

CALCULATIONS:

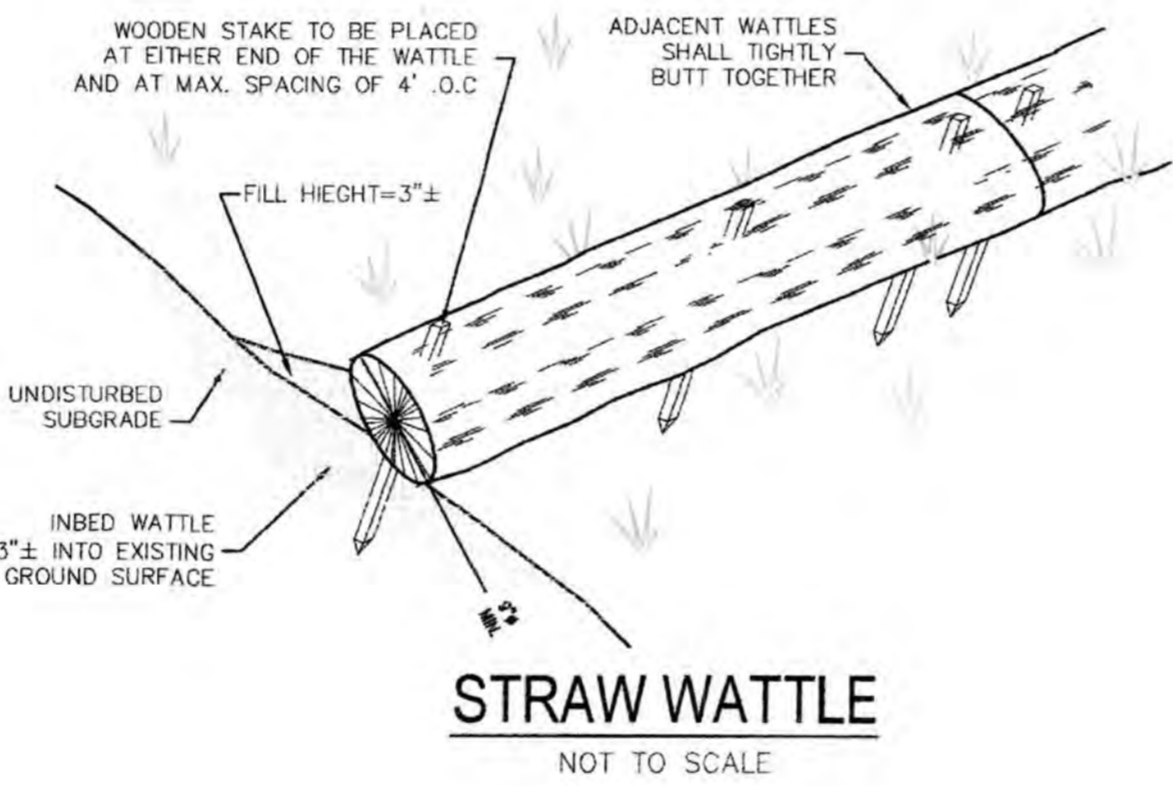
HYDRAULIC LOADINGS:
 FOUR (4) BEDROOMS PER DAY PER BEDROOM = 440 GALLONS PER DAY.
SEPTIC TANK SIZE:
 AVERAGE DAILY FLOW = 440 G.P.D.
 MINIMUM STORAGE REQUIRED:
 COMPARTMENT #1 = 440 G.P.D. X 200% = 880 GAL.
 COMPARTMENT #2 = 440 G.P.D. X 100% = 440 GAL.
 SEPTIC TANK PROVIDED = 1,500 GALLONS.
PRIMARY LEACHING AREA (PRESBY ENVIRONMENTAL, INC.):
 DESIGN PERCOLATION RATE = 30 M.P.I. (SOIL CLASS II)
 SLOPE ACROSS SYSTEM = 20%
 LINEAL FOOTAGE REQUIRED = 250 L.F. (TABLE A - DESIGN REFERENCE GUIDE-REV. DEC. 2016)
 LINEAL FOOTAGE PROVIDED = 270 L.F. (6 - 45' LINES)
 MINIMUM CENTER TO CENTER SPACING REQUIRED = 2.25 FEET
 MINIMUM SAND BED REQUIRED = 800 S.F. (TABLE D - DESIGN REFERENCE GUIDE-REV. DEC 2016)
 SAND BED PROVIDED = 810 S.F. (47'x17.25')
CONVENTIONAL SYSTEM LEACHING AREA:
 DESIGN PERCOLATION RATE = 30 M.P.I. (SOIL CLASS II)
 EFFLUENT LOADING RATE = 0.33 GALLONS/S.F.
 LEACHING AREA REQUIRED = 440 GPD / 0.33 GPD/S.F. = 1,334 S.F.
 TOTAL LEACHING AREA PROVIDED = (4) 6' TRENCHES, 3' WIDE X 1' DEEP (4 X 6 X 1) = 1,340 S.F.
 TOTAL DESIGN FLOW = 1,340 S.F. X 0.33 GALLON/S.F. = 442 GALLONS.

SCHEDULE OF ELEVATIONS:

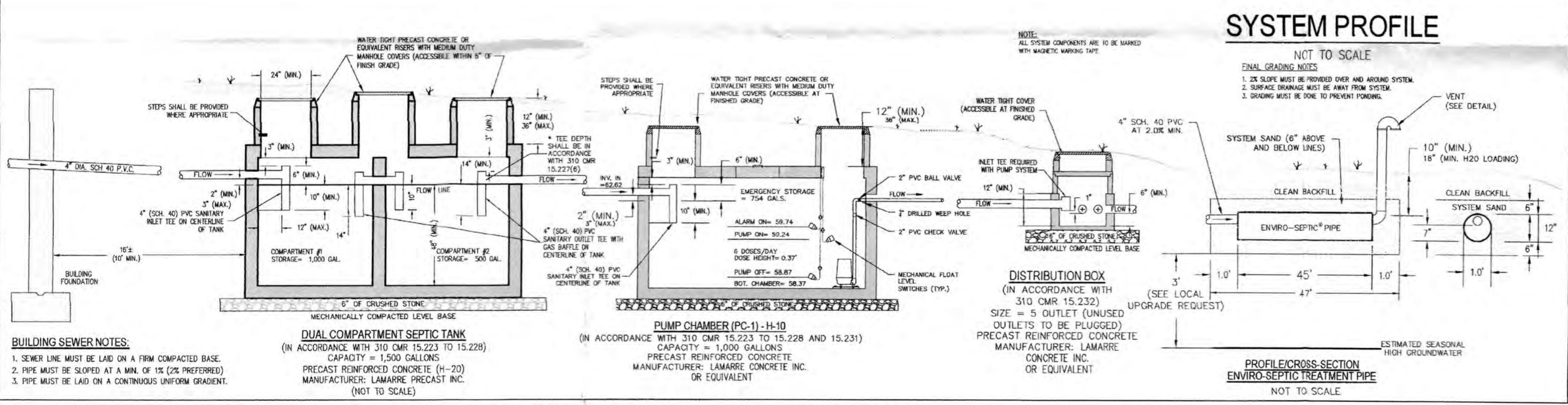
SYSTEM ELEVATIONS:			PIPE DATA:			
TOP EL. OF FOUNDATION WALL = 68.0±	PIPE 1 GRAVITY SEWER 4" PVC (SCH. 40)	L=16 S=0.02	PIPE 2 GRAVITY SEWER 4" PVC (SCH. 40)	L=2 S=0.02	PIPE 3 FORCE MAIN 2" PVC (SDR 21)	L=147
INV. EL. AT FOUNDATION WALL = 63.2±	SEPTIC TANK (ST-1) - H-10	4" INV. (N) = 62.91 4" INV. (OUT) = 62.66	PUMP CHAMBER (PC)	4" INV. (N) = 62.62 2" INV. (OUT) = 62.37	DISTRIBUTION BOX (DB-1)	4" INV. (N) = 100.89 4" INV. (OUT) = 100.72
PRIMARY PRESBY ELEVATIONS:						
LINE NO.	EL. INV. OF 4" PVC	EL. INV. OF PRESBY PIPE	EL. OF BOT. OF SAND BED	LINE NO.	EL. INV. BEG. OF 4" PVC	EL. INV. OF PRESBY PIPE
P1	100.55	99.97	99.47	P1	XXX.XX	XXX.XX
P2	100.10	99.52	99.02	P2	XXX.XX	XXX.XX
P3	99.65	99.07	98.57	P3	XXX.XX	XXX.XX
P4	99.20	98.62	98.12	P4	XXX.XX	XXX.XX
P5	98.75	98.17	97.67	P5	XXX.XX	XXX.XX
P6	98.30	97.72	97.22	P6	XXX.XX	XXX.XX
AS-BUILT PRESBY ELEVATIONS:						
LINE NO.	EL. INV. OF 4" PVC	EL. INV. OF PRESBY PIPE	EL. OF BOT. OF SAND BED	LINE NO.	EL. INV. BEG. OF 4" PVC	EL. INV. OF PRESBY PIPE
P1	100.55	99.97	99.47	P1	XXX.XX	XXX.XX
P2	100.10	99.52	99.02	P2	XXX.XX	XXX.XX
P3	99.65	99.07	98.57	P3	XXX.XX	XXX.XX
P4	99.20	98.62	98.12	P4	XXX.XX	XXX.XX
P5	98.75	98.17	97.67	P5	XXX.XX	XXX.XX
P6	98.30	97.72	97.22	P6	XXX.XX	XXX.XX

BUOYANCY CALC'S

SEPTIC TANK:
 TOTAL DOWNWARD FORCE: 18,348 LBS±
 TOTAL UPWARD FORCE: 17,201 LBS±
 FACTOR OF SAFETY: 1.07
 (WITH 1.1' OF SOIL COVER)
PUMP CHAMBER:
 TOTAL DOWNWARD FORCE: 13,567 LBS±
 TOTAL UPWARD FORCE: 10,323 LBS±
 FACTOR OF SAFETY: 1.31
 (WITH 1.1' OF SOIL COVER)

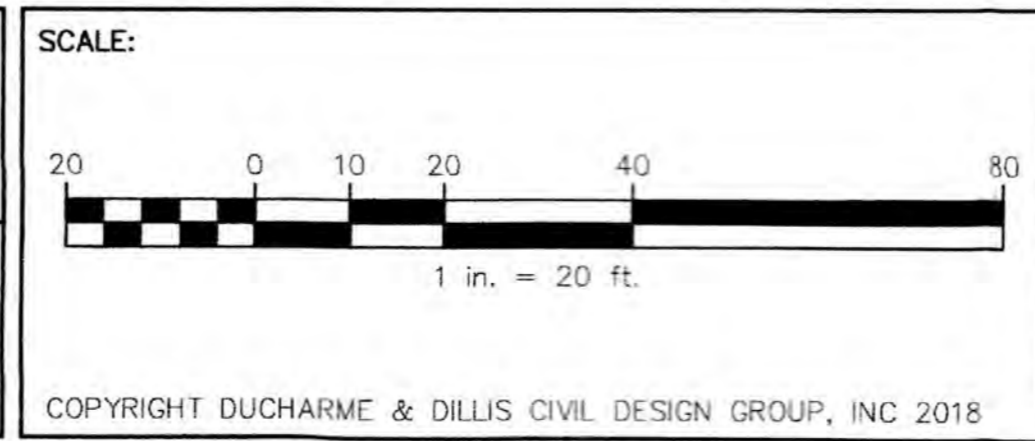


STRAW WATTLE
NOT TO SCALE



PREPARED BY:
DUCHARME & DILLIS
 Civil Design Group, Inc.
 CIVIL ENGINEERS • LAND SURVEYORS • WETLAND CONSULTANTS
 1092 MAIN STREET, P.O. BOX 428 BOLTON, MASSACHUSETTS 01740
 PHONE: (978) 779-6091 FAX: (978) 779-0260 www.DucharmeandDillis.com

OWNER:
 KEVIN KEENAN
 16 PINE POINT ROAD
 STOW, MA 01775
APPLICANT:
 KEVIN KEENAN
 16 PINE POINT ROAD
 STOW, MA 01775



THE SEWAGE DISPOSAL SYSTEM SHOWN HEREON HAS BEEN DESIGNED IN ACCORDANCE WITH 310 CMR 15.00 (TITLE 5), MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION SYSTEM APPROVALS AND/OR CERTIFICATIONS AND THE MANUFACTURERS SYSTEM DESIGN GUIDANCE.

GENERAL NOTES:

- TOPOGRAPHIC INFORMATION IS THE RESULT OF AN ON-THE-GROUND SURVEY PERFORMED BY DUCHARME & DILLIS CIVIL DESIGN GROUP, INC. ELEVATIONS REFER TO AN ASSUMED DATUM (SEE BENCH MARK LOCATED ON PLOT PLAN).
- PROPERTY LINE INFORMATION TAKEN FROM RECORDED PLAN ON FILE WITH THE MIDDLESEX SOUTH REGISTRY OF DEEDS.
- PLAN NUMBER: 1082 OF 1959.
- PROPERTY LINES SHALL BE DETERMINED PRIOR TO CONSTRUCTION OR INSTALLATION OF ANY OF THE PROPOSED IMPROVEMENTS HEREON.
- PERCOLATION TESTS PERFORMED IN ACCORDANCE WITH 310 CMR (TITLE 5) REGULATIONS 15.104 AND 15.105.
- ANY DEVIATIONS FROM THIS DESIGN PLAN MUST BE APPROVED IN WRITING BY DUCHARME & DILLIS CIVIL DESIGN GROUP, INC.
- NO PERMANENT STRUCTURES MAY BE CONSTRUCTED OVER THE RESERVE LEACHING AREA.
- THE BOARD OF HEALTH REQUIRES INSPECTION OF ALL CONSTRUCTION BY THE DESIGN ENGINEER OR BY AN AGENT OF THE BOARD OF HEALTH, AND THAT SUCH A PERSON CERTIFIES IN WRITING THAT ALL WORK HAS BEEN COMPLETED IN ACCORDANCE WITH THE PERMIT AND THE APPROVED PLANS.
- FOR PROPER PERFORMANCE, A SEPTIC TANK SHOULD BE INSPECTED AT LEAST ONCE EVERY YEAR AND WHEN THE TOTAL DEPTH OF SCUM AND SOLIDS EXCEEDS ONE THIRD OF LIQUID DEPTH OF THE TANK, THE TANK SHOULD BE PUMPED.
- THERE ARE NO POTABLE DRINKING WATER WELLS WITHIN 150 FEET OF THE PROPOSED SEWAGE DISPOSAL SYSTEM UNLESS OTHERWISE NOTED.
- THIS DESIGN DOES NOT ACCOMMODATE A CARBASE DISPOSAL.
- CONSTRUCTION WITHIN 100 FEET OF A WETLAND RESOURCE AREA AS DEFINED IN THE MASSACHUSETTS WETLAND PROTECTION ACT AND REGULATIONS (310 CMR 10.00) SHALL NOT BE PERFORMED UNTIL AN ORDER OF CONDITIONS OR NEGATIVE DETERMINATION OF APPLICABILITY HAS BEEN OBTAINED FROM THE LOCAL CONSERVATION COMMISSION.
- EXISTING UTILITIES SHOWN ON THIS PLAN WERE COMPILED FROM FIELD MEASUREMENT AND RECORD PLANS. THE UTILITIES SHOWN ARE THE ONLY UTILITIES LOCATED ON OR NEAR THE SITE. THE CONTRACTOR SHALL CALL DIG SAFE 1-888-DIG-SAFE PRIOR TO CONSTRUCTION IN ACCORDANCE WITH STATE LAWS.
- A NOTICE OF THE EXISTENCE OF THIS ALTERNATIVE SYSTEM SHALL BE RECORDED AT THE REGISTRY OF DEEDS IN THE CHAIN OF TITLE TO THE PROPERTY.
- THE OWNER SHALL BE RESPONSIBLE FOR THE APPLICABLE PROVISIONS SET FORTH IN 310 CMR 15.287.

CONSTRUCTION NOTES:

- CONTACT DESIGN ENGINEER PRIOR TO SYSTEM INSTALLATION. DESIGN ENGINEER MUST BE ON SITE ONCE TOPSOIL AND ORGANIC MATERIAL IS REMOVED AND PRIOR TO PLACEMENT OF ANY SAND OR FILL.
- SYSTEM TO BE INSTALLED IN ACCORDANCE WITH PRODUCT DESIGN AND INSTALLATION MANUAL, AND 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.PRESBYECO.COM
- MINIMUM OF 6" OF MEDIUM TO COARSE SAND MEETING THE REQUIREMENTS OF ASTM C-33, WITH LESS THAN 2% PASSING A # 200 SIEVE REQUIRED AROUND CIRCUMFERENCE OF ENVIRO-SEPTIC PIPE. SYSTEM COMPONENTS SHALL BE MECHANICALLY SOUND, WATER TIGHT AND PROTECTED AGAINST DAMAGE BY ROOTS.
- MEETS ASTM C-33.
- SYSTEM SHALL NOT BE INSTALLED ON FROZEN GROUND OR LEFT UNCOVERED FOR EXTENDED PERIODS OF TIME.
- FINISH GRADING SHALL BE DONE IN ACCORDANCE WITH THE PLOT PLAN. ALL DISTURBED AREAS SHALL BE COVERED WITH A MINIMUM OF 4" OF LOAM AND SEEDED WITH A NATIVE GRASS MIXTURE.
- BACKFILL OVER THE SOIL ABSORPTION SYSTEM, SEPTIC TANK AND DISTRIBUTION BOX SHALL BE A MINIMUM OF 9 INCHES EXCLUDING TOPSOIL, PLACED IN LIFTS AND BOULDERS GREATER THAN 6 INCHES IN SIZE.
- ALL PIPING SHALL BE MINIMUM OF SCHEDULE 40 UNLESS OTHERWISE NOTED.
- ALL PIPE JOINTS AND CONNECTIONS TO SYSTEM COMPONENTS SHALL BE MECHANICALLY SOUND, WATER TIGHT AND PROTECTED AGAINST DAMAGE BY ROOTS.
- ALL BUILDING SEWERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STATE PLUMBING CODE 248 CMR 2.00.
- OUTLET DISTRIBUTION LINE FROM THE D-BOX TO THE FIRST LINE SHALL BE LAID AT A MINIMUM SLOPE OF 2.0%.
- FINAL COVER OVER THE SYSTEM SHALL BE GRADED TO REDUCE INFILTRATION OF SURFACE WATER AND MINIMIZE EROSION. FINISH GRADE SHALL HAVE A MINIMUM SLOPE OF 2%.
- EFFLUENT DISTRIBUTION LINES SHALL BE LAID LEVEL.
- FILL MATERIAL FOR SYSTEMS CONSTRUCTED IN FILL SHALL CONSIST OF SELECT ON-SITE OR IMPORTED SOILS MATERIAL THAT MEET THE MINIMUM REQUIREMENTS STATED IN 310 CMR 15.25(3).
- WHERE FILL IS REQUIRED TO REPLACE UNSUITABLE SOILS, THE EXCAVATION OF THE UNSUITABLE MATERIAL SHALL EXTEND A MINIMUM OF 5 FEET LATERALLY IN ALL DIRECTIONS BEYOND THE OUTER PERIMETER OF THE SOIL ABSORPTION SYSTEM TO THE DEPTH OF 3 INCHES INTO THE NATURALLY OCCURRING PERVIOUS MATERIAL.
- THE BOTTOM SURFACE OF THE EXCAVATION SHALL BE SCARIFIED AND RELATIVELY DRY. FILL SHALL NOT BE PLACED DURING RAIN OR SNOW STORMS. IF THE WATER TABLE ELEVATION IS ABOVE THE ELEVATION OF THE BOTTOM OF THE EXCAVATION, THE EXCAVATION SHALL BE DEWATERED.
- SUBSURFACE COMPONENTS OF A SYSTEM SHALL NOT BE BACKFILLED OR OTHERWISE CONCEALED FROM VIEW UNTIL A FINAL INSPECTION HAS BEEN CONDUCTED BY THE APPROVING AUTHORITY AND PERMISSION HAS BEEN GRANTED BY THE APPROVING AUTHORITY TO BACKFILL THE SYSTEM. THE DESIGNER SHALL INSPECT THE CONSTRUCTION AFTER THE INITIAL EXCAVATION, PRIOR TO BACKFILLING, AND DURING BACKFILLING. IN ADDITION, THE FINAL INSPECTION OF THE SYSTEM SHALL BE CONDUCTED BY THE APPROVING AUTHORITY. THE SYSTEM INSTALLER AND THE DESIGNER PRIOR TO THE ISSUANCE OF A CERTIFICATE OF COMPLIANCE PURSUANT TO 310 CMR 15.02(3). ANY COMPONENT OF THE SYSTEM WHICH HAS BEEN COVERED WITHOUT SUCH PERMISSION SHALL BE UNCOVERED UPON THE REQUEST OF THE APPROVING AUTHORITY OR THE DEP.
- ALL SYSTEM COMPONENTS SHALL BE MARKED WITH MAGNETIC MARKING TAPE OR A COMPARABLE MEANS IN ORDER TO LOCATE THEM ONCE BURIED.
- ALL SOIL ABSORPTION SYSTEMS SHALL HAVE A MINIMUM OF ONE (1) INSPECTION PORT CONSISTING OF A PERFORATED FOUR (4) INCH PIPE PLACED VERTICALLY TO THE NATURALLY OCCURRING SOIL OR SAND FILL BELOW THE SYSTEM SAND. THE PIPE SHALL BE CAPPED WITH A SCREW TYPE CAP AND ACCESSIBLE TO WITHIN THREE (3) INCHES OF FINISH GRADE. (SEE DETAIL)

REPAIR NOTES:

- CONTRACTOR TO VERIFY ELEVATION (*) PRIOR TO THE START OF CONSTRUCTION AND REPORT TO ENGINEER ANY VARIATIONS IN ELEVATIONS TO THOSE SHOWN ON THIS PLAN.
- EXISTING SYSTEM MAY BE ENCOUNTERED DURING THE INSTALLATION OF NEW SOIL ABSORPTION SYSTEM (S.A.S). REMOVAL, DISPOSAL AND UTILIZATION OF MATERIAL SHALL BE IN ACCORDANCE WITH THE TOWN OF STOW'S BOARD OF HEALTH RULES AND REGULATIONS.
- EXISTING SEPTIC TANK TO BE PUMPED, CRUSHED AND BACKFILLED WITH CLEAN GRANULAR MATERIAL AND/OR REMOVED IN ACCORDANCE WITH THE TOWN STOW'S BOARD OF HEALTH RULES AND REGULATIONS.

SPECIAL APPROVALS REQUIRED:

- STOW B.O.H. REGULATION VARIANCES:**
- THE BOARD OF HEALTH REQUIRES THAT THERE BE A MINIMUM OF 2 PERCOLATION TESTS IN THE PRIMARY DISPOSAL AREA (UNABLE TO PERFORM PERCOLATION TESTS DUE TO HIGH WATER TABLE, SOIL SAMPLE TAKEN FOR SIEVE ANALYSIS)
 - LEACHING AREA SHALL HAVE AN EFFECTIVE SQUARE FOOTAGE TO HANDLE 150% OF THE ESTIMATED DESIGN FLOW. (SYSTEM SIZE BASED ON MINIMUM SIZING REQUIREMENTS FOR A PRESBY SYSTEM)
- TITLE V LOCAL UPGRADE APPROVALS:**
- 310 CMR 15.405(1)(b): REDUCTION OF THE REQUIRED 4 FOOT MINIMUM SEPARATION BETWEEN THE BOTTOM OF THE LEACH AREA AND THE ESTIMATED SEASONAL HIGH GROUND WATER TABLE. (3 FOOT SEPARATION IS PROPOSED)
 - 310 CMR 15.405(1)(c): A SIEVE ANALYSIS MAY BE PERFORMED IF A PERCOLATION TEST CANNOT BE PERFORMED. (SOIL SAMPLE TAKEN FOR SIEVE ANALYSIS DUE TO HIGH WATER TABLE)
 - 310 CMR 15.405(1)(d): REDUCTION OF THE REQUIRED 12 INCH SEPARATION BETWEEN THE INLET AND OUTLET TEES AND THE ESTIMATED SEASONAL HIGH GROUND WATER TABLE. (LESS THAN 12" SEPARATION IS PROPOSED)

NAME OF APPROVING AUTHORITY:				NAME OF SOIL EVALUATOR:			
STOW BOARD OF HEALTH				DUCHARME & DILLIS CIVIL DESIGN GROUP			
JAMIE TERRY, NASHOBA B.O.H. AGENT				WILLIAM A. LUCK, MALONEY, JR. (SE-13704)			
IN-SEASON GROUND WATER TESTING - (IF REQ'D)				PERCOLATION TEST DATA			
TEST NO.	DATE	SURFACE ELEVATION	DEPTH TO OBSERVED PERCOLATION	WATER ELEVATION	TEST NO.	DATE	TOP OF 12" OF WATER
							DEPTH FROM SURFACE
							SURFACE ELEVATION
							RATE: MINUTES PER INCH
				PA (BOLD TEST) 7/31/18			
SOIL CLASSIFICATION: PAVON FINE SANDY LOAM							
GEOLOGICAL MATERIAL: LODGMENT TILL							
LAND FORM: DRUMLIN							
SOIL LIMITATIONS: NONE							
GENERAL NOTES: X							
DEEP TEST PIT: 718-1	DEPTH	HOR.	TEX.	COLOR	MOTT.	G.W.	OTHER
DATE OF TEST: 7/31/18	0-12"	A	S.L.	10R 3/3	NONE	NONE	CRUMB, FRABLE
REFUSAL AT: NONE	12-24"	B	S.L.	10R 5/6	NONE	NONE	S.A.B., FRABLE
(SURFACE ELEV. = 100.0)	24"-72"	C	S.L.	10R 5/4	30"	NONE	MASSIVE, FRABLE
ESTIMATED SEASONAL HIGH GROUND WATER AT 30" (ELEVATION = 97.54)							
DEEP TEST PIT: 718-2	DEPTH	HOR.	TEX.	COLOR	MOTT.	G.W.	OTHER
DATE OF TEST: 7/31/18	0-12"	A	S.L.	10R 3/3	NONE	NONE	CRUMB, FRABLE
REFUSAL AT: NONE	12-24"	B	S.L.	10R 5/6	NONE	NONE	S.A.B., FRABLE
(SURFACE ELEV. = 100.0)	24"-84"	C	S.L.	10R 5/4	30"	NONE	MASSIVE, FRABLE
ESTIMATED SEASONAL HIGH GROUND WATER AT 28" (ELEVATION = 97.54)							

I CERTIFY THAT I AM CURRENTLY APPROVED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION PURSUANT TO 310 CMR 15.017 TO CONDUCT SOIL EVALUATIONS AND THAT THE ABOVE ANALYSIS HAS BEEN PERFORMED BY ME CONSIDERING THE REQUIRED TRAINING, EXPERIENCE, AND EXPERTISE REQUIRED BY 310 CMR 15.017. I FURTHER CERTIFY THAT THE RESULTS OF MY SOIL EVALUATION, AS INDICATED ON THE ATTACHED SOIL EVALUATION FORM, ARE ACCURATE IN ACCORDANCE WITH 310 CMR 15.017 THROUGH 15.019.

WILLIAM A. LUCK, MALONEY, JR. (SE-13704)

LICENSED SOIL EVALUATOR

LEGEND

DESCRIPTION	DRAWING ENTRY
DENOTES EXISTING CONTOUR (INDEX)	100
DENOTES EXISTING CONTOUR (INTERMEDIATE)	99
DENOTES PROPOSED CONTOUR (INDEX)	100
DENOTES PROPOSED CONTOUR (INTERMEDIATE)	99
DENOTES LIMIT OF EXCAVATION OF UNSUITABLE SOILS	5' EXC.
DENOTES PROPOSED SEWER LINE	S
DENOTES PROPOSED WATER LINE	W
DENOTES PROPOSED UNDERGROUND UTILITIES	ETC
DENOTES PROPOSED BUILDING ENVELOPE	
DENOTES PROPOSED CONCRETE SEPTIC TANK	
DENOTES PROPOSED CONCRETE PUMP CHAMBER	PC-1
DENOTES PROPOSED CONCRETE DISTRIBUTION BOX	DB-1
DENOTES PROPOSED SEWER CLEANOUT	CO



DATE: 2/12/2019

DESIGN BY: CLM

DRAWN BY: CLM

CHECKED BY: WJM

SEWAGE DISPOSAL SYSTEM DESIGN
 16 PINE POINT ROAD (M: U01 P: 4)
 STOW, MASSACHUSETTS

NO.	DATE	DESCRIPTION	BY

JOB NO.: 5907
DRAWING NO.: 5907-SDS
SHEET NO.: 1 OF 2