Sheldon Creek Developments

Servicing Brief

40-60 Emma Street, Grand Valley

Kim Pilon, P.Eng.
10-2-2023
Moorefield Excavating

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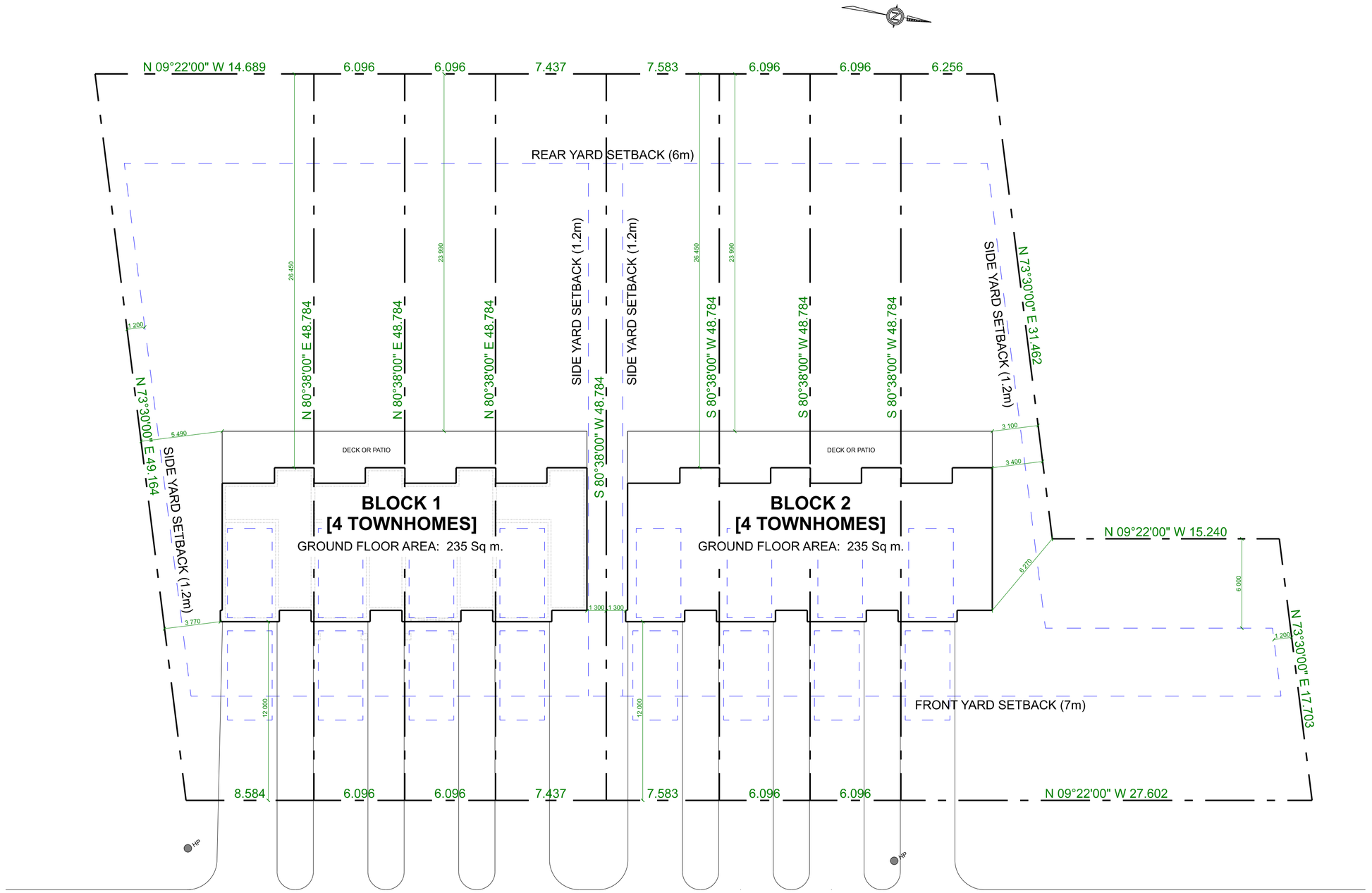
1.0 Introduction

Sheldon Creek Developments is proposing to develop the vacant lands known as 40, 50 and 60 Emma Street in the Town of Grand valley in Dufferin County. To support this development, Moorefield Excavating has prepared this servicing brief to review the required servicing for the proposed residential development of the existing undeveloped parcel. See **Figure 1.1** overleaf for the proposed site plan.

This report will demonstrate the proposed site can be developed while meeting the design criteria of the Town of Grand Valley (Town), Dufferin County (County) and the Grand River Conservation Authority (GRCA).

Moorefield Excavating reviewed the Town's design standards as well MECP's updated Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains for Alterations Authorized under Environmental Compliance Approval Document (MECP Design Criteria). Further preliminary consultation was completed with the respective approval authorities.

The client also completed a geotechnical investigation of the site and slope stability study which also influenced this report.



SITE PLAN OPTION 3

SCALE: 1:200

AREA SCHEDULE (PER BLOCK)
LEVEL ONE AREA: 233 Sq m.
LEVEL TWO AREA: 235 Sq m.
LEVEL THREE AREA: 304 Sq m.
TOTAL AREA: 771 Sq m.

TOTAL USABLE FLOOR AREA (BOTH BLOCKS): 1528 Sq m.
TOTAL LOT AREA: 3212 Sq m.
FLOOR SPACE INDEX: 0.48

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TOWNHOME

SHELDON CREEK DEVELOPMENTS
50 EMMA STREET
GRAND VALLEY

SITE PLAN

PROJECT NO: 22-102
STARTING DATE: Aug 16, 2022
LAST REVISION DATE: Sep 21, 2023
DRAWN BY: JF

SCALE: As Noted

A1

2.0 Property Description

The subject property located at 40-60 Emma Street is 0.32 ha and exists in a vegetated undisturbed state. The site fronts Emma Street on the east, neighbours a Hydro One Site to the north as well as an industrial building to the south. To the west exists established single family dwellings.

The original site ground profile has a steep gradient towards Emma. The existing residential properties to the west sheet flow towards this development.

The Grand River is located approximately 110m east of the site. The southeast corner of the site is considered part of the floodplain on GRCA mapping, however based on the survey completed the site is out of the floodplan. However, the entirety of the site is within the GRCA's regulated area due to the steep slope on the property. The GRCA has provided the Regulatory Flood Elevation (RFE) for the property as 455.39 CGVD28. This has been mapped on the drawings as part of this submission.

The proposed development will consist of 8 street townhomes separated into 2 - 4 row townhomes. Each lot will be serviced by its own driveway. The development is proposed as slab on grade at the front and a walkout second storey at the back of the building in order to accommodate the grade change on the property.

The Town specifies a density of 4.0 persons/ unit.

8 units * 4.0 persons/unit = 32 persons will be used in determining servicing requirements throughout this report.

3.0 Existing Site Services

The following is a general description of the existing municipal services available at the perimeter of the property.

3.1 Roadways

3.1.1 Emma Street

Emma Street intersects with Mill Street West to the north of the proposed development and William Street to the South. It has been constructed to a semi urban standard with asphalt curb along the west and a combination of barrier curb and ditches along the east.

3.1.2 Water Service

This street is serviced with a 300mm diameter watermain on the east side of the street. A hydrant exists across the street from the proposed development. 3 services exist presently and are terminated at property line as shown on the plans.

3.2 Storm Servicing

Storm sewers currently do not exist on Emma Street between Mill Street West and William Street. It is serviced by a combination of ditches, ditch inlet with culvert outlet and culverts which discharge to the William Street storm sewer.

The William Street storm sewer was upgraded in 2013-2014 to accommodate new development lands on the east end of Town. The storm sewer was designed with the existing residential areas in mind; a runoff coefficient of 0.5 was used for the existing residential area. The design report by Gamsby and Mannerow (Design Brief, William Street Storm Outlet, Grand Valley, Revised, August 2011) indicates a review of the storm sewer for both the 5 year and 100 year storm. The trunk sewer is 1500mm upstream from the William and Emma Street intersection and a 1220mm x 1920 mm horizontal elliptical concrete pipe (1500mm equivalent) downstream of the intersection to the outlet at the Grand River.

3.3 Sanitary Servicing

A 200mm sanitary sewers exists on Emma terminating roughly 20m north of the south property line of the proposed development.

4.0 Proposed Development Servicing

The following is a general description of the municipal services necessary to support the proposed development.

4.1 Emma Street

In consultation with the Town, upgrades to the west side of Emma street will be required including concrete barrier curb (OPSD 600.040), 4m wide asphalt lane and 1.5m wide concrete sidewalk situated 1m off of the property line.

4.2 Water Servicing

Individual water services will be provided to each unit and connected to the existing watermain. The existing services will be utilized and 5 additional services will be installed perpendicular to the main. The Town has requested that the services not be located in the driveways.

Water demands were calculated for the 8 units based on the Town's design criteria. An average daily water demand of 450L/capita/day was used.

Average Day:

$$Q_{max} = \frac{QP}{86400} \text{ where } Q = 450 \text{ L/cap/day and } P = 32$$

$$= 0.16 \text{ L/s}$$

Max Day:

$$Q_{max} = \frac{QP \times 2.75}{86400} \text{ where } Q = 450 \text{ L/cap/day and } P = 32$$

$$= 0.45 \text{ L/s}$$

Peak Hour Flow:

$$Q_{ph} = \frac{QP \times 3.97}{86400}$$

$$= 0.66 \text{ L/s}$$

4.2.1 Fire Underwriters Survey

To assess the fire flow requirements for the proposed site the Fire Underwriters Survey (FUS) has been referenced. It should be noted that specific building details were not available at the time of preparation for this report. Therefore, a conservative estimate for the building materials, fire separations, and contents was assumed, based on experience.

