



MEMO

DATE	June 26, 2026	FILE NO.	721-3464-2
RE	Home Farm Rental Development Home Farm SPS Feasibility – Long Term Care & Rental Units		
TO	Evan Hancock Development Engineering Reviewer	CC	Brian Worsley Manager, Engineering
COMPANY	Town of The Blue Mountains		

This memorandum has been prepared to summarize the feasibility of the constructed Sanitary Pumping Station (SPS) on the Home Farm Development to accommodate additional flows from the proposed Long-Term Care Facility and Rental units (Home Farm Rental Development).

A Sanitary Pumping Station Design Brief had previously been completed in May of 2024, with drawings being approved for construction in August 2025. The SPS has since been fully constructed; however, no sewers or servicing has been constructed within the subdivision to date. The SPS is currently in a “mothball” state with preliminary commissioning completed.

For further information on the existing facility design and servicing strategy for the additional lands, please refer to the following reports:

- Home Farm Residential Development Sanitary Pumping Station Design Brief (Crozier, May 2024)
- Home Farm Rental Development Servicing and Stormwater Management Implementation Report (Crozier, June 2026)

Please note that this memorandum is intended to serve as a direct update to the approved SPS Design Brief and will be revised and reissued as necessary as the design of the Home Farm Rental Development progresses.

1.0 SANITARY FLOWS

The design of the SPS originally included flows from the Home Farm Residential Development and a Town Block. The original Town Block design accounted for 130 affordable housing units and 14 equivalent units for a proposed Town fire station outside the block. The design flows for the Town Block have since been revised based on the concept plan including a 192-bed Long-Term Care Facility and 112 Rental units, with the SPS no longer accepting flows from the fire station.

The total daily peak flow into the SPS has increased from 18.15 L/s to 20.18 L/s.

2.0 PUMP STATION WET WELL AND OPERATING ELEVATIONS

The SPS wet well has been constructed as precast concrete with a 3048 mm inner diameter. The original and revised system design and station levels are as described in **Table 1**. Please refer to **Appendix A** for the relevant Approved for Construction drawings.

2.1 Wet Well Working Volume and Pump Cycle Times

The original design set the working volume (normal volume between duty pump start and all pumps stop) at 2.92 m³, or 0.4 m of depth. This volume ensured that the pumps do not cycle more than six times an hour, but also at least every thirty minutes at average day flows to prevent accumulation of odours.

Based on the increased peak flows, the working volume needs to increase to **3.28 m³**, or **0.45 m** of depth. This revision of the working volume does not affect the efficacy of the pumping station and only requires slightly raising the proposed pump start elevations for both the primary PLC and backup float controls. Please refer to **Table 1** below for a comparison in the operating elevations between the original design and the revised design.

Table 1: Comparison of Pump Station Operating Elevations

Description	Original Elevation Layout	Revised Elevation Layout
Invert of F/M discharge at Grey Rd 19 MH 12.	220.96	221.87 ¹
High Point of Forcemain	224.70	224.70
Top of Pump Station Conc.	216.00	216.00
Centreline of F/M at Pump Station	213.90	213.90
Minimum Basement Flooding Elevation	214.60	214.60
Top of the First Intermediate Platform	213.25	213.25
Top of the Second Intermediate Platform	210.90	210.90
Influent Sewer Invert at Pump Station	210.50	210.50
High Alarm Level/Start Standby Pump (Float)	210.20	210.25
High Alarm Level (PLC)	210.10	210.15
Start Duty Pump (Float)	209.90	209.95
Start Standby Pump (PLC)	209.80	209.85
Start Duty Pump (PLC)	209.60	209.65
Stop All Pumps (PLC)	209.20	209.20
Stop All Pumps (Float)	208.90	208.90
Low Alarm Level (PLC)	208.80	208.80
Invert of Station	208.40	208.40
U/S of Concrete Foundation/Ballast	207.40	207.40

¹ Forcemain discharge elevation updated to reflect Home Farm Issued for Subdivision Agreement drawings dated June 4, 2025.

Based on the revised operating levels, the SPS continues to have a residence time under 30 minutes and fewer than 6 starts per hour, as outlined in MECF guidelines. The revised pump cycle times are summarized below in **Table 2**, with additional details provided in **Appendix B**.

Table 2: Summary of Pump Cycle Times

Flow Scenario	Inflow (L/s)	Fill Time (min)	Pump Discharge (L/s)	Pump Time (min)	Cycle Time (min)	Starts Per Hour
Average (dry weather)	3.90	14.0	20.18	3.4	17.4	3.4
Average (wet weather)	9.22	5.9		5.0	10.9	5.5

3.0 PRESSURE PIPE SIZE SELECTION

All pressure pipes within the pumping station have been sized to convey the sanitary discharge to the proposed outlet while providing suitable flow velocities per MECP Guidelines (0.6 - 3.0 m/s) to minimize headlosses within the system.

As the proposed pump discharge rate has only been nominally revised, the existing piping remains sufficiently sized for the increased design flows.

4.0 SYSTEM CURVE

The system curve of the pumping station was previously calculated based on calculated friction losses through equivalent length of pipes at the proposed nominal pipe diameters of 100 and 150 mm. As part of the efforts to investigate the station's capacity for additional flow from the Home Farm Rental Development, a more detailed approach to calculate the system curve has been conducted to determine if the current pumps and their associated pump curves can support the increased design flows.

The actual internal diameters of the selected pressure pipes are now used to determine the major losses in the system. Refer to **Table 3** for the comparison between diameters used in the original design and the revised design.

Table 3: Comparison of Pressure Pipe Diameters

Pipe	Material	Nominal Diameter (Original Design)	Actual Internal Diameter (Revised Design)
Individual Pump Discharge	Sch 10s SS	100 mm	108.2 mm
Common Header	Sch 10s SS	150 mm	161.5 mm
Forcemain	DR18 PVC	150 mm	154.7 mm

The increased diameters of the pipes significantly reduce the major friction losses in the system.

A more refined approach has been completed to determine the minor losses through the system by calculating the minor losses associated with piping appurtenances directly rather than converting them to an equivalent length of pipe and applying the Hazen-Williams equation. Please refer to **Appendix B** for a breakdown of the major and minor losses through the system.

Based on the revised approach to calculating the system curve, the Flygt model NP 3127 SH3 pumps installed within the SPS are capable of handling the revised design peak flow with one pump in operation at maximum speed, thereby providing a firm capacity rating of the station to support the increased flow rate.

Two variations of the system and pump curve charts have been included in **Appendix B**. The first chart considers the highest static head a pump will experience from the low level within the wet well to the forcemain highpoint using Hazen-Williams friction coefficients (C) of 100, 110, and 120. From the chart, the firm capacity provided by a single pump (against a friction coefficient of 100) is 20.50 L/s.

The second chart considers the lowest static head a pump could experience from the high emergency level within the wet well to the forcemain outlet using Hazen-Williams friction coefficients of 100, 110, and 140. This chart indicates the maximum anticipated flow for a single pump (against a friction coefficient of 140) is 27.0 L/s. It should be noted that this scenario would only occur in emergency situations and is well outside the typical operating range for the pump station.

5.0 EMERGENCY STORAGE

With the increased flow into the SPS, the required emergency storage volume to provide a 2-hour buffer time per the Town's CLI-ECA will increase from 130.68 m³ to 145.30 m³. The proposed sanitary sewers and maintenance holes within the rental unit area will provide some additional storage, but not enough to achieve the required 2-hour retention volume.

To provide the remainder of the additional storage volume, it is proposed to install a 2400 mm diameter maintenance hole (SAMH60A) just upstream of the SPS Block, connected to SAMH59A but outside the sewer flow path. This manhole will be solely for additional storage. The top of grate of SAMH60A and maximum emergency storage elevation in the sewer network has been kept consistent at 214.60 m, corresponding to 0.30 m below the lowest connected basement elevation.

Refer to the Home Farm Rental Development Servicing and Stormwater Management Implementation Report for further information on the sanitary sewer network and see **Table 4** below for a summary of storage provided.

Table 4: Emergency Storage Volumes Provided

Structure	Storage – Original Design (m ³)	Storage – Revised Design (m ³)
Wet Well	32.10	31.74
Storage Tank	50.08	50.08
Sanitary Sewers	11.13	12.78
Sanitary Maintenance Holes	37.45	51.24
TOTAL	130.76	145.84

Detailed calculations for emergency storage are provided in **Appendix B**.

6.0 CONCLUSIONS

Based on the foregoing, the existing sanitary pumping station as it is currently constructed can support the proposed long-term care and rental unit developments. Should you have any questions or require any further information, please do not hesitate to contact the undersigned.

Yours truly,

C.F. CROZIER & ASSOCIATES INC.



Brady Ellsworth, P.Eng.
Project Engineer

/cb

C.F. CROZIER & ASSOCIATES INC.

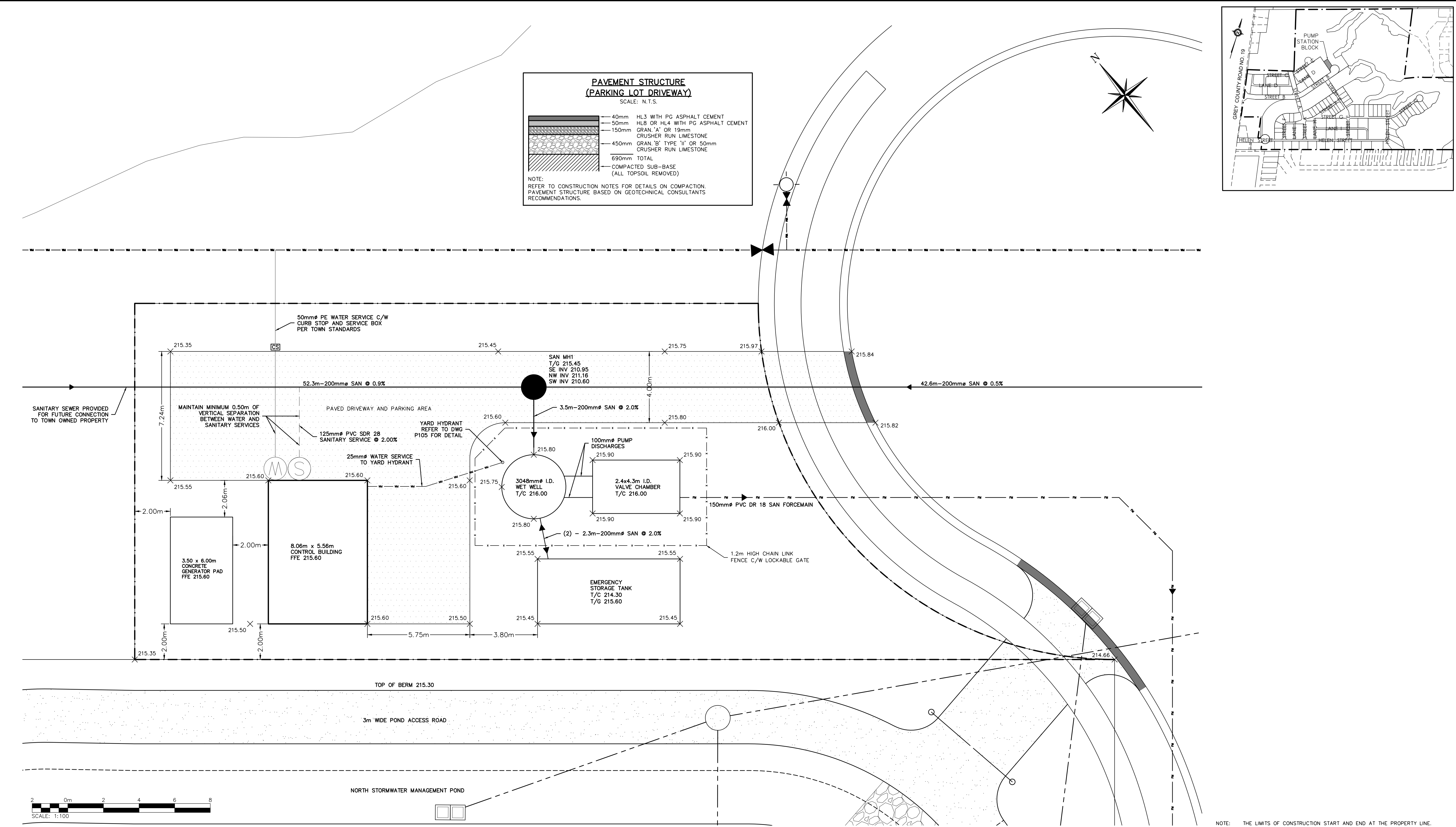


Charles Buscher
Engineering Intern

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APPENDIX A

Process AFC Drawings



NOTE: THE LIMITS OF CONSTRUCTION START AND END AT THE PROPERTY LINE.

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- ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
- DO NOT SCALE DRAWINGS.

TEMPORARY BENCHMARKS

TBM#1
TBM#2
TBM#3

***ADD REFERENCE TO SURVEY/SOURCE

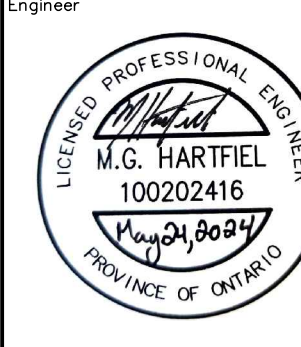
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Project
HOME FARM
SEWAGE PUMPING STATION
TOWN OF THE BLUE MOUNTAINS
Drawing
SEWAGE PUMPING STATION SITE PLAN



Drawn By	B.E.	Design By	B.E.	Project	721-3464
Check By	A.L.	Check By	M.H.	Drawing	P101

1. FOUNDATION DESIGN TO BE CONFIRMED BASED ON RECOMMENDATION OF GEOTECHNICAL ENGINEER.
2. SUBGRADE ELEVATIONS TO BE APPROVED BY THE GEOTECHNICAL ENGINEER.
3. SUPPORT ALL FOOTINGS AND SLABS ON UNDISTURBED SUB-GRADE WHEN DEEMED SUITABLE BY GEOTECHNICAL ENGINEER, WHERE UNSUITABLE, REPLACE WITH ENGINEERED FILL TO ELEVATIONS RECOMMENDED BY GEOTECHNICAL ENGINEER.
4. REVIEW GEOTECHNICAL REPORT FOR RECOMMENDATIONS CONCERNING DEWATERING AT ALL STRUCTURES.
5. CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR ALL STRUCTURAL AND MECHANICAL COMPONENTS.

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2. DEWATER EXCAVATION UNTIL CONSTRUCTION IS COMPLETE.

