

**Leaching Area Design**

DESIGN FLOW 26 UNITS X 3 BEDROOMS PER UNIT = 78 BEDROOMS  
78 BEDROOMS X 110 GPD/BEDROOM = 8,580 GPD

SEPTIC TANK PER LOCAL REGULATIONS INDIVIDUAL 1,500 GAL. SEPTIC TANKS WILL BE PROVIDED FOR EACH UNIT  
330 GAL. X 200% = 660 GAL., USE MIN 1,500 GAL. TANKS

PERC RATE PERC. RATE = <2 MIN./IN. CLASS 1 SOIL

PRESBY DESIGN LOADING RATE FOR 1-9 MPL = 50 LF OF ENVIRO-SEPTIC (E-S) PIPE PER 100 GPD OF FLOW  
8,940 GAL./2 BEDS = 4,470 GPD PER BED  
8,580 GAL./100 GAL. = 85.8/50 LF = 4,290 LF REQUIRED  
54 E-S LINES X 80 LF/E-S LINE = 4,320 LF PROVIDED  
INSTALL A COMBINATION SYSTEM WITH 18 SECTIONS OF 3 LINES EACH FOR A TOTAL OF 54 E-S LINES. EACH SERIAL SECTION TREATS 480 GPD. SYSTEM TREATS 8,640 GPD.

Design Schedule	ELEVATION
FINISHED FLOOR	VARIES
TOP OF FOUNDATION	VARIES
SEWER INVERT AT FOUNDATION	VARIES
SEWER INVERT INTO SEPTIC TANK	VARIES
SEWER INVERT OUT OF SMH-35	67.87
SEWER INVERT INTO PUMP CHAMBER	67.08
FORCE MAIN INVERT OUT OF PUMP CHAMBER	67.08
SEWER INVERT INTO DISTRIBUTION BOX	74.06
SEWER INVERT OUT OF DISTRIBUTION BOX	73.89
SEWER INVERT INTO LEACHING SYSTEM	73.33
BOTTOM OF ENVIRO-SEPTIC PIPE	72.75
BOTTOM OF LEACHING FIELD (SYSTEM SAND)	72.25
WATER TABLE (TP# JDE1)	66.93

Septic Tank Schedule	BLDG. #1	BLDG. #2	BLDG. #3	BLDG. #4	BLDG. #5
FINISHED FLOOR	80.17	81.17	78.17	80.17	81.67
TOP OF FOUNDATION	79.00	80.00	77.00	79.00	80.50
SEWER INVERT AT FOUNDATION	73.00	73.00	70.00	72.00	73.50
SEWER INVERT INTO SEPTIC TANK	72.78	72.74	69.72	71.78	73.22
SEWER INVERT OUT OF SEPTIC TANK	72.53	72.49	69.47	71.53	72.97
SEWER INVERT AT UPPER END	72.27	70.15	69.37	72.70	71.05
SEWER INVERT AT LOWER END	71.06	68.33	68.33	71.80	69.17

- GENERAL NOTES:**
- ALL SYSTEM COMPONENTS SHALL BE INSTALLED IN ACCORDANCE WITH TITLE 5 OF THE STATE SANITARY CODE, 310 CMR 15.000, AS AMENDED AND IN EFFECT AS OF MARCH 31, 1995, AND ANY LOCAL REGULATIONS APPLICABLE.
  - ANY CHANGE TO THIS PLAN MUST BE APPROVED IN WRITING BY THE DESIGN ENGINEER AND BOARD OF HEALTH.
  - BENCHMARK SHOWN ON PLAN IS TO BE VERIFIED BY THE CONTRACTOR. ANY DISCREPANCIES MUST BE RESOLVED WITH THE ENGINEER PRIOR TO CONSTRUCTION.
  - THIS SYSTEM IS NOT DESIGNED TO ACCOMMODATE A GARBAGE GRINDER.
  - SOIL CONDITIONS CAN VARY. GROUNDWATER ELEVATION AND THE LIMITS OF ACCEPTABLE SOIL MUST BE VERIFIED PRIOR TO INSTALLATION OF THE SOIL ABSORPTION SYSTEM (SAS).
  - LOCATIONS OF UTILITIES ARE APPROXIMATE. CONTRACTORS SHALL NOTIFY DIG SAFE (DIAL 811) OR 1-888-344-7233 AT LEAST 72-HOURS PRIOR TO BREAKING GROUND TO HAVE ALL EXISTING UTILITIES LOCATED AND CLEARLY MARKED.
  - ALL SYSTEM COMPONENTS TO BE H-10 RATED (MINIMUM).
  - HEAVY EQUIPMENT SHALL NOT BE ALLOWED TO OPERATE OVER THE LIMITS OF THE SEWAGE DISPOSAL SYSTEM DURING THE COURSE OF CONSTRUCTION OF THE SYSTEM.
  - BACKFILL OVER SAS MUST BE CLEAN AND FREE OF STONES >6 IN AND TAILINGS, CLAY OR SIMILAR MATERIALS. PLACE IN LIFTS AND SUFFICIENTLY COMPACT TO PREVENT DEPRESSIONS DUE TO SETTLING. MINIMUM 2% SLOPE REQUIRED OVER LEACHING AREA IN FINAL GRADING.
  - DESIGN ENGINEER TO BE NOTIFIED AT LEAST 48 HOURS PRIOR TO REQUIRED INSPECTIONS.
  - AN AS-BUILT SURVEY OF THE SYSTEM IS REQUIRED. ENGINEER AND BOARD OF HEALTH SHALL BE NOTIFIED FOR INSPECTION OF FIELD LOCATION PRIOR TO BACKFILLING/COVERING THE SYSTEM COMPONENTS. INSTALLER SHALL PROVIDE ENGINEER WITH RESULTS OF FILL SOIL SIEVE ANALYSIS BEFORE THE AS-BUILT CERTIFICATION WILL BE RELEASED.
  - THIS PLAN IS THE RESULT OF AN ON THE GROUND FIELD SURVEY BY GALLAGHER ENGINEERING AND THIS FIRM. SUBJECT SITE IS NOT LOCATED WITHIN AN AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC).
  - SUBJECT SITE IS NOT LOCATED WITHIN AN AQUIFER PROTECTION DISTRICT OR FLOODPLAIN DISTRICT.
  - THERE ARE NO WELLS WITHIN 200 FEET OF THE PROPOSED SEPTIC SYSTEM.
  - THERE ARE NO WETLANDS WITHIN 100 FEET OF THE PROPOSED SEPTIC SYSTEM.
  - CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY APPLICABLE PERMITS.
  - CONTRACTOR SHALL MECHANICALLY COMPACT BASE UNDER SEPTIC TANKS, PUMP CHAMBER AND DISTRIBUTION BOX (IF INSTALLED IN FILL SOIL).
  - CONTRACTOR SHALL RESTORE (LOAM & SEED) ALL AREAS DISTURBED DURING THE CONSTRUCTION.
  - LOCAL REFERENCE: DEED BOOK 04500, PAGE 0280.
  - OWNER SHALL HAVE TANKS INSPECTED AND/OR CLEANED ANNUALLY. ZABEL FILTERS SHALL BE CLEANED REGULARLY AND AT EACH TIME OF TANK PUMPING.
  - THE SITE IS NOT LOCATED WITHIN A ZONE II OR IMA TO A PUBLIC WATER SUPPLY.
  - SITE DRAINAGE STRUCTURES ARE LOCATED WITHIN 100' OF THE PROPOSED SEPTIC SYSTEM.
  - THERE ARE NO SUBSTANCES ON THE SUBJECT PROPERTY.
  - THERE ARE NO EXISTING ABUTTING FOUNDATIONS WITHIN 25' OF THE SAS.

- REQUIRED INSPECTIONS (CONTACT BOH)**
- BOTTOM OF EXCAVATION.
  - TANK, PIPING, AND DISTRIBUTION BOX AND LINES PRIOR TO BACKFILLING (SEE PUMP CHAMBER DETAIL FOR TANK WATER-TIGHTNESS TESTING PROCEDURE).
  - PUMP OPERATION
  - FINAL COVER AND GRADING

- REQUIRED TESTING**
- WITHIN AREAS SHOWN ON THE PLAN, ALL UNSUITABLE MATERIAL (E.G., TOPSOIL AND SUBSOIL) SHALL BE REMOVED AND REPLACED WITH FILL SOIL CONSIST OF SELECT ON-SITE OR IMPORTED MATERIAL. THE FILL SOIL SHALL BE COMPRISED OF CLEAN GRANULAR SAND, FREE FROM ORGANIC MATTER AND DELETERIOUS SUBSTANCES. MIXTURES AND LAYERS OF DIFFERENT CLASSES OF SOIL SHALL NOT BE USED. THE FILL SHALL NOT CONTAIN ANY MATERIAL LARGER THAN TWO INCHES. A SIEVE ANALYSIS, USING A #4 SIEVE, SHALL BE PERFORMED ON A REPRESENTATIVE SAMPLE OF THE FILL UP TO 45% BY HEIGHT OF THE FILL SAMPLE MAY BE RETAINED ON THE #4 SIEVE. SIEVE ANALYSES ALSO SHALL BE PERFORMED ON THE FRACTION OF THE FILL SAMPLE PASSING THE #4 SIEVE. SUCH ANALYSES MUST DEMONSTRATE THAT THE MATERIAL MEETS EACH OF THE FOLLOWING SPECIFICATIONS:
- | SIEVE SIZE | EFFECTIVE PARTICLE SIZE | % THAT MUST PASS SIEVE |
|------------|-------------------------|------------------------|
| #4         | 4.75 MM                 | 100%                   |
| #50        | 0.30 MM                 | 10% - 100%             |
| #100       | 0.15 MM                 | 0% - 20%               |
| #200       | 0.075 MM                | 0% - 5%                |

- PRESBY SPECIFIC NOTES:**
- SYSTEM TO BE INSTALLED IN ACCORDANCE WITH PRODUCT DESIGN AND INSTALLATION MANUAL, STATE AND LOCAL REGULATIONS, FOR PRODUCT INFORMATION OR THE NEAREST DEALER CONTACT PRESBY ENVIRONMENTAL, INC. 143 AIRPORT ROAD, WHITEFIELD, NH 03598, PHONE 1-800-473-5298 WWW.PRESBYENVIRONMENTAL.COM
  - MINIMUM OF 6" OF MEDIUM TO COARSE SAND, WITH LESS THAN 2% PASSING A # 200 SIEVE, REQUIRED AROUND CIRCUMFERENCE OF ENVIRO-SEPTIC PIPES. ("CONCRETE SAND" SEE DESIGN AND INSTALLATION MANUAL FOR COMPLETE SAND AND FILL SPECIFICATIONS.)
  - INSTALLER ADVISED TO CONTACT DIG SAFE PRIOR TO CONSTRUCTION.
  - DO NOT INSTALL SYSTEM ON FROZEN GROUND OR LEAVE SYSTEM UNCOVERED FOR EXTENDED PERIODS OF TIME.
  - NO DRAINS, HOT TUBS, SAUNAS, GARBAGE DISPOSALS ETC.. SHALL BE INCORPORATED INTO THIS SYSTEM UNLESS OTHERWISE SPECIFIED.
  - MAINTENANCE: RECOMMEND INSPECTION OF SEPTIC TANKS AT LEAST ONCE EVERY TWO YEARS AND CLEAN IF COMBINED THICKNESS OF SLUDGE AND SCUM EQUALS MORE THAN 1/4 OF THE LIQUID DEPTH INSIDE THE TANK.
  - THIS DOCUMENT IS FOR THE CONSTRUCTION OF THE EFFLUENT DISPOSAL SYSTEM SHOWN. ANYONE USING INFORMATION FROM THIS DOCUMENT FOR ANY OTHER PURPOSE DOES SO AT THEIR OWN RISK.
  - INSTALLER TO PROVIDE BILL OF LADING AND SIEVE ANALYSIS FOR SYSTEM SAND TO OWNER, ENGINEER AND THE HALIFAX BOARD OF HEALTH.
  - REMOTE/ALTERNATIVE VENTING ALLOWED.

**VARIANCE REQUEST:**

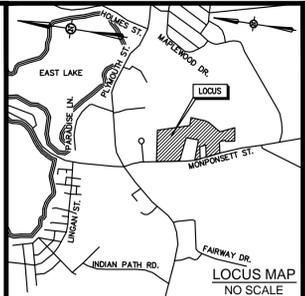
1) IN ACCORDANCE WITH 310 CMR 15.410-15.413, THE FOLLOWING VARIANCE IS REQUESTED FROM 310 CMR 15.221(7), DEPTH OF COMPONENTS TO ALLOW GREATER THAN 36" OF COVER OVER THE PUMP CHAMBER TO A DEPTH OF COVER OF APPROXIMATELY 6.22 FEET.

**BENCHMARKS:**

CURRENT BENCHMARKS:  
BM-A-EL. 71.04  
LOCATION: DRILL HOLE IN CORNER BOUND AT SOUTHWEST CORNER OF PROPERTY

BM-B-EL. 76.11  
LOCATION: MAG NAIL SET IN SIDEWALK IN FRONT OF THE SHELBY PLAZA.

NEW CONSTRUCTION BENCHMARKS WILL BE SET DURING THE DRIVEWAY STAKEOUT AND THE CONTRACTOR WILL BE GIVEN THIS INFORMATION FOR THE DRIVEWAY, FOUNDATION AND SEPTIC SYSTEM CONSTRUCTION.



**PERMITTING SET**

REVISIONS		
No.	DATE	DESCRIPTION
1	9/16/2014	PER REVIEW COMMENTS
2	9/29/2014	PER CONDITIONS OF APPROVAL

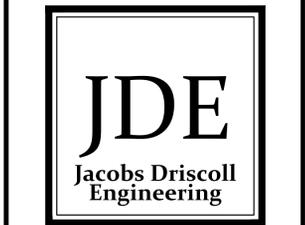
DRAWN BY: MPJ/GWD  
CHECKED BY: EPJ/GWD  
DESIGNED BY: EPJ/GWD  
JOB NUMBER: 2014-014

PREPARED FOR:  
HALIFAX TRAILS CO., INC.  
11 FOX RUN  
MARSHFIELD, MA 02050

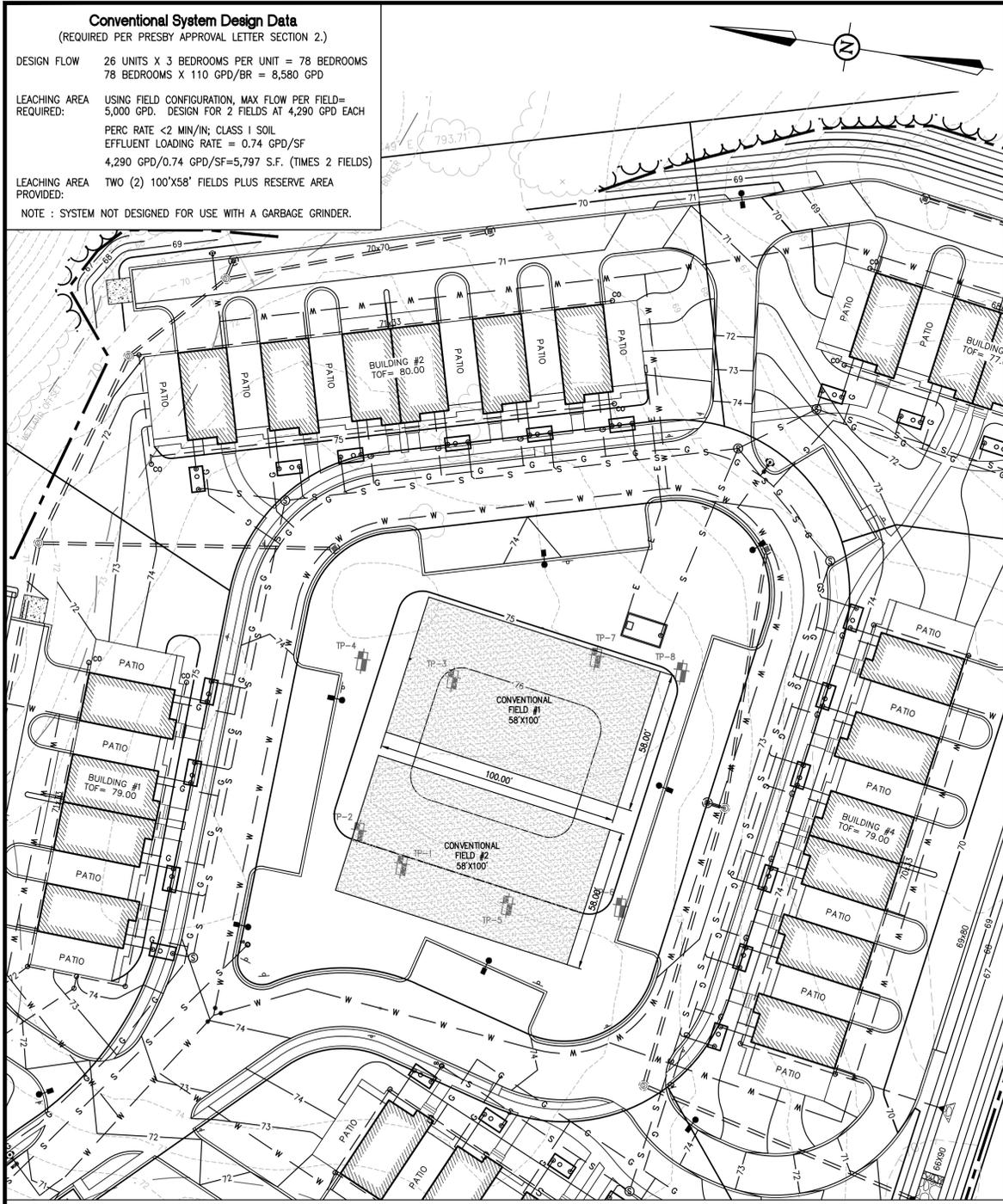
**SANITARY DISPOSAL SYSTEM DESIGN PLANS**

**SEPTIC LAYOUT AND GRAVITY SEWER PLAN**

265 MONPONSETT ST.  
IN  
HALIFAX  
(PLYMOUTH COUNTY)  
MASSACHUSETTS  
AUGUST 26, 2014



50 Oliver Street, Suite W3  
North Easton, Massachusetts 02356  
Phone: 508-928-4400  
www.JacobsDriscoll.com



CONVENTIONAL SYSTEM LAYOUT PLAN

OBSERVATION HOLE DATA

INDICATES PERC TEST      INDICATES OBSERVED GROUNDWATER

TEST PIT # 1 GRD. EL. 74.20 TEST BY: G.W. DRISCOLL, JR., P.E.\*  
 GW. EL. 66.87 WITNESSED BY: C. DRINAN  
 DATE: 7/18/2014 MOTTLING. EL. 66.87 CERTIFIED BY: G.W. DRISCOLL, JR., P.E.  
 \*APPROVED SOIL EVALUATOR NUMBER SE2816

SURFACE DEPTH (IN.)	SOIL HORZ.	SOIL TEXTURE	SOIL COLOR	SOIL MOTTLING	OTHER
0-12"	A	SANDY LOAM	10YR 3/3		
12-28"	B	LOAMY SAND	10YR 4/6	NONE	
28-84"	C <sub>1</sub>	COURSE SAND	2.5Y 5/4	NONE	
84-120"	C <sub>2</sub>	FINE SAND	2.5Y 6/3	88"	

WATER OBSERVED @ NONE PERC DEPTH 30 INCHES  
 PERC RATE <2 MIN/INCH

TEST PIT # 2 GRD. EL. 74.50 TEST BY: G.W. DRISCOLL, JR., P.E.\*  
 GW. EL. 66.33 WITNESSED BY: C. DRINAN  
 DATE: 7/18/2014 MOTTLING. EL. 66.33 CERTIFIED BY: G.W. DRISCOLL, JR., P.E.  
 \*APPROVED SOIL EVALUATOR NUMBER SE2816

SURFACE DEPTH (IN.)	SOIL HORZ.	SOIL TEXTURE	SOIL COLOR	SOIL MOTTLING	OTHER
0-10"	A	SANDY LOAM	10YR 3/3		
10-27"	B	LOAMY SAND	10YR 4/6	NONE	
27-80"	C <sub>1</sub>	COURSE SAND	2.5Y 5/4	NONE	VARIATIONS
80-120"	C <sub>2</sub>	FINE SAND	2.5Y 6/3	86"	

WATER OBSERVED @ NONE PERC DEPTH 30 INCHES  
 PERC RATE <2 MIN/INCH

TEST PIT # 3 GRD. EL. 74.50 TEST BY: G.W. DRISCOLL, JR., P.E.\*  
 GW. EL. >120" WITNESSED BY: C. DRINAN  
 DATE: 7/18/2014 MOTTLING. EL. NONE CERTIFIED BY: G.W. DRISCOLL, JR., P.E.  
 \*APPROVED SOIL EVALUATOR NUMBER SE2816

SURFACE DEPTH (IN.)	SOIL HORZ.	SOIL TEXTURE	SOIL COLOR	SOIL MOTTLING	OTHER
0-13"	A	SANDY LOAM	10YR 3/3		
13-30"	B	LOAMY SAND	10YR 4/6	NONE	
30-120"	C <sub>1</sub>	COURSE SAND	2.5Y 5/4	NONE	VARIATIONS

WATER OBSERVED @ NONE PERC DEPTH 13 INCHES  
 PERC RATE <2 MIN/INCH

TEST PIT # 4 GRD. EL. 74.75 TEST BY: G.W. DRISCOLL, JR., P.E.\*  
 GW. EL. >120" WITNESSED BY: C. DRINAN  
 DATE: 7/18/2014 MOTTLING. EL. NONE CERTIFIED BY: G.W. DRISCOLL, JR., P.E.  
 \*APPROVED SOIL EVALUATOR NUMBER SE2816

SURFACE DEPTH (IN.)	SOIL HORZ.	SOIL TEXTURE	SOIL COLOR	SOIL MOTTLING	OTHER
0-11"	A	SANDY LOAM	10YR 3/3		
11-24"	B	LOAMY SAND	10YR 4/6	NONE	
24-90"	C <sub>1</sub>	COURSE SAND	2.5Y 5/4	NONE	VARIATIONS
90-120"	C <sub>2</sub>	FINE SAND	2.5Y 6/3	NONE	

WATER OBSERVED @ NONE PERC DEPTH 13 INCHES  
 PERC RATE <2 MIN/INCH

TEST PIT # 5 GRD. EL. 74.20 TEST BY: G.W. DRISCOLL, JR., P.E.\*  
 GW. EL. 66.58 WITNESSED BY: C. DRINAN  
 DATE: 7/18/2014 MOTTLING. EL. 66.58 CERTIFIED BY: G.W. DRISCOLL, JR., P.E.  
 \*APPROVED SOIL EVALUATOR NUMBER SE2816

SURFACE DEPTH (IN.)	SOIL HORZ.	SOIL TEXTURE	SOIL COLOR	SOIL MOTTLING	OTHER
0-11"	A	SANDY LOAM	10YR 3/3		
11-27"	B	LOAMY SAND	10YR 4/6	NONE	
27-78"	C <sub>1</sub>	COURSE SAND	2.5Y 5/4	NONE	
78-120"	C <sub>2</sub>	FINE SAND	2.5Y 6/3	89"	

WATER OBSERVED @ NONE PERC DEPTH 30 INCHES  
 PERC RATE <2 MIN/INCH

TEST PIT # 6 GRD. EL. 74.50 TEST BY: G.W. DRISCOLL, JR., P.E.\*  
 GW. EL. 65.77 WITNESSED BY: C. DRINAN  
 DATE: 7/18/2014 MOTTLING. EL. 65.77 CERTIFIED BY: G.W. DRISCOLL, JR., P.E.  
 \*APPROVED SOIL EVALUATOR NUMBER SE2816

SURFACE DEPTH (IN.)	SOIL HORZ.	SOIL TEXTURE	SOIL COLOR	SOIL MOTTLING	OTHER
0-10"	A	SANDY LOAM	10YR 3/3		
10-31"	B	LOAMY SAND	10YR 4/6	NONE	
31-89"	C <sub>1</sub>	COURSE SAND	2.5Y 5/4	NONE	VARIATIONS
89-120"	C <sub>2</sub>	FINE SAND	2.5Y 6/3	94"	

WATER OBSERVED @ NONE PERC DEPTH 32 INCHES  
 PERC RATE <2 MIN/INCH

TEST PIT # 7 GRD. EL. 74.00 TEST BY: G.W. DRISCOLL, JR., P.E.\*  
 GW. EL. >120" WITNESSED BY: C. DRINAN  
 DATE: 7/18/2014 MOTTLING. EL. 65.58 JDE-5 CERTIFIED BY: G.W. DRISCOLL, JR., P.E.  
 \*APPROVED SOIL EVALUATOR NUMBER SE2816

SURFACE DEPTH (IN.)	SOIL HORZ.	SOIL TEXTURE	SOIL COLOR	SOIL MOTTLING	OTHER
0-11"	A	SANDY LOAM	10YR 3/3		
11-27"	B	LOAMY SAND	10YR 4/6	NONE	
27-90"	C <sub>1</sub>	COURSE SAND	2.5Y 5/4	NONE	VARIATIONS
90-120"	C <sub>2</sub>	FINE SAND	2.5Y 6/3	NONE	

WATER OBSERVED @ NONE PERC DEPTH 14 INCHES  
 PERC RATE <2 MIN/INCH

TEST PIT # 8 GRD. EL. 74.75 TEST BY: G.W. DRISCOLL, JR., P.E.\*  
 GW. EL. >120" WITNESSED BY: C. DRINAN  
 DATE: 7/18/2014 MOTTLING. EL. 65.77 JDE-6 CERTIFIED BY: G.W. DRISCOLL, JR., P.E.  
 \*APPROVED SOIL EVALUATOR NUMBER SE2816

SURFACE DEPTH (IN.)	SOIL HORZ.	SOIL TEXTURE	SOIL COLOR	SOIL MOTTLING	OTHER
0-11"	A	SANDY LOAM	10YR 3/3		
11-32"	B	LOAMY SAND	10YR 4/6	NONE	
32-86"	C <sub>1</sub>	COURSE SAND	2.5Y 5/4	NONE	VARIATIONS
86-120"	C <sub>2</sub>	FINE SAND	2.5Y 6/3	NONE	

WATER OBSERVED @ NONE PERC DEPTH 14 INCHES  
 PERC RATE <2 MIN/INCH

TEST PIT # 9 GRD. EL. 72.70 TEST BY: G.W. DRISCOLL, JR., P.E.\*  
 GW. EL. 67.03 WITNESSED BY: C. DRINAN  
 DATE: 7/18/2014 MOTTLING. EL. 67.03 CERTIFIED BY: G.W. DRISCOLL, JR., P.E.  
 \*APPROVED SOIL EVALUATOR NUMBER SE2816

SURFACE DEPTH (IN.)	SOIL HORZ.	SOIL TEXTURE	SOIL COLOR	SOIL MOTTLING	OTHER
0-10"	A	SANDY LOAM	10YR 3/3		
10-23"	B	LOAMY SAND	10YR 5/6	NONE	
23-70"	C <sub>1</sub>	COURSE SAND	2.5Y 5/8	NONE	
70-120"	C <sub>2</sub>	FINE SAND	2.5Y 5/3	68"	

WATER OBSERVED @ NONE PERC DEPTH 23 INCHES  
 PERC RATE <2 MIN/INCH

TEST PIT # 10 GRD. EL. 73.20 TEST BY: G.W. DRISCOLL, JR., P.E.\*  
 GW. EL. 67.53 WITNESSED BY: C. DRINAN  
 DATE: 7/18/2014 MOTTLING. EL. 67.53 CERTIFIED BY: G.W. DRISCOLL, JR., P.E.  
 \*APPROVED SOIL EVALUATOR NUMBER SE2816

SURFACE DEPTH (IN.)	SOIL HORZ.	SOIL TEXTURE	SOIL COLOR	SOIL MOTTLING	OTHER
0-12"	A	SANDY LOAM	10YR 3/3		
12-28"	B	LOAMY SAND	10YR 4/6	NONE	
28-60"	C <sub>1</sub>	COURSE SAND	2.5Y 5/4	NONE	
60-120"	C <sub>2</sub>	FINE SAND	2.5Y 6/3	68"	

WATER OBSERVED @ NONE PERC DEPTH 18 (B. HORIZ.) INCHES  
 PERC RATE <2 MIN/INCH

TEST PIT # 11 GRD. EL. 73.10 TEST BY: G.W. DRISCOLL, JR., P.E.\*  
 GW. EL. 66.43 WITNESSED BY: C. DRINAN  
 DATE: 7/18/2014 MOTTLING. EL. 66.43 CERTIFIED BY: G.W. DRISCOLL, JR., P.E.  
 \*APPROVED SOIL EVALUATOR NUMBER SE2816

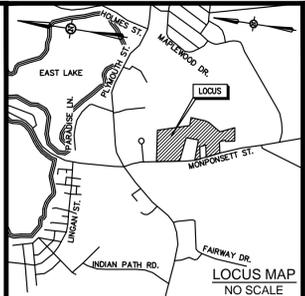
SURFACE DEPTH (IN.)	SOIL HORZ.	SOIL TEXTURE	SOIL COLOR	SOIL MOTTLING	OTHER
0-15"	A	SANDY LOAM	10YR 3/3		
15-33"	B	LOAMY SAND	10YR 4/6	NONE	
33-60"	C <sub>1</sub>	MED. SAND	10YR 4/6	NONE	
60-80"	C <sub>2</sub>	MED. SAND	2.5Y 5/4	NONE	
80-120"	C <sub>3</sub>	FINE LOAMY SAND	2.5Y 5/3	80"	

WATER OBSERVED @ NONE PERC DEPTH 18 INCHES  
 PERC RATE <2 MIN/INCH

TEST PIT # 12 GRD. EL. 72.00 TEST BY: G.W. DRISCOLL, JR., P.E.\*  
 GW. EL. 66.00 WITNESSED BY: C. DRINAN  
 DATE: 7/18/2014 MOTTLING. EL. 66.00 CERTIFIED BY: G.W. DRISCOLL, JR., P.E.  
 \*APPROVED SOIL EVALUATOR NUMBER SE2816

SURFACE DEPTH (IN.)	SOIL HORZ.	SOIL TEXTURE	SOIL COLOR	SOIL MOTTLING	OTHER
0-12"	A	SANDY LOAM	10YR 3/3		
12-34"	B	LOAMY SAND	10YR 4/6	NONE	
34-61"	C <sub>1</sub>	MED. SAND	10YR 4/6	NONE	
61-120"	C <sub>2</sub>	FINE LOAMY SAND	2.5Y 5/3	72"	

WATER OBSERVED @ NONE PERC DEPTH 18 INCHES  
 PERC RATE <2 MIN/INCH



PERMITTING SET

REVISIONS

No.	DATE	DESCRIPTION
1	9/16/2014	PER REVIEW COMMENTS
2	9/29/2014	PER CONDITIONS OF APPROVAL

DRAWN BY: MPJ/GWD  
 CHECKED BY: EPJ/GWD  
 DESIGNED BY: EPJ/GWD  
 JOB NUMBER: 2014-014

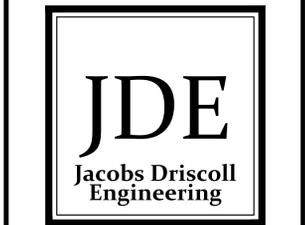
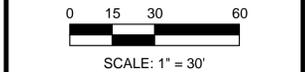
PREPARED FOR:

HALIFAX TRAILS CO., INC.  
 11 FOX RUN  
 MARSHFIELD, MA 02050

SANITARY DISPOSAL SYSTEM DESIGN PLANS

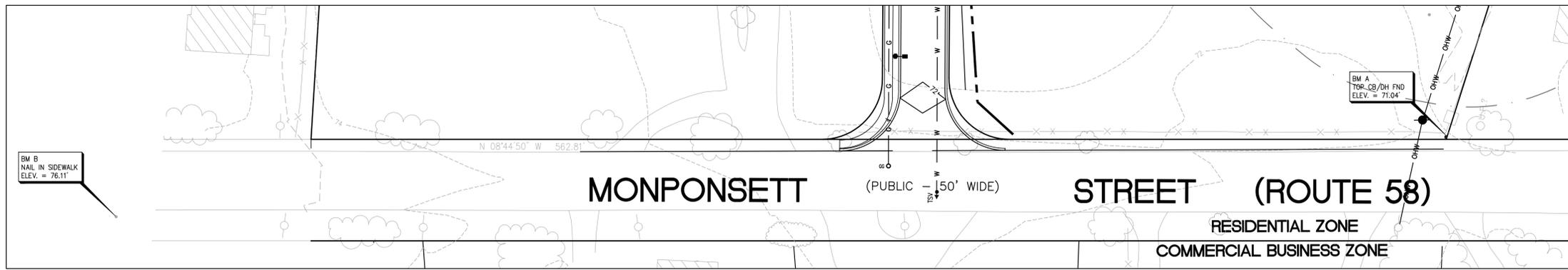
CONVENTIONAL LAYOUT AND SOIL LOGS

265 MONPONSETT ST.  
 IN  
 HALIFAX  
 (PLYMOUTH COUNTY)  
 MASSACHUSETTS  
 AUGUST 26, 2014



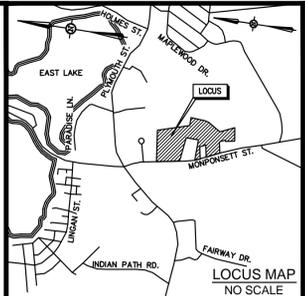
50 Oliver Street, Suite W3  
 North Easton, Massachusetts 02356  
 Phone: 508-928-4400  
 www.JacobsDriscoll.com

BENCHMARKS:  
 CURRENT BENCHMARKS:  
 BM-A: EL. 71.04  
 LOCATION: DRILL HOLE IN CORNER BOUND AT SOUTHWEST CORNER OF PROPERTY  
 BM-B: EL. 76.11  
 LOCATION: MAG NAIL SET IN SIDEWALK IN FRONT OF THE SHELBY PLAZA.  
 NEW CONSTRUCTION BENCHMARKS WILL BE SET DURING THE DRIVEWAY STAKEOUT AND THE CONTRACTOR WILL BE GIVEN THIS INFORMATION FOR THE DRIVEWAY, FOUNDATION AND SEPTIC SYSTEM CONSTRUCTION.



BENCHMARK LOCATIONS

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**PERMITTING SET**

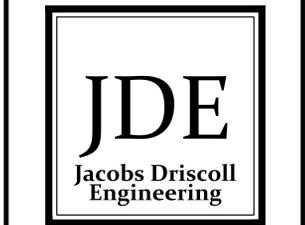
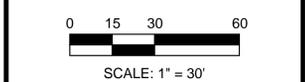
REVISIONS		
No.	DATE	DESCRIPTION
1	9/16/2014	PER REVIEW COMMENTS
2	9/29/2014	PER CONDITIONS OF APPROVAL

DRAWN BY: MPJ/GWD  
 CHECKED BY: EPJ/GWD  
 DESIGNED BY: EPJ/GWD  
 JOB NUMBER: 2014-014

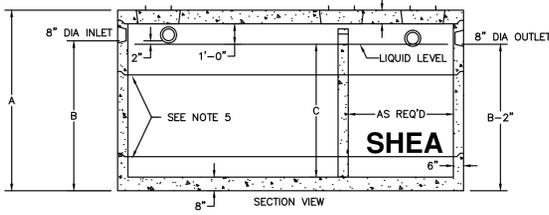
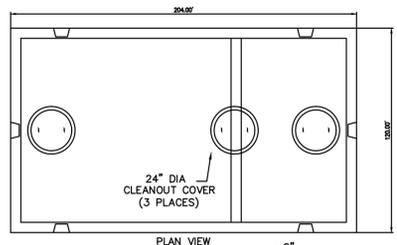
PREPARED FOR:  
**HALIFAX TRAILS CO., INC.**  
 11 FOX RUN  
 MARSHFIELD, MA 02050

**SEPTIC CONSTRUCTION DETAILS AND CALCULATIONS**

265 MONPONSETT ST.  
 IN  
 HALIFAX  
 (PLYMOUTH COUNTY)  
 MASSACHUSETTS  
 AUGUST 26, 2014



50 Oliver Street, Suite W3  
 North Easton, Massachusetts 02356  
 Phone: 508-928-4400  
 www.JacobsDriscoll.com



GALLONS	A (HEIGHT)	B (INLET)	C (LIQUID)	WEIGHT (LBS)	ITEM NO.
4,000	76"	58"	48"	56,260	TK-4000C2C
5,000	88"	70"	60"	60,820	TK-5000C2C
5,500	92"	74"	64"	62,230	TK-5500C2C
6,000	96"	78"	68"	63,730	TK-6000C2C
6,500	100"	82"	72"	65,340	TK-6500C2C
7,000	106"	88"	78"	67,470	TK-7000C2C
7,500	112"	94"	84"	69,750	TK-7500C2C
8,000	118"	100"	90"	72,000	TK-8000C2C
8,500	124"	106"	96"	74,280	TK-8500C2C
9,000	130"	112"	102"	76,530	TK-9000C2C
9,500	136"	118"	108"	78,780	TK-9500C2C
10,000	140"	122"	112"	80,300	TK-10000C2C
10,500	146"	128"	118"	82,550	TK-10500C2C
11,000	152"	134"	124"	84,810	TK-11000C2C
11,500	158"	140"	130"	87,070	TK-11500C2C
12,000	162"	144"	134"	88,570	TK-12000C2C

- NOTES:
- CONCRETE: 5,000 PSI MINIMUM AFTER 28 DAYS.
  - DESIGN CONFORMS WITH 310 CMR 15.00, DEP TITLE 5 RECS, FOR SEPTIC TANKS.
  - ALL REINFORCEMENT PER ASTM C1227.
  - DESIGNED FOR H-20 LOADING, COVER 1'-5FT.
  - TONGUE AND GROOVE JOINT SEALED WITH BUTYL RESIN. INLET HEIGHT MAY INCREASE SLIGHTLY DUE TO THE BUTYL RESIN USED.
  - TEES AND Baffles SOLD SEPARATELY.

**COMMERCIAL 2-COMPART TANK**  
 4000 TO 12000 GALLON

18.2  
 ctk10x172C.dwg 02/01/2013

**PUMP CHAMBER NOTES:**

- BOTH INLET AND OUTLET KNOCKOUTS TO BE FURNISHED WITH CAST IN PLACE RUBBER BOOTS AND STAINLESS STEEL STRAPS.
- TANK SHALL BE WATERTIGHT. PROVIDE APPROPRIATE WATERPROOFING.
- WATER-TIGHTNESS TESTING SHALL BE PERFORMED ON THE PUMP CHAMBER TANK:  
 -GROUNDWATER INFILTRATION TEST: INSTALL TANK AND WATERPROOFING THEN BACKFILL TANK TO TANK TOP AT A MINIMUM. ENSURE THAT THE TANK IS EMPTY. LET THE TANK SIT FOR 24 HOURS. IF ANY GROUNDWATER INFILTRATES INTO THE TANK, THE TEST HAS FAILED AND THE WATERPROOFING SHALL BE RE-TESTED.  
 -WATER EXFILTRATION TEST: AFTER A SUCCESSFUL INFILTRATION TEST, FILL THE TANK WITH WATER UP TO THE OUTLET INVERT ELEVATION AND LET THE TANK SIT FOR ANOTHER 24 HOURS. NOTE ANY DROP IN THE WATER LEVEL. IT IS EXPECTED THAT THE CONCRETE WILL ABSORB A SMALL AMOUNT OF WATER. IF THERE IS A SIGNIFICANT DROP IN THE WATER LEVEL, CORRECT THE WATERPROOFING AND RE-TEST.

**PUMP CHAMBER TANK DETAIL**

Septic Tank Schedule	ELEVATIONS				
	BLDG. #1	BLDG. #2	BLDG. #3	BLDG. #4	BLDG. #5
FINISHED FLOOR	80.17	81.17	78.17	80.17	81.67
TOP OF FOUNDATION	79.00	80.00	77.00	79.00	80.50
SEWER INVERT AT FOUNDATION	73.00	73.00	70.00	72.00	73.50
SEWER INVERT INTO SEPTIC TANK	72.78	72.74	69.72	71.78	73.22
SEWER INVERT OUT OF SEPTIC TANK	72.53	72.49	69.47	71.53	72.97
SEWER INVERT AT UPPER END	72.27	70.15	69.37	72.70	71.05
SEWER INVERT AT LOWER END	71.06	68.33	68.33	71.80	69.17

Design Schedule	ELEVATION
FINISHED FLOOR	VARIES
TOP OF FOUNDATION	VARIES
SEWER INVERT AT FOUNDATION	VARIES
SEWER INVERT INTO SEPTIC TANK	VARIES
SEWER INVERT OUT OF SMH-35	67.87
SEWER INVERT INTO PUMP CHAMBER	67.08
FORCE MAIN INVERT OUT OF PUMP CHAMBER	67.08
SEWER INVERT INTO DISTRIBUTION BOX	74.06
SEWER INVERT OUT OF DISTRIBUTION BOX	73.89
SEWER INVERT INTO LEACHING SYSTEM	73.33
BOTTOM OF ENVIRO-SEPTIC PIPE	72.75
BOTTOM OF LEACHING FIELD (SYSTEM SAND)	72.25
WATER TABLE (TP# JDE1)	66.93

**PUMP CHAMBER CAPACITY CALCULATION PER 310 CMR 15.203**

DESIGN FLOW = 8,580 GPD  
 LEACHING SYSTEM: 54 ROWS OF PRESSBY ENVIRO SEPTIC OR ADS GEO-FLOW LINES  
 VOLUME OF DELIVERY PIPE = 3.14 X (2 1/2 FT)<sup>2</sup> X 42.5 FT = 2.09 C.F.  
 = 2.09 C.F. X 7.48 GAL/C.F. = 15.6 GAL  
 ∴ ADD PIPE VOLUME TO DOSING VOLUME  
 EACH DOSE WILL EQUAL 1/8 DAILY FLOW VOLUME:  
 = 8,580 GPD / 8 DOSES = 1,072.5 GAL/DOSE  
 EACH VERTICAL FOOT OF THE 11,500 PUMP CHAMBER HOLDS THE FOLLOWING VOLUME:  
 = 11,500 GAL / 10.83 FT = 1,062 GAL/VERTICAL FOOT  
 DOSING DEPTH REQUIRED:  
 = 1,072.5 GAL / 1,062 GAL/VERTICAL FOOT = 1.03 FT

**EMERGENCY STORAGE CAPACITY CALCULATION**

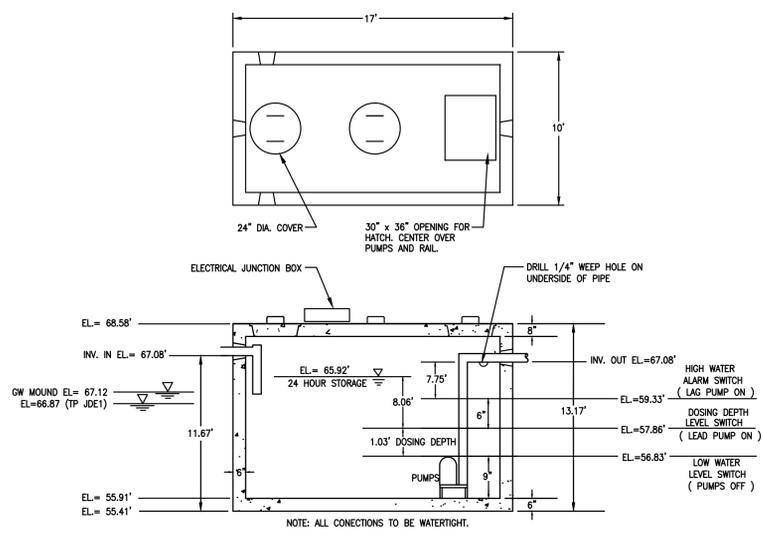
STORAGE NEEDED = 8,580 GALLONS  
 OPERATING VOLUME OF PUMP SYSTEM:  
 = 0.75 FT X 1.01 FT X 0.50 FT = 0.38 FT<sup>3</sup> X 7.48 GAL/FT<sup>3</sup> = 2,840 GAL  
 AVAILABLE EMERGENCY STORAGE VOLUME = 11,500 GAL - 2,840 GAL = 8,660 GAL  
 REQUIRED EMERGENCY STORAGE DEPTH = 8,580 GPD / 1,062 GAL/FT = 8.08 FT  
 DEPTH PROVIDED = 9.24 FT

**TOTAL DYNAMIC HEAD CALCULATION**

AMOUNT OF HEAD REQUIRED = (INVERT INTO D-BOX)  
 - (ELEVATION OF INTERIOR BOTTOM OF PUMP TANK)  
 = 73.81 - 56.58 = 17.23'  
 FRICTION LOSS  
 USE A 3" SCH. 80 FORCE MAIN  
 PRESSBY PUMPING REQUIREMENT IS 20 GPM PER COMBINATION SYSTEM LINE  
 = 20 GPM X 18 = 360 GPM MAX. ALLOWABLE  
 EQUIVALENT PIPE LENGTH FOR 90° BEND = 7.5'  
 EQUIVALENT PIPE LENGTH FOR 45° BEND = 4.0' (NEED 2)  
 TOTAL LENGTH OF PIPE = 53.5' + 7.9' + 8.0' = 69.4'  
 FRICTION LOSS PER 100' OF PIPE = 1.82'  
 TOTAL LOSS DUE TO FRICTION = (69.4') (0.0182) = 1.26'  
 TOTAL DYNAMIC HEAD = 17.23' + 1.26' = 18.49'

**BUOYANCY CALCULATIONS- PUMP CHAMBER**

MAXIMUM GROUNDWATER ELEVATION = 66.93  
 PROPOSED TANK BOTTOM ELEV. = 55.41  
 1. BUOYANCY FORCE ON EMPTY TANK:  
 VOLUME DISPLACED = 17' X 10' X 11.52'  
 = 1,958.4 C.F.  
 WT. OF DISPLACED WATER = 1,958.4 C.F. X 62.4 #/C.F.  
 = 122,204 #  
 2. WEIGHT OF EMPTY TANK: (FROM PRODUCT SPEC. SHEET)  
 = 79,360 #  
 3. WEIGHT OF SOIL ABOVE TANK  
 VOLUME = 622' DEEP X 17' X 10' = 1,057.4 C.F.  
 WEIGHT = 1,057.4 C.F. X 110 #/C.F. = 116,314 #  
 4. SUM OF FORCES  
 F.S. = (116,314 # + 79,360 #) / 122,204 # = 1.6  
 WT. OF TANK AND SOIL IS GREATER THAN WT. OF DISPLACED WATER  
 ∴ OK



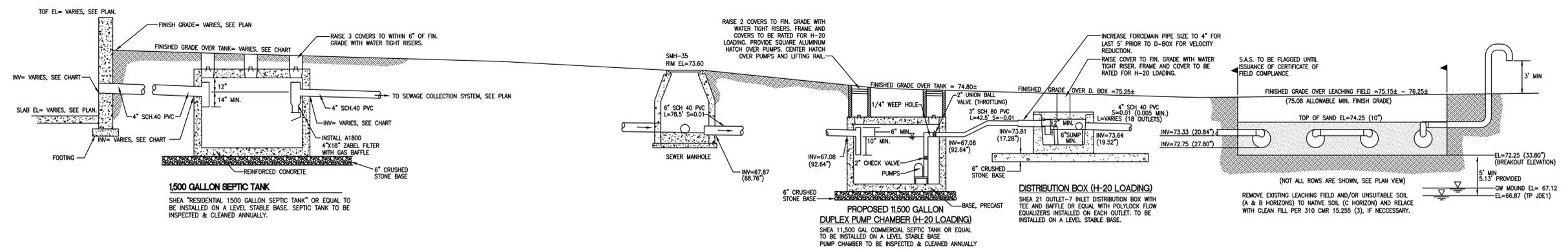
**PROPOSED 11,500 GALLON DUPLEX PUMP CHAMBER (H-20 LOADING)**

SHEA 11,500 GAL COMMERCIAL SEPTIC TANK OR EQUAL TO BE INSTALLED ON A LEVEL STABLE BASE. PUMP CHAMBER TO BE INSPECTED & CLEANED ANNUALLY.

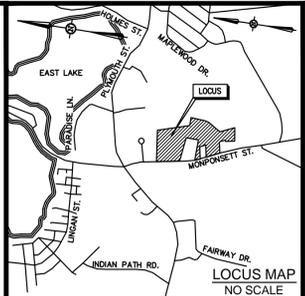
PUMP SUPPLIER:  
 JOHN PENNINI  
 WILLIAMSON NEW ENGLAND  
 25 GRIFFIN WAY  
 CHELSEA, MA 02150  
 (617) 884-9200 x14

**PUMP NOTES:**

- FURNISH AND INSTALL ONE (1) DUPLEX SET OF GOULDS PUMPS MODEL WS07BF SUBMERSIBLE SEWAGE PUMPS, EACH PUMP RATED TO DELIVER: 98 GPM AT 18.5' TDH. PUMPS SHALL HAVE STAINLESS STEEL SHAFTS AND CAST IRON IMPELLERS.
- MOTORS WILL BE NOT LESS THAN: 2 HP, 230 VOLT, THREE PHASE 60 CYCLE 1,750 RPM WITH 20' OF POWER CABLE AIR FILLED DRY RUNNING TYPE. OIL FILLED MOTORS WILL NOT BE CONSIDERED EQUAL. THE MOTORS SHALL BE HOUSED IN AN AIR FILLED WATERTIGHT CAST IRON MOTOR SHELL WITH THE WINDINGS HAVING CLASS 'B' INSULATION AND PRE-LUBRICATED DOUBLE SEAL BEARINGS. THE MOTOR SHAFT SHALL BE 300 STAINLESS STEEL WITH KEWAY FOR POSITIVE POSITIONING AND SECURING OF THE IMPELLER. MOTOR END BELL TO BE DESIGNED AS A TERMINAL BOX.
- IMPELLERS : CAST IRON, ACCURATELY MACHINED TO PROPER DIAMETER AND STATICALLY AND DYNAMICALLY BALANCED.
- PROVIDE 2 INCH PUMP REMOVAL SYSTEM WITH SLIDING BRACKET. PUMP RAIL SHALL BE 2 INCH GALVANIZED AND ATTACHED AS PER PUMP MANUFACTURER'S RECOMMENDATION.
- 4 - FLOAT SWITCHES, HERMETICALLY SEALED, MOUNTED ON GALVANIZED ROD WITH WALL BRACKET. EACH SWITCH TO HAVE 20' OF CABLE.
- PUMP CONTROLS SHALL BE MOUNTED TO THE SIDE OF BUILDING #2 PROVIDED AS FOLLOWS:  
 1 - NEMA 1 DUPLEX CONTROL PANEL CONTAINING :  
 2 - COMB. MANUAL DISCONNECT SWITCHES & MOTOR CIRCUIT PROTECTORS  
 2 - MAGNETIC STARTERS  
 2 - SELECTOR SWITCHES  
 2 - PILOT LIGHTS  
 1 - AUTOMATIC ALTERNATOR  
 1 - CONTROL CIRCUIT TRANSFORMER  
 1 - ALARM BELL W/SILENCER  
 1 - SET OF ISOLATED CONTACTS FOR REMOTE ALARM  
 1 - NUMBERED AND WIRED TERMINAL STRIP
- ACCESS HATCH SHALL BE LOCATED DIRECTLY OVER THE PUMP LOCATIONS TO ENSURE THE PROPER OPERATION OF THE PUMP REMOVAL SYSTEM.
- ELECTRIC CONDUIT BETWEEN PUMP CHAMBER AND BUILDING SHALL BE MADE EXPLOSION PROOF AND WATERTIGHT.
- PUMP CHAMBER SHALL BE VENTED WITH A SEPARATE 4" SCH. 80 PVC VENT CONNECTED FROM THE PUMP CHAMBER TO THE SEPTIC TANK.
- ALARM SYSTEM SHALL BE ON A SEPARATE POWER CIRCUIT THAN PUMP.
- ELECTRICAL JUNCTION BOX AT PUMP CHAMBER SHALL BE LOCATED OUTSIDE OF THE PUMP CHAMBER.



**TYPICAL SYSTEM PROFILE**  
 NOT TO SCALE



**PERMITTING SET**

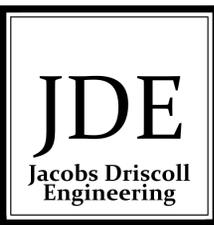
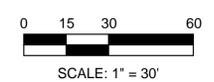
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No.	DATE	DESCRIPTION
1	9/16/2014	PER REVIEW COMMENTS
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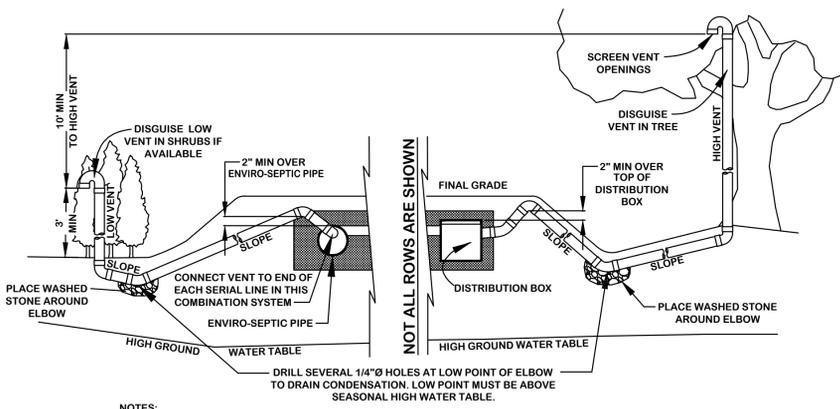
PREPARED FOR:  
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 11 FOX RUN  
 MARSHFIELD, MA 02050

**SEPTIC CONSTRUCTION DETAILS AND CALCULATIONS**

265 MONPONSETT ST.  
 IN  
 HALIFAX  
 (PLYMOUTH COUNTY)  
 MASSACHUSETTS  
 AUGUST 26, 2014

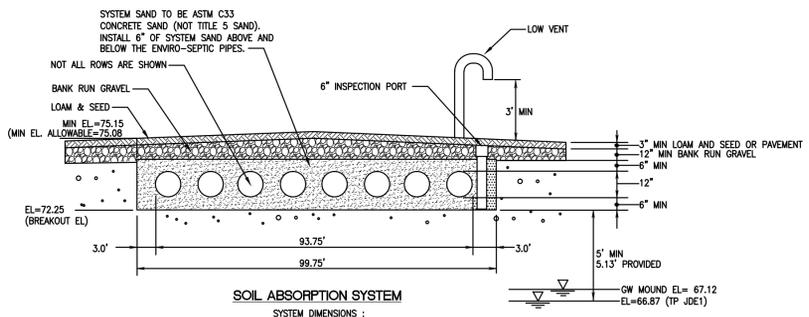


50 Oliver Street, Suite W3  
 North Easton, Massachusetts 02356  
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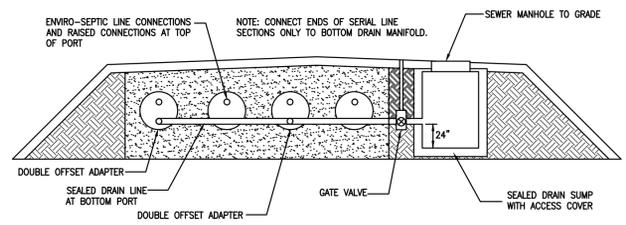
- NOTES:
1. 10' MIN ELEVATION DIFFERENCE FROM LOW VENT TO HIGH VENT. LOW VENT AND HIGH VENT ELEVATIONS TBD IN FIELD ONCE REMOTE VENTING LOCATION IS IDENTIFIED.
  2. VENTS TO BE 6" SCH 80 PVC.
  3. PROVIDE CHARCOAL FILTERS ON VENTS PER LOCAL REGULATIONS.

**REMOTE VENTING**  
(NOT TO SCALE)

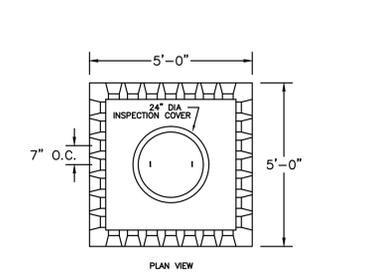


**SOIL ABSORPTION SYSTEM**

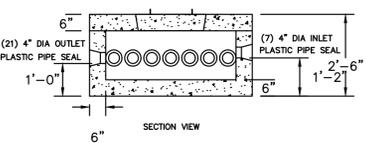
SYSTEM DIMENSIONS:  
 PIPE (OUTSIDE TO OUTSIDE) LW = 86.00' X 99.75'  
 SAND BED LW = 80.00' X 93.75'  
 ENVIRO-SEPTIC PIPE CENTER TO CENTER SPACING = 1.75'



**SYSTEM BOTTOM DRAIN DETAIL**

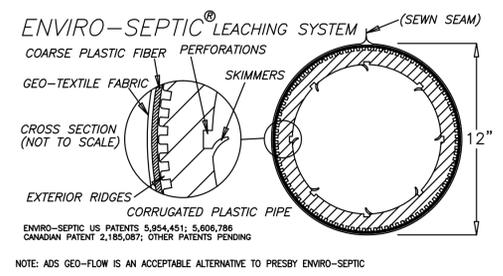


**21-OUTLET DISTRIBUTION BOX**  
(NOT TO SCALE)

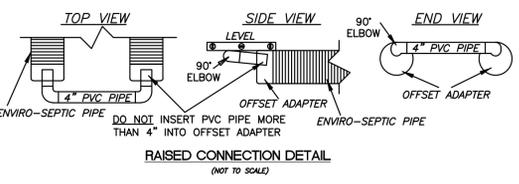


- NOTES:
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
  2. DESIGN CONFORMS WITH 310 CMR 15.000, DEP TITLE 5 REGS, FOR DISTRIBUTION BOXES.
  3. DESIGNED FOR H-20 LOADING.

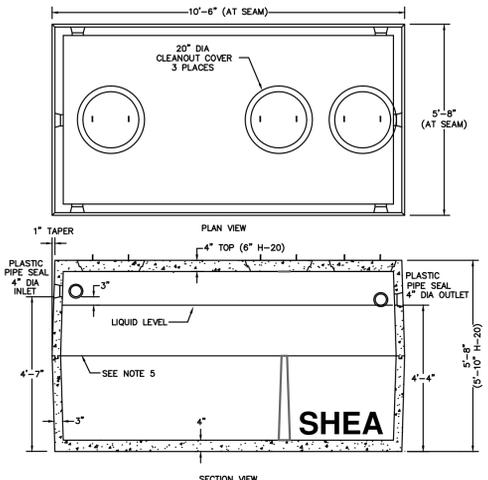
ITEM NO.	DESCRIPTION	WEIGHT
B-21DBH	H-20 W/COVER	5,562#
B-21DBC	COVER ONLY	1,850#



**ENVIRO-SEPTIC PIPE DETAIL**  
(NOT TO SCALE)



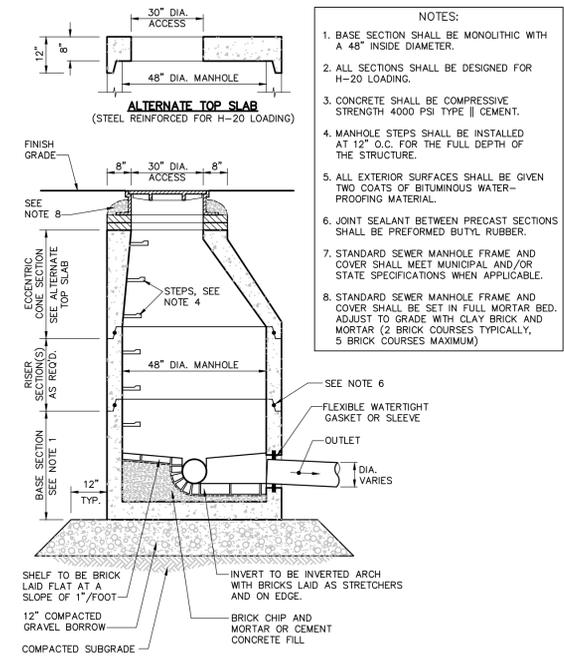
**RAISED CONNECTION DETAIL**  
(NOT TO SCALE)



- NOTES:
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
  2. DESIGN CONFORMS WITH 310 CMR 15.000, DEP TITLE 5 REGS, FOR SEPTIC TANKS.
  3. ALL REINFORCEMENT PER ASTM C1227-93.
  4. BAFFLE WALL OPTIONAL FOR TWO COMPARTMENT TANKS.
  5. TEES AND GAS BAFFLE SOLD SEPARATELY.
  6. TONGUE & GROOVE JOINT SEALED WITH BUTYL RESIN.
  7. ALSO AVAILABLE IN H-20 LOADING.

ITEM NO.	DESCRIPTION	WEIGHT
TK-1500H	STANDARD	11,670#
TK-1500H	H-20	13,135#
TK-15002C	STANDARD	12,830#
TK-15002CH	H-20	14,395#

**SEPTIC TANK**  
1500 GALLON



- NOTES:
1. BASE SECTION SHALL BE MONOLITHIC WITH A 48" INSIDE DIAMETER.
  2. ALL SECTIONS SHALL BE DESIGNED FOR H-20 LOADING.
  3. CONCRETE SHALL BE COMPRESSIVE STRENGTH 4000 PSI TYPE II CEMENT.
  4. MANHOLE STEPS SHALL BE INSTALLED AT 12" O.C. FOR THE FULL DEPTH OF THE STRUCTURE.
  5. ALL EXTERIOR SURFACES SHALL BE GIVEN TWO COATS OF BITUMINOUS WATER-PROOFING MATERIAL.
  6. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PERFORMED BUTYL RUBBER.
  7. STANDARD SEWER MANHOLE FRAME AND COVER SHALL MEET MUNICIPAL AND/OR STATE SPECIFICATIONS WHEN APPLICABLE.
  8. STANDARD SEWER MANHOLE FRAME AND COVER SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR (2 BRICK COURSES TYPICALLY, 5 BRICK COURSES MAXIMUM).

**SANITARY SEWER MANHOLE (SMH)**

DETAIL # 201

JDE