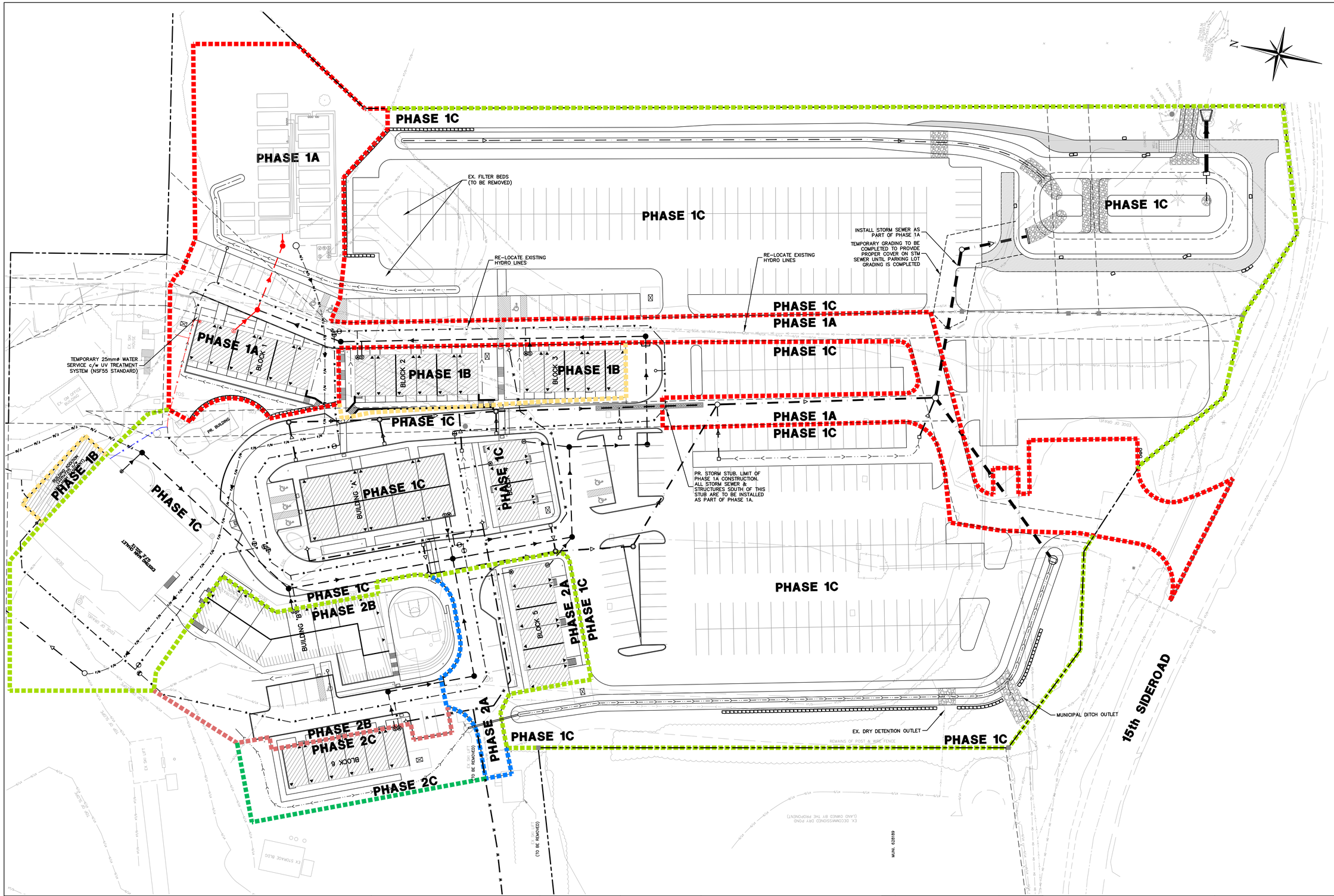
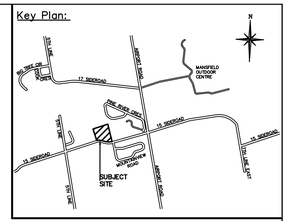


Key Plan:



Legend:

EXISTING FEATURES (EX)

- EX SIB — EX STD IRON BAR
- EX IB — EX IRON BAR
- EX UP — EX UTILITY POLE
- EX BELL PED
- EX WS — EX WATER SERVICE
- EX HYD — EX FIRE HYD.
- NS — EX ST NAME SIGN
- SS — EX STOP SIGN
- x123.45 — EX ELEVATION
- EX FENCE
- GAS — EX U/G GASMAIN
- XB — EX U/G BELL
- HX — EX HYDRO
- EX BOTTOM OF SLOPE
- EX TOP OF SLOPE
- EX WV — EX WATERMAIN & VALVE
- EX SAN @ 0.0% — EX SAN SEWER & MH
- EX STM @ 0.0% — EX STM SEWER & MH

PROPOSED FEATURES (PR)

- NS — PR STREET NAME SIGN
- SS — PR STOP SIGN
- SF — PR SILT FENCE
- PR LEGAL PART LOTS
- PR LEGAL BOUNDARY
- L — PR STREET LIGHT
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- 00mmø W/M — PR WATERMAIN
- 00mmø W/M — PR TEMPORARY WATERMAIN FOR PHASE 1A
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Phasing Legend:

- PHASE 1A
- PHASE 1B
- PHASE 1C
- PHASE 2A
- PHASE 2B
- PHASE 2C

CAUTION

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Benchmark: 463.937m

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No.	Issue / Revision	Date
1	SPA FIRST SUBMISSION	AUG. 17, 2020
2	SPA SECOND SUBMISSION	DEC. 15, 2020
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5	SPA FINAL SUBMISSION	SEPT. 8, 2021

Mansfield Ski Club

PHASING PLAN

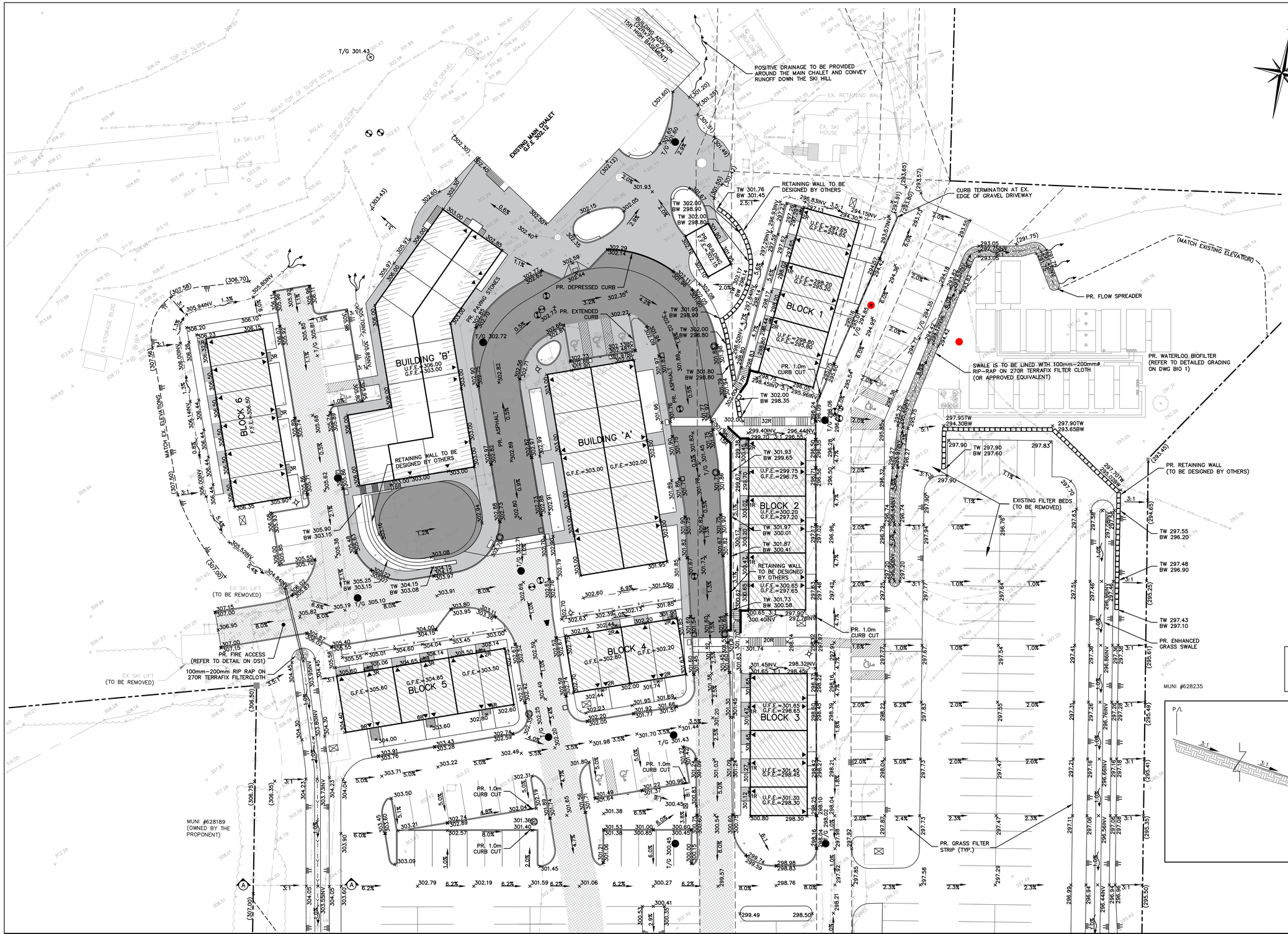
Client:

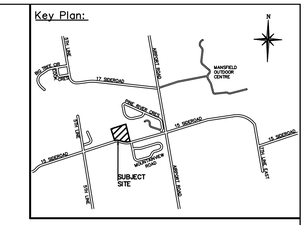
Mansfield Ski Club

628213 15th Sideroad
PO Box 75 RPO Mansfield,
Mulmur, Ontario
L9V 3M6

WMI & Associates Limited
119 Collier Street
Barrie, Ontario
L4M 1H5
Ph 705-797-2027
www.wmiengineering.ca

Drawn By	Checked By	Drawing No.
AW	JWL	PHA
Scale 1:400	Project No. 15–319	





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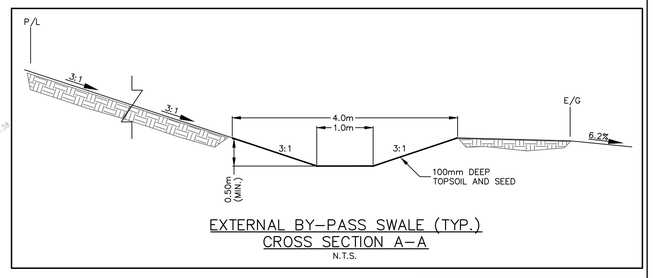

EXTERNAL BY-PASS SWALE (TYP.)
CROSS SECTION A-A
N.T.S.

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REGISTERED PROFESSIONAL ENGINEER
J.W.LIGHTHEART
100140403
SEPT 8, 2021
PROVINCE OF ONTARIO

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Mansfield Ski Club

SITE GRADING PLAN NORTH

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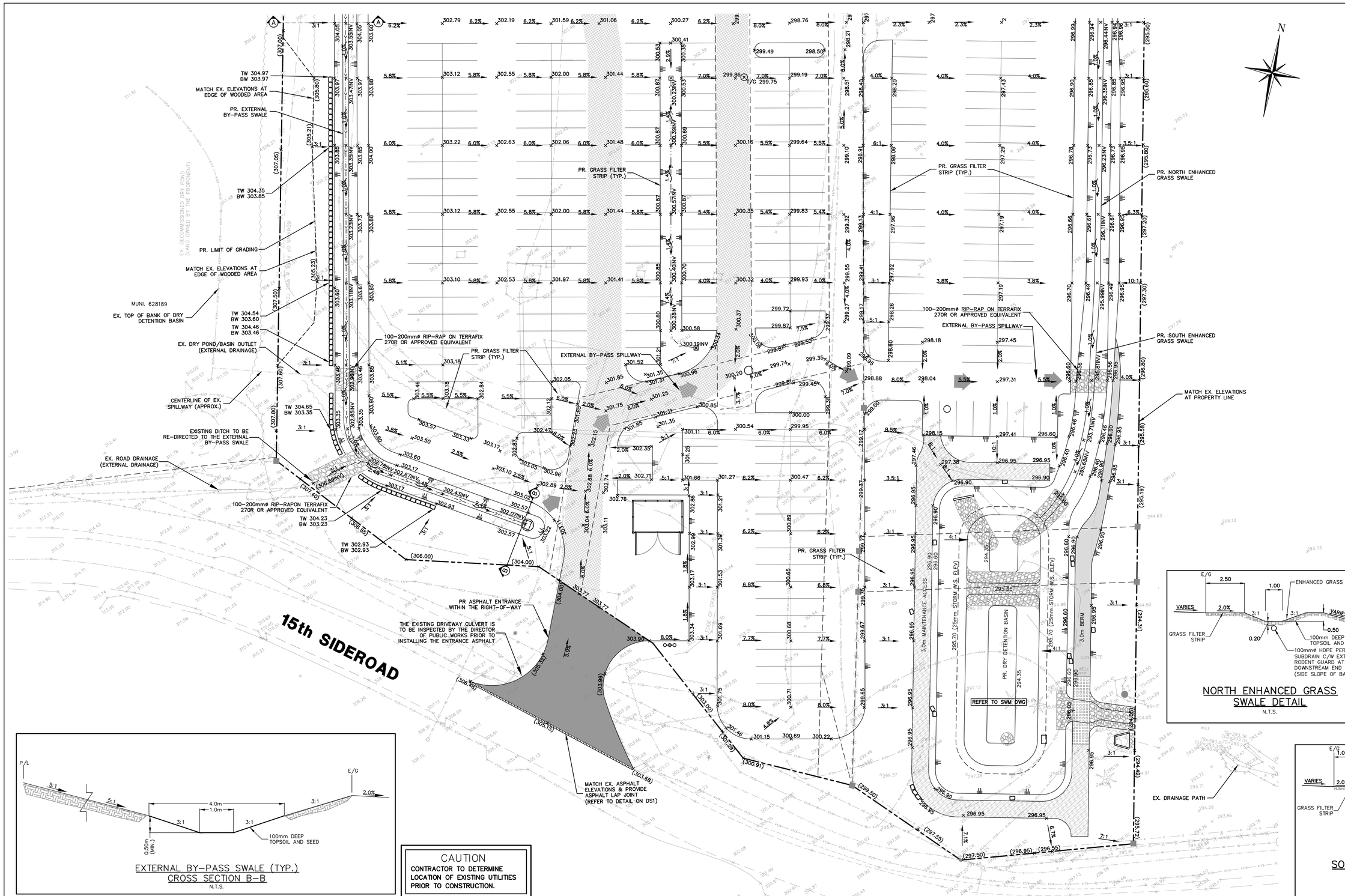
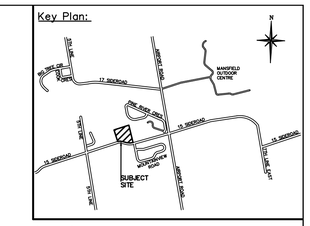
Drawn By	AW	Checked By	JWL	Drawing No.
Scale	1:300	Project No.	15-319	SGRN





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- EX HYD — EX FIRE HYD.
- NS — EX ST NAME SIGN
- SS — EX STOP SIGN
- 123.45 — EX ELEVATION
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- PR PERMANENT SAN SEWER FOR PHASE 1A
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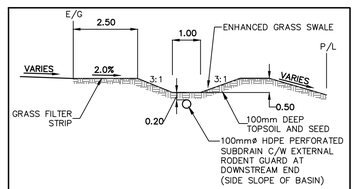
- U.F.E — UPPER FLOOR ELEVATION
- G.F.E — GROUND FLOOR ELEVATION
- EXTERNAL BY-PASS SPILLWAY

EXTERNAL BY-PASS SWALE (TYP.)
CROSS SECTION B-B
N.T.S.



NORTH ENHANCED GRASS SWALE DETAIL
N.T.S.

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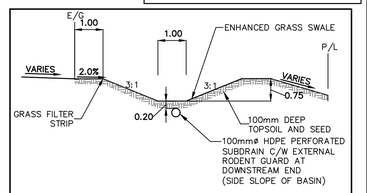

SOUTH ENHANCED GRASS SWALE DETAIL
N.T.S.