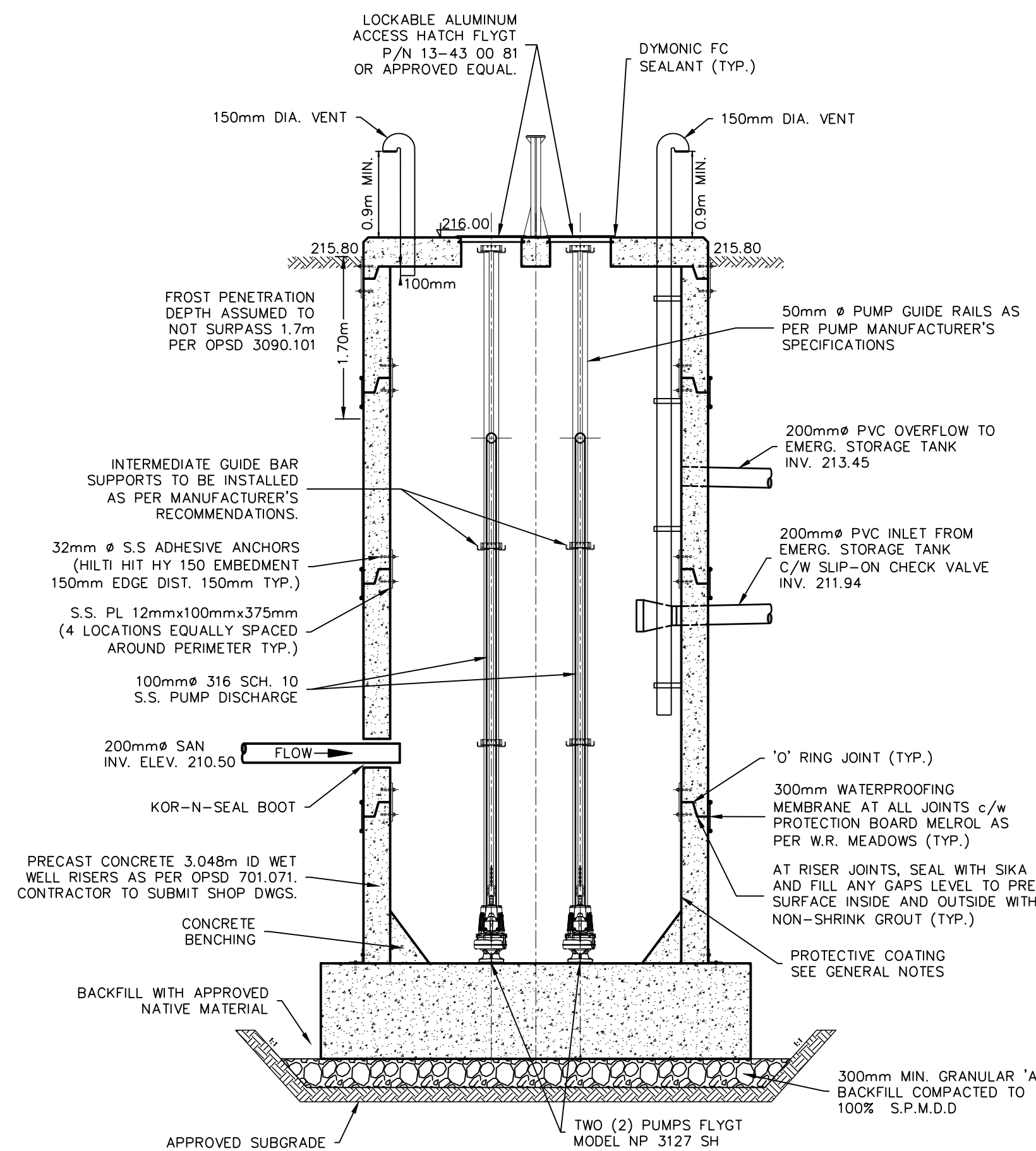
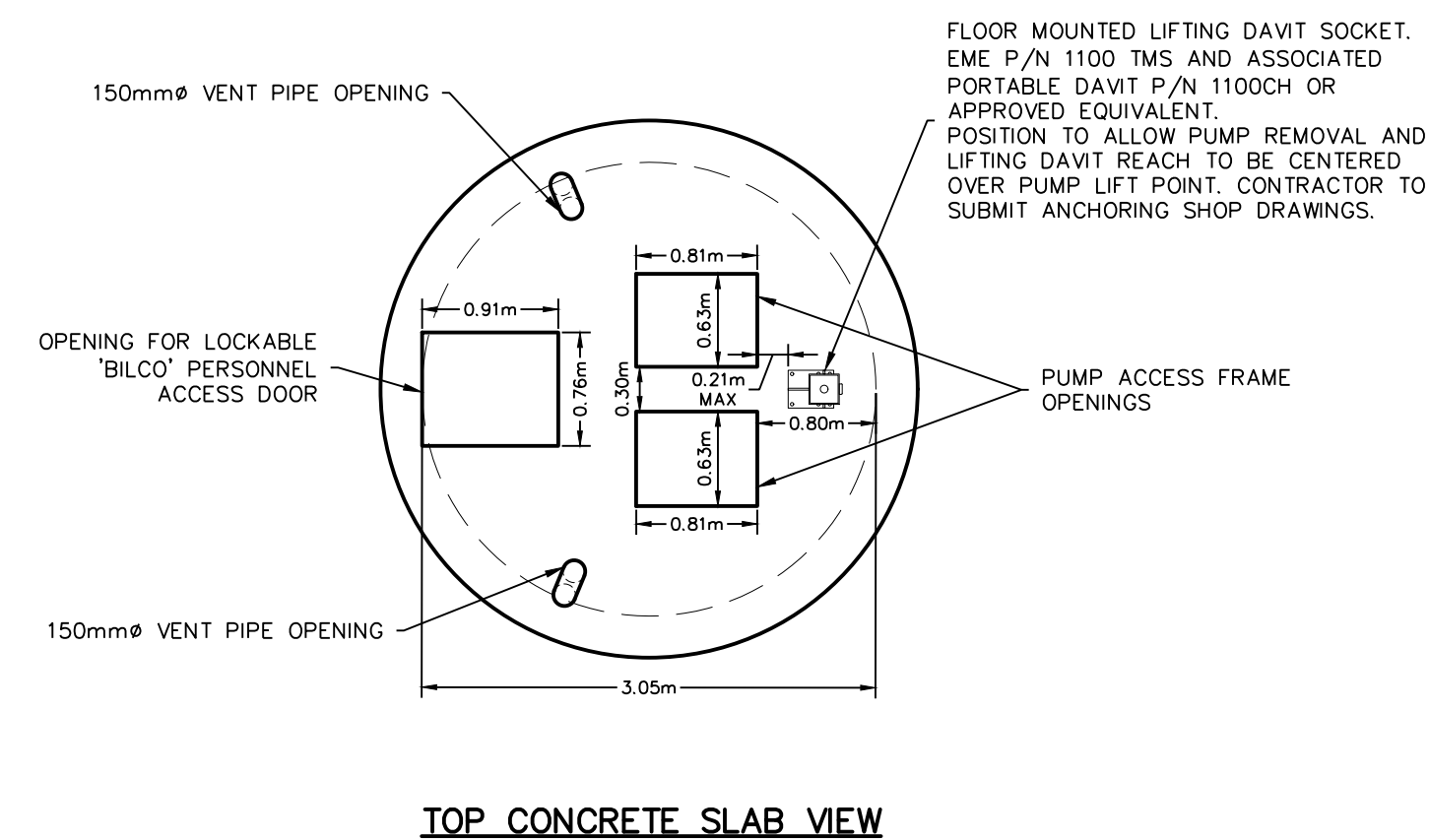
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3. EXPOSURE CLASSIFICATION A-1.
4. MAXIMUM WATER CEMENT RATIO 0.50 U.N.O.
5. USE WATER REDUCING AGENT AND SUPERPLASTICIZER.
6. NORMAL MAXIMUM AGGREGATE SIZE 20mm.
7. ENTRAINED AIR CONTENT RANGE 4% TO 7%.
8. LEAN FILL AND MASS CONCRETE 28-DAYS COMPRESSIVE STRENGTH 15 MPa
9. REINFORCING STEEL: CSA STANDARD G30.18-09(2014), GRADE 400, DEFORMED BARS
10. STRUCTURAL STEEL: CSA STANDARD G40.21-13/G40.21-13, GRADE 350 ROLLED SECTIONS, GRADE 300 PLATES.
11. ALUMINUM HATCH:
DESIGNED FOR 14.4IKPA (300 PSF) LOAD C/W S.S. HOLD OPEN ARM AND RELEASE ASSEMBLY, S.S. AUTOMATIC LIFTING ASSEMBLY, LUG CONNECTION FOR PADLOCK, NEOPRENE GASKET FOR WEATHER AND ODOUR TIGHTNESS, ALL HARDWARE TO BE STAINLESS STEEL, PADLOCK TO MATCH OWNERS STANDARD, SUBMIT SHOP DWGS. FOR APPROVAL.
12. CEMENTITIOUS COATING FOR INTERIOR OF PUMPING STATION:
RUBBER SPECIFICATION 07610 CEMENTITIOUS WATERPROOFING FOR COATING REQUIREMENTS.

1. TWO ELECTRIC SUBMERSIBLE WASTEWATER PUMPS.
2. FLYGT MODEL NP 3127 SH3 ADAPTIVE 248 12HP WITH 155mm IMPELLER
3. PUMP CAPACITY 18.9 L/S @ 28.1m TDH WITH ONE PUMP IN OPERATION.
4. CAST IRON CASING AND IMPELLER WITH 80mm SOLIDS PASSING.
5. 80mmø (3") DISCHARGE ELBOW, ACCESSORIES AND S.S. GUIDE BARS.
6. 8.0m STAINLESS STEEL LIFTING CHAIN.

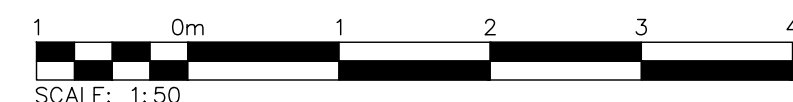
AS PART OF THEIR FIELD SERVICES, THE ENGINEER MAY REVIEW SHOP DRAWINGS PERTAINING TO WORK SHOWN ON THE ENGINEER'S DRAWINGS. BY MEANS OF APPROPRIATE RATIONAL SAMPLING PROCEDURES AND COMMENT ON THE ACCURACY WITH WHICH THE CONTRACTOR PREPARED THE DRAWINGS, REVIEW OF SHOP DRAWINGS IS FOR THE SOLE PURPOSE OF OBTAINING CONFIDENCE IN THE ACCURACY OF THE INFORMATION SHOWN AND IS NOT AN APPROVAL OF THE DETAIL DESIGN INHERENT IN THE SHOP DRAWINGS. RESPONSIBILITY FOR WHICH SHALL REMAIN WITH THE CONTRACTOR SUBMITTING THEM. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR ERRORS AND OMISSIONS IN THE SHOP DRAWINGS OR FOR MEETING ALL REQUIREMENTS OF THE CONTRACT DOCUMENTS.

THE CONTRACTOR IS SOLELY RESPONSIBLE FOR INFORMATION PERTAINING TO THE FABRICATION PROCESS TECHNIQUES OF CONSTRUCTION AND INSTALLATION, AND FOR CO-ORDINATION OF THE WORK OF ALL SUB-TRADES.

1. MANUFACTURERS OF ALL STRUCTURAL ELEMENTS SHALL SUBMIT COMPLETE SHOP DRAWINGS, SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN ONTARIO TO THE CONSULTANT FOR REVIEW PRIOR TO THE FABRICATION (3 SETS OR PDF). SUBMIT SHOP DRAWINGS IN ACCORDANCE WITH NOTIFICATION AND ALLOW A MINIMUM OF TWO(2) WEEKS FOR REVIEW. THE SUBMISSION NOR THE REVIEW SHALL RELIEVE THE CONTRACTOR OF THEIR RESPONSIBILITY FOR PROVIDING PROPER ENGINEERING DESIGN, METHODS, EQUIPMENT, WORKMANSHIP AND SAFETY PROCEDURES.
2. CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR THE FOLLOWING:
 - A. PRECAST STRUCTURE (CAP, RISERS, BASE)
 - B. PLATFORM, GUARD AND SURROUND
 - C. LADDER, SUPPORT, AND FALL ARREST SYSTEM
 - D. FROST STRAPS
 - E. WATERPROOFING MEMBRANE
 - F. VENT PIPE SUPPORT
 - G. STEEL ANGLES, PLATES, AND FASTENERS



PUMP OPERATING ELEVATIONS (m)	
HIGH LEVEL ALARM AND START STANDBY PUMP (FLOAT INTERLOCK)	210.20
START DUTY PUMP ELEVATION (FLOAT INTERLOCK)	209.90
START STANDBY PUMP (PLC)	209.80
START DUTY PUMP (PLC)	209.60
STOP ALL PUMPS (PLC)	209.20
STOP ALL PUMPS (FLOAT INTERLOCK)	208.90
WET WELL FLOOR ELEVATION	208.40



