





GENERAL NOTES

1. THE HORIZONTAL DATUM FOR THIS SURVEY IS THE MASSACHUSETTS COORDINATE SYSTEM, NAD 1983, MAINLAND ZONE. THE VERTICAL DATUM FOR THIS SURVEY IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). SAID DATUMS WERE ESTABLISHED VIA GPS OBSERVATIONS UTILIZING NAD83 (NA2011) EPOCH 2010.00 (MYCS2) AND GEOID 18.
2. UTILITIES SHOWN HEREON FROM FIELD LOCATIONS OF SURFACE STRUCTURES. NO UNDERGROUND UTILITIES WERE INCLUDED AS PART OF THIS SURVEY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATION, SIZE & ELEVATION OF ALL UTILITIES WITHIN THE AREA OF PROPOSED WORK AND TO CONTACT "DIG-SAFE" AT 811 AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION, DEMOLITION OR CONSTRUCTION.
3. LIMITS OF BORDERING VEGETATED WETLANDS SHOWN HEREON WERE DELINEATED BY DEROSA ENVIRONMENTAL CONSULTING, INC. ON 1/3/2024 AND LOCATED BY FIELD SURVEY.
4. LIMIT OF FEMA FLOOD ZONE 'A' COMPILED FROM FEMA MAP 25009C0427F EFFECTIVE 7/3/2012. NO BASE FLOOD ELEVATION NOTED ON SAID PLAN.
5. APPROXIMATE LOCATION OF UNDERGROUND SEPTIC FEATURES SHOWN HEREON FROM "TITLE 5 OFFICIAL INSPECTION FORM" BY JESSICA A WISTRAN PROVIDED BY THE TOWN OF HAMILTON. EXACT LOCATION IS UNKNOWN.
6. LOCATIONS OF EXISTING UNDERGROUND UTILITIES/OBSTRUCTIONS/SYSTEMS SHOWN HEREON ARE APPROXIMATE ONLY. ALL UTILITIES/OBSTRUCTIONS/SYSTEMS MAY NOT BE SHOWN. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND PROTECTING ALL UNDERGROUND UTILITIES/OBSTRUCTIONS/ SYSTEMS, WHETHER OR NOT SHOWN HEREON.
7. UNLESS OTHERWISE SHOWN, ALL NEW UTILITIES SHALL BE UNDERGROUND.
8. CONTRACTOR SHALL FURNISH CONSTRUCTION LAYOUT OF BUILDING, SEPTIC SYSTEM, AND SITE IMPROVEMENTS. THIS WORK SHALL BE PERFORMED BY A PROFESSIONAL LAND SURVEYOR. PROPERTY LINES SHOWN HEREON ARE APPROXIMATE.
9. SAFETY MEASURES, CONSTRUCTION METHODS AND CONTROL OF WORK SHALL BE RESPONSIBILITY OF THE CONTRACTOR.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR AND/OR REPLACEMENT OF ANY EXISTING IMPROVEMENTS DAMAGED DURING CONSTRUCTION THAT ARE NOT DESIGNATED FOR DEMOLITION AND/OR REMOVAL HEREON. DAMAGED IMPROVEMENTS SHALL BE REPAIRED TO THE SATISFACTION OF THEIR RESPECTIVE OWNERS.
11. ANY INTENDED REVISION OF THE HORIZONTAL AND/OR VERTICAL LOCATION OF IMPROVEMENTS TO BE CONSTRUCTED AS SHOWN HEREON SHALL BE REVIEWED AND APPROVED BY ENGINEER PRIOR TO IMPLEMENTATION.
12. RIM ELEVATIONS SHOWN FOR NEW STRUCTURES ARE APPROXIMATE AND ARE PROVIDED TO ASSIST CONTRACTOR WITH MATERIAL TAKEOFFS. FINISH RIM ELEVATIONS SHOULD MATCH PAVEMENT, GRADING, OR LANDSCAPING, UNLESS SPECIFICALLY INDICATED OTHERWISE.
13. WHERE EXISTING UTILITY LINES/STRUCTURES ARE TO BE CUT/BROKEN DOWN/ABANDONED, LINES/ STRUCTURES SHALL BE PLUGGED/CAPPED/FILLED IN ACCORDANCE WITH OWNER REQUIREMENTS.
14. ALL WORK ON SEWAGE DISPOSAL SYSTEM SHALL BE COMPLETED BY A LICENSED "DISPOSAL WORKS INSTALLER."
15. THE ISSUANCE OF A PERMIT TO CONSTRUCT, OR A CERTIFICATE OF COMPLIANCE, SHALL NOT BE CONSTRUED AS A GUARANTEE THAT THE DISPOSAL SYSTEM WILL FUNCTION SATISFACTORILY.
16. THE CONTRACTOR SHALL VERIFY THE LOCATION AND RELATIVE ELEVATION OF BENCH MARKS PRIOR TO COMMENCEMENT OF CONSTRUCTION. ANY DISCREPANCY SHALL BE REPORTED TO THE ENGINEER.
17. STRUCTURE DETAILS FROM INDEPENDENT VENDORS ARE CONSTANTLY CHANGING. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL VERIFY THAT DETAILS SHOWN MATCH CURRENT DETAILS AND SPECIFICATIONS FROM VENDORS.
18. BACKWASH FROM A WATER SOFTENER SHALL NOT BE DISCHARGED INTO THE SUBSURFACE SEWAGE DISPOSAL SYSTEM, BUT INTO A SEPARATE DRY WELL OR ONTO GROUND PER 310 CMR 15.004(9).
19. MAGNETIC TAPE IS TO BE PLACED OVER ALL SYSTEM COMPONENTS BEFORE BACKFILLING, 15.221(12).
20. PERIMETER OF SOIL ABSORPTION SYSTEM TO BE STAKED AND FLAGGED FROM BEFORE CONSTRUCTION UNTIL ISSUANCE OF CERTIFICATE OF COMPLIANCE, 15.246(2).
21. A DEED RESTRICTION IS REQUIRED FOR A 2-BEDROOM SYSTEM