A fire flow demand analysis was completed for a single unit and 4-plex structure. The buildings were assumed to be of ordinary wood-frame, brick and metal siding exterior construction. The floor area used in the analysis assumes that there are rated fire walls subdividing units. The contents of the buildings are considered limited combustible, as defined in the FUS guidelines, consisting of normal low-risk residential occupancy. It has been assumed that there will be no sprinkler systems installed. The exposure charges are based on separation distances from adjacent buildings. Based on the above criteria, the fire flow demands were calculated as shown in the table below using the FUS method.

Structure Type	Fire Flow (L/s)	Storage Requirements (for 2 hours) (m^3)
Townhouse – Interior Unit	117	840
Townhouse – four Units Together	200	1440

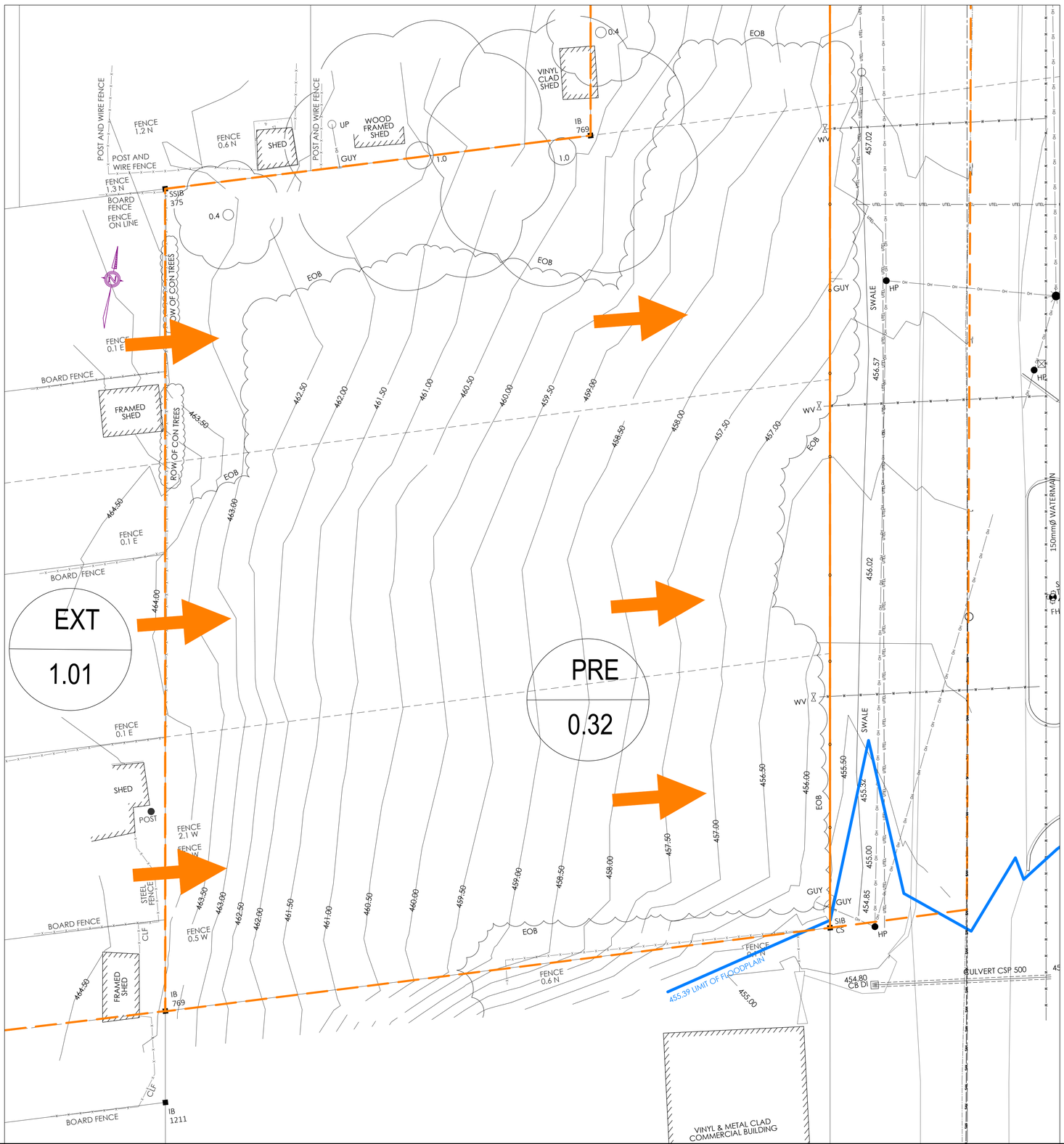
Detailed fire flow calculations can be found in **Appendix B.** It should be noted that the FUS requirements are quite conservative in nature.

Design flow is defined as the maximum daily demand plus fire flow or peak demand flow, whichever is greater. The calculated design flow is 118L/s with 2 hour storage requirements of 840m^3.

The existing 300mm diameter municipally designed watermain should be able to service this development without further improvements. 25mm diameter water services are recommended due to the length of service required.

4.3 Storm Servicing

Existing stormwater conditions and associated catchment areas are shown on plan PRE-1, Storm Drainage Plan, Pre Development Conditions overleaf – **Figure 4.1.** The vacant land generally sheet flows to the East and is captured by a ditch inlet structure at the southeast corner of the property out letting through a culvert



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IS	RE	DATE	DESCRIPTION

PROJECT NO: 231-103
DATE: SEPTEMBER 2023
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DESIGNED BY: K.PILON
DRAWN BY: K.PILON
CHECKED BY:

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TITLE:
STORM DRAINAGE PLAN, PRE-DEVELOPMENT CONDITIONS 40 EMMA STREET GRANDVALLEY

SHEET NUMBER: PRE-1

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to the east side of the road and into a road side ditch. Ultimately out letting into the William Street Storm Sewer.

The MECP's Design Criteria (2022) was used for the basis of the design of the proposed stormwater management system. Further, the Town's design standards were followed along with requirements from the GRCA.

The proposed development includes a storm sewer system designed for the post development 100 year flows. A preliminary grading and drainage plan as well as a servicing drawing can be found in **Appendix A** with further details. The storm sewer design sheet can be found in **Appendix C**. Pipe sizes and slopes are based on the SWMPD manual and the Town's requirements. Proposed stormwater conditions and associated catchment areas are shown on plan POST-1, Storm Drainage Plan, Post Development Conditions overleaf – **Figure 4.2**.

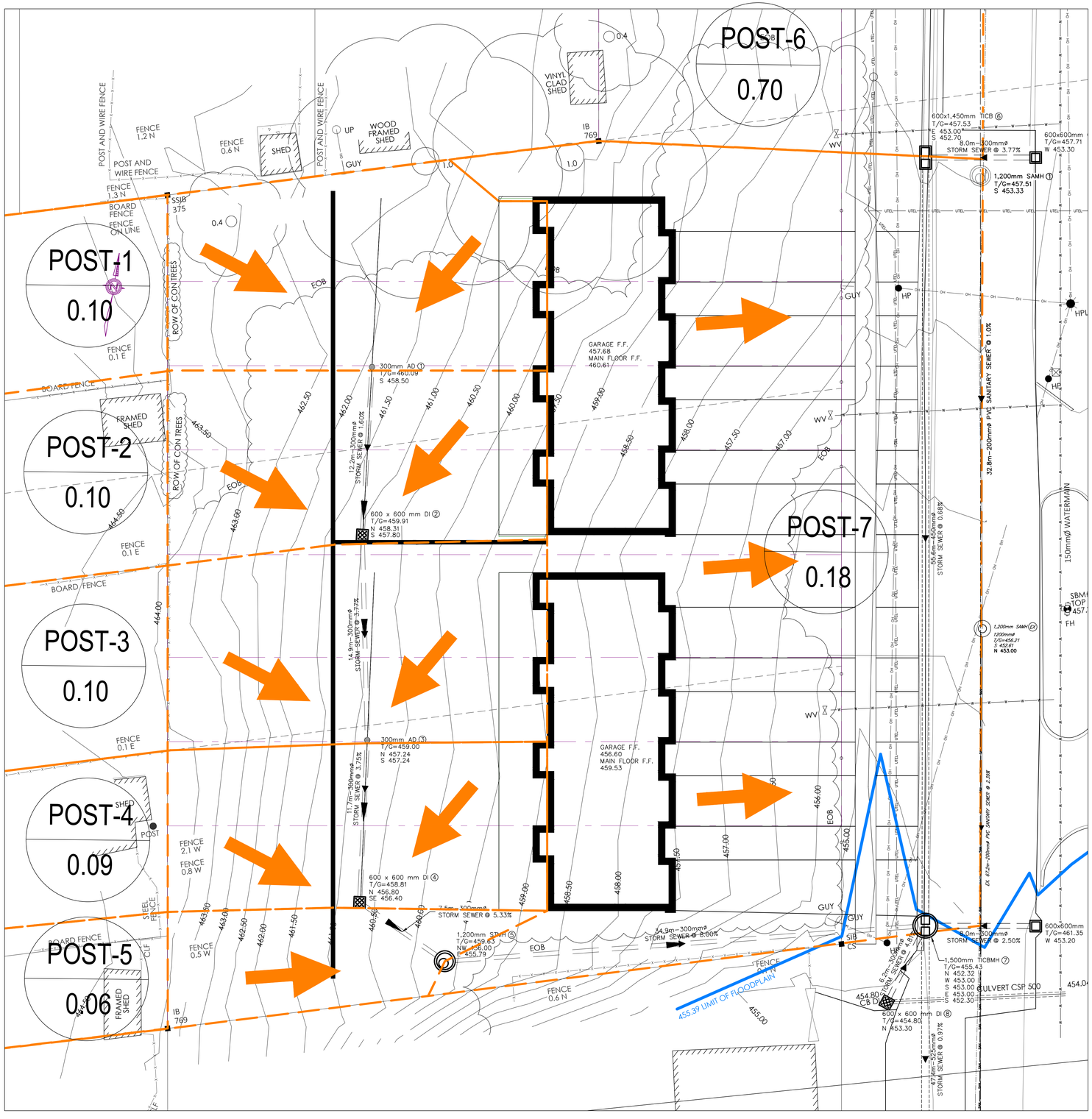
The overall catchment area was assessed and pre to post-development flows were reviewed for the 5 and 100 year storm:

	5 Year (L/s)	100 Year (L/s)
Pre-development	187.07	311.17
Post-development	214.11	360.56

The existing storm sewer capacity was reviewed as presented in **Appendix C**. This was completed on a local level and compared to the design report by Gamsby and Mannerow Limited, Design Brief, William Street Storm Outlet, Grand Valley, Revised, August 2011. The 2011 Design Brief considers the entire catchment area to be developed using a runoff coefficient of 0.5. This coefficient was also used in the calculations throughout this report for the development area. As the storm sewer was designed for the 100 year conveyance of the flows to the Grand River no quantity control is being recommended. This also allows for flows to enter and leave the system before receiving peak flows from upstream developments.