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TBM#3-

***ADD REFERENCE TO SURVEY/SOURCE

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Brian West 26-Aug-20

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	Project
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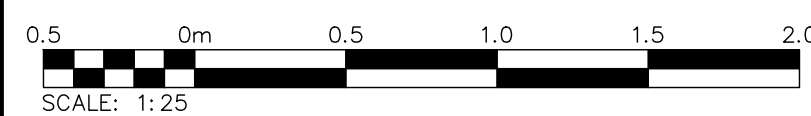
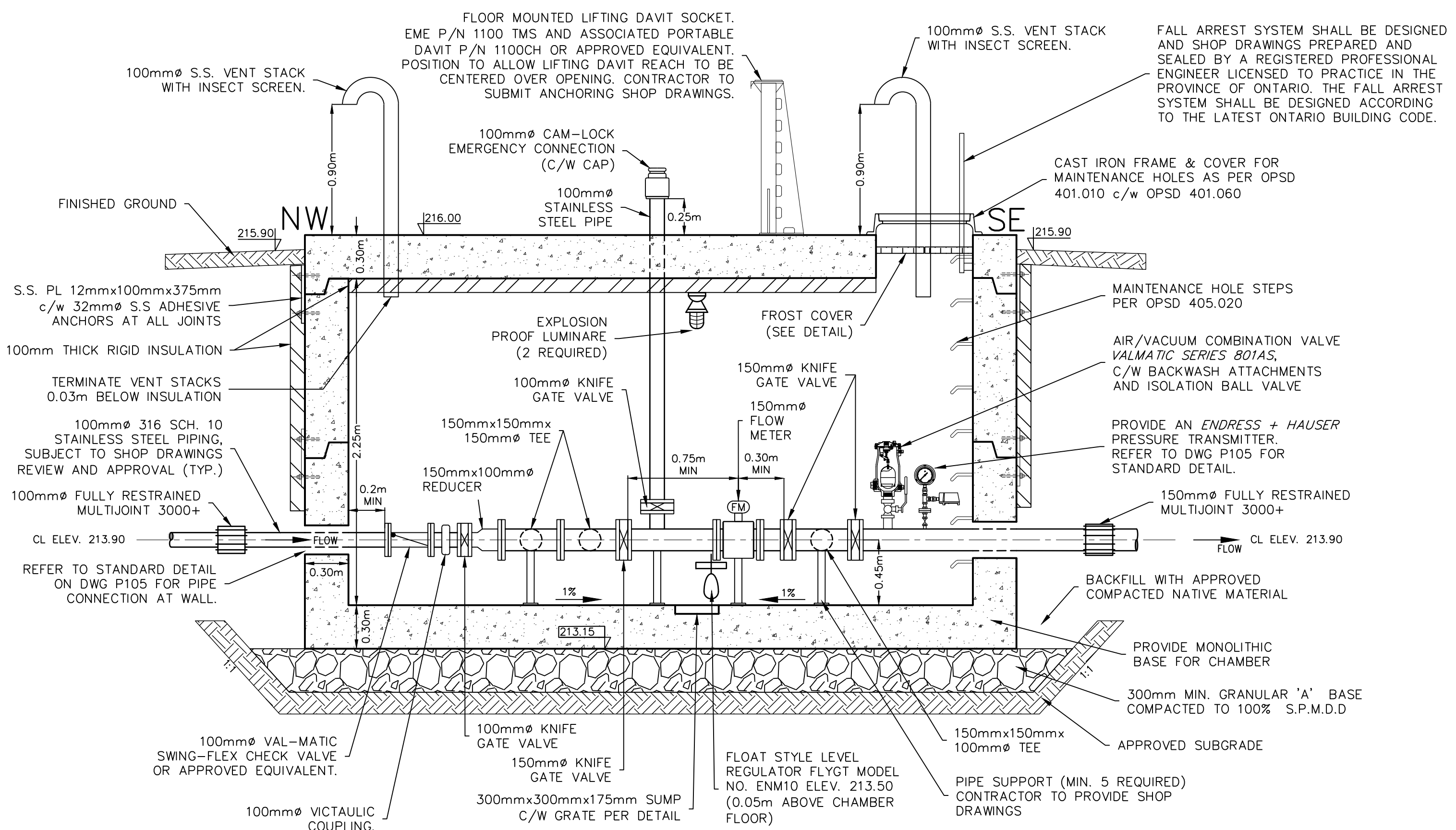
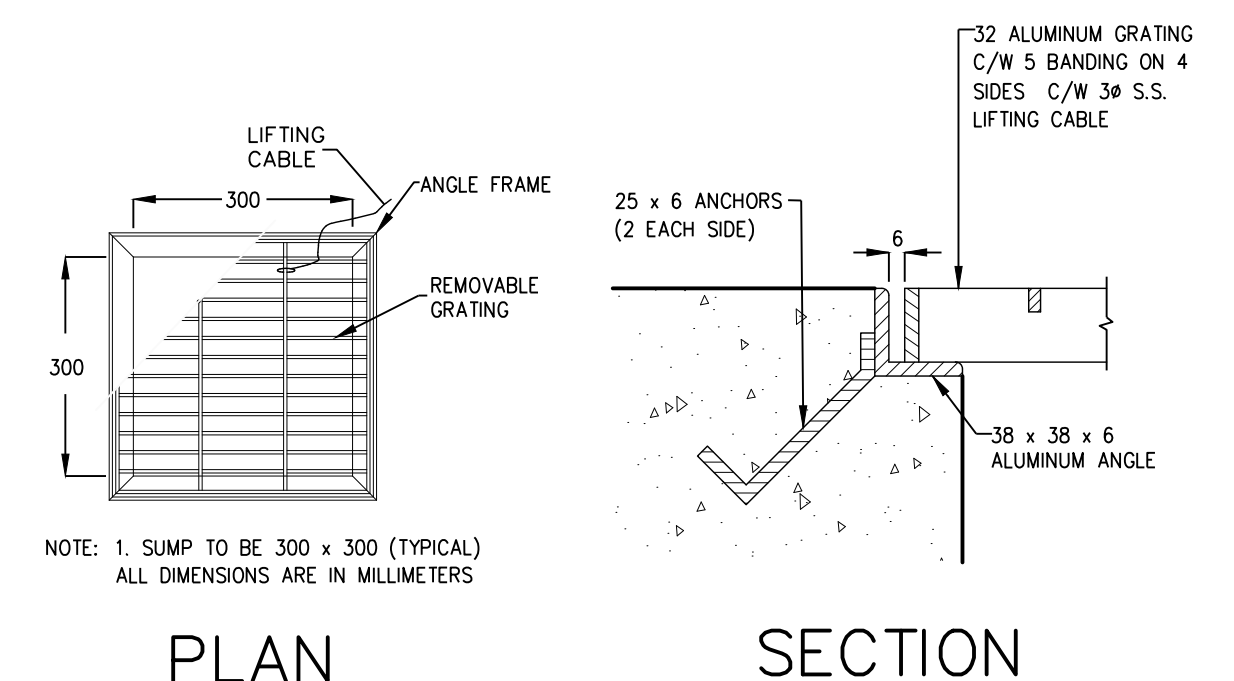
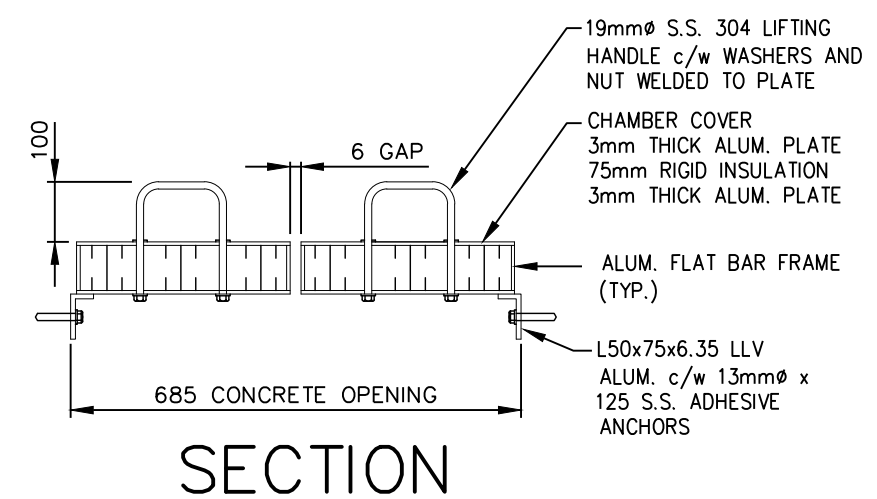
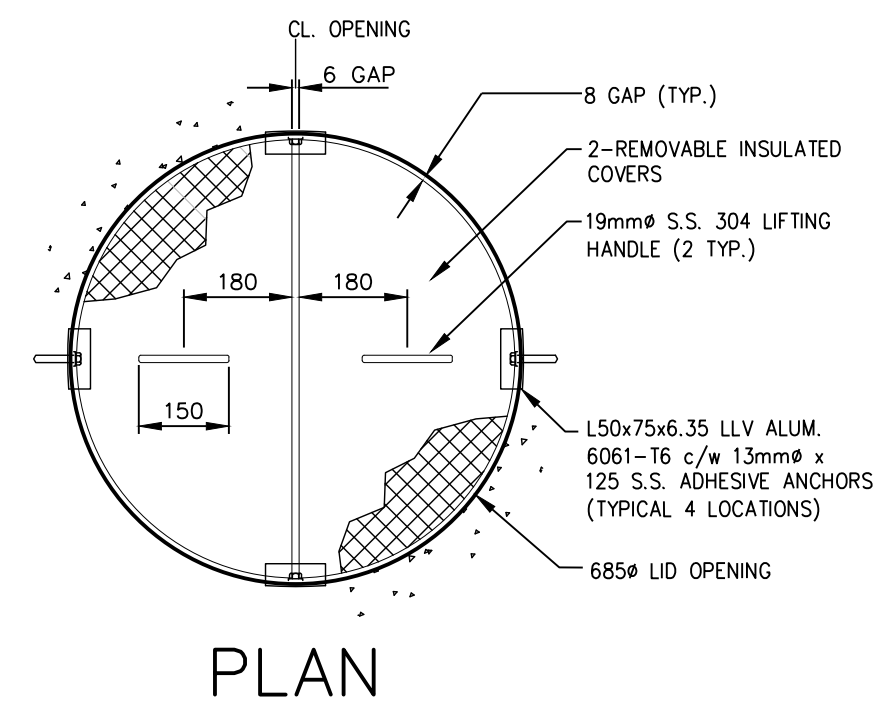
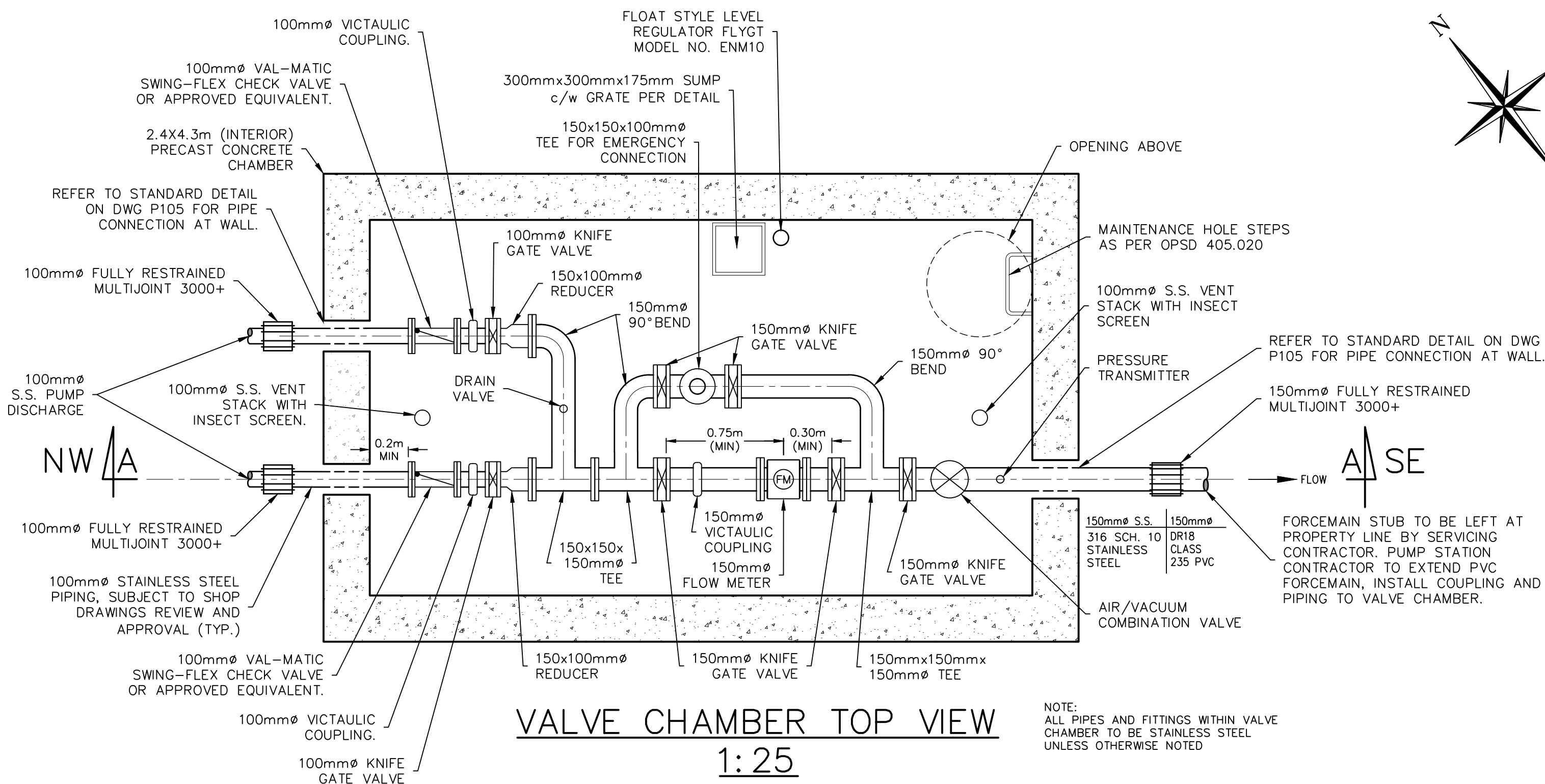
Drawing

HOME FARM
SEWAGE PUMPING STATION
TOWN OF THE BLUE MOUNTAINS

WET WELL CROSS SECTIONS & CONSTRUCTION NOTES



Drawn By B.E.	Design By B.E.	Project 721-3464
Check By A.L.	Check By M.H.	Drawing P102



