MINIMUM ISOLATION DISTANCES

(Contact Engineer for any Clarifications or Conflicts)

	Horizontal Distance (Feet) Leachfield	Septic Tank	Sewer
Drilled Well Serving 1 Home – Up Slope of Disposal Field	100 (Min.)[1]	50	50
Drilled Well Serving 1 Home – Down Slope of Disposal Field	200 (Min.)[1]	50	50
Shallow Well or Spring, Up Slope of Disposal Field	150 (Min.)[1]	75	75
Shallow Well or Spring, Down Slope of Disposal Field	500 (Min.)[1]	75	75
Lakes, Ponds and Impoundment	50	25	25
Rivers, Streams	50	25	10
Drainage Swales, Roadway Ditches	25	–	–
Municipal Water Main	50	50	10
Service Water Lines	25	25	10
Roadways, Driveways, Buildings	10	5	5[3]
Top of embankment or slope > 30%	25	10	–
Property Line	10 (25 Downslope)	10	10
Trees	10	10	10
Replacement Area	10	–	–
Foundation, Footing Drains	35 (75 Downslope)[2]	10	–

1. Isolation distances to well locations may vary due to site conditions – contact Engineer for verification with the Vermont Water Supply Rule Regulations.
2. If a curtain or foundation drain is downslope of the leachfield, the leachfield cannot be closer than 75 feet to the drain. If the drain is upslope of the leachfield, it shall be 35' if possible and 20' minimum.
3. Sewers under roads, driveways or parking lots may require protective conduits or sleeves.

Test Pit Results

Steve Vock
Carpenter Rd, Charlotte Vt
June 25, 2011

TP #1
0"-6" Topsoil
6"-50" Medium Fine Sand

TP #2
0"-6" Topsoil
6"-55" Medium Fine Sand

TP #3
0"-6" Topsoil
6"-52" Medium Fine Sand

TP #4
0"-6" Topsoil
6"-56" Medium Fine Sand

Percolation Test Results

Performed on: 6/21/11
Performed by: Greg Carter
Jason Burt

Perc Test #1: 12 min/in
Perc Test #2: 6 min/in
Perc Test #2: 8 min/in
Perc Test #2: 8 min/in

DESIGN DATA

Design Daily Flow:
5 Bedroom House
- 3 Br. @ 140 GPD/Br. = 420 gpd
- 2 Br. @ 70 GPD/Br. = 140 gpd
  Total Design flow = 560 gpd

Septic Tank Size:

- Design flow = 560 gpd <667 gpd
- Use 1000 gallon septic tank

System Design:
- Second Slowest Percolation Rate = 8 Min/Inch
- Basic Application Rate = 0.8 * 3 / sqrt(8 min/in.) = 0.85 GPD/SF
- Depth of stone below distribution pipe = 9"
- Required Surface Area = 560 GPD/.85 GPD/SF = 659 SF
- Proposed System Width = 10 FT
- Required Length of Trench = 659 SF / 10 FT = 66 LF
- Construction Replacement Option increase size by 50% = 66 x 1.5 = 99 LF
- Proposed Bed = 10 ft wide x 70 ft long = 700 SF. > 659 sf required