CAUTION

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Benchmark: 463.937m

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REGISTERED PROFESSIONAL ENGINEER
J.W.LIGHTHEART
100140403
SEPT 8, 2021
PROVINCE OF ONTARIO

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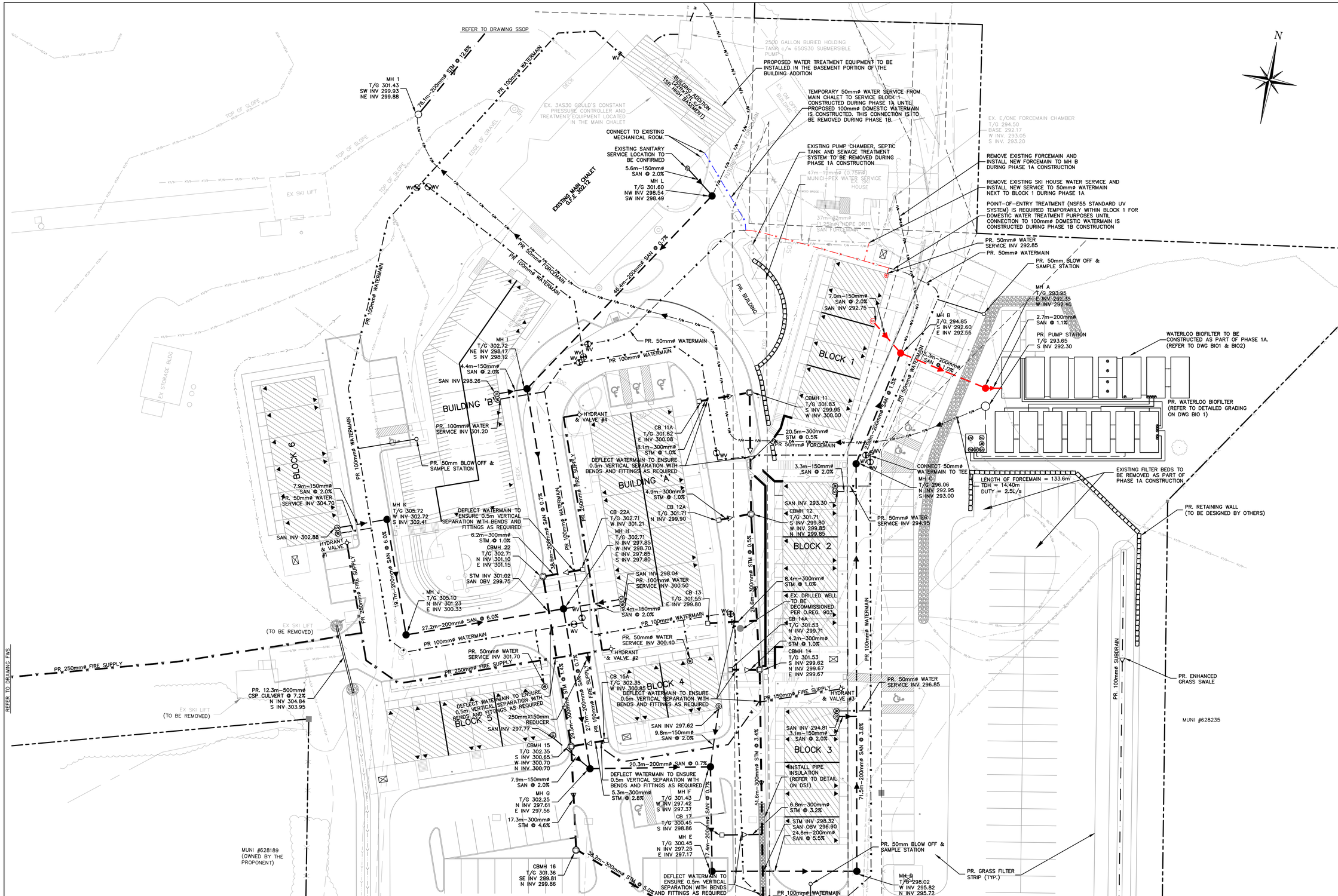
Mansfield Ski Club

SITE GRADING PLAN SOUTH

Client:
Mansfield Ski Club
628213 15th Sideroad
PO Box 75 RPO Mansfield,
Mulmur, Ontario
L9V 3M6

WMI & Associates Limited
119 Collier Street
Barrie, Ontario
L4M 1H5
Ph 705-797-2027
www.wmiengineering.ca

Drawn By	AW	Checked By	JWL	Drawing No.
Scale	1:300	Project No.	15-319	SGRS



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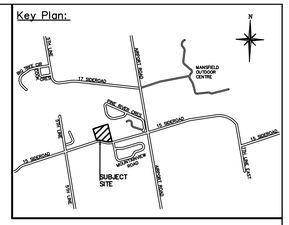

Legend:

EXISTING FEATURES (EX)

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- EX WS — EX WATER SERVICE
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PROPOSED FEATURES (PR)

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WATERMAIN NOTE:
1. THE PROPOSED BUILDINGS ARE NOT SPRINKLERED. NO SIAMESE CONNECTIONS ARE REQUIRED.

SANITARY NOTE:
1. ALL BUILDINGS THAT HAVE RESTAURANT USES WILL REQUIRE AN OIL/GREASE INTERCEPTOR PRIOR TO DISCHARGING INTO THE SANITARY SEWER SYSTEM.

CAUTION
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REGISTERED PROFESSIONAL ENGINEER
J.W.LIGHTHEART
100140403
SEPT 8, 2021
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GENERAL SERVICING PLAN NORTH

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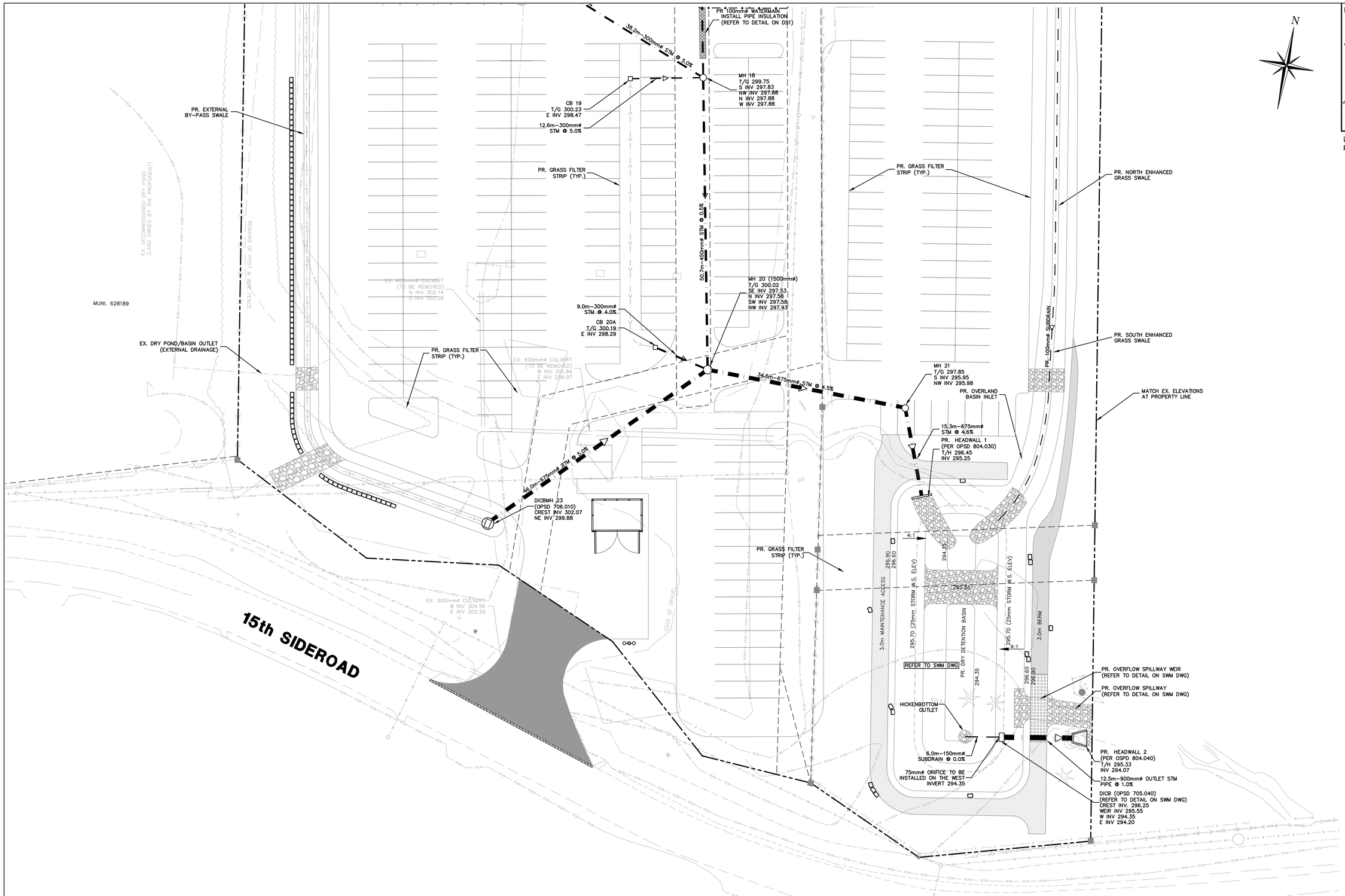
Scale	1:300	Project No.	15-319	GENN



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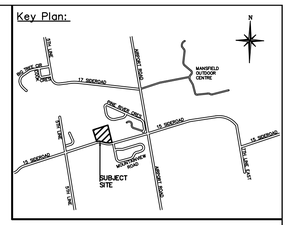

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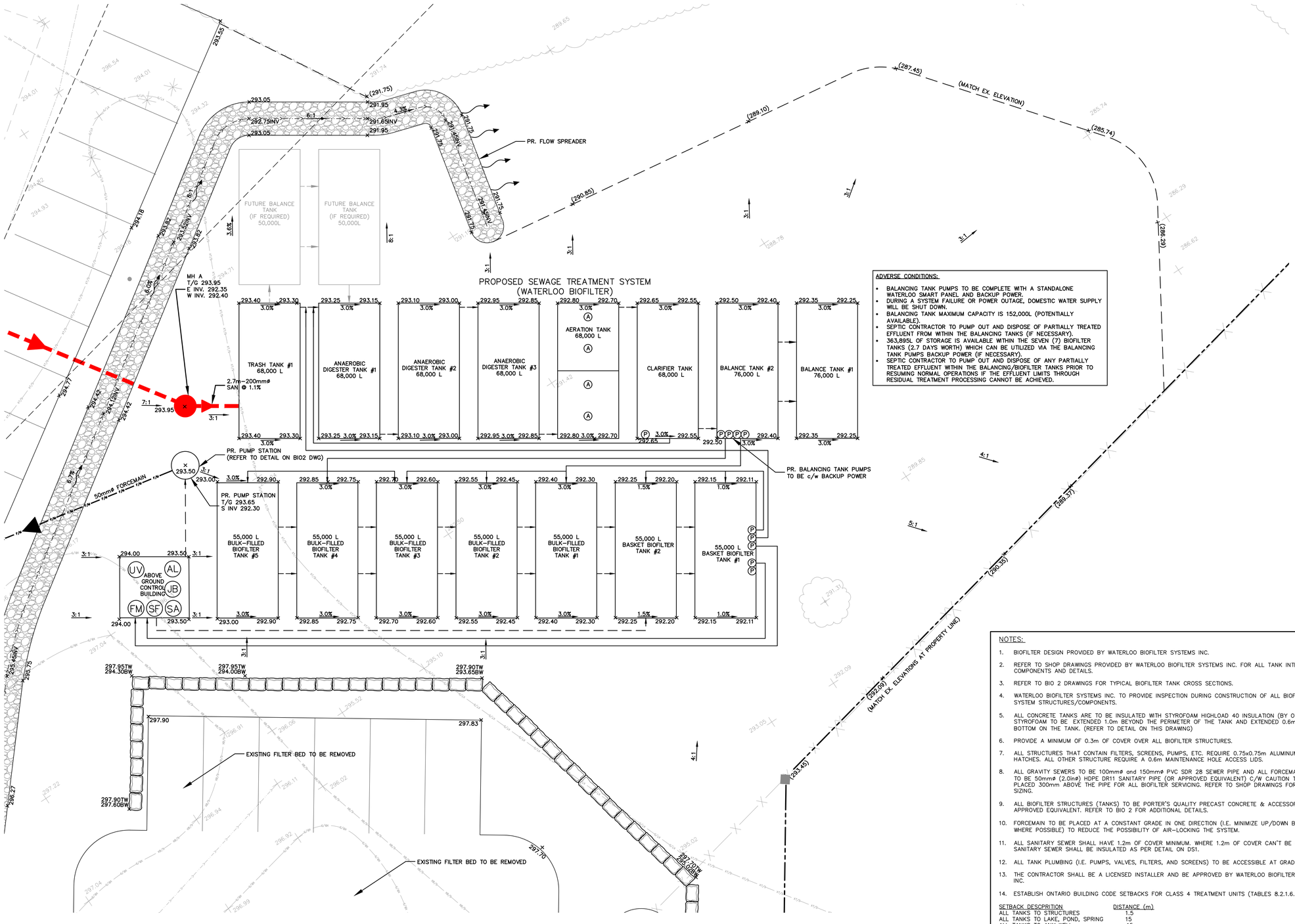
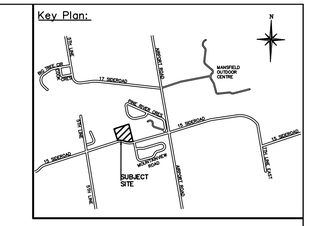
Scale 1:300	Project No. 15–319	





Legend:

——►	PR. FORCEMAIN
– – ►	PR. GRAVITY SEWER
104.90	PR. ELEVATION
(104.90)	
(A)	AERATOR
(P)	SUBMERSIBLE PUMP
(SA)	SODIUM ALUMINATE X2
(JB)	JUMPSTART BACTERIA
(AL)	ALKALINITY
(SF)	SAND FILTER X3
(FM)	FLOW METER
(UV)	UV DISINFECTION UNIT X5

ADVERSE CONDITIONS:

- BALANCING TANK PUMPS TO BE COMPLETE WITH A STANDALONE WATERLOO SMART PANEL AND BACKUP POWER.
- DURING A SYSTEM FAILURE OR POWER OUTAGE, DOMESTIC WATER SUPPLY WILL BE SHUT DOWN.
- BALANCING TANK MAXIMUM CAPACITY IS 152,000L (POTENTIALLY AVAILABLE).
- SEPTIC CONTRACTOR TO PUMP OUT AND DISPOSE OF PARTIALLY TREATED EFFLUENT FROM WITHIN THE BALANCING TANKS (IF NECESSARY).
- 363,895L OF STORAGE IS AVAILABLE WITHIN THE SEVEN (7) BIOFILTER TANKS (2.7 DAYS WORTH) WHICH CAN BE UTILIZED VIA THE BALANCING TANK PUMPS BACKUP POWER (IF NECESSARY).
- SEPTIC CONTRACTOR TO PUMP OUT AND DISPOSE OF ANY PARTIALLY TREATED EFFLUENT WITHIN THE BALANCING/BIOFILTER TANKS PRIOR TO RESUMING NORMAL OPERATIONS IF THE EFFLUENT LIMITS THROUGH RESIDUAL TREATMENT PROCESSING CANNOT BE ACHIEVED.

BIOFILTER TANK	GROUND ELEV.	TOP OF STRUCTURE ELEV.	INLET ELEV.	OUTLET ELEV.
TRASH TANK	293.40	292.67	292.32	292.27
ANAEROBIC DIGESTER TANK #1	293.25	292.44	292.09	292.04
ANAEROBIC DIGESTER TANK #2	293.10	292.21	291.86	291.81
ANAEROBIC DIGESTER TANK #3	292.95	292.11	291.76	291.71
AERATION TANK	292.80	291.88	291.53	291.48
CLARIFIER TANK	292.65	291.73	291.38	291.33
BALANCE TANK #2	292.50	291.63	291.28 (G)	287.73 (G) 290.93 (F)
BALANCE TANK #1	292.35	291.63	287.73 (G)	287.73 (G)
BULK–FILLED BIOFILTER TANK #5	293.00	292.08	292.70 (M)	290.10 (G)
BULK–FILLED BIOFILTER TANK #4	292.85	292.08	292.55 (M) 290.10 (G)	290.10 (G)
BULK–FILLED BIOFILTER TANK #3	292.70	291.93	292.55 (M) 289.95 (G)	289.95 (G)
BULK–FILLED BIOFILTER TANK #2	292.55	291.93	292.40 (M) 289.95 (G)	289.95 (G)
BULK–FILLED BIOFILTER TANK #1	292.40	291.93	292.25 (M) 289.95 (G)	289.95 (G)
BASKET BIOFILTER TANK #2	292.25	291.78	292.10 (M) 289.80 (G)	289.80 (G)
BASKET BIOFILTER TANK #1	292.25	291.78	291.95 (M) 289.80 (G)	289.80 (F)
ABOVE GROUND CONTROL BUILDING	294.00	N/A	N/A	N/A
PUMP STATION	293.50	293.65	292.30	292.30

NOTES:

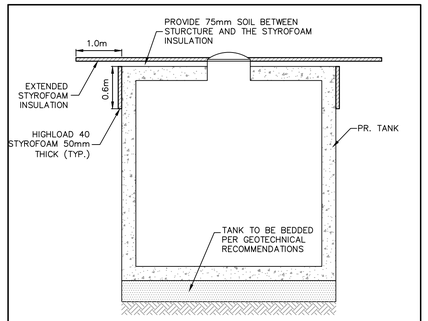
IF TANK HAS MULTIPLE INLETS AND/OR OUTLETS, ASSUME ALL INLETS ARE AT THE SAME ELEVATION AND ALL OUTLETS ARE AT THE SAME ELEVATION UNLESS OTHERWISE INDICATED.