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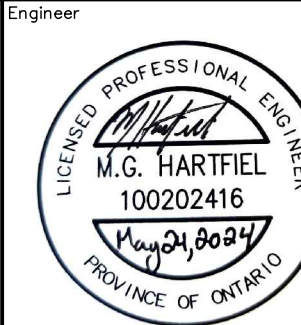
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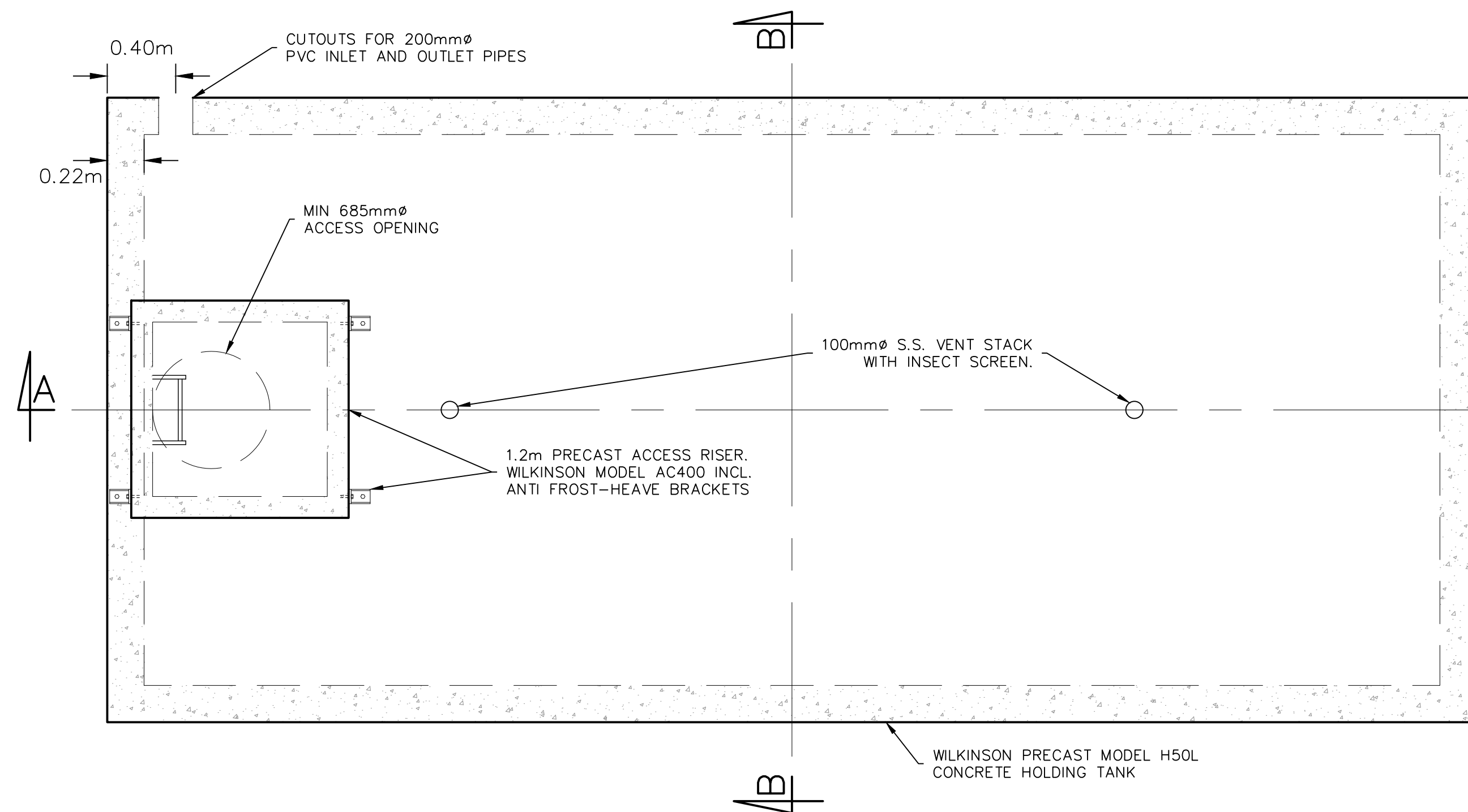
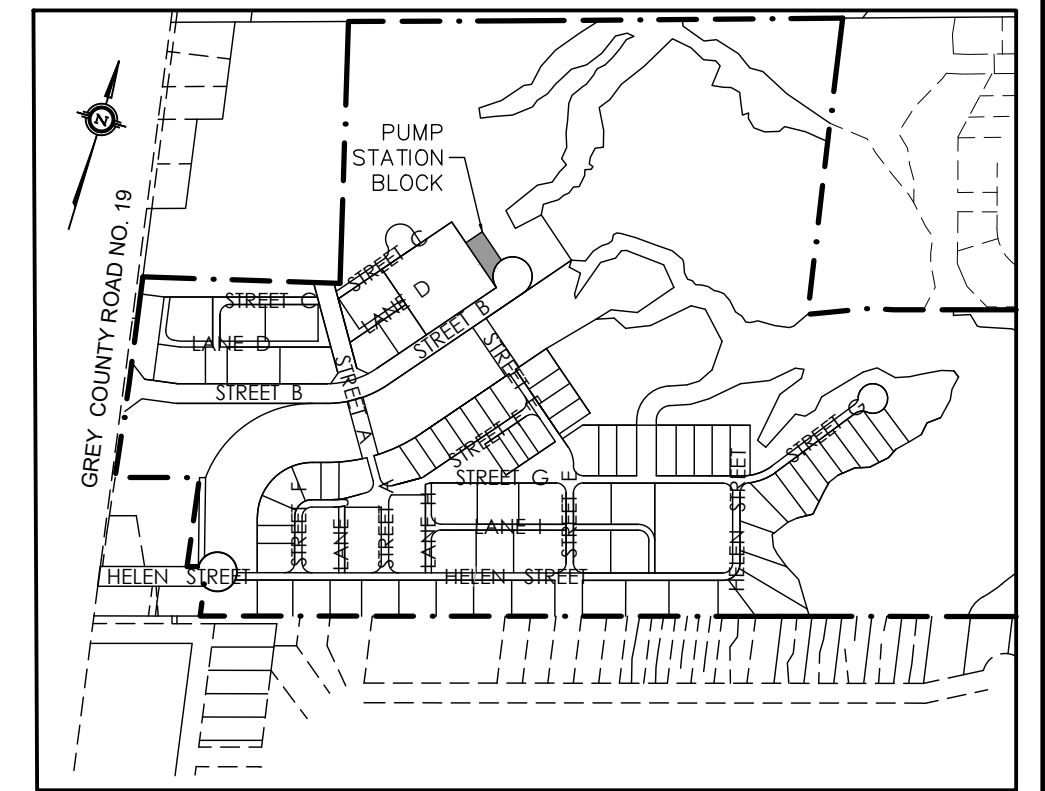
12 *W. Ward* *26-Aug-2022*
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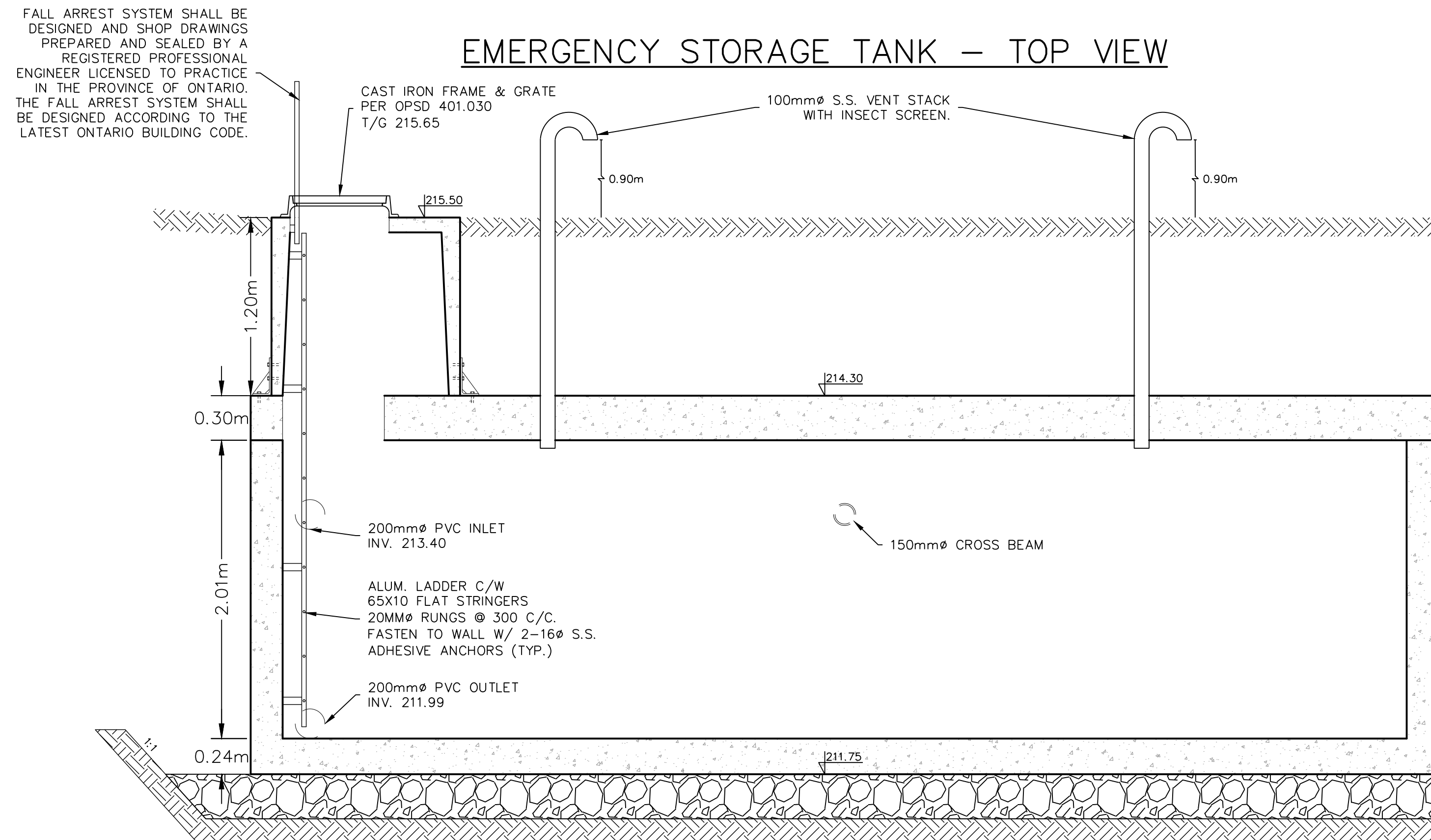


Project	HOME FARM SEWAGE PUMPING STATION TOWN OF THE BLUE MOUNTAINS
Drawing	VALVE CHAMBER CROSS SECTIONS





EMERGENCY STORAGE TANK – TOP VIEW



EMERGENCY STORAGE TANK SECTION A-A



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4. REVIEW GEOTECHNICAL REPORT FOR RECOMMENDATIONS CONCERNING DEWATERING AT ALL STRUCTURES.
5. CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR ALL STRUCTURAL AND MECHANICAL COMPONENTS.

TANK BUOYANCY AND UPLIFT RESISTANCE

1. PROTECT ALL STRUCTURES FROM FLOTATION DURING CONSTRUCTION.
2. DEWATER EXCAVATION UNTIL CONSTRUCTION IS COMPLETE.
3. ANTI-FLOTATION BALLAST SYSTEM TO BE PROVIDED AND INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

MATERIAL SPECIFICATIONS

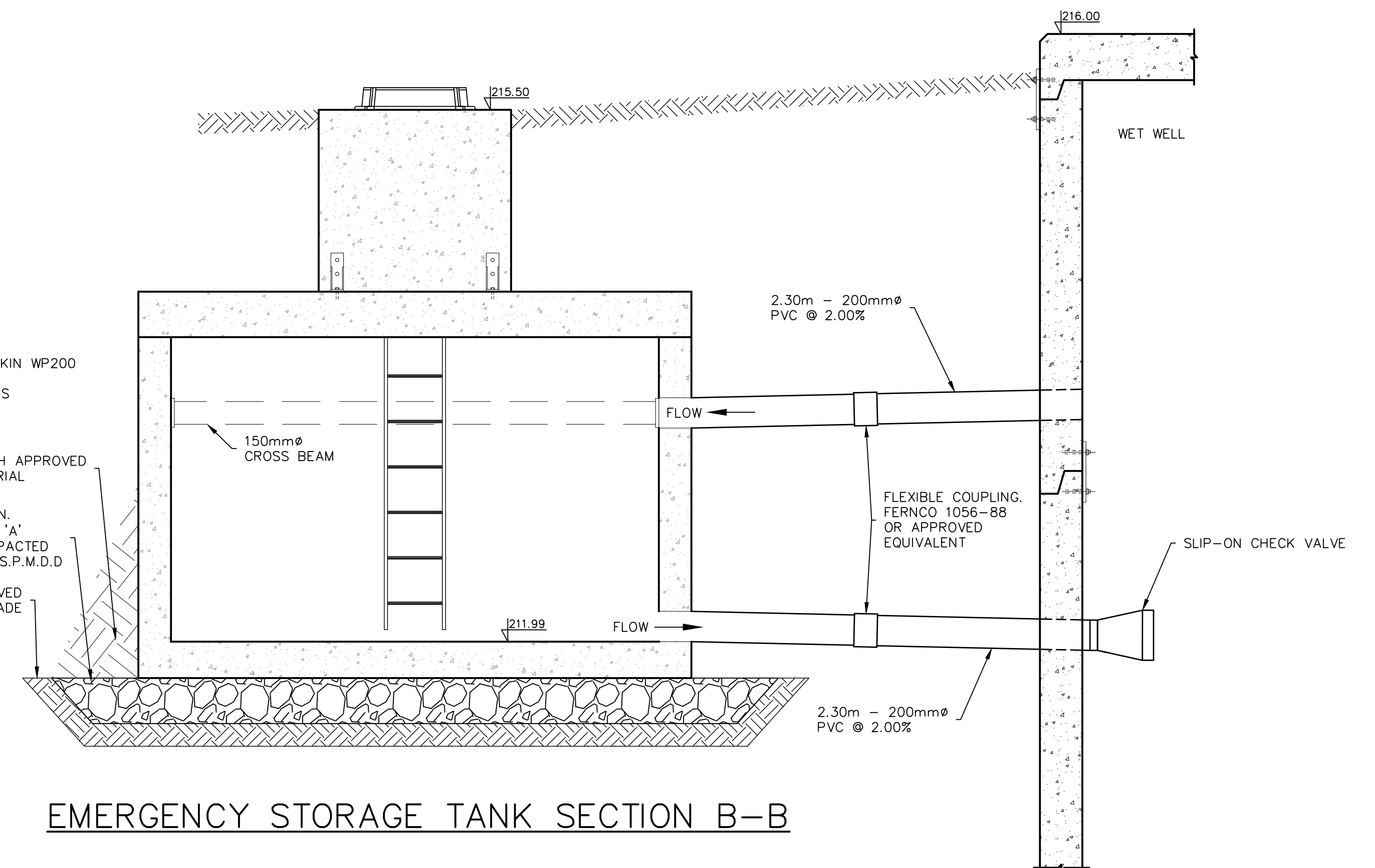
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AS PART OF THEIR FIELD SERVICES, THE ENGINEER MAY REVIEW SHOP DRAWINGS PERTAINING TO WORK SHOWN ON THE ENGINEER'S DRAWINGS BY MEANS OF APPROPRIATE RATIONAL SAMPLING PROCEDURES AND COMMENT ON THE ACCURACY WITH WHICH THE CONTRACTOR PREPARED THE DRAWINGS. REVIEW OF SHOP DRAWINGS IS FOR THE SOLE PURPOSE OF ASCERTAINING CONFORMANCE WITH THE GENERAL DESIGN CONCEPT AND IS NOT A GUARANTEE OF THE ACCURACY OF THE INFORMATION IN THE SHOP DRAWINGS. RESPONSIBILITY FOR WHICH SHALL REMAIN WITH THE CONTRACTOR SUBMITTING THEM. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR ERRORS AND OMISSIONS IN THE SHOP DRAWINGS OR FOR MEETING ALL REQUIREMENTS OF THE CONTRACT DOCUMENTS.