SITE NOTES

1. ALL SEWAGE DISPOSAL SYSTEM COMPONENTS ARE GREATER THAN 400 FEET AWAY FROM SURFACE WATER RESERVOIRS AND GREATER THAN 400 FEET FROM TRIBUTARIES TO SURFACE WATER RESERVOIRS.
2. THERE ARE NO WELLS WITHIN 150 FEET OF THE SOIL ABSORPTION AREA.
3. THERE ARE NO COASTAL WETLANDS WITHIN 200 FEET OF SOIL ABSORPTION AREA.
4. SITE LIES WITHIN A ZONE II, A NITROGEN SENSITIVE AREA.
5. SITE LIES WITHIN A FEMA FLOOD ZONE A.
6. EROSION CONTROL SHOWN HEREON SHALL BE INSTALLED BEFORE EARTH DISTURBANCE OCCURS AND SHALL SERVE AS THE LIMIT OF WORK.

REGULATORY NOTES

1. CONTRACTOR SHALL CONTACT DIG-SAFE FOR UNDERGROUND UTILITY MARKING AT 811 AT LEAST 72 HOURS PRIOR TO COMMENCEMENT OF ANY WORK.
2. CONTRACTOR SHALL MAKE HIMSELF AWARE OF ALL CONSTRUCTION REQUIREMENTS, CONDITIONS, AND LIMITATIONS IMPOSED BY PERMITS AND APPROVALS ISSUED BY REGULATORY AUTHORITY PRIOR TO COMMENCEMENT OF ANY WORK. CONTRACTOR SHALL COORDINATE AND OBTAIN ALL CONSTRUCTION PERMITS REQUIRED BY REGULATORY AUTHORITIES.
3. ALL WORK OUTSIDE OF BUILDING THAT IS LESS THAN 10 FEET FROM THE INSIDE FACE OF BUILDING FOUNDATIONS SHALL CONFORM WITH THE UNIFORM STATE PLUMBING CODE OF MASSACHUSETTS, 248 CMR 2.00.
4. ALL WORK SHALL COMPLY WITH TITLE V AND LOCAL BOARD OF HEALTH REGULATIONS EXCEPT AS PROVIDED BY APPROVED WAIVERS.

SELECT SOIL FILL SPECIFICATION (310 CMR 15.255)

1. SELECT SOIL FILL MATERIAL FOR SYSTEM CONSTRUCTION IN FILL MAY CONSIST OF SELECT ON-SITE SOIL, OR IMPORTED SOIL.
2. SELECT SOIL FILL MATERIAL SHALL BE COMPRISED OF CLEAN, GRANULAR SAND, FREE FROM ORGANIC MATTER AND DELETERIOUS SUBSTANCES. MAXIMUM PARTICLE SIZE SHALL BE 2 INCHES.
3. A SIEVE ANALYSIS SHALL BE PERFORMED ON A REPRESENTATIVE SAMPLE OF THE FILL. UP TO 45% BY WEIGHT OF THE FILL SAMPLE MAY BE RETAINED ON A #4 SIEVE. A SIEVE ANALYSIS SHALL ALSO BE PERFORMED ON THE FRACTION OF THE FILL SAMPLE PASSING THE #4 SIEVE. SUCH ANALYSIS SHALL DEMONSTRATE THAT THE MATERIAL PASSING THE #4 SIEVE MEETS THE FOLLOWING GRADATION:

SIEVE	EFFECTIVE PARTICLE SIZE	PERCENT PASSING SIEVE
#4	4.75 mm	100
#50	0.30 mm	10 To 100
#100	0.15 mm	0 To 20
#200	0.075 mm	0 To 5

SEPTIC TANK COMPUTATIONS (310 CMR 15.223)

1. FIRST COMPARTMENT : 200% DAILY FLOW = 440 GAL.
2. SECOND COMPARTMENT : 100% DAILY FLOW = 220 GAL.
3. REQUIRED: 1,560/440 GAL., 2 COMPARTMENT TANK (2,000 GAL)

FLOW AND AREA COMPUTATIONS (310 CMR 15.242)