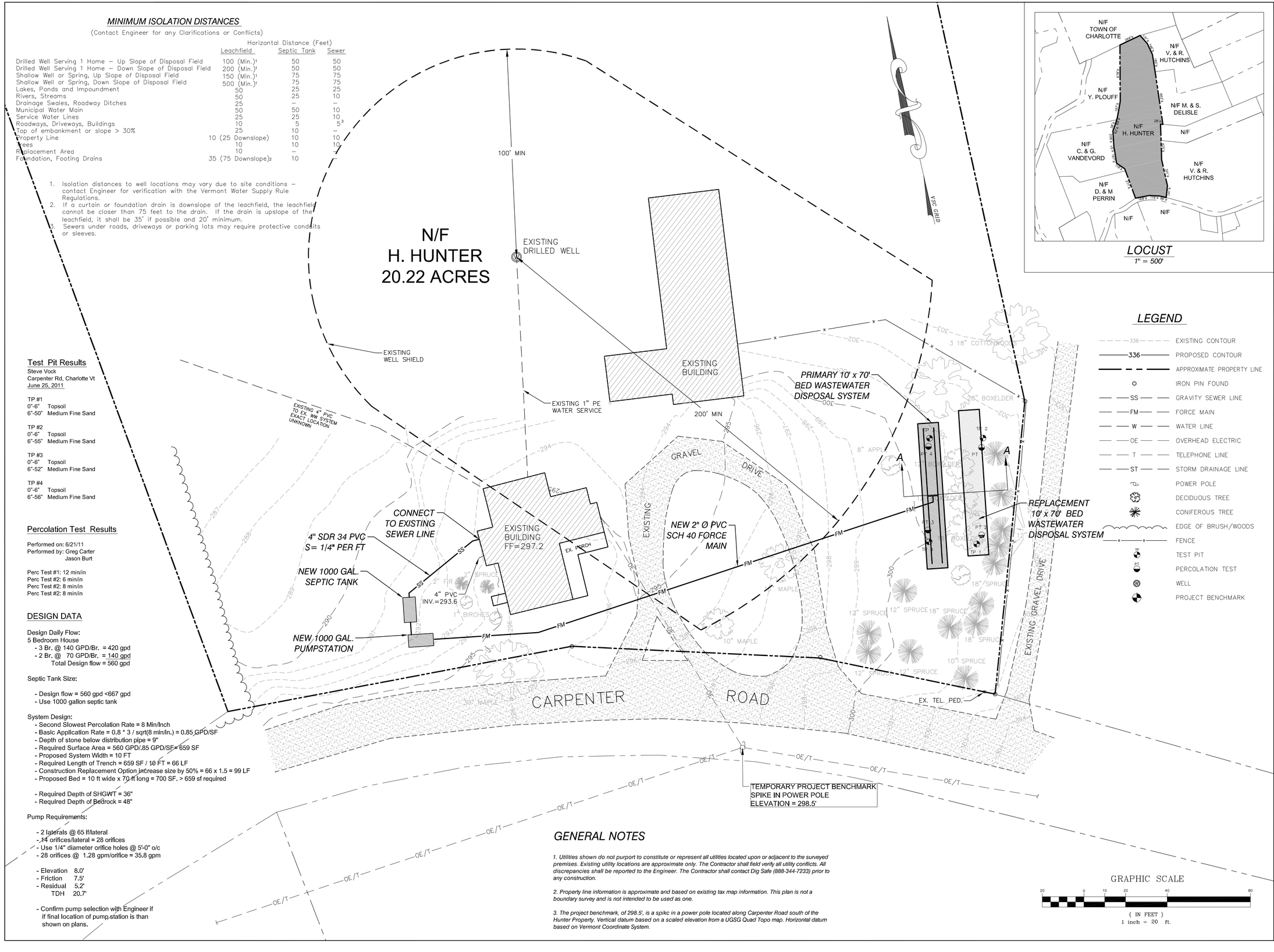
- Required Depth of SHGWT = 36"
- Required Depth of Bedrock = 48"

Pump Requirements:

- 2 laterals @ 65 lf/lateral
- 14 orifices/lateral = 28 orifices
- Use 1/4" diameter orifice holes @ 5'-0" o/c
- 28 orifices @ 1.28 gpm/orifice = 35.8 gpm

- Elevation 8.0'
- Friction 7.5'
- Residual 5.2'
  TDH 20.7'

- Confirm pump selection with Engineer if if final location of pump station is than shown on plans.



LOCUST
1" = 500'

LEGEND

- EXISTING CONTOUR
- PROPOSED CONTOUR
- APPROXIMATE PROPERTY LINE
- IRON PIN FOUND
- SS — GRAVITY SEWER LINE
- FM — FORCE MAIN
- W — WATER LINE
- OE — OVERHEAD ELECTRIC
- T — TELEPHONE LINE
- ST — STORM DRAINAGE LINE
- POWER POLE
- DECIDUOUS TREE
- CONIFEROUS TREE
- EDGE OF BRUSH/WOODS
- FENCE
- TP — TEST PIT
- PT — PERCOLATION TEST
- W — WELL
- PROJECT BENCHMARK

GENERAL NOTES

1. Utilities shown do not purport to constitute or represent all utilities located upon or adjacent to the surveyed premises. Existing utility locations are approximate only. The Contractor shall field verify all utility conflicts. All discrepancies shall be reported to the Engineer. The Contractor shall contact Dig Safe (888-344-7233) prior to any construction.

2. Property line information is approximate and based on existing tax map information. This plan is not a boundary survey and is not intended to be used as one.

3. The project benchmark, of 298.5', is a spikc in a power pole located along Carpenter Road south of the Hunter Property. Vertical datum based on a scaled elevation from a UGSG Quad Topo map. Horizontal datum based on Vermont Coordinate System.