THE CONTRACTOR IS SOLELY RESPONSIBLE FOR INFORMATION PERTAINING TO THE FABRICATION PROCESS TECHNIQUES OF CONSTRUCTION AND INSTALLATION, AND FOR CO-ORDINATION OF THE WORK OF ALL SUB-TRADES.

1. MANUFACTURERS OF ALL STRUCTURAL ELEMENTS SHALL SUBMIT COMPLETE SHOP DRAWINGS, SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN ONTARIO TO THE CONSULTANT FOR REVIEW PRIOR TO THE FABRICATION (3 SETS OR PDF). SUBMIT SHOP DRAWINGS IN ACCORDANCE WITH SPECIFICATIONS AND ALLOW A MINIMUM OF TWO (2) WEEKS FOR REVIEW. THE SUBMISSION NOW THE REVIEW SHALL RELIEVE THE CONTRACTOR OF THEIR RESPONSIBILITY FOR PROVIDING PROPER ENGINEERING DESIGN, METHODS, EQUIPMENT, WORKMANSHIP AND SAFETY PROCEDURES.
2. CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR THE FOLLOWING:
 - A. PRECAST STRUCTURE (CAP, RISERS, BASE)
 - B. PLATFORM, GUARD, AND SUPPORT
 - C. LADDER, SUPPORT, AND FALL ARREST SYSTEM
 - D. STROT STRAPS
 - E. WATERPROOFING MEMBRANE
 - F. VENT PIPE SUPPORT
 - G. STEEL ANGLES, PLATES, AND FASTENERS



EMERGENCY STORAGE TANK SECTION B-B



1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE MODIFICATION AND/OR REPRODUCTION OF ANY PART OF THIS DRAWING IS STRICTLY PROHIBITED WITHOUT WRITTEN PERMISSION OF C.F. CROZIER & ASSOCIATES INC.
2. THE DIGITAL FILES CONTAIN INTELLECTUAL AND DIGITAL DATA PROPERTY THAT IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. THE CONTRACTOR SHALL BE RESPONSIBLE FOR BACKUP OF ALL DATA, STATUS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO C.F. CROZIER & ASSOCIATES INC. PRIOR TO CONSTRUCTION.
3. THIS DRAWING IS TO BE USED IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.
4. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
5. DO NOT SCALE DRAWINGS.

TEMPORARY BENCHMARKS

TBM#1—
TBM#2—
TBM#3—

***ADD REFERENCE TO SURVEY/SOURCE

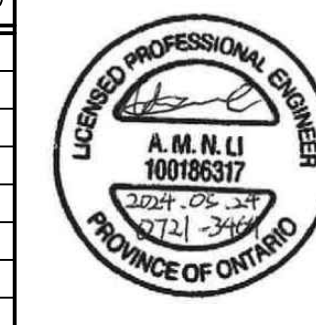
Town of Blue Mountains
Planning and Development Services
Accepted For Construction
Pre-Servicing Only

AFC Drawings are only valid as part and upon execution of a
Pre-servicing Agreement

[Signature] 26-Aug-2023
signature date

No.	ISSUE	DATE: YYYY/MM/DD
1	ISSUED FOR 1st SUBMISSION	2021/12/10
2	ISSUED FOR 90% DETAILED DESIGN	2023/03/21
3	ISSUED FOR CLIENT REVIEW – IFT	2023/12/15
4	ISSUED FOR 90% DETAILED DESIGN REV 1	2024/01/02
5	ISSUED FOR TENDER	2024/01/22
6	ISSUED FOR APPROVAL	2024/03/08
7	ISSUED FOR APPROVAL REV 1 	2024/05/24