FLOW

1. BUILDING USE : SINGLE FAMILY DWELLING
2. NO. OF BEDROOMS : 2
3. DESIGN FLOW : 110 GPD/BEDROOM
4. TOTAL DAILY FLOW : 220 GALLONS [3]

SOIL ABSORPTION SYSTEM REQUIREMENTS

1. DESIGN PERCOLATION RATE : <5 MINUTES PER INCH [1]
2. SOIL CLASS : CLASS I
3. LONG TERM ACCEPT. RATE: 0.74 GAL./SF [1]
4. GARBAGE GRINDER: NO
5. TOTAL AREA REQ'D - CONVENTIONAL: 298 SF
6. TOTAL AREA REQ'D - SECONDARY TREATMENT (50% REDUCTION) [2]: 149 SF
7. TOTAL AREA PROVIDED: 10' X 15' = 150 SF

- [1] A SIEVE ANALYSIS WAS USED IN LIEU OF TRADITIONAL SOIL TESTING. SIEVE ANALYSIS DETERMINED SOILS TO BE SILT LOAM. PER TITLE 5 ALTERNATIVE TO PERCOLATION TESTING GUIDANCE FOR SYSTEM UPGRADES, CLASS I SOILS WITH >85% SAND CONTENT HAVE A LONG TERM ACCEPTANCE RATE OF 0.74 GPD/SF, EQUIVALENT TO A <5 MINUTES PER INCH PERCOLATION RATE.
- [2] PER MASS DEP REMEDIAL USE STANDARD CONDITIONS FOR SECONDARY TREATMENT UNITS, THE SIZE OF THE SAS MAY BE REDUCED BY UP TO 50% DEED RESTRICTION REQUIRED
- [3]

WATERLOO PUMP SPECIFICATIONS (310 CMR 15.231)

PUMPS

1. NO. OF PUMPS REQUIRED: 1
2. STATIC HEAD: 7.2 FEET
3. TOTAL DYNAMIC HEAD AT FLOW: 15.0' @ 69 GPM
4. IMPELLER DIAMETER: 5.44 IN
5. SOLIDS HANDLING: 2"
6. MANUF./MODEL (OR EQUAL): PEABODY-BARNES SE411
7. HORSEPOWER/SPEED: 0.4/1750 RPM
8. VOLTAGE/PHASE: 115/1

CONTROL PANEL

MANUF: BARNES TYPE: STANDARD SIMPLEX  
MODEL: 065400 PROVIDE MANUAL ON/OFF SWITCH FOR PUMP.

FLOATS

NO. REQUIRED: 3 TYPE: MERCURY SWITCH  
MANUF./MODEL: BARNES 73612 OR 73613

ALARM

MANUF. BARNES TYPE: VISUAL AND AUDIBLE  
MODEL: 061487  
VISUAL LEG TO REMAIN ON UNTIL REPAIRS INITIATED.  
ALARM AND PUMP TO BE ON SEPARATE CIRCUITS.

WATERLOO DOSING CHAMBER CAPACITY (310 CMR 15.254)

DOSING CHAMBER VOLUME

1. FORCE MAIN LENGTH: 35 FT.
2. FORCE MAIN DIAMETER: 2 IN.
3. FORCE MAIN VOLUME: 5.7 GAL.
4. DOSES PER DAY: 4
5. AVERAGE DAILY FLOW: 220 GPD
6. MIN. VOLUME PER DOSE: 55 GPD
7. DESIGN VOLUME PER DOSE
3. PLUS 6.): 60.7 GAL.
8. EMERGENCY STORAGE REQUIRED (5.): 220 GAL.
9. MIN. TOTAL VOLUME REQUIRED
- BELOW INLET (7. PLUS 8.): 280.7 GAL.
10. USE CAPACITY: 631 GAL.