4.3.1.1 Overland Flows

During regional storm events, stormwater runoff will exceed the storm sewer capacity. Flows will be directed through the swales and along the south property line to the road. Ultimately heading down Emma to William Street and into the Grand River utilizing the existing storm overflow designed for the upstream development lands on the east end of Town.



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STORM DRAINAGE PLAN, POST-DEVELOPMENT CONDITIONS 40 EMMA STREET GRANDVALLEY

SHEET NUMBER: POST-1

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4.3.2 Quality Control

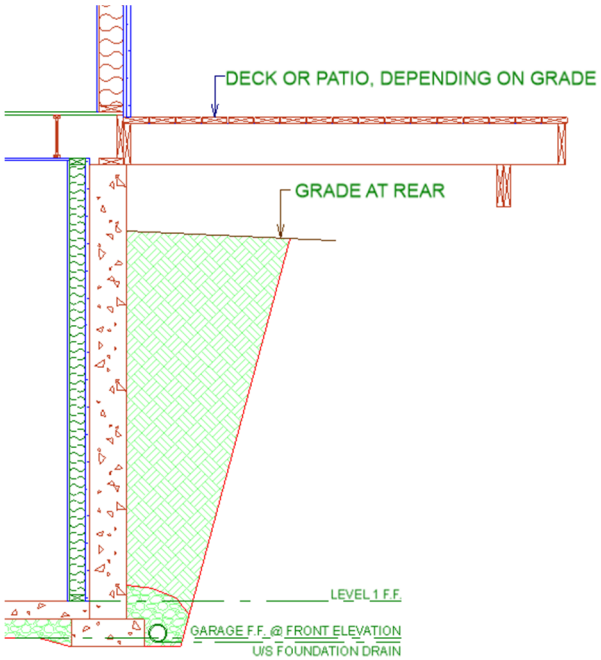
The majority of the discharge from this site is considered clean runoff, minor sediment/salt could be expected from the driveways on the lots. This water will be directed to Emma Street and into the storm sewers. All catchbasins and manholes within the right of way will be provided with minimum 600 mm sump. This will assist in removing a portion of the sediment contained in the runoff from the street. Catchbasins could be fitted with catchbasin shields and sump depths increased to a maximum of 1.2m in order to improve sediment collection.

Grassed drainage swales are proposed to be constructed along the west and south property line. These swales will provide for drainage of the grassed areas and some rooftop runoff.

4.3.3 Storm Services

Storm services will be required for the units. 150mm services will be provided for each unit and will drain by gravity to the storm system. The hydraulic grade line was not reviewed as the lowest foundation drain elevation (~456.35) is projected to be approximately 3.2m above the obvert of the 450mm storm sewer in the right of way (453.15) at it's highest point.

Figure 4.3 – Foundation Drain



4.3.4 Erosion & Sedimentation Control During Construction

The following are details regarding the erosion and sediment control measures to be implemented during construction. Details can be found on ESC-1, Sediment and Erosion Control plan in **Appendix A**:

- Placement of siltation fences in all areas where surface drainage flows over disturbed areas. Siltation fence shall remain erect until construction is completed, and the upstream area is fully re-vegetated;
- Placement of temporary straw check dams within swales and any other locations where a concentrated flow of runoff may occur. All proposed drainage swales are to be seeded during construction;
- A mud mat will be placed at the site access to keep public roadways free from debris during the construction period.

Once the ground surface of the site has been stabilized, the straw bale check dams and siltation fences can then be removed. Before final acceptance of the site, storm structures shall be cleaned to remove all silt and the storm sewers shall be flushed.

During the construction phase, it is important to ensure that erosion/sediment controls are in place to ensure limited transport of sediment into the existing downstream drainage ditches.

4.4 Sanitary Servicing

Design flow calculations were completed in accordance with the Town's Engineering Standards. A peak flow for the proposed development was calculated as follows:

Qp (Peak Flow) = $\frac{MQP}{86.4} + IA$

Where:
- Q = 450 L/cap/day
- M = Peak Flow Factor "Harmon"
  - = $1 + \frac{14}{4 + P^{0.5}} = 2.45$
- P = Population/1000 = 0.032
- I = 0.20 L/ha. (extraneous flow)
- A = Area (site) = (0.32 ha.)

Therefore, Qp = $\frac{2.45 \times 450 \times 0.032}{86.4} + (0.20 \times 0.32)$

= 0.41 + 0.06

= 0.47 L/s

Servicing of the units/lots will be as per the Town's design standards with individual 125mm diameter services perpendicular to the main.

The existing sanitary sewer will be extended with a 200mm sewer at 1% to accept the proposed services perpendicular to the main. The sewer will be constructed to prevent infiltration into the sanitary system including manufactured boots and waterproofing of the manhole.

A 200mm diameter PVC sewer at minimum 1.0% grade reaches a full flow velocity of 1.04m/s which exceeds the ministry's requirement of 0.6m/s and provides for the required flows from the development.

5.0 Conclusions and Recommendations

Based on the foregoing, the following is concluded regarding the proposed multi-residential development.

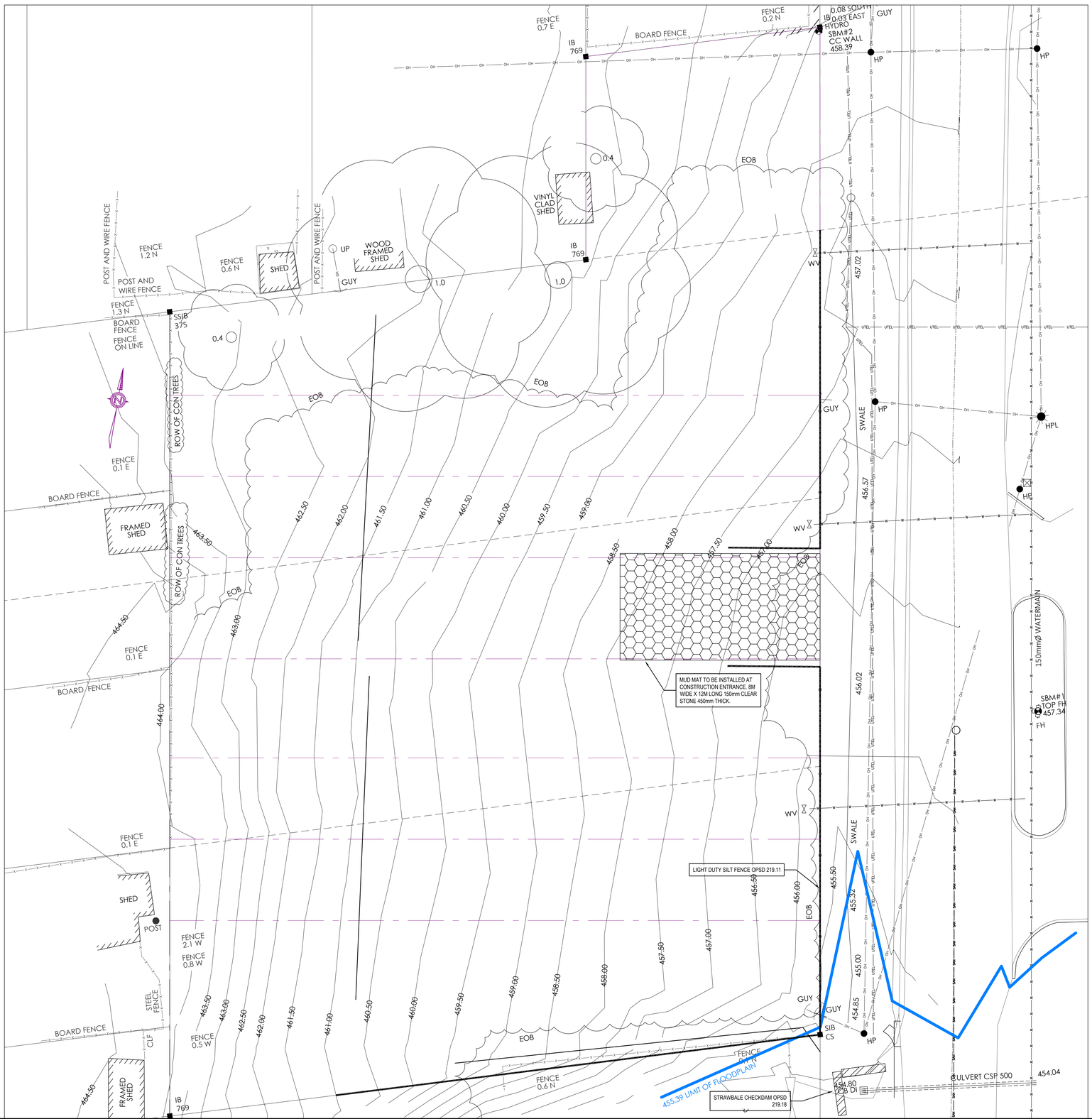
1. Existing public roadway access is available to the site, subject to necessary improvements to the Town's standards and approval.
2. Storm Water will be directed to the new sewers in the right of way, quantity control is not recommended. A gravity storm service will be provided to each unit.
3. Sanitary sewer will be extended in order to provide individual services to each unit perpendicular to the sanitary main.
4. Domestic water services will be provided to each unit, existing services will be utilized where possible.