Engineer



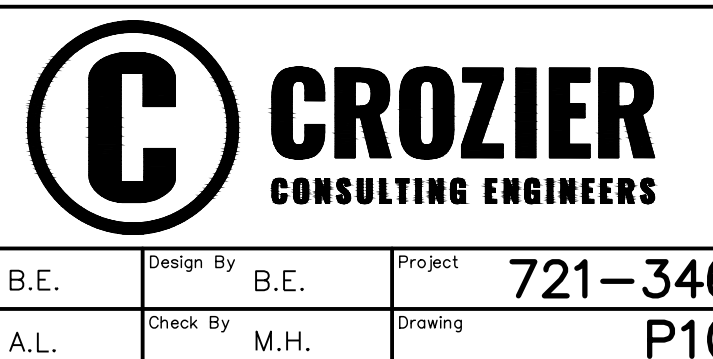
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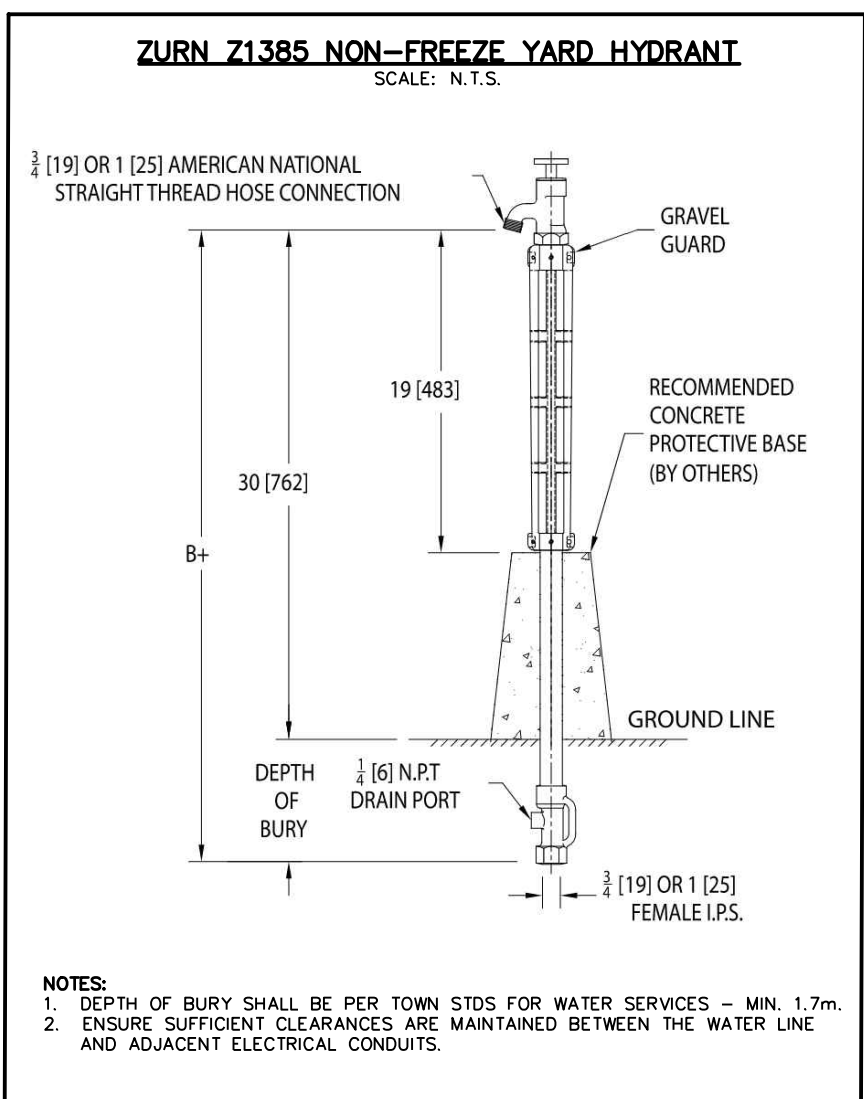
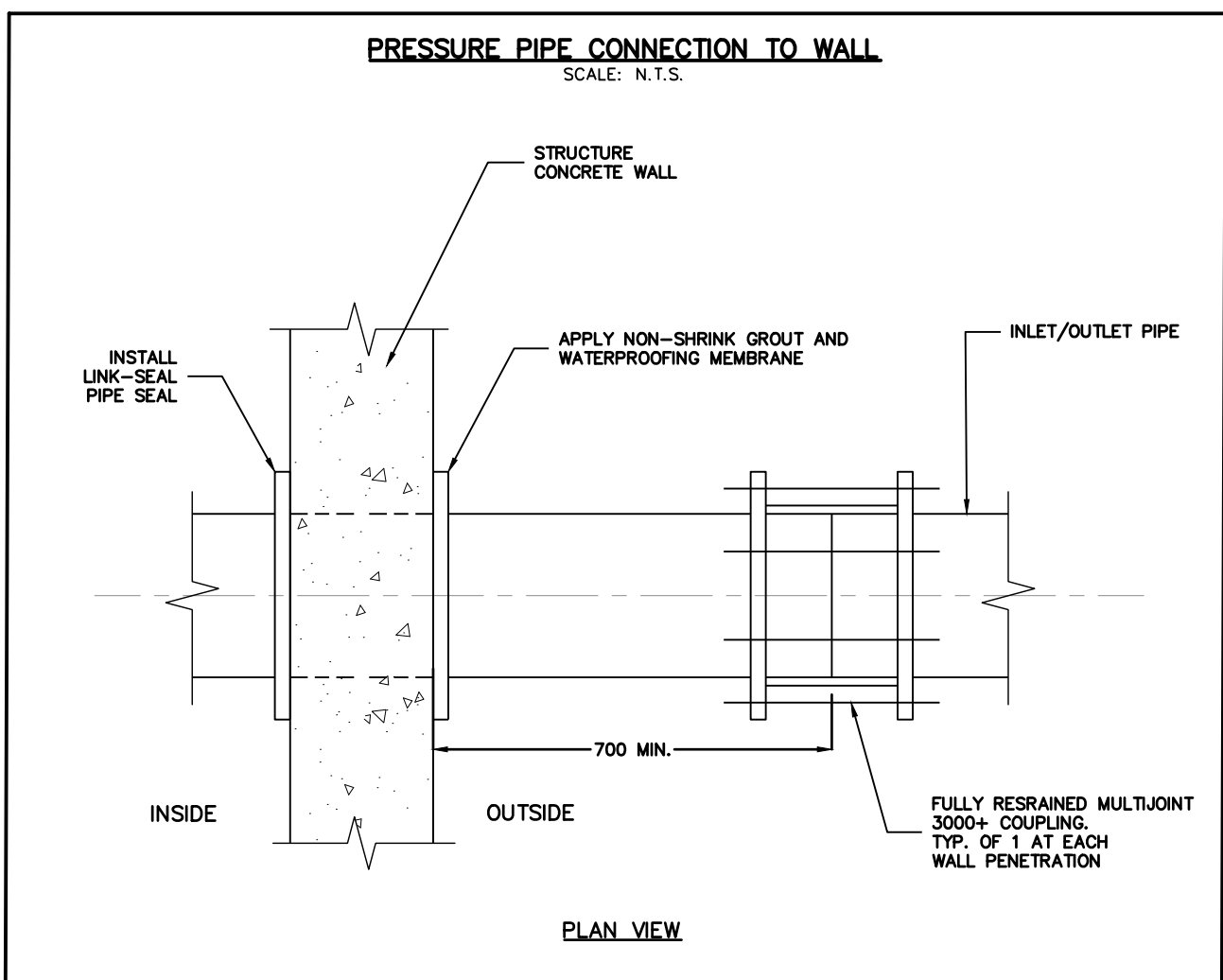
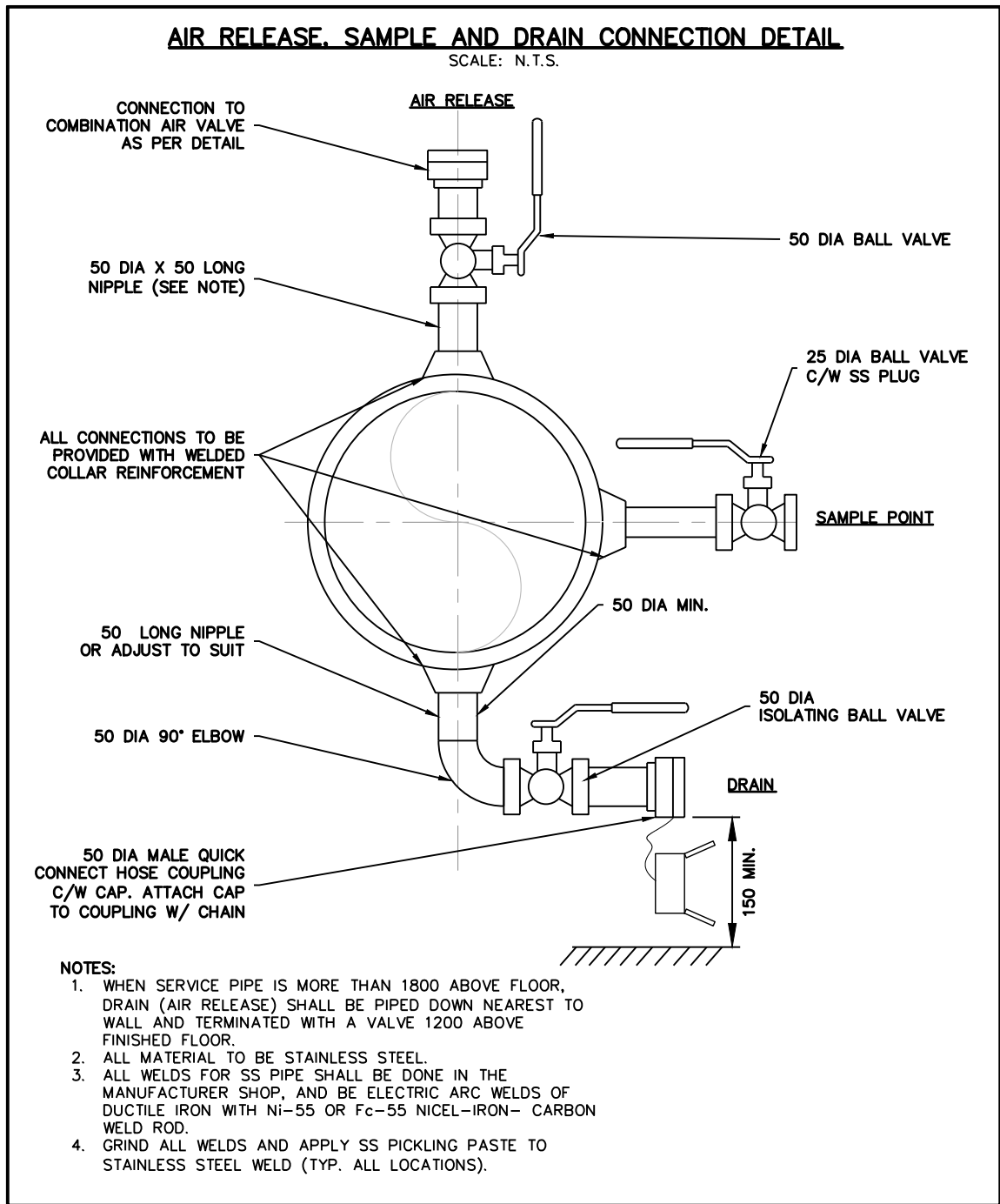
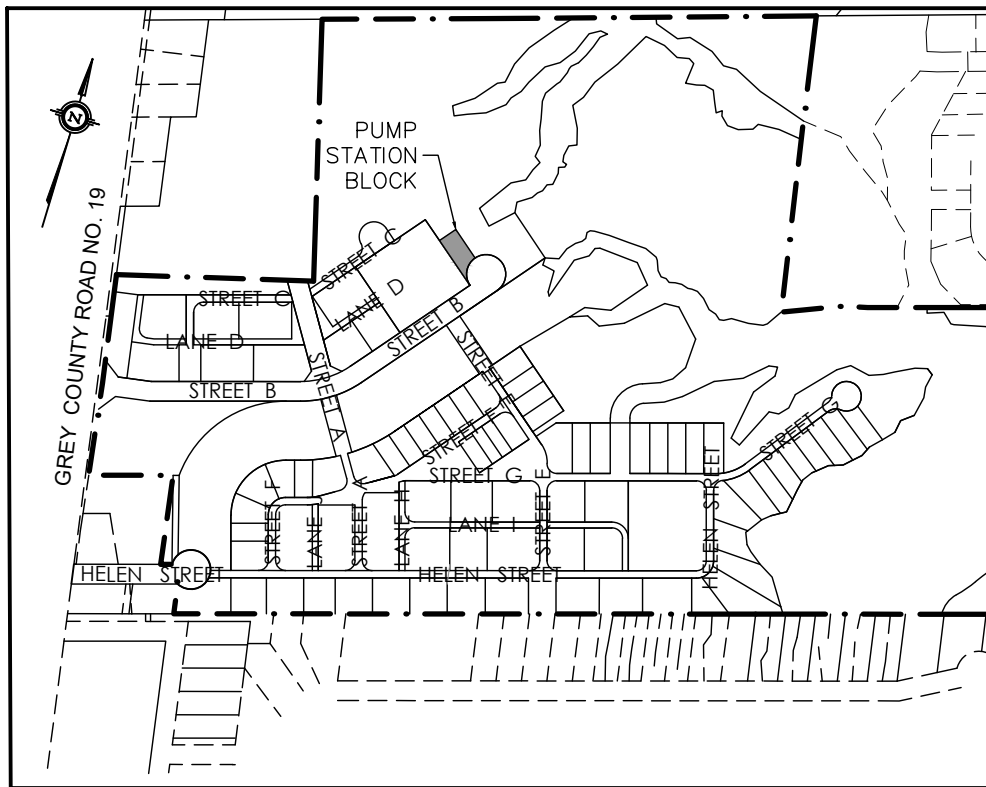
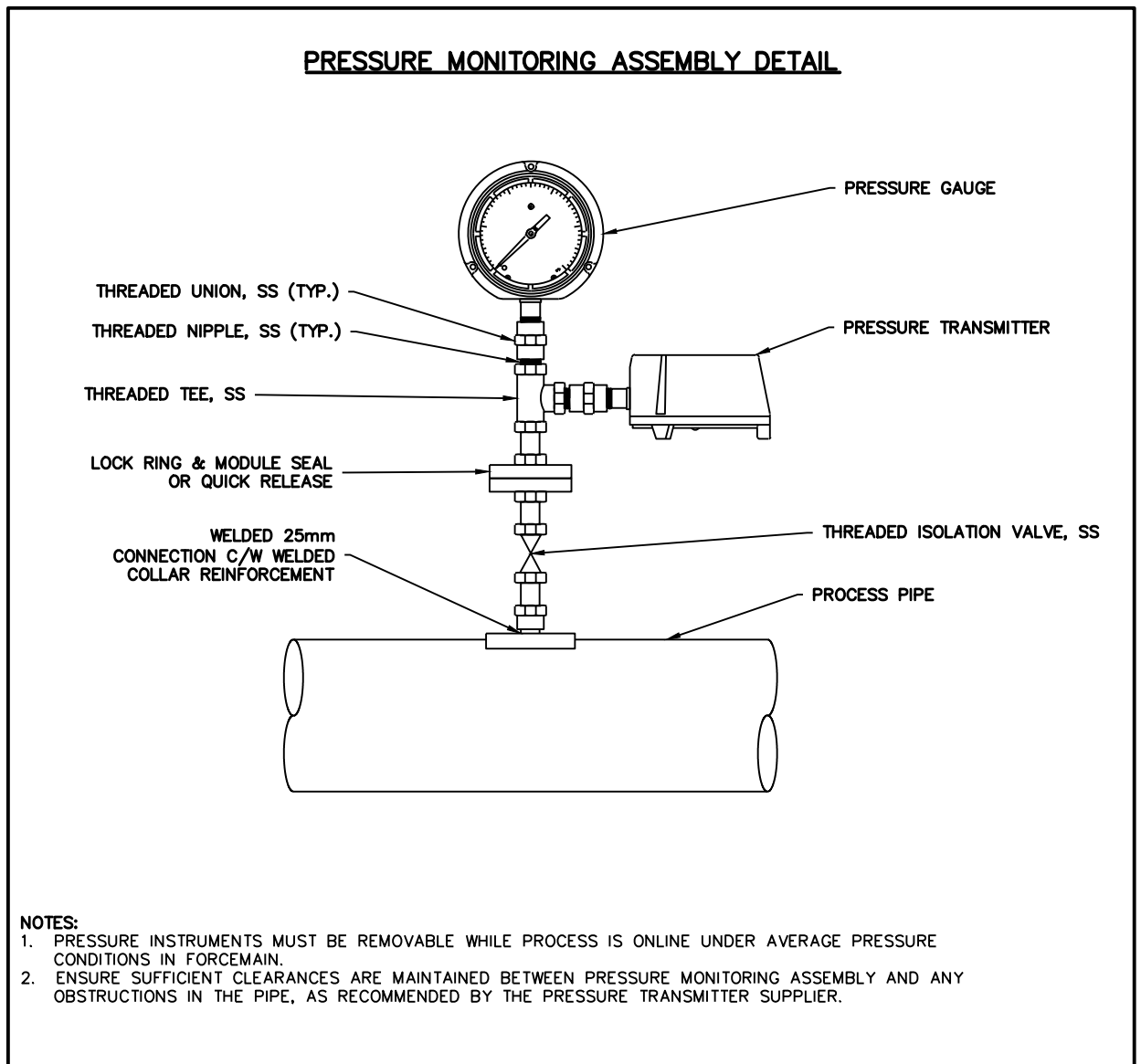
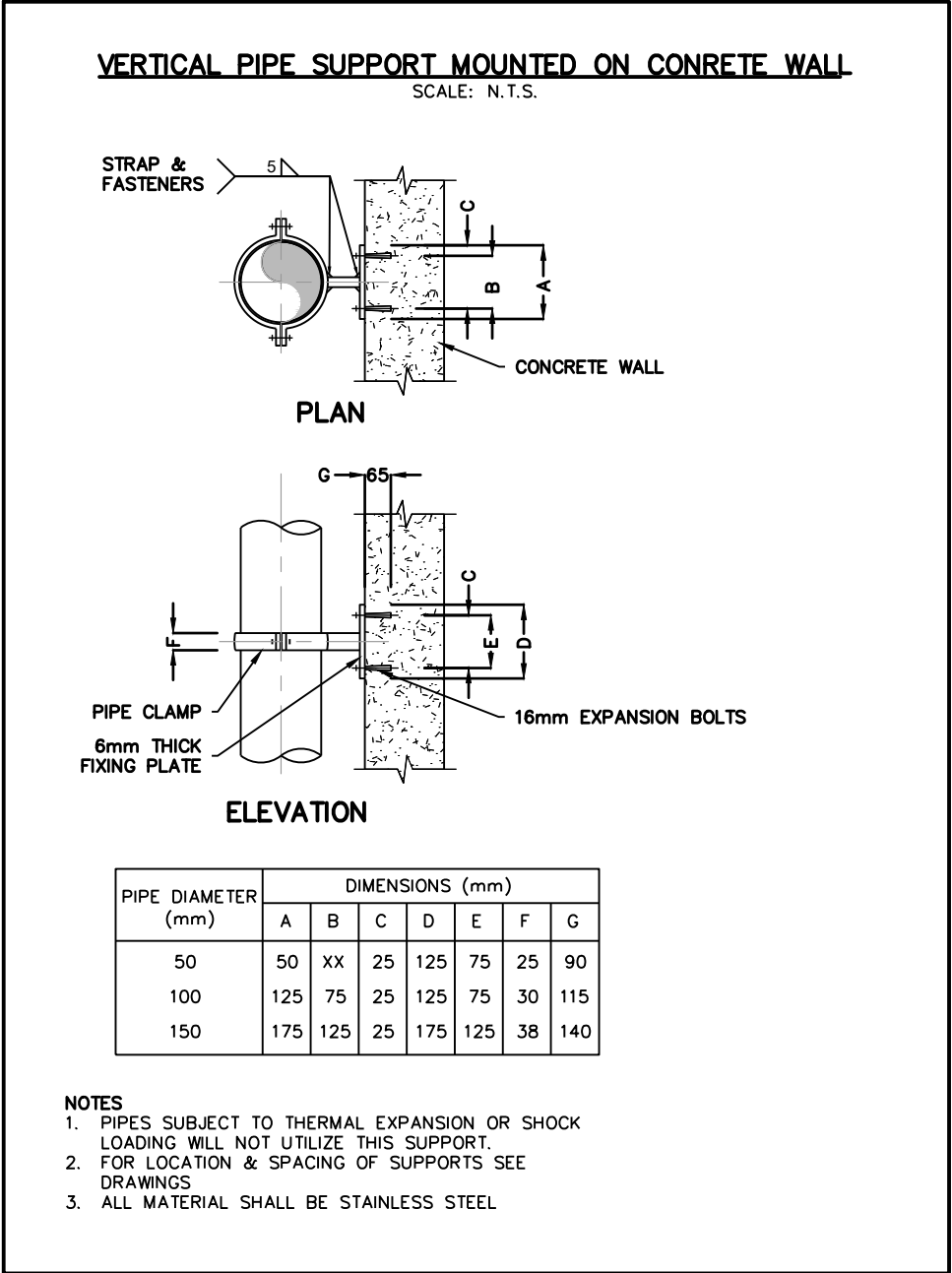
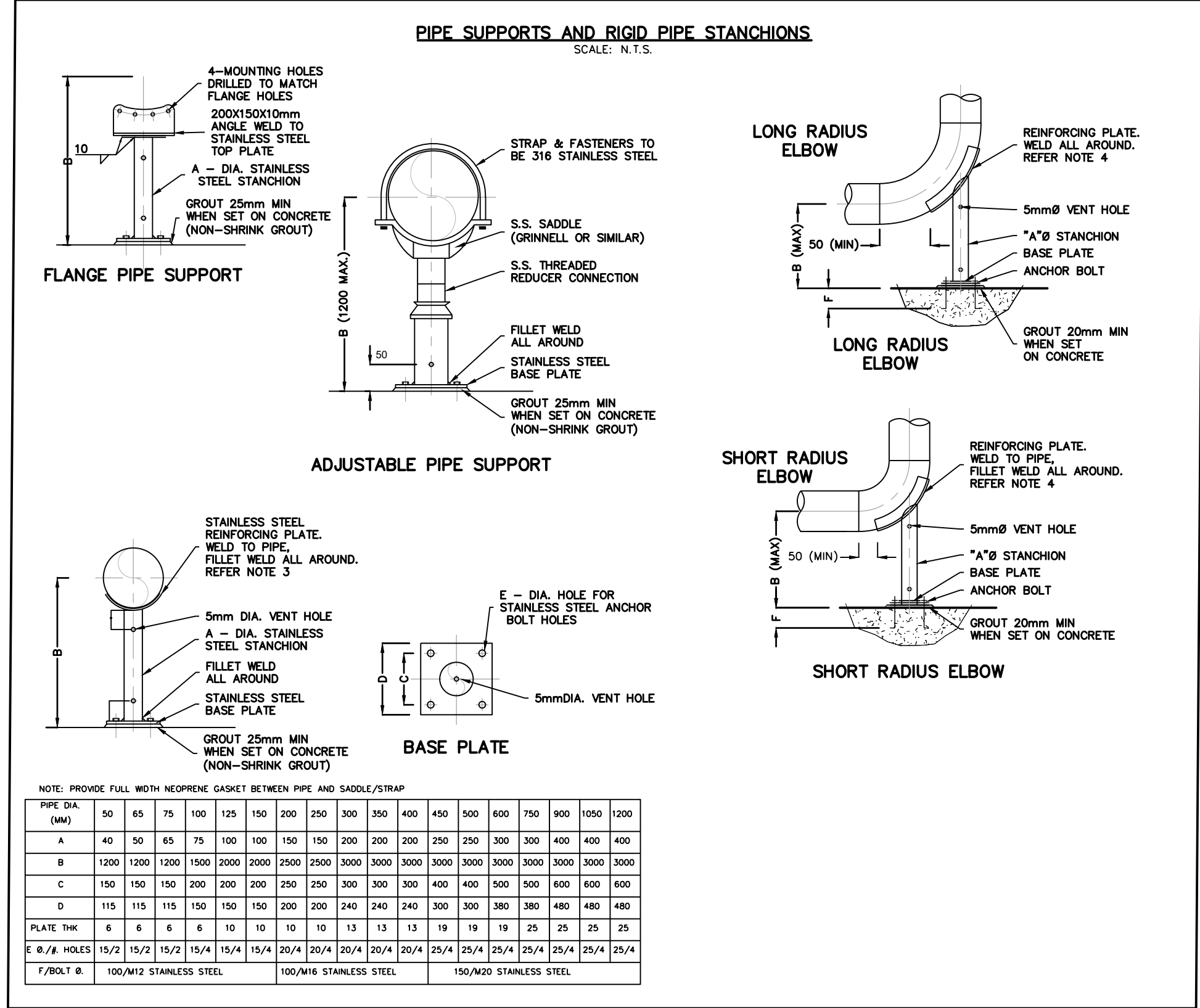


	Project
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Drawing

Project	HOME FARM SEWAGE PUMPING STATION TOWN OF THE BLUE MOUNTAINS
Drawing	EMERGENCY STORAGE TANK CROSS SECTIONS





NOTES:

PIPING SUPPORT SYSTEM SHALL BE DESIGNED AND SHOP DRAWINGS PREPARED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE PROVINCE OF ONTARIO.

