



**Howard County
Health Department**

Bureau of Environmental Health

8930 Stanford Boulevard, Columbia, MD 21045

Main: 410-313-2640 | Fax: 410-313-2648

TDD 410-313-2323 | Toll Free 1-866-313-6300

www.hchealth.org

Facebook: www.facebook.com/hocohealth

Maura J. Rossman, M.D., Health Officer

RECEIPT DATE: 9/1/20 **ONSITE SEWAGE DISPOSAL SYSTEM** P 567957

APPROVAL DATE: 12/23/20 **PERMIT: CONSTRUCTION** A _____

PROPERTY ADDRESS: 4360 Linthicum Road

SUBDIVISION: Titherington Property LOT: 1 TAX ID: 05-435005

CONTRACTOR: Sams Creek EMAIL: samscreek@aol.com

CONTRACTOR ADDRESS: 2810 Sams Creek Road, New Windsor, MD 21776 PHONE: 443-690-0082

CONTRACTOR CERTIFIED FOR BAT INSTALLATION: MDE MANUFACTURER: Norweco

PROPERTY OWNER: Kenneth and Sarah Mueller EMAIL: _____

OWNER ADDRESS: 7014 Mink Hollow Road PHONE: _____

BAT UNIT MODEL: Norweco TNTLP 500 PUMP SIZE: ME45 PUMP TANK CAPACITY: 1500 Gallon
Myers

OPERATION & MAINTENANCE AGREEMENT DATE SIGNED: 10/9/20 ✓ DATE RECORDED: 10/15/20 ✓

DISTRIBUTION SYSTEM: GRAVITY PRESSURE DOSED BEDROOMS: 4 APPLICATION RATE: 0.8

TRENCHES:	LINEAR FEET REQUIRED: <u>166.667</u>	INLET DEPTH: <u>2</u>
	TRENCH WIDTH: <u>2</u>	MAXIMUM BOTTOM DEPTH: <u>8</u>
	MINIMUM SPACE BETWEEN TRENCHES: <u>10</u>	EFFECTIVE AREA BEGINNING DEPTH: <u>5</u>
LOCATION:	PER APPROVED SITE PLAN. SEWAGE DISPOSAL AREA AND BAT UNIT LOCATION MUST BE STAKED BY LICENSED SURVEYOR PRIOR TO PRE-CONSTRUCTION INSPECTION.	
NOTES:	Install BAT and LPD according to plan.	

ISSUED BY: Hank Oswald ISSUE DATE: 10/15/20 EXPIRATION DATE: 9/1/21

- NOTE: CONTRACTOR MUST SCHEDULE A PRE-CONSTRUCTION INSPECTION PRIOR TO BEGINNING ANY INSTALLATION
- NOTE: CONTRACTOR MUST SCHEDULE AN INSPECTION AND GAIN APPROVAL OF ALL COMPONENTS PRIOR TO COVERING
- NOTE: STONE MUST BE APPROVED BY HEALTH DEPARTMENT AND GRAVEL TICKET MUST BE AVAILABLE FOR REVIEW.
- NOTE: WATERTIGHT SEPTIC TANKS REQUIRED
- NOTE: ALL PARTS OF SEPTIC SYSTEM SHALL BE AT LEAST 100 FEET DOWNGRAIENT FROM ANY WATER WELL
- NOTE: MANHOLE RISERS REQUIRED ON ALL SEPTIC TANKS AND PUMP CHAMBERS
- NOTE: AN ELECTRICAL PERMIT IS REQUIRED FOR INSTALLATION OF ANY ELECTRICAL COMPONENTS OF THE SYSTEM
 ELECTRICAL PERMIT ISSUED E 20003677
- NOTE: AN INDIVIDUAL CERTIFIED BY MDE AND THE MANUFACTURER FOR BAT INSTALLATION MUST BE PRESENT AT ALL TIMES DURING BAT INSTALLATION.
- NOTE: MDE RECOMMENDS SEPTIC TANKS, BAT, AND OTHER PRETREATMENT UNITS BE PUMPED AT A FREQUENCY ADEQUATE TO ENSURE THAT SOLIDS ARE NOT DISCHARGED TO THE DISPOSAL AREA

NEITHER THE HOWARD COUNTY COUNCIL NOR THE HEALTH DEPARTMENT IS RESPONSIBLE FOR THE SUCCESSFUL OPERATION OF ANY SYSTEM.

PERMITTEE RESPONSIBLE FOR OBTAINING FINAL APPROVAL ON THIS PERMIT.

CALL 410-313-1771 TO SCHEDULE INSPECTIONS.

NOT TO SCALE

* see attached

ROAD NAME

TRENCH/DRAINFIELD DATA

WIDTH INLET BOTTOM

2 2 8

NUMBER OF TRENCHES 2

TOTAL LENGTH 174'

ABSORPTION AREA 522 sq ft + sidewalk

DISTRIBUTION BOX LEVEL -

DISTRIBUTION BOX BAFFLE -

DISTRIBUTION BOX PORT -

SEPTIC TANK DATA

SEPTIC TANK 1 LEVEL

MANUFACTURER Norweco

CAPACITY 500 GAL

SEAM LOC top

TANK LID DEPTH 2.5'

BAFFLES -

BAFFLE FILTER -

MANHOLE LOC -

6" PORT LOC -

WATERTIGHT TEST -

SLOTTED -

DATE ON LID 8/30/2020

PUMP/SEPTIC TANK LEVEL

MANUFACTURER Babylon

CAPACITY 1500 GAL

SEAM LOC top

TANK LID DEPTH 2.5'

BAFFLES -

BAFFLE FILTER -

MANHOLE LOC -

6" PORT LOC -

WATERTIGHT TEST -

SLOTTED -

DATE ON LID 9/22/2020

PRE-CONSTRUCTION:

INSTALLATION: 10/23/2020 Trench and LPD installed according to plan. Perforations were 4.175" apart with 10 on each side. Reinspect for BAT startup and SHC. (S) 12/22/2020 Obs. water flowing through SHC Pump and alarm for pump tank observed to be on separate breakers inside Norweco box, located outside. Pump works - distal head pressure obs. on all laterals. Alarm for pump tank functions (located on Norweco box.) Wiring currently located inside user - needs to be moved outside. Reinspect for wiring. (S) 12/23/2020 Wiring now located on box outside of user. (S)

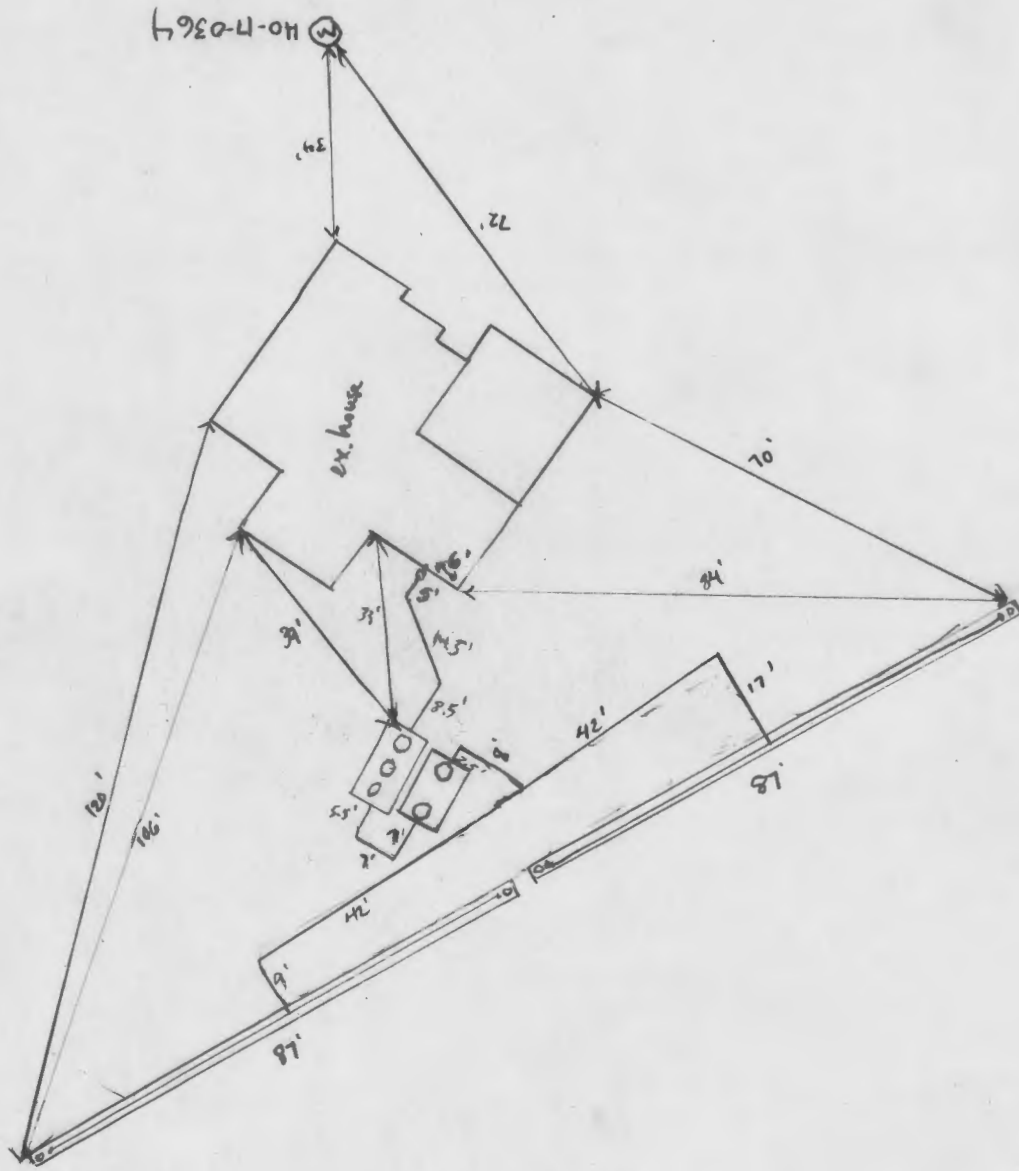
FINAL INSPECTOR

Susan Thomas

DATE OF APPROVAL

12/23/2020

NOT TO SCALE 1"=30'



septic tank Norweco

level —

manufacturer —

capacity

seam loc

tank lid depth 2.5'

baffles

baffle filter

manhole loc

6" port loc

watertight test

slotted

data on lid

Pump tank

Babylon

1500

2.5' depth

no compartment

10/23/2020

Trench

Revisions acc to plan. Reinspect for BAT startup + SHC (ST)

Oswald, Hank

From: Oswald, Hank
Sent: Friday, March 20, 2020 3:58 PM
To: Mark Hurt
Subject: BAT Plan_Titherington Property

Hello Mark:

I hope your doing well. I reviewed the revised plan and I have a couple of additional comments. With the way the forcemain tees off and continues uphill to then tee into the laterals, how are you proposing that split forcemain at an upward angle. The plan must show those details of how that will be installed. Also, I'm just realizing that there is a severe bend in one lateral as it rounds the corner. The plan must show the location of the perforations relative to that bend. We can't have it where the coupling to create that bend will fall where a perforation needs to go. Lastly, the lateral diagram on page 2 shows a lateral length of 39.66 ft. when it should be $41.750 - 1.74 = 40.01$ ft. Let me know if you have any questions.

Take care,

Hank

LPD Charts Worksheet

Titherington Property 4 BR x 150 = 600

Trench #	Ground Elev.	Pipe Invert Elev.	Trench Length (FT)	1.5 in. Lateral Pipe Length	Perforation Diameter (IN)	Head (FT)	Perf. Flow Rate (GPM)	Perforation Spacing (FT)	# of Orifices	Trench Flow Rate (GPM)	Flow (GPM) per LF Trench
1.1.1	556	553.8	41.75	38.27	5/16	2	1.628	3.479	12	19.536	0.468
1.1.2	556	553.8	41.75	38.27	5/16	2	1.628	3.479	12	19.536	0.468
1.2.1	556	553.8	41.75	38.27	5/16	2	1.628	3.479	12	19.536	0.468
1.2.2	556	553.8	41.75	38.27	5/16	2	1.628	3.479	12	19.536	0.468

↑ 5/16 = 0.3125

Total Trench Flow Rate = _____

Trench #	Ground Elev.	Top of Stone Elev.	Pipe Invert Elev.	Depth to Stone from Ground	Depth of Stone (FT)	Bottom of Trench Elev.	Effective Depth Begins	Effective depth	Width of Trench	Trench Spacing	Trench Length (FT)
1.1.1	556		554			548	5'	3'	2'	10'	41.75
1.1.2	556		554			548	5'	3'	2'	10'	41.75
1.2.1	556		554			548	5'	3'	2'	10'	41.75
1.2.2	556		554			548	5'	3'	2'	10'	41.75

↑ Add ↑ Add ↑ Add ↑ Add ↑ Add ↑ Add ↑ Add ↑ Add ↑ Add

All (3) systems:

A pplic rate 0.8

Effective area beginning 5' Best max 8'

Lat dia = 1 1/2

FM dia = 3"

vol of FM $\frac{1}{4} \pi M = 93.253' \times 38.4/100 = \boxed{35.81}$

vol of lat. pipe = $153.1' \times 18.6/100 = \boxed{16.226}$

545 flow rate
78.157

DAIC $\frac{1}{6} (600) = 100 \text{ gal}$
or

$5 \times 16.226 + 35.81 = \boxed{116.94}$

Static Head = $554 - 551.326 = \boxed{2.674}$
(Pipe Invert Elev)

Friction Head

$93.253 \times 58 = 181.253$ $0.3125 \times 1.38 = 2.50$
 $2.674 + 2.50 + 2 (\text{distal}) = \boxed{7.175}$

Maura J. Rossman, M.D., Health Officer

MEMORANDUM

TO: D.R.S. & Associates
52 Winters Street
Westminster, MD 21157

FROM: Hank Oswald, L.E.H.S.
Well & Septic Program

RE: Site Plan for BAT Installation
Titherington Property
Linthicum Road, Dayton, MD
Map 22 Parcel 561

Date: 2.27.2020

The Site plan for BAT Installation for has been reviewed with the following comments:

- ✓ 1.) Change title of plan to; *Site Plan for BAT Installation* ✓
- ✓ 2.) Add required BAT site plan notes (see attachment)
- ✓ 3.) Add top of tank elevations and grade elevations over tank to data sheet.
- ✓ 4.) Adjust BAT unit to be at least 20 feet from entire house foundation.
- ✓ 5.) Move lateral 1.1/1.2 closer to top of SDA to maximize use of area while maintaining same invert lateral elevation and system head as other laterals.
- ✓ 6.) Ensure lateral positions on view plan match elevations in septic profile.
- * — 7.) Show manifold diagram. ?
- ✓ 8.) Show perforation spacing and lateral diagram.
- ✓ 9.) Change observation well detail to show no perforations above fabric.
- ✓ 10.) Add the following to Trench Design:
 - a.) Top of Stone Elevation
 - b.) Depth to Stone from Ground (FT)
 - c.) Depth of Stone (FT)
 - d.) Effective Depth Begins
 - e.) Effective Depth (FT)
 - f.) Width of Trench (FT)
 - g.) Trench Spacing (FT)
- ✓ 11.) A perforation spacing of 3.5 is shown under **Distribution Network Design** but 3.479 is used further down in the charts.
- ✓ 12.) You show a FM & M length = 92.353 but the pipe lengths on the plan layout (1" = 30') doesn't seem to line up.
- 13.) The well sites (particularly the alternate well sites) don't match the perc cert plan.

Maura J. Rossman, M.D., Health Officer

**OPERATION AND MAINTENANCE AGREEMENT
FOR AN ON-SITE SEWAGE DISPOSAL SYSTEM
HAVING AN ADVANCED PRE-TREATMENT SYSTEM**

THIS AGREEMENT is made this 18th day of September among Kenneth and Sarah Mueller, hereinafter collectively referred to as "Owner", and the Howard County Health Department hereinafter referred to as the "County".

WHEREAS, Owner is the owner or contract owner of a parcel of land located at 4360 Lirithicum Road, in the 5th Election District of Howard County, Maryland, and the deed and subdivision plat of the property is recorded among the Land Records of Howard County, Maryland, Tax Map # 22, Block # 19, Parcel # 561, Deed Reference # 19702-249 and Tax Account # 435005 ("the Property").

WHEREAS, The Property is suitable for the installation of a conventional on-site sewage disposal system with an advanced pre-treatment system, utilizing best available technology to perform nitrogen reduction, in accordance with the Code of Maryland Regulations 26.04.02.07, effective November 24, 2016. The pre-treatment device being installed is Norweco 600.

NOW, THEREFORE, the parties hereto agree as follows:

- A. Owner hereby grants to the County the right to enter upon the Property at any reasonable time with prior notice for access to the system to make periodic inspections and the Owner agrees to provide any information and data in Owner's possession reasonably requested and needed by the County.
- B. Owner acknowledges and agrees that neither the County nor any of its agents or employees, either officially or individually, underwrites the operation of any system approved by them.
- C. The Owner will devote reasonable care and effort to the operation and maintenance of the system in perpetuity or until a public sewer connection is made so that a system malfunction is not the result of poor maintenance, faulty operation, or neglect.
- D. The Owner agrees to enter into a contract reasonably acceptable to the Owner and the County with a private entity to operate and maintain on a regularly scheduled basis an approved advanced pre-treatment system. The owner shall supply a copy of the contract to the County when it is renewed or altered.
- E. This agreement shall run with the land and upon Owner's taking title to the Property shall bind the Owner, their heirs, successors, and assigns to the provisions of the agreement as long as

the property is in existence and after installation of the system. Owner further agrees that they shall inform in writing any subsequent purchaser or lessee of the Property that the system shall require maintenance or other attention. Upon taking title to the Property, the Owner agrees to cause this agreement to be recorded in the Land Records of Howard County and assure that it becomes part of the Deed for the subject property in order that prospective buyers may be aware of the special conditions affecting this property.

F. This agreement shall not be construed to limit any authority of the County to protect the public health, safety or comfort or to issue any other orders to take any other action which is now or may hereafter be within its authority.

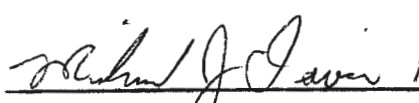
G. This agreement may be voided at any time at the discretion of the County.

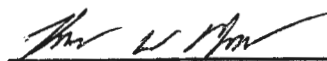
H. This agreement contains the entire agreement and understanding between the County and the Owner. There are no additional terms other than as contained in this agreement. This agreement may not be modified, except in writing signed by each of the parties or by their authorized representatives.

I. The laws of the State of Maryland govern the provisions of all transactions pursuant to this agreement.


J. Owner acknowledges and agrees that interior renovations to increase the number of bedrooms or an increase in living space shall not be permitted without approval from the County.

IN WITNESS WHEREOF, the parties have signed this agreement on the date indicated above.

 10/9/2020
Howard County Health Department

 9/18/2020
Owner #1 Signature Date

Kenneth Mueller
Owner #1 Print Name

 9/18/2020
Owner #2 Signature Date

Sarah Mueller
Owner #2 Print Name

Buyer #1 Signature Date

Buyer #2 Signature Date

Buyer #1 Print Name

Buyer #2 Print Name



BACK RIVER PRE-CAST, LLC
 PO BOX 329
 GLYNDON, MD 21071
 PH# 410-833-3394

NORWECO CERTIFICATION

PROPERTY OWNER: KENNETH MUELLER	INSTALLATION COMPANY: SAMS CREEK
ADDRESS: 4360 LINTHICUM RD	CERTIFIED INSTALLER: JOE WRIGHT
CITY, ZIPCODE & COUNTY: DAYTON, 21036, HOWARD	PERMIT#
SIZE OF SYSTEM INSTALLED:	DATE INSTALLED: 10-20-20
600 GPD CONCRETE	START-UP DATE: 12-22-20
NUMBER OF BEDROOMS:	DATE OF FINAL INSPECTION:
TYPE OF INSTALLATION: NEW	DATE OF ELECTRICAL INSPECTION:
ELECTRICAL WIRING PER ELECTRICAL INSTRUCTIONS: YES	TANK LEVEL: YES
HT. OF CONTROL PANEL ABOVE FINAL GRADE: 34"	BURIAL DEPTH OF TANK: 24"
SYSTEM WIRED ON A 15-AMP DEDICATED CIRCUIT WITH STD. BREAKER: YES	RISERS 4" - 6" ABOVE GRADE: YES
LENGTH(S) OF UF WIRE PAST LAST AERATION RTISER(S): 30"	VENTED LID(S) ON AERATION CHAMBER(S): YES
FEMALE PLUG(S) WIRED TO UF WIRE: YES	ANY GROUND SETTLING AROUND TANK:
CONDUIT(S) ENTERING AERATION RISER MADE WITH A WATERTIGHT CONNECTION: YES	NO
ISTHE INSIDE OF THE CONDUIT ENTERING THE CONTROL PANEL(S) AND AERATION RISER(S) SEALED WITH DUCT SEAL: YES	

I certify that the Norweco Singulair TNT Wastewater Treatment System was installed according to the manufacture's specifications.

Matthew Geckle

December 22, 2020

Signature of BRP Representative

Vice-President

Date

Project: Titherington Property
 File: 03417-97283
 Date: 2020-02-11
 By: ebp
 Version: 3.0.1

Septic Tank Design
 Number of Bedrooms: 4.000
 Design Flow (50 GPD X Number of Bedrooms): 200,000 GPD
 Minimum Septic Tank size=(Design Flow X 1.5): 300,000 Gal.
 Septic Tank - NORWECO: 1500,000 Gal.

Trench Design
 Average Percolation Rate: 9.00 Min./in.
 Application Rate: 0.800 GPD/Fl²
 Absorption Area=(Design Flow/Application Rate): 750,000 S.F.
 Trench Width (W): 2,000 FT.
 Effective Area (d): 3,000 FT.
 Standard Trench Length = (Absorption Area/Trench Width) Deep Trench = (((w+2d)/(w+1+2d)) X Std Trench Length): 166,667 FT.

Distribution Network Design
 Number of Trenches: 4
 Length Top Trench: 41,750 FT.
 Initial Perforation Spacing Value: 4,250 FT.
 Perforations Top Trench=(Trench Length/Initial Perforation Spacing Value Rounded up to Whole Number): 10,000
 Perforation Spacing=(Top Trench Length/Number of Perforations): 4,175 FT. P
 Distance between Tee and First Perforation=(Perforation Spacing/2): 2,088 FT. Q
 Distance between End of Trench and Last Perforation=(Perforation Spacing/2): 2,088 FT. Q
 Length of Longest Trench: 41,750 FT.
 Lateral Diameter: 1 1/2 in. S

LATERAL DIMENSIONS (PVC SCH.40)		
LENGTH (ft.)	NOMINAL DIA. (in.)	INSIDE DIA. (in.)
Less than 23	1	1.049
between 23 and 36	1 1/4	1.380
between 36 and 50	1 1/2	1.610
between 50 and 75	2	2.067

Distance and Elevation Data
 Top Lateral Invert Elevation: 554,000 FT.
 Linear Feet of Foremain between Top of Pump to Supply Manifold: 113,820 FT.
 Invert Elevation in of Pump Tank: 553,826 FT.
 Length of Supply Manifold: 0,000 FT.

Foremain Specification
 Schedule 40 PVC: 3,000 in. T
 Inside Diameter: 3,068 in.

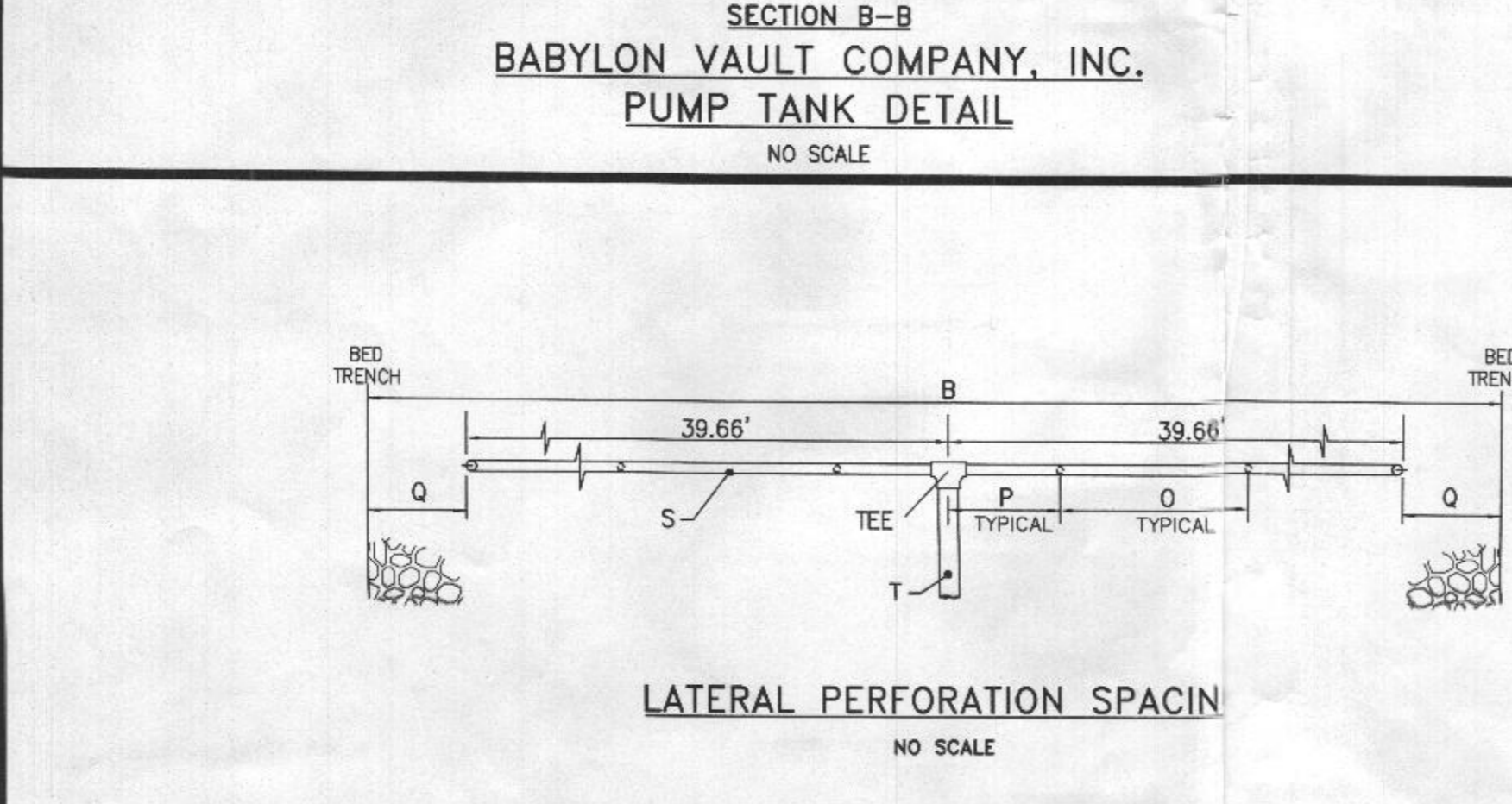
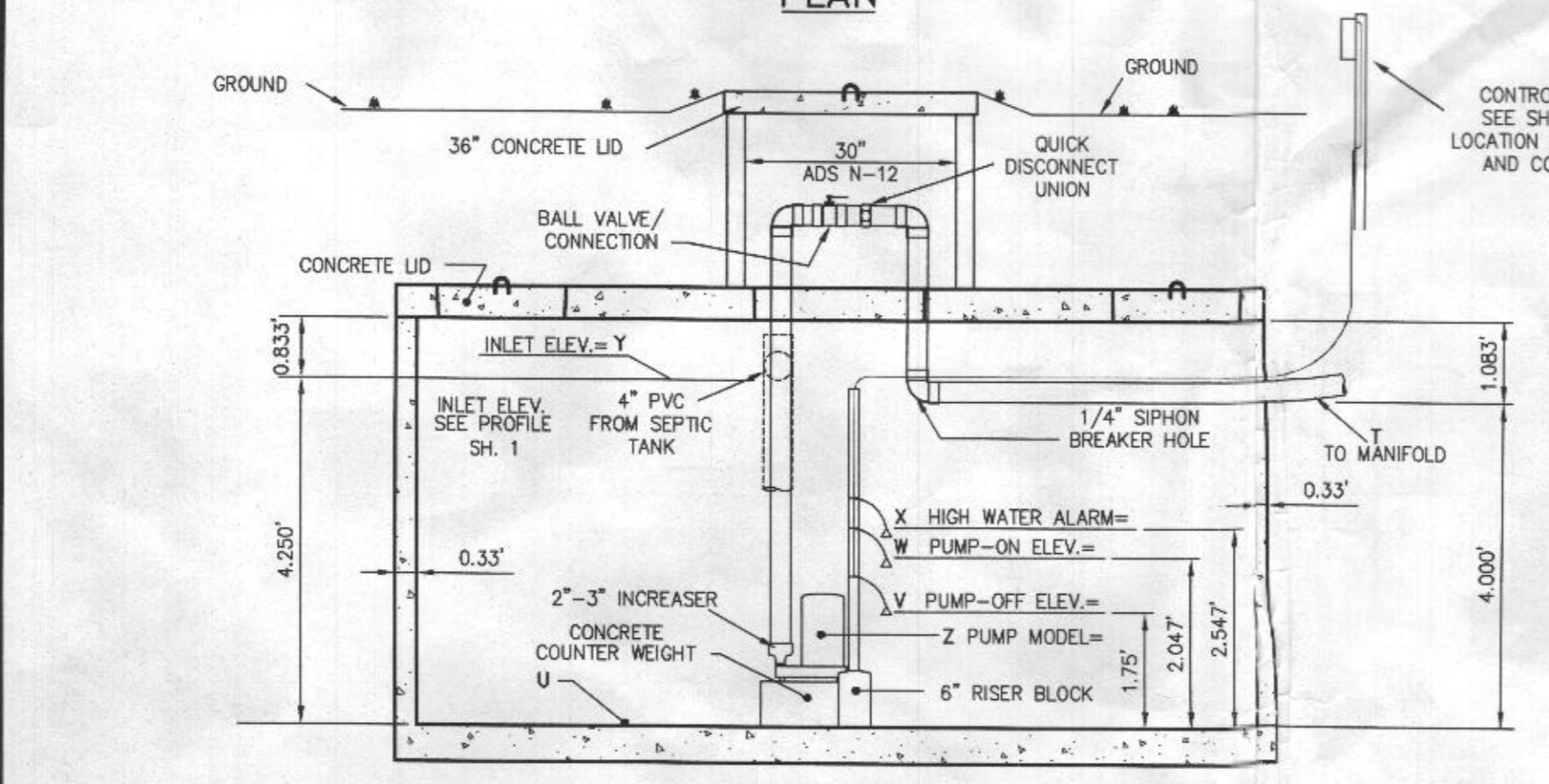
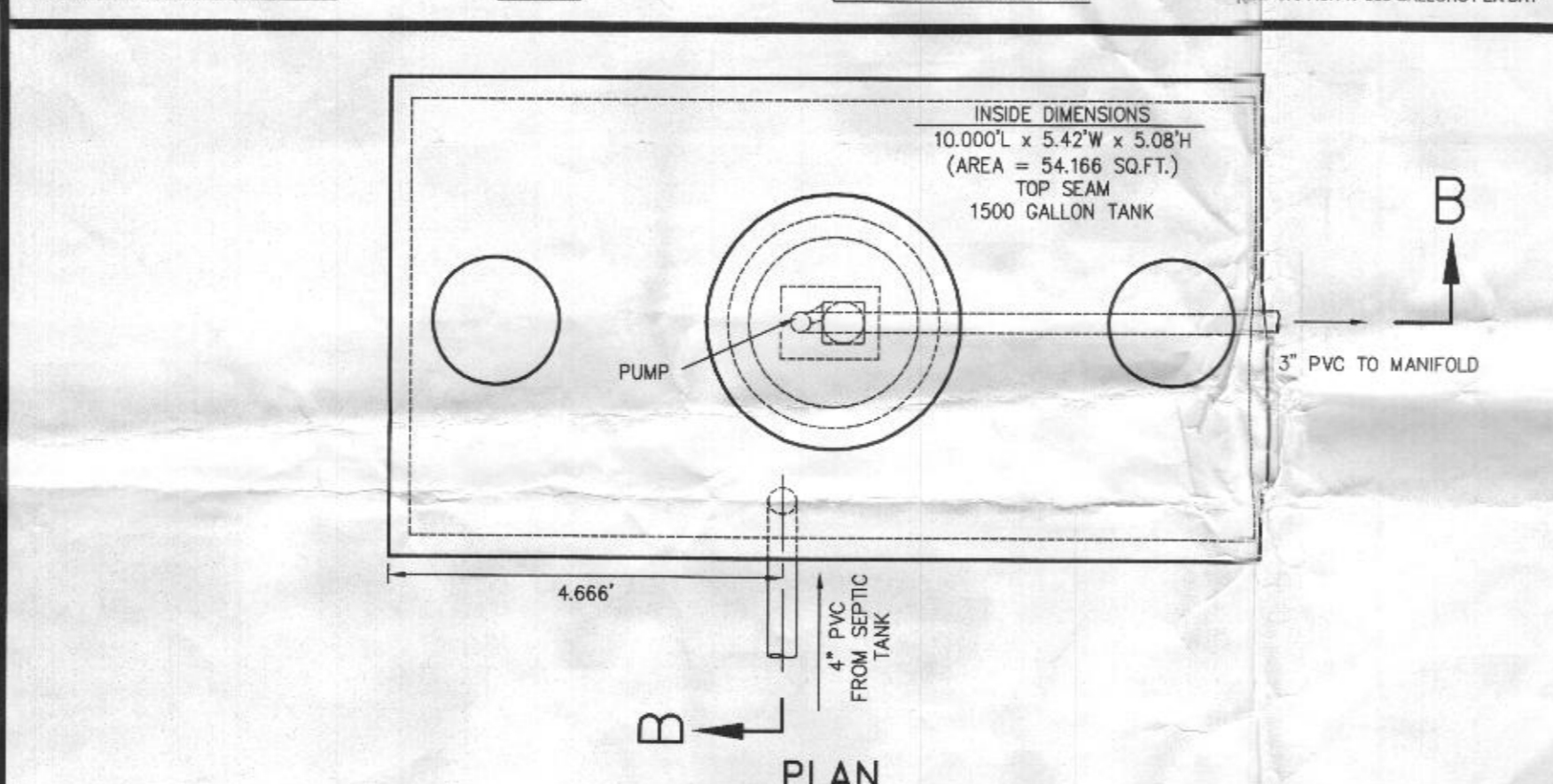
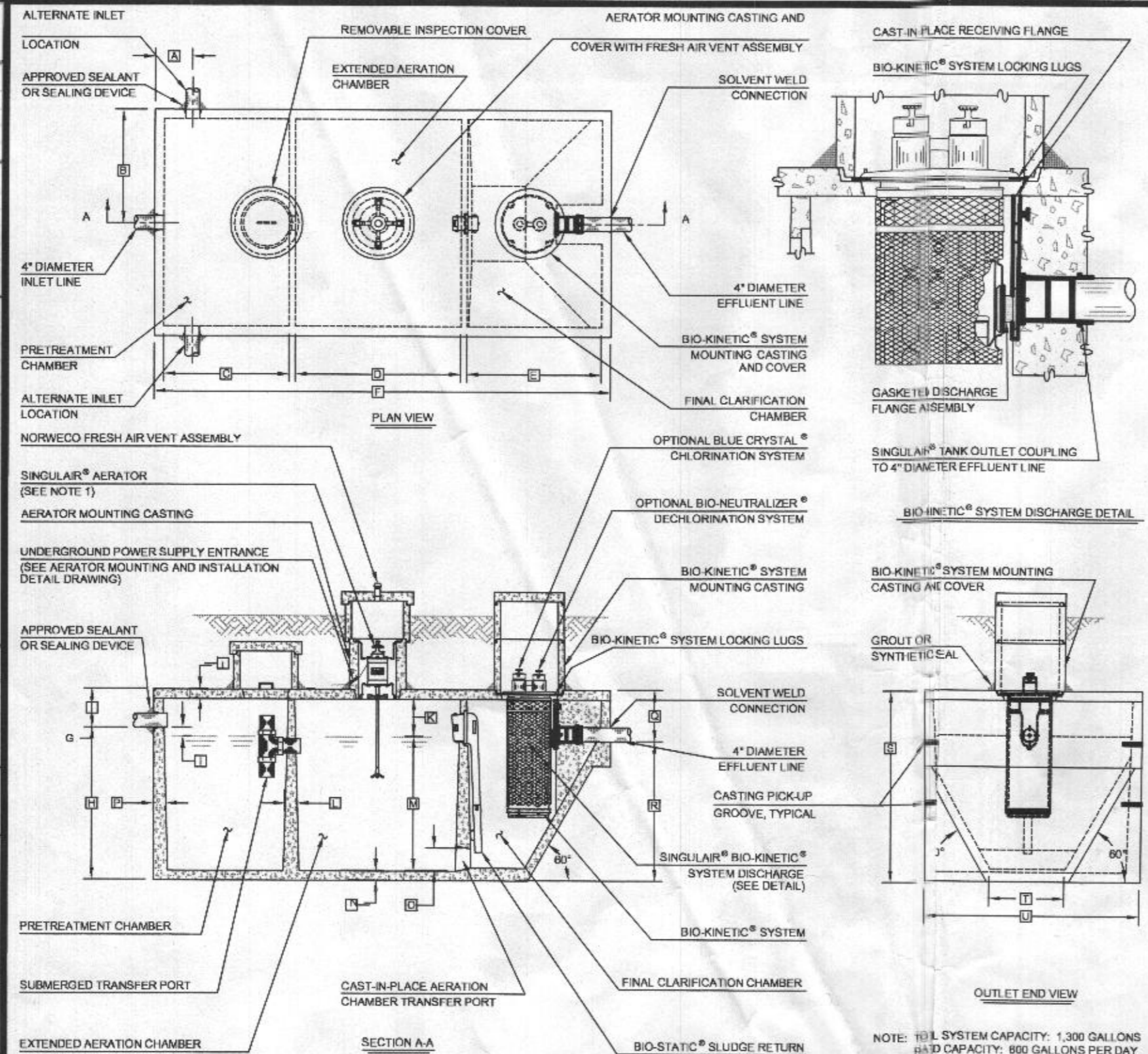
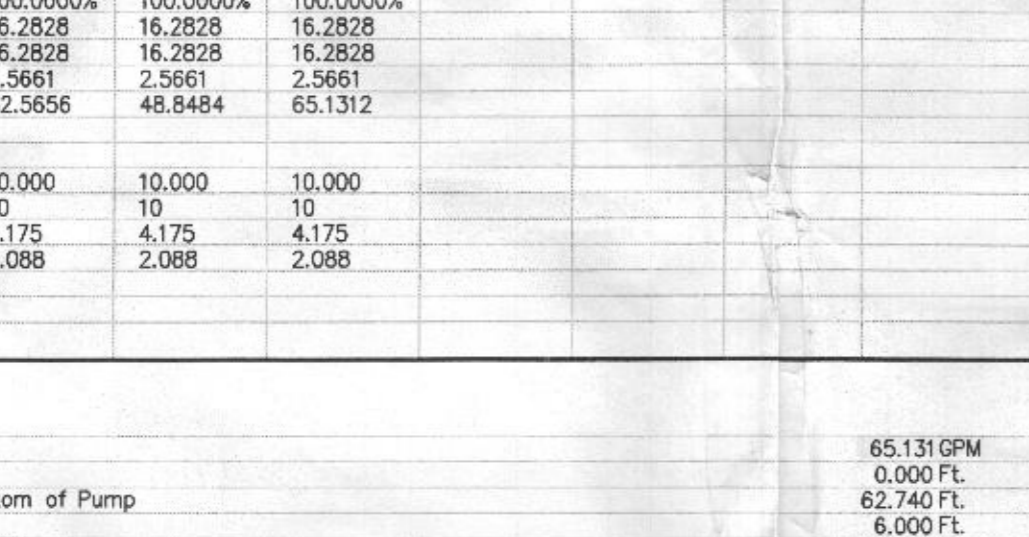
Dose Volume
 Length of 3" Foremain & Supply Manifold from Pump Off: 113,820 FT.
 Length of Laterals: 158,650 FT.
 Volume of Foremain & Supply Manifold=(pi x [(D/2)/12]^2 X Length of Foremain & Supply Manifold X 7.48/C.F.T.): 43,711 Gal.
 Volume of Laterals=(pi x [(D/2)/12]^2 X Length of Laterals X 7.48/C.F.T.): 16,778 Gal.
 Dose Volume=(greater of 3xLateral Volume+Foremain+Supply Manifold+Equalization Manifold Volume or 1/6 Design Flow or 100 Gal): 127,603 Gal.
 Dose Volume in C.F.T.=(Dose Volume/7.48): 17,058 Cu.Ft.

Pump Tank Design (1500 GAL)
 Bottom of Pump Tank Elevation: 548,576 FT. U
 6" Riser Block: 0,500 FT.
 Bottom of Pump Elevation: 550,076 FT.
 Distance Between Bottom of Pump to Pump Off Elevation: 1,250 FT. V
 Pump Off Elevation: 551,326 FT. V
 Distance Between Pump On & Pump Off Elevation (Dose/Area of Pump Tank): 0,315 FT. W
 Pump On Elevation: 551,641 FT. W
 Per MDE Pump On to High Water Alarm (>0.50H): 0,500 FT. X
 High Water Alarm Elevation: 552,141 FT. X
 Distance Between Pump On & Pump Tank Inlet (Design Flow/7.48/Area of Pump Tank): 4,481 FT. Y
 Design Pump Tank Inlet Elevation: 553,622 FT. Y
 Actual Pump Tank Inlet Elevation>Design Pump Tank Inlet Elevation: 553,826 FT. Y

Equalize Low Pressure Dose at Varying Elevations

SYSTEM TRENCH NUMBER	1.1.1	1.1.2	1.2.1	1.2.2
TRENCH DATA				
Trench Length	41,750	41,750	41,750	41,750
Ground Elevation (ft.)	556,000	556,000	556,000	556,000
Trench Cover (ft.)	2,000	2,000	2,000	2,000
Stone Over Lateral (ft.)	0.167	0.167	0.167	0.167
Diameter Lateral (ft.)	0.125	0.125	0.125	0.125
Invert Lateral (ft.)	553,708	553,708	553,708	553,708
HEAD CALCULATION				
System Head (ft.)	2,000	2,000	2,000	2,000
Head Elevation	555,708	555,708	555,708	555,708
PERFORATION CALCULATION				
Perforation Dia. (in.)	0.313	0.313	0.313	0.313
Perforation Flow Rate (gpm)	1,828	1,828	1,828	1,828
FLOW CALCULATION				
Percent of Flow per Top Trench	100,0000%	100,0000%	100,0000%	100,0000%
Lateral Flow Rate Design (gpm)	16,2828	16,2828	16,2828	16,2828
Lateral Flow Rate Actual (gpm)	16,2828	16,2828	16,2828	16,2828
Lateral Velocity (fps)	2,5661	2,5661	2,5661	2,5661
System Flow (gpm)	16,2828	32,5656	48,8484	65,1312
PERFORATION LOCATIONS				
Perforations Number Design	10,000	10,000	10,000	10,000
Perforations Number Used	10	10	10	10
Perforation Spacing (ft.)	4,175	4,175	4,175	4,175
Perforation from End (ft.)	2,088	2,088	2,088	2,088

Pump Design
 System Flow Rate: 65.131 GPM
 Length of Supply Manifold: 0,000 FT.
 Length of 3" Foremain & Supply Manifold from Bottom of Pump:
 2 - increasers (3.0 FT. each): 6,000 FT.
 4 - 90° Bend (10.0 FT. each): 40,000 FT.
 0 - 60° Bend (8.0 FT. each): 0,000 FT.
 2 - 45° Bend (6.0 FT. each): 12,000 FT.
 0 - 30° Bend (4.5 FT. each): 0,000 FT.
 0 - 22 1/2° Bend (3.0 FT. each): 0,000 FT.
 0 - 15° Bend (2.0 FT. each): 0,000 FT.
 0 - 11 1/4° Bend (1.5 FT. each): 0,000 FT.
 2 - Tee (15 FT. each): 30,000 FT.
 Total Length: 150,740 FT.
 Friction Loss per 100 Feet: 0.961 FT.
 Pump Off Float Elevation: 551,326 FT.
 Manifold Elevation: 554,000 FT.
 Head Loss: 2,674 FT.
 Total Friction Loss: 1,449 FT.
 Required Head for Peak Flow: 2,000 FT.
 Dynamic Head: 6,123 FT.

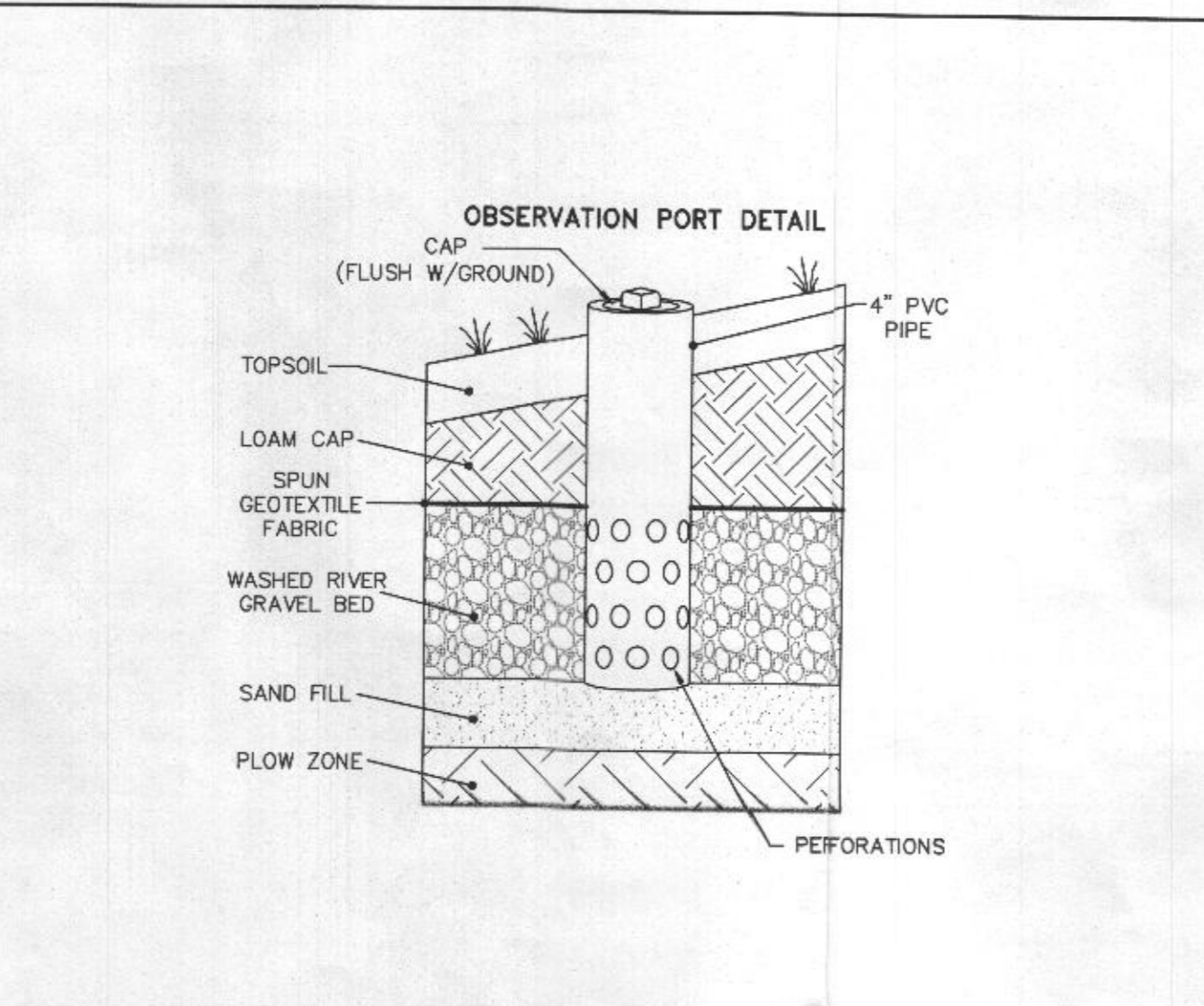
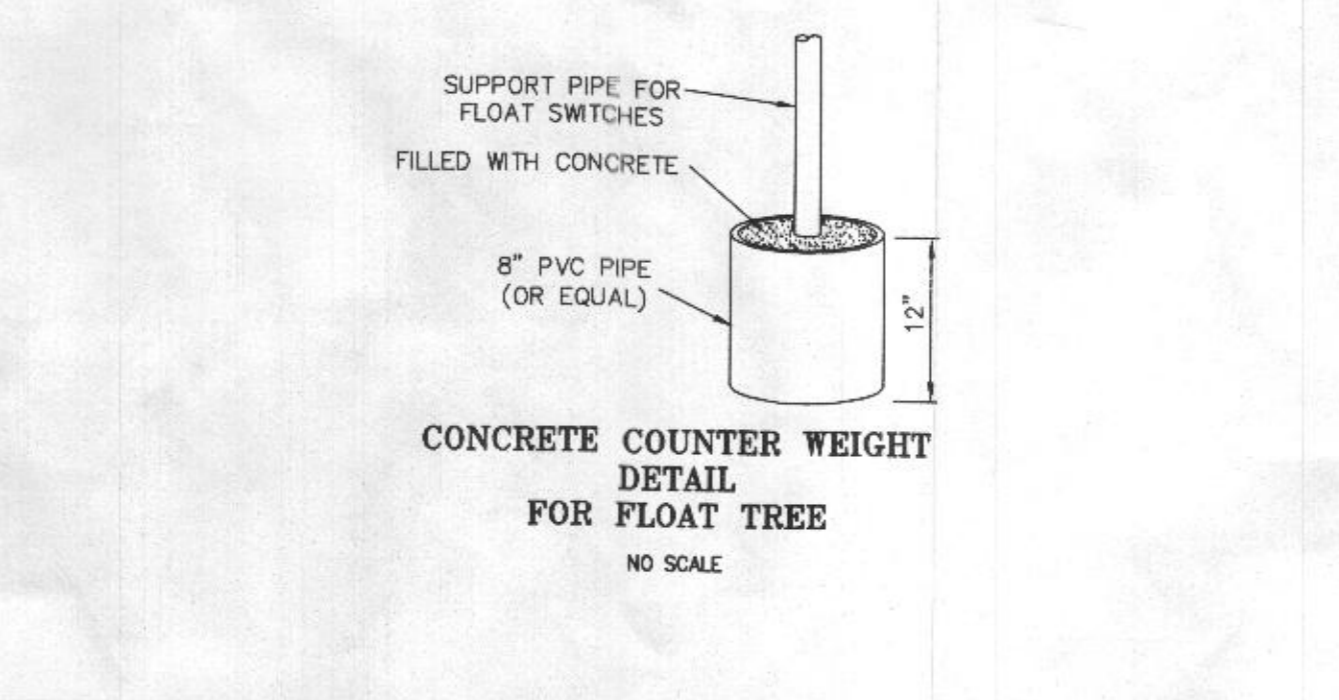
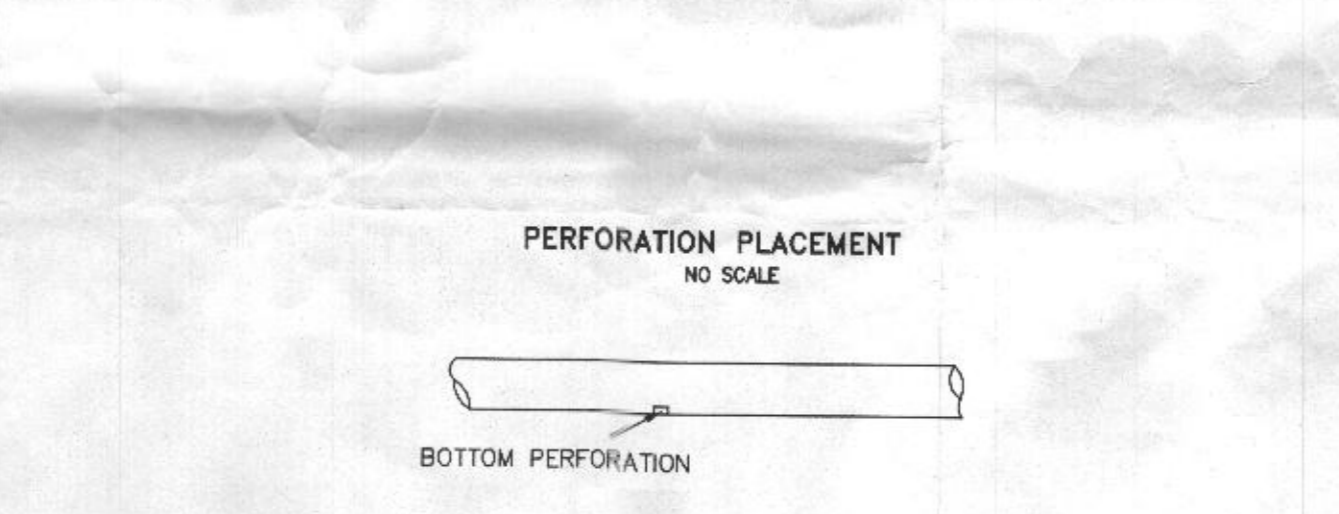
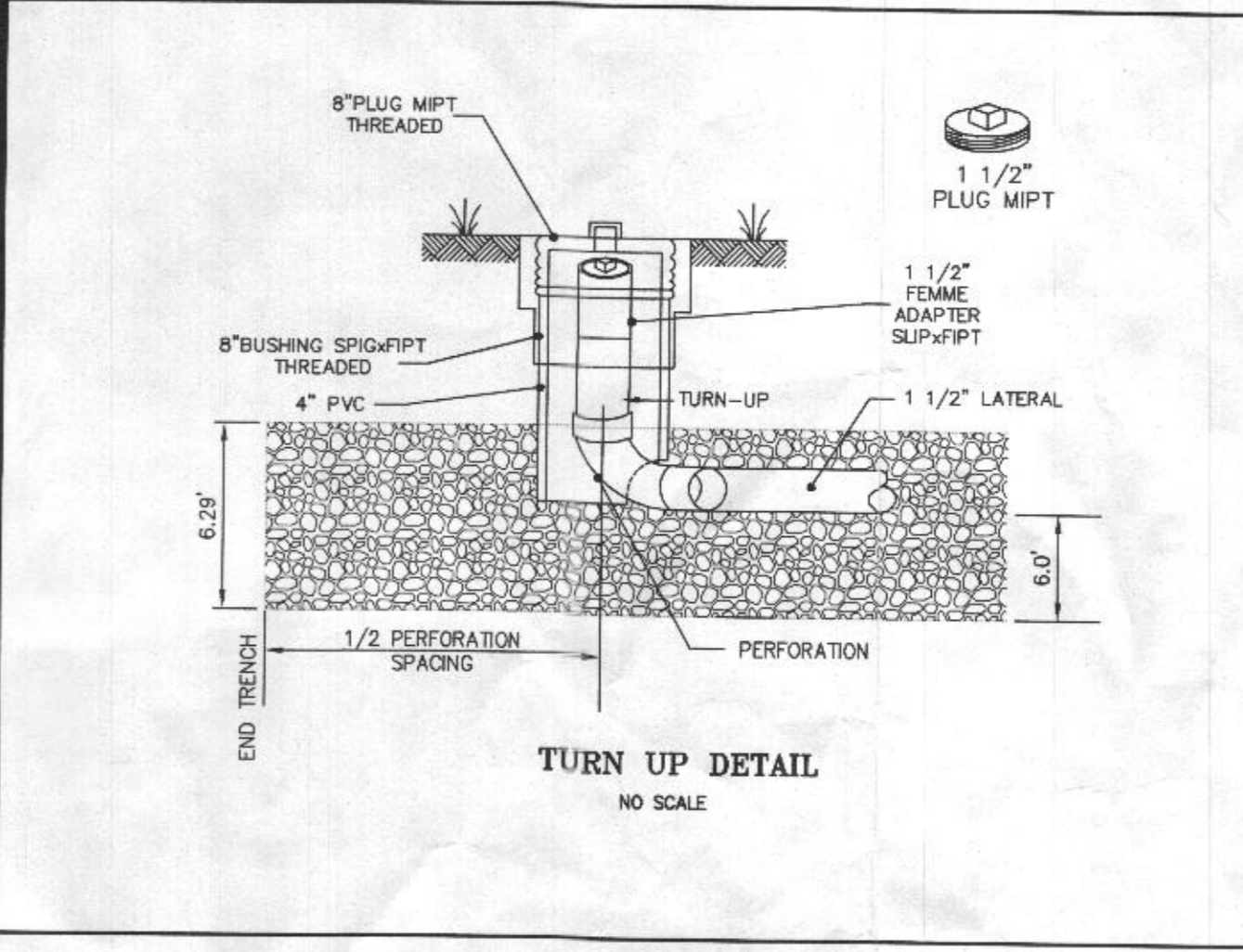
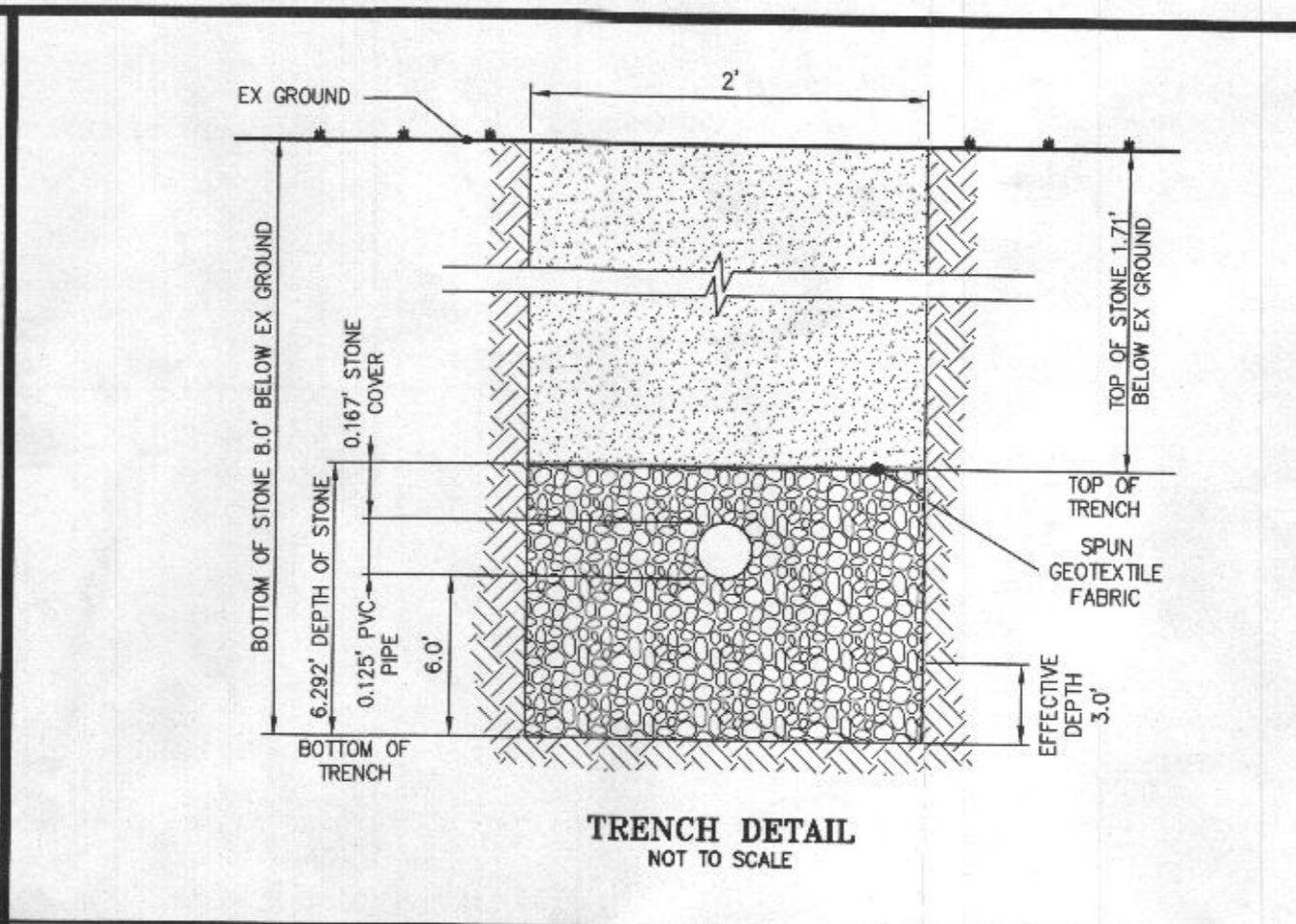


GENERAL NOTES:
 1. SINGULAR® AERATOR, AS TESTED AND ACCEPTED BY NSF, OPERATING 80 MINUTES ON / 60 MINUTES OFF.
 2. FALL THROUGH SINGULAR® PLANT FROM INLET INVERT TO OUTLET INVERT IS FOUR INCHES. INLET INVERT IS TWELVE INCHES BELOW TANK TOP.
 3. ON KEOPER INSTALLATIONS, PRECAST RISERS MUST BE USED TO EXTEND AERATOR MOUNTING CASTING AND BIO-KINETIC® SYSTEM MOUNTING CASTING TO GRADE.
 4. TANK REINFORCED PER ACI STD. 318-03.
 5. REMOVABLE COVERS ON RISERS WEIGH IN EXCESS OF SEVENTY FIVE POUNDS EACH TO PREVENT UNAUTHORIZED ACCESS.
 6. CONTACT THE LOCAL LICENSED SINGULAR® DISTRIBUTOR FOR ELECTRICAL REQUIREMENTS.

PROJECT ENGINEER'S APPROVAL:
 I HEREBY CERTIFY THAT THIS DRAWING HAS BEEN CHECKED AND IS APPROVED FOR USE IN CONFORMITY WITH THE CONTRACT DOCUMENTS.
 DATE: _____
 NAME: _____

CONTRACTOR'S CERTIFICATION:
 I HEREBY CERTIFY THAT THIS DRAWING HAS BEEN CHECKED AND IS APPROVED FOR USE IN CONFORMITY WITH THE CONTRACT DOCUMENTS.
 DATE: _____
 NAME: _____

CRITICAL DIMENSIONS	
A 1'-0"	B 6'-0"
D 3'-0"	E 6'-0"
G 3'-0"	H 6'-0"
I 4'-0"	J 1'-0"
K 12'-0"	L 5'-0"
M 1'-0"	N 2'-0"
O 6'-0"	P 6'-0"
Q 6'-0"	R 6'-0"
S 6'-0"	T 6'-0"
U 6'-0"	V 6'-0"
W 6'-0"	X 6'-0"
Y 6'-0"	Z 6'-0"



Site Plan for BAT Installation
TITHERINGTON PROPERTY
 LINTHICUM ROAD DAYTON
 HOWARD COUNTY, MARYLAND 21036

OWNER: Kenneth & Sarah Mueller
 7014 Mink Hollow Road
 Highland, MD 20777
 443-651-1470

DEVELOPER: Viking Development Corp.
 815 Windriver Drive
 Sykesville, MD 21784
 410-977-2188

MAY 22 BLOCK 19 PARCEL 561
 Account Number 435005
 ZONED RC-DEO COUNTY LAND RECORD 19202 Page 249
 5TH ELECTION DISTRICT

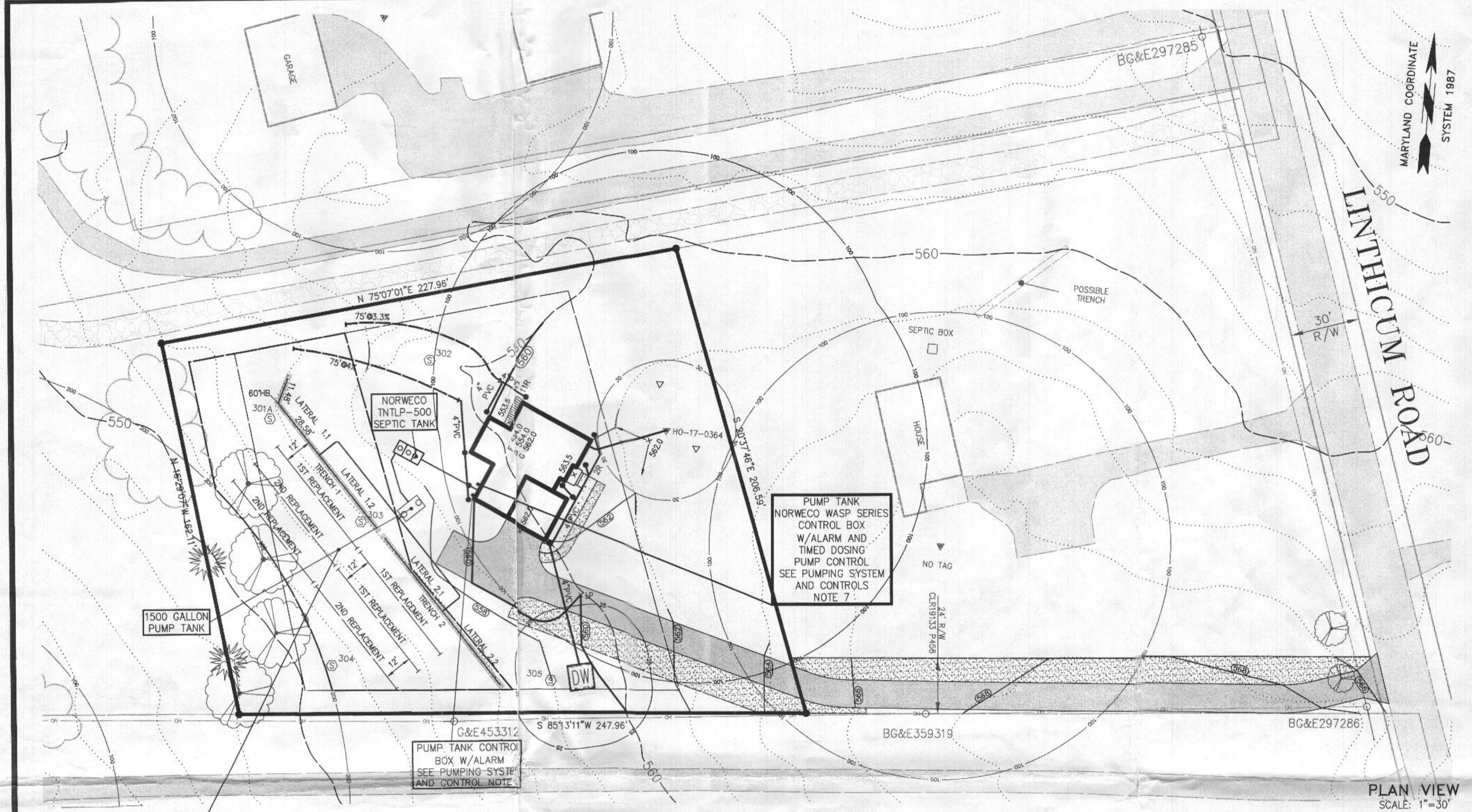
D.R.S. & ASSOCIATES
 LAND DESIGN CONSULTANTS
 52 WINTERS STREET WESTMINSTER, MARYLAND 21157
 410-848-4060 410-876-6040 F. 410-848-8818

REV.No.	DATE	BY	DESCRIPTION	DATE
1	2020-03-02	DRS/ebp	PER HCHD 2020-02-26/2020-02-07	2020-02-10
2	2020-03-27	DRS/ebp	PER HCHD 2020-03-23	2020-03-23

SCALE: 1"=30'
 SHEET NO. : 2 OF 2
 DWG.: WS01-01

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EBP - 03417-97283 - 97283-WS01-02-Rev2.plt - 04-07-2020 - 13:23
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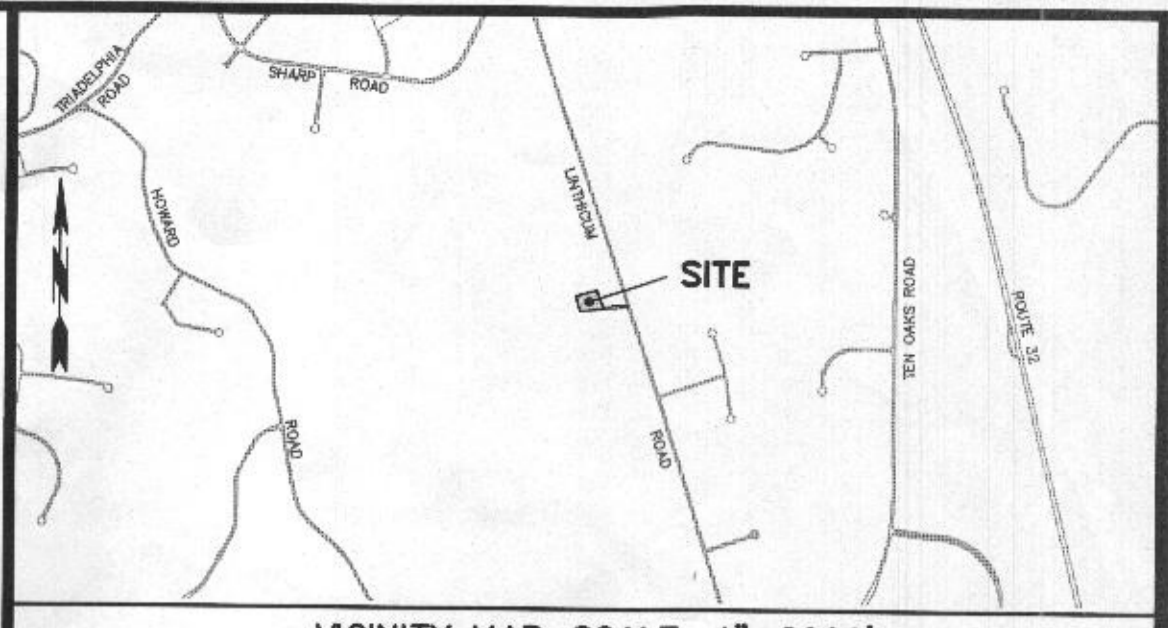


CONSTRUCTION NOTES
SEPTIC TANK
 1. All tanks must be watertight and meet all horizontal separation distances specified in State and County regulations.
 2. Tanks that are constructed with seams and joints must be above the high water table.
 3. A 24-hour leakage test may be conducted to demonstrate water tightness prior to final construction approval.
PUMPING SYSTEM AND CONTROLS
 1. The pump tank must provide sufficient capacity to allow for storage of the dose and one day design flow between the high water alarm and the inlet of the first septic tank. It is also recommended that sufficient capacity be provided so that the pump can be set on a block and remain submerged at all times.
 2. The pump tank must be watertight, protected against buoyant forces and meet all horizontal separation distances in State and County regulations.
 3. Tanks that are constructed with seams and joints must be above the high water table.
 4. A 24-hour leakage test may be conducted to demonstrate water tightness prior to final construction approval.
 5. The pump shall be capable of delivering 65.131 g.p.m. at the design head.
 6. The use of a three float system to control pump on, pump off and the high water alarm is recommended. The float system must be capable of delivering the specified dose.
 7. The control box or panel should be mounted outside the building at least 30' above final grade, not more than 48" above final grade, inline of sight of the pump tank and in an accessible location.
 8. All electrical connections should be located outside the tank.
 9. The high water alarm must be wired on a separate electrical circuit.
 10. A test of the pumping system and distribution network will be required prior to covering the system. The force main can be partially covered as long as all joints, elbows, tees, etc. are visible. The test will require sufficient water crane to activate the pump through several pumping cycles. Provisions to protect the pumping system and distribution network from erosion and sedimentation must be made by the contractor.
 11. The pump is to be made of submersible construction, mounted 6" above the pumping station floor.
 12. The supply line is to be installed with a uniform slope to assure complete drainage of effluent from the manifold and supply line following each pumping cycle.

CONSTRUCTION SPECIFICATIONS
 1. All piping to be schedule 40 PVC.
 2. Supply line from pump to laterals to be 3 inches in diameter.
 3. Lateral to be 1 1/2 inches in diameter.
 4. For lateral perforations and spacing, see detail sheet 2. Perforation to be in the bottom of each lateral (see detail).
 5. The pump is to be of submersible construction, mounted 6 inches above the pumping station floor, capable of delivering 78.157 gpm at 7.133 Ft/Total dynamic head.
 6. The supply line is to be installed with a uniform slope to assure complete drainage of effluent from the supply line following each pumping cycle.
 7. Each pump cycle will remove approximately 120.441 gallons of effluent at the approximate rate of 78.157 gpm. Measurements shown on the drawing for pump-on, pump-off and alarm are based upon inside tank dimension of 10 ft long by 5.417 ft wide.
 8. The high level alarm is to be on a separate electrical circuit.
 9. An event counter or elapsed time meter is required.
 10. Septic tank to be top seam tank manufactured by NORWECO.
 11. Pump tank to be top seam tank manufactured by Babylon Int'l Co.
 12. The gravel shall be free of fines and between 3/4 inch and inches in size.

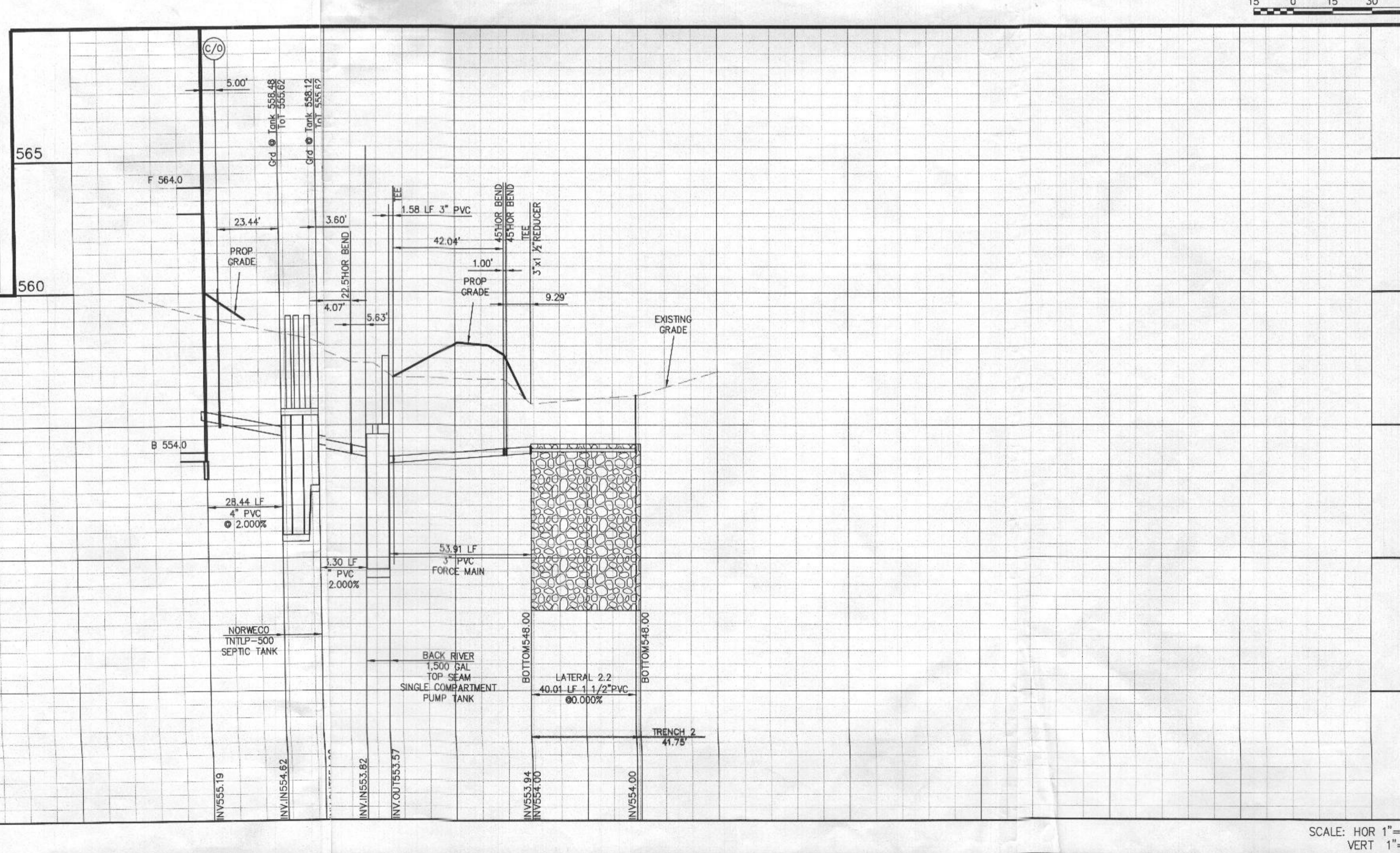
CONSTRUCTION PROCEDURES
MATERIALS
 The following specifications are required:
 1. Aggregate shall be clean aggregate free of fines and between 3/4 to 2 inches in diameter.
 2. Geotextile fabric shall be a type approved by the Approv. Authority.
 3. Cap material shall be soil relatively free of coarse fragments and preferably a clay loam or silt loam texture.
TANK INSTALLATION AND SITE PREPARATION
 1. Locate and rope-off the entire sewage disposal area to event damage to the area during other construction activity on the site. Vehicular traffic over the disposal area should be prohibited to avoid soil compaction.
 2. Install septic tank and pumping tank and pump as shown on the drawings. Call for inspection.
 3. Excess vegetation should be cut and removed.
 4. Determine the location where the force main from the piping tank will connect to the distribution network manifold.
 5. Install the force main from the pumping tank to the prior location. Pipe should be laid with uniform slope back to the tank so it drains after dosing. Backfill trench and compact to prevent seepage along the trench.
DISTRIBUTION NETWORK
 1. Carefully place the coarse aggregate in the trench. Do not create ruts in the bottom of the trench. Level the aggregate to minimum depth.
 2. The distribution network is assembled in place setting force main to ensure draining the laterals between doses. The laterals should be laid level with the holes directed downward. Call for inspection. Test the pumping tank and distribution network with clean water.
 3. Place additional aggregate to a depth of at least two feet over the crown of the lateral.
 4. Place the approved geotextile fabric over the aggregate.
COVER MATERIAL
 1. Place a finer textured soil material such as sandy clay loam, clay loam or silt loam on top of the fabric.
 2. Place a minimum of six inches of good quality topsoil c the entire surface. Call for final inspection.

VEGETATION
 1. Fertilize, lime, seed and mulch the entire surface. Grasses/turf sods to the area should be used.
 2. Consult the county extension agent or Soil Conservation Service for recommendations.



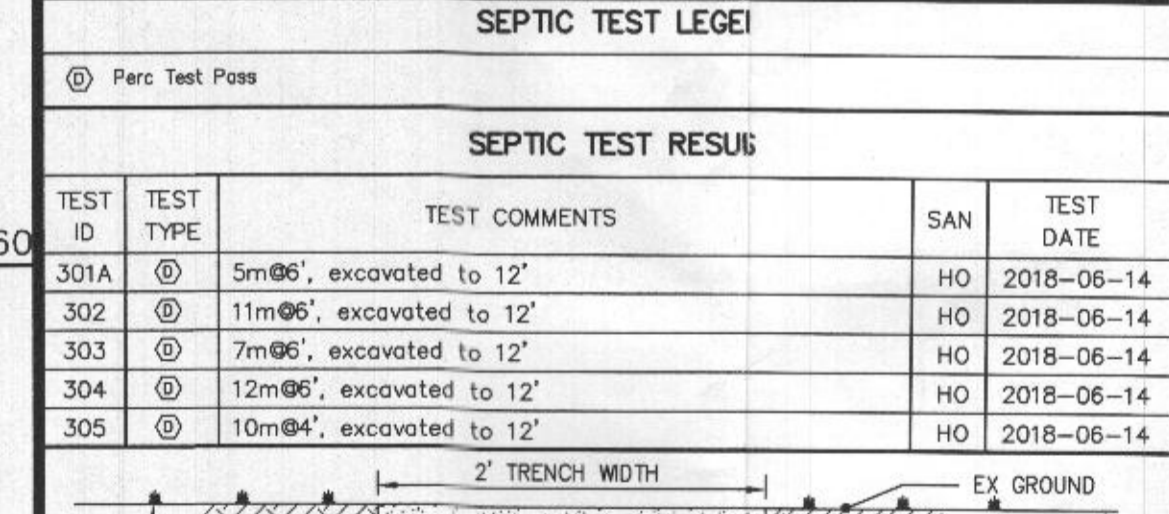
GENERAL NOTES
 1. Current Title Reference:
 Owner: Jon Dennis Titherington & Ann Nicodemus Titherington
 County Land Record 2865 Page 686
 Grantor: Ernest Richard Shipley and Janice M. Shipley
 Subject Property Zoned: RC-DEO.
 2. Total area of property: 43,110 sq.ft.
 3. Septic easement subject to Howard County Health Department review.
 4. Contractor/Builder to verify elevation in the field before beginning any construction.
 5. The topography shown hereon was taken from data by Howard County and based on Bare Earth LIDAR Data U.S. Feet supplemented with field run data by DRS & Associates and is verified to accurately represent the relative changes on the subject property by DRS & Associates.
 6. No wetlands currently exist on the property.
 7. This area designates a private sewage area as required by the Maryland Department of the Environment for individual sewage disposal. For lots created prior to March of 1972 it provides at least enough area to accommodate an initial on two replacement septic systems as required by the Howard County Health Department. Improvements of any nature in this area are restricted until public sewerage is available. This area shall become null and void upon connection to a public sewerage system. The county Health Officer shall have the authority to grant adjustments to the private sewage area. Recordation of a modified sewage area shall not be necessary.
 8. Existing wells and/or sewerage easements within 100 feet of the property have been shown from the best available information.
 9. The existing well shown on this plan identified with the attached well tag number "HO-17-0364" has been field located by DRS & Associates professional land surveyor and is accurately shown.
 10. Any change to the locations or depths to any components must be approved by the engineer and the Howard County Health Department prior to installation. A revised site plan may be required.
 11. The maximum depth of the BAT per the manufacturer's specification is 3 feet.
 12. Electrical work for the installation must be performed by a licensed electrician.
 13. All wells and septic systems located within 100' of the property boundaries and 200' down gradient of any wells and/or septic systems have been shown.
 14. The BAT system shall be maintained and operated for the life of the system.
 15. The BAT shall be operated by and maintained by a certified service provider.
 16. Within one month of installation, a person installing the BAT system shall report to the Maryland Department of the Environment (MDE) in a manner acceptable to MDE, the address and date of completion of the Bat installation and the type of BAT installed.
 17. An Agreement and Easement must be completed and signed by all applicable parties, and recorded in the Land Records of Howard County.
 18. The Health Department requires documentation for the start-up certification from the manufacturer prior to final approval of the installation.

4 BEDROOM: 600 GPD 1300 Gallon NORWECO TNL-500 Septic Tank
INITIAL SYSTEM:
 Loading Rate: 0.8 GPD per Square Foot
 Effective Area Depth: 5.0' to 8.0'
 2' Wide Trench
 Standard Trench: 375 LF
 $w=2/(w+2d)$
 where w=width of trench
 d=depth of gravel
 $2+2/(2+1+2*3)=0.4444$
 $375*0.4444=166.67$ LF Deep Trench
 Use: 2 Lines @ 83.50'
FIRST & SECOND REPLACEMENT:
 Loading Rate: 0.8 GPD per Square Foot
 Effective Area Depth: 5.0' to 8.0'
 2' Wide Trench
 Standard Trench: 375 LF
 $w=2/(w+2d)$
 where w=width of trench
 d=depth of gravel
 $2+2/(2+1+2*3)=0.4444$
 $375*0.4444=166.67$ LF Deep Trench
 Use: 3 Lines @ 55.70'



SEPTIC TEST LOG

TEST ID	TEST TYPE	TEST COMMENTS	SAN	TEST DATE
301A	⊙	5m⊙6", excavated to 12'	HO	2018-06-14
302	⊙	11m⊙6", excavated to 12'	HO	2018-06-14
303	⊙	7m⊙6", excavated to 12'	HO	2018-06-14
304	⊙	12m⊙6", excavated to 12'	HO	2018-06-14
305	⊙	10m⊙4", excavated to 12'	HO	2018-06-14



INVERT CHART FOR TRENCHES

LATERAL NUMBER	BEGINNING EX GRD EL	BEGINNING INV	BEGINNING TRENCH BOT	END EL	END INV	END TRENCH BOT
1.1	556.47	554.00	548.00	556.04	554.00	548.00
1.2	556.47	554.00	548.00	556.09	554.00	548.00
2.1	555.80	554.00	548.00	556.09	554.00	548.00
2.2	555.80	554.00	548.00	556.07	554.00	548.00

LEGEND

Existing Proposed

Edge of Rd
 Feature separation distance in feet

Ind. Contours
 Int. Contours

Lot Line
 Plat Outline
 Approved SDA

Bit. Conc. Pav.

Clean Out, Sewer/Drain Structure
 Utility Pole
 Utility Pole w/Guy Wire
 Well

Approved Septic System Plan
 Howard County Health Department
 Hank Oswald
 Signature Date 4/24/20

ABBREVIATIONS

B Basement floor elevation or Book
 CLR County Land Record
 F First floor elevation
 G Garage floor elevation

Grd
 Page
 PB Plat Book
 TOT Top of Tank

Site Plan for BAT Installation
TITHERINGTON PROPERTY
 LINTICUM ROAD DAYTON
 HOWARD COUNTY, MARYLAND 21036

OWNER Kenneth & Sarah Mueller
 7014 Mink Hollow Road
 Highland, MD 20777
 443-651-1470

DEVELOPER Viking Development Corp.
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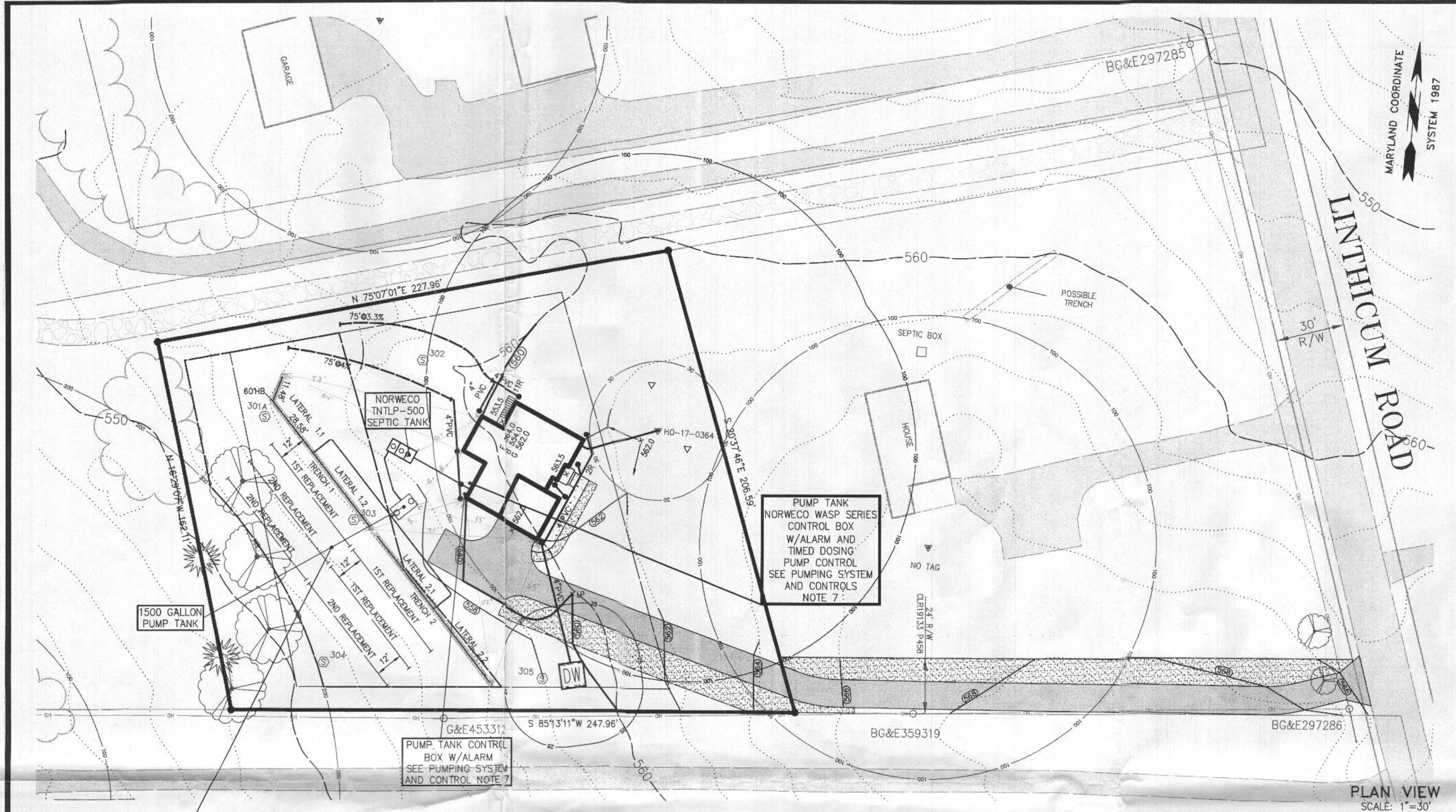
MARYLAND DEPARTMENT OF THE ENVIRONMENT
 STATE OF MARYLAND
 DEPARTMENT OF THE ENVIRONMENT
 DIVISION OF WASTE MANAGEMENT

MAY 22 2020
 ACCOUNT NUMBER 435005
 ZONED RC-DEO COUNTY LAND RECORD 19202 Page 249
 5TH ELECTION DISTRICT

D.R.S. & ASSOCIATES
LAND DESIGN CONSULTANTS
 52 WINTERS STREET WESTMINSTER, MARYLAND 21157
 410-848-4060 410-876-6040 F. 410-848-8818

REV. No. DATE BY DESCRIPTION DATE: 2020-02-10
 1 2020-03-02 DRS/ebp PER HCHD 2020-02-26/2020-02-07 SCALE: 1"=30'
 2 2020-03-27 DRS/ebp PER HCHD 2020-03-23 SHT. NO.: 1 OF 2
 DWG.: WS01-01

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CONSTRUCTION NOTES

SEPTIC TANK

- All tanks must be watertight and meet all horizontal separation distances specified in State and County regulations.
- Tanks that are constructed with seams and joints must be above the high water table.
- A 24-hour leakage test may be conducted to demonstrate water tightness prior to final construction approval.

PUMPING SYSTEM AND CONTROLS

- The pump tank must provide sufficient capacity to allow for storage of the dose and one day design flow between the high water alarm and the inlet of the first septic tank. It is also recommended that sufficient capacity be provided so that the pump can be set on a block and remain submerged at all times.
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- The pump shall be capable of delivering 65.131 g.p.m. at the design head.
- The use of a three float system to control pump on, pump off and the high water alarm is recommended. The float system must be capable of delivering the specified dose.
- The control box or panel should be mounted outside the building at least 30' above final grade, not more than 48" above final grade, in line of sight of the pump tank and in an accessible location.
- All electrical connections should be located outside the tank.
- The high water alarm must be wired on a separate electrical circuit.
- A test of the pumping system and distribution network will be required prior to covering the system. The force main can be partially covered as long as all joints, elbows, tees, etc. are visible. The test will require sufficient water onsite to activate the pump through several pumping cycles. Provisions to protect the pumping system and distribution network from erosion and sedimentation should be made by the contractor.
- The pump is to be made of submersible construction, mounted 6" above the pumping station floor.
- The supply line is to be installed with a uniform slope to assure complete drainage of effluent from the manifold and supply line following each pumping cycle.

CONSTRUCTION SPECIFICATIONS

- All piping to be schedule 40 PVC.
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- The high level alarm is to be on a separate electrical circuit.
- An event counter or elapsed time meter is required.
- Septic tank to be top seam tank manufactured by NORWECO.
- Pump tank to be top seam tank manufactured by Balfour Becht Co.
- The gravel shall be free of fines and between 3/4 inch and 2 inches in size.

CONSTRUCTION PROCEDURES

MATERIALS

- Aggregate shall be clean aggregate free of fines and between 3/4 to 2 inches in diameter.
- Geotextile fabric shall be a type approved by the Approving Authority.
- Cap material shall be soil relatively free of coarse fragments and preferably a clay loam or silt loam texture.

TANK INSTALLATION AND SITE PREPARATION

- Locate and rope-off the entire sewage disposal area to prevent damage to the area during other construction activity on the site. Vehicular traffic over the disposal area should be prohibited to avoid soil compaction.
- Install septic tank and pumping tank and pump as shown on the drawings. Call for inspection.
- Excess vegetation should be cut and removed.
- Determine the location where the force main from the pumping tank will connect to the distribution network manifold.
- Install the force main from the pumping tank to the proper location. Pipe should be laid with uniform slope back to the tank so that it drains after dosing. Backfill trench and compact to prevent seepage along the trench.

DISTRIBUTION NETWORK

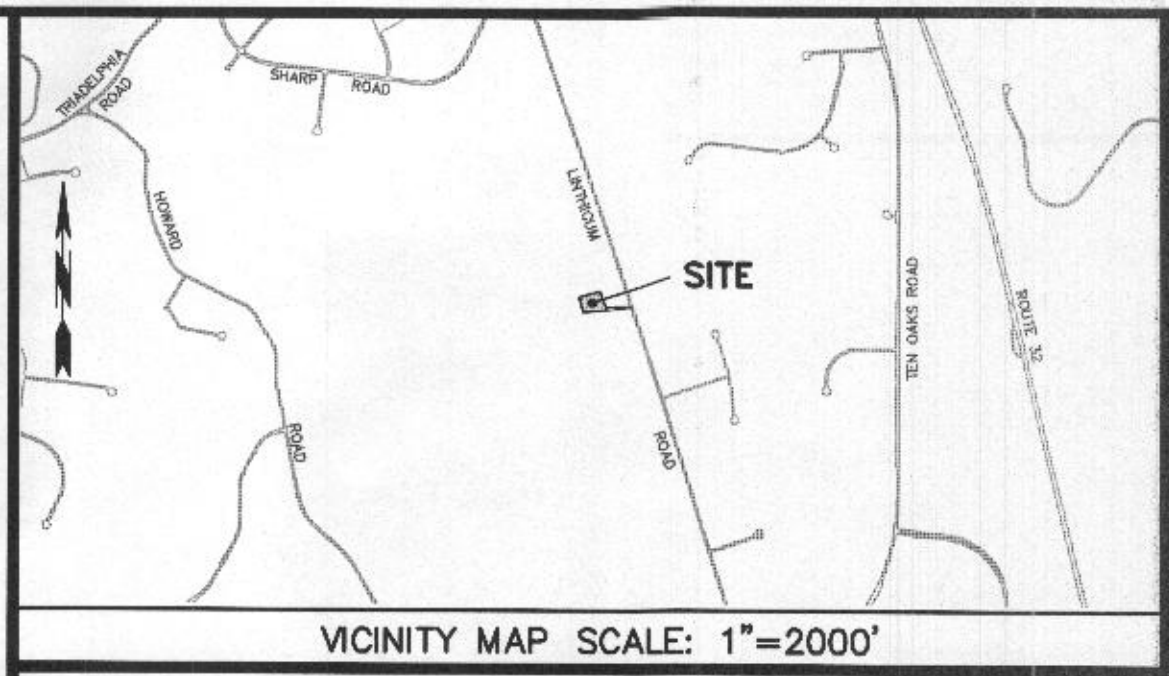
- Carefully place the coarse aggregate in the trench. Do not create ruts in the bottom of the trench. Level the aggregate to a minimum depth.
- The distribution network is assembled in place setting the force main to ensure draining the laterals between doses. The laterals should be laid level with the holes directed downward. Call for inspection. Test the pumping tank and distribution network with clean water.
- Place additional aggregate to a depth of at least two inches over the crown of the lateral.
- Place the approved geotextile fabric over the aggregate.

COVER MATERIAL

- Place a finer textured soil material such as sandy clay loam, clay loam or silt loam on top of the fabric.
- Place a minimum of six inches of good quality topsoil over the entire surface. Call for final inspection.

VEGETATION

- Fertilize, lime, seed and mulch the entire surface. Grass mixtures adopted to the area should be used.
- Consult the county extension agent or Soil Conservation Service for recommendations.



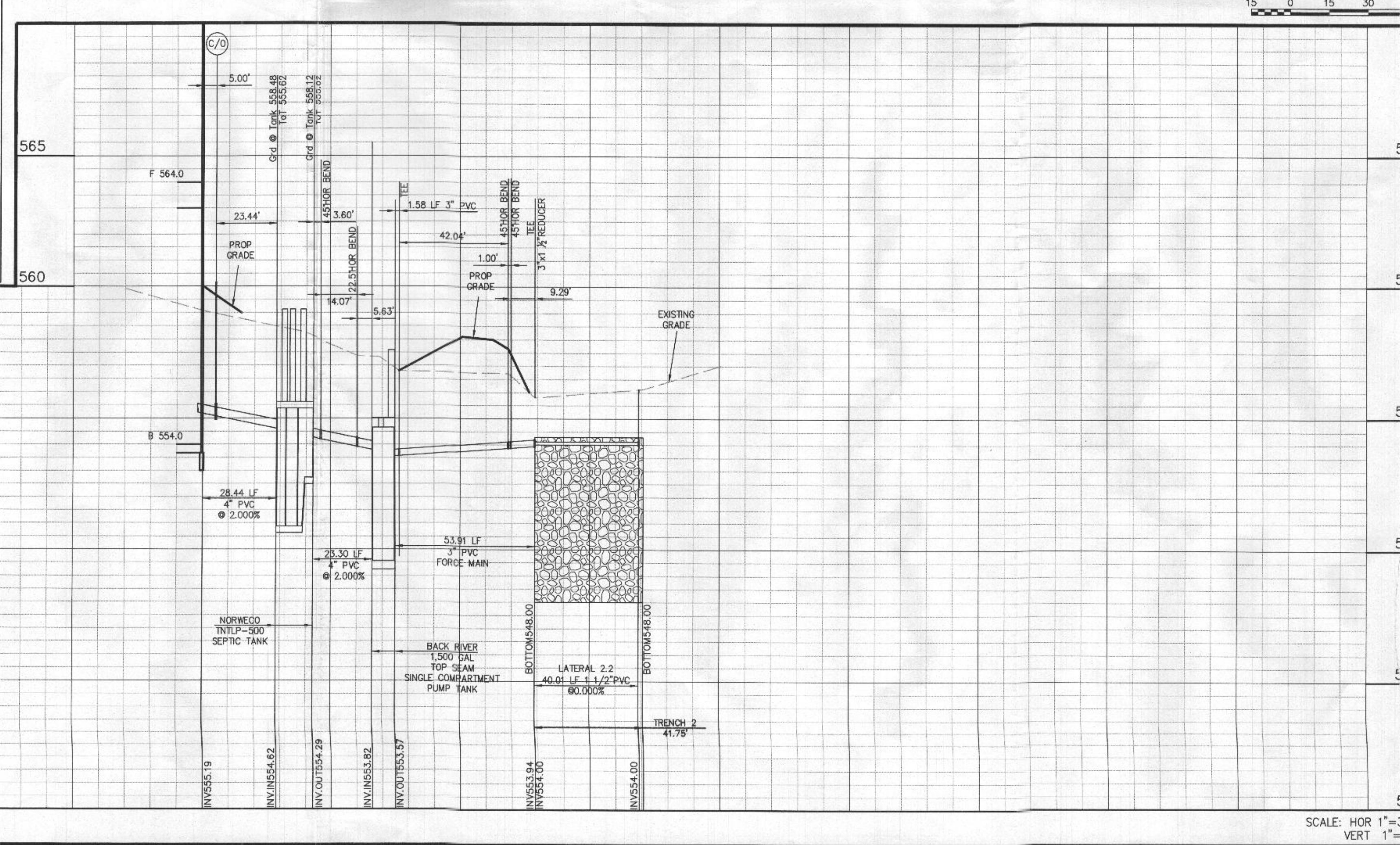
GENERAL NOTES

- Current Title Reference:
Owner: Jon Dennis Titherington & Ann Nicodemus Titherington
County Land Record 2865 Page 686
Grantor: Ernest Richard Shipley and Janice M. Shipley
Subject Property Zoned: RC-DEO.
- Total area of property: 43,110 sq.ft.
- Septic easement subject to Howard County Health Department review.
- Contractor/Builder to verify elevation in the field before beginning any construction.
- The topography shown hereon was taken from data by Howard County and based on Bare Earth LIDAR Data U.S. Feet supplemented with field run data by DRS & Associates and is verified to accurately represent the relative changes on the subject property by DRS & Associates.
- No wetlands currently exist on the property.
- This area designates a private sewage area as required by the Maryland Department of the Environment for individual sewage disposal. For lots created prior to March of 1972 it provides at least enough area to accommodate an initial on two replacement septic systems as required by the Howard County Health Department. Improvements of any nature in this area are restricted until public sewerage is available. This area shall become null and void upon connection to a public sewerage system. The county Health Officer shall have the authority to grant adjustments to the private sewage area. Recordation of a modified sewage area shall not be necessary.
- Existing wells and/or sewerage easements within 100 feet of the property have been shown from the best available information.
- The existing well shown on this plan identified with the attached well tag number "HO-17-0364" has been field located by DRS & Associates professional land surveyor and is accurately shown.
- Any change to the locations or depths to any components must be approved by the engineer and the Howard County Health Department prior to installation. A revised site plan may be required.
- The maximum depth of the BAT per the manufacturer's specification is 3 feet.
- Electrical work for the installation must be performed by a licensed electrician.
- All wells and septic systems located within 100' of the property boundaries and 200' down gradient of any wells and/or septic systems have been shown.
- The BAT system shall be maintained and operated for the life of the system.
- The BAT shall be operated by and maintained by a certified service provider.
- Within one month of installation, a person installing the BAT system shall report to the Maryland Department of the Environment (MDE) in a manner acceptable to MDE, the address and date of completion of the Bat installation and the type of BAT installed.
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- The Health Department requires documentation for the start-up certification from the manufacturer prior to final approval of the installation.

4 BEDROOM: 600 GPD 1300 Gallon NORWECO TINTLP-500 Septic Tank

INITIAL SYSTEM:
Loading Rate: 0.8 GPD per Square Foot
Effective Area Depth: 5.0' to 8.0'
2' Wide Trench
Standard Trench: 375 LF
w+2/(w+2d)
where w=width of trench
d=depth of gravel
2+2/(2+1+2+3)=0.4444
375*0.4444=166.67 LF Deep Trench
Use: 2 Lines @ 83.50'

FIRST & SECOND REPLACEMENT:
Loading Rate: 0.8 GPD per Square Foot
Effective Area Depth: 5.0' to 8.0'
2' Wide Trench
Standard Trench: 375 LF
w+2/(w+2d)
where w=width of trench
d=depth of gravel
2+2/(2+1+2+3)=0.4444
375*0.4444=166.67 LF Deep Trench
Use: 3 Lines @ 55.70'

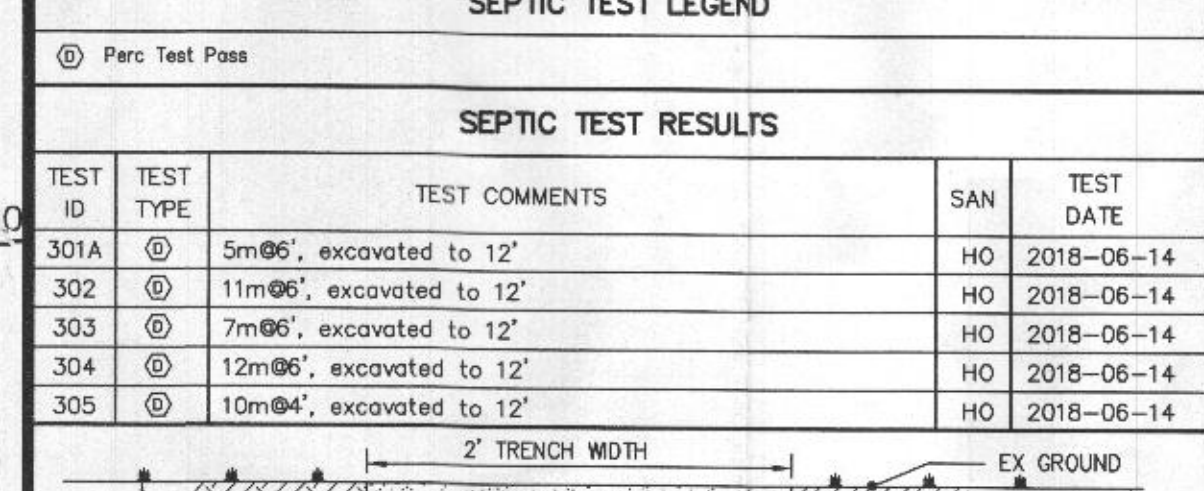


SEPTIC TEST LEGEND

⊙ Pierc Test Pass

SEPTIC TEST RESULTS

TEST ID	TEST TYPE	TEST COMMENTS	SAN	TEST DATE
301A	⊙	5m⊙6', excavated to 12'	HO	2018-06-14
302	⊙	11m⊙6', excavated to 12'	HO	2018-06-14
303	⊙	7m⊙6', excavated to 12'	HO	2018-06-14
304	⊙	12m⊙6', excavated to 12'	HO	2018-06-14
305	⊙	10m⊙4', excavated to 12'	HO	2018-06-14



INVERT CHART FOR TRENCHES

LATERAL NUMBER	BEGINNING EX GRD EL	BEGINNING INV	BEGINNING TRENCH BOT	END EX GRD EL	END INV	END TRENCH BOT
1.1	556.47	554.00	548.00	556.04	554.00	548.00
1.2	556.47	554.00	548.00	556.09	554.00	548.00
2.1	555.80	554.00	548.00	556.09	554.00	548.00
2.2	555.80	554.00	548.00	556.07	554.00	548.00

LEGEND

Existing Proposed

Edge of Rd
Feature separation distance in feet

Ind. Contours
Int. Contours

Lot Line
Plot Outline
Approved SDA

Bit. Conc. Pav.

Clean Out, Sewer/Drain Structure

Utility Pole w/Guy Wire
Well

Approved Septic System Plan
Howard County Health Department
Hane Oswald 4/24/20
Signature Date

ABBREVIATIONS

B CLR Basement floor elevation or Book
F County Land Record
G First floor elevation
Garage floor elevation

Grd Page
P Page
PB Plot Book
Tot Top of Tank

Site Plan for BAT Installation

TITHERINGTON PROPERTY
LINTHICUM ROAD DAYTON
HOWARD COUNTY, MARYLAND 21036

OWNER DEVELOPER
Kenneth & Sarah Mueller
7014 Mink Hollow Road
Highland, MD 20777
443-651-1470

Viking Development Corp.
815 Windriver Drive
Sykesville, MD 21784
410-977-2188

MAP 22 BLOCK 19 PARCEL 561
Account Number 435005
ZONED RC-DEO COUNTY LAND RECORD 19202 Page 249
5TH ELECTION DISTRICT

D.R.S. & ASSOCIATES
LAND DESIGN CONSULTANTS
52 WINTERS STREET WESTMINSTER, MARYLAND 21157
410-848-4060 410-876-6040 F. 410-848-8818

REV. No. DATE BY DESCRIPTION DATE: 2020-02-10

1	2020-03-02	DRS/ebp	PER HCHD 2020-02-28/2020-02-07	SCALE: 1"=30'
2	2020-03-27	DRS/ebp	PER HCHD 2020-03-23	SHT. NO. : OF 2

DWG.: WS01-01

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Project: Titherington Property
 File: 03417-97283
Septic Tank Design
 Date: 2020-02-11
 By: ebp
 Version: 3.01
 Number of Bedrooms: 4,000
 Design Flow=(150 GPD X Number of Bedrooms): 600,000 GPD
 Minimum Septic Tank Size=(Design Flow X 1.5): 900,000 Gal.
 Septic Tank - NORWECO

Trench Design
 Average Percolation Rate: 9.00 Min./In.
 Application Rate: 0.800 GPD/Ft2
 Absorption Area=(Design Flow/Application Rate): 750,000 Sq. Ft.
 Trench Width (W): 2,000 Ft.
 Effective Area (A): 3,000 Ft.
 Standard Trench Length = (Absorption Area/Trench Width) Deep Trench = $\frac{((w+2)/(w+1+2d)) \times \text{Std Trench Length}}$: 166,667 Ft.

Distribution Network Design
 Number of Trenches: 4
 Length Top Trench: 41,750 Ft.
 Initial Perforation Spacing Value: 4,250 Ft.
 Perforations Top Trench=(Trench Length/Initial Perforation Spacing Value Rounded up to Whole Number): 10,000
 Perforation Spacing=(Top Trench Length/Number of Perforations): 4,175 Ft. Q
 Distance between Tee and first Perforation=(Perforation Spacing/2): 2,088 Ft. P
 Distance between End of Trench and Last Perforation=(Perforation Spacing/2): 2,088 Ft. Q
 Length of Longest Trench: 41,750 Ft.
 Lateral Diameter: 1 1/2 in. S

LATERAL DIMENSIONS (PVC SCH.40)		
LENGTH (ft.)	NOMINAL DIA. (in.)	INSIDE DIA. (in.)
Less than 23	1	1.049
between 23 and 36	1 1/4	1.380
between 36 and 50	1 1/2	1.610
between 50 and 75	2	2.067

Distance and Elevation Data
 Top Lateral Invert Elevation: 554,000 Ft.
 Linear Feet of Forcemain between Top of Pump to Supply Manifold: 113,820 Ft.
 Invert Elevation in of Pump Tank: 553,826 Ft.
 Length of Supply Manifold: 0,000 Ft.

Forcemain Specification
 Schedule 40 PVC: 3,000 in. T
 Inside Diameter: 3,068 in.

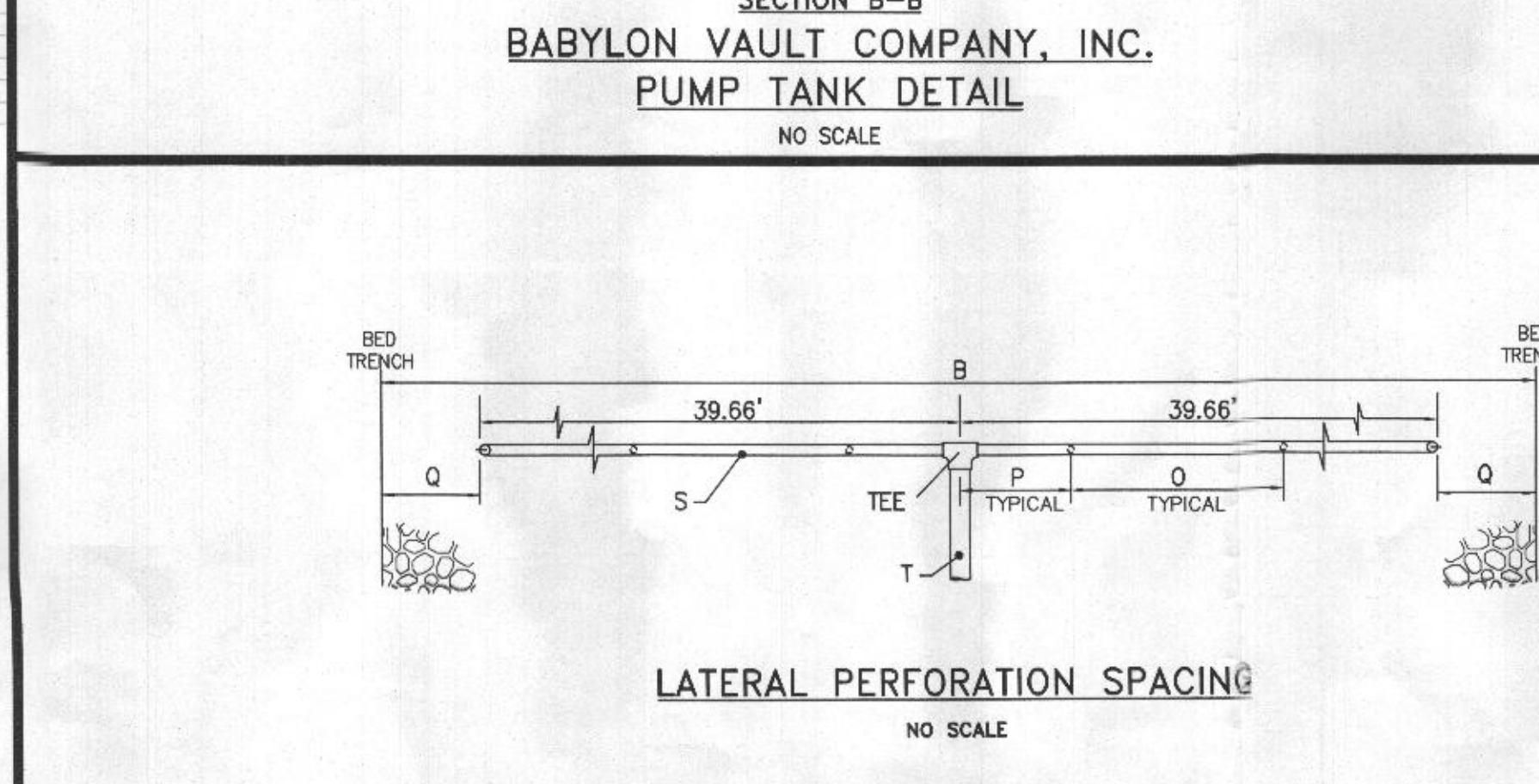
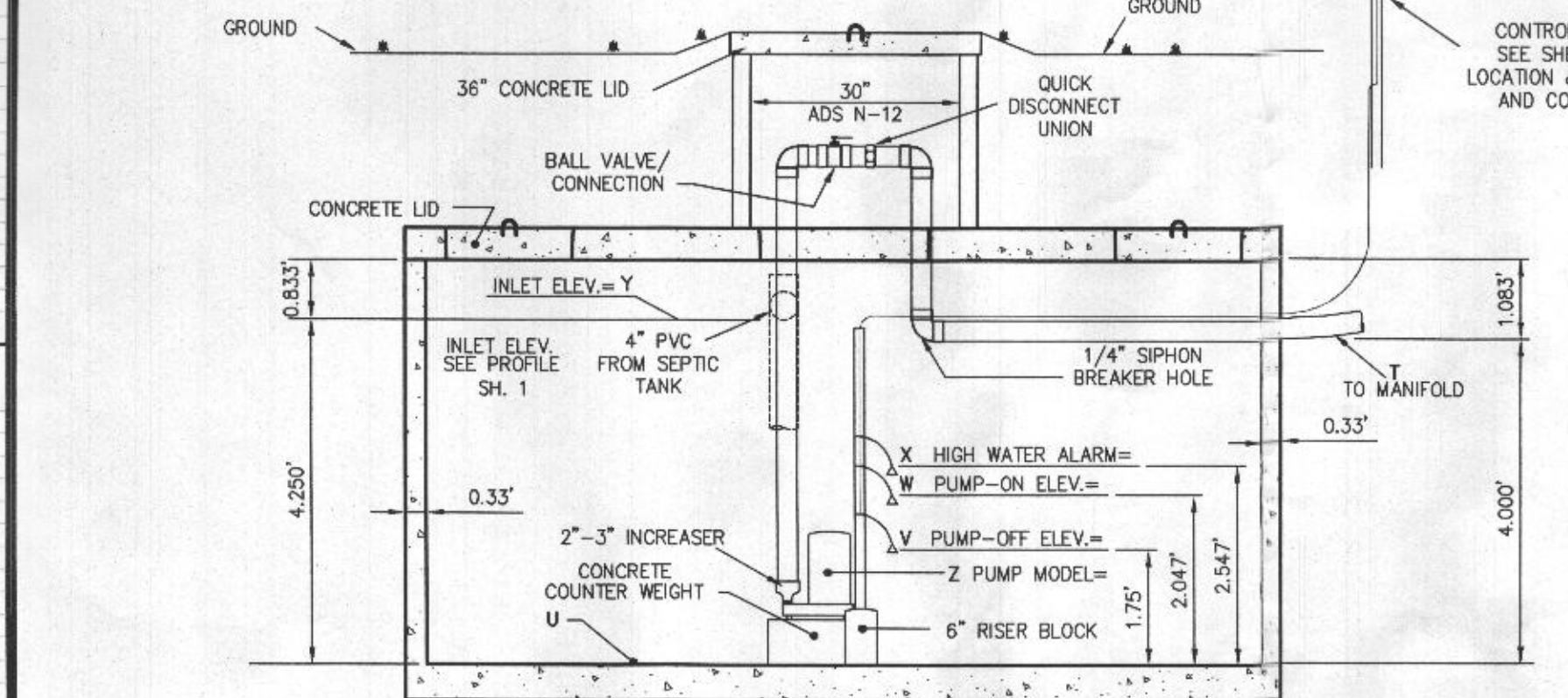
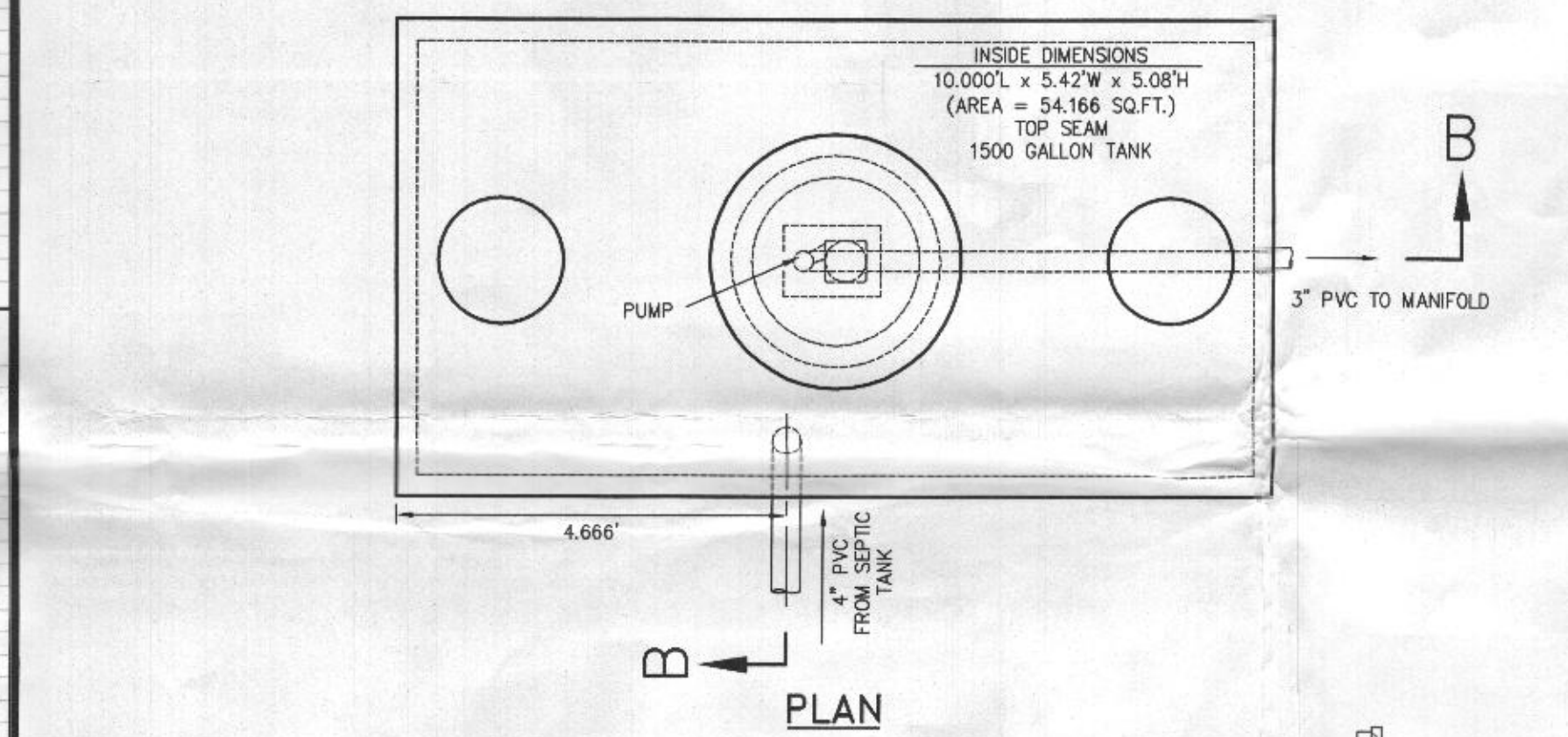
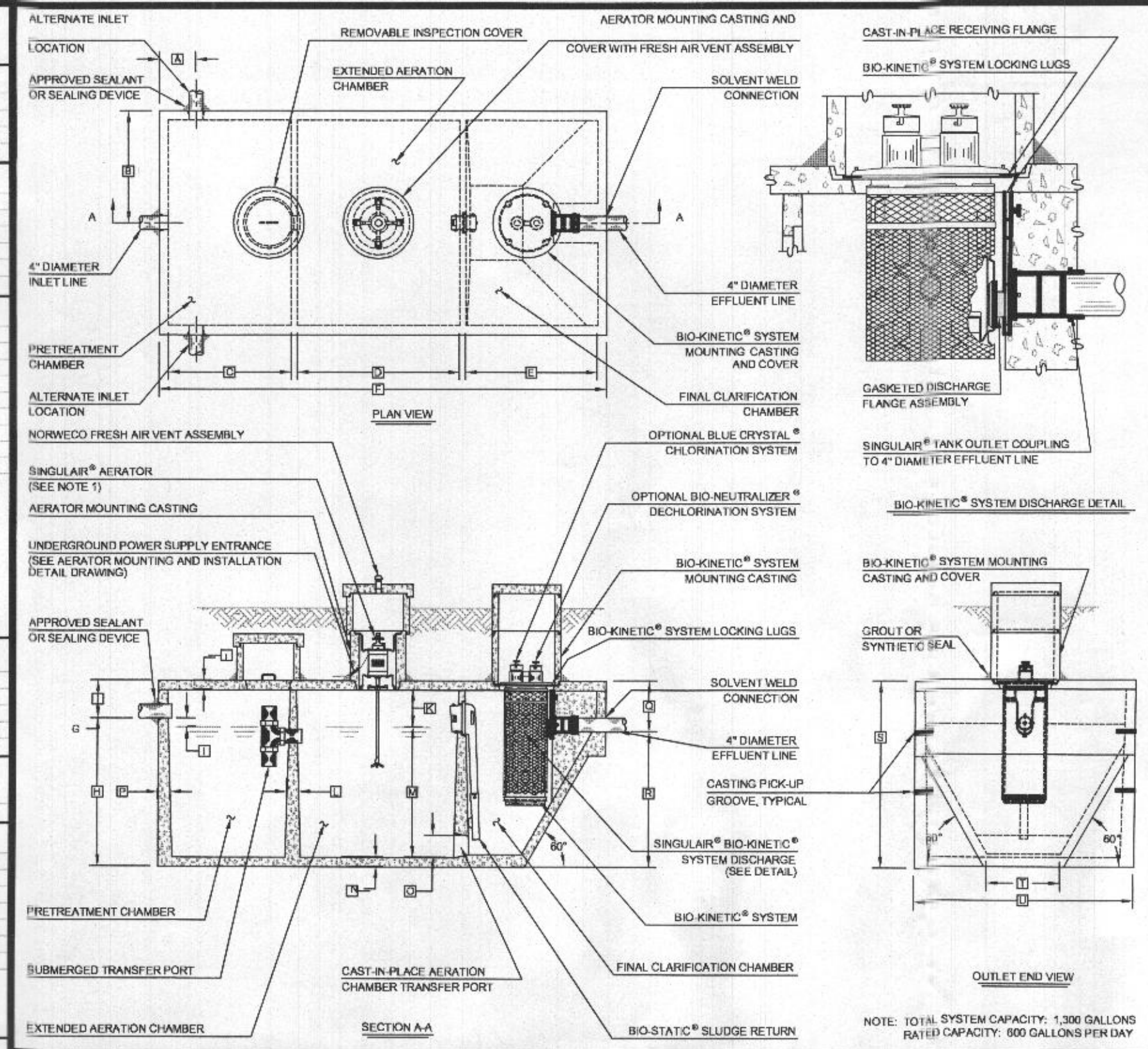
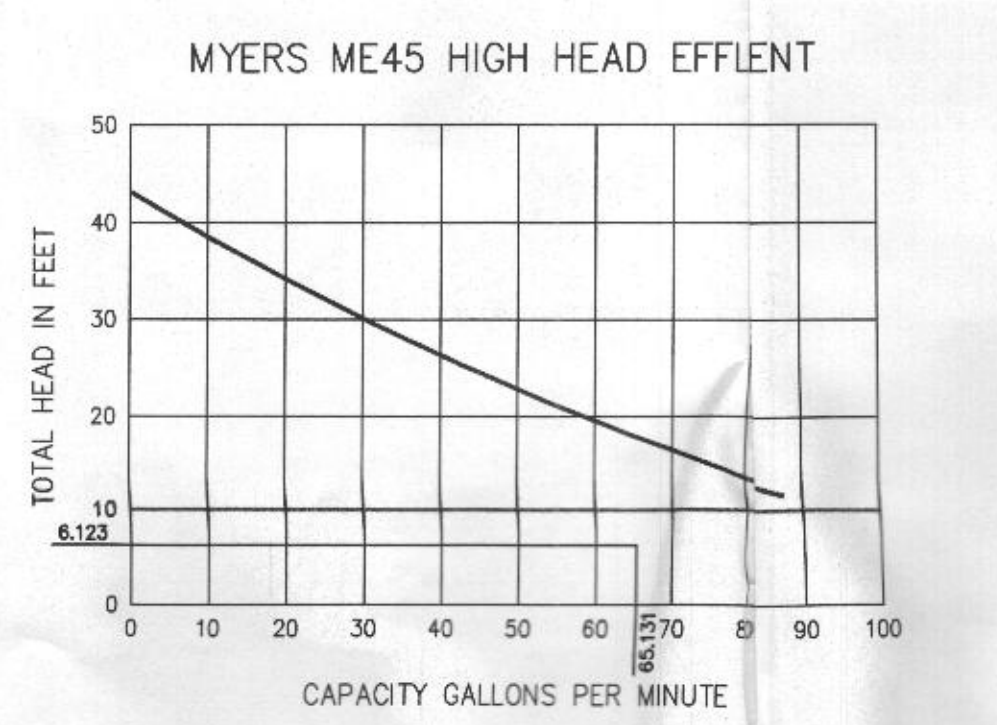
Dose Volume
 Length of 3" Forcemain & Supply Manifold from Pump Off: 113,820 Ft.
 Length of Laterals: 158,650 Ft.
 Volume of Forcemain & Supply Manifold= $\pi \times [(D/2)/12]^2 \times \text{Length of Forcemain} \times 7.48/\text{C.Ft.}$: 43,711 Gal.
 Volume of Laterals= $\pi \times [(D/2)/12]^2 \times \text{Length of Laterals} \times 7.48/\text{C.Ft.}$: 16,778 Gal.
 Dose Volume=(greater of Volume of Forcemain+Supply Manifold+Equalization Manifold Volume or 1/3 Design Flow or 100 Gal): 127,603 Gal.
 Dose Volume in C.Ft.=(Dose Volume/7.48): 17,058 Cu.Ft.

Pump Tank Design (1500 GAL)
 Bottom of Pump Tank Elevation: 549,576 Ft. U
 6" Riser Block: 0,500 Ft.
 Bottom of Pump Elevation: 550,076 Ft.
 Distance Between Bottom of Pump to Pump Off Elevation: 1,250 Ft.
 Pump Off Elevation: 551,326 Ft. V
 Distance Between Pump On & Pump Off Elevation (Dose/Area of Pump Tank): 0,315 Ft.
 Pump On Elevation: 551,641 Ft. W
 Per MDE Pump On to High Water Alarm (>0.50ft): 0,500 Ft.
 High Water Alarm Elevation: 552,141 Ft. X
 Distance Between Pump On & Pump Tank Inlet (Design Flow/7.48/Area of Pump Tank): 1,481 Ft.
 Design Pump Tank Inlet Elevation: 553,622 Ft.
 Actual Pump Tank Inlet Elevation-Design Pump Tank Inlet Elevation: 553,826 Ft. Y

Equalize Low Pressure Dose at Varying Elevations

SYSTEM TRENCH NUMBER	1.1.1	1.1.2	1.2.1	1.2.2
TRENCH DATA				
Trench Length	41,750	41,750	41,750	41,750
Ground Elevation (ft.)	556,000	556,000	556,000	556,000
Trench Cover (ft.)	2,000	2,000	2,000	2,000
Stone Over Lateral (ft.)	0.167	0.167	0.167	0.167
Diameter Lateral (ft.)	0.125	0.125	0.125	0.125
Invert Lateral (ft.)	553,708	553,708	553,708	553,708
HEAD CALCULATION				
System Head (ft.)	2,000	2,000	2,000	2,000
Head Elevation	555,708	555,708	555,708	555,708
PERFORATION CALCULATION				
Perforation Dia. (in.)	0.313	0.313	0.313	0.313
Perforation Flow Rate (gpm)	1.628	1.628	1.628	1.628
FLOW CALCULATION				
Percent of Flow per Top Trench	100.0000%	100.0000%	100.0000%	100.0000%
Lateral Flow Rate Design (gpm)	16,2828	16,2828	16,2828	16,2828
Lateral Flow Rate Actual (gpm)	16,2828	16,2828	16,2828	16,2828
Lateral Velocity (fps)	2,5661	2,5661	2,5661	2,5661
System Flow (gpm)	16,2828	32,5656	48,8484	65,1312
PERFORATION LOCATIONS				
Perforations Number Design	10,000	10,000	10,000	10,000
Perforation Number Used	10	10	10	10
Perforation Spacing (ft.)	4,175	4,175	4,175	4,175
Perforation from End (ft.)	2,088	2,088	2,088	2,088

Pump Design
 System Flow Rate: 65,131 GPM
 Length of Supply Manifold: 0,000 Ft.
 Length of 3" Forcemain & Supply Manifold from Bottom of Pump: 62,740 Ft.
 2 - increasers (3.0 Ft. each): 6,000 Ft.
 4 - 90° Bend (10.0 Ft. each): 40,000 Ft.
 0 - 60° Bend (8.0 Ft. each): 0,000 Ft.
 0 - 45° Bend (8.0 Ft. each): 0,000 Ft.
 0 - 30° Bend (4.5 Ft. each): 0,000 Ft.
 0 - 22 1/2° Bend (3.0 Ft. each): 0,000 Ft.
 0 - 15° Bend (2.0 Ft. each): 0,000 Ft.
 0 - 1 1/4" Bend (1.5 Ft. each): 0,000 Ft.
 2 - Tee (15 Ft. each): 30,000 Ft.
 Total Length: 150,740 Ft.
 Friction Loss per 100 Feet: 0.961 Ft.
 Pump Off Float Elevation: 551,326 Ft.
 Manifold Elevation: 554,000 Ft.
 Head Loss: 2,874 Ft.
 Total Friction Loss: 1,448 Ft.
 Required Head for Peak Flow: 2,000 Ft.
 Dynamic Head: 6,123 Ft.



GENERAL NOTES:

