BRISTOL, VERMONT
ANNUAL WASTEWATER SYSTEM EVALUATION
2021-2022

INDIRECT DISCHARGE PERMIT ID 9-0208

APRIL 2022

Prepared By: VTM Engineering, PLC

Date: June 29, 2022

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1.0 INTRODUCTION

The Town of Bristol, Vermont owns and operates a sewage collection and treatment system located in the downtown core of Bristol village. The system collects and treats wastewater from approximately thirty-four (34) individual commercial and residential properties within the "core" business district. The wastewater collection and disposal system are governed by Indirect Discharge Permit number 9-0208 issued by the State of Vermont.

The System has been operating since September 1, 1993. The system consists of a wastewater collection system, a septic tank, disposal fields and associated appurtenances. An annual inspection of the collection and disposal system by a registered professional engineer is required as a condition of the Indirect Discharge Permit.

Historically Green Mountain Engineering (GME) has conducted the annual inspection and evaluation of the Bristol wastewater collection and disposal system. GME dissolved in early 2022 however and is no longer providing engineering services. The Town of Bristol subsequently contracted with VTM Engineering, PLC (VTM) of Hinesburg, Vermont to conduct the annual wastewater inspection and evaluation.

The annual inspection of the Bristol wastewater collection, treatment and disposal systems was performed on April 20, 2022 by Steven Palmer, P.E. of VTM. Mr. Palmer performed the inspection in conjunction with Mr. Cyrus Marsano of Vermont Utility Management Services (VTUMS). VTUMS is the licensed wastewater operator of the Bristol wastewater treatment system.

This Report outlines the items inspected, the conditions encountered, analysis of annual sampling and testing data as well as providing recommendations for repairs and/or operations.

2.0 WASTEWATER SYSTEM FIELD INSPECTION

The Bristol Wastewater system is comprised of three major components including a wastewater collection system, septic tank and eight separate wastewater disposal fields. The design envisioned four disposal fields in operation at any given time. The original design envisioned a flow of 5,000 gpd maximum capacity to each operating field (20,000 gallon total system design capacity). The system capacity however was later limited by future permit amendments that applied discharge limits on TSS and BOD[5].

Figures 1, 2 and 3 Appendix A show the general location of the major system components.

2.1 Wastewater Collection System Inspection

The inspection consisted of visually observing the physical condition of each component as well as evaluating the operation of each component within the system. A summary of the individual wastewater collection system component inspection observations noted by VTM are presented in Table 1. VTUMS updated VTM on June 28, 2022 regarding maintenance items that have been addressed prior to this submittal. Those items are also noted in Table 1.

The municipal wastewater collection system consists of six separate exterior grease traps (primarily for restaurants), twelve concrete collection manholes and approximately 1,500-feet of wastewater collection piping. It should be noted that a number of the restaurants connected to this system also have privately owned grease traps inside of each facility which are regulated by the Vermont Health Department and were not a part of this inspection. It is VTM's understanding from VTUMS personnel however that the interior grease traps are pumped on a quarterly schedule.

2.2 Septic Tank Inspection

The septic tank cover was removed and the tank was inspected by both VTM and VTUMS personnel. The septic tank is constructed with four separate compartments for sludge accumulation and storage (refer to Figure 4). Sludge and scum measurements for each compartment were conducted by VTUMS personnel during the inspection. Results were as follows:

Sludge Measurements/Observations Cell #1	Sludge Measurements/Observations Cell #2
Compartment #1 – Sludge 60", Scum 8"	Compartment #1 – Sludge 12", Scum 12"
Compartment #2 – Sludge 24", Scum 18"	Compartment #2 – Sludge 12", Scum 6"

VTM obwerved that the septic tank slide gates, safety locks and hasps on hatches were in good condition. The interior handles are in need replacement and the box trough needs re-building. Pumping of both compartments of Cell #1 is also recommended based on sludge buildup.

TABLE 1
WASTEWATER COLLECTION SYSTEM OBSERVATIONS

ITEM A	COLLECTION SYSTEM COMPONENT
MH #1	Low flow/good condition/dead end/no service connections in MH
MH #2	Low flow/good condition/MH riser recently added
MH #3	Low flow/good condition
MH #4	Good condition/low flow/cover needs grout repair. *Update - VTUMS reported regrouting the manhole riser and replaced sidewalk section 5/6/22*
MH #5	Good condition, low flow/dead end/dirty shelves, cover needs grout repair. *Update – VTUMS reported regrouting the manhole cover and repaving on 5/10/22.*
MH #6	Under stone drive/good condition
MH #7	Under stone drive/not inspected
MH #8	Low flow/gravel on shelves/excellent condition
MH #9	Low flow/good condition/recently regrouted
MH #10	Excellent condition/cover needs grout repair. Update – VTUMS reported. *Update – VTUMS reported regrouting the manhole cover on 6/24/22.*
MH #10A	Low flow/good condition/starting to backup/needs jetting. *Update – VTUMS reported jetting between manholes 10 & 10A on 4/21/22 to clean and restore flow.*
MH #11	Low flow/good condition/dirty shelves/ no evidence of backup
Mary's Grease Trap - Not in use. Trap not inspected due to car parked over manhole	
Hendee Grease Trap - RCC tank. Quarterly pumping schedule	
Snap's Grease Trap - RCC tank. Quarterly pumping schedule. Cover needs grout repair. *Update – VTUMS reported regrouting the manhole cover on 5/19/22.*	
Bakery Grease Trap - RCC tank. Quarterly pumping schedule	
Cubbers Grease Trap- RCC tank. Bi-monthly pumping schedule	
Treatment/Disposal System - Mowed. Sumac clearing needed on SW side. See Item B for individual component inspection.	
Interior Grease Traps (private) - Not Inspected. Operator reports local hauler is cleaning quarterly for the property owners under separate maintenance agreement.	
Viens Dosing Siphon - Visually in good condition. Riser and cover replaced in 2020.	

TABLE 2
WASTEWATER COLLECTION SYSTEM
SUMMARY OF RECOMENDED REPAIRS & MAINTENANCE[1]

Description	Frame and Cover				Clean Invert	Clean Shelves	Repair Infiltration	Comments/Additional Items
	Replace	Grout	Center	Raise				
S.T. Inlet								Cell 1 Needs Pumping
S.T. Outlet								Eff. Box Needs Rebuilding
Splitter Box								Replace 8" D.I. Entry pipe
D.S. #1								VTUMS to Check Operation
D.S #2								VTUMS to Check Operation
D.S. #3								VTUMS to Check Operation
D.S. #4								VTUMS to Check Operation
D.S. #5								VTUMS to Check Operation
D.S. #6								VTUMS to Check Operation
D.S. #7								VTUMS to Check Operation
D.S. #8								VTUMS to Check Operation
M.H. #1								Good Condition
M.H. #2								Good Condition
M.H. #3								Good Condition
M.H. #4		X						Needs Grout Repair
M.H. #5		X				X		Needs Grout Repair
M.H. #6								Good Condition
M.H. #7								Not Accessible - Vehicle
M.H. #8						X		Good Condition
M.H. #9								Good Condition
M.H. #10		X						Needs Grout Repair
M.H. #10A								Good Cond. Line needs jetting
M.H. #11						X		Good Condition
Mary's GT								Inactive, not inspected
Hendee GT								Good Condition

Snap's GT		X						Needs Grout Repair
Bakery GT								Good Condition
Cubbers GT								Good Conditions
Viens DS								Good Cond. Functioning

S.T. = Septic Tank
D.S. = Dosing siphon
M.H. = Manhole
GT = Grease Trap

2.3 Splitter Box Inspection and Disposal Field Rotation

The splitter box cover was opened and inspected by VTM and VTUMS personnel. Observations were as follows:

1. Fields #1, #2, #4 and #6 were observed to be on at the start of the inspection
2. Good flow, very little grease observed in splitter box.
3. Operator indicated that periodic skimming of grease in the splitter box is conducted by VTUMS personnel to ensure even flow to the four fields.

Disposal fields #1, #2, #4 and #6 were observed to be on at the start of the inspection. These disposal fields were turned off by the operator and switched to disposal fields #3, #5, #7 and #8 during the inspection. Flow seemed to be evenly distributed between the four fields.

VTM recommends complete replacement of the 8" ductile iron entry pipe and elbow entering the splitter box.

2.4 Dosing Siphon Inspection

Dosing siphons were visually inspected by VTM and VTUMS personnel. Insufficient flow existed in fields #3, #5, #7 & #8 to determine if siphons were properly functioning at that time. VTM recommends that the operator verify the operation of siphons once they receive sufficient flow.

The siphon counters do not appear to be operational. GME who originally designed the system indicated that the counters have never functioned properly. In the 2020/2021 Annual Inspection Report GME recommended relacing the existing counters with mechanical counters when practical. VTM would also support that recommendation.

2.5 Shallow Monitoring Well Observations

Each disposal field contains shallow observation wells to assist in monitoring potential standing water in each disposal field. Each shallow monitoring well was noted to be approximately 1.5 – 2.0 deep. No standing water was noted in any of the shallow monitoring wells. VTM's observations are summarized in Table 2:

TABLE 2
SHALLOW OBSERVATION WELL MONITORING

Field	Observation
#1	Dry
#2	Dry
#3	Dry
#4	Dry
#5	Dry
#6	Dry
#7	Dry
#8	Dry

2.6 Deep Monitoring Well Observations

Three monitoring wells surround the wastewater disposal fields. These wells are used to monitor existing groundwater levels below the trench bottoms for each disposal field. Water levels were obtained by VTUMS personnel in June and September 2021. Table 3 summarizes the most recent groundwater level information.

TABLE 3
DEEP MONITORING WELL MEASUREMENTS[1]

Date	Well #	Depth to Groundwater (ft)
6/4/21	2	18.2
	3	33.4
	4	41.1
6/11/21	2	18.3
	3	33.3
	4	41.3
6/18/21	2	18.4
	3	33.6
	4	40.5
6/25/21	2	18.5
	3	33.9
	4	40.6
9/3/21	2	18.4
	3	33.7
	4	40.6
9/10/21	2	18.3

	3	33.6
	4	40.3
9/17/21	2	18.4
	3	33.8
	4	40.4
9/24/21	2	18.7
	3	33.9
	4	40.6
9/30/21	2	18.6
	3	33.7
	4	41.6

1. Groundwater level measurements provided by VTUMS.

2.7 Wastewater Effluent Sampling & Testing

Effluent sampling was performed by VTUMS during June and September 2021. VTUMS obtained representative wastewater samples from the Splitter Box. Samples were submitted to Endyne Environmental Laboratories for analysis. A summary of the laboratory data from 2020 and 2021 is provided in Table 3.