THE DIMENSIONS PROVIDED IN THE DETAILS ON THIS SHEET ARE ONLY SUGGESTIONS. IT IS THE RESPONSIBILITY OF THE ENGINEER WHO SEALED THE SHOP DRAWING(S) TO VERIFY THOSE DIMENSIONS.

- THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE MODIFICATION AND/OR REPRODUCTION OF ANY PART OF THIS DRAWING IS STRICTLY PROHIBITED WITHOUT WRITTEN AUTHORIZATION FROM THIS OFFICE.
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TBM#2
TBM#3

***ADD REFERENCE TO SURVEY/SOURCE

Town of Blue Mountains
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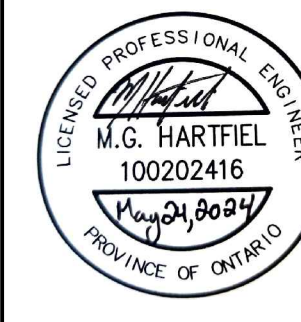
signature date 26-Aug-2024

No.	ISSUE	DATE: YYYY/MM/DD
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Engineer



Engineer



Project

HOME FARM
SEWAGE PUMPING STATION
TOWN OF THE BLUE MOUNTAINS

GENERAL PROCESS DETAILS



Drawn By B.E. Design By B.E. Project 721-3464
Check By A.L. Check By M.H. Drawing P105

APPENDIX B

Wet Well Design
System Curve Calculations
Emergency Storage Calculations

Home Farm SPS Wet Well Design and Emergency Storage Time

Wet Well Design	
Ultimate Peak Design Flow	20.18 L/s
Ultimate Peak Pump Target Design Flow (per pump)	20.18 L/s
Target Min Operating Volume per MECP	3.03 m ³
Wet Well Size (Circular)	
Wet Well Diameter	3048 mm
Wet Well Surface Area	7.30 m ²
Ultimate Depth of pump start to pump stop	0.45 m
Volume	3.28 m ³

Wet Well Structure Elevations	
Top of Wet Well Elevation	216.10 m
Top of Ground Elevation	215.90 m
Forcemain C/L Elevation Exiting Wet Well	213.90 m
Basement Flood Elevation	214.90 m
Emergency Storage Elevation	214.60 m
Influent Sewer Elevation in Wet Well	210.50 m
Wet Well Floor Elevation	208.40 m

Emergency Storage Retention Time	
Hours of Peak Flow Required	2.00 hr
Volume Required	145.30 m ³
Wet Well Storage Provided	31.74 m ³
Emergency Storage Tank Volume	50.08 m ³
Emergency Storage in Sewer System	64.02 m ³
Total Emergency Storage	145.84 m³
% of 2 hr Storage Onsite	56%
% of 2 hr Storage within Collection System	44%
Sufficient Emergency Storage	YES (Total > Req)

Note: Emergency Storage Depth calculated from standby pump start to overflow.

Recommended Wet Well Pump Control & Alarm Elevations		
		Delta
Emergency Storage Alarm (Float)	214.60	- m
High Level Alarm (Float)	210.25	0.00 m
Start Standby Pump (Backup - Float)	210.25	0.10 m
High Level Alarm (PLC)	210.15	0.20 m
Start Duty Pump (Backup - Float)	209.95	0.10 m
Start Standby Pump (PLC)	209.85	0.20 m
Start Duty Pump - Ultimate (PLC)	209.65	0.45 m
Stop Pumps (PLC)	209.20	0.30 m
Stop Pumps (Backup - Float)	208.90	0.10 m
Low Level Alarm (PLC)	208.80	0.10 m
Pump Volute C/L	208.70	0.30 m
Wet Well Floor Elevation	208.40	0.00 m

*Minimum depth per Flygt

0.28 m

*PLC = Ultrasonic

Criteria for Pump Controls

Lag Pump Start 0.30m below incoming sewer

0.30m between float/backup controls

Minimum elevation to avoid intake vortexing 0.28m (per Xylem for proposed pump)

Wet Well Working Volume and Pump Cycle Times

Working Well Volume Check

Criteria:

Less than 30 min residence time (Time to Fill) at average dry weather flows.

Fewer than 6 starts per hour.

Lead Pump ON - (Stop Duty Pump to Start Duty Pump)

Inflow Scenario	Inflow (L/s)	Working Volume (m ³)	Time to Fill (min)	Pump Discharge Rate (L/s)	Discharge minus Inflow (L/s)	Pump Time (min)	Cycle Time (min)	Starts Per Hour
Ultimate - Average Dry Weather	3.90	3.28	14.0	20.18	16.28	3.4	17.4	3.4
Ultimate - Average Wet Weather	9.22		5.9		10.96	5.0	10.9	5.5



Project: Home Farm
Project No.: 721-3464
Design By: CB
Checked By: BE
Date: 26-Jun-26
Updated: -

Hazen Williams C-Factor

Maximum Lift	Curve A (C_A)	100
Normal Lift	Curve B (C_B)	110
Min. Lift (Max Storage)	Curve C (C_C)	120 / 140

Pipe Section 1

Name:	Individual Pump Discharge	
Flow Type:	Individual	
Material:	100mm SCH10s SS	
Pipe I.D.:	0.108	m
Length:	8.8	m
Side:	Discharge	

Valves and Fittings

[illegible]

Pipe Section 2

Name:	Common Header (VC)	
Flow Type:	Common	
Material:	150mm SCH10s SS	
Pipe I.D.:	0.162	m
Length:	3.9	m
Side:	Discharge	

Valves and Fittings

Type	K	Qty	Total K
T Line Flow	0.30	2	0.60
T Branch Flow	1.25	1	1.25
Magnetic Flowmeter	0.15	1	0.15
Gate Valve	0.31	3	0.93
90° Elbow	0.31	1	0.31
Air & Vacuum Valve	0.30	1	0.30
		Total K	3.54

Pipe Section 3

Name:	Forcemain
Flow Type:	Common
Material:	150mm DR18 PVC
Pipe I.D.:	0.155 m
Length:	600.0 m
Side:	Discharge

Valves and Fittings

[illegible]

Pipe Section 4

Name:	
Flow Type:	
Material:	
Pipe I.D.:	m
Length:	m
Side:	

Valves and Fittings

[illegible]

Home Farm SPS
One Pump System Curve (To Forcemain Highpoint)

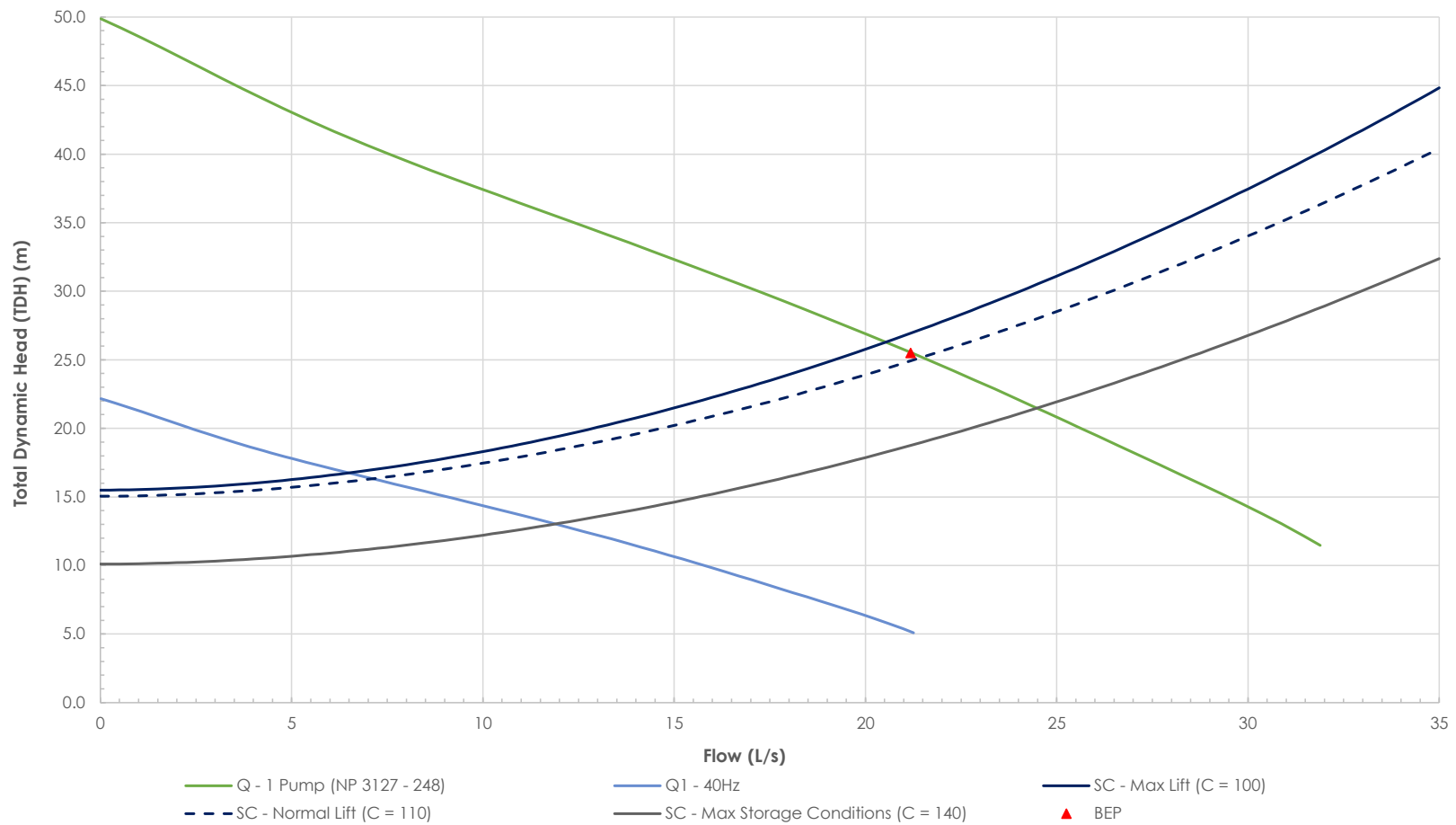
FLOW RATE QT (L/s)	Max Lift TDH (m)	Normal Lift TDH (m)	Overflow Conditions TDH (m)
	C = 100 Static Head (m) = 15.50	C = 110 Static Head (m) = 15.05	C = 120 Static Head (m) = 10.10
0.00	15.50	15.05	10.10
2.50	15.71	15.23	10.26
5.00	16.27	15.71	10.67
7.50	17.14	16.46	11.33
10.00	18.30	17.46	12.21
12.50	19.76	18.72	13.31
15.00	21.49	20.21	14.62
17.50	23.50	21.95	16.15
20.18	25.95	24.06	18.01
22.50	28.31	26.10	19.80
25.00	31.11	28.52	21.93
27.50	34.16	31.17	24.25
30.00	37.47	34.03	26.77
32.50	41.03	37.11	29.49
35.00	44.83	40.41	32.39
37.50	48.89	43.92	35.48
40.00	53.18	47.64	38.77
42.50	57.73	51.58	42.24
45.00	62.51	55.72	45.89
47.50	67.53	60.08	49.73
50.00	72.79	64.64	53.75
52.50	78.28	69.40	57.96
55.00	84.01	74.37	62.34
57.50	89.97	79.55	66.91
60.00	96.17	84.93	71.66
62.50	102.59	90.51	76.58
65.00	109.25	96.29	81.69
67.50	116.14	102.27	86.97
70.00	123.25	108.44	92.43
72.50	130.59	114.82	98.06
75.00	138.16	121.40	103.87
77.50	145.95	128.17	109.85
80.00	153.97	135.13	116.01
82.50	162.21	142.30	122.34
85.00	170.67	149.65	128.85
87.50	179.36	157.20	135.52
90.00	188.26	164.95	142.37
92.50	197.39	172.89	149.39
95.00	206.74	181.02	156.58
97.50	216.30	189.34	163.94
100.00	226.09	197.85	171.47

System Curve Calculation

- Hazen Williams C-factor is applied in Bulk to the entire system
- Head loss calculated according to:
Major losses $(10.675 * L * Q^{1.852}) \div (C^{1.852} * D^{4.8704})$
Minor losses $(k * v^2) \div (2 * g)$
- Units, unless otherwise noted are:

Q	L/s	Head	m	D	m
v	m/s	L	m		

Home Farm SPS
PUMP CURVE AND SYSTEM CURVE (TO FORCEMAIN HIGHPOINT)



Home Farm SPS
One Pump System Curve (To Forcemain Outlet)

FLOW RATE QT (L/s)	Max Lift TDH (m)	Normal Lift TDH (m)	Overflow Conditions TDH (m)
	C = 100 Static Head (m) = 12.67	C = 110 Static Head (m) = 12.22	C = 140 Static Head (m) = 7.27
0.00	12.67	12.22	7.27
2.50	12.88	12.40	7.39
5.00	13.44	12.88	7.73
7.50	14.31	13.63	8.25
10.00	15.47	14.63	8.95
12.50	16.93	15.89	9.83
15.00	18.66	17.38	10.89
17.50	20.67	19.12	12.11
20.18	23.12	21.23	13.60
22.50	25.48	23.27	15.05
25.00	28.28	25.69	16.76
27.50	31.33	28.34	18.64
30.00	34.64	31.20	20.67
32.50	38.20	34.28	22.86
35.00	42.00	37.58	25.21
37.50	46.06	41.09	27.71
40.00	50.35	44.81	30.36
42.50	54.90	48.75	33.17
45.00	59.68	52.89	36.13
47.50	64.70	57.25	39.23
50.00	69.96	61.81	42.49
52.50	75.45	66.57	45.90
55.00	81.18	71.54	49.46
57.50	87.14	76.72	53.16
60.00	93.34	82.10	57.01
62.50	99.76	87.68	61.01
65.00	106.42	93.46	65.16
67.50	113.31	99.44	69.44
70.00	120.42	105.61	73.88
72.50	127.76	111.99	78.46
75.00	135.33	118.57	83.18
77.50	143.12	125.34	88.04
80.00	151.14	132.30	93.05
82.50	159.38	139.47	98.20
85.00	167.84	146.82	103.50
87.50	176.53	154.37	108.93
90.00	185.43	162.12	114.51
92.50	194.56	170.06	120.22
95.00	203.91	178.19	126.08
97.50	213.47	186.51	132.08
100.00	223.26	195.02	138.21