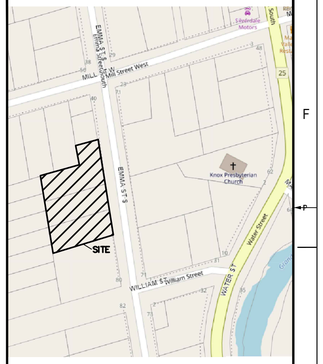
Respectfully submitted,

Kim Pilon, P. Eng.
Civil Engineer

APPENDIX A

Preliminary Servicing and Grading Plans





BENCHMARK TOP OF FIRE HYDRANT 457.34 AND CONCRETE RETAINING WALL NORTHEAST CORNER OF SITE 458.39 AS SHOWN ON THE PLANS.

SEAL:

LICENSED PROFESSIONAL ENGINEER
K. PILON
100174821
Oct 6 '23
PROVINCE OF ONTARIO

MOOREFIELD excavating
BUILDS · SERVICES · WATER MAINS

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CHECKED BY:	

TITLE:

EROSION AND SEDIMENT CONTROL
40 EMMA STREET
GRANDVALLEY

SHEET NUMBER: ESC-1

NOTES:

1. PROPERTY BOUNDARY DERIVED IN PARTS FROM INFORMATION SHOWN ON R PLAN LT 13-15 PL 33A (31972-22) (UTM2010) PROVIDED BY VAN HARTEN SURVEYING INC (PROJECT 31972-22
2. SURVEY COMPLETED BY VAN HARTEN SURVEYING INC AND MOOREFIELD EXCAVATING INC
3. BENCHMARK TOP OF FIRE HYDRANT 457.34 AND CONCRETE RETAINING WALL NORTH OF SITE 458.39 AS SHOWN ON THE PLANS.
4. MIN F.F. 455.39 CGVD 28 (DRY LAND ACCESS) PER GRCA
5. ALL STORM CATCHBASINS TO HAVE A MINIMUM SUMP OF 600mm AND ALL STORM MAINTENANCE HOLES TO HAVE A MINIMUM SUMP OF 300mm.
6. FIELD LOCATES OF ALL UNDERGROUND UTILITIES INCLUDING BUT NOT LIMITED TO; UNDERGROUND GAS, HYDRO, TELEPHONE, AND CABLE TELEVISION SHALL BE ARRANGED PRIOR TO CONSTRUCTION AND IS THEREFORE RESPONSIBILITY OF THE CONTRACTOR.
7. THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNTIL STAMPED 'ISSUED FOR CONSTRUCTION'.
8. ALL CONSTRUCTION SHALL BE COMPLETED IN ACCORDANCE WITH THE TOWN OF GRAND VALLEY ENGINEERING STANDARDS.
9. PLACEMENT OF SILTATION FENCES IN ALL AREAS WHERE SURFACE DRAINAGE FLOWS OVER DISTURBED AREAS. SILTATION FENCE SHALL REMAIN ERECT UNTIL CONSTRUCTION IS COMPLETED AND THE UPSTREAM AREA IS FULLY RE-VEGETATED.
10. PLACEMENT OF TEMPORARY STRAW CHECK DAMS WITHIN SWALES AND ANY OTHER LOCATIONS WHERE A CONCENTRATED FLOW OF RUNOFF MAY OCCUR. ALL PROPOSED DRAINAGE SWALES ARE TO BE SEEDED DURING CONSTRUCTION;
11. INSTALLATION OF FILTER CLOTH UNDER ALL NEW AND EXISTING CATCHBASIN GRATES UNTIL PAVING OF THE SITE STREETS ARE COMPLETED;
12. MUD MATS WILL BE PLACED AT CONSTRUCTION ACCESSES TO KEEP PUBLIC ROADWAYS FREE FROM DEBRIS DURING THE CONSTRUCTION PERIOD.

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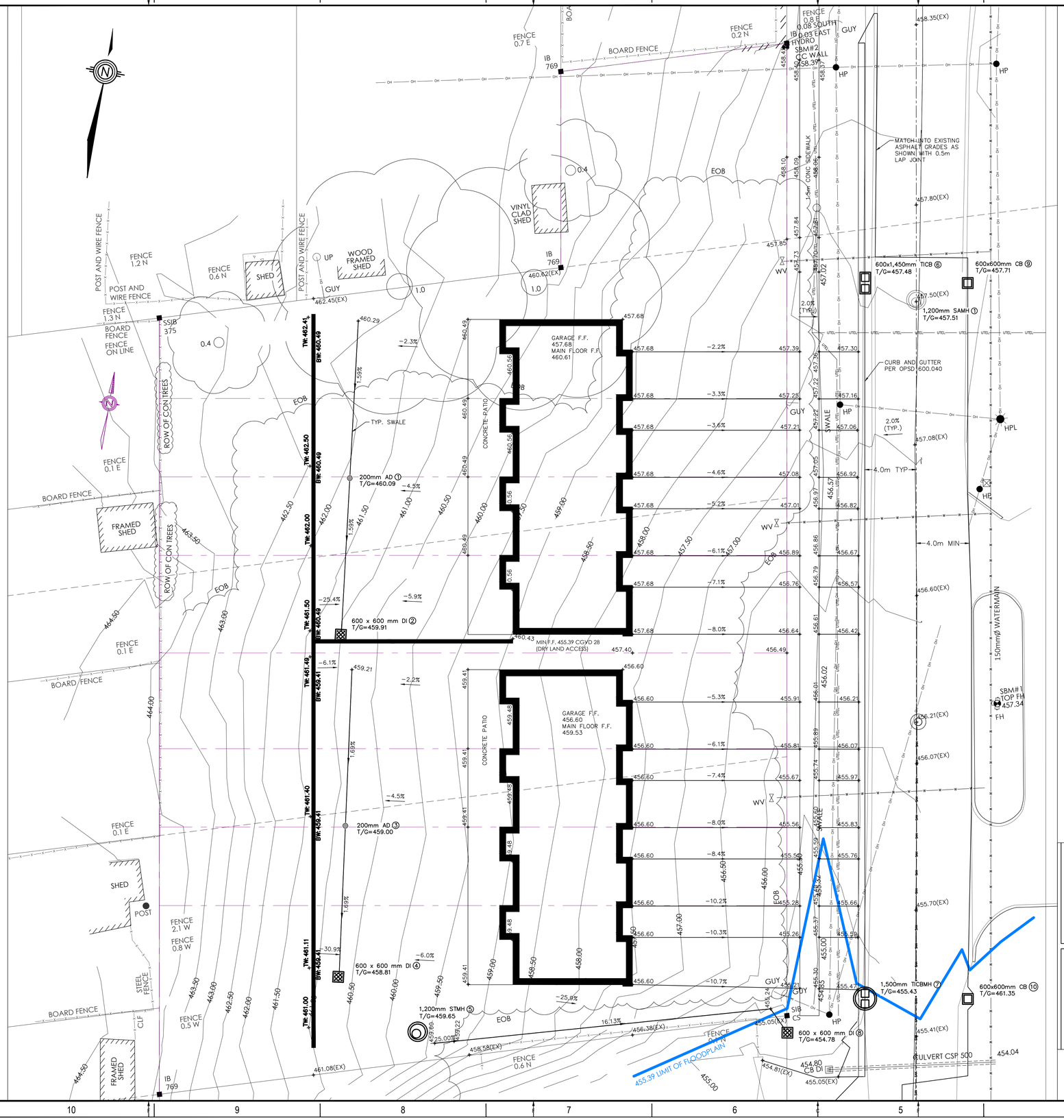
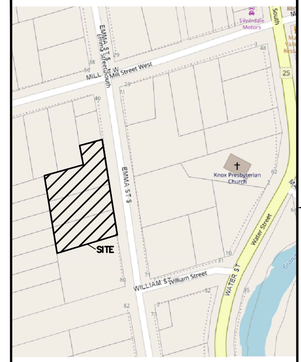
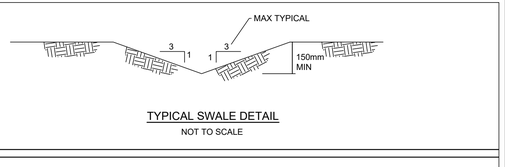
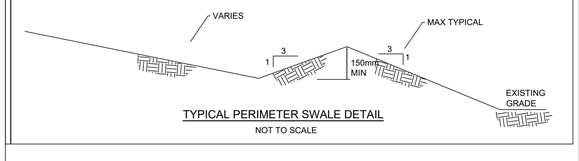






TYPICAL SWALE DETAIL
NOT TO SCALE



TYPICAL PERIMETER SWALE DETAIL
NOT TO SCALE

BENCHMARK TOP OF FIRE HYDRANT 457.34 AND CONCRETE RETAINING WALL NORTHEAST CORNER OF SITE 458.39 AS SHOWN ON THE PLANS.