(G) = GRAVITY SEWER
(F) = FORCEMAIN
(M) = 50mm FORCEMAIN SPRAY MANIFOLD THROUGH POLYLOK RISER

NOTES:

1. BIOFILTER DESIGN PROVIDED BY WATERLOO BIOFILTER SYSTEMS INC.
2. REFER TO SHOP DRAWINGS PROVIDED BY WATERLOO BIOFILTER SYSTEMS INC. FOR ALL TANK INTERIOR COMPONENTS AND DETAILS.
3. REFER TO BIO 2 DRAWINGS FOR TYPICAL BIOFILTER TANK CROSS SECTIONS.
4. WATERLOO BIOFILTER SYSTEMS INC. TO PROVIDE INSPECTION DURING CONSTRUCTION OF ALL BIOFILTER SYSTEM STRUCTURES/COMPONENTS.
5. ALL CONCRETE TANKS ARE TO BE INSULATED WITH STYROFOAM HIGHLOAD 40 INSULATION (BY OTHERS). STYROFOAM TO BE EXTENDED 1.0m BEYOND THE PERIMETER OF THE TANK AND EXTENDED 0.6m BELOW BOTTOM ON THE TANK. (REFER TO DETAIL ON THIS DRAWING)
6. PROVIDE A MINIMUM OF 0.3m OF COVER OVER ALL BIOFILTER STRUCTURES.
7. ALL STRUCTURES THAT CONTAIN FILTERS, SCREENS, PUMPS, ETC. REQUIRE 0.75x0.75m ALUMINUM ACCESS HATCHES. ALL OTHER STRUCTURE REQUIRE A 0.6m MAINTENANCE HOLE ACCESS LIDS.
8. ALL GRAVITY SEWERS TO BE 100mmø and 150mmø PVC SDR 28 SEWER PIPE AND ALL FORCEMAIN TO BE 50mmø (2.0inø) HDPE DR11 SANITARY PIPE (OR APPROVED EQUIVALENT) C/W CAUTION TAPE PLACED 300mm ABOVE THE PIPE FOR ALL BIOFILTER SERVICING. REFER TO SHOP DRAWINGS FOR PIPE SIZING.
9. ALL BIOFILTER STRUCTURES (TANKS) TO BE PORTER'S QUALITY PRECAST CONCRETE & ACCESSORIES OR APPROVED EQUIVALENT. REFER TO BIO 2 FOR ADDITIONAL DETAILS.
10. FORCEMAIN TO BE PLACED AT A CONSTANT GRADE IN ONE DIRECTION (I.E. MINIMIZE UP/DOWN BENDS WHERE POSSIBLE) TO REDUCE THE POSSIBILITY OF AIR–LOCKING THE SYSTEM.
11. ALL SANITARY SEWER SHALL HAVE 1.2m OF COVER MINIMUM. WHERE 1.2m OF COVER CAN'T BE OBTAINED, SANITARY SEWER SHALL BE INSULATED AS PER DETAIL ON DS1.
12. ALL TANK PLUMBING (I.E. PUMPS, VALVES, FILTERS, AND SCREENS) TO BE ACCESSIBLE AT GRADE.
13. THE CONTRACTOR SHALL BE A LICENSED INSTALLER AND BE APPROVED BY WATERLOO BIOFILTER SYSTEMS INC.
14. ESTABLISH ONTARIO BUILDING CODE SETBACKS FOR CLASS 4 TREATMENT UNITS (TABLES 8.2.1.6.A.)

SETBACK DESCPRITION	DISTANCE (m)
ALL TANKS TO STRUCTURES	1.5
ALL TANKS TO LAKE, POND, SPRING	15
ALL TANKS TO ANY WELL	15
ALL TANKS TO PROPERTY LINE	3



STYROFOAM INSULATION DETAIL
N.T.S.

NOTE: CONTRACTOR TO ARRANGE WITH HYDRO RE: METERING REQUIREMENTS, METERING CABINET, MOUNTING & FINAL CONNECTION AT CONTROL PANEL. CONTRACTOR TO COORDINATE BELL CONNECTION FOR ALARM FOR PROPOSED SEWAGE PUMPING STATION

CAUTION
CONTRACTOR TO DETERMINE LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.

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Benchmark: 463.937m

ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE DERIVED FROM CANNET NETWORK BASE STATION ORVL HAVING A PUBLISHED ELEVATION OF 463.937m

REGISTERED PROFESSIONAL ENGINEER
J.W.LIGHTHEART
100140403
SEPT 8, 2021
PROVINCE OF ONTARIO

No.	Issue / Revision	Date
1	SPA FIRST SUBMISSION	AUG. 17, 2020
2	SPA SECOND SUBMISSION	DEC. 15, 2020
3	SPA THIRD SUBMISSION	APR. 5, 2021
4	SPA THIRD SUBMISSION – UPDATE	APR. 12, 2021
5	ECA CONTINGENCY PLAN	JULY 27, 2021
6	SPA FINAL SUBMISSION	SEPT. 8, 2021

Mansfield Ski Club

BIOFILTER PLAN 1

Client:
Mansfield Ski Club
628213 15th Sideroad
PO Box 75 RPO Mansfield,
Mulmur, Ontario
L9V 3M6

WMI & Associates Limited
119 Collier Street
Barrie, Ontario
L4M 1H5
Ph 705-797-2027
www.wmiengineering.ca

Drawn By	Checked By	Drawing No.
AW	JWL	BIO1
Scale 1:100	Project No. 15–319	

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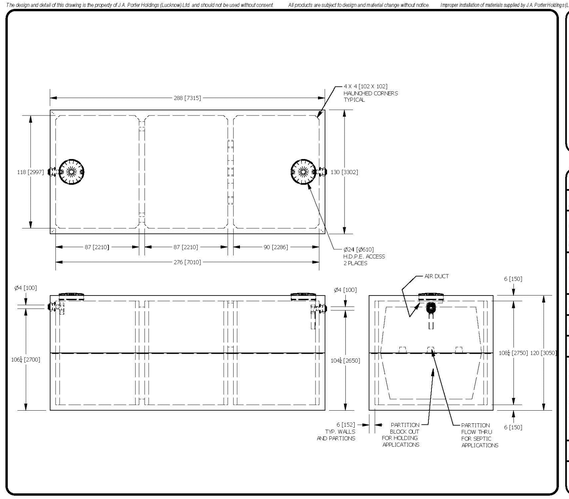


A Division of J.A. Porter Holdings (Lucknow) Ltd.

Porter's

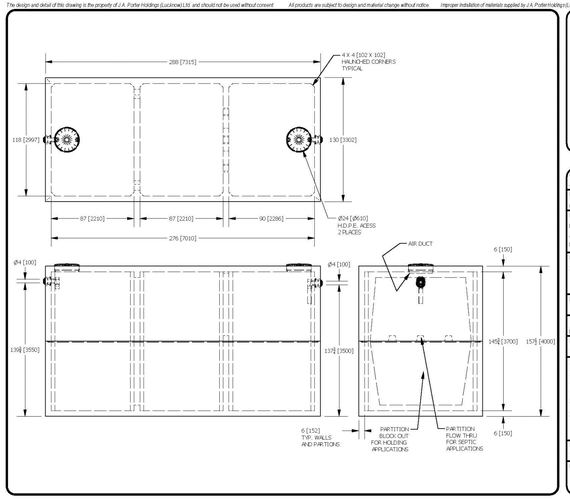
Lucknow, Ontario
Tel: 519 528 3537
Fax: 519 528 2025

Owen Sound, Ontario
Tel: 519 372 1636
Fax: 519 372 1882

www.porters.ca

THE DRAWING IS NOT TO SCALE AND ISSUED IN THIRD ANGLE PROJECTION
DIMENSIONS INCHES [MILIMETERS] UNLESS OTHERWISE NOTED

CONCRETE	
45 MPa 5-8% air entrainment	
DESIGN	
CSA B66 1.2m burial depth	
REINFORCING	
Bar to CSA G30.18	
All reinforcing has 1 [25] minimum cover	
Macro fibre	
PROPERTIES	
20800 kg Per Half	
MODEL	
11000GA	
TYPE	
Double Compartment Septic Tank	
SIZE / VOLUME	
11000 G [50460 L] / 12201 G [55465 L] Interior	
TITLE	
11000 G / 50000 L Double Compartment Septic Tank Standard Construction	
SHT # 1	DATE 09/08/2016	REV	SIZE A
DWG #	
50000 L Septic Volume/sec	



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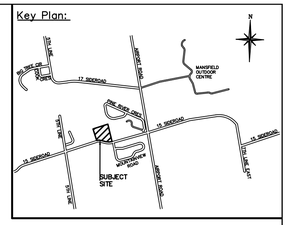
DIMENSIONS INCHES [MILIMETERS] UNLESS OTHERWISE NOTED

CONCRETE	
45 MPa 5-8% air entrainment	
DESIGN	
CSA B66 1.5m burial depth	
REINFORCING	
Bar to CSA G30.18	
All reinforcing has 1 [25] minimum cover	
Macro fibre	
PROPERTIES	
25000 kg Per Half	
MODEL	
15000GA	
TYPE	
Double Compartment Septic	
SIZE / VOLUME	
15045 G [68385 L] / 16595 G [75935 L] Interior	
TITLE	
15000 G / 68000 L Double Compartment Septic Tank Standard Construction	
SHT # 1	DATE 09/08/2016	REV	SIZE A
DWG #	
68000 L Septic Volume/sec	

Key Plan:



CAUTION
CONTRACTOR TO DETERMINE LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.

BIOFILTER SYSTEM NOTES PROVIDED BY WATERLOO BIOFILTER SYSTEMS INC.:

1. THIS IS A PRELIMINARY PROCESS DESCRIPTION FOR A WATERLOO BIOFILTER SEWAGE TREATMENT SYSTEM.
2. THE MAXIMUM DAILY SEWAGE DESIGN FLOW FOR THIS FACILITY IS 135,050 L/day. THE MAXIMUM DAILY SEWAGE FLOW IS EXPECTED TO OCCUR INFREQUENTLY WITH AVERAGE FLOWS BEING AROUND HALF OF THE MAXIMUM.
3. THE RAW SEWAGE IS EXPECTED TO HAVE THE FOLLOWING TYPICAL CONCENTRATIONS:

   BOD = 250 mg/L
   TSS = 210 mg/L
   TP = 7 mg/L
   TKN = 60 mg/L

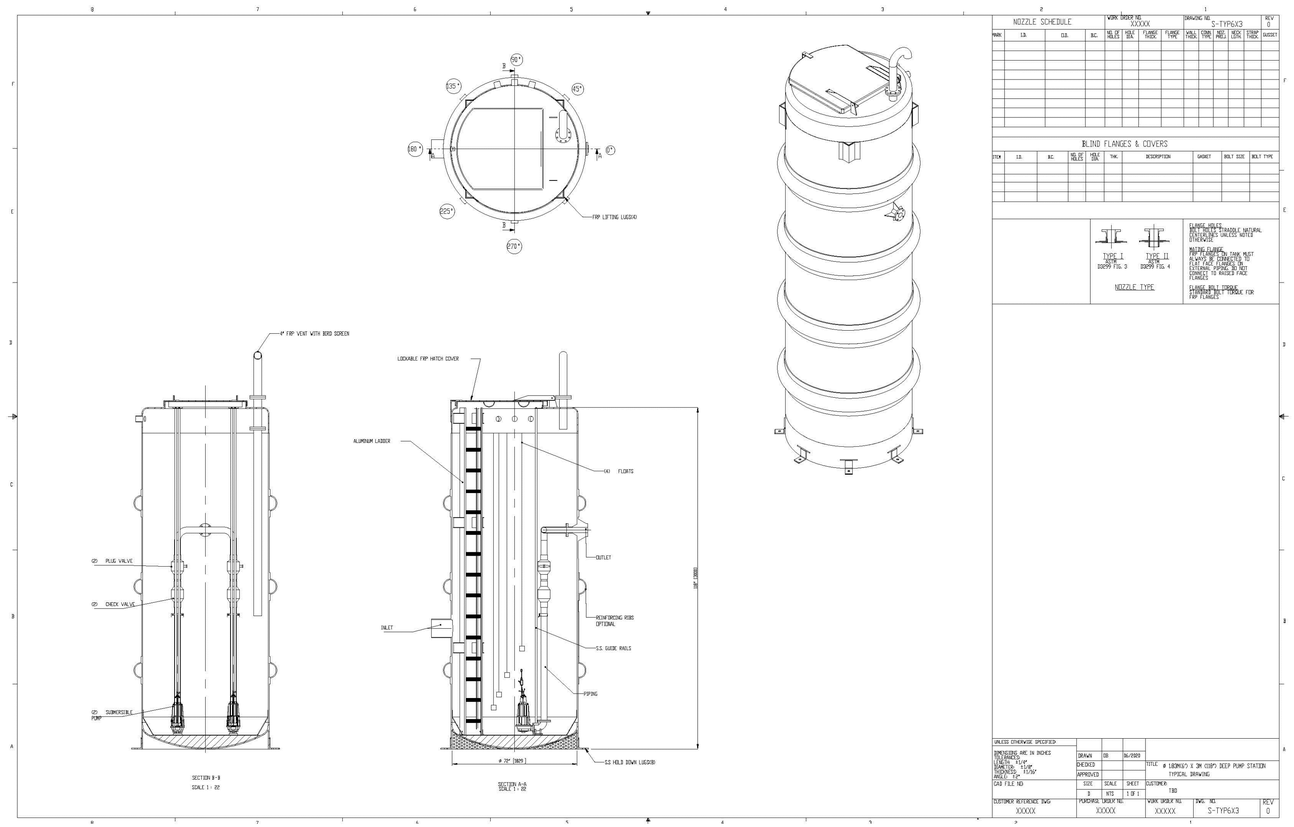
4. ALL SANITARY SEWAGE FROM THE FACILITY IS DIRECTED INTO A 68,000 L SINGLE COMPARTMENT TRASH TANK. THE INLET AND OUTLET OF THE TANK ARE EQUIPPED WITH BAFFLES.
5. THE TRASH TANK EFFLUENT FLOWS BY GRAVITY THROUGH THREE (3) 68,000 L SINGLE COMPARTMENT ANAEROBIC DIGESTER TANKS ARRANGED IN SERIES. THE INLET OF EACH TANK IS EQUIPPED WITH AN INNERTUBE. THE OUTLET OF TANK #1 AND #2 ARE EQUIPPED WITH A BAFFLE AND THE OUTLET OF TANK #3 IS EQUIPPED WITH SIX (6) EFFLUENT FILTERS.
6. ANAEROBIC DIGESTER TANK #3 EFFLUENT FLOWS BY GRAVITY INTO A 68,000 L DOUBLE COMPARTMENT AERATION TANK. THE INLET OF THE TANK IS EQUIPPED WITH A BAFFLE. THE AERATION TANK HOUSES FOUR (4) AERATORS, TWO (2) IN EACH COMPARTMENT. THE OUTLET OF THE TANK IS EQUIPPED WITH A BAFFLE.
7. THE AERATION TANK EFFLUENT FLOWS BY GRAVITY INTO A 68,000 L DOUBLE COMPARTMENT CLARIFIER TANK. THE INLET OF THE TANK IS EQUIPPED WITH AN INNERTUBE. A SUBMERSIBLE PUMP RECIRCULATES A PORTION OF THE EFFLUENT TO THE INLET OF THE TRASH TANK. THE OUTLET OF THE TANK IS EQUIPPED WITH SIX (6) EFFLUENT FILTERS.
8. THE CLARIFIER TANK EFFLUENT FLOWS BY GRAVITY INTO A 76,000 L SINGLE COMPARTMENT BALANCING TANK #2 WHICH IS CONNECTED BY BOTTOM DRAINS WITH A 76,000 L SINGLE COMPARTMENT BALANCING TANK #1. BALANCING TANK #2 IS EQUIPPED WITH TWO (2) PAIRS OF SUBMERSIBLE PUMPS, WITH EACH PAIR OPERATING ON AN ALTERNATING TIMER.
9. THE EFFLUENT IS DOSED FROM BALANCING TANK #2 TO FIVE (5) 55,000 L SINGLE COMPARTMENT BULK-FILLED BIOFILTER TANKS EACH FILLED WITH 55 m^3 OF BIOFILTER MEDIUM (275 m^3 TOTAL). THE FIRST PAIR OF PUMPS IN BALANCING TANK #2 DOSES BULK-FILLED BIOFILTER TANKS #1, #2, AND HALF OF #3. THE SECOND PAIR OF PUMPS IN BALANCING TANK #2 DOSES BULK FILLED BIOFILTER TANKS #4, #5, AND HALF OF #3. THE EFFLUENT IS EVENLY DISTRIBUTED OVER THE SURFACE OF THE MEDIUM AND TREATED AS IT TRICKLES THROUGH THE INTERIOR OF THE MEDIUM. SMALL, LOW VOLTAGE AIR FANS AND PASSIVE VENTING PROMOTE AEROBIC CONDITIONS. THE BULK-FILLED BIOFILTER TANKS ARE CONNECTED BY BOTTOM DRAINS.
10. BULK-FILLED BIOFILTER TANK #1 IS CONNECTED BY BOTTOM DRAINS TO A 55,000 L SINGLE COMPARTMENT BASKET BIOFILTER TANK #2 WHICH IN TURN IS CONNECTED BY BOTTOM DRAINS TO A 55,000 L BASKET BIOFILTER TANK #1. BASKET BIOFILTER TANK #1 IS EQUIPPED WITH THREE (3) SUBMERSIBLE PUMPS OPERATING ON SEPARATE TIMERS AND TWO (2) SUBMERSIBLE PUMPS OPERATING ON ALTERNATING DEMAND.
11. THE FIRST SIMPLEX PUMP IN BASKET BIOFILTER TANK #1 PUMPS A MAXIMUM OF 43,000 L/day TO THREE (3) BASKETS LOCATED IN EACH OF BASKET BIOFILTER TANK #1 & #2. EACH BASKET IS FILLED WITH 10 m^3 OF BIOFILTER MEDIUM (60 m^3 TOTAL). THE SEWAGE IS EVENLY DISTRIBUTED OVER THE SURFACE OF THE MEDIUM AND TREATED AS IT TRICKLES THROUGH THE INTERIOR OF THE MEDIUM. SMALL, LOW VOLTAGE AIR FANS AND PASSIVE VENTING PROMOTE AEROBIC CONDITIONS. THE EFFLUENT FROM THE BASKETS MIXES WITH THE EFFLUENT FROM THE BULK-FILLED BIOFILTER TANKS.
12. THE SECOND SIMPLEX PUMP IN BASKET BIOFILTER TANK #1 RECIRCULATES A PORTION OF THE EFFLUENT (PERCENTAGE IS ADJUSTABLE) TO THE INLET OF THE TRASH TANK.
13. THE THIRD SIMPLEX PUMP IN BASKET BIOFILTER TANK #1 PUMPS A PORTION OF THE EFFLUENT (PERCENTAGE IS ADJUSTABLE) TO THREE (3) SAND FILTERS LOCATED IN AN ABOVE GROUND CONTROL BUILDING. THE EFFLUENT FROM THE SAND FILTERS DRAINS BY GRAVITY BACK TO BASKET BIOFILTER TANK #1.
14. THE PAIR OF PUMPS IN BASKET BIOFILTER TANK #1 PUMP THE EFFLUENT THROUGH A FLOW METER AND FIVE (5) UV DISINFECTION UNITS LOCATED IN THE ABOVE GROUND CONTROL BUILDING.
15. THE CONTROL BUILDING ALSO HOUSES FOUR (4) METERING PUMPS. THE FIRST TO DOSE SODIUM ALUMINATE INTO THE TRASH TANK AND/OR ANAEROBIC DIGESTER TANK #2, THE SECOND TO DOSE SODIUM ALUMINATE INTO ANAEROBIC DIGESTER TANK #2 AND/OR THE CLARIFIER TANK, THE THIRD TO DOSE AN ALKALINITY CHEMICAL INTO THE CLARIFIER TANK, AND THE FOURTH TO DOSE BENEFICIAL BACTERIA TO THE INLET OF BALANCING TANK #2.
16. THE UV EFFLUENT CONTINUES TO A PUMP STATION SUPPLIED BY JOHN BROOKS COMPANY LIMITED.
17. ALL PUMPS ARE RUN BY A WATERLOO SMART PANEL(S). THE WATERLOO SMART PANEL PROVIDES REMOTE MONITORING, CONTROL, AND DATA LOGGING OVER A STABLE WIRELESS CELLULAR NETWORK. THIS FUNCTIONALITY ALLOWS FOR REAL TIME OPERATIONAL ADJUSTMENTS TO OPTIMIZE SYSTEM PERFORMANCE. THE WATERLOO SMART PANEL ALSO IMMEDIATELY NOTIFIES THE SERVICE PROVIDER OF A PUMP FAILURE OR HIGH LEVEL ALARM, PROVIDING THEM WITH VITAL INFORMATION TO LIMIT SITE VISITS WHILE KEEPING THE SYSTEM OPERATING PROPERLY. THE BALANCING TANK #2 PUMPS ARE RUN BY THEIR OWN SMART PANEL THAT IS CONNECTED TO BACK-UP POWER.
18. ADHERENCE TO BEST MANAGEMENT PRACTICES (PROVIDING THE APPROPRIATE STRENGTH SEWAGE, PERFORMING ROUTINE MAINTENANCE, LIMITING TOXINS ENTERING THE SYSTEM, ETC.) IS NECESSARY FOR OPTIMAL PERFORMANCE OF THE WATERLOO BIOFILTER TREATMENT SYSTEM OUTLINED IN THIS SCHEMATIC, WHICH IS DESIGNED FOR THE FOLLOWING EFFLUENT OBJECTIVES (LIMITS) (LOADING LIMITS):

