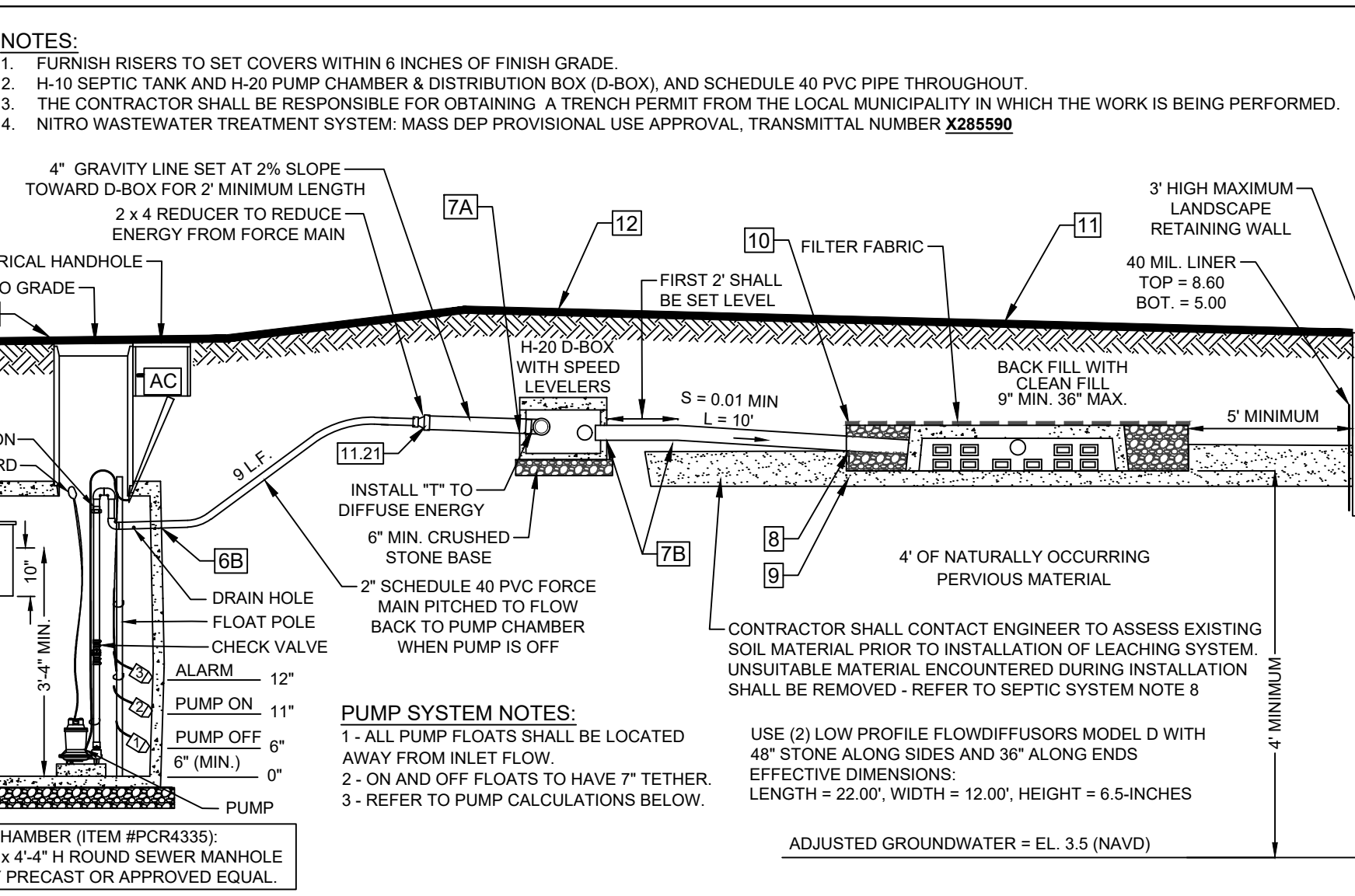