SEAL:

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Oct 6 23
PROVINCE OF ONTARIO

MOOREFIELD excavating
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DRAWN BY: K.PILON	
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TITLE:

GRADING PLAN
40 EMMA STREET
GRANDVALLEY

SHEET NUMBER: GRAD-1

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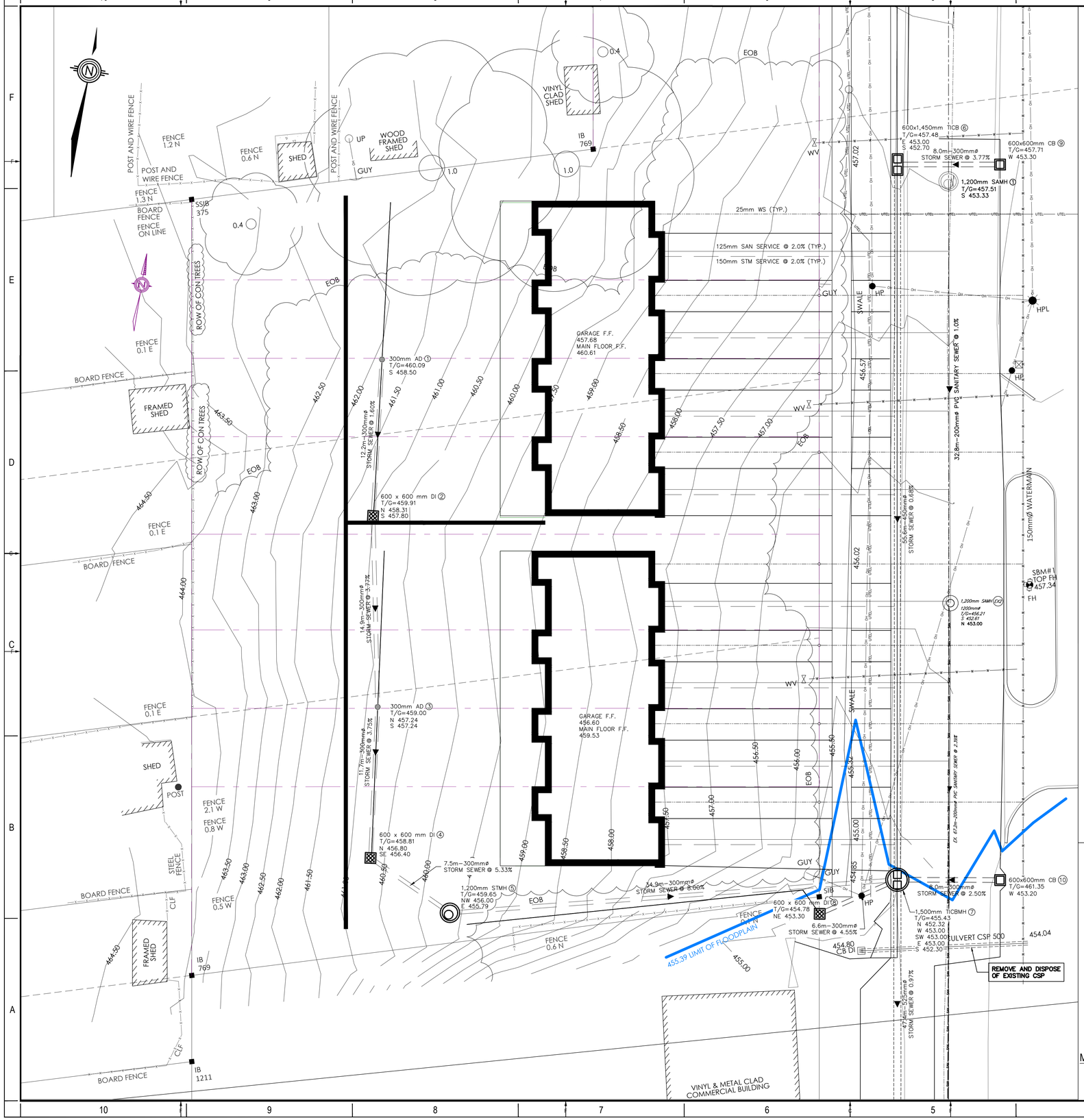


GENERAL NOTES:

GENERAL - CONSTRUCTION

1. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH TOWN OF GRAND VALLEY ENGINEERING STANDARDS, OPSS AND OPSD. WHERE CONFLICT OCCURS, TOWN STANDARDS GOVERN.

2. DEWATERING TO BE CARRIED OUT IN ACCORDANCE WITH OPSS 517 AND 518 TO MAINTAIN ALL TRENCHES IN A DRY CONDITION.

3. ALL ENGINE DRIVEN PUMPS TO BE ADEQUATELY SILENCED, SUITABLE FOR OPERATION IN A RESIDENTIAL AREA.

4. DISTURBED AREAS TO BE REINSTATED TO EXISTING CONDITION. BOULEVARD AND GRASS AREAS; 200mm SCREENED TOPSOIL AND SOD; FOR ENTRANCES 40mm HL4 OVER 150mm GRAN. 'A' MINIMUM AND 450mm GRAN 'B' GRANULAR BASE. ALL TO BE APPROVED BY THE ENGINEER.

5. ALL MAINTENANCE HOLE FRAMES AND COVERS TO BE INITIALLY SET TO BASE COURSE HL4 ASPHALT ELEVATION AND ULTIMATELY RAISED BY ADDING PRECAST CONCRETE ADJUSTMENT UNITS OR POLYETHYLENE UNITS PRIOR TO PLACING SURFACE COURSE HL3 ASPHALT. MIN 150mm AND MAX 300mm ADJUSTMENT ALLOWED.

6. CONTRACTOR IS RESPONSIBLE TO NOTIFY ALL UTILITY COMPANIES AND RECEIVE LOCATES PRIOR TO COMMENCING WORK AND COORDINATE CONSTRUCTION ACCORDINGLY.

7. TOPSOIL TO BE REMOVED TO ITS FULL DEPTH ALONG ENTIRE WIDTH OF ROAD ALLOWANCE.

8. HYDRO AUTHORITY TO MODIFY GUY WIRES TO ACCOMMODATE SIDEWALK.

9. HYDRO POLES TO BE 'HELD' BY HYDRO AUTHORITY DURING EXCAVATION WORK IF WITHIN SAFE TRENCH.

ROADWAYS

1. CONCRETE CURB AND GUTTER TO OPSD 600.040.

2. CURB AND GUTTER TERMINATION TO OPSD 608.010.

3. CURB AND GUTTER CONSTRUCTION SHALL CONFORM TO OPSS 353.

4. 150Ø PIPE SUBDRAINS C/W FILTER "SOCK" SHALL BE INSTALLED UNDER ALL CURB AND GUTTER IN A 300x300mm TRENCH BELOW SUBGRADE IN GRANULAR 'A' BEDDING AND CONNECTED TO NEAREST CB OR CBMH WITH 2m SOLID 150Ø PIPE. ALL SUBDRAINS TO BE INSTALLED AS PER OPSS.PROV 405. WHERE CURB AND GUTTER IS NOT REQUIRED 6m OF SUBDRAIN TO BE INSTALLED UPSTREAM AND DOWNSTREAM OF STORM STRUCTURES.

5. SUBGRADE AND TRENCHES TO BE COMPACTED TO 95% SPDD COMPACTION AS PER OPSS 401 & 402.

6. GRANULAR 'A' AND 'B' MATERIALS TO BE COMPACTED TO 100% SPDD, AS PER OPSS 501.

7. BOULEVARD COMPACTION TO 95% SPDD. MINIMUM 200mm SCREENED TOPSOIL AND SOD IN RESTORED AREAS.

8. ROADWAY SUBGRADE TO BE PROOF ROLLED AND COMPACTED TO 95% SPDD PER GEOTECHNICAL REPORT RECOMMENDATIONS.

9. PAVEMENT ON ROADS TO BE HOT MIX HL4 (50mm) BASE AND HL3 (40mm) OVER 150mm GRAN. 'A' MINIMUM AND 450mm GRAN 'B' GRANULAR BASE.

10. SIDEWALK 1.5m WIDE, 125mm THICK, CONCRETE SIDEWALK ON MINIMUM 100mm DEPTH GR ANULAR 'A' BASE. AT ENTRANCES 150mm THICK GRANULAR BASE REQUIRED AND 150mm CONCRETE. ALL IN ACCORDANCE WITH OPSS 351. SIDEWALK RAMPS TO BE PROVIDED AT ALL INTERSECTIONS AND ROAD CROSSINGS IN ACCORDANCE WITH OPSD 310.033.

11. DRIVEWAYS TO BE CONSTRUCTED WITH MINIMUM 200mm GRANULAR A AND 50mm HL4 ASPHALT

SANITARY SEWERS AND SERVICES

1. MAINTENANCE HOLES TO OPSS 407 & OPSD 701.01 (1200mmØ). SET AS PER OPSD 704.010. (BENCHED AS PER OPSD 701.021).

2. SEWERMAINS SHALL BE PVC SDR 35 AT A MINIMUM DEPTH OF 2.4m.

3. FRAMES AND COVERS TO BE OPSD 401.010 (TYPE A).

4. SERVICE CONNECTIONS TO BE GREEN 125mm PVC SDR28 WITH BELL AND SPIGOT JOINTS USING ELASTOMERIC GASKETS @ 2% min AND 8% MAX. RESIDENTIAL CONNECTIONS SHALL TERMINATE AT PROPERTY LINE WITH A TEST FITTING, PLUG SUITABLY BRACED TO WITHSTAND TEST PRESSURES AND 89mm X 38mm MARKER PLACED FROM THE INVERT OF THE CONNECTION TO 600mm ABOVE GRADE PAINTED GREEN.