PIPE SPECIFICATIONS

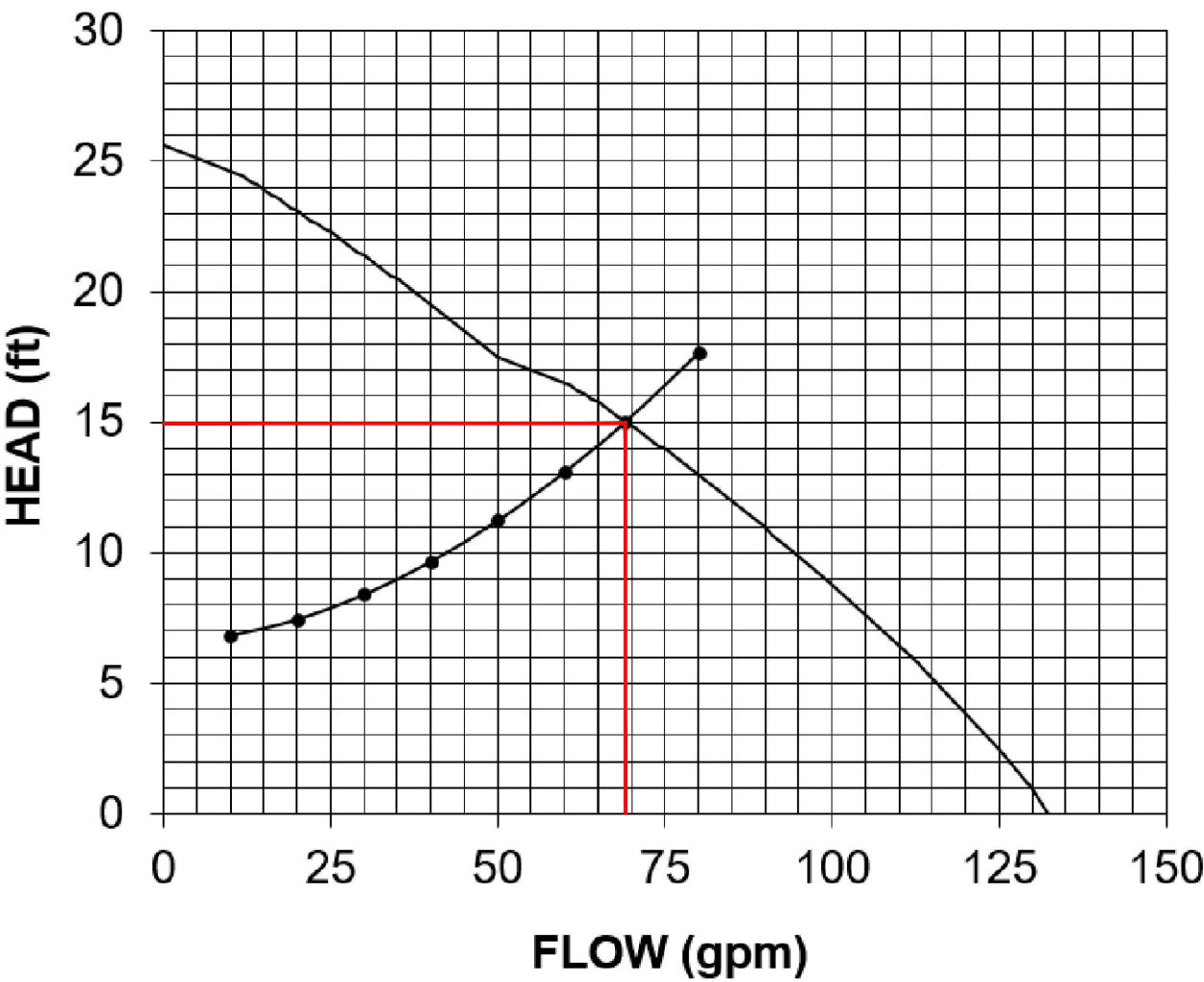
(310 CMR 15.251)

SEGMENT	DIA. (IN.)	MATERIAL	[4] [5]	MIN. SLOPE (IN/FT.)
BUILDING TO SEPTIC TANK	4	PVC	SCH 40, ASTM D1785	1/4
SEPTIC TANK TO PUMP CHAMBER	1	PVC	SDR 35, ASTM D3034	1/8
PUMP CHAMBER TO D-BOX	2	PVC	SDR 21, ASTM D2241	N.A.
D-BOX TO SOIL ABSORPTION AREA	4	PVC	SDR 35, ASTM D3034	1/8 [2]
SOIL ABSORPTION AREA	4	PVC	PERFORATED [3], SDR 35, ASTM D3034 (FOR GRAVITY SYSTEMS ONLY)	1/16

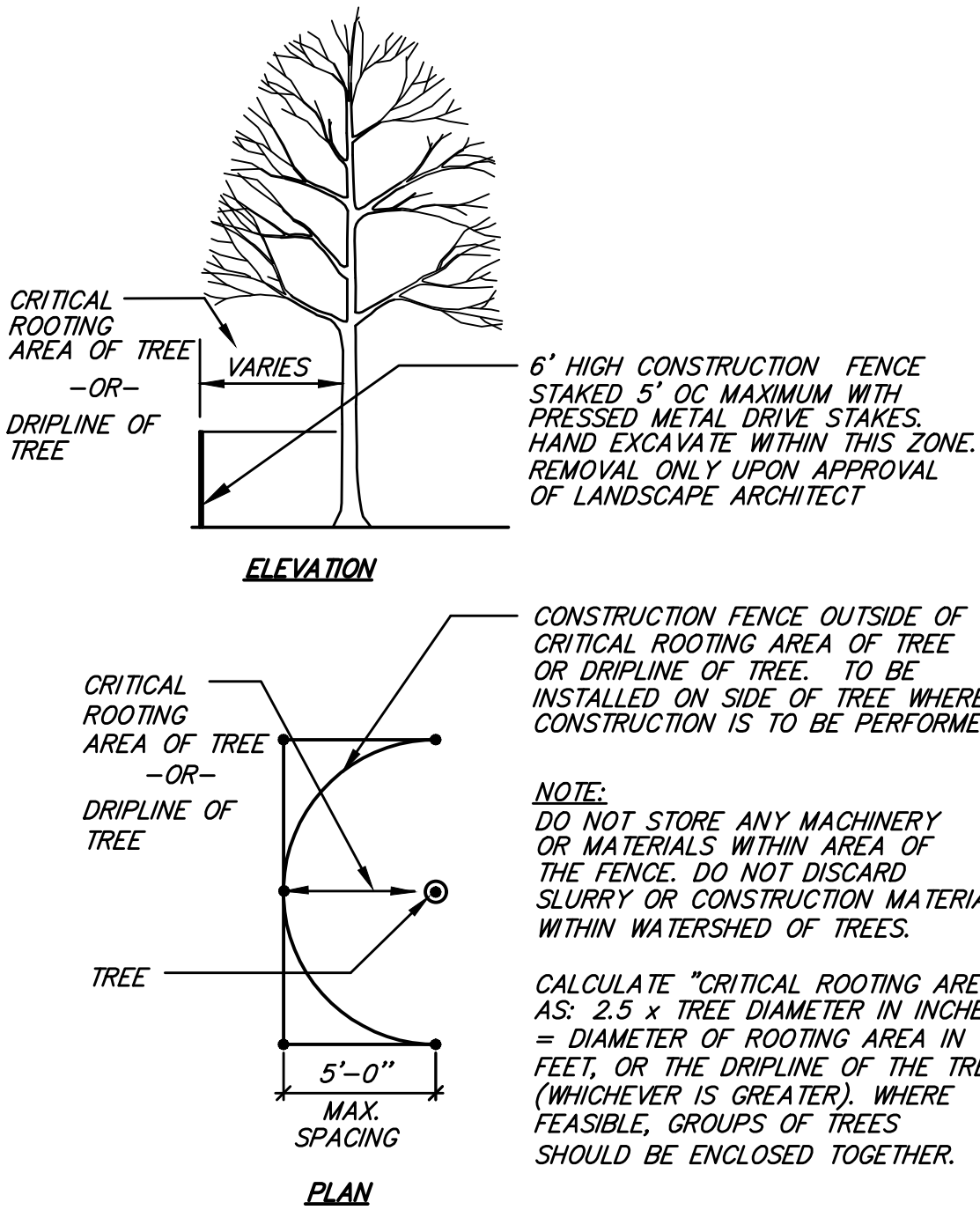
- [1] ALL PIPE SHALL BE PROPERLY BEDDED, HAUNCHED, BACKFILLED. ALL JOINTS SHALL BE WATERTIGHT.
- [2] PIPE SHALL BE LAID LEVEL, FIRST 2 FEET DOWNSTREAM FROM DISTRIBUTION BOX.
- [3] PERFORATIONS DOWN AT 5 AND 7 O'CLOCK (FOR GRAVITY SYSTEMS ONLY).
- [4] UNLESS OTHERWISE SPECIFIED ON FLOW PROFILE.
- [5] WHERE SDR 35 PIPE IS SPECIFIED, SCH 40 MAY BE SUBSTITUTED.

SEPTIC TANK BUOYANCY COMPUTATION

PARAMETER	UNIT	VALUE
FINISH GRADE	EL	49.2
INLET INVERT	EL	47.0
OUTSIDE TOP STRUCTURE	EL	48.5
OUTSIDE BOT. STRUCTURE	EL	42.5
ESHW	EL	44.0
STRUCTURE LENGTH	FT	13.0
STRUCTURE WIDTH	FT	7.0
STRUCTURE FOOTPRINT	SF	91.0
WEIGHT OF STRUCTURE	LB	21,150
WEIGHT OF BALLAST	LB	0
UNIT WEIGHT OF SOIL	PCF	115
WEIGHT OF SOIL COVER	LB	7,668
WEIGHT OF STRUCTURE + WEIGHT OF SOIL COVER	LB	28,818
WEIGHT OF WATER DISPLACED (STRUCTURE)	LB	8,802
NET FORCE	LB	20,017
FACTOR OF SAFETY		3.27



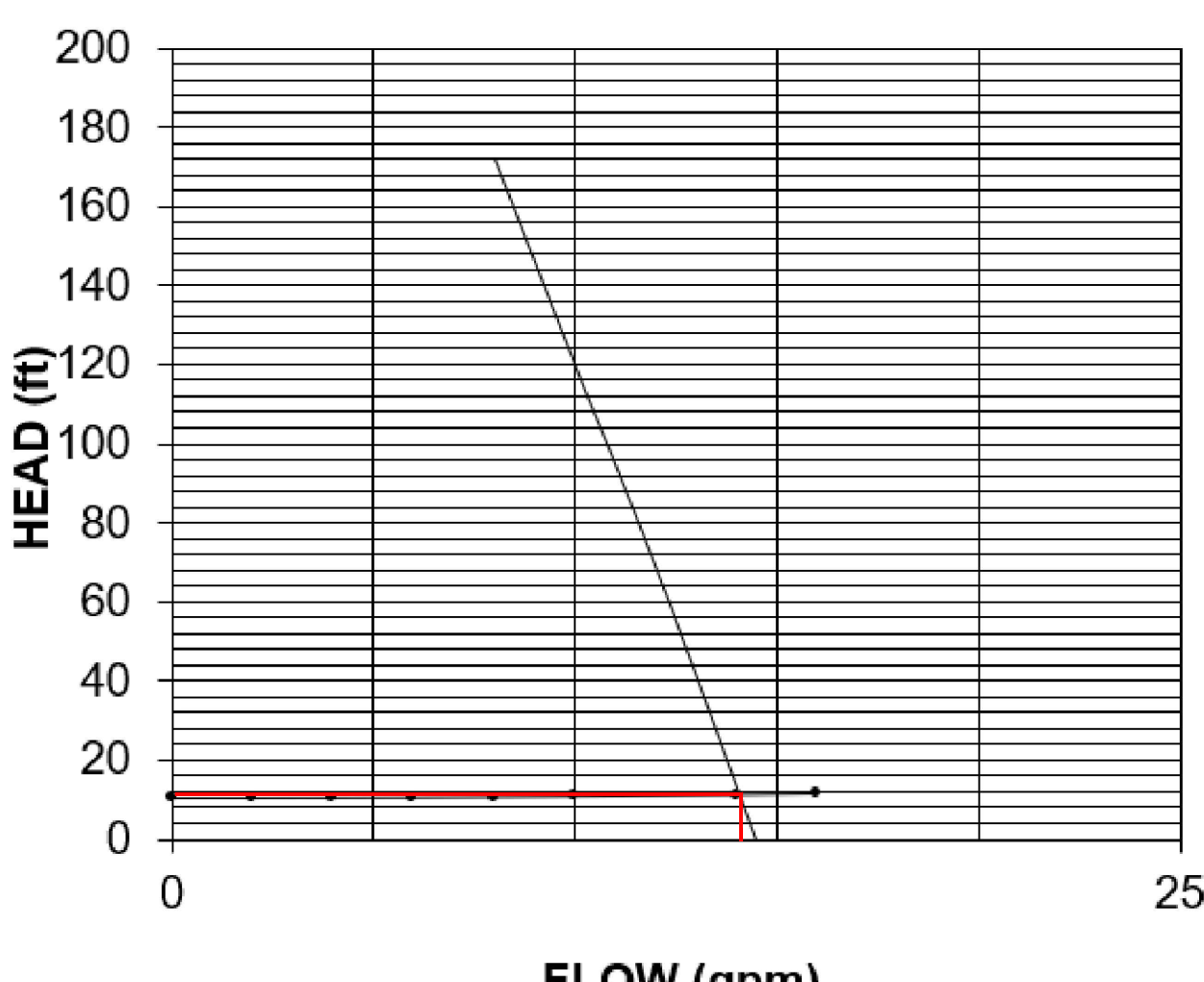
1 WATERLOO PERFORMANCE CURVE NOT TO SCALE



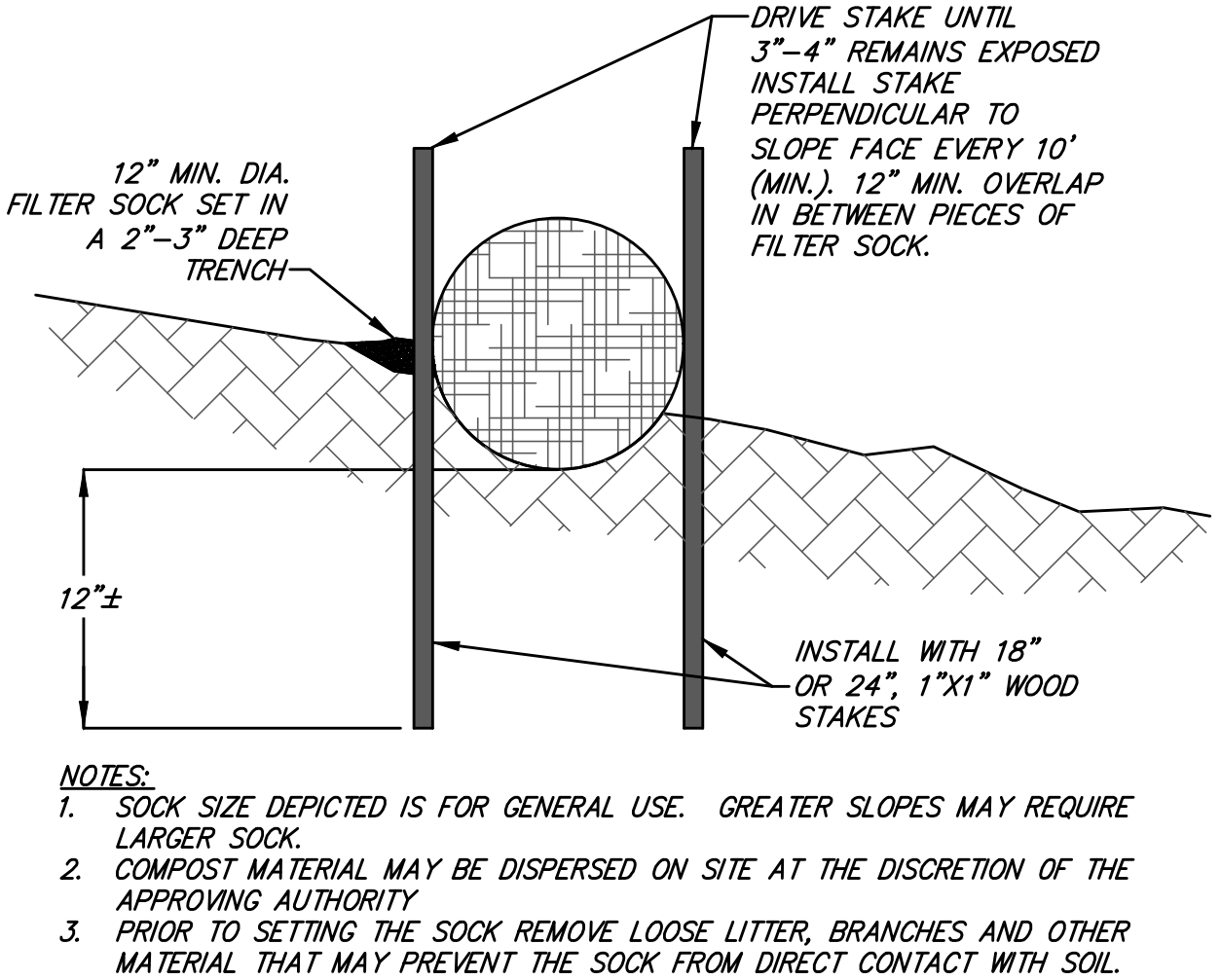
3 TREE PROTECTION NOT TO SCALE

WATERLOO BIOFILTER BUOYANCY COMPUTATION

PARAMETER	UNIT	VALUE
FINISH GRADE	EL	48.3
INLET INVERT	EL	46.8
OUTSIDE TOP STRUCTURE	EL	47.8
OUTSIDE BOT. STRUCTURE	EL	41.3
ESHW	EL	44.0
STRUCTURE LENGTH	FT	5.0
STRUCTURE WIDTH	FT	5.0
STRUCTURE FOOTPRINT	SF	25.0
WEIGHT OF STRUCTURE	LB	6,600
WEIGHT OF BALLAST	LB	0
UNIT WEIGHT OF SOIL	PCF	115
WEIGHT OF SOIL COVER	LB	1,362
WEIGHT OF STRUCTURE + WEIGHT OF SOIL COVER	LB	7,962
WEIGHT OF WATER DISPLACED (STRUCTURE)	LB	2,605
NET FORCE	LB	5,357
FACTOR OF SAFETY		3.06



2 E-ONE PERFORMANCE CURVE NOT TO SCALE



4 WATTLE NOT TO SCALE

PERMIT SITE PLAN

20 Beech Street Extension  
Hamilton, Massachusetts 01982

ASSESSORS:

PARCEL ID  
66-1B-B

PREPARED FOR:

A & L  
Construction  
Corporation

100 Conifer Hill Drive, Suite 512  
Danvers, Massachusetts 01923

HANCOCK  
ASSOCIATES

Civil Engineers

Land Surveyors

Wetland Scientists

185 CENTRE STREET, DANVERS, MA 01923  
VOICE (978) 777-3050, FAX (978) 774-7816  
WWW.HANCOCKASSOCIATES.COM



12/13/24

2	BY	NDL	12/13/24	CONCOM	COMMENTS
1	BY	JTE	11/09/24	BOH	COMMENTS
NO.	BY	APP	DATE	ISSUE/REVISION	DESCRIPTION
DATE:		10/21/24		DESIGN BY:	JJP
SCALE:		AS SHOWN		DRAWN BY:	JTE
APPRVD. BY:		JJP		CHECK BY:	RMD

DETAIL SHEET

PLOT DATE: Dec 16, 2024 8:12 am  
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DWG: 27701sds.rev1.dwg

LAYOUT: C2

SHEET: 2 OF 3

PROJECT NO.:

27701

C2



20 Beech Street Extension  
Hamilton, Massachusetts 01982

**ASSESSORS:**

PREPARED FOR:

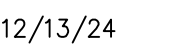
100 Conifer Hill Drive, Suite 512  
Danvers, Massachusetts 01923

Civil Engineers

## Land Surveyors

Wetland Scientists

185 CENTRE STREET, DANVERS, MA 01923  
VOICE (978) 777-3050, FAX (978) 774-7816  
WWW.HANCOCKASSOCIATES.COM



DATE:	10/21/24	DESIGN BY:	JJP
SCALE:	AS SHOWN	DRAWN BY:	JTE
APPRVD. BY:	JJP	CHECK BY:	RMD

PLOT DATE: Dec 16, 2024 8:12 am  
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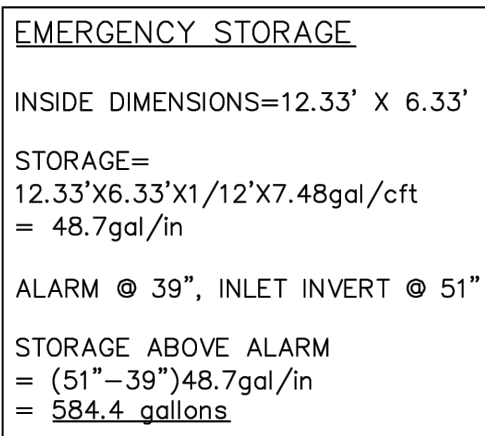
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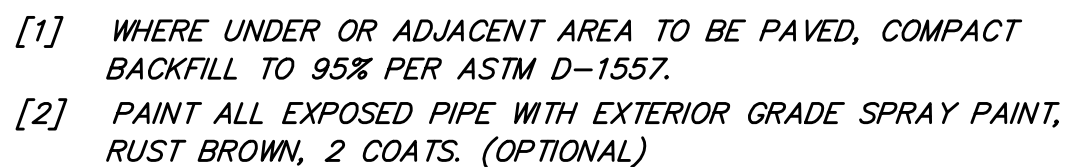
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PROJECT NO.:

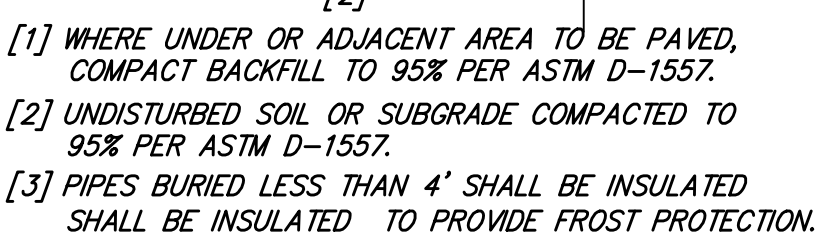
27701



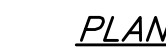
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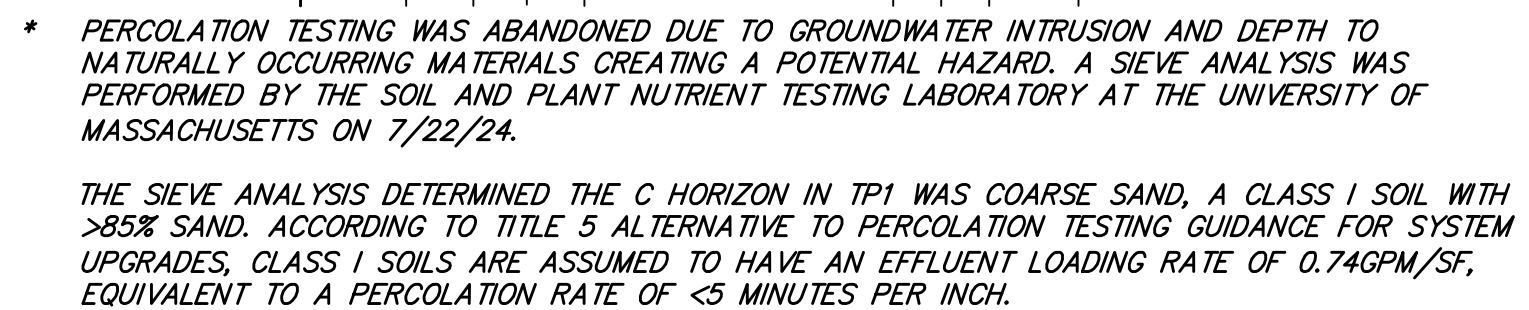


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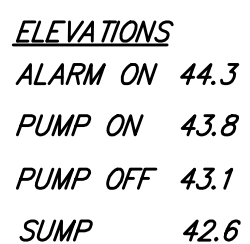


- [1] NUMBER OF OUTLETS: 6
- [2] LOAD RATING: H20
- [3] MANHOLE RISER REQUIRED: NO
- DISTRIBUTION BOXES BURIED GREATER THAN 9 INCHES BELOW  
GRADE SHALL BE EQUIPPED WITH RISERS.
- [4] WHERE UNDER OR ADJACENT AREA TO BE PAVED, COMPACT BACKFILL  
TO 95% PER ASTM D-1557
- [5] UNDISTURBED SOIL OR SUBGRADE COMPACTED TO 95% PER ASTM D-1557
- [6] CLOSURE TO BE KEPT WATER TIGHT.
- [7] ALL OUTLET PIPE INVERTS AT SAME ELEVATION, LAID LEVEL FOR 2  
FEET DOWNSTREAM FROM DISTRIBUTION BOX.
- [8] ALL OUTLETS TO BE FITTED WITH FLOW REGULATING DEVICES UNLESS  
INLET IS A FORCE MAIN.

4



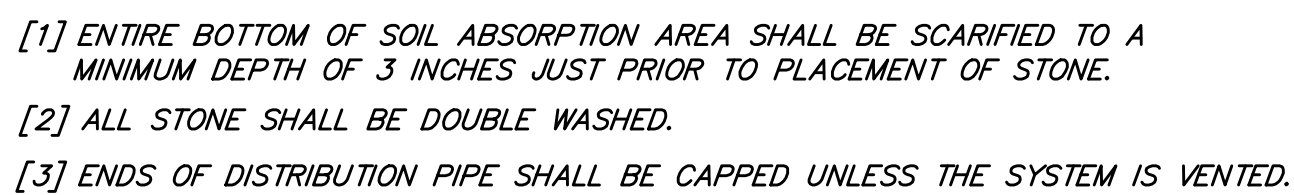
7



5



8



9



**SEPTIC PROFILE - BARN**  
SCALE: VERTICAL 1" = 5'

10