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

SITE ENGINEER:

CIVIL ENGINEERING ASSOCIATES, INC.
10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403
802-864-2323 FAX: 802-864-2271 web: www.cea-vt.com

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DRAWN JCB
CHECKED XXX
APPROVED XXX

OWNER:

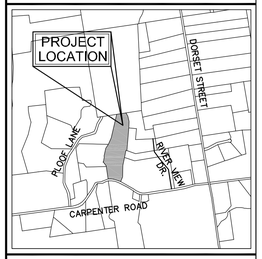
HILLARY HUNTER

CARPENTER ROAD
CHARLOTTE, VERMONT

PROJECT:

WASTEWATER DESIGN

CARPENTER ROAD
CHARLOTTE, VERMONT



LOCATION MAP
1" = 2000'

DATE	CHECKED	REVISION

OVERALL SITE PLAN

DATE AUG., 2011
SCALE 1" = 20'
PROJ. NO. 11170

DRAWING NUMBER C1.0

DISPOSAL FIELDS & FORCE MAINS

PART 1 – GENERAL

1.01 Summary

A. Section includes:
   1. Wastewater Disposal Field
   2. Force Main Materials

1.02 References

A. All work shall be done in accordance with the State of Vermont Environmental Protection Rules effective September 29, 2007.

PART 2 – PRODUCTS

2.01 General

A. Disposal Fields: Schedule 40 PVC pipe meeting the requirements of the latest revision of ASTM Specification D–1785. Fittings used in the disposal fields shall be compatible with distribution lines material.

B. Force Mains: PVC pipe shall conform in all respects to the latest revisions of ASTM Specifications D–2241. All pipe fittings shall be SDR 26 (or SCH 40) clearly marked as follows:

   – Manufacturer's Name and Trademark
   – Nominal Pipe Size (as shown on plans)
   – Material Designation

   Joints shall be push–on type using elastomeric gaskets factory installed conforming to ASTM Specification D–3212.

C. Crushed stone shall be clean, durable and no smaller than 3/4" or larger than 1 1/2 inches in diameter.

PART 3 – EXECUTION

3.01 MOUND CONSTRUCTION

A. Aboveground vegetation shall be closely cut and removed from the ground surface throughout the area to be utilized for the placement of the fill material. Prior to plowing, the dosing pump discharge line from the pump chamber or dosing chamber to the point of connection with the distribution piping header shall be installed. The area shall then be plowed to a depth of seven to eight inches, parallel to the land contour with the plow throwing the soil upslope to provide a proper interface between the fill and natural soils. Tree stumps should be cut flush with the surface of the ground and roots should not be pulled. Once plowing of the mound area is completed, the area shall be fenced to prevent vehicles and equipment from entering the plowed area.

B. To prevent compaction, construction equipment shall not be moved across the plowed surface or the effluent disposal area. However, after placement of a minimum of six inches of sand fill over the plowed area, construction equipment may be driven over the protected surface to expedite construction. Construction equipment shall be kept off the area down gradient of the disposal field. Construction and/or plowing shall not be initiated when the soil moisture content is high.

C. Construction should be initiated immediately after preparation of the soil interface by placing all of the sand fill needed for the mound to a minimum depth of 27 inches. This depth will permit excavation of trenches to accommodate the crushed stone (12 inches) necessary for the distribution piping.

D. The pressure distribution pipe should be laid level on top of the stone and flushing valves installed at the ends of the pipe. Upon completion of the distribution piping, the qualified consultant shall test the system with clean water. The test shall show that a minimum pressure of three feet of head is present at the ends of the pipe and that the difference in discharge rate between the two orifices with the greatest difference in discharge rates is not greater than 15 percent. After connecting the distribution pipe to the force main, the distribution pipe shall be covered with at least two inches of clean stone aggregate. The stone aggregate shall be covered completely with filter fabric.

E. After installation of the distribution system, crown the entire mound with cover of soil less permeable than the mound fill, covering with 12 inches on the side slopes and a minimum of 18 inches over the center of the mound. Native soil from the site is normally suitable for cover material, though the top two to four inches of this cover should be topsoil. The entire mound shall be seeded, sodded or otherwise provided with vegetative cover to assure stability of the installation.

F. The area surrounding the disposal field shall be graded to provide diversion of surface runoff waters if required.

3.02 Testing Notes

A. The wastewater system shall be inspected during critical stages of construction by a qualified consultant. This shall include at a minimum the staking of the disposal field, the trenches after the initial 9 inches of stone and distribution piping is placed, the installation and pressure test of distribution piping, and a final inspection of the entire system. The Contractor will be responsible for contacting the Engineer to set up the inspection schedule.

B. Testing of pressure distribution shall be done in the Engineer's presence. Pressure shall be measured to insure a minimum of 1 psi. (See section D above).

C. The distribution line shall then be carefully placed on the bedding with no slope, orifice shields snapped into place, and covered with at least 2" of crushed stone.

D. All work shall be done in accordance with the State of Vermont Environmental Protection Rules and the Town of Shelburne Sewage Ordinance Standards.

E. Prior to use of the system, the qualified consultant shall submit a written report to the State of Vermont stating that the system has been installed according to the approved plans and permit. The report shall specifically address the inspection of the site preparations and include numerical results of the orifice discharge rate comparison.

3.02 PRESSURE PIPE LEAKAGE TESTING

A. General: All force mains shall pass the hydrostatic pressure test and leakage test described herein. Prior to testing, all anchors and braces shall be installed. All concrete thrust blocks and restraints shall be in place and cured at least seven days. All buried pipe shall be backfilled. Suitable test plugs shall be installed and air release valves shall be installed at the high points.

B. Hydrostatic Test: The following procedure shall be used:
   1. All air release valves shall be opened and the pipe shall be filled with water at a rate not to exceed the venting capacity of the air release valves.
   2. The water pressure shall be raised to 150 percent of the designed operating pressure or 60 psi minimum at the highest point.
   3. Failure to hold the designated pressure within 5 psi of the specified test pressure for the two hour period constitutes a failure of the section tested.

C. Leakage Test: The following procedure shall be used:
   1. Leakage shall be defined as the quantity of water that must be supplied into the pipe being tested to maintain pressure within 5 psi of the specified test pressure.
   2. No pipe installation shall be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{ND(P)0.5}{7{,}400}$$

Whichever is less

$$L = \frac{SD(P)0.5}{148{,}000}$$

S = Length of Pipe Testing (ft)
L = Allowable Leakage in Gal/Hr
D = Nominal Diameter of Pipe (in)
P = Average Test Pressure (psi)
N = Number of Joints in the Pipeline Tested

All testing shall be conducted in accordance with AWWA C600–87 or latest revision.

PUMP STATION / SEPTIC TANK TESTING

The tnaks shall be tested by the following procedure and in conformance with the State of Vermont – Environmental Protection Rules:

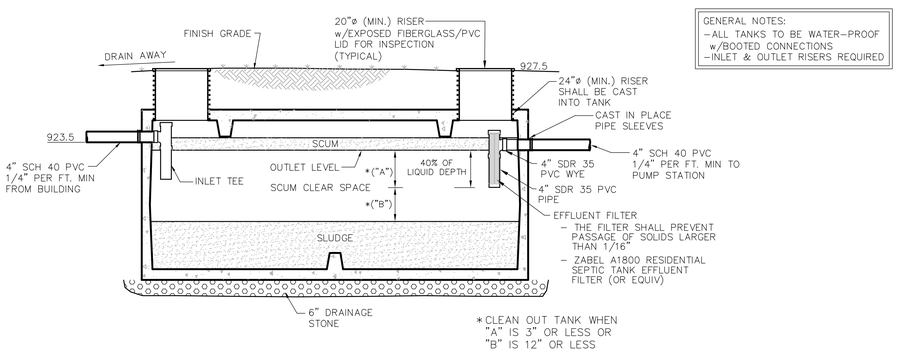
1. Exfiltration Leakage Test: All pipes and other openings into the tank shall be suitably plugged and the plugs braced to prevent blowout.

   The tank shall then be filled with water to the top of the riser section. A period of time may be permitted, if the Contractor so wishes, to allow for absorption. At the end of this period, the tank shall be refilled to the top of the riser, if necessary, and the measuring time of at least four hours begun. At the end of the test period, the tank shall be refilled to the top of the riser, measuring the volume of water added. This amount shall be converted to gallons per vertical foot depth for 24 hours. The leakage for each tank shall not exceed four gallon/vertical foot/day. If leakage exceeds the allowable rate, repairs shall be made as approved by the Engineer and the tank retested.

   If the Contractor elects to backfill prior to testing, the testing shall be at his own risk, and it shall be incumbent upon the Contractor to determine the reason for any failure of the test. No adjustment in the leakage allowance will be made for unknown causes such as leaking plugs, absorption, etc. It will be assumed that all loss of water during the test is a result of leaks through the joints or through the concrete. Furthermore, the Contractor shall take any steps necessary to assure the Engineer that the water table is below the bottom of the tank throughout the test.

   or

2. Vacuum test in accordance with ASTM C1227–03, Standard Specification for Precast Concrete Septic Tanks, except as noted below:
   –seal the empty tank and apply a vacuum to 5 inches (100mm) of mercury. The tank is approved if 90% of vacuum is held for 5 minutes.



GENERAL NOTES:
– ALL TANKS TO BE WATER–PROOF w/BOOTED CONNECTIONS
– INLET & OUTLET RISERS REQUIRED

1000 GALLON SEPTIC TANK

N.T.S.

Septic Tank Notes

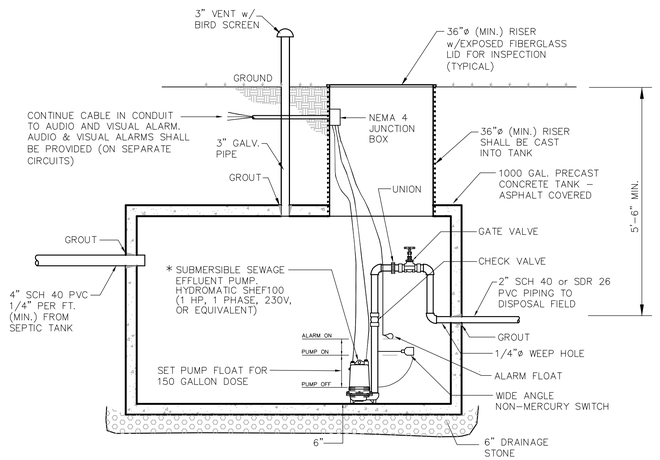
1. Septic tank shall be a precast concrete tank, unless otherwise approved.

2. Maintenance
   – At least once a year, the depth of sludge and scum in the septic tank should be measured. The tank should be pumped if;
   – The sludge is closer than twelve inches to the outlet baffle or;
   – The scum layer is closer than three inches to the outlet baffle.
   – Under no circumstances should anyone enter a septic tank.

3. Recommendations
   – The use of garbage grinders is discouraged as sludge accumulation in the septic tank can be increased by up to 40%. If used, the septic tank will require more frequent pumping.
   – The septic system is designed to handle human waste and toilet paper, plus water from plumbing fixtures such as toilets, baths and sinks. Moderate use of household cleaners, detergents and bleach should not damage your system; however, indiscriminate use may cause problems. Non–degradable paper products and any other non–biodegradable substances should not be put in your wastewater system.
   – Minimize the amount of water used in the household. Excessive water could flush solids from the septic tank to the disposal field which leads to clogging or plugging of the piping. When dishwashers and washers are used, make sure loads are full and stagger their use to reduce peak flows, i.e. stagger loads of laundry over several days instead of one day.

4. Walkways, patios and decks or other permanent structures should not be constructed over the septic tank.

5. There should be no need to use commercial "starter", "bacterial feeds", or "cleaners", etc. Bacteria in a septic tank system occurs naturally.



*VERIFY PUMP REQUIREMENTS WITH THE ENGINEER IF FINAL SITE SELECTED IS OTHER THAN SHOWN ON PLAN

1000 GALLON PUMP STATION DETAIL

N.T.S.

SITE ENGINEER:

CIVIL ENGINEERING ASSOCIATES, INC.
10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403
802-864-2323 FAX: 802-864-2271 web: www.cea-vt.com

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DRAWN: JDL
CHECKED: SAV
APPROVED: SAV

OWNER:

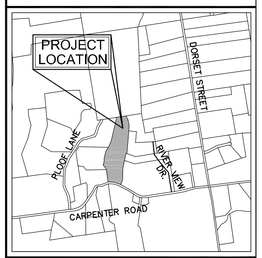
HILLARY HUNTER

CARPENTER ROAD
CHARLOTTE
VT

PROJECT:

WASTE WATER DESIGN

CARPENTER ROAD
CHARLOTTE,
VERMONT



LOCATION MAP

1" = 2000'

DATE	CHECKED	REVISION

WASTEWATER DETAILS

DATE: AUG., 2011
SCALE: AS SHOWN
PROJ. NO.: 11170

DRAWING NUMBER: C2.0