5. SERVICE CONNECTIONS TO OPSD 1006.010 CLEANOUTS AT PROPERTY LINE.

6. BEDDING FOR SEWERS SHALL BE AS PER OPSD 802.01. BEDDING MATERIAL FOR SANITARY SEWER AND SERVICES SHALL BE GRANULAR 'A' AND OPSD 806.040.

7. BACKFILL AS PER OPSS 401 & 402 USING APPROVED IMPORTED GRANULAR MATERIAL.

8. INSTALLATION AND TESTING TO BE AS PER OPSS 410.

9. FROST STRAPS, TWO (2), REQUIRED BETWEEN EACH SECTION OF THE SANITARY MANHOLE FROM THE TOP SECTION DOWN TO AT LEAST 2.5M.

10. MAINTENANCE HOLES TO BE EXTERNALLY WRAPPED WITH WATERPROOF MEMBRANE AROUND ALL PRECAST JOINTS INCLUDING JOINTS BELOW THE MAINTENANCE HOLE FRAME AND COVER WITH A MINIMUM 300MM WIDE STRAP.

STORM SEWERS

1. CONSTRUCTION OF MANHOLES, CATCH BASINS DITCH INLETS TO BE AS PER OPSS 407, STRUCTURES PER OPSD 701.010 (1200mmØ), 701.011 (1500mmØ), 701.012 (1800mmØ), 705.01 (600X600 CB), 705.02 (600X1450 DCB), 705.03 (600X600 DI). SET AS PER OPSD 704.010. BENCHED AS PER OPSD 701.021 FOR PIPES GREATER THAN 450mm.

2. MANHOLE FRAMES AND COVERS TO OPSD 401.010 (TYPE B) & 704.010.

3. CATCHBASIN AND CATCHBASIN MH FRAME AND GRATES TO OPSD 400.11 DITCH INLETS TO OPSD 403.01 & 704.010.

4. STORM SEWER CONSTRUCTION AS PER OPSS 410 & BACKFILL PER OPSS 401 & 402.

5. BEDDING FOR SEWERS SHALL BE AS PER OPSD 802.01, 802. 050, 802.051, or 802.052 AS APPLICABLE. BEDDING MATERIAL FOR SANITARY SEWER AND SERVICES SHALL BE GRANULAR 'A' AND OPSD 806.040, 807.010 OR 807.030 AS APPLICABLE

6. BACKFILL, WITH APPROVED IMPORTED GRANULAR MATERIAL AS PER OPSS 401 & 402.

7. FOR ALL STRUCTURES 600mm SUMPS TO BE CONSTRUCTED UNLESS ANY ONE PIPE IS GREATER THAN 450mm; BENCHING SHALL THEN BE REQUIRED PER OPSD 701.021. REAR YARD STRUCTURES SHALL BE SUMPLESS.

8. 600mm Ø OR LESS SEWERMAINS SHALL BE HDPE AT A MINIMUM DEPTH OF 1.2m. GREATER THAN 600mm Ø SEWERMAINS SHALL BE CONCRETE - CSA A257.2 CL 65D. REAR YARD PIPE SHALL BE CONCRETE.

9. SERVICE CONNECTIONS TO BE WHITE 150mm PVC SDR28 @ 1% MINIMUM GRADE AT A MINIMUM DEPTH OF 1.2m. SERVICES TO BE LOCATED AS INDICATED ON THE DRAWING COMPLETE WITH PLUG SUITABLY BRACED TO WITHSTAND TEST PRESSURES AND 89mmX38mm MARKER PAINTED WHITE PLACED FROM THE INVERT TO 600mm ABOVE FINISHED GRADE PER OPSD 1006.010 OR 1006.020 AS APPLICABLE.

10. CATCHBASIN CONNECTIONS SHALL BE PER OPSD 708.010, 708.020 AND/OR 708.030 AS APPLICABLE.

11. ROOF DRAINS SHALL BE DIRECTED TO REAR YARD SWALES WHERE POSSIBLE. OTHERS SHALL BE DIRECTED OVERLAND WITH SPLASH PAD DIRECTED TO THE ROAD.

12. SWALES TO HAVE MINIMUM DEPTH OF 150mm AND MAX 3:1 SIDE SLOPES.

13. INSULATE CATCHBASIN LEADS AND SERVICES IF MINIMUM COVER OF 1.2M IS NOT ACHIEVED. INSULATION DETAIL ON THIS PAGE.

14. WHERE WATERMAIN IS ADJACENT TO STORM STRUCTURES, INSULATE SIDE OF STRUCTURE AS PER DETAIL.

WATERMAIN AND WATER SERVICES

1. USE GRANULAR 'A' BEDDING AND COVER MATERIAL AS PER OPSD - 802.010 AND 806.040. BACKFILL TO BE APPROVED IMPORTED GRANULAR MATERIAL TO OPSS 401 AND 402.

2. SERVICE CONNECTIONS TO BE 25mm MUNICPEX SERIES 200 POLYETHYLENE - 200 PSI RATED PIPE. SERVICES SHALL BE TERMINATED WITH TEMPORARY PLASTIC BLOW-OFF PIPES AND MARKED AT PROPERTY LINE AS PER OPSD 1104.010. AND SHALL BE SUITABLY BRACED TO WITHSTAND TEST PRESSURES AND 89mmX38mm MARKER PLACED FROM THE INVERT TO 600mm ABOVE FINISHED GRADE PAINTED BLUE.

3. WATERMAIN SERVICES TO BE INSTALLED AS PER OPSS 441. MINIMUM SEPARATION FROM SANITARY SERVICES TO BE 500mm IN ACCORDANCE WITH THE O.B.C. MINIMUM COVER OF 2.0M

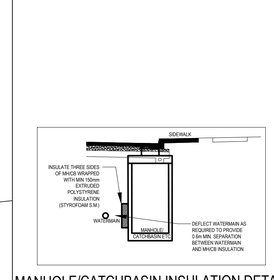
4. ALL CHEMICALS AND MATERIALS USED IN THE ALTERATION OR OPERATION OF THE DRINKING WATER SYSTEM THAT COME INTO CONTACT WITH WATER WITHIN THE SYSTEM SHALL MEET ALL APPLICABLE STANDARDS SET BY BOTH THE AMERICAN WATER WORKS ASSOCIATION ('AWWA') AND THE AMERICAN NATIONAL STANDARDS INSTITUTE ('ANSI') SAFETY CRITERIA STANDARDS NSF/60, NSF/61 AND NSF/372.

5. SERVICE SADDLES (ROBAR S.S. 2616 DOUBLE BOLD, WIDE STRAP) WITH TAPPING SADDLE (ROBAR 6906)

6. CURB STOPS (MUELLER B25209) WITH STAINLESS STEEL ROD AND PINS

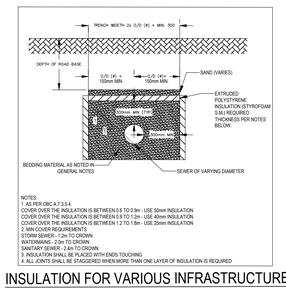
7. MINIMUM VERTICAL CLEARANCE BETWEEN SEWERS AND WATERMAIN TO BE 0.5M. MINIMUM HORIZONTAL CLEARANCE TO BE 2.5M. SEWERS INCLUDE SANITARY SEWERS, STORM SEWERS AND ASSOCIATED SERVICES OR APPURTENANCES (MANHOLES, CATCHBASINS ETC).

8. 75mm PVC SLEEVE TO BE PROVIDED FOR CURB STOP IN DRIVEWAYS, MAXIMUM 300mm IN LENGTH.



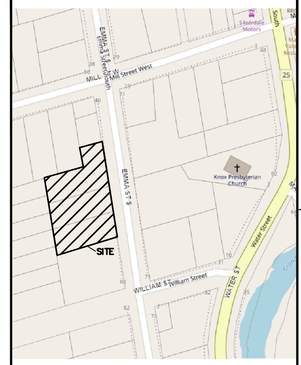
MANHOLE/CATCHBASIN INSULATION DETAIL

N.T.S.



INSULATION FOR VARIOUS INFRASTRUCTURE

N.T.S.



SEAL:

LICENSED PROFESSIONAL ENGINEER
K. PILON
100174821
Oct 6 '23
PROVINCE OF ONTARIO

MOOREFIELD excavating
ROADS · SEWERS · WATER MAINS
6297 WELLINGTON COUNTY ROAD RR#3
HARRISTON, ONTARIO
CANADA N0G 1Z0
PHONE: 519-510-3571 FAX: 519-510-3277
WWW.MOOREFIELDEX.CA

ISSUED FOR - REVISION:

IS	RE	DATE	DESCRIPTION
1	0	10-05-2023	ZBA OPA SUBMISSION

PROJECT NO: DATE:

ORIGINAL SCALE:

DESIGNED BY:

DRAWN BY:

CHECKED BY:

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SHEET NUMBER:

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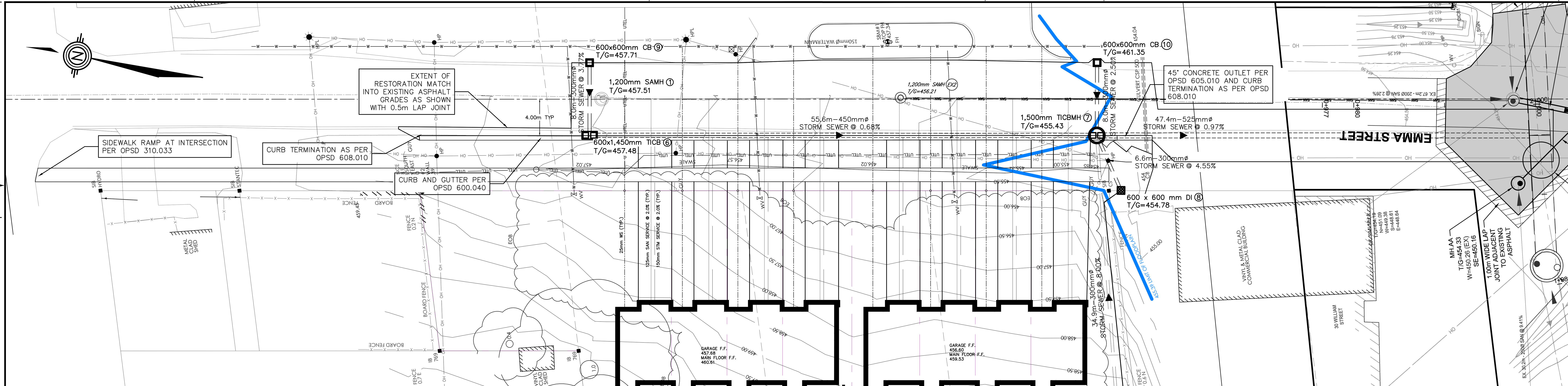
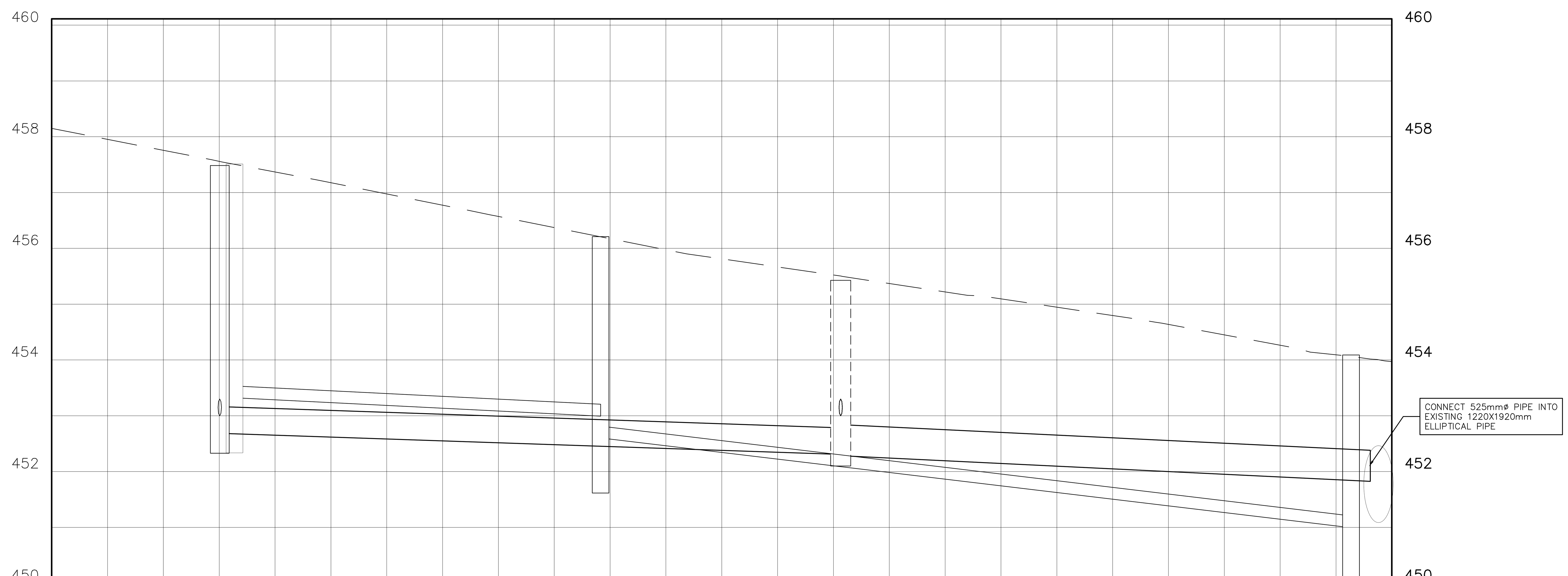
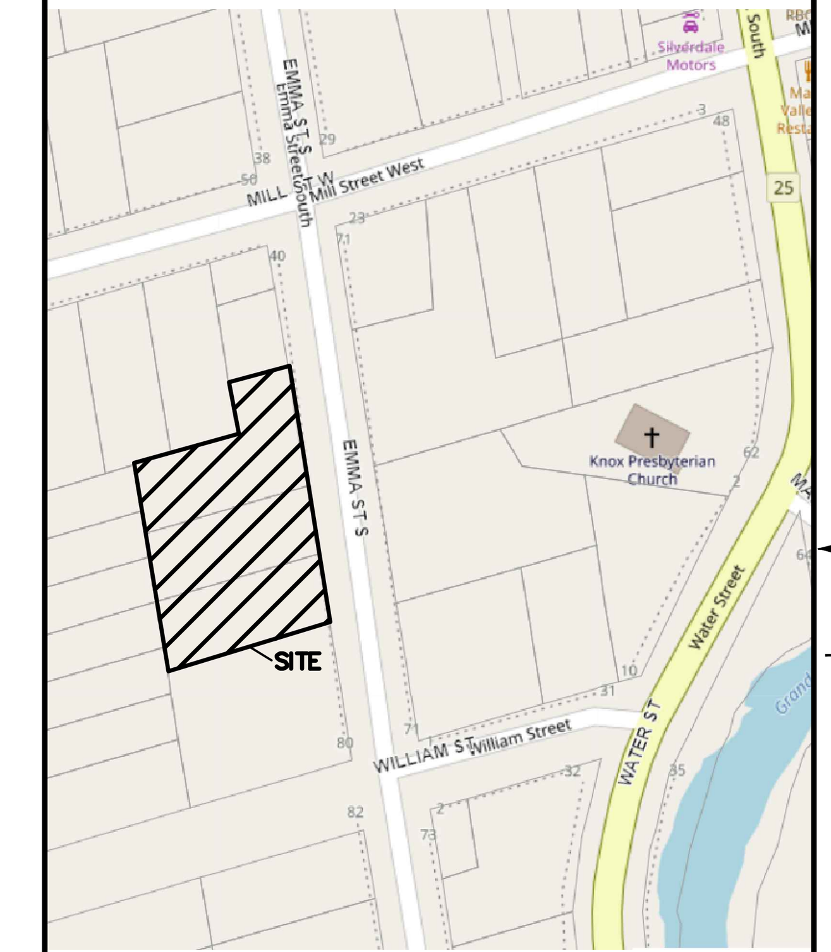




STATION	0+050	0+060	0+080	0+100	0+120	0+140	0+160	0+170	STATION
CENTERLINE GRADE FINISHED / EXISTING	458.15 / 458.15	457.76 / 457.76	456.97 / 456.97	456.17 / 456.17	455.52 / 455.52	454.95 / 454.95	454.26 / 454.26	453.97 / 453.97	FINISHED / EXISTING CENTERLINE GRADE
SANITARY SEWER INVERT	1 0+066.37 T/G 457.51	NEW 32.78m 200mmØ SANITARY SEWER @ 1.00%	EX2 0+099.15 T/G 456.21	N 453.00	NEW 67.20m 200mmØ SANITARY SEWER @ 2.39%	EX1 0+166.35 T/G 454.09			SANITARY SEWER INVERT
STORM SEWER INVERT	6 0+065.05 T/G 457.48	NEW 55.60m 450mmØ STORM SEWER @ 0.68%	7 0+120.65 T/G 455.43	NEW 47.43m 525mmØ STORM SEWER @ 0.97%	N 451.84				STORM SEWER INVERT



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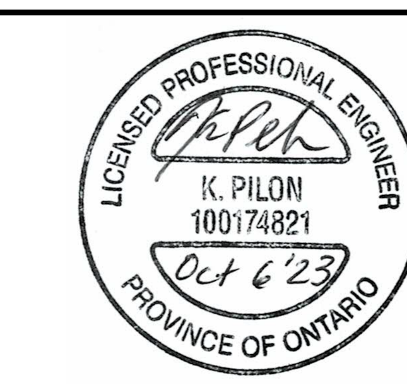

MOOREFIELD excavating

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PHONE: 519-510-3571 FAX: 519-510-3277
WWW.MOOREFIELDEX.CA

ISSUED FOR - REVISION:

IS	RE	DATE	DESCRIPTION
1	0	10-05-2023	ZBA OPA SUBMISSION

PROJECT NO:
DATE:
ORIGINAL SCALE:
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DRAWN BY:
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APPENDIX B

Fire Flow Calculations

Table 1.0 - Fire Flows and Fire Storage Requirement Calculation

Project: **40-60 Emma Street**

Owner: **Sheldon Creek Developments**

Project No. 231-103

Guidelines: **Water Supply for Public Fire Protection - Fire Underwriters Survey - 1999**

Date: October 2023

Facility	Building Classification								Fire Flow Calculations			Adjustments to Fire Flow			Recommended Values		
	Occupancy	Floor Area (m^2)		Fire Walls	Dist. To Adj. Bldgs (m)	Roofing Material	Construction		C	A	F	Occupancy Hazard	Sprinkler Reduction	Building Exposure	**Fire Flow Rate** (l/s)	**Duration** (hours)	**Fire Storage** (m^3)
		Above Grade*	Basement				Type	Year	Value	Area (m^2)	Fire F (l/min)						
1. Single Unit - worst case occurs with centre unit																	
	Group C	187	0	1hr	side 1 ~ 0m side 2 ~ 0m side 3 ~ 25m side 4 ~ 40m	Asphalt Shingles	Wood framed multi storey structure with brick veneer/siding	2023	1.5	187	5,000	-15%	0%	65%	117	2	840
2. Four Units Together																	
	Group C	748	0	1hr	side 1 ~ 2.6m side 2 ~ 10.0m side 3 ~ 25.0m side 4 ~ 40.0m	Asphalt Shingles	Wood framed multi storey structure with brick veneer/siding	2023	1.5	748	9025	-15%	0%	50%	200	2	1440