TABLE 3
WASTEWATER EFFLUENT TESTING SUMMARY
(Sampling Conducted in Splitter Box)

Sampling Date	June 18, 2020	Sept. 15, 2020	June 21, 2021	Sept. 9, 2021
pH	6.2	6.9	6.28	6.48
Chloride	69	74	82	64
Nitrogen, Ammonia	NR	NR	NR	NR
Nitrogen, Nitrite	0.22	<0.20	<0.20	<0.20
Nitrogen, Nitrate	<0.20	<0.20	<0.20	<0.20
TKN	63	61	74	<0.64
Tot. Dissolved Phosphorous	8.6	8.7	9.7	7.0
Biochemical Oxygen Demand (5-day)	560	490	640	420
Total Suspended Solids	70	86	90	66

Oil and Grease	32.3	37.1	37.1	37.1

Notes:

1. *Wastewater quality results are reported in milligrams per liter (ppm) unless otherwise specified.*
2. *Wastewater quality results are for samples from the splitter box (after septic tank).*
3. *NR = Not reported*
4. *laboratory information from 2020 as reported by Green Mountain Engineering.*
5. *Laboratory sampling conducted by Vermont Utility Management Services (VTUMS)*

Copies of the laboratory testing data sheets are contained in Appendix B.

2.8 Groundwater Testing Results

Groundwater sampling was performed by VTUMS during June and September 2021. VTUMS obtained representative wastewater samples from Monitoring Wells #3 and #4. Samples were subsequently submitted to Endyne Environmental Laboratories for analysis. A summary of the laboratory data from 2020 and 2021 is provided in Table 4. Copies of the laboratory testing data sheets are contained in Appendix B.

TABLE 4
GROUNDWATER WELL TESTING SUMMARY
(Sampling Conducted in Monitoring Wells #3 & #4)

Monitoring Well # & Date Sampled	pH	E. Coli (MPN/100ml)	Chloride	Nitrate as N	Tot. Dissolved Phosphorous
MW – 3 (June 18, 2020)	6.75	<1.0	7.4	1.3	0.008
MW – 3 (Sept. 15, 2020)	6.86	<1.0	8.8	0.16	0.006
MW-3 (June 21, 2021)	6.93	<1.0	11	1.4	0.007
MW-3 (Sept. 9, 2021)	6.68	<1.0	9.0	<0.20	0.008
MW – 4	6.65	1.0	27	3.3	0.016

(June 18, 2020)					
MW – 4 (Sept. 15, 2020)	6.80	1.0	35	5.1	0.009
MW-4 (June 21, 2021)	7.49	<1.0	15	1.0	<.005
MW-4 (Sept 9, 2021)	6.71	2.0	27	4.5	0.010

Notes:

1. Wastewater quality results are reported in milligrams per liter (ppm) unless otherwise specified.
2. Wastewater quality results are for samples from the splitter box (after septic tank).
3. NR = Not reported
4. Laboratory information from 2020 as reported by Green Mountain Engineering.
5. Laboratory sampling conducted by Vermont Utility Management Services (VTUMS)

2.9 Wastewater Flow Data

The treatment system average daily flows are estimated using individual water meter readings for each of the 34 customers connected to the system. The water meter data was provided by the Town of Bristol and is presented in Appendix D.

The average daily flow for the system for the 2021/2022 reporting period was 8,362 gpd based on water meter readings provided from May 9, 2021 to May 11, 2022. Alternatively, the average daily flow as reported in the 2020/2021 Annual Inspection Report by Green Mountain Engineering was 6,082 gpd. Much of this year over year increase in flow can likely be attributed to an increase in business activity after the re-opening of the area businesses following the lifting of covid restrictions.

2.10 Wastewater Effluent Evaluation

Historic laboratory testing data has been summarized by Green Mountain Engineering going back a number of years. VTM compared GME's 2020 Effluent wastewater testing information to the 2021. Both sets of information are summarized in Table 3. All parameters are well withing the anticipated normal ranges for commercial/residential wastewater. No significant variations in parameters were noted from year to year which could indicate a change in the wastewater stream over this time period.

Nitrite levels in the groundwater samples appear to be variable as was also noted in last years annual Inspection Report. No trend clear appears however it is advised to continue to monitor these levels for substantive changes.

2.11 Uncommitted Reserve Capacity

The uncommitted reserve capacity of the system is based upon daily maximum BOD^5 and TSS loading. The calculations for loading capacity are outlined in the Permit. A copy of the Uncommitted Reserve Capacity calculations are contained in Appendix D. The total allowable BOD^5 AND TSS loadings per the Permit are 33.4 lb/day and 25.0 lb/day respectively. A two-year average was used for calculating the average BOD^5 and TSS loadings. The actual loadings based on the two-year average were 31.8 and 4.7 lb/day respectively which are less than the allowable permit limits. From a practical standpoint there is no additional uncommitted reserve capacity remaining in the system.

2.12 Mowing and General Upkeep

The area is clean and appears to be mowed on a regular basis. There appear to be mowing issues in and around the shallow observation wells and many of the well caps were difficult to remove. Sumac was noted to be encroaching the disposal fields along the north and northwest sides of the disposal area. A discharge pipe for a private stormwater or groundwater drain line appears to have been recently installed and daylights along the bottom of the bank along the northwest side of disposal Field #1. This line was observed to have a steady flow of water that was discharging on the ground adjacent to the northwest corner of Disposal Field #1.

3.0 TREATEMENT SYSTEM EVALUATION & RECOMENDATIONS

The wastewater collection and disposal system is in its 29th year of operation. Overall, the system appears to be in good working condition. The disposal fields show no signs of excessive odor, settlement, effluent surfacing, elevated water elevations or other conditions that would indicate potential disposal field failure or other issues of concern.

Laboratory testing results show that the wastewater effluent and groundwater sampling parameters are withing the historical range of values. Results for TKN during the September 2021 Wastewater Effluent Sample are extremely low and it appears based on historic data to be a laboratory error. Nitrite levels in the groundwater samples should continue to be monitored to note any spikes or an increasing in the trend line.

The site in general is neat and well maintained. Current recommended maintenance and repair issues include:

a. Utilize the routine system maintenance checklists outlined in the O&M Manual
b. Complete the recommended collection system maintenance items listed in Table 2.
c. Cell #1 of the septic tank should be pumped. *Update - VTUMS reported that pumping of Septic Tank 1 was completed by Clark Wright on 6/20/22 and 19,500 gallons were disposed of at the Middlebury WWTF.*
d. Re-build the septic tank interior handles and box trough.
e. Replace the 8" DI entry pipe into the splitter box.
f. Replace the existing dosing siphon counters with mechanical counters when practical.
g. Install flush mounted riser covers (or similar) over each observation well to allow for ease of mowing as well as preventing dirt from getting in the threads. All well caps should be removed, cleaned and threads greased. *Update – VTUMS reported that as of 6/28/22 they have ordered (4) of recommended risers from EJP as a trial and will change all over if they work well.*
h. Sumac should be removed and the area cleared back to the bottom of bank within the boundaries of the Town property at the disposal fields to provide a buffer that can be mowed and easily maintained. Sumac should also be removed in and around the shallow and deep monitoring wells to provide easy access and maintenance.
i. The new stormwater or groundwater drainage line that was observed discharging near field #1 should either be removed OR moved to a location downstream that does not have the potential to impact the disposal fields.
j. Monitor the splitter box flows regularly. Clean the v-notches with a brush at least bi-weekly to ensure equal flow to each of the disposal fields.
k. Continued effort should be placed on pre-treatment technologies to reduce the BOD^5 levels so that the system has some reasonable amount of uncommitted reserve capacity.
l. Verify proper operation of the dosing syphons.
m. Continue regular mowing and trimming of the disposal field area as well as access road maintenance as necessary.