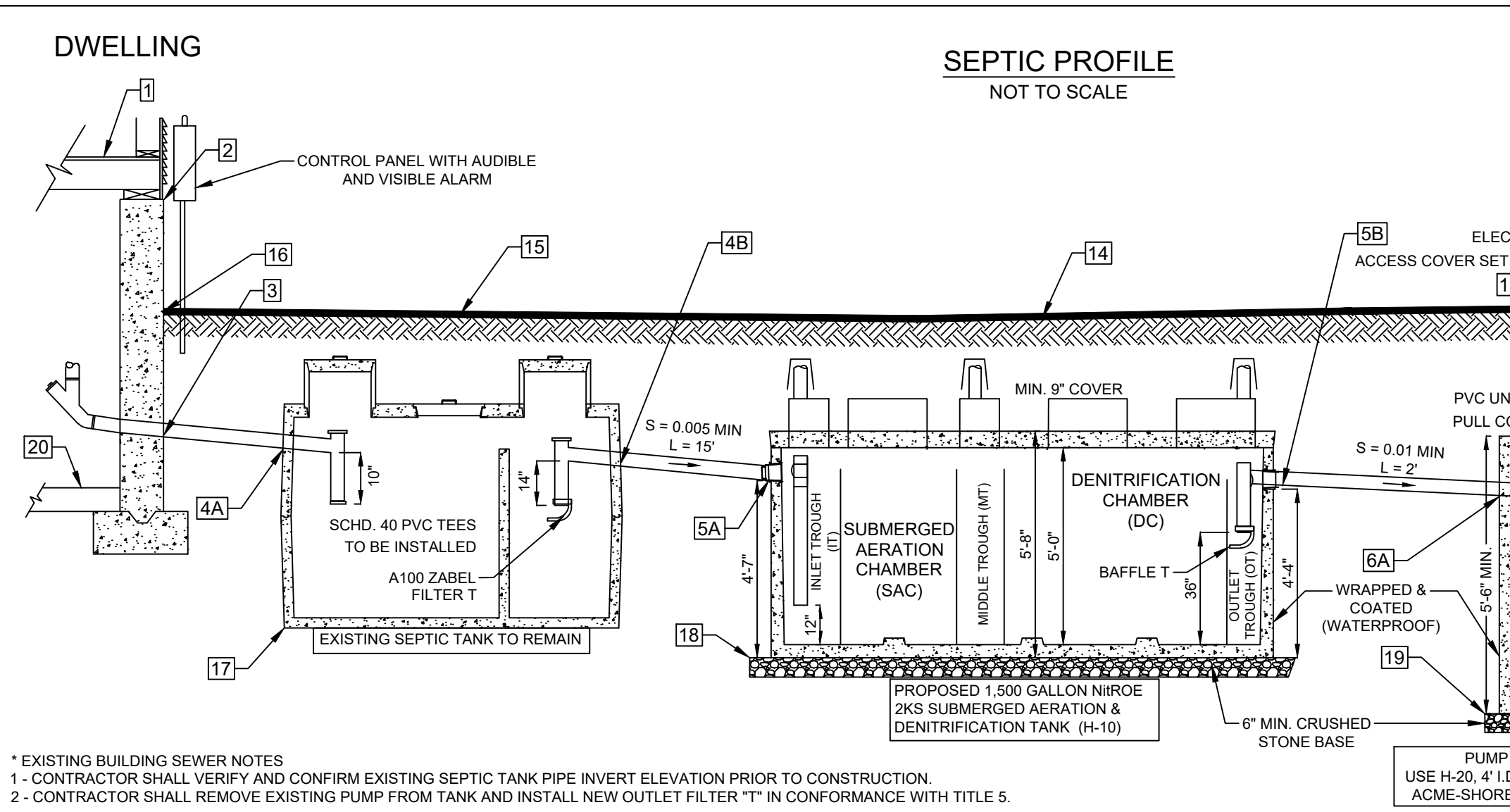