* Assumed Fire resistive between units

1. Floor Area - Total floor area in square metres (including all storeys, but excluding basements which are at least 50% below grade) in the building considered. Condos assumed to contain loft (1.5xmain floor area was used).
   For fire-resistive buildings, consider the two largest adjoining floors plus 50 percent of each of any floors immediately above them up to eight, when the vertical openings are inadequately protected. If the vertical openings and exterior vertical communications are properly protected (one hour rating), consider only the area of the largest floor plus 25 percent of each of the two immediately adjoining floors.
   Note D: Wood frame structures separated by less than 3 metres shall be considered as one fire area.
   Note E: Fire Walls: - In determining floor areas, a fire wall that meets or exceeds the requirements of the current edition of the National Building Code of Canada (provided this necessitates a fire resistance rating of 2 or more hours) may be deemed to subdivide the building into more than one area or may, as a party wall, separate the building from an adjoining building.
   Normally any unpierced party wall considered to form a boundary when determining floor areas may warrant up to a 10% exposure charge.
2. C Value - Coefficient related to the type of construction: 1.5 - for wood frame construction (structure essentially all combustible); 1.0 - for ordinary construction (brick or other masonary walls, combustible floor and interior; 0.8 - for non-combustible construction (unprotected metal structural components, masonry or metal walls; 0.6 - for fire-resistive construction (fully protected frame, floors, roof)
3. F - the required fire flow in litres per minute calculated as follows: $F = 220 \times C \times A^{0.5}$
4. Occupancy Hazard Adjustments: the calculated fire flow may be modified based on the potential fire hazard of the occupancy contents. Adjustment factors for the type of contents are as follows:
   Non-combustible: -25%; Limited combustible: -15%; Combustible: no change; Free burning: +15%; Rapid burning: +25%. The fire flow demand shall not be less than 2,000 l/min.
5. Automatic Sprinkler Protection - the adjusted fire flow (as modified by the Occupancy Hazard Adjustment) may be further reduced by up to 50% for complete automatic sprinkler protection, depending upon adequacy of of the system.
   Typical adjustments include: -30% for sprinkler system that complies with NFPA 13 and other sprinkler standards; additional credit of up to -10% if the water supply is standard for both the system and fire department hose lines; additional credit up to -10% for for a fully supervised system.
6. Adjacent Building Exposure - the value obtained in #4 above (adjusted fire flow as modified by the Occupancy Hazard Adjustment) should be increased for structures exposed within 45 metres by the fire area under consideration.
   The charge for any one side generally should not exceed the following limits for the separations shown: 0 to 3 m 25%; 3.1 to 10 m 20%; 10.1 to 20 m 15%; 20.1 to 30 m 10%; 30.1 to 45 m 5%. The total shall be the sum of the percentages for all sides, but shall not exceed 75%.
7. The adjusted fire flow shall not exceed 45,000 l/min nor be less than 2,000 l/min.
8. Required Duration of Fire Flow: 2,000 l/min or less - 1.0 hr; 3,000 l/min - 1.25 hrs; 4,000 l/min - 1.5 hrs; 5,000 l/min - 1.75 hrs; 6,000 l/min - 2 hrs; 8,000 l/min - 2.0 hrs.
9. Occupancy Group per OBC

APPENDIX C

Stormwater Management – Storm Sewer Calculations, Rational Method

STORM SEWER DESIGN SHEET
5 & 100 YEAR DESIGN STORM
PRE AND POST DEVELOPMENT

LOCATION				AREAS (ha)													SEWER DATA								
CATCHMENT	AREA TOTAL	FROM	TO	at R=0.20 (ha)	at R=0.30 (ha)	at R=0.50 (ha)	at R=0.60 (ha)	at R=0.75 (ha)	at R=0.90 (ha)	INDIV. 2.78 AR	ACCUM. 2.78 AR	TIME OF CONC.	RAINFALL INTENSITY I (mm/hr)	PEAK FLOW 100 YEAR Q (L/s)	PEAK FLOW 5 YEAR Q (L/s)	Pipe	DIAMETER (mm)	SLOPE (%)	LENGTH (m)	CAPACITY (L/s)	VELOCITY (m/s)	TIME (minutes)	Total Time (min)	% Capacity 100 YEAR	% Capacity 5 YEAR
PRE-DEVELOPMENT																									
EXT	1.01		EMMA ST			0.860			0.150	1.569	1.569	10.00	178.09	279.51	168.03	Metric									
PRE	0.32		EMMA ST	0.320						0.178	0.178	10.00	178.09	31.66	19.03	Metric									
Total														311.17	187.07	Metric	1500	0.45	82.20	4792.40	2.71	0.51	0.51	6.5%	3.9%
POST-DEVELOPMENT																									
POST-1	0.10	AD1	AD2	0.015		0.081			0.004	0.131	0.131	10.00	178.09	23.40	14.07	Metric	300	1.60	12.20	122.32	1.73	0.12	10.12	19.1%	11.5%
POST-2	0.10	AD2	AD3	0.014		0.082			0.004	0.132	0.263	10.12	176.64	46.46	27.93	Metric	300	3.77	14.90	187.76	2.66	0.09	10.21	24.7%	14.9%
POST-3	0.10	AD3	AD4	0.014		0.082			0.004	0.132	0.395	10.21	175.51	69.31	41.53	Metric	300	3.75	11.70	187.26	2.65	0.07	10.28	37.0%	22.2%
POST-4	0.09	AD4	AD5	0.012		0.074			0.004	0.120	0.515	10.28	174.63	89.86	53.70	Metric	300	5.33	7.50	223.25	3.16	0.04	10.32	40.3%	24.1%
POST-5	0.06	AD5	DCBMH	0.008		0.052				0.077	0.591	10.32	174.16	102.98	61.40	Metric	300	8.00	34.90	273.51	3.87	0.15	10.47	37.6%	22.4%
POST-6	0.70	DCB	DCBMH			0.571			0.129	1.116	1.116	10.00	178.09	198.67	119.44	Metric	450	0.68	55.61	235.11	1.48	0.63	10.63	84.5%	50.8%
POST-7	0.18	DCBMH	EX-PIPE			0.059			0.121	0.384	2.091	10.47	172.41	360.56	214.11	Metric	525	0.97	47.40	423.56	1.96	0.40	10.88	85.1%	50.6%
William Street 1220x1920 pipe outlet														360.56	214.11	Metric	1500	0.45	82.20	4792.40	2.71	0.51	0.51	7.5%	4.5%

PROJECT :	40-60 EMMA ST
PROJECT NUMBER :	191-102
CLIENT :	MEX Developments
DATE :	October 5, 2023

Designed By : KP KP

Checked By :

Comments:

Roughness Coeff. "n" 0.013

I_{5YR} = 30.6*T^-0.699

I_{100YR} = 50.9*T^-0.699

*From MTO IDF Lookup for Grand Valley overleaf

Bransby Williams

tc=0.057*L/(Sw^0.2*A^0.1)

L=watershed length, m

Sw=watershed slope, %

A= watershed Area, ha

Active coordinate

43° 53' 45" N, 80° 19' 14" W (43.895833,-80.320833)

Retrieved: Mon, 02 Oct 2023 17:46:40 GMT

Location summary

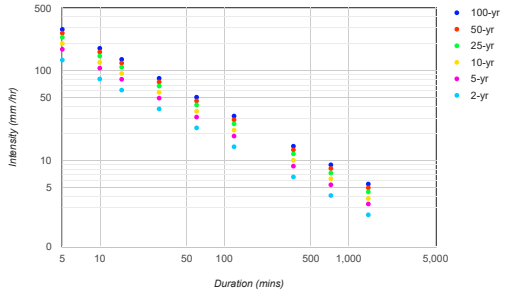
These are the locations in the selection.

IDF Curve: 43° 53' 45" N, 80° 19' 14" W (43.895833,-80.320833)

Results

An IDF curve was found.

Coordinate: 43.895833, -80.320833
IDF curve year: 2010



Coefficient summary

IDF Curve: 43° 53' 45" N, 80° 19' 14" W (43.895833,-80.320833)

Retrieved: Mon, 02 Oct 2023 17:46:40 GMT

Data year: 2010
IDF curve year: 2010

Return period	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
A	23.2	30.6	35.5	41.7	46.3	50.9
B	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

Statistics

Rainfall intensity (mm hr^{-1})

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	131.8	81.2	61.1	37.7	23.2	14.3	6.6	4.1	2.5
5-yr	173.8	107.1	80.6	49.7	30.6	18.8	8.7	5.4	3.3
10-yr	201.6	124.2	93.6	57.6	35.5	21.9	10.1	6.3	3.8
25-yr	236.9	145.9	109.9	67.7	41.7	25.7	11.9	7.3	4.5
50-yr	263.0	162.0	122.0	75.2	46.3	28.5	13.2	8.2	5.0
100-yr	289.1	178.1	134.1	82.6	50.9	31.4	14.5	9.0	5.5

Rainfall depth (mm)

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	11.0	13.5	15.3	18.8	23.2	28.6	39.8	49.0	60.4
5-yr	14.5	17.8	20.2	24.8	30.6	37.7	52.5	64.6	79.6
10-yr	16.8	20.7	23.4	28.8	35.5	43.7	60.9	75.0	92.4
25-yr	19.7	24.3	27.5	33.8	41.7	51.4	71.5	88.1	108.5
50-yr	21.9	27.0	30.5	37.6	46.3	57.0	79.4	97.8	120.5
100-yr	24.1	29.7	33.5	41.3	50.9	62.7	87.3	107.5	132.5

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