APPENDIX A

FIGURES

VTM ENGINEERING, PLC
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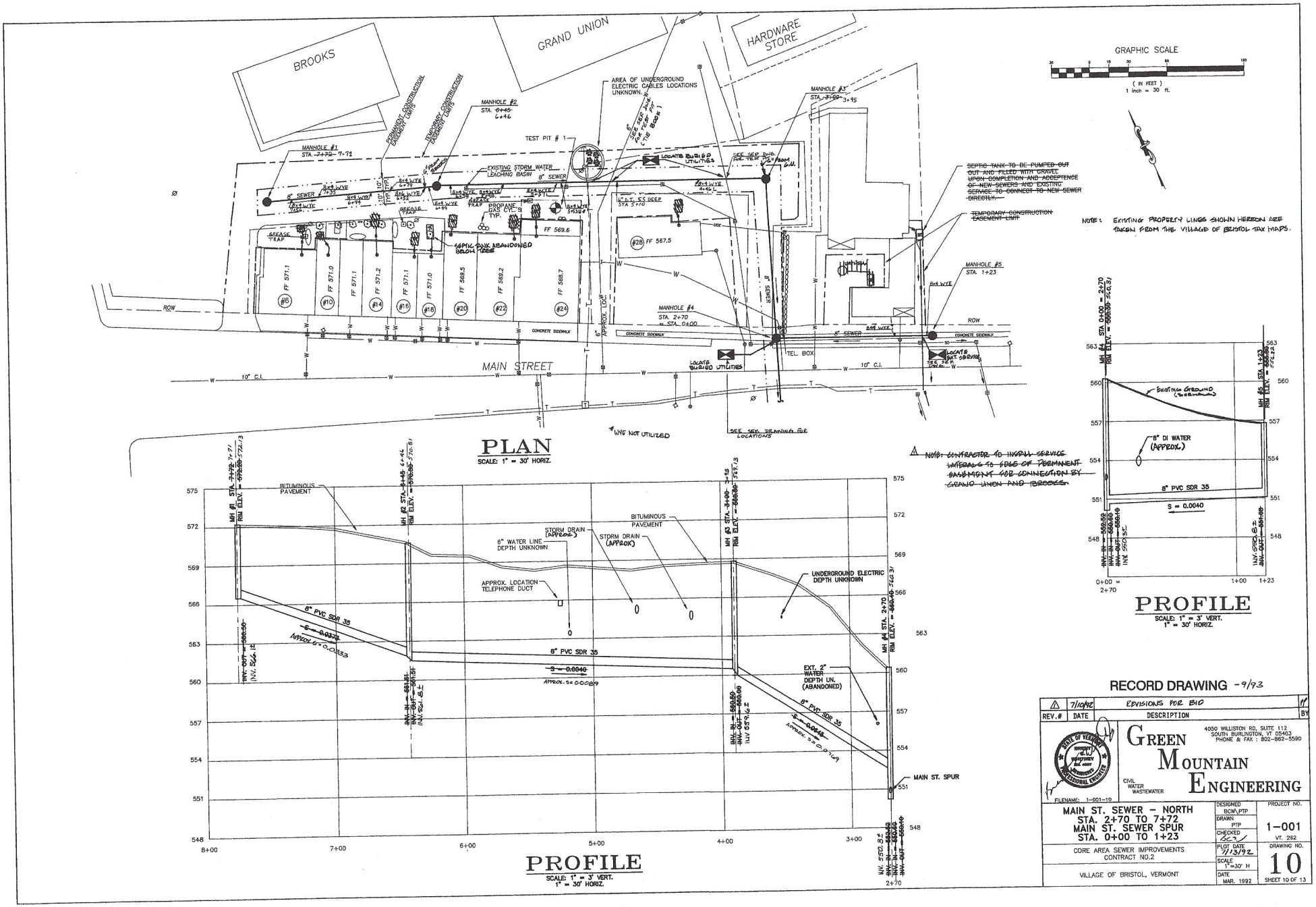
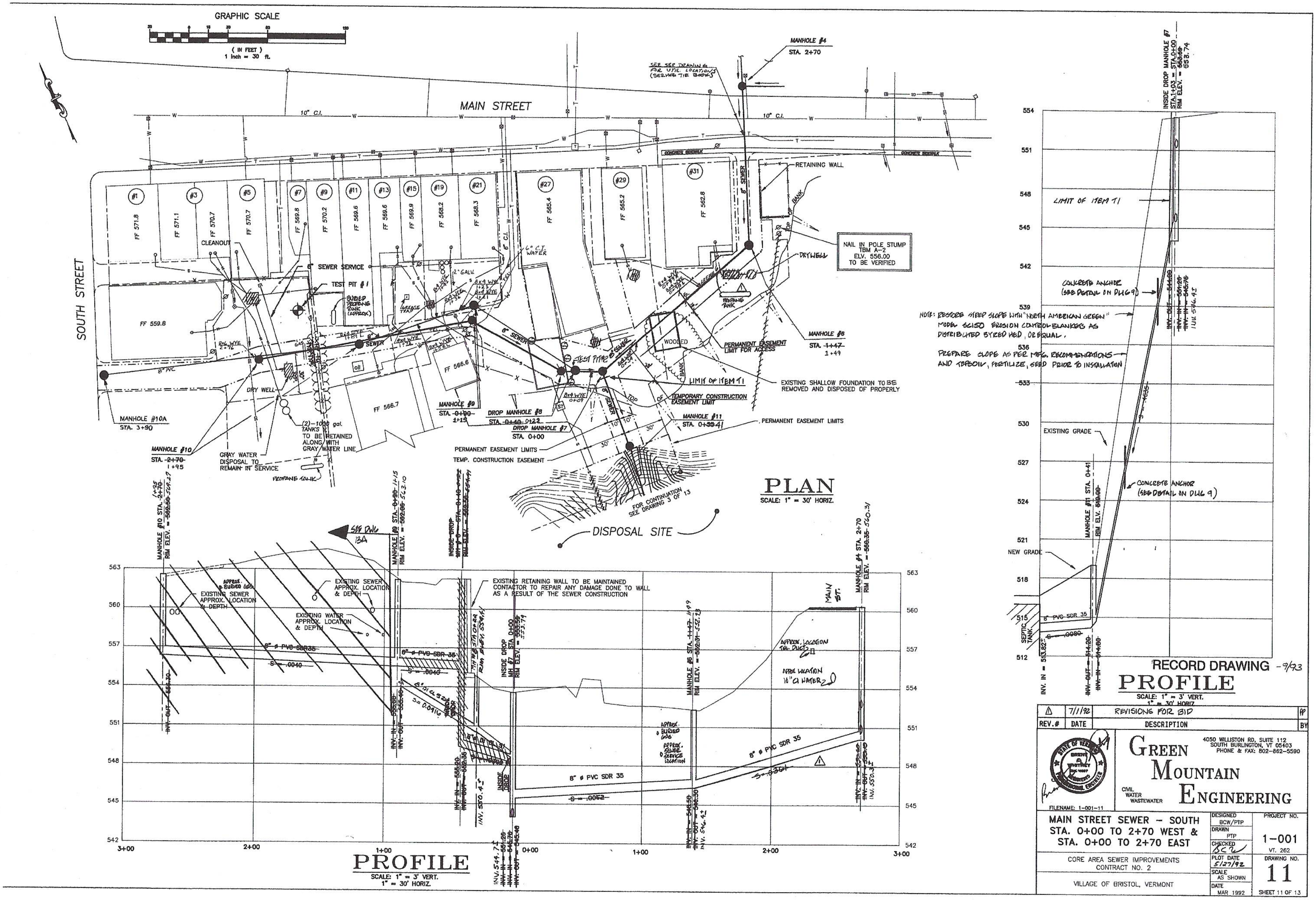

BROOKS
GRAND UNION
HARDWARE STORE
GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft.
MANHOLE #1
MANHOLE #2
MANHOLE #3
MANHOLE #4
MANHOLE #5
TEST PIT # 1
EXISTING STORM WATER LEACHING BASIN
AREA OF UNDERGROUND ELECTRIC CABLES LOCATIONS UNKNOWN.
SEPTIC TANK TO BE PUMPED OUT AND FILLED WITH GRAVEL UPON COMPLETION AND ACCEPTENCE OF NEW SEWERS AND EXISTING SERVICE TO CONNECT TO NEW SEWER DIRECTLY.
TEMPORARY CONSTRUCTION EASEMENT LIMIT
NOTE: EXISTING PROPERTY LINES SHOWN HEREON ARE TAKEN FROM THE VILLAGE OF BRISTOL TAX MAPS.
MAIN STREET
ROW
TEL. BOX
LOCATE BURIED UTILITIES
*WYE NOT UTILIZED
PLAN
SCALE: 1" = 30' HORIZ.
NOTE: CONTRACTOR TO INSTALL SERVICE LATERALS TO EDGE OF PERMANENT EASEMENT FOR CONNECTION BY GRAND UNION AND BROOKES
PROFILE
SCALE: 1" = 3' VERT.
1" = 30' HORIZ.
8" DI WATER (APPROX.)
8" PVC SDR 35
S = 0.0040
EXISTING GROUND (APPROX.)
BITUMINOUS PAVEMENT
STORM DRAIN (APPROX.)
6" WATER LINE DEPTH UNKNOWN
APPROX. LOCATION TELEPHONE DUCT
UNDERGROUND ELECTRIC DEPTH UNKNOWN
EXT. 2" WATER DEPTH UN. (ABANDONED)
MAIN ST. SPUR
PROFILE
SCALE: 1" = 3' VERT.
1" = 30' HORIZ.
RECORD DRAWING - 9/93
7/10/92
REVISIONS PER BID
REV.# DATE DESCRIPTION BY
GREEN MOUNTAIN ENGINEERING
CIVIL WATER WASTEWATER
4050 WILLISTON RD, SUITE 112
SOUTH BURLINGTON, VT 05403
PHONE & FAX: 802-862-5590
FILENAME: 1-001-10
MAIN ST. SEWER - NORTH
STA. 2+70 TO 7+72
MAIN ST. SEWER SPUR
STA. 0+00 TO 1+23
CORE AREA SEWER IMPROVEMENTS
CONTRACT NO.2
VILLAGE OF BRISTOL, VERMONT
DESIGNED BCW, PTP
DRAWN PTP
CHECKED
PLOT DATE 7/13/92
SCALE 1"=30' H
DATE MAR. 1992
PROJECT NO. 1-001
VT. 282
DRAWING NO. 10
SHEET 10 OF 13

FIGURE 1



REV. #	DATE	DESCRIPTION	BY
1	7/1/92	REVISIONS FOR BID	PP

GREEN MOUNTAIN ENGINEERING
4050 WILLISTON RD, SUITE 112
SOUTH BURLINGTON, VT 05403
PHONE & FAX: 802-862-5590
CIVIL WATER WASTEWATER
FILENAME: 1-001-11

MAIN STREET SEWER - SOUTH
STA. 0+00 TO 2+70 WEST &
STA. 0+00 TO 2+70 EAST

CORE AREA SEWER IMPROVEMENTS
CONTRACT NO. 2

VILLAGE OF BRISTOL, VERMONT

DESIGNED BCW/PTP
DRAWN PTP
CHECKED BCW
PLOT DATE 5/27/92
SCALE AS SHOWN
DATE MAR 1992
PROJECT NO. 1-001
VT. 262
DRAWING NO. 11
SHEET 11 OF 13