   cBOD = 10.0 mg/L (15.0 mg/L) (2.0 kg/day)
   TSS = 10.0 mg/L (15.0 mg/L) (2.0 kg/day)
   TP = 0.5 mg/L (1.0 mg/L) (0.14 kg/day)
   TAN = 3.0 mg/L (5.0 mg/L) (0.68 kg/day)
   E.Coli = 100 cfu/100 mL (200 cfu/100 mL)
   pH = 6.5 to 8.5 (6.0 to 9.0)

PUMP STATION NOTES:

1. THE CONTRACTOR SHALL TAKE PRECAUTIONS TO PREVENT UPLIFT DURING CONSTRUCTION.
2. ELECTRICAL CONDUITS SHALL BE BURIED 0.9m MIN. BELOW FINISHED GRADE C/W TRACING WIRE.
3. DUTY POINT: 2.5 L/S @ 14.40m TDH

   ONE (1) JOHN BROOKS DUPLEX SUBMERSIBLE PUMP STATION WITH THE FOLLOWING COMPONENTS:
   - (2) TWO SUBMERSIBLE SEWAGE GRINDER PUMP
   - (2) TWO 10FT GALV LIFTING CHAIN PACKAGES
   - (1) ONE STAINLESS STEEL LEVEL CONTROL BRACKET #10-0253
   - (1) ONE NEMA 4X DUPLEX CONTROL PANEL WITH HWA & AUX CONTACT (#10-1044).
   - (4) FOUR #10-0744 LEVEL CONTROLS ONE
   - (4) FOUR FLOATATION WEIGHTS
   - (2) JUNCTION BOX (WIRING BY OTHERS)
   - (1) ONE FIBERGLASS BASIN (1800mmø X 3.0m DEEP) WITH QUICK DISCONNECTS, PVC DISCHARGE PIPING, GUIDE RAILS, FIBERGLASS COVER AND HATCHES
   - (2) TWO 2x2 EZ-OUT ASSEMBLY WITH UPPER GUIDE BRACKET #39-0083
   - (2) TWO #30-0152 2" CAST IRON FULL FLOW CHECK VALVE
   - (2) TWO SHUT OFF VALVES
   - (2) TWO VENTS
   - UNLOADING AND INSTALLATION TO BE COMPLETED BY THE CONTRACTOR
   - **ANTI-FLOAT CONCRETE BLOCK REQUIRED
     (PUMP STATION BALLAST TO BE DONE BY OTHERS)
   - SUITABLE CONDUIT SEALS ARE TO BE SUPPLIED AND INSTALLED BETWEEN THE JUNCTION BOX AND THE PANEL AS REQUIRED BY THE CANADIAN ELECTRICAL CODE, THE ENGINEER OR THE AUTHORITY HAVING JURISDICTION
4. VENT PIPE ASSEMBLY AS PER DETAIL ON BROOKS DRAWING
5. ELECTRICAL WORK AND EQUIPMENT IN WET WELL TO COMPLY WITH THE CURRENT ONTARIO ELECTRICAL CODE



NOTE: THIS DRAWING IS FOR SCHEMATIC PURPOSES ONLY AND FINAL SHOP DRAWINGS ARE TO BE PROVIDED BY JOHN BROOKS COMPANY PRIOR TO CONSTRUCTION.

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Benchmark: 463.937m

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REGISTERED PROFESSIONAL ENGINEER
J.W.LIGHTHEART
100140403
SEPT 8, 2021
PROVINCE OF ONTARIO

No.	Issue / Revision	Date
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2	SPA SECOND SUBMISSION	DEC. 15, 2020
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4	SPA THIRD SUBMISSION – UPDATE	APR. 12, 2021
5	SPA FINAL SUBMISSION	SEPT. 8, 2021

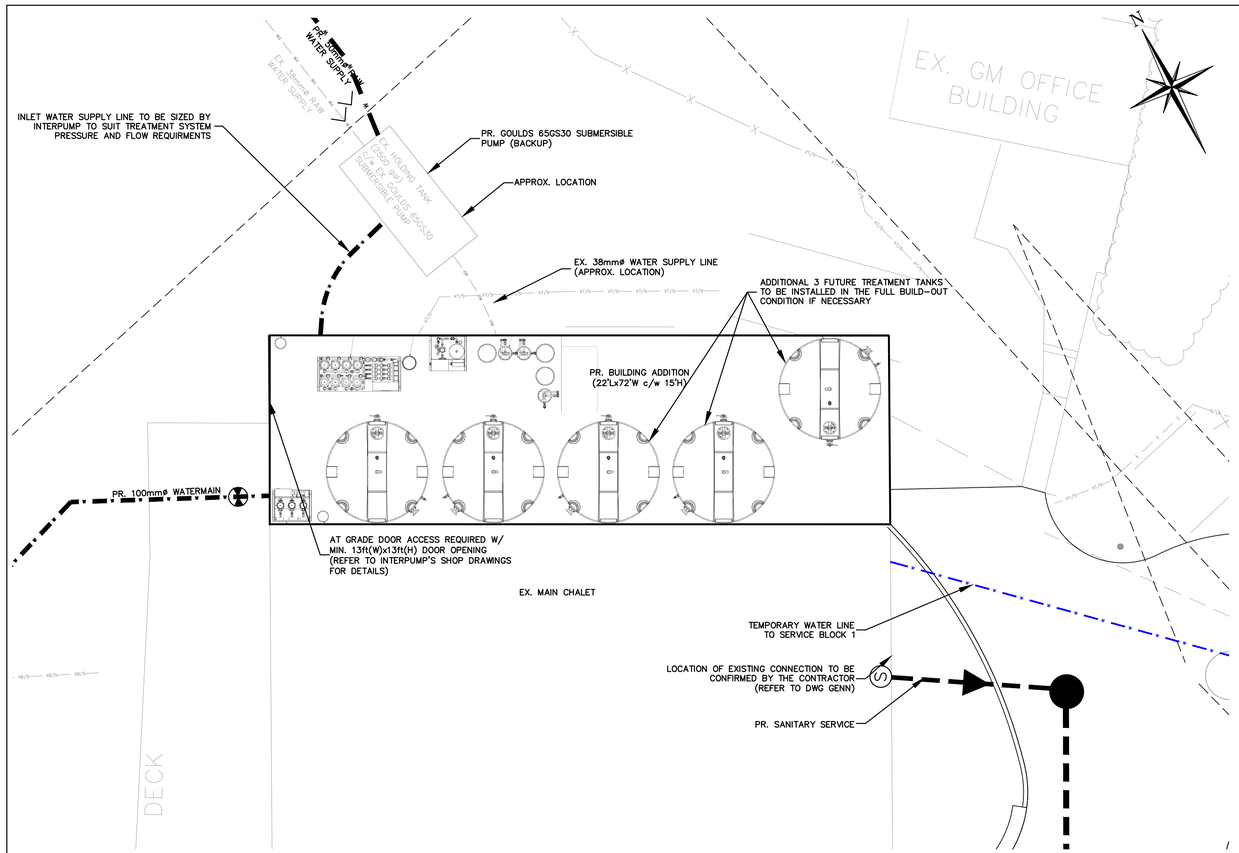
Mansfield Ski Club

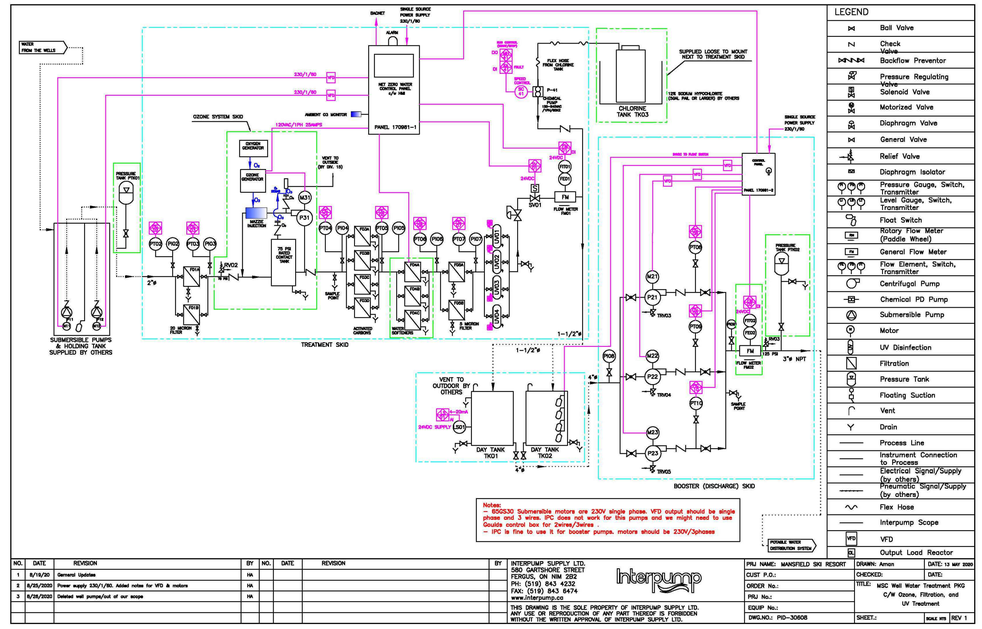
BIOFILTER PLAN 2

Client:
Mansfield Ski Club
628213 15th Sideroad
PO Box 75 RPO Mansfield,
Mulmur, Ontario
L9V 3M6

WMI & Associates Limited
119 Collier Street
Barrie, Ontario
L4M 1H5
Ph 705-797-2027
www.wmiengineering.ca

Drawn By	Checked By	Drawing No.
AW	JWL	BIO2
Scale 1:100	Project No. 15-319	





Notes:
- 65GS30 Submersible motors are 230V single phase. VFD output should be single phase and 3 wires. IPC does not work for this pumps and we might need to use Goulds control box for 2wires/3wires .
- IPC is fine to use it for booster pumps. motors should be 230V/3phases

NO.	DATE	REVISION	BY	NO.	DATE	REVISION	BY
1	9/16/20	General Update	HA				
2	8/25/2020	Power supply 230/1/60. Added notes for VFD & motors	HA				
3	8/25/2020	Deleted well pumps/out of our scope	HA				

INTERPUMP SUPPLY LTD.
560 GARTSHORE STREET
FERGUS, ON N1M 2B2
PH: (519) 843 4232
FAX: (519) 843 6474
www.interpump.co

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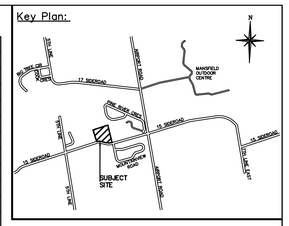
PRJ NAME: MANSFIELD SKI RESORT
CUST P.O.:
ORDER No.:
PRJ No.:
EQUIP No.:
DWG.NO.: PID-30608
DRAWN: Amon — DATE: 13 MAY 2020
CHECKED: — DATE:
TITLE: MSC Well Water Treatment PKG C/W Ozone, Filtration, and UV Treatment
SHEET.: — SCALE NTS — REV 1

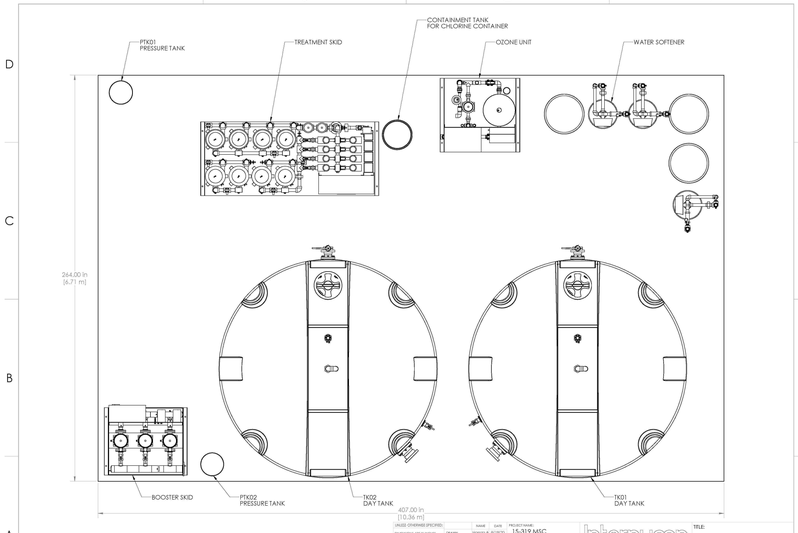
LEGEND

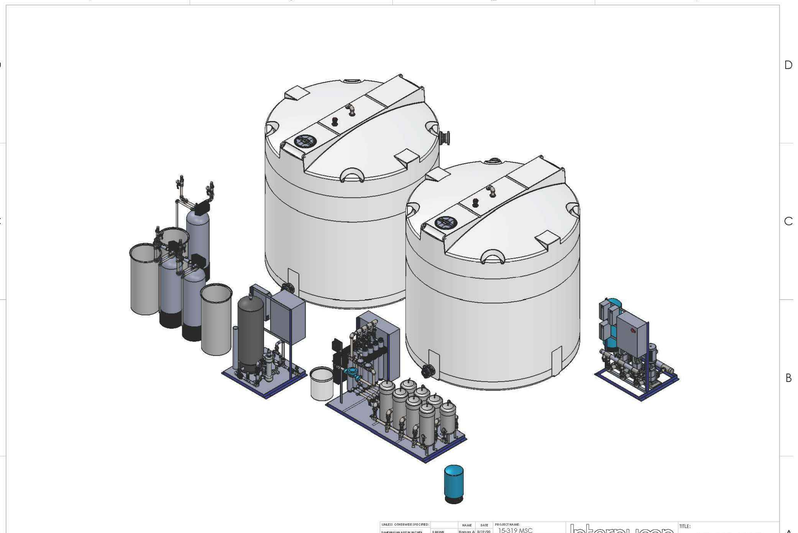
	Ball Valve
	Check Valve
	Backflow Preventor
	Pressure Regulating Valve
	Solenoid Valve
	Motorized Valve
	Diaphragm Valve
	General Valve
	Relief Valve
	Diaphragm Isolator
PT	Pressure Gauge, Switch, Transmitter
LT	Level Gauge, Switch, Transmitter
	Float Switch
	Rotary Flow Meter (Paddle Wheel)
	General Flow Meter
FT	Flow Element, Switch, Transmitter
	Centrifugal Pump
	Chemical PD Pump
	Submersible Pump
	Motor
	UV Disinfection
	Filtration
	Pressure Tank
	Floating Suction
	Vent
	Drain
	Process Line
	Instrument Connection to Process
	Electrical Signal/Supply (by others)
	Pneumatic Signal/Supply (by others)
	Flex Hose
	Interpump Scope
VFD	VFD
SL	Output Load Reactor

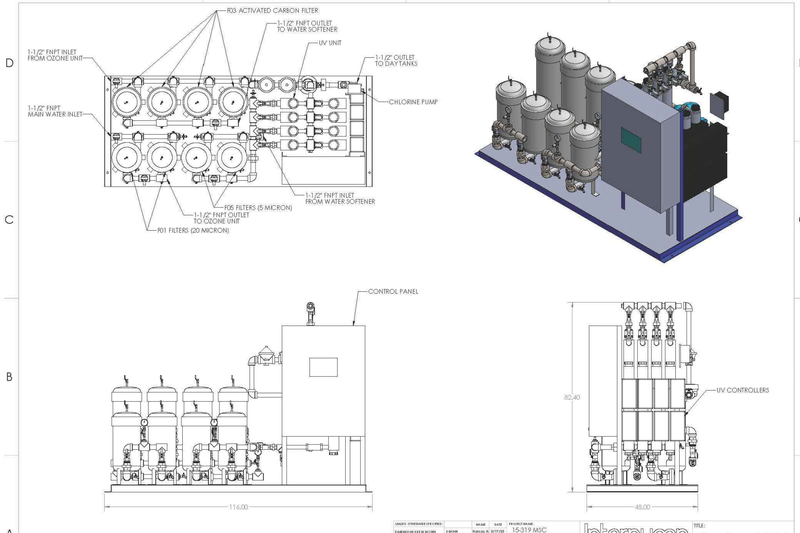
Key Plan:



CAUTION
CONTRACTOR TO DETERMINE LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.







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Benchmark: 463.937m

ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE DERIVED FROM CANNET NETWORK BASE STATION ORVL HAVING A PUBLISHED ELEVATION OF 463.937m

REGISTERED PROFESSIONAL ENGINEER
J.W.LIGHTHEART
100140403
SEPT 8, 2021
PROVINCE OF ONTARIO

No.	Issue / Revision	Date
1	SPA FIRST SUBMISSION	AUG. 17, 2020
2	SPA SECOND SUBMISSION	DEC. 15, 2020
3	SPA THIRD SUBMISSION	APR. 5, 2021
4	SPA THIRD SUBMISSION – UPDATE	APR. 12, 2021
5	SPA FINAL SUBMISSION	SEPT. 8, 2021

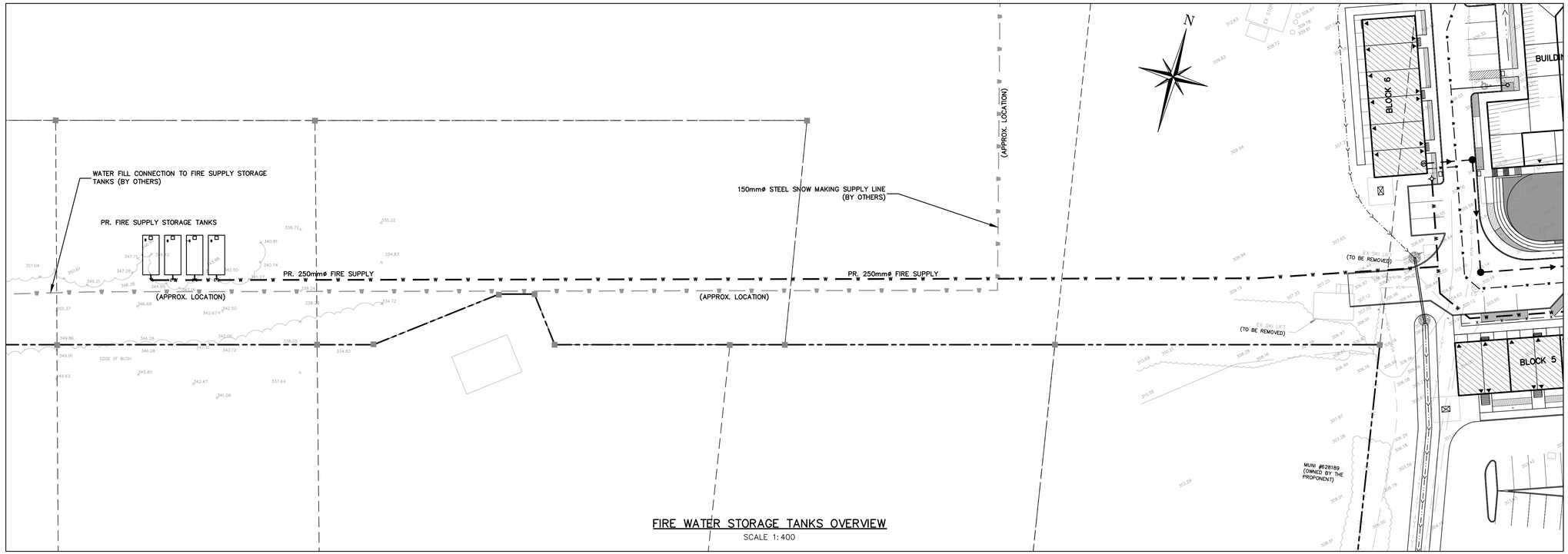
Mansfield Ski Club

WATER TREATMENT FACILITY

Client:
Mansfield Ski Club
628213 15th Sideroad
PO Box 75 RPO Mansfield,
Mulmur, Ontario
L9V 3M6

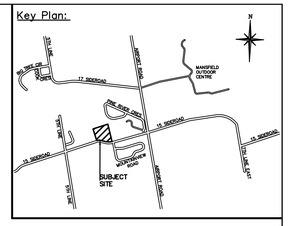
WMI & Associates Limited
119 Collier Street
Barrie, Ontario
L4M 1H5
Ph 705-797-2027
www.wmiengineering.ca

Drawn By	Checked By	Drawing No.
AW	JWL	WF
Scale 1:100	Project No. 15-319	



FIRE WATER STORAGE TANKS OVERVIEW

SCALE 1:400



CAUTION

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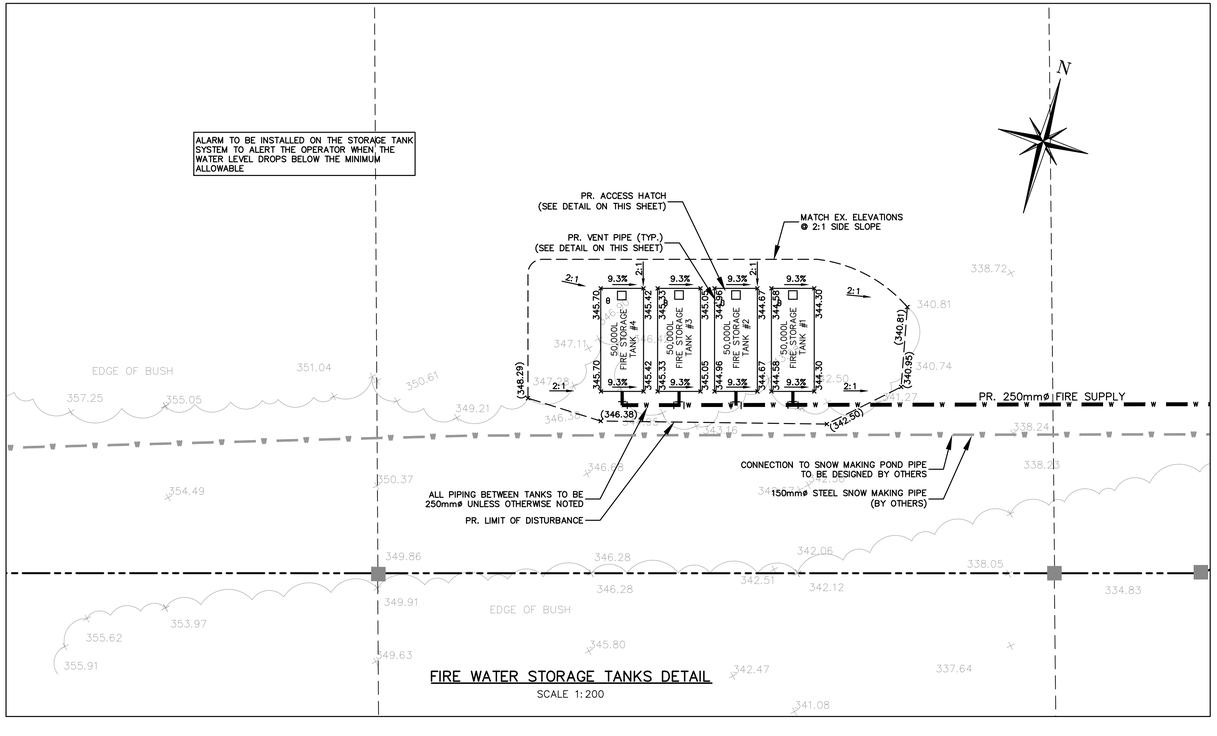


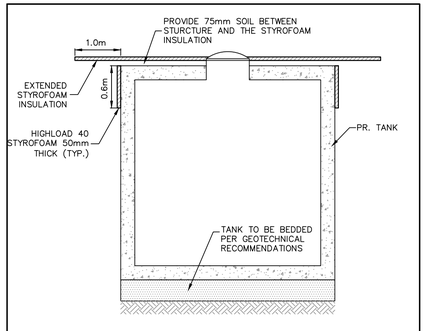
FIRE WATER STORAGE TANKS DETAIL

SCALE 1:200

WATER TANK	GROUND ELEV.	TOP OF STRUCTURE ELEV.	OUTLET ELEV.
FIRE STORAGE TANK #1	344.58	343.70	340.90
FIRE STORAGE TANK #2	344.96	343.70	340.90
FIRE STORAGE TANK #3	345.33	343.70	340.90
FIRE STORAGE TANK #4	345.70	343.70	340.90

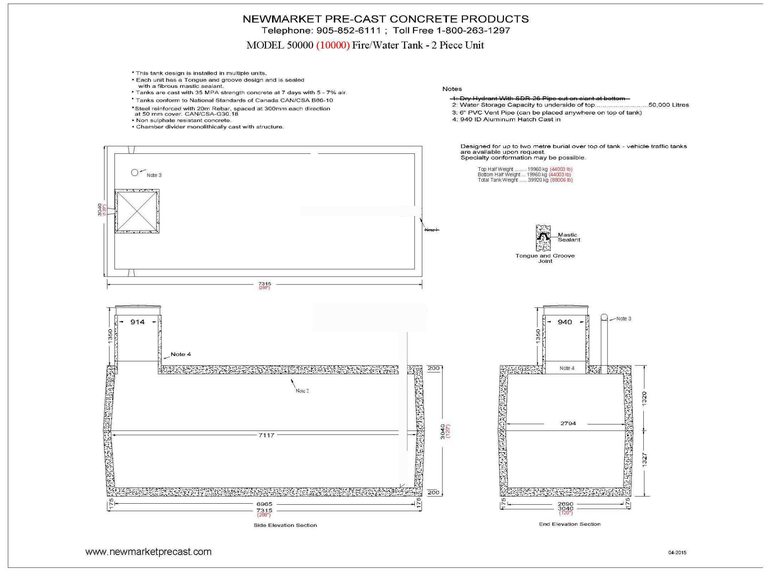
NOTES:

1. TANK ACCESS MUST BE PROVIDED VIA LOCKED WATER CHUTE ACCESS HATCH COMPLETE WITH LADDER RUNGS.
2. ALL CONNECTIONS TO THE STORAGE TANKS ARE TO BE WATER TIGHT.
3. TANK IS TO BE BEDDED AS PER GEOTECHNICAL RECOMMENDATIONS.
4. REFER TO DRAWING ON THIS SHEET FOR 50,000L TANK CROSS SECTION DETAILS.
5. ALL CONCRETE TANKS ARE TO HAVE 1.2m COVER (MIN.) OR TO BE INSULATED (REFER TO DETAIL ON THIS SHEET)
6. ALL STRUCTURES (TANKS) TO BE NEWMARKET PRE-CAST CONCRETE PRODUCTS OR APPROVED EQUIVALENT. REFER TO THIS DRAWING FOR TANK DETAILS.



STYROFOAM INSULATION DETAIL

N.T.S.



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REGISTERED PROFESSIONAL ENGINEER
J.W.LIGHTHEART
100140403
SEPT 8, 2021
PROVINCE OF ONTARIO

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5	SPA FINAL SUBMISSION	SEPT. 8, 2021

Mansfield Ski Club

FIRE WATER STORAGE

Client:

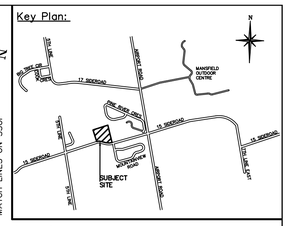
Mansfield Ski Club

628213 15th Sideroad
PO Box 75 RPO Mansfield,
Mulmur, Ontario
L9V 3M6

WMI & Associates Limited
119 Collier Street
Barrie, Ontario
L4M 1H5
Ph 705-797-2027
www.wmiengineering.ca

Drawn By	Checked By	Drawing No.
AW	JWL	FWS
Scale: AS SHOWN	Project No. 15-319	

Key Plan:



Legend:

EXISTING FEATURES (EX)

- EX SIB / EX IB — EX STD IRON BAR / EX IRON BAR
- EX UP — EX UTILITY POLE
- EX BELL PED
- EX WS — EX WATER SERVICE
- EX HYD — EX FIRE HYD.
- NS — EX ST NAME SIGN
- SS — EX STOP SIGN
- x123.45 — EX ELEVATION
- EX FENCE
- GAS — EX U/G GASMAIN
- XB — EX U/G BELL
- HY — EX HYDRO
- EX BOTTOM OF SLOPE
- EX TOP OF SLOPE
- EX WV — EX WATERMAIN & VALVE
- EX SAN @ 0.0% — EX SAN SEWER & MH
- EX STM @ 0.0% — EX STM SEWER & MH

PROPOSED FEATURES (PR)

- NS — PR STREET NAME SIGN
- SS — PR STOP SIGN
- SF — PR SILT FENCE
- PR LEGAL PART LOTS
- PR LEGAL BOUNDARY
- L — PR STREET LIGHT
- W — PR WATER SERVICE
- S — PR SAN SERVICE
- PR HYDRO TRANSFORMER
- 00mmø W/M — PR WATERMAIN
- 00mmø W/M — PR TEMPORARY WATERMAIN FOR PHASE 1A
- 00mmø W/M — PR PERMANENT WATERMAIN FOR PHASE 1A
- PR FIRE HYDRANT
- PR WATER VALVE
- 0m–00mmø SAN @ 0.0% — PR SAN SEWER
- F/M — PR FORCEMAIN
- F/M — FUTURE FORCEMAIN
- PR PERMANENT SAN SEWER FOR PHASE 1A
- MH K — PR SANITARY MANHOLE
- 0m–00mmø STM @ 0.0% — PR STM SEWER
- MH 4 — PR CATCHBASIN MANHOLE
- MH 4 — PR MANHOLE
- PR CATCHBASIN
- x 000.00 — PROPOSED ELEVATION
- x (000.00) — PR. MATCH EXISTING ELEVATION (INTERPOLATED)
- PR SWALE
- PR HEAVY DUTY ASPHALT
- PR UNIT PAVING
- PR BERM
- PR FIRE ACCESS
- U.F.E — UPPER FLOOR ELEVATION
- G.F.E — GROUND FLOOR ELEVATION
- WATERMAIN BY OTHERS

CAUTION
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100140403
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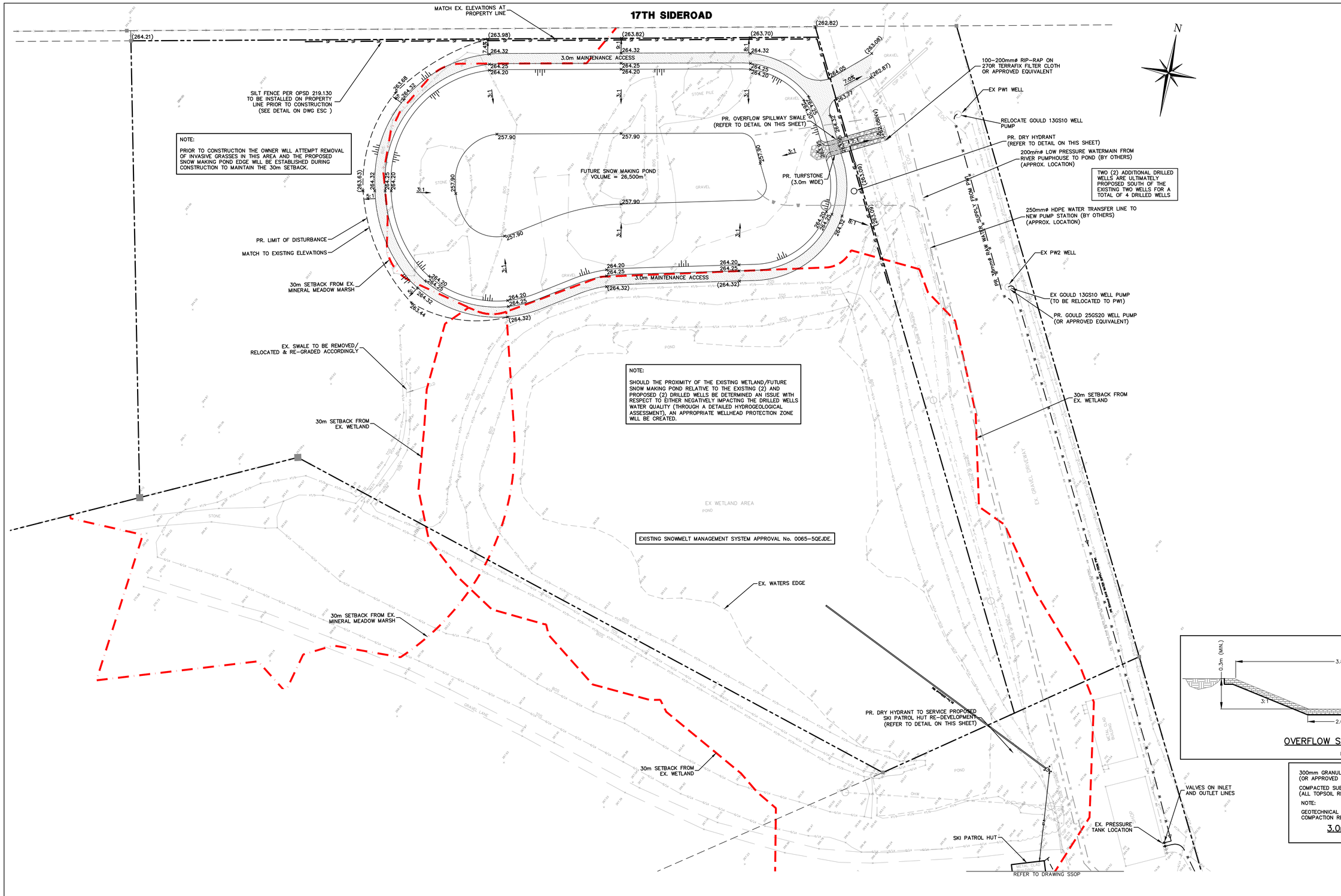
Mansfield Ski Club

SITE SERVICING OUTLET PLAN

Client:
Mansfield Ski Club
628213 15th Sideroad
PO Box 75 RPO Mansfield,
Mulmur, Ontario
L9V 3M6

WMI & Associates Limited
119 Collier Street
Barrie, Ontario
L4M 1H5
Ph 705-797-2027
www.wmiengineering.ca

Drawn By	Checked By	Drawing No.
AW	JWL	SSOP
Scale 1:500	Project No. 15–319	



NOTE:

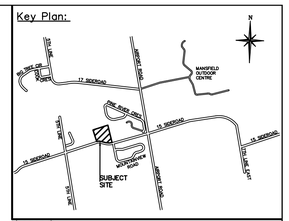
PRIOR TO CONSTRUCTION THE OWNER WILL ATTEMPT REMOVAL OF INVASIVE GRASSES IN THIS AREA AND THE PROPOSED SNOW MAKING POND EDGE WILL BE ESTABLISHED DURING CONSTRUCTION TO MAINTAIN THE 30m SETBACK.

NOTE:

SHOULD THE PROXIMITY OF THE EXISTING WETLAND/FUTURE SNOW MAKING POND RELATIVE TO THE EXISTING (2) AND PROPOSED (2) DRILLED WELLS BE DETERMINED AN ISSUE WITH RESPECT TO EITHER NEGATIVELY IMPACTING THE DRILLED WELLS WATER QUALITY (THROUGH A DETAILED HYDROGEOLOGICAL ASSESSMENT), AN APPROPRIATE WELLHEAD PROTECTION ZONE WILL BE CREATED.

TWO (2) ADDITIONAL DRILLED WELLS ARE ULTIMATELY PROPOSED SOUTH OF THE EXISTING TWO WELLS FOR A TOTAL OF 4 DRILLED WELLS

Key Plan:



Legend:

EXISTING FEATURES (EX)

- EX SIB
- EX IB
- EX UP
- EX STD IRON BAR
- EX IRON BAR
- EX UTILITY POLE
- EX BELL PED
- EX WS — EX WATER SERVICE
- EX HYD — EX FIRE HYD.
- NS — EX ST NAME SIGN
- SS — EX STOP SIGN
- 123.45 — EX ELEVATION
- EX FENCE
- GAS — EX U/G GASMAIN
- XB — EX U/G BELL
- HY — EX HYDRO
- 98/5 — EX BOTTOM OF SLOPE
- 97/5 — EX TOP OF SLOPE
- EX WV — EX WATERMAIN & VALVE
- EX SAN @ 0.0% — EX SAN SEWER & MH
- EX STM @ 0.0% — EX STM SEWER & MH

PROPOSED FEATURES (PR)

- NS — PR STREET NAME SIGN
- SS — PR STOP SIGN
- SF — PR SILT FENCE
- PR LEGAL PART LOTS
- PR LEGAL BOUNDARY
- L — PR STREET LIGHT
- W — PR WATER SERVICE
- S — PR SAN SERVICE
- PR HYDRO TRANSFORMER
- 00mmø W/M — PR WATERMAIN
- 00mmø W/M — PR TEMPORARY WATERMAIN FOR PHASE 1A
- 00mmø W/M — PR PERMANENT WATERMAIN FOR PHASE 1A
- PR FIRE HYDRANT
- PR WATER VALVE
- 0m-00mmø SAN @ 0.0% — PR SAN SEWER
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- F/M — FUTURE FORCEMAIN
- PR PERMANENT SAN SEWER FOR PHASE 1A
- MH K — PR SANITARY MANHOLE
- 0m-00mmø STM @ 0.0% — PR STM SEWER
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- MH 4 — PR MANHOLE
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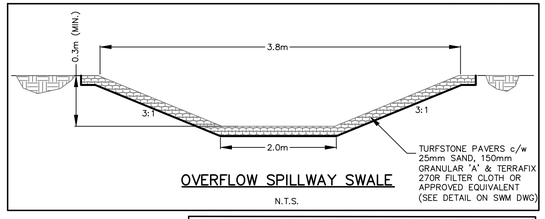
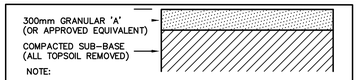


OVERFLOW SPILLWAY SWALE

N.T.S.



NOTE:

GEOTECHNICAL ENGINEER TO CONFIRM MATERIAL THICKNESS AND COMPACTION REQUIREMENTS.

3.0m MAINTENANCE ACCESS

N.T.S.

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REGISTERED PROFESSIONAL ENGINEER J.W.LIGHTHEART 100140403 SEPT 8, 2021 PROVINCE OF ONTARIO

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5	SKI PATROL HUT REDEVELOPMENT	APR. 15, 2021
6	SPA FINAL SUBMISSION	SEPT. 8, 2021

Mansfield Ski Club

PROPOSED SNOW MAKING POND & WELL LOCATION PLAN

Client:

Mansfield Ski Club

628213 15th Sideroad
PO Box 75 RPO Mansfield,
Mulmur, Ontario
L9V 3M6

WMI & Associates Limited
119 Collier Street
Barrie, Ontario
L4M 1H5
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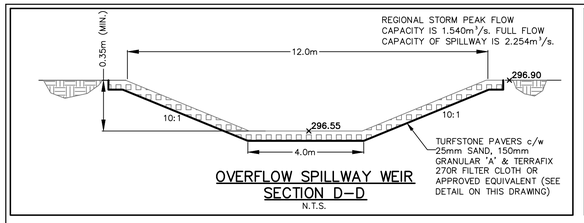
Drawn By	Checked By	Drawing No.
AW	JWL	SMPLP
Scale 1:500	Project No. 15-319	



OVERFLOW SPILLWAY WEIR SECTION D–D
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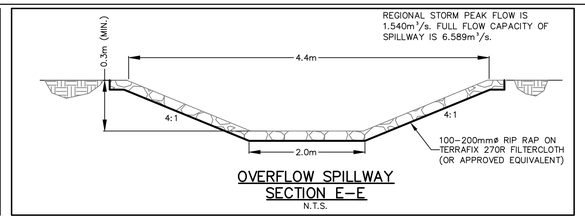

OVERFLOW SPILLWAY SECTION E–E
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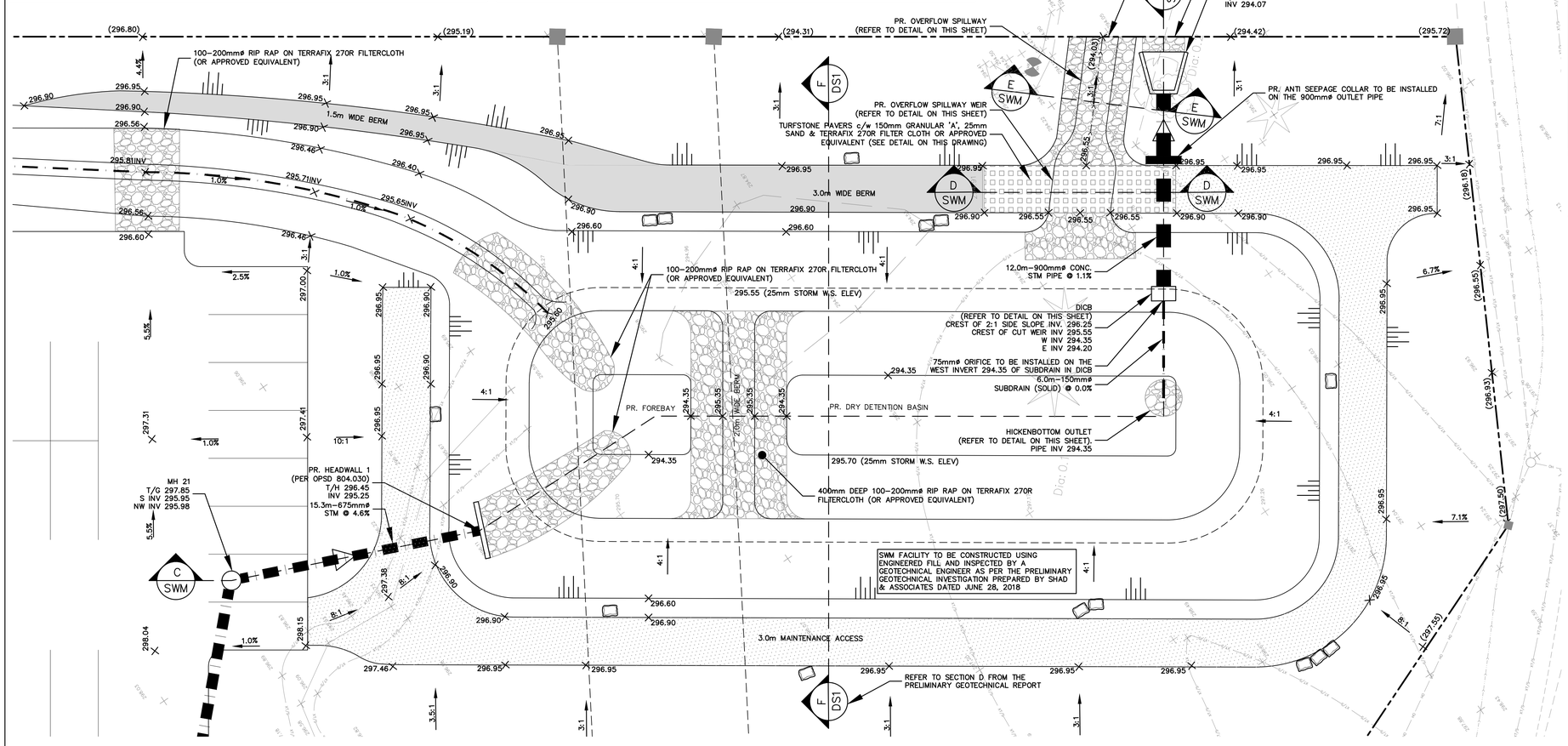
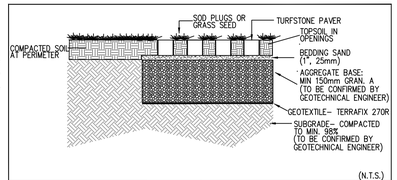
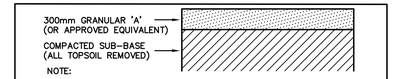


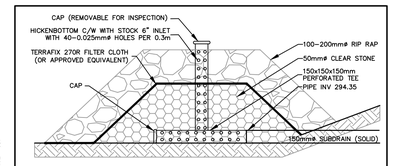
FEATURE	ELEVATION	VOLUME
BASE OF BASIN	294.35m	0.0m³
(ACTIVE STORAGE VOLUMES)		
25mm HWL	295.70	443m³
2 YR HWL	296.12	742m³
5 YR HWL	296.32	922m³
REGIONAL STORM HWL	296.48	1080m³
25 YR HWL	296.56	1158m³
100 YR HWL	296.61	1364m³
TOP OF BASIN	296.90	1772m³



OVERFLOW SPILLWAY WEIR Turfstone Paver	UNILOCK® Designed to be a step ahead 1•800•UNILOCK www.unilock.com	PAVER DETAIL Cross Section
		SWM.DWG

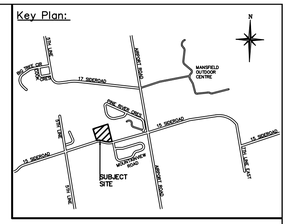


3.0m MAINTENANCE ACCESS
N.T.S.



HICKENBOTTOM OUTLET DETAIL
N.T.S.

Key Plan:



Legend:

EXISTING FEATURES (EX)

- EX SIB, EX IB, EX UP, EX BELL PED
- EX STD IRON BAR, EX IRON BAR, EX UTILITY POLE
- EX WS, EX HYD, NS, SS, 123.45
- EX WATER SERVICE
- EX FIRE HYD.
- EX ST NAME SIGN
- EX STOP SIGN
- EX ELEVATION
- EX FENCE
- EX U/G GASMAIN
- EX U/G BELL
- EX HYDRO
- EX BOTTOM OF SLOPE
- EX TOP OF SLOPE
- EX WATERMAIN & VALVE
- EX SAN SEWER & MH
- EX STM SEWER & MH

PROPOSED FEATURES (PR)

- PR STREET NAME SIGN
- PR STOP SIGN
- PR SILT FENCE
- PR LEGAL PART LOTS
- PR LEGAL BOUNDARY
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- PR SAN SERVICE
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- 00mmø W/M — PR TEMPORARY WATERMAIN FOR PHASE 1A
- 00mmø W/M — PR PERMANENT WATERMAIN FOR PHASE 1A
- PR FIRE HYDRANT
- PR WATER VALVE
- 0m–00mmø SAN @ 0.0% — PR SAN SEWER
- F/M — PR FORCEMAIN
- F/M — FUTURE FORCEMAIN
- PR PERMANENT SAN SEWER FOR PHASE 1A
- MH K — PR SANITARY MANHOLE
- 0m–00mmø STM @ 0.0% — PR STM SEWER
- MH 4 — PR CATCHBASIN MANHOLE
- MH 4 — PR MANHOLE
- PR CATCHBASIN
- 000.00 — PROPOSED ELEVATION
- (000.00) — PR. MATCH EXISTING ELEVATION (INTERPOLATED)
- PR SWALE
- PR HEAVY DUTY ASPHALT
- PR UNIT PAVING
- PR BERM
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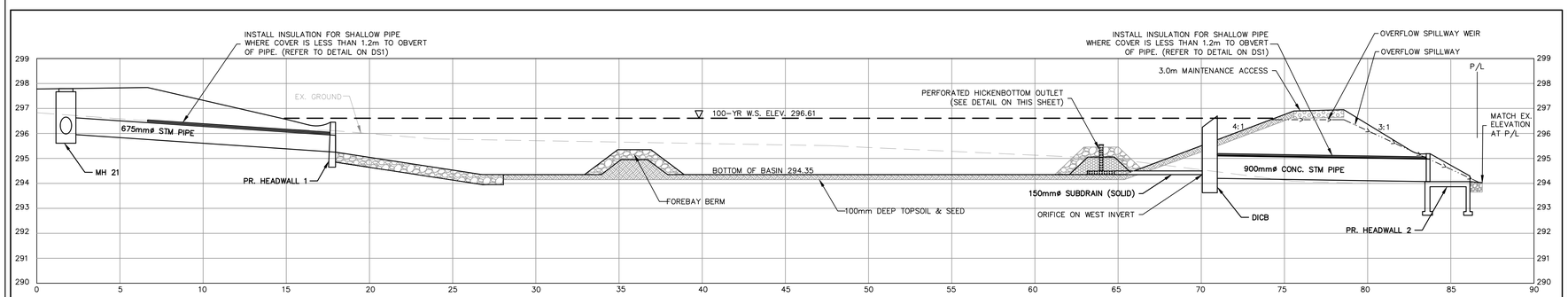
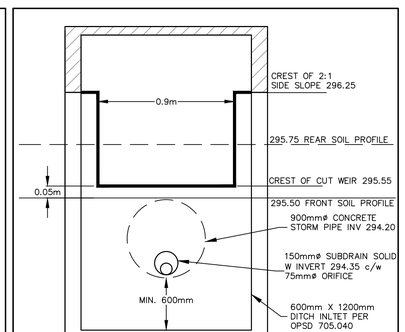
- U.F.E — UPPER FLOOR ELEVATION
- G.F.E — GROUND FLOOR ELEVATION

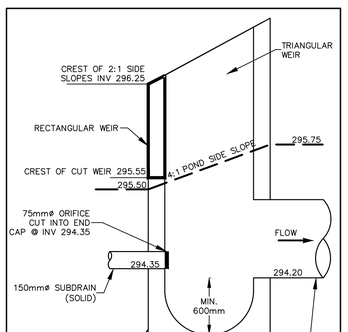
CAUTION
CONTRACTOR TO DETERMINE LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.



SECTION C–C
H 1:150 V 1:100



DICB WEIR DETAIL A
N.T.S.



DICB WEIR DETAIL B
N.T.S.

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Benchmark: 463.937m
ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE DERIVED FROM CANNET NETWORK BASE STATION ORVL HAVING A PUBLISHED ELEVATION OF 463.937m

REGISTERED PROFESSIONAL ENGINEER J.W.LIGHTHEART 100140403 SEPT 8, 2021 PROVINCE OF ONTARIO

No.	Issue / Revision	Date
1	SPA FIRST SUBMISSION	AUG. 17, 2020
2	SPA SECOND SUBMISSION	DEC. 15, 2020
3	SPA THIRD SUBMISSION	APR. 5, 2021
4	SPA THIRD SUBMISSION – UPDATE	APR. 12, 2021
5	SPA FINAL SUBMISSION	SEPT. 8, 2021

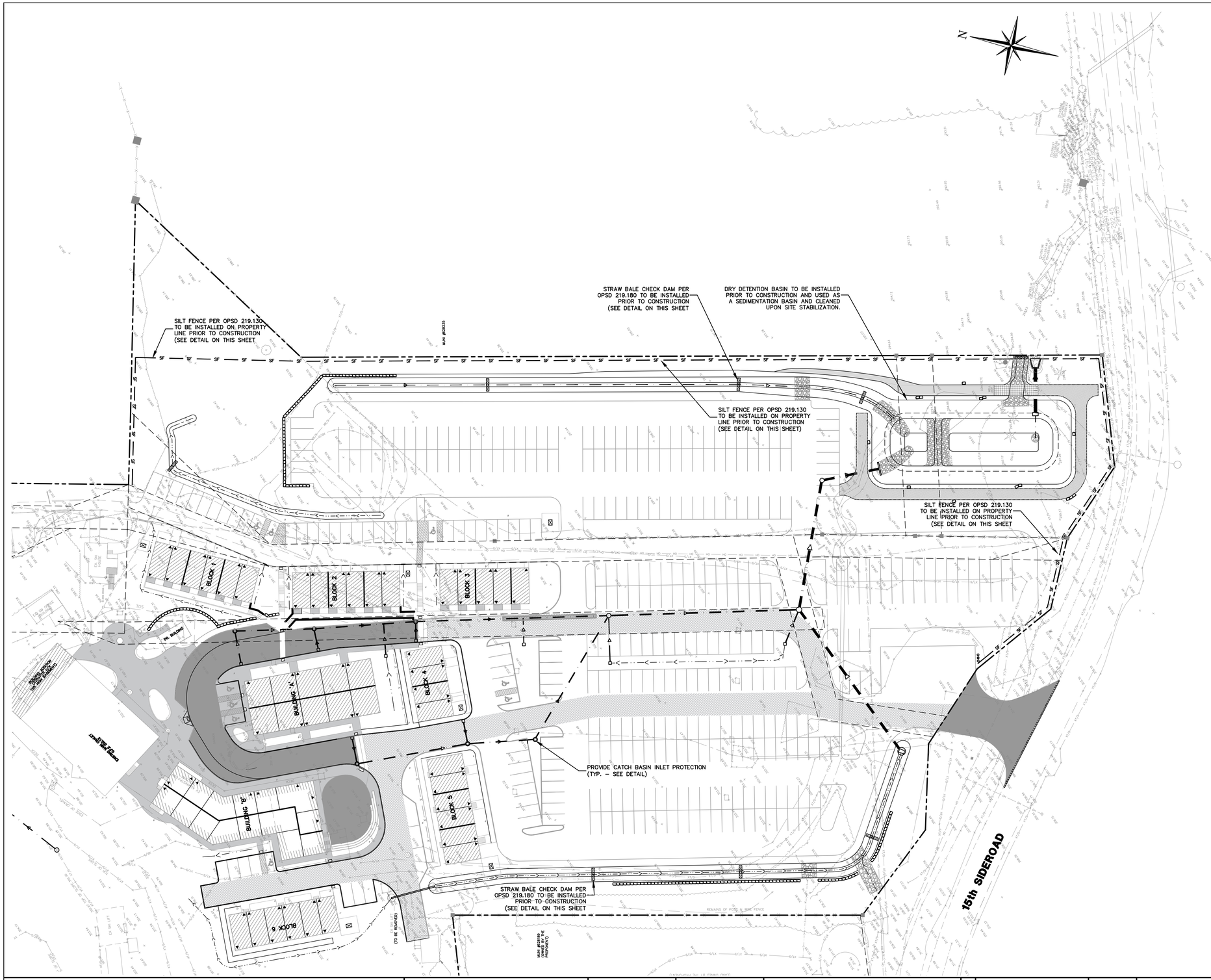
Mansfield Ski Club

STORMWATER MANAGEMENT FACILITY PLAN

Client:
Mansfield Ski Club
628213 15th Sideroad
PO Box 75 RPO Mansfield,
Mulmur, Ontario
L9V 3M6

WMI & Associates Limited
119 Collier Street
Barrie, Ontario
L4M 1H5
Ph 705-797-2027
www.wmiengineering.ca

Drawn By	AW	Checked By	JWL	Drawing No.
Scale	1:150	Project No.	15–319	SWM



NOTES

EROSION CONTROL WORKS TO BE INSPECTED REGULARLY AFTER EVERY RAINFALL AND REPAIRED/REPLACED AS REQUIRED BY THE MUNICIPALITY OR DEVELOPER'S ENGINEER.

ALL DISTURBED AREAS TO BE RESTORED USING TOPSOIL AND SEED IMMEDIATELY UPON ESTABLISHING FINAL GRADES.

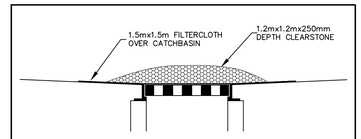
EROSION CONTROL WORKS TO BE MAINTAINED UNTIL THE SITE HAS STABILIZED AND REMOVAL IS DIRECTED BY THE MUNICIPALITY OR DEVELOPER'S ENGINEER.

SILT FENCE TO BE MAINTAINED ON THE DOWNSTREAM SIDE OF ALL STOCK PILES.

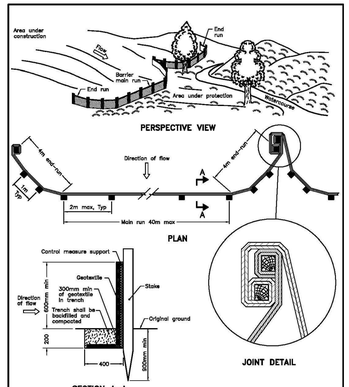
SILT FENCE IS TO BE CONSTRUCTED/INSTALLED AS INDICATED PRIOR TO CONSTRUCTION COMMENCEMENT.

ALL SWALES c/w STRAW BALE CHECK DAMS (REFER TO DETAIL ON ON THIS SHHET) TO BE POSITIONED AND INSTALLED BY THE CONTRACTOR PRIOR TO ANY SITE DISTURBANCE.

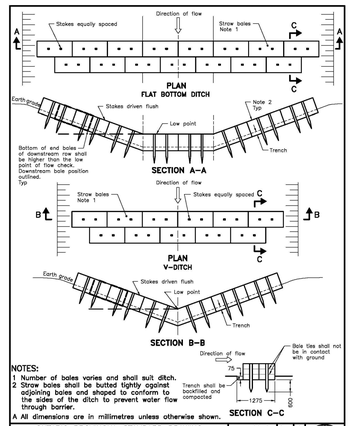
STORM OUTLET STRUCTURES, DITCHES/SWALES, CULVERTS AND THE DRY DETENTION BASIN ARE TO BE CLEANED UPON COMPLETION OF THE SITE GRADING AND SITE STABILIZATION WORKS.



CATCHBASIN INLET PROTECTION
N.T.S.

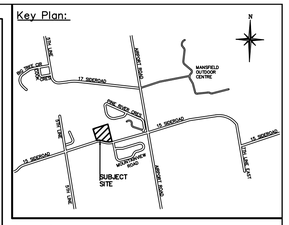


ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
HEAVY–DUTY SILT FENCE BARRIER	OPSD 219.130	



ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
STRAW BALE FLOW CHECK DAM	OPSD 219.180	

Key Plan:



Legend:

EXISTING FEATURES (EX)

- EX SIB — EX STD IRON BAR
- EX IB — EX IRON BAR
- EX UP — EX UTILITY POLE
- EX BELL PED
- EX WS — EX WATER SERVICE
- EX HYD — EX FIRE HYD.
- NS — EX ST NAME SIGN
- SS — EX STOP SIGN
- x123.45 — EX ELEVATION
- EX FENCE
- GAS — EX U/G GASMAIN
- XB — EX U/G BELL
- HH — EX HYDRO
- EX BOTTOM OF SLOPE
- EX TOP OF SLOPE
- EX WV — EX WATERMAIN & VALVE
- EX SAN @ 0.0% — EX SAN SEWER & MH
- EX STM @ 0.0% — EX STM SEWER & MH

PROPOSED FEATURES (PR)

- NS — PR STREET NAME SIGN
- SS — PR STOP SIGN
- SF — PR SILT FENCE
- PR LEGAL PART LOTS
- PR LEGAL BOUNDARY
- L — PR STREET LIGHT
- W — PR WATER SERVICE
- SN — PR SAN SERVICE
- PR HYDRO TRANSFORMER
- 00mmø W/M — PR WATERMAIN
- 00mmø W/M — PR TEMPORARY WATERMAIN FOR PHASE 1A
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- G.F.E — GROUND FLOOR ELEVATION
- PR STRAW BALE CHECK DAM

CAUTION

CONTRACTOR TO DETERMINE LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.

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REGISTERED PROFESSIONAL ENGINEER
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Mansfield Ski Club

EROSION & SEDIMENT CONTROL PLAN

Client:

Mansfield Ski Club

628213 15th Sideroad
PO Box 75 RPO Mansfield,
Mulmur, Ontario
L9V 3M6

WMI & Associates Limited
119 Collier Street
Barrie, Ontario
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www.wmiengineering.ca

Drawn By	Checked By	Drawing No.
AW	JWL	ESC
Scale 1:500	Project No. 15–319	

GENERAL – CONSTRUCTION

1. ALL MEASUREMENTS ARE IN METRES, PIPE SIZES IN MILLIMETRES, UNLESS OTHERWISE NOTED.
2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CURRENT MUNICIPAL STANDARDS AND THE MOST CURRENT ONTARIO PROVINCIAL STANDARD DRAWINGS AND SPECIFICATIONS (IN THAT ORDER UNLESS NOTED OTHERWISE). IF A DISCREPANCY ARISES THE MUNICIPAL STANDARDS ARE TO GOVERN.
3. LOCATIONS OF EXISTING SERVICES ARE NOT GUARANTEED. CONTRACTOR TO CONFIRM EXISTING UTILITY LOCATIONS AND ELEVATIONS PRIOR TO CONSTRUCTION. THE CONTRACTOR IS REQUIRED TO NOTIFY THE VARIOUS UTILITY COMPANIES 48 HOURS PRIOR TO THE COMMENCEMENT OF ANY WORK.
4. THE CONTRACTOR SHALL INFORM THE MUNICIPALITY AND ENGINEER A MINIMUM OF 48 HOURS IN ADVANCE OF COMMENCING ANY WORK. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING INSPECTION FOR ALL CIVIL WORKS WITH THE ENGINEER IN ORDER TO PROVIDE SUFFICIENT CERTIFICATION AS REQUIRED BY THE MUNICIPALITY.
5. ALL DIMENSIONS AND ELEVATIONS ARE TO BE CHECKED AND VERIFIED BY THE CONTRACTOR. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER.
6. TRAFFIC CONTROLS TO CONFORM TO THE LATEST REVISION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AND ONTARIO TRAFFIC MANUAL TEMPORARY CONDITIONS (BOOK 7).
7. STREET AND TRAFFIC SIGNS – M.T.O. STANDARDS
8. FILTER FABRIC – TERRAFIX 270R OR APPROVED EQUAL.
9. DEWATERING TO BE CARRIED OUT IN ACCORDANCE WITH OPSS-517 AND 518 TO MAINTAIN ALL TRENCHES IN A DRY CONDITION, CONTRACTOR IS RESPONSIBLE FOR OBTAINING NECESSARY PERMITS FOR DEWATERING.
10. ALL DISTURBED AREAS WITHIN EXISTING RIGHT-OF-WAYS ARE TO BE REINSTATED TO THEIR ORIGINAL CONDITION OR BETTER AS DETERMINED BY THE MUNICIPALITY (MIN 300mm TOPSOIL AND NURSERY SOD).
11. ALL SEWER SYSTEMS INCLUDING SERVICE CONNECTIONS TO THE SEWER MAINS AS WELL AS CATCHBASINS AND MANHOLES SHALL BE THOROUGHLY FLUSHED AND/OR CLEANED OF DEBRIS AND ALL PIPES SHALL BE TESTED IN ACCORDANCE WITH OPS AND SHALL BE INSPECTED BY AN APPROVED VIDEO CAMERA TESTING COMPANY AND THE ENGINEER SHALL BE PROVIDED A COPY OF APPROPRIATE DATA UPON COMPLETION OF CONSTRUCTION AND PRIOR TO FINAL APPROVAL. ANY SECTIONS OF SEWER OR SERVICE CONNECTIONS THAT FAIL TO MEET THE REQUIREMENTS SHALL BE REPAIRED OR REPLACED AT THE DIRECTION OF THE ENGINEER. ONLY CHEMICAL PRESSURE GROUTING REPAIR TECHNIQUES WILL BE CONSIDERED ACCEPTABLE.
12. THESE ENGINEERING DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE LATEST VERSION OF THE GEOTECHNICAL INVESTIGATION. GEOTECHNICAL INSPECTION & MATERIALS TESTING TO BE PROVIDED DURING ALL SERVICING, PARKING LOT SUB-GRADE, PARKING LOT BASE, PAVEMENT, SWM POND, BERMING AND CONCRETE WORKS.
13. FOR SPECIFIC DIMENSIONS AND BUILDING INFORMATION REFER TO SITE PLAN/ARCHITECTURAL DRAWINGS.
14. PIPE DEFLECTION SHOULD BE USED WHEREVER POSSIBLE TO MINIMIZE THE USE OF BENDS, WHEREVER IT IS NECESSARY TO DEFLECT FROM A STRAIGHT LINE, EITHER IN THE VERTICAL OR HORIZONTAL PLANE. THE AMOUNT OF DEFLECTION SHALL NOT EXCEED THE MANUFACTURER'S SPECIFICATIONS.

ABOVE GROUND WORKS:

1. SUB-GRADE PREPARATION TO BE COMPLETED IN ACCORDANCE WITH THE GEOTECHNICAL INVESTIGATIONS RECOMMENDATIONS.
2. ASPHALT SURFACES TO BE CONSTRUCTED AS SHOWN ON THE PAVEMENT CROSS-SECTIONS DETAIL.
3. ENTRANCE CONNECTIONS TO CONSIST OF GRINDING EXISTING ASPHALT AND PROVIDE 0.3m WIDE OVERLAP JOINT AS SHOWN ON THE PAVEMENT LAP JOINT DETAIL.
4. CONCRETE CURB ON THE PROPERTY TO BE AS PER OPSD-600.110 BARRIER CURB. .
5. SIDEWALKS TO BE CONSTRUCTED AS PER OPSD 310.010, 310.020, & 310.030.
6. CONCRETE STRENGTH FOR CURB AND SIDEWALK IS TO BE 30MPa AT 28 DAYS.
7. A ROAD OCCUPANCY PERMIT IS REQUIRED PRIOR TO COMMENCEMENT OF WORK IN ANY MUNICIPAL RIGHT-OF-WAY.
8. A SITE ALTERATION PERMIT MAY BE REQUIRED FROM THE MUNICIPALITY PRIOR TO THE COMMENCEMENT OF EARTHWORKS.

SANITARY SEWER:

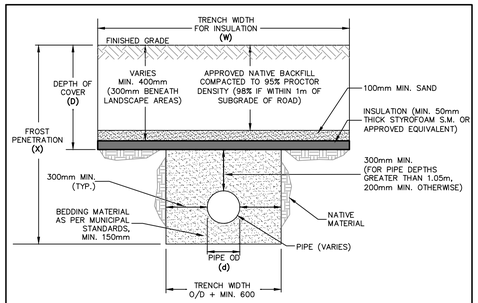
1. SANITARY MANHOLES TO BE 1200mmø AS PER OPSD 701.010 WITH BENCHING ACCORDING TO OPSD-701.021.
2. ALL SANITARY SEWERS TO BE PVC SDR-35 (OR APPROVED EQUIVALENT). ALL SANITARY SERVICES TO BE PVC SDR-28. BEDDING TO BE IN ACCORDANCE WITH OPSD 1006.020 AND 802.010.
3. PROVIDE SANITARY SEWER CLEANOUTS AS REQUIRED BY THE ONTARIO BUILDING CODE.
4. ALL SANITARY MANHOLES SHALL BE COMPLETED WITH FROST STRAPS PER OPSD 701.100.
5. MODULAR ADJUSTMENT UNITS FOR MANHOLES TO BE PROVIDED IN ACCORDANCE WITH OPSD 704.010. MAXIMUM THICKNESS OF ADJUSTMENTS UNITS IS 300mm.
6. WATER TIGHT COVERS TO BE PROVIDED FOR SANITARY MANHOLES LOCATED IN PONDING AREAS.
7. TESTING INCLUDING BUT NOT LIMITED TO DEFLECTION AND CCTV ARE TO BE COMPLETED AS PER MUNICIPAL STANDARDS AND OPSS.

STORM SEWER:

1. ALL SITE DRAINAGE POSSIBLE, INCLUDING ALL ROOF AND ASPHALT DRAINAGE, IS TO BE DIRECTED TO THE STORMWATER MANAGEMENT SYSTEM.
2. STORM SEWER 450mmø OR LESS: PVC CERTIFIED TO C.S.A. STANDARDS 182.2 AND 182.4.
   STORM SEWER GREATER THAN 450mmø: REINFORCED CONCRETE WITH A MINIMUM STRENGTH OF 50 N/m/mm CERTIFIED TO C.S.A. STANDARD A257.2, CLASS 50-D
3. STORM SEWER TO BE MINIMUM 300mm DIAMETER WITH JOINTS CONFORMING TO C.S.A. STANDARD A257.3.
4. MODULAR ADJUSTMENT UNITS FOR MANHOLES TO BE PROVIDED IN ACCORDANCE WITH OPSD 704.010. MAXIMUM THICKNESS OF ADJUSTMENTS UNITS IS 300mm.
5. STORM SEWER BEDDING AS PER OPSD 802.010 (FLEXIBLE PIPE) OR 802.030 (RIGID PIPE).
6. MANHOLES AND CATCHBASINS ARE TO BE IN ACCORDANCE WITH OPSD STANDARDS. CATCHBASIN MANHOLES ARE TO HAVE SUMPS.
7. CATCHBASIN LEADS – 300mmø. DOUBLE CATCHBASIN LEADS – 300mmø UNLESS OTHERWISE NOTED.
8. STORM SEWER COVER LESS THAN 1.2m TO PIPE OBVERT WILL REQUIRE FROST PROTECTION INSULATION, SEE INSULATION FOR SHALLOW PIPE DETAIL.
9. ALL STORM MANHOLES SHALL BE COMPLETED WITH FROST STRAPS AS PER OPSD 701.100.
10. TESTING INCLUDING BUT NOT LIMITED TO DEFLECTION AND CCTV ARE TO BE COMPLETED AS PER MUNICIPAL STANDARDS AND OPSS.

WATERMAINS:

1. WATERMAIN PIPES, FITTINGS, HYDRANTS, SERVICE PIPE TYPES & MANUFACTURERS ARE TO BE IN ACCORDANCE WITH MUNICIPAL STANDARDS.
2. WATERMAINS SHALL BE MINIMUM 100mmø, DR18. FIRE SUPPLY (250mmø) SHALL BE POLYVINYL CHLORIDE (PVC) CLASS 235 (DR18) OR APPROVED EQUIVALENT. TRACER WIRE (#12 STRANDED COPPER WIRE WITH OUTER PLASTIC COATING) SHALL BE INSTALLED ALONG THE ENTIRE LENGTH OF PVC WATERMAIN, SECURED TO FITTINGS AT INTERVALS NOT EXCEEDING 3m, AND BROUGHT UP AND LOOPED AT EACH VALVE BOX, CHAMBER AND HYDRANT SUCH THAT CONTINUITY IS MAINTAINED. TAPE IS TO BE USED TO AFFIX THE WIRE TO THE PIPE.
3. 50mmø WATER SUPPLY LINE FROM WELL PW1 IS TO BE 50mmø MUNICIPLEX (OR APPROVED EQUIVALENT).
4. WATERMAIN BEDDING AS PER OPSD 802.010 (FLEXIBLE PIPE) OR 802.030 (RIGID PIPE) AND AS PER TOWN STANDARDS.
5. HYDRANT INSTALLATION AS PER MUNICIPAL STANDARD.
6. THE MINIMUM HORIZONTAL SEPARATION BETWEEN THE WATERMAIN / WATER SERVICES AND THE SANITARY / STORM SEWER IS TO BE 2.5m.
7. A MINIMUM OF 0.5m VERTICAL CLEARANCE BETWEEN THE WATERMAIN / WATER SERVICES AND ALL UTILITIES SHALL BE MAINTAINED, WHILE MAINTAINING A MINIMUM DEPTH OF COVER AT ALL TIMES. WATERMAIN & WATER SERVICE TO BE INSULATED WITH HI-40 INSULATION AND/OR CONCRETE ENCASED AT THE ENGINEER'S DISCRETION WHERE 0.5m SEPARATION CANNOT BE MAINTAINED.
8. WATERMAIN / WATER SERVICE COVER LESS THAN 1.7m BELOW FINISHED GROUND SURFACE OR 1.9m BELOW ROAD CENTRELINE, WHICHEVER IS GREATER TO PIPE OBVERT WILL REQUIRE FROST PROTECTION, SEE INSULATION FOR SHALLOW PIPE DETAIL.
9. VALVE, VALVE BOXES AND CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH OPSD STANDARDS.
10. 50mm BLOW-OFF WITH SAMPLING PORT TO BE MUELLER CO. HYDRO-GUARD BSS-02 (OR APPROVED EQUIVALENT).
11. CONTRACTOR IS RESPONSIBLE FOR ALL TIE-INS INCLUDING MATERIALS, EXCAVATION AND BACKFILL AS REQUIRED TO FACILITATE THE SWABBING AND TESTING OF THE NEW WATERMAINS UNDER THE SUPERVISION OF THE ENGINEER.
12. FIRE HYDRANTS AND VALVES SHALL ONLY BE OPERATED BY MUNICIPAL WATER DEPARTMENT STAFF.
13. MECHANICAL JOINT RESTRAINTS ARE TO BE INSTALLED AT ALL TEES, HORIZONTAL BENDS, VERTICAL BENDS, HYDRANTS, END OF MAINS AND VALVES. CONCRETE THRUST BLOCKS ARE NOT PERMITTED UNLESS APPROVED BY THE ENGINEER. ALL MECHANICAL RESTRAINT SYSTEMS SHALL BE INSTALLED WITH CATHODIC PROTECTION AS PER THE TOWN STANDARD AND TREATED WITH DENSO TAPE.
14. THE CONTRACTOR SHALL SWAB, PRESSURE TEST, CHLORINATE AND FLUSH THE NEW WATERMAINS. ANY SWABBING, PRESSURE TESTING, CHLORINATING AND FLUSHING BEYOND THE INITIAL PROCEDURE WILL BE THE CONTRACTORS' RESPONSIBILITY. TESTING PROCEDURES TO BE IN ACCORDANCE WITH MUNICIPALITY STANDARDS.
15. ALL EXISTING WELLS LOCATED ON THE PROPOSED DEVELOPMENT LANDS ARE TO BE ABANDONED AND DECOMMISSIONED IN ACCORDANCE WITH ONTARIO REGULATION 903 UPON FINAL TESTING AND APPROVAL BY THE HYDROGEOLOGIST.



IN DETERMINING THE WIDTH OF SLAB REQUIRED, THE MINISTRY RECOMMENDS THAT THE FOLLOWING FORMULA BE USED;
W=2(X–D)+d, WHERE:

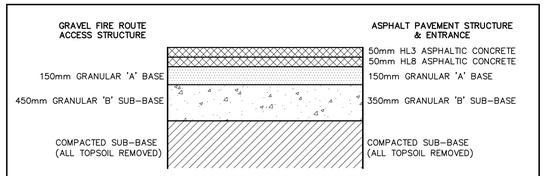
W = WIDTH OF SLAB IN METERS
X = FROST PENETRATION DEPTH IN METERS
D = DEPTH OF COVER OVER INSULATION IN METERS
d = OUTSIDE DIAMETER OF PIPE IN METERS

NOTES: –INSULATION SHALL BE PLACED WITH ENDS CLOSELY BUTTED TOGETHER. ALL JOINT ENDS SHALL BE STAGGERED WHEN MORE THAN ONE LAYER OF INSULATION IS BEING INSTALLED.

–FORMULA TAKEN FROM MOE GUIDELINES FOR SERVICING IN AREAS SUBJECT TO ADVERSE CONDITIONS DATED JANUARY 1985.

–FOR EVERY 300mm REDUCTION IN FROST COVER USE 25mm OF EXTRUDED POLYSTYRENE INSULATION.

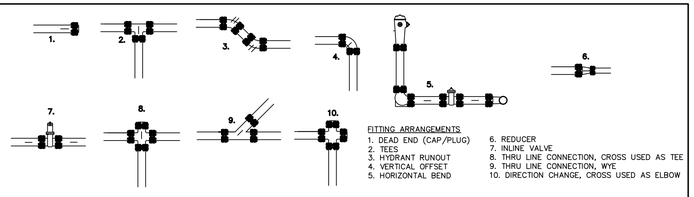
INSULATION FOR SHALLOW PIPES



NOTE: – REFER TO THE ADDENDUM GEOTECHNICAL REPORT PREPARED BY SHAD & ASSOCIATES INC. DATED APRIL 22, 2020 FOR FURTHER PAVEMENT DETAILS. ALSO REFER TO THE RECOMMENDED GRAVEL FIRE ROUTE PAVEMENT THICKNESS PREPARED BY SHAD & ASSOCIATES DATED MARCH 20, 2020.

PAVEMENT CROSS-SECTIONS

N.T.S.

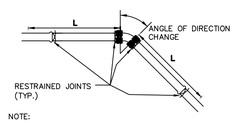


FITTING ARRANGEMENTS
1. DEAD END (CAP/PLUG)
2. TEES
3. HYDRANT RUNOUT
4. VERTICAL OFFSET
5. HORIZONTAL BEND
6. REDUCER
7. INLINE VALVE
8. THRU LINE CONNECTION, CROSS USED AS TEE
9. THRU LINE CONNECTION, WYE
10. DIRECTION CHANGE, CROSS USED AS ELBOW

TABLE 1.0

PIPE DIA.	L – MIN. LENGTH TO BE RESTRAINED ON EACH SIDE OF FITTING ARRANGEMENTS (M)						
	FITTING ARRANGEMENT No. 3 & 4		ELBOWS (DEG.)		INLINE VALVES, Y's & TEES, FITTING ARRANGEMENTS No. 2, 7 & 9	DEADENDS FITTING ARRANGEMENTS No. 1, 5, 8 & 10	REDUCER FITTING ARRANGEMENTS No. 6
	11 1/4	22 1/2	45	90			
mm							
100	8.0	8.0	8.0	8.0	8.0	12.4	8.0
150	8.0	8.0	8.0	8.0	8.0	17.8	9.2
200	8.0	8.0	8.0	8.0	8.7	23.1	9.5
250	8.0	8.0	8.0	8.7	13.6	28.3	9.7
300	8.0	8.0	8.0	10.2	18.0	33.5	9.8
350	8.0	8.0	8.0	11.7	23.7	38.7	9.9
400	8.0	8.0	8.0	13.3	28.6	43.6	10

* NOTE THE MINIMUM LENGTH OF PIPE ALLOWED ON EACH SIDE OF THE FITTING (BEFORE NEXT FITTING) TO BE 1.5m

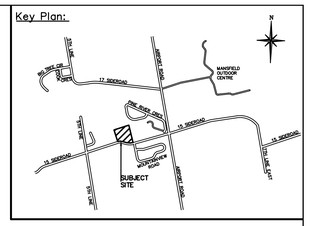


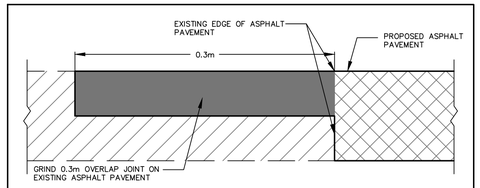
NOTE:
- ALL JOINTS MUST BE RESTRAINED IN ALL APPLICATIONS. TABLE 1 SHOWS RESTRAINED JOINTS REQUIRED ON BOTH SIDE OF THE RESTRAINED FITTINGS
- WHERE CONNECTING TO EXISTING WATERMAIN, EXCAVATE AND INSTALL RESTRAINTS ON EXISTING WATERMAIN FOR LENGTHS IDENTIFIED IN TABLE 1.0
- LENGTHS TO BE RESTRAINED SHOWN IN TABLE 1.0 ARE MINIMUMS. CONTRACTOR TO CONFIRM WITH RESTRAINT AND/OR PIPE SUPPLIER THE NEED FOR ADDITIONAL RESTRAINT. MINIMUM FACTOR OF SAFETY TO BE USED IS 2.5 FOR A TEST PRESSURE OF 1034kPa (150 psi)

RESTRAINED JOINTS DETAIL

N.T.S.

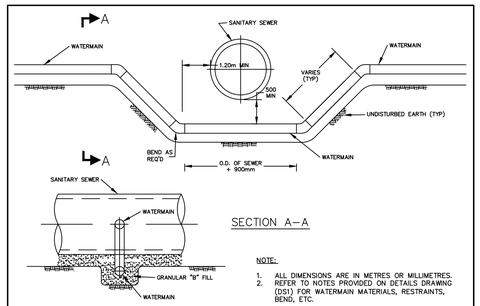
Key Plan:





PAVEMENT LAP JOINT

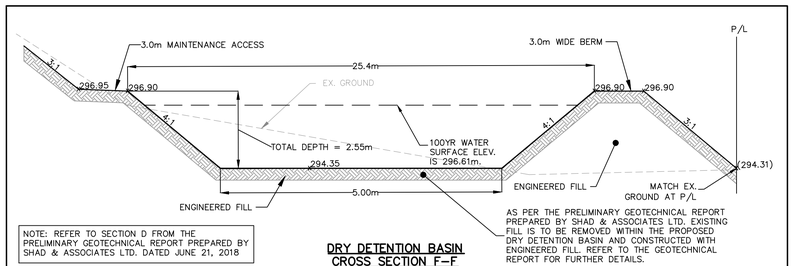
N.T.S.



NOTE:
1. ALL DIMENSIONS ARE IN METRES OR MILLIMETRES.
2. REFER TO NOTES PROVIDED ON DETAILS DRAWING (DS1) FOR WATERMAIN MATERIALS, RESTRAINTS, BEND, ETC.

TYPICAL WATERMAIN DEFLECTION DETAIL

N.T.S.



NOTE: REFER TO SECTION D FROM THE PRELIMINARY GEOTECHNICAL REPORT PREPARED BY SHAD & ASSOCIATES LTD. DATED JUNE 21, 2018

AS PER THE PRELIMINARY GEOTECHNICAL REPORT PREPARED BY SHAD & ASSOCIATES LTD. EXISTING FILL IS TO BE REMOVED WITHIN THE PROPOSED DRY DETENTION BASIN AND CONSTRUCTED WITH ENGINEERED FILL. REFER TO THE GEOTECHNICAL REPORT FOR FURTHER DETAILS.

DRY DETENTION BASIN CROSS SECTION F–F

N.T.S.

Notes:

1. Unless noted otherwise, the measurements and distances shown on this drawing are shown in meters.
2. Do not scale drawings.
3. It is the contractor's responsibility to verify all dimensions, levels and datums on site and report any discrepancies or omissions to WMI & Associates Ltd. prior to construction.
4. This drawing is to be read and understood in conjunction with all other relevant documents applicable to this project.
5. This drawing is the exclusive property of WMI & Associates Ltd. and the reproduction of any part of this document without prior written consent is strictly prohibited.

Benchmark: 463.937m

ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE DERIVED FROM CANNET NETWORK BASE STATION ORVL HAVING A PUBLISHED ELEVATION OF 463.937m

REGISTERED PROFESSIONAL ENGINEER
J.W.LIGHTHEART
100140403
SEPT 8, 2021
PROVINCE OF ONTARIO

No.	Issue / Revision	Date
1	SPA FIRST SUBMISSION	AUG. 17, 2020
2	SPA SECOND SUBMISSION	DEC. 15, 2020
3	SPA THIRD SUBMISSION	APR. 5, 2021
4	SPA THIRD SUBMISSION – UPDATE	APR. 12, 2021
5	SPA FINAL SUBMISSION	SEPT. 8, 2021

Mansfield Ski Club

DETAIL SHEET 1

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Drawn By	Checked By	Drawing No.
AW	JWL	DS1
Scale N.T.S.	Project No. 15–319	