System Curve Calculation

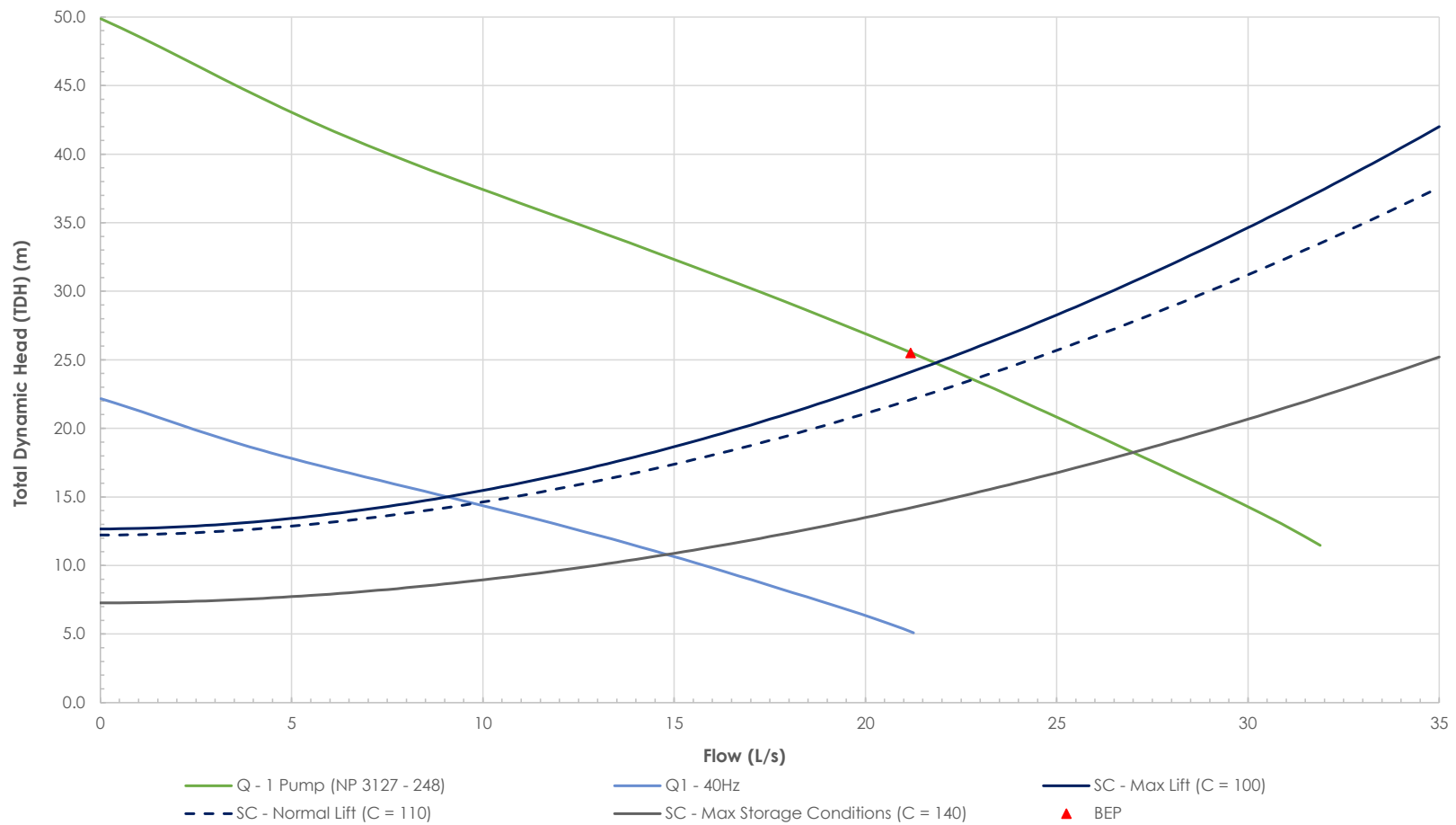
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- Units, unless otherwise noted are:

Q	L/s	Head	m	D	m
v	m/s	L	m		

Home Farm SPS
PUMP CURVE AND SYSTEM CURVE (TO FORCEMAIN OUTLET)





Project: Home Farm
Project No: 721-3464

Design by: BE
Check By:
Update By: CB

Date: 2023-03-21
Updated: 2026-06-25

EMERGENCY RETENTION CALCULATIONS

Operating Levels

Duty Pump* 209.65
Alarm Level 210.25
Basement Flooding* 214.60

*Start Duty Pump (PLC)

*0.30m below lowest connected BFE (214.90 - Lot 1)

Wet Well Storage

Water Depth* 4.35 m
Wet Well Diameter 3.048 m
Wet Well Volume 31.7 m³

*Depth from alarm level to basement flooding

SANITARY SEWER EMERGENCY STORAGE

Location	From	To	Diameter (mm)	Upstream Invert	Downstream Invert	Length (m)	Storage Volume (m ³)*	*0 if DS invert above BFE
Street A	MH11	MH20	200	219.35	219.02	66.1	0.00	
	MH20	MH16	200	218.973	218.88	18.7	0.00	
Street B	MH37	MH36	200	222.81	222.61	20.0	0.00	
	MH36	MH35	200	222.06	221.16	90.1	0.00	
	MH35	MH34	200	221.11	219.27	87.5	0.00	
	MH34	MH33	200	219.22	217.97	41.3	0.00	
	MH33	MH32	200	217.94	215.82	57.3	0.00	
	MH32	MH3	200	215.78	213.80	19.2	0.60	Partial Length
	MH3	MH2	200	211.49	211.24	49.2	1.55	
	MH2	MH1	200	211.16	210.95	42.7	1.34	
Street C	MH42	MH41	200	221.44	220.77	27.6	0.00	
	MH41	MH40	200	220.72	220.43	16.8	0.00	
	MH40	MH39	200	220.35	218.24	102.4	0.00	
	MH39	MH38	200	218.19	215.85	73.8	0.00	
Street E	MH38	SAMH43A	200	215.60	212.38	51.4	1.61	Partial Length
	MH9	MH8	200	213.22	212.97	49.7	1.56	
	MH8	MH7	200	212.94	212.69	48.3	1.52	
	MH7	MH6	200	212.66	212.55	24.2	0.76	
	MH6	MH5	200	212.50	212.19	61.4	1.93	
	MH5	MH4	200	212.16	211.95	42.2	1.33	
Street F	MH4	MH3	200	211.92	211.57	70.0	2.20	
	MH19	MH12	200	221.66	221.03	62.8	0.00	
	MH19	MH18	200	221.74	221.45	14.7	0.00	
	MH18	MH17	200	221.40	220.49	32.0	0.00	
	MH17	MH16	200	220.44	219.27	41.6	0.00	
	MH16	MH15	200	218.80	218.19	52.5	0.00	
Street G	MH15	MH21	200	218.14	217.08	62.2	0.00	
	MH21	MH5	200	217.05	215.30	69.9	0.00	
	MH15	MH14	200	218.34	216.53	90.6	0.00	
	MH14	MH7	200	216.50	215.72	52.6	0.00	
Helen Street	MH28A	MH7	200	213.04	212.74	62.2	1.95	
	MH28	MH28A	200	213.22	213.07	15.0	0.47	
	MH13A	MH13	200	226.02	223.26	97.8	0.00	
	MH13	MH12	200	222.67	220.97	100.5	0.00	
	MH12	MH11	200	220.94	219.79	87.2	0.00	
	MH11A	MH10	200	219.17	217.57	80.1	0.00	
Town & SPS Blocks	MH10	MH9	200	217.45	215.40	89.4	0.00	
	MH31	MH31A	200	213.87	213.72	15.0	0.47	
	MH31A	MH9	200	213.69	213.30	77.9	2.45	
	SAMH43A	SAMH59A	200	211.80	211.48	24.9	0.78	
Rental / Long-Term Care Units	SAMH60A	SAMH59A	200	211.64	211.51	25.6	0.80	
	SAMH59A	MH1	200	211.43	211.16	30.5	0.96	
	MH1	Wet Well	200	210.60	210.53	3.5	0.11	
	SAMH50A	SAMH51A	200	215.93	215.48	45.0	0.00	
	SAMH51A	SAMH52A	200	215.45	215.03	83.8	0.00	
	SAMH53A	SAMH52A	200	215.27	214.98	29.0	0.00	
	SAMH52A	SAMH54A	200	214.95	214.83	23.6	0.00	
	SAMH54A	SAMH55A	200	214.78	214.72	12.6	0.00	
	SAMH55A	SAMH56A	200	214.67	214.55	23.0	0.00	
	SAMH56A	SAMH57A	200	214.50	214.44	13.1	0.00	
	SAMH57A	SAMH58A	200	214.39	213.95	85.5	2.69	
	SAMH58A	SAMH43A	200	213.87	213.79	15.0	0.47	



Project: Home Farm
Project No: 721-3464

Design by: BE
Check By:
Update By: CB

Date: 2023-03-21
Updated: 2026-06-25

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Alarm Level 210.25
Basement Flooding* 214.60

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*0.30m below lowest connected BFE (214.90 - Lot 1)

Wet Well Storage

Water Depth* 4.35 m
Wet Well Diameter 3.048 m
Wet Well Volume 31.7 m³

*Depth from alarm level to basement flooding

SANITARY STRUCTURES EMERGENCY STORAGE

Location	Structure	Diameter	Top of Grate Elevation	Emergency Storage Elevation	Downstream Invert	Depth Below Basement Flooding (m)	Storage Volume (m ³)*	*0 if DS invert above BFE
Street A	MH20	1200	222.73	214.60	218.97	0.0	0.00	
Street B	MH37	1200	226.25	214.60	222.81	0.0	0.00	
	MH36	1200	225.91	214.60	222.06	0.0	0.00	
	MH35	1200	224.93	214.60	221.11	0.0	0.00	
	MH34	1200	222.54	214.60	219.22	0.0	0.00	
	MH33	1200	221.31	214.60	217.94	0.0	0.00	
	MH32	1200	219.31	214.60	215.78	0.0	0.00	
	MH3	1200	216.66	214.60	211.49	3.1	3.52	
Street C	MH2	1200	215.96	214.60	211.16	3.4	3.89	
	MH42	1200	224.69	214.60	221.44	0.0	0.00	
	MH41	1200	224.10	214.60	220.72	0.0	0.00	
	MH40	1200	223.75	214.60	220.35	0.0	0.00	
	MH39	1200	222.11	214.60	218.19	0.0	0.00	
Street E	MH38	1200	218.69	214.60	215.60	0.0	0.00	
	MH8	1200	219.04	214.60	212.94	1.7	1.88	
	MH7	1200	218.52	214.60	212.66	1.9	2.19	
	MH6	1200	218.58	214.60	212.50	2.1	2.38	
	MH5	1200	218.89	214.60	212.16	2.4	2.76	
Street F	MH4	1200	218.29	214.60	211.92	2.7	3.03	
	MH19	1200	225.28	214.60	221.66	0.0	0.00	
	MH18	1200	225.04	214.60	221.40	0.0	0.00	
	MH17	1200	223.67	214.60	220.44	0.0	0.00	
	MH16	1200	222.64	214.60	218.80	0.0	0.00	
	MH15	1200	222.00	214.60	218.14	0.0	0.00	
Street G	MH21	1200	220.46	214.60	217.05	0.0	0.00	
	MH14	1200	219.92	214.60	216.50	0.0	0.00	
	MH28	1200	215.45	214.60	213.22	1.4	1.56	
Helen Street	MH13A	1200	229.06	214.60	226.02	0.0	0.00	
	MH13	1200	227.25	214.60	222.67	0.0	0.00	
	MH12	1200	224.48	214.60	220.94	0.0	0.00	
	MH11	1200	222.96	214.60	219.35	0.0	0.00	
	MH10	1200	220.90	214.60	217.45	0.0	0.00	
	MH31	1200	216.03	214.60	213.87	0.7	0.83	
Town and SPS	MH9	1200	218.97	214.60	213.22	1.4	1.56	
	SAMH43A	1500	217.48	214.60	211.80	2.8	4.95	
	SAMH60A	2400	214.60	214.60	211.64	3.0	13.40	
	SAMH59A	1200	216.48	214.60	211.43	3.2	3.59	
Rental / Long-Term Care Units	MH1	1200	215.68	214.60	210.60	4.0	4.52	
	SAMH50A	1200	219.08	214.60	215.93	0.0	0.00	
	SAMH51A	1200	218.85	214.60	215.45	0.0	0.00	
	SAMH53A	1200	218.63	214.60	215.27	0.0	0.00	
	SAMH52A	1200	218.45	214.60	214.95	0.0	0.00	
	SAMH54A	1200	218.30	214.60	214.78	0.0	0.00	
	SAMH55A	1200	218.22	214.60	214.67	0.0	0.00	
	SAMH56A	1200	218.07	214.60	214.50	0.1	0.11	
	SAMH57A	1200	217.99	214.60	214.39	0.2	0.24	
	SAMH58A	1200	217.39	214.60	213.87	0.7	0.83	



Project: Home Farm
Project No: 721-3464

Design by: BE
Check By:
Update By: CB

Date: 2023-03-21
Updated: 2026-06-25

EMERGENCY RETENTION CALCULATIONS

Operating Levels

Duty Pump*	209.65	*Start Duty Pump (PLC)
Alarm Level	210.25	
Basement Flooding*	214.60	*0.30m below lowest connected BFE (214.90 - Lot 1)

Wet Well Storage

Water Depth*	4.35	m	*Depth from alarm level to basement flooding
Wet Well Diameter	3.048	m	
Wet Well Volume	31.7	m ³	

Available Storage

	Ultimate	Units
Wet Well	31.74	m ³
Sanitary Manhole	51.24	m ³
Sanitary Sewer	12.78	m ³
Storage Tank	50.08	m ³
Total	145.84	m³

assume only 1/2 of sewer below bfe is available

Hydraulic Retention Time (Home Farm/Long-term care/Rentals)

	Flow (L/s)	Flow (m ³ /min)	HRT (min)	HRT (hr)
Average Flow (Resid. + Comm.)	3.90	0.23	623.2	10.4
Wet Weather Flow (+ I&I)	9.05	0.54	268.6	4.5
Peak Flow	20.01	1.20	121.5	2.02