FIGURE 2

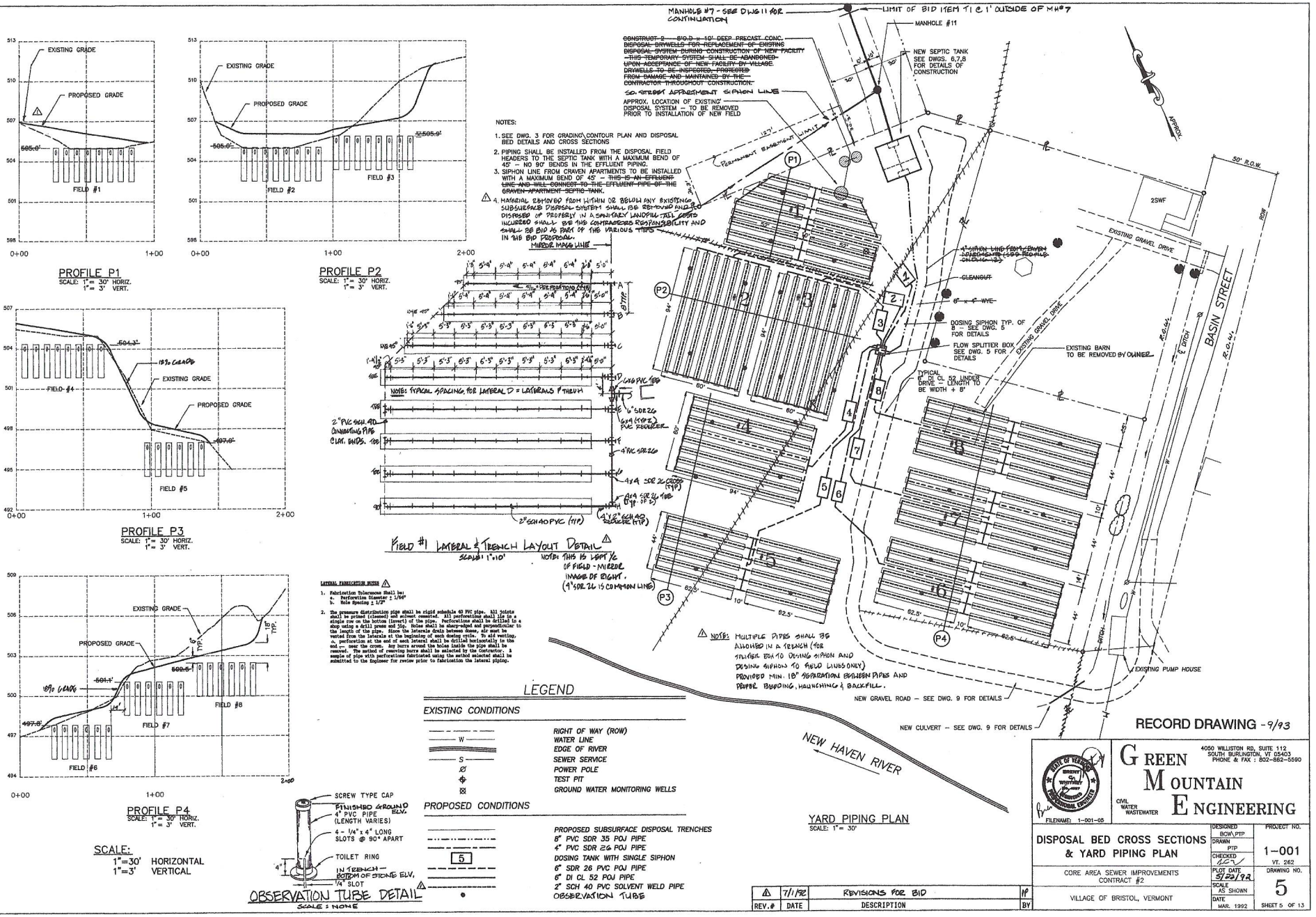
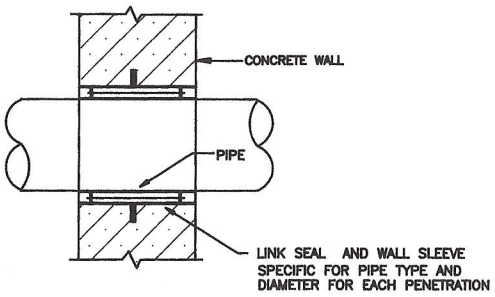
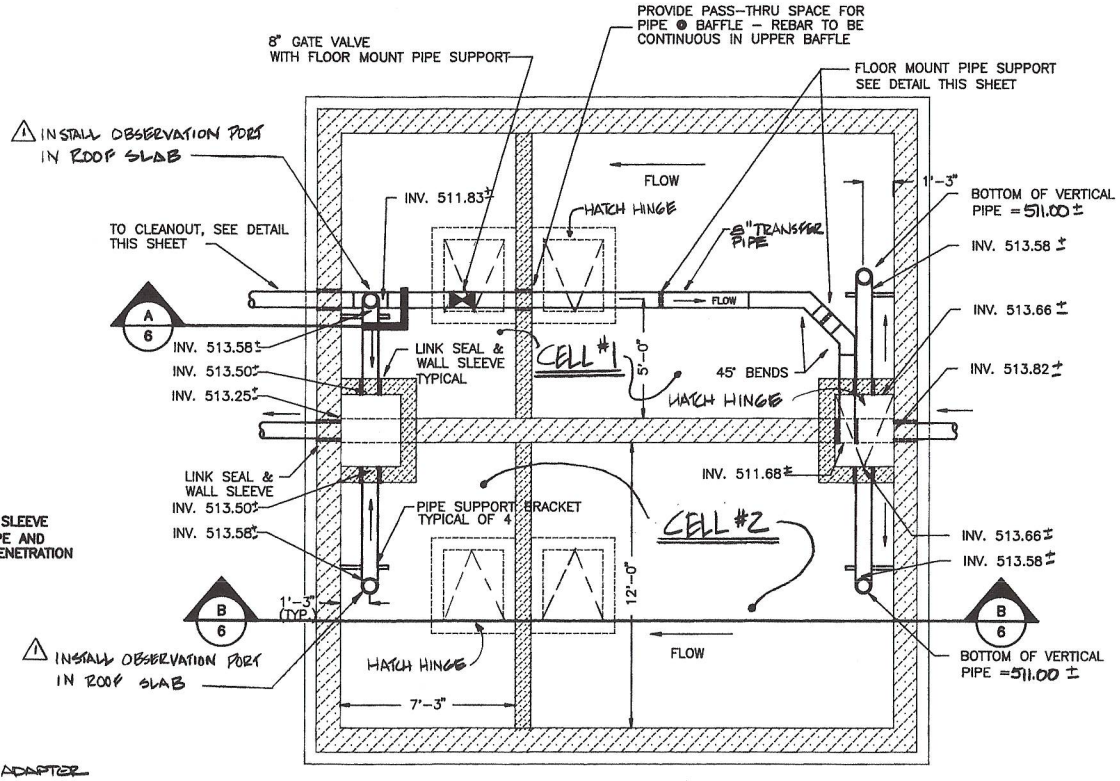

MANHOLE #7 - SEE DWG 11 FOR CONTINUATION
LIMIT OF BID ITEM T1 @ 1' OUTSIDE OF MH#7
MANHOLE #11
NEW SEPTIC TANK SEE DWGS. 6,7,8 FOR DETAILS OF CONSTRUCTION
CONSTRUCT 2 - BID D = 10' DEEP PRECAST CONC. DISPOSAL DRYWELLS FOR REPLACEMENT OF EXISTING DISPOSAL SYSTEM DURING CONSTRUCTION OF NEW FACILITY - THIS TEMPORARY SYSTEM SHALL BE ABANDONED UPON ACCEPTANCE OF NEW FACILITY BY VILLAGE. DRYWELLS TO BE INSPECTED, PROTECTED FROM DAMAGE AND MAINTAINED BY THE CONTRACTOR THROUGHOUT CONSTRUCTION.
50 STREET APPURTENANT EASEMENT LINE
APPROX. LOCATION OF EXISTING DISPOSAL SYSTEM - TO BE REMOVED PRIOR TO INSTALLATION OF NEW FIELD
NOTES:
1. SEE DWG. 3 FOR GRADING\CONTOUR PLAN AND DISPOSAL BED DETAILS AND CROSS SECTIONS
2. PIPING SHALL BE INSTALLED FROM THE DISPOSAL FIELD HEADERS TO THE SEPTIC TANK WITH A MAXIMUM BEND OF 45° - NO 90° BENDS IN THE EFFLUENT PIPING.
3. SIPHON LINE FROM CRAVEN APARTMENTS TO BE INSTALLED WITH A MAXIMUM BEND OF 45° - THIS IS AN EFFLUENT LINE AND WILL CONNECT TO THE EFFLUENT PIPE OF THE CRAVEN APARTMENT SEPTIC TANK.
4. MATERIAL REMOVED FROM WITHIN OR BELOW ANY EXISTING SUBSURFACE DISPOSAL SYSTEM SHALL BE REMOVED AND DISPOSED OF PROPERLY IN A SANITARY LANDFILL. ALL COSTS INCURRED SHALL BE THE CONTRACTORS RESPONSIBILITY AND SHALL BE BID AS PART OF THE VARIOUS ITEMS IN THE BID PROPOSAL.
MIRROR IMAGE LINE
PERMANENT EASEMENT LIMIT
4" SIPHON LINE FROM CRAVEN APARTMENTS (SEE NOTE 3)
CLEANOUT
6" x 4" WYE
DOSING SIPHON TYP. OF 8 - SEE DWG. 8 FOR DETAILS
FLOW SPLITTER BOX SEE DWG. 5 FOR DETAILS
EXISTING BARN TO BE REMOVED BY OWNER
TYPICAL 6" DI CL 52 UNDER DRIVE - LENGTH TO BE WIDTH + 8'
EXISTING GRAVEL DRIVE
2SWF
50' R.O.W.
BASIN STREET
R.O.W.
6" DITCH
APPROX.
NOTE: MULTIPLE PIPES SHALL BE ANCHORED IN A TRENCH (FOR SPLITTER BOX TO DOSING SIPHON AND DOSING SIPHON TO FIELD LINES ONLY) PROVIDED MIN. 18" SEPARATION BETWEEN PIPES AND PROPER BEDDING, HAUNCHING & BACKFILL.
NEW GRAVEL ROAD - SEE DWG. 9 FOR DETAILS
NEW CULVERT - SEE DWG. 9 FOR DETAILS
EXISTING PUMP HOUSE
NEW HAVEN RIVER
RECORD DRAWING - 9/93
PROFILE P1
SCALE: 1" = 30' HORIZ. 1" = 3' VERT.
EXISTING GRADE
PROPOSED GRADE
FIELD #1
FIELD #2
FIELD #3
PROFILE P2
SCALE: 1" = 30' HORIZ. 1" = 3' VERT.
PROFILE P3
SCALE: 1" = 30' HORIZ. 1" = 3' VERT.
FIELD #4
FIELD #5
15% GRADE
PROFILE P4
SCALE: 1" = 30' HORIZ. 1" = 3' VERT.
FIELD #6
FIELD #7
FIELD #8
SCALE:
1"=30' HORIZONTAL
1"=3' VERTICAL
FIELD #1 LATERAL & TRENCH LAYOUT DETAIL
SCALE: 1"=10'
NOTE: THIS IS LEFT 1/2 OF FIELD - MIRROR IMAGE OF RIGHT. (4"SDR 26 IS COMMON LINE)
NOTE: TYPICAL SPACING FOR LATERAL D = LATERALS 9' THICK
2" PVC SCH. 40 CONNECTING PIPE CLAY. BNDS.
2" SCH 40 PVC (TYP)
LATERAL FABRICATION NOTE
1. Fabrication Tolerances Shall be:
a. Perforation Diameter ± 1/64"
b. Hole Spacing ± 1/2"
2. The pressure distribution pipe shall be rigid schedule 40 PVC pipe. All joints shall be primed (cleaned) and solvent cemented. All perforations shall lie in a single row on the bottom (invert) of the pipe. Perforations shall be drilled in a step using a drill press and jig. Holes shall be sharp-edged and perpendicular to the length of the pipe. Since the laterals drain between doses, air must be vented from the laterals at the beginning of each dosing cycle. To aid venting, a perforation at the end of each lateral shall be drilled horizontally to the end — near the crown. Any burrs around the holes inside the pipe shall be removed. The method of removing burrs shall be selected by the Contractor. A sample of pipe with perforations fabricated using the method selected shall be submitted to the Engineer for review prior to fabrication the lateral piping.
LEGEND
EXISTING CONDITIONS
RIGHT OF WAY (ROW)
WATER LINE
EDGE OF RIVER
SEWER SERVICE
POWER POLE
TEST PIT
GROUND WATER MONITORING WELLS
PROPOSED CONDITIONS
PROPOSED SUBSURFACE DISPOSAL TRENCHES
8" PVC SDR 35 POJ PIPE
4" PVC SDR 26 POJ PIPE
DOSING TANK WITH SINGLE SIPHON
6" SDR 26 PVC POJ PIPE
6" DI CL 52 POJ PIPE
2" SCH 40 PVC SOLVENT WELD PIPE
OBSERVATION TUBE
SCREW TYPE CAP
FINISHED GROUND ELV.
4" PVC PIPE (LENGTH VARIES)
4 - 1/4" x 4" LONG SLOTS @ 90° APART
TOILET RING
IN TRENCH - BOTTOM OF STONE ELV. 1/4" SLOT
OBSERVATION TUBE DETAIL
SCALE: NONE
YARD PIPING PLAN
SCALE: 1" = 30'
REV.# 1 DATE 7/1/92 DESCRIPTION REVISIONS FOR BID BY HP
GREEN MOUNTAIN ENGINEERING
CIVIL WATER WASTEWATER
4050 WILLISTON RD, SUITE 112 SOUTH BURLINGTON, VT 05403 PHONE & FAX: 802-862-5590
FILENAME: 1-001-05
DISPOSAL BED CROSS SECTIONS & YARD PIPING PLAN
CORE AREA SEWER IMPROVEMENTS CONTRACT #2
VILLAGE OF BRISTOL, VERMONT
DESIGNED BOW\PTP
DRAWN PTP
CHECKED
PROJECT NO. 1-001
VT. 262
PLOT DATE 5/28/92
SCALE AS SHOWN
DATE MAR. 1992
DRAWING NO. 5
SHEET 5 OF 13

FIGURE 3



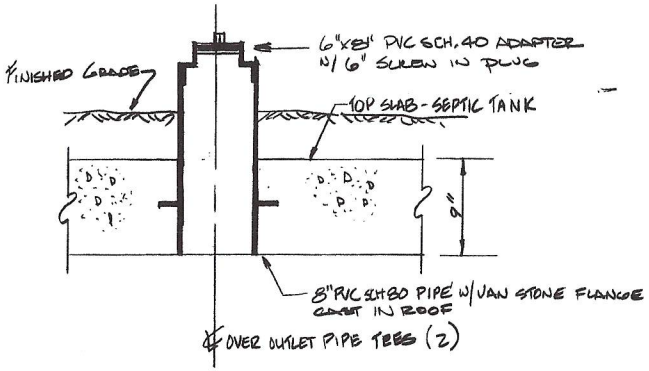
LINK SEAL WALL SLEEVE

SCALE: NONE



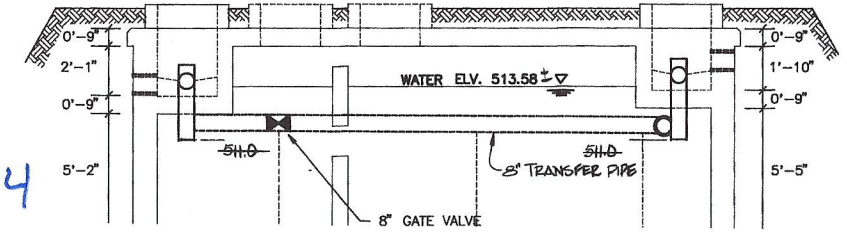
SEPTIC TANK – PLAN VIEW

SCALE: 1/4"=1'-0"



OUTLET PIPE OBSERVATION PORT ⚠

SCALE: NONE



NOTES:

1. ALL PIPES IN SEPTIC TANK TO BE 8"ø SCHEDULE 80 SOLVENT CEMENT PVC.
2. ALL ANCHOR BOLTS AT SEPTIC TANK TO BE STAINLESS STEEL.

FIGURE 4

APPENDIX B

2021 WASTEWATER DISCHARGE AND MONITORING WELL RESULTS

VTM ENGINEERING, PLC
2941 Shelburne Falls Road, Hinesburg, Vermont 05461
spalmer@vtmengineering.com (802) 233-7531

ENDYNE Inc.
Environmental Laboratories

Bristol, Town of	
PO Box 249	070294
Bristol, VT 05443	
Atten: Cyrus Marsano	

PROJECT: Bristol Core Area Sewer
WORK ORDER: **2106-17268**
DATE RECEIVED: June 21, 2021
DATE REPORTED: July 08, 2021
SAMPLER: Jill Marsano

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corres ponding NELAC and Qual fields. The Williston, VT fac ility is also ISO/IEC 17025:2017 accredited for Total Coliform and E coli by SM9223B.

The NELAC column also denotes the accredit ation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation fo r that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as t hey were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

Laboratory Report DATE REPORTED: 07/08/2021

CLIENT: Bristol, Town of
PROJECT: Bristol Core Area Sewer

WORK ORDER: **2106-17268**
DATE RECEIVED: 06/21/2021

001 Site: Splitter Box — Date Sampled: 6/21/21 Time: 11:00

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
pH per Client	6.28	SU at 21.8C	Client Data	6/21/21 11:00	W CJS	N	
BOD-5day	640	mg/L	SM 5210B(11)	6/23/21 10:55	W JSS	A	
Chloride	82	mg/L	EPA 300.0	6/22/21 11:15	W TEL	A	
Nitrate as N	< 0.20	mg/L	EPA 300.0	6/22/21 11:15	W TEL	A	
Nitrite as N	< 0.20	mg/L	EPA 300.0	6/22/21 11:15	W TEL	A	
TKN	74	mg/L	EPA 351.2, R.2(1993)	6/29/21	N MAP	A	
Phosphorus, Total Dissolved	9.7	mg/L	SM20 4500 P-F	6/29/21 15:38	R RLS	A	
Solids, Total Suspended	90	mg/L	SM 2540 D-11	6/23/21	W JSS	A	
Oil & Grease	37.1	mg/L	EPA 1664A	7/7/21	W MTA	A	

002 Site: MW #3 — Date Sampled: 6/21/21 Time: 10:30

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
pH per Client	6.93	SU at 15.3C	Client Data	6/21/21 10:30	W CJS	N	
E. coli	< 1.0	MPN/100ml	SM 9223B(04)	6/21/21 17:30	W AKJ	A	
Chloride	11	mg/L	EPA 300.0	6/22/21 11:41	W TEL	A	
Nitrate as N	1.4	mg/L	EPA 300.0	6/22/21 11:41	W TEL	A	
Phosphorus, Total Dissolved	0.007	mg/L	SM20 4500 P-F	6/29/21 15:39	R RLS	A	

003 Site: MW #4 — Date Sampled: 6/21/21 Time: 10:40

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
pH per Client	7.49	SU at 14.6C	Client Data	6/21/21 10:40	W CJS	N	
E. coli	< 1.0	MPN/100ml	SM 9223B(04)	6/21/21 17:30	W AKJ	A	
Chloride	15	mg/L	EPA 300.0	6/22/21 12:01	W TEL	A	
Nitrate as N	1.0	mg/L	EPA 300.0	6/22/21 12:01	W TEL	A	
Phosphorus, Total Dissolved	< 0.005	mg/L	SM20 4500 P-F	6/29/21 15:52	R RLS	A	

Bristol Core Area Sewer

Endyne Inc. COC 2106-17268

Prepared: 5/29/20

2106-17268

Bristol, Town of
Bristol Core Area Sewer

Bill to:
Pam Correia
Bristol, Town of
PO Box 249
Bristol VT 05443
Ph: (802)453-2410

Report to:
Cyrus Marsano
Bristol, Town of
PO Box 249
Bristol VT 05443
town@bristolvt.org;info@vtums.com

Cust # (

COREAREAS

W-

Splitter Box

Sampled Date/Time: 6/21/21 @ 11:00am Sampler: Jill Marsano

pH Client Data	6.28 S.U. @ 21.8°C		
Oil & Grease	1 - Liter Amber Glass and 1 - 8oz Amber Glass	<6C	HCL_____
Chloride Nitrate as N Nitrite as N	1 -2 oz-Plastics Anion	<6C	
BOD-5day Solids, Total Suspended	1 - 1/2 gal Plastic	<6C	
TKN	1 - 16oz Plastic	<6C, NY Phos, H2SO4_____	
Phosphorus, Total Dissolved	1 - 4oz Clear Glass	<6C, Filter then preserve	

MW #3

Sampled Date/Time: 6/21/21 @ 10:30am Sampler: Jill Marsano

pH Client Data	6.93 S.U. @ 15.3°C		
E. coli	1 - 150ml Sterile Plastic	<10C, Na2S2O3 if Cl2	
Chloride Nitrate as N	1 -2 oz-Plastics Anion	<6C	
Phosphorus, Total Dissolved	1 - 4oz Clear Glass	<6C, Filter then preserve	

MW #4

Sampled Date/Time: 6/21/21 @ 10:40am Sampler: Jill Marsano

pH Client Data	7.49 S.U. @ 14.6°C		
E. coli	1 - 150ml Sterile Plastic	<10C, Na2S2O3 if Cl2	
Chloride Nitrate as N	1 -2 oz-Plastics Anion	<6C	
Phosphorus, Total Dissolved	1 - 4oz Clear Glass	<6C, Filter then preserve	

Relinquished by: Logan Marsano 6-21-21 2:47 (Date Time) Accepted by: _____ (Date Time)

Relinquished by: _____ (Date Time) Received by: Cameron Smith 6/21/21 14:57 (Date Time)

Sites/Parameters correct as listed. Client initials _____

Client Authorization to use Subcontract lab Client initials _____

Sample origin: VT ☐ NH ☐ NY ☐ Other ☐

Special reporting instructions: (PO#) _____

Requested Turnaround Time: Routine: Rush Due Date _____

Lab use Only

Delv: Client
Temp C: 0.0(
Comment:

Tmpl Ck
Log by

Aqueous samples requiring metals testing require acid preservation for a 24 hr period prior to analysis.

ENDYNE Inc.
www.endynelabs.com

160 James Brown Dr.
Williston, VT 05495
Ph 802-879-4333
Fax 802-879-7103

56 Etna Road
Lebanon, NH 03766
Ph 603-678-4891
Fax 603-678-4893

315 New York Rd.
Plattsburgh, NY 12903
Ph 518-563-1720
Fax 518-563-0052

ENDYNE Inc.
Environmental Laboratories

Bristol, Town of	
PO Box 249	070294
Bristol, VT 05443	
Atten: Cyrus Marsano	

PROJECT: Bristol Core Area Sewer
WORK ORDER: **2109-27003**
DATE RECEIVED: September 09, 2021
DATE REPORTED: September 27, 2021
SAMPLER: Jill Marsano

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corres ponding NELAC and Qual fields. The Williston, VT facility is also ISO/IEC 17025:2017 accredited for Total Coliform and E coli by SM9223B.

The NELAC column also denotes the accredit ation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation fo r that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as t hey were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

Laboratory Report

DATE REPORTED: 09/27/2021

CLIENT: Bristol, Town of
PROJECT: Bristol Core Area Sewer

WORK ORDER: **2109-27003**
DATE RECEIVED: 09/09/2021

001 Site: Splitter Box — Date Sampled: 9/9/21 Time: 8:00

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
pH per Client	6.48	SU at __C	Client Data	9/9/21 8:00	W CLI	N	
BOD-5day	420	mg/L	SM 5210B(11)	9/10/21 9:47	W JSS	A	
Chloride	64	mg/L	EPA 300.0	9/10/21 19:09	W TEL	A	
Nitrate as N	< 0.20	mg/L	EPA 300.0	9/10/21 19:09	W TEL	A	
Nitrite as N	< 0.20	mg/L	EPA 300.0	9/10/21 19:09	W TEL	A	
TKN	< 0.64	mg/L	EPA 351.2, R.2(1993)	9/23/21	N CAL	A	
Phosphorus, Total Dissolved	7.0	mg/L	SM20 4500 P-F	9/22/21 15:59	R LPJ	A	
Solids, Total Suspended	66	mg/L	SM 2540 D-11	9/14/21	W JSS	A	
Oil & Grease	37.1	mg/L	EPA 1664A	9/13/21	W CLD	A	

002 Site: MW #3 — Date Sampled: 9/9/21 Time: 8:30

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
pH per Client	6.68	SU at __C	Client Data	9/9/21 8:30	W CLI	N	
E. coli	< 1.0	MPN/100ml	SM 9223B(04)	9/9/21 15:21	W CM	A	
Chloride	9.0	mg/L	EPA 300.0	9/10/21 19:29	W TEL	A	
Nitrate as N	< 0.20	mg/L	EPA 300.0	9/10/21 19:29	W TEL	A	
Phosphorus, Total Dissolved	0.008	mg/L	SM20 4500 P-F	9/22/21 12:40	R LPJ	A	

003 Site: MW #4 — Date Sampled: 9/9/21 Time: 8:45

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
pH per Client	6.71	SU at __C	Client Data	9/9/21 8:45	W CLI	N	
E. coli	2.0	MPN/100ml	SM 9223B(04)	9/9/21 15:21	W CM	A	
Chloride	27	mg/L	EPA 300.0	9/10/21 19:49	W TEL	A	
Nitrate as N	4.5	mg/L	EPA 300.0	9/10/21 19:49	W TEL	A	
Phosphorus, Total Dissolved	0.010	mg/L	SM20 4500 P-F	9/22/21 12:42	R LPJ	A	

Bristol Core Area Sewer

Endyne Inc. COC

Prepared: 6/14/21

2109-27003

2109-27003

Bristol, Town of
Bristol Core Area Sewer

Bill to:
Pam Correia
Bristol, Town of
PO Box 249
Bristol VT 05443
Ph: (802)453-2410

Report to:
Cyrus Marsano
Bristol, Town of
PO Box 249
Bristol VT 05443
town@bristolvt.org;info@vtums.com

Cust # 07

COREAREASE

W-70

Splitter Box

Sampled Date/Time: 9/9/21@8:00 AM Sampler: Jill Marsano

pH Client Data	6.48 SU @ 21.8°C		
Oil & Grease	1 - Liter Amber Glass and 1 - 8oz Amber Glass	<6C	HCL_____
Chloride Nitrate as N Nitrite as N	1 -2 oz-Plastics Anion	<6C	
BOD-5day Solids, Total Suspended	1 - 1/2 gal Plastic	<6C	
TKN	1 - 16oz Plastic	<6C, NY Phos, H2SO4_____	
Phosphorus, Total Dissolved	1 - 4oz Clear Glass	<6C, Filter then preserve	

MW #3

Sampled Date/Time: 9/9/21@8:30 AM Sampler: Jill Marsano

pH Client Data	6.68 SU @ 12.3°C	
E. coli	1 - 150ml Sterile Plastic	<10C, Na2S2O3 If Cl2
Chloride Nitrate as N	1 -2 oz-Plastics Anion	<6C
Phosphorus, Total Dissolved	1 - 4oz Clear Glass	<6C, Filter then preserve

MW #4

Sampled Date/Time: 9/9/21@8:45 AM Sampler: Jill Marsano

pH Client Data	6.71 SU @ 13.7°C	
E. coli	1 - 150ml Sterile Plastic	<10C, Na2S2O3 If Cl2
Chloride Nitrate as N	1 -2 oz-Plastics Anion	<6C
Phosphorus, Total Dissolved	1 - 4oz Clear Glass	<6C, Filter then preserve

Relinquished by: Jill Marsano 9/9/21 11:52 AM Date Time

Accepted by: _____

Relinquished by: _____ Date Time

Received by: _____ 9/9/21 1151 Date Time

Sites/Parameters correct as listed. Client Initials _____

Client Authorization to use Subcontract lab Client Initials _____

Sample origin: VT ☐ NH ☐ NY ☐ Other ☐

Special reporting instructions: (PO#) _____

Requested Turnaround Time: Routine: Rush Due Date _____

Aqueous samples requiring metals testing require acid preservation for a 24 hr period prior to analysis.

Lab use Only

Delv: client
Temp C: -1.6
Comment:

Tmpl Ck
Log by

ENDYNE Inc. www.endyneLabs.com

160 James Brown Dr.
Williston, VT 05495
Ph 802-879-4333
Fax 802-879-7103

56 Etna Road
Lebanon, NH 03766
Ph 603-678-4891
Fax 603-678-4893

315 New York Rd.
Plattsburgh, NY 12903
Ph 518-563-1720
Fax 518-563-0052

APPENDIX C

2021/2022 WASTEWATER TREATEMENT SYSTEM FLOW DATA

VTM ENGINEERING, PLC
2941 Shelburne Falls Road, Hinesburg, Vermont 05461
spalmer@vtmengineering.com (802) 233-7531

Bristol 2021/2022 Wastewater Flow Summary

Billing Month	Beginning Date	Ending Date	Calculated Number of Days in Billing Period	Total Flow (Gal)
May-21	5/9/2021	6/9/2021	31	215,000
June-21	6/9/2021	7/13/2021	34	250,000
July-21	7/13/2021	8/12/2021	30	240,000
August-21	8/12/2021	9/13/2021	32	265,000
September-21	9/13/2021	10/12/2021	29	251,000
October-21	10/12/2021	11/21/2021	40	314,000
November-21	11/21/2021	12/13/2021	22	270,000
December-21	12/13/2021	1/14/2022	32	260,000
January-22	1/14/2022	2/11/2022	28	225,000
February-22	2/11/2022	3/9/2022	26	231,000
March-22	3/9/2022	4/12/2022	34	318,000
April-22	4/12/2022	5/11/2022	29	230,000
		5/11/2022	367	**3,069,000**

Annual Average Daily Flow =	**8,362**

* Wastewater Flow Data supplied by the Town of Bristol

APPENDIX D

RESERVE CAPACITY CALCULATIONS

VTM ENGINEERING, PLC
2941 Shelburne Falls Road, Hinesburg, Vermont 05461
spalmer@vtmengineering.com (802) 233-7531

Town of Bristol
Wastewater Reserve Capacity

Revised 6/20/22

Base Information

1. Average Daily Flow 2019 & 2020 =	6,082			
2. Average Daily Flow 2020 & 2021 =	8,362			
2 Year Average (gpd) =	**7,222**	**0.007222**	mgd	

	20-Jun	20-Sep	Jun-21	Sep-21	2 Year Average (mg/l)
3. 2-Year AVG BOD 5 (mg/l) =	560	490	640	420	**527.5**
4. 2-Year AVG TSS (mg/l) =	70	86	90	66	**78**

Calulations lbs/day Discharged

BOD 5 (lb.day) discharged = ADF x (BOD 5) x 8.34

Calculated BOD 5 (lb/day) discharged = **31.8** lb/day

Result < Permitted Capacity of 33.4 lb/day
80% of 33.4 lb/day = 26.72 lb/day
Result > 26.72 lb/day. Indicates no reserve capacity.

TSS (lb/day) discharged = ADF x TSS x 8.34

Calculated TSS Discharged = **4.7** lb/day

Result < Permitted Capacity of 25 lb/day

APPENDIX E

INDIRECT DISCHARGE PERMIT #ID-9-0208

VTM ENGINEERING, PLC
2941 Shelburne Falls Road, Hinesburg, Vermont 05461
spalmer@vtmengineering.com (802) 233-7531

AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
1 NATIONAL LIFE DRIVE - MAIN 2
MONTPELIER, VERMONT 05620-3521

INDIRECT DISCHARGE PERMIT

Permit No.: ID-9-0208
PIN: RU97-0143

SECTION A - "ADMINISTRATION"

In compliance with provisions of 10 V.S.A. §1263, and in accordance with the following conditions, the permittee:

Town of Bristol
P.O. Box 249
Bristol, Vermont 05443

is authorized to discharge treated domestic sewage from a subsurface disposal system serving various establishments in the Bristol Core Area in Bristol, Vermont to groundwater and indirectly into the New Haven River. **This is a permit renewal.**

A1. Permit Summary:

Expiration Date	December 31, 2022
Type of Waste	Domestic Sewage
Treatment System	Septic Tank
Disposal System	Leachfield Trenches
Design Capacity	20,000 gallons per day
Town	Bristol
Receiving Water	New Haven River
Drainage Area	Approx. 68 sq. mi.
Low Median Monthly Stream Flow (LMMF)	Est. 13.8 c.f.s.
Dilution Ratio at LMMF	
Stream Flow: Effluent	447 : 1
Drainage Basin	Otter Creek

A2. Compliance Schedule:

The following schedule summarizes the actions and requirements necessary for compliance with the conditions of this permit. The permittee shall complete the requirements in accordance with the dates indicated. See the designated section for specific details.

Condition # & Description		Schedule Date
A3.	Apply for renewal of Indirect Discharge Permit	September 30, 2022
A13.	Submit letter with listing of approved connections during previous twelve months	Annually, by May 15th
D2(A).	Have a Vermont Registered Professional engineer complete an inspection of sewage collection, treatment and disposal system	Annually in April
D2(B).	Submit Annual Inspection Report	Annually, by July 1st
D2(C).	Submit Schedule for Implementing engineer's recommendations	Annually, by August 1st
D3.	Notify Secretary of pumping of tanks and septage disposal	As specified
E2(A).	Sample and analyze septic tank Effluent	June and September
E2(B).	Record and submit sewage flows	Monthly
E3.	Sample and analyze groundwater from groundwater monitoring wells	June and September
E4.	Sample and analyze surface water from New Haven River	Upon written request
	Perform biological sampling of New Haven River	Upon written request
E6.	Submit evaluation by a water quality specialist of all groundwater and surface water quality data	September 30, 2022

A3. Expiration Date:

This permit, unless revoked, or amended shall be valid until December 31, 2022 despite any intervening change in Water Quality Standards or the classification of receiving waters. Renewal of this Indirect Discharge permit will be subject to all rules applicable at the time of renewal, including biological standards to determine significant alteration of aquatic biota.

The permittee should apply for an Indirect Discharge Permit renewal by September 30, 2022 for continued authorization to discharge treated sewage. For the purposes of Title 3, an application for renewal of this indirect discharge permit will be considered timely if a complete application is received by the expiration date.

A4. Effective Date:

This permit becomes effective on the date of signature.

A5. Revocation:

The Secretary may revoke this permit in accordance with 10 V.S.A. §1267.

A6. Transfer of Permit:

This permit is not transferable without prior written approval of the Secretary. The permittee shall notify the Secretary immediately, in writing, before any sale, lease or other transfer of ownership of the property from which the permitted discharge originates. The proposed transferee shall make application for a permit to be reissued in their name. Failure to apply shall be considered a violation of this permit. Responsibility for compliance with the conditions of this permit shall be the burden of the permittee until such time as transfer of the permit to the transferee is complete. All application and operating fees must be paid in full prior to transfer of this permit. This permit shall be transferred only upon showing by the permittee or proposed transferee of compliance with the following conditions:

a. The transferee shall be a legal entity, financially and technically competent to operate, inspect, maintain and replace the system.

b. The transferee shall demonstrate that they have the legal authority to raise revenues for the proper operation, inspection, and maintenance of the system.

c. The transferee shall provide a written agreement containing a specific date for transfer of permit responsibility, coverage, and liability between the current and new permittees to the Secretary.

A7. Minor Modifications of Permit:

The Secretary may modify this permit without requiring a permit application, a public notice, or a public hearing to correct typographical errors, or to increase the monitoring frequency in accordance with Condition E(6) of this permit.

A8. Indirect Discharge Rules:

This indirect discharge was reviewed and qualified for an Indirect Discharge Permit in accordance with Section 14-406 (b) of the Indirect Discharge Rules for new indirect discharges of sewage. The water quality data collected during the period September 2012 – June 2017 indicates that the discharge from the disposal system is in compliance with the Aquatic Permitting Criteria of the Indirect Discharge Rules, effective April 30, 2003.

The permittee is authorized to use the "Procedure for Using Metered Sewage Flows to Determine the Uncommitted Reserve Capacity for Indirect Discharge Systems with Design Flows Greater than 6,500 GPD." The application of this Procedure constitutes an expansion of the use of the system and therefore requires that the indirect discharge be in compliance with the standard of "No Significant Alteration of the Aquatic Biota" in the receiving stream, the New Haven River. Since the disposal system is in compliance with the Aquatic Permitting Criteria, the discharge is presumed to have not significantly altered the aquatic biota in the New Haven River.

A9. Right of Secretary to Inspect:

The permittee shall allow the Secretary or the Secretary's authorized representative upon the presentation of their credentials and at reasonable times:

a. To enter upon permittee's premises in which any effluent source, treatment or disposal system is located or in which any records are required to be kept under the conditions of the permit;

b. To have access to and copy any records required to be kept under conditions of this permit;

c. To inspect any monitoring equipment or method required in this permit;

d. To sample any discharge of waste, groundwater or surface water; and

e. To inspect any collection, treatment, pollution management and disposal facilities required by this permit.

A10. Permit Availability:

A copy of this permit shall remain at the office of the permittee and upon request shall be made available for inspection by the Secretary.

A11. Minor Modifications to System:

Minor modifications of the engineering design which do not reduce the treatment effectiveness or increase the capacity of the system may be approved in writing by the Secretary without permit amendment.

Before making modifications to the treatment and/or disposal system the permittee shall submit plans to the Secretary for review and approval. These plans must be approved before any of the modifications or additions are made.

A12. Correction of Failed Systems:

The Secretary may, upon discretion, require the permittee to submit an application for an Indirect Discharge Permit Amendment for a replacement wastewater disposal system to replace a failed system if a replacement system was not previously approved in accordance with the design standards of the current Indirect Discharge Rules.

Before reconstruction of the failed system, the permittee shall submit plans to the Secretary for review and approval. These plans must be approved before any reconstruction occurs. Due to the urgency of the need to correct failed disposal systems, the Secretary will process these Amendments as soon as possible.

A13. Calculation of Uncommitted Reserve Capacity:

By May 15th each year, the permittee shall submit a letter to the Secretary listing those facilities which were approved for connection to the sewage collection, treatment and disposal system during the previous twelve months and the approximate date of the connection of those facilities.

For calculation of uncommitted reserve capacity, the Secretary will review the long-term data for concentrations of BOD_5 and TSS in the septic tank effluent and the long-term average daily flow (ADF) for the system. The following formulae will be utilized for calculation of the pounds of BOD_5 and TSS actually discharged to the leachfields where ADF is expressed in million gallons/day:

BOD_5 (lbs/day) discharged = ADF x [BOD_5 (mg/l)] x 8.34
TSS (lbs/day) discharged = ADF x [TSS (mg/l)] x 8.34

The leachfields, at the design capacity of 20,000 gallons per day, have a loading capacity of:

BOD_5 capacity = 33.4 lbs/day
TSS capacity = 25.0 lbs/day

A13. Calculation of Uncommitted Reserve Capacity (continued):

The reserve capacity in terms of gallons per day is equal to:

([BOD_5 (lbs/day) capacity] - [BOD_5 (lbs/day) discharged] x 1,000,000) / 8.34 x BOD_5 ave
([TSS (lbs/day) capacity] - [TSS (lbs/day) discharged] x 1,000,000) / 8.34 x TSS ave

where: BOD_5 ave is the long-term average concentration for septic tank effluent
TSS ave is the long-term average concentration for septic tank effluent

The uncommitted reserve capacity shall be equal to 80% of the reserve capacity for any given year, after subtracting those approved connections to the system which have not actually connected to the system or which have been connected less than six (6) months.

A14. Operating Fees:

This indirect discharge is subject to operating fees. The permittee shall submit the operating fees in accordance with procedures provided by the Secretary.

SECTION B "INDIRECT DISCHARGE"

B1. Location of Indirect Discharge:

This indirect discharge is located in the Otter Creek drainage basin in the Town of Bristol, Vermont. The indirect discharge can be located on the USGS Bristol, Vermont 7.5' quadrangle map at Latitude N 44° 07' 54.4" and Longitude W 73° 04' 38".

B2. Nature of Indirect Discharge:

This indirect discharge is from a wastewater collection, treatment and disposal system serving the Bristol Core Area in Bristol, Vermont.

The design flow for the system was originally calculated based on a listing of approved connected establishments and their individual design flows.

Sewage treatment occurs in a 30,000 gallon septic tank which effectively functions as two tanks in series. The septic tank effluent flows by gravity to a flow splitter box which directs the flow to eight dosing siphons, each connected to a 5,000 gallon per day disposal field. The leachfield trench width is 4' with 24" of stone below the lateral, resulting in a total application rate of 1.1 gpd/sq.ft.

Five of the restaurants/bakeries connected to the system have a grease interceptor and a few other establishments have an interior grease trap.

SECTION C "SYSTEM APPROVALS"

C1. Approved Plans and Certification:

The approved plans for the sewage collection, treatment and disposal system for the Town of Bristol, Vermont are listed in the January 2003 Fact Sheet.

On September 3, 1993, Brent Whitney, P.E., of Green Mountain Engineering provided certification that the construction of the subsurface disposal system was completed in accordance with the approved plans and specifications.

SECTION D "SYSTEM OPERATION"

D1. General Operating Requirements:

The sewage treatment and disposal system shall be operated at all times in a manner that will: (1) not permit the discharge of sewage onto the surface of the ground; (2) not result in the surfacing of sewage; (3) not result in the direct discharge of sewage into the waters of the State; (4) not result in a violation of the Vermont Water Quality Standards, and (5) not cause a Significant Alteration of the Aquatic Biota in the receiving waters.

In accordance with accepted design practices, the effluent disposal rate to the disposal fields shall not exceed 20,000 gallons per day except as may occur on an occasional basis during normal operation.

D2. Annual Inspection, Report and Implementation Schedule:

(A) Annual Inspection:

Annually during the month of April, the permittee shall retain a Vermont Registered Professional engineer to make a thorough inspection, evaluation and report of the complete sewage collection, treatment and disposal system. The engineer's inspection shall include, but not be limited to the following:

1. inspecting the entire collection system, removing manhole covers to observe the condition of the sewers, grease interceptors, septic tanks, and manholes, and noting any signs of inflow or excess infiltration;

2. evaluating the accumulation of solids and scum in both compartments of the septic tank and verifying the pumping of the septic tank;

3. evaluating the accumulation of grease in the grease interceptors and verifying cleaning of the interceptors, if necessary;

D2. Annual Inspection, Report and Implementation Schedule:

(A) Annual Inspection (continued):

4. inspecting the evenness of distribution through the flow splitter box and making required adjustments;

5. verifying the proper operation of the dosing siphons;

6. verifying the alternation of the fields;

7. checking the depth of ponding in all shallow in-field observation wells; and

8. noting any necessary repairs or maintenance that needs to be performed on the sewage collection, treatment and disposal system.

(B) Annual Inspection Report:

By July 1st each year, the permittee shall have a professional engineer submit an annual report including the following items:

1. a complete list of the items inspected and the results of the inspection;

2. an evaluation of the degree of ponding observed in the shallow in-field observation wells;

3. The results of any other inspection performed in accordance with the approved Operation Management and Emergency Response Plan; and

4. a discussion of the recommended repairs and maintenance required.

(C) Implementation Schedule:

By August 1st each year, the permittee shall notify the Secretary in writing stating how the engineer's recommendations were or are to be implemented, including a schedule for the required repair and maintenance items which have not yet been completed.

D3. Septage Disposal:

During the system's annual inspection, the depth of sludge and scum shall be measured in all septic tanks. The septic tanks shall be pumped if: 1) the sludge is closer than twelve (12) inches to the outlet baffle or; 2) the scum layer is closer than three (3) inches to the septic tank outlet baffle or; 3) if otherwise recommended by the inspecting engineer. As part of the annual inspection report, the permittee shall supply the Secretary with the name and address of the pumper and the municipal sewage treatment facility or other facility approved by the Secretary where the septage was or is to be disposed.

D4. System Operation and Maintenance:

The sewage collection, treatment and disposal system shall be operated and maintained at all times in a manner satisfactory to the Secretary and in a manner that will not pose a risk to the public health and safety, or cause contamination of drinking water supplies, groundwater and/or surface water.

D5. Reporting of Failures:

The permittee shall immediately report any failure of the sewage collection, treatment or disposal system to the Secretary, first by telephone within 24 hours of the failure and then in writing within 5 days of the failure. The written notice shall include a discussion of the actions taken or to be taken to correct the failure.

D6. Discharge Restrictions:

The permittee shall not allow any person to discharge or cause to be discharged anything other than sanitary sewage to this collection, treatment and disposal system.

D7. Operation, Management and Emergency Response Plan:

The permittee shall implement the approved Operation, Management and Emergency Response Plan for the wastewater treatment facility, including tankage and sewage pump stations as well as the sewage collection system. The results of any inspection performed in accordance with the inspection schedules contained in the Plan shall be submitted with the engineer's annual inspection report.

SECTION E "MONITORING"

E1. Quality Assurance/Quality Control Plan:

The permittee shall perform compliance monitoring in accordance with an approved Quality Assurance/Quality Control Plan (QA/QC Plan) and the conditions of this indirect discharge permit.

E2. Effluent Monitoring:

A. Chemical:

The septic tank effluent shall be sampled and analyzed as follows:

Parameter	Units	Sample Type	Sample Frequency
Biochemical Oxygen Demand (5-day)	mg/L	Grab	June and September
Total Suspended Solids	mg/L	Grab	June and September
Oil and Grease	mg/L	Grab	June and September
pH	S.U.	Grab	June and September
Total Kjeldahl Nitrogen (TKN)	mg/L	Grab	June and September
Nitrate Nitrogen	mg/L	Grab	June and September
Total Phosphorus	mg/L	Grab	June and September
Chloride	mg/L	Grab	June and September
Samples shall be taken at the flow splitter box. The results of the effluent analysis shall be submitted to the Secretary by the 15th day of the second month following the date of sampling.			

B. Sewage Volume:

On a monthly basis, the permittee shall record the meter readings for the sewage collection, treatment and disposal system to determine the total volume of sewage discharged from the system each month. The sewage meter readings and gallons of sewage discharged each month shall be submitted to the Secretary by the 15th of the month following the recording period.

E3. Groundwater Monitoring:

The groundwater in monitoring wells #3 and #4 shall be sampled and analyzed as follows:

Parameter	Units	Sample Type	Sample Frequency
Nitrate Nitrogen	mg/L	Grab	June and September
Total Dissolved Phosphorus	mg/L	Grab	June and September
Chlorides	mg/L	Grab	June and September
pH	S.U.	Grab	June and September
Escherichia coli	Colonies/100 ml	Grab	June and September
Depth to Groundwater (below ground surface)	Feet and tenths of feet	----	At time of sampling
Because of changing water table conditions, the samples from the groundwater monitoring wells may not be able to be collected on the same day or in the same week. If a monitoring well has water at any time during the month, then a single sample from that well is required to be collected and analyzed.			
The results of these analyses shall be submitted to the Secretary by the 15th day of the second month following the date of sampling.			

E4. Receiving Stream Monitoring:

Upon written request from the Secretary, the permittee shall conduct chemical and/or biological sampling of the New Haven River upstream and downstream of the indirect discharge in accordance with the written request and/or procedures approved by the Secretary.

E5. Sampling and Testing Procedures:

All wastewater, groundwater and surface water sampling, preservation, handling and test procedures used to comply with the monitoring requirements herein shall conform to procedures specified in the most current edition of Standard Methods for the Examination of Water and Wastewater APHA - AWWA - WPCF, and the Vermont Water Quality Standards unless written approval of an alternate method is received from the Agency.

E5. Sampling and Testing Procedures (continued):

The laboratory utilized for analyzing the samples shall demonstrate successful participation in third party proficiency testing recognized by ISO or NELAP for all parameters and shall analyze any check sample provided by the Secretary. Failure to obtain an acceptable result for either the Secretary's check sample or successful third-party proficiency testing may be a basis for requiring an alternate analytical laboratory.

E6. Summary Water Quality Evaluation:

By September 30, 2022, the permittee shall have a qualified water quality specialist submit an evaluation to the Secretary of all the past groundwater and surface water quality data and determine what, if any, short or long-term impacts there have been on ground or surface water quality. The in-stream biological monitoring data, if available, shall also be included. The biological data shall be analyzed by the Secretary to determine if there have been any significant alterations to the aquatic biota.

E7. Additional Monitoring Requirements:

No additional water quality monitoring of the system is required under this permit. However, the Secretary reserves the right to require monitoring of the system in accordance with Condition A(7) should operation of the system fail to meet the requirements of Sections D(1) and D(4).

SECTION F "COMPLIANCE REVIEW"

If the results of any inspection or monitoring indicate that a violation of the effluent disposal rate, a violation of the Vermont Water Quality Standards, or a significant alteration of the aquatic biota in the receiving stream is occurring, or is likely to occur, the Secretary may require the permittee to take appropriate corrective actions to eliminate or reduce the possibility of a violation.

The issuance of this permit, ID-9-0208, to the Town of Bristol by the Secretary relies upon the data, designs, judgment and other information supplied by the applicant, the applicant's consultants and other experts who have participated in the preparation of the application. The Secretary makes no assurance that this system will meet the performance objectives of the applicant and no warranties or guarantees are given or implied.

SECTION G "EFFECTIVE DATE"

This Indirect Discharge Permit, ID-9-0208, issued to the Town of Bristol for the discharge of treated domestic sewage from the municipal sewage collection, treatment and disposal system serving the Bristol Core Area in Bristol, Vermont is effective on this 29th day of January 2018.

Emily Boedecker, Commissioner
Department of Environmental Conservation

By: Mary K Clark
Mary Clark, Program Manager
Indirect Discharge Program

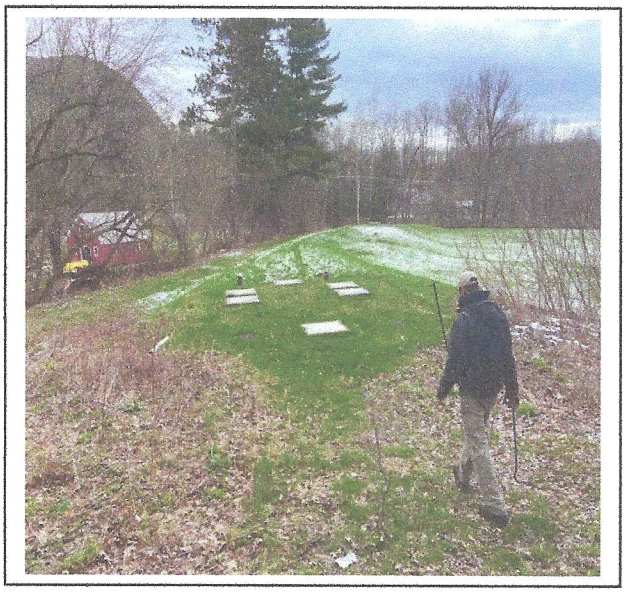
APPENDIX F

PHOTOGRAPHS

VTM ENGINEERING, PLC
2941 Shelburne Falls Road, Hinesburg, Vermont 05461
spalmer@vtmengineering.com (802) 233-7531

Septic Tank Influent Trough

Splitter Box



Septic Tank Covers and Disposal Field

Shallow Monitoring Well