### SCHEDULE OF ELEVATIONS

1	FIRST FLOOR =	13.7
2	TOP OF FOUNDATION =	EXISTING
3	PIPE INV. AT FOUNDATION =	EXISTING*
4A	INV. OF PIPE AT SEPTIC TANK INLET =	7.51 EX.*
4B	INV. OF PIPE AT SEPTIC TANK OUTLET =	6.26 EX.*
5A	INV. OF PIPE AT NIROE TANK INLET =	6.18
5B	INV. OF PIPE AT NIROE TANK OUTLET =	5.93
6A	INV. OF PIPE AT PUMP CHAMBER INLET =	5.89
6B	INV. OF PIPE AT PUMP CHAMBER OUTLET =	6.14
7A	INV. OF PIPE AT D-BOX INLET =	8.31
7B	INV. OF PIPE AT D-BOX OUTLET =	8.14
8	INV. OF PIPE AT LEACHING FIELD INLET =	8.04
9	BOTTOM OF LEACHING FIELD =	7.50
10	TOP OF STONE	8.58
11	FINISHED GRADE OVER LEACHING FACILITY =	9.3 - 9.5
12	FINISHED GRADE OVER D-BOX =	9.5
13	FINISHED GRADE OVER PUMP CHAMBER =	9.5
14	FINISHED GRADE OVER NIROE TANK =	9.3
15	FINISHED GRADE OVER EXISTING TANK =	EXISTING
16	FINISHED GRADE AT FOUNDATION =	EXISTING
17	BOTTOM OF SEPTIC TANK =	EXISTING
18	BOTTOM OF NIROE TANK =	1.60
19	BOTTOM OF PUMP CHAMBER =	2.06
20	CRAWL SPACE =	EXISTING

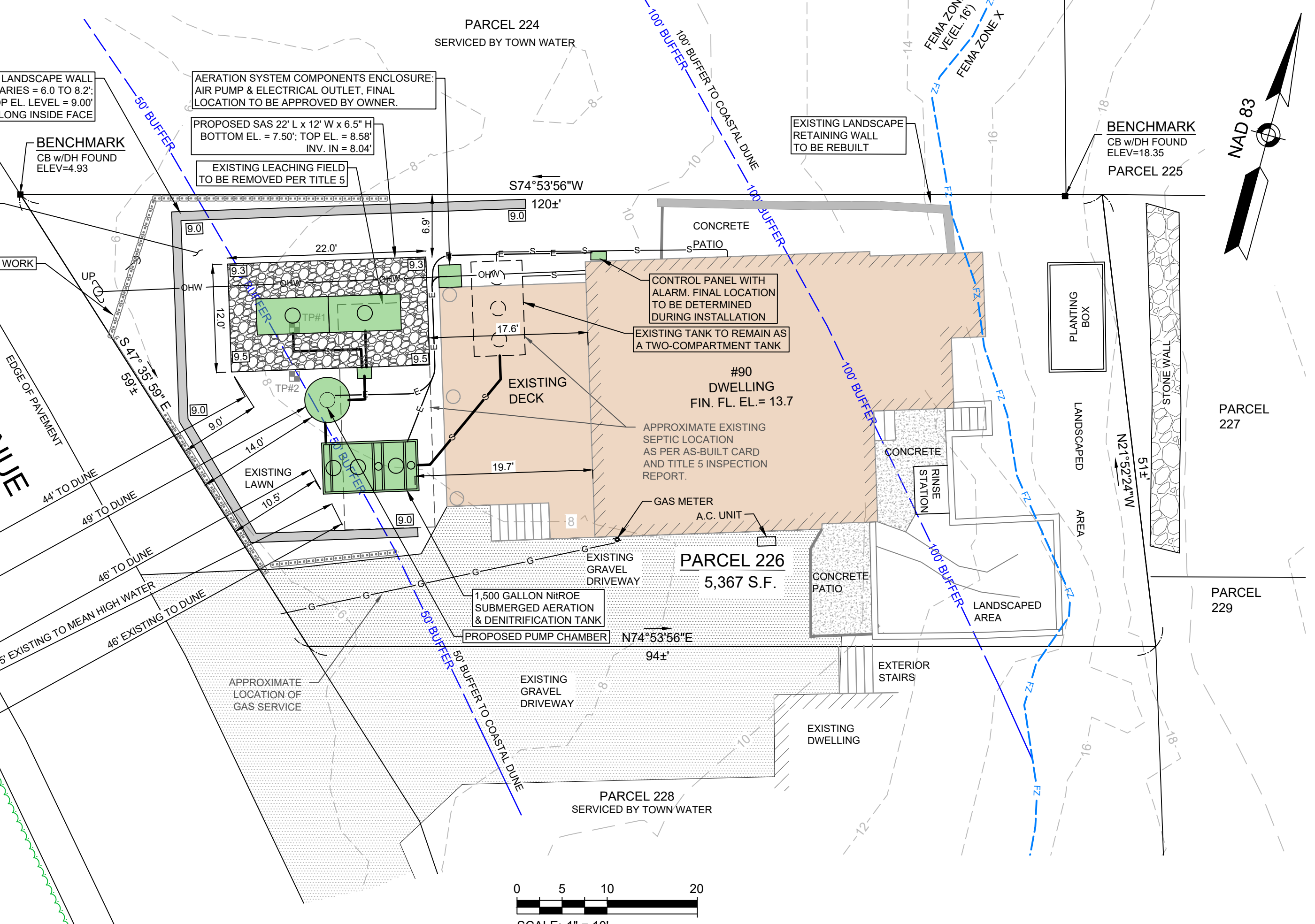
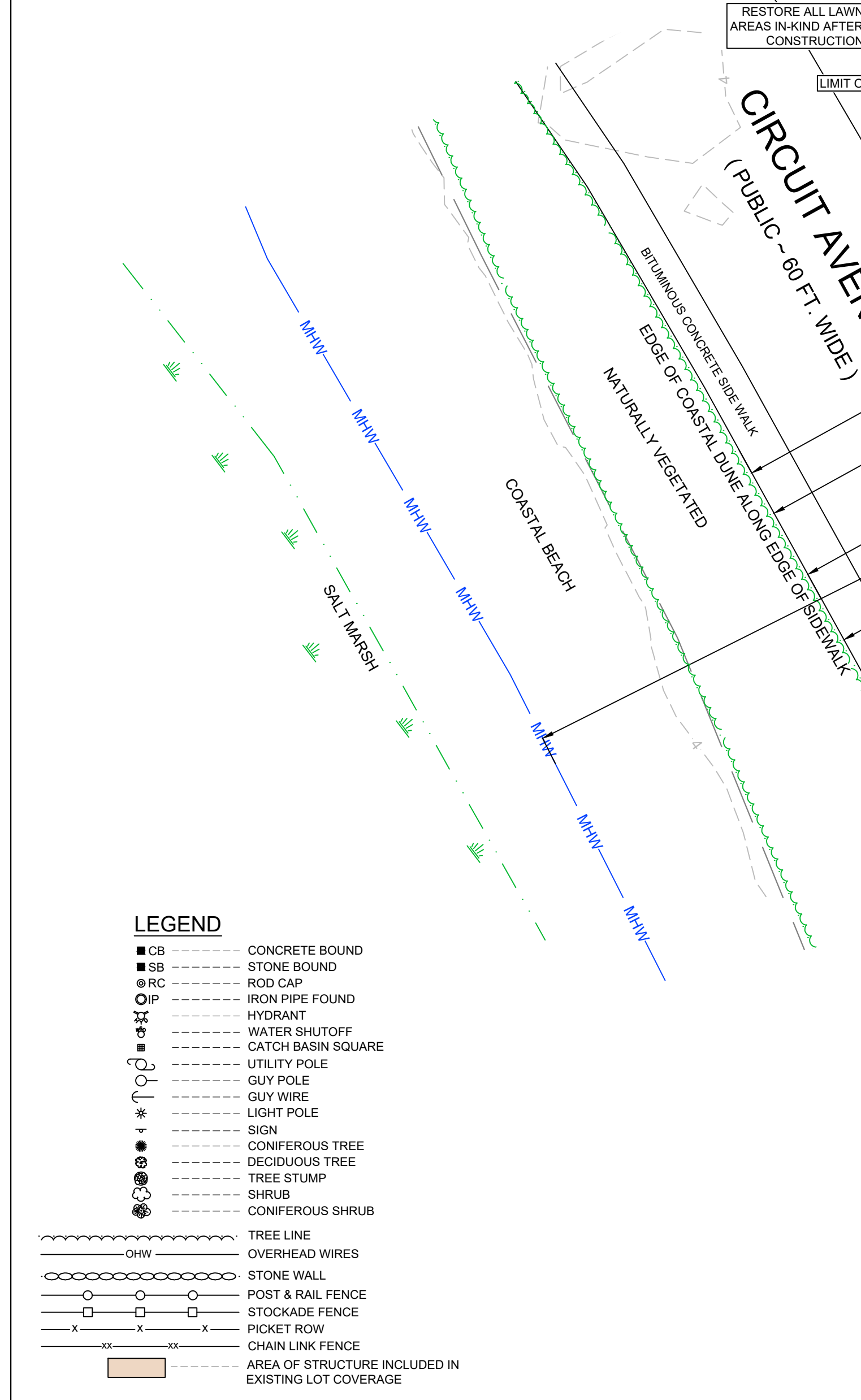


- ### SEPTIC SYSTEM NOTES
- ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE STATE ENVIRONMENTAL CODE, TITLE 5 (310 CMR 15.00), AND THE LOCAL BOARD OF HEALTH.
  - THERE SHALL BE NO CHANGES MADE IN THIS PLAN WITHOUT THE WRITTEN PERMISSION OF THE ENGINEER AND LOCAL BOARD OF HEALTH.
  - ALL ERRORS, OMISSIONS, AND CHANGE OF CONDITIONS AT THE SITE SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO PERFORMING THE RELATED WORK.
  - ALL DISTURBED AREAS ARE TO BE LOAMED, SEEDING AND MAINTAINED TO PREVENT EROSION.
  - FOR PROPER PERFORMANCE, SEPTIC TANK SHOULD BE INSPECTED AT LEAST ONCE A YEAR AND WHEN THE TOTAL DEPTH OF SCUM AND SOLIDS EXCEEDS 1/3 THE LIQUID DEPTH OF THE TANK, THE TANK SHOULD BE PUMPED.
  - THIS SYSTEM HAS BEEN DESIGNED FROM DATA REVIEWED AND ACKNOWLEDGED BY THE MASS. D.E.P. AND THE LOCAL BOARD OF HEALTH. AND CONFORMS WITH THE REQUIREMENTS OF THE STATE ENVIRONMENTAL CODE, TITLE 5. NO GUARANTEE OF PERFORMANCE IS EXPRESSED OR IMPLIED.
  - TEST HOLE INFORMATION SHOWN HEREON IS LIMITED TO SOIL CONDITIONS FOUND AT THAT PARTICULAR TEST HOLE LOCATIONS AND IS NOT CONSIDERED AN IMPLIED OR EXPRESSED WARRANTY OF SOIL CONDITIONS BEYOND LIMITS OF SUCH TEST HOLE.
  - ALL ORGANIC AND UNSUITABLE MATERIAL MUST BE REMOVED FROM THE AREA DIRECTLY UNDER AND 5 FEET BEYOND THE PROPOSED LEACHING FACILITY. THIS AREA MUST BE BACKFILLED TO THE ELEVATIONS INDICATED ON THESE PLANS WITH SELECT ON-SITE OR IMPORTED SOIL MATERIAL, CONSISTING OF CLEAN GRANULAR SAND OR OTHER GRANULAR MATERIAL, FREE FROM ORGANIC MATTER AND OTHER DELETERIOUS SUBSTANCES. MIXTURES AND LAYERS SHALL NOT BE USED. THE FILL MATERIAL SHALL CONFORM TO THE STATE ENVIRONMENTAL CODE, TITLE 5 - 310 CMR SECTION 15.255 (3) AND SHALL HAVE PERCOLATION RATE OF BETWEEN TWO AND FIVE MINUTES PER INCH, BEFORE AND AFTER PLACEMENT.
  - ALL STONE MUST BE DOUBLE WASHED AND FREE FROM FINES AND ANY ORGANIC MATERIAL AND MUST HAVE LESS THAN 0.2 PERCENT MATERIAL FINER THAN A NUMBER 200 SIEVE.
  - THE DESIGNER HAS NOT BEEN RETAINED BY THE CLIENT TO CONSTRUCT OR SUPERVISE THE CONSTRUCTION OF THE SYSTEM. THE CONTRACTOR IS RESPONSIBLE FOR MAKING ARRANGEMENTS FOR INSPECTION OF INSTALLATION OF THE SYSTEM WITH THE LOCAL BOARD OF HEALTH.
  - THE GENERAL CONTRACTOR IS RESPONSIBLE FOR ALL HORIZONTAL AND VERTICAL CONTROL OF ALL SYSTEM COMPONENTS.
  - TIGHT JOINT PIPING MATERIAL TO CONSIST OF POLYVINYL CHLORIDE (P.V.C.) SCHEDULE 40, UNLESS OTHERWISE NOTED.
  - THE CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER FOR CONSTRUCTION INSPECTION AFTER EXCAVATION FOR THE LEACHING BED (PRIOR TO THE PLACEMENT OF STONE) AND ALSO AFTER PLACEMENT OF PIPE & STONE PRIOR TO BACKFILLING.
  - DESIGN ENGINEER SHALL CERTIFY CONSTRUCTION OF SYSTEM AND MATERIALS INSTALLED. THE CONTRACTOR SHALL PROVIDE A SIEVE ANALYSIS OF THE FILL MATERIAL REQUIRED. AN AS-BUILT PLAN SHALL BE SUBMITTED TO THE LOCAL BOARD OF HEALTH UPON COMPLETION.
  - NO RUBBER TIRE CONSTRUCTION MACHINERY SHALL DRIVE OVER THE PROPOSED SEPTIC BED EXCAVATION DURING CONSTRUCTION.
  - DIG-SAFE AND ALL OTHER NECESSARY AUTHORITIES SHALL BE NOTIFIED FOR THE PROPER LOCATION OF EXISTING UTILITIES PRIOR TO ANY EXCAVATION. THE SEPTIC SYSTEM SHALL BE MAINTAINED.
  - WATER SERVICE LINE SHALL BE LOCATED AND MARKED PRIOR TO ANY EXCAVATION AND 10' MIN. SETBACK DISTANCE FROM SAID SERVICE TO THE SEPTIC SYSTEM SHALL BE MAINTAINED.
  - ALL WATER LINES WITHIN 10' OF SEPTIC SYSTEM COMPONENTS SHALL BE SLEEVED WITHIN 4" PVC SCHEDULE 40 PIPE.

### REQUESTED LOCAL UPGRADE APPROVAL WAIVERS

NO.	DESCRIPTION	REQUIRED	REQUESTED
1	SETBACK DISTANCE FROM PROPERTY LINE TO S.A.S.	10'	6.9' & 9.0'
2	SETBACK DISTANCE FROM SAS LINE TO GROUNDWATER	5'	4'
3	SETBACK DISTANCE FROM SAS LINE TO DUNE	150'	44'

A PROPOSED ENHANCED NITROGEN REDUCING INNOVATIVE ALTERNATIVE TECHNOLOGY SEPTIC SYSTEM AND AN IMPERMEABLE LINER ARE INCORPORATED TO THIS SEPTIC SYSTEM UPGRADE DESIGN TO OFFSET THE NECESSARY WAIVERS REQUESTED HEREIN WHILE PROVIDING EQUAL OR GREATER PROTECTION COMPARED TO A TITLE 5 FULLY CONFORMING SEPTIC SYSTEM DESIGN.



- ### PUMP CHAMBER NOTES AND DOSING CALCULATIONS
- PROPOSED PUMP DISCHARGE RATE = 28 GALLONS PER MINUTE (GPM) @ 7 TPD  
 PROPOSED DOSE PER CYCLE = 220 GALLONS / 8 = 27.5 GALLONS  
 DELIVERY (FORCE MAIN) PIPE VOLUME = 2' D @ 75 L.F. = 12.3 GALLONS  
 DELIVERY + DOSED VOLUME = 27.5 GALLONS + 12.3 GALLONS = 39.8 GALLONS
- PUMP CHAMBER SIZE: 4' INTERIOR DIAMETER x 5' HIGH; D = 4' x H = 5'  
 DEPTH OF DOSE = (39.8 GAL / 7.48 GAL/CU.FT.) / (2' X 2' X 3.14) = 0.423 FT. === USE 5 INCHES  
 DEPTH OF DAILY FLOW = (220 GAL / 7.48 GAL/CU.FT.) / (2' X 2' X 3.14) = 2.34 FT. === USE 28 INCHES
- FRICITION LOSS CALCULATIONS:  
 1) VERTICAL HEAD LOSS:  
 EL. 8.5 (D-BOX INLET) - EL. 3.1 (PUMP CHAMBER BOTTOM) = 5.4 FT.  
 2) FRICTION HEAD LOSS:  
 9 FT OF 2" PVC PIPE X 2.58 FT / 100 FT @ 45 GAL/MIN = 0.23 FT.  
 3) MINOR HEAD LOSS FROM FITTINGS (EQUIVALENT LENGTH OF 51.5 FT.) = 51.5 FT OF 2" PVC PIPE X 2.58 FT / 100 FT @ 45 GAL/MIN = 1.32 FT.
- TOTAL HEAD LOSS = 5.4 FT. + 0.23 FT. + 1.32 FT. = 7 FT. AT 28 GALLONS PER MINUTE
- USE LIBERTY MODEL 240 SERIES 1/4 H.P. RATED AT 28 G.P.M. FOR 7 FT. OF HEAD (OR EQUAL)  
 ESTIMATED PUMP RUN TIME PER DOSE = 1.0 MINUTES
- INSTALL THREE MERCURY FLOAT SWITCHES: OFF, ON AND ALARM.  
 ALARM ACTIVATION WILL INDICATE PUMP FAILURE.  
 A MINIMUM OF 24 HOUR RESERVE CAPACITY IS PROVIDED ABOVE ALARM ACTIVATION.  
 220 GALLONS OF RESERVE CAPACITY IS PROVIDED ABOVE ALARM PER MINIMUM REQUIREMENTS.
- ELECTRICIAN SHALL INSTALL A SIMPLEX CONTROL PANEL TO BE LOCATED IN AN ACCESSIBLE AREA. AN ELECTRICAL PERMIT IS REQUIRED FOR ALARM AND PUMP INSTALLATION.
- ### CONSERVATION NOTES
- PRIOR TO ANY WORK COMMENCING, THE DEP FILE NUMBER SHALL BE POSTED ON A SIGN ON THE STREET SIDE OF THE LOT AND MAINTAINED IN A VISIBLE CONDITION THROUGHOUT THE PROJECT.
- THE LIMIT OF WORK WILL BE INSTALLED PRIOR TO ANY WORK. EXCAVATION, CONSTRUCTION OR CLEARING OF VEGETATION, IN ORDER TO PREVENT DAMAGE TO THE INTERESTS OF THE ACT AND BYLAW, THE LIMIT OF WORK WILL CONSIST OF A ROW OF STAKED SILTATION FENCE. THE SILTATION FENCE WILL BE REPLACED AS NECESSARY TO BE MAINTAINED IN GOOD CONDITION THROUGHOUT THE ENTIRE CONSTRUCTION PERIOD. NO FILL WILL BE ALLOWED TO BE PLACED AGAINST THE LIMIT OF WORK AT ANY TIME. UPON COMPLETION OF ALL CONSTRUCTION AND STABILIZATION OF THE SITE, THE SILTATION FENCE WILL BE REMOVED AND PROPERLY DISPOSED OF.
- PRIOR TO ANY WORK COMMENCING, ADVANCE WRITTEN NOTIFICATION WILL BE PROVIDED TO THE BOURNE CONSERVATION COMMISSION
- NO DEBRIS, EQUIPMENT OR MATERIALS WILL BE STORED, EVEN TEMPORARILY, OUTSIDE THE DESIGNATED LIMIT OF WORK AREA.
- THE CONSTRUCTION SITE WILL BE CLEANED DAILY TO REMOVE ANY LOOSE DEBRIS.
- ALL DISTURBED AREAS WITHIN THE LIMIT OF WORK REQUIRING RESTORATION OR MITIGATION WILL BE STABILIZED TO PREVENT EROSION. STABILIZATION WILL BE DONE IMMEDIATELY FOLLOWING COMPLETION OF CONSTRUCTION.

- ### GENERAL NOTES
- LOCATIONS ARE BASED ON AN "ON THE GROUND" INSTRUMENT SURVEY AND ELEVATIONS BASED ON THE NAVD 1988 DATUM. COORDINATE SYSTEM USED IS THE MA-MAINLAND COORDINATE SYSTEM, DATUM: NAD 83, UNITS: U.S. SURVEY FEET.
- THE FINISHED FLOOR ELEVATION (FIN. FL. EL.) SHOWN HEREON IS BASED ON AN ASSUMED 1" LOWER THAN THE SURVEYED THRESHOLD ELEVATION. AN INTERIOR INSPECTION OF BUILDINGS WAS NOT PERFORMED.
- ZONING DISTRICT: R-40
- PROPERTY IS LOCATED WITHIN AN AREA HAVING A ZONE DESIGNATION OF VE (ELEV 16) BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA), ON FLOOD INSURANCE RATE MAP NO. 2501C051J, WITH A MAP EFFECTIVE DATE OF JULY 16, 2014.
- THIS LOT IS NOT LOCATED WITHIN A DEP APPROVED ZONE II WELLHEAD PROTECTION AREA. THIS LOT IS NOT MAPPED WITHIN A MESA NATURAL HERITAGE AND ENDANGERED SPECIES AREA. WIND EXPOSURE CATEGORY: ZONE C
- DEED REFERENCE: BOOK 19415 PAGE 216 PLAN REFERENCE: BOOK 28 PAGE 1  
 OWNER: ERICA K. ROBERT K AND LINDA S MORSE  
 PO BOX 907  
 POCASSETT, MA 02559

**RECEIVED**  
 By Bourne Health Department at 11:48 am, Aug 16, 2023

**COMMUNAL HEALTH OF MASSACHUSETTS**  
 MATTHEW C. COSTA  
 CIVIL No. 52292  
 PROFESSIONAL LAND SURVEYOR

**COMMUNAL HEALTH OF MASSACHUSETTS**  
 RAUL LIZARRA-RIVERA  
 No. 46645  
 REGISTERED PROFESSIONAL ENGINEER

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DATE	REVISIONS TO PLAN NOTES PER BOARD OF HEALTH HEARING	RLR	RLR
8/16/23			

PREPARED FOR:	ROBERT K. MORSE ERICA K. ROBERT K AND LINDA S MORSE PO BOX 907 POCASSETT, MA 02559	BY	CHK
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PROJECT:  
 90 CIRCUIT AVENUE  
 BOURNE, MASSACHUSETTS

SHEET NO.: 1 OF 1	DATE: APRIL 7, 2023
DRAWN BY: WNH, MC	CHECKED BY: MC/RLR

PREPARED BY:  
**CAPE & ISLANDS ENGINEERING**

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DRAWING TITLE:  
 SEPTIC SYSTEM UPGRADE PLAN

ASSESSORS INFORMATION: MAP 43.3 PARCEL 226

CIRCUIT\_90\_MORSE\_NITROE