WMI & Associates Limited
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August 5, 2021

Via: Email

Ministry of the Environment, Conservation and Parks (MECP)
Industrial & Private Wastewater Approvals, Environmental Permissions Branch
135 St. Clair Ave. W, 7th Floor
Toronto, Ontario
M4V 1P5

Attention: **Scott Wei, M.A.Sc., P.Eng.**
Senior Wastewater Engineer

Re: **Mansfield Ski Club**
Community of Mansfield, Township of Mulmur,
ECA Reference No. 8664-BZVSYN
Contingency Plan
WMI File No. 15-319

Dear Mr. Wei,

The following is a formal response to your email dated July 8, 2021 which requested a technical memorandum related to the discrepancy between Maximum Daily Sewage flows referenced within the approved Assimilative Capacity Study dated May 2018 and the Site Servicing & Stormwater Management Report dated April 2021.

We provide the following memorandum in support of the current sewage treatment systems (STS) design which is based on a Maximum Daily Sewage flow of 135,050L/day (1.56L/s) and the approved ACS discharge rate of 120,387L/day (1.39L/s) to the Pine River. Based on my understanding Tech Support has limited resources at the moment and their required review of the ACS Addendum dated March 2021 may result in significant delays in our expedited ECA approval process. For this reason, we've decided to propose the following Contingency Plan should actual flows exceed the approved discharge rate of 120,387L/day rather than amending the approved discharge rate.

The maximum daily design flow has been conservatively calculated based on the assumption that all uses at the MSC are all fully occupied at the same time (i.e. Main Chalet, Accommodation Units, Chili Shack, Patrol Hut, Admin Building, GM Office, etc.). This assumption resulted in the 135,050L/day Maximum Daily Sewage flow. Realistically it is a private club with only a limited number of members and staff who are incapable of generating sewage at multiple facilities at a given instance in time (i.e. no one person can generate sewage within their accommodation unit at the same time they are generating sewage in the Main Chalet). Considering the above, the fact that the design flow assumes all facilities are fully occupied and the fact that actual sewage flows are typically much less than theoretical design values, we have conservatively determined a theoretical design flow while also proposing a contingency within the proposed sewage treatment system's design to accommodate flow balancing should actual flows warrant it.

Our approach is to closely monitor flows as construction is phased in and more of the proposed facilities become occupied. If flows remain below the allowable discharge rate of 120,387L/day (1.39L/s) flow balancing will not be implemented. On the other hand, in the event that flow monitoring data suggests that additional build-out of the proposed development may result in an exceedance of the allowable discharge rate to the Pine River, flow balancing will be implemented at the upstream end of the sewage treatment system in order to maintain the allowable discharge rate.

Based on a review of monitored flow data as noted above, should it be determined that 50,000L or less of flow balancing is suffice, only one (1) of the proposed balancing tanks will be installed. Otherwise, if the monitored flow data warrants greater than 50,000L of flow balancing, both tanks will be installed as outlined on the Biofilter Plan 1 (BIO1). Refer to the attached **BIO1** drawing and supporting flow balancing calculations for additional details.

Once the proposed sewage treatment system is in place, flow monitoring will be provided and tracked via the Waterloo Biofilter Smart Panels. As each Phase of construction is completed and becomes occupied, available flow data will be analyzed and compared to the corresponding theoretical design values to confirm that the estimated design values are in line with actual flow generation. A threshold of 80% of the allowable discharge rate will be used to defer any further construction/occupancy until the necessary flow balancing is implemented.

Should you have any questions or require further clarification, please do not hesitate to contact the undersigned.

Respectfully submitted,

WMI & Associates Limited

Jeremy W. Lightheart, P. Eng.

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FLOW BALANCING CALCULATIONS
SEWAGE TREATMENT SYSTEM DESIGN

Date: 16-Jul-21 **Project No.:** 15-319

Project: Mansfield Ski Club **Prepared By:** JWL

<<< Elements Requiring Input Information

Maximum Daily Sewage Flow = **135050** L/day
Daily Discharge Flow = **120387** L/day (typ. weekly average flow)

Volume in Tank Today (End) = Previous Day's Volume (Start) + Flow into Tank (Added) - Flow pumped out of Tank (Discharged)

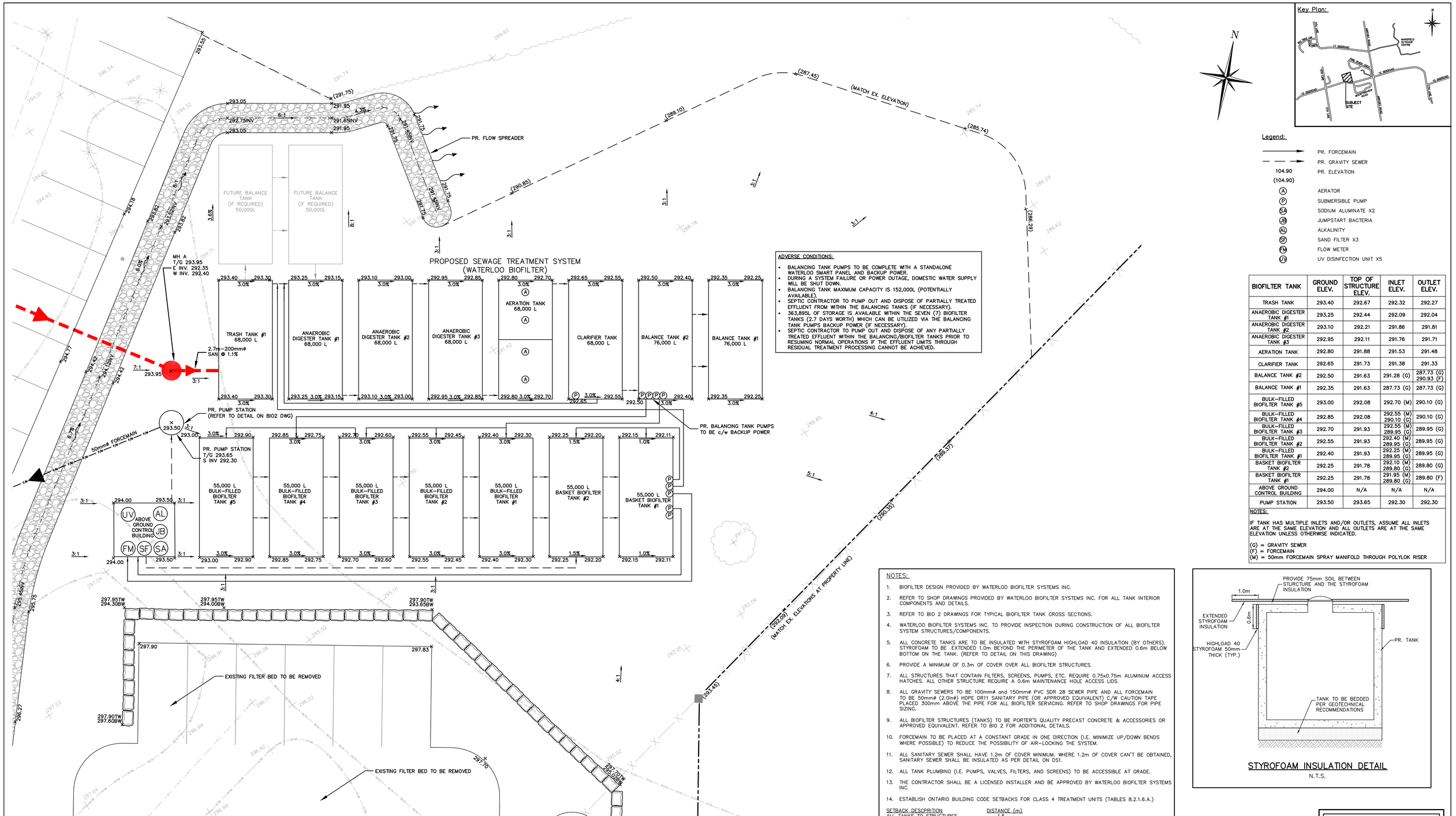
Day	% of Max. Volume, L	Start Volume, L	Added Volume, L	Discharged Volume, L	End Volume, L	
Saturday	**100**	0	135050	120387	14663	
Sunday	**100**	14663	135050	120387	29326	**< MAX.**
Monday	**10**	29326	13505	42831	0	
Tuesday	**10**	0	13505	13505	0	
Wednesday	**35**	0	47268	47268	0	
Thursday	**35**	0	47268	47268	0	
Friday	**60**	0	81030	81030	0	

Emergency storage volume equal to 1/2 day response time for service or pump-out

Governing End Volume + 1/2 of Maximum Daily Sewage Volume = Balancing Tank Volume
= **96851 L OR 25622 gal**

Use 2 x 50,000L balancing tanks

NOTES: - Daily Discharge Flow has been assumed to be the original ACS flow approved by MECP Tech Support during pre-consultation.
- MSC is closed on Monday and Tuesday's but 10% of the Maximum Daily Sewage Flow has been assumed for staff usage during these days, 35% was assumed for Wednesday and Thursday's based on 2019-2020 statistical data, 70% was assumed for Friday's (avg between Thursday and Saturday) and 100% was conservatively assumed for each day of the weekend although statistical data suggested 20% for a typical Saturday. The Maximum Daily Sewage Flow was only experienced during big events (i.e. Family Day Weekend, Ladie's Day, etc.) but we've assumed both weekend days at this rate to conservatively size the balancing tank.
- Refer to the Site Servicing & Stormwater Management Report dated April 2021 for all flow data with the exception of the Daily Discharge Flow, refer to the Assimilative Capacity Study dated May 2018.



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.

Key Plan:

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

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.

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

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

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
July 27, 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

Mansfield Ski Club

BIOFILTER PLAN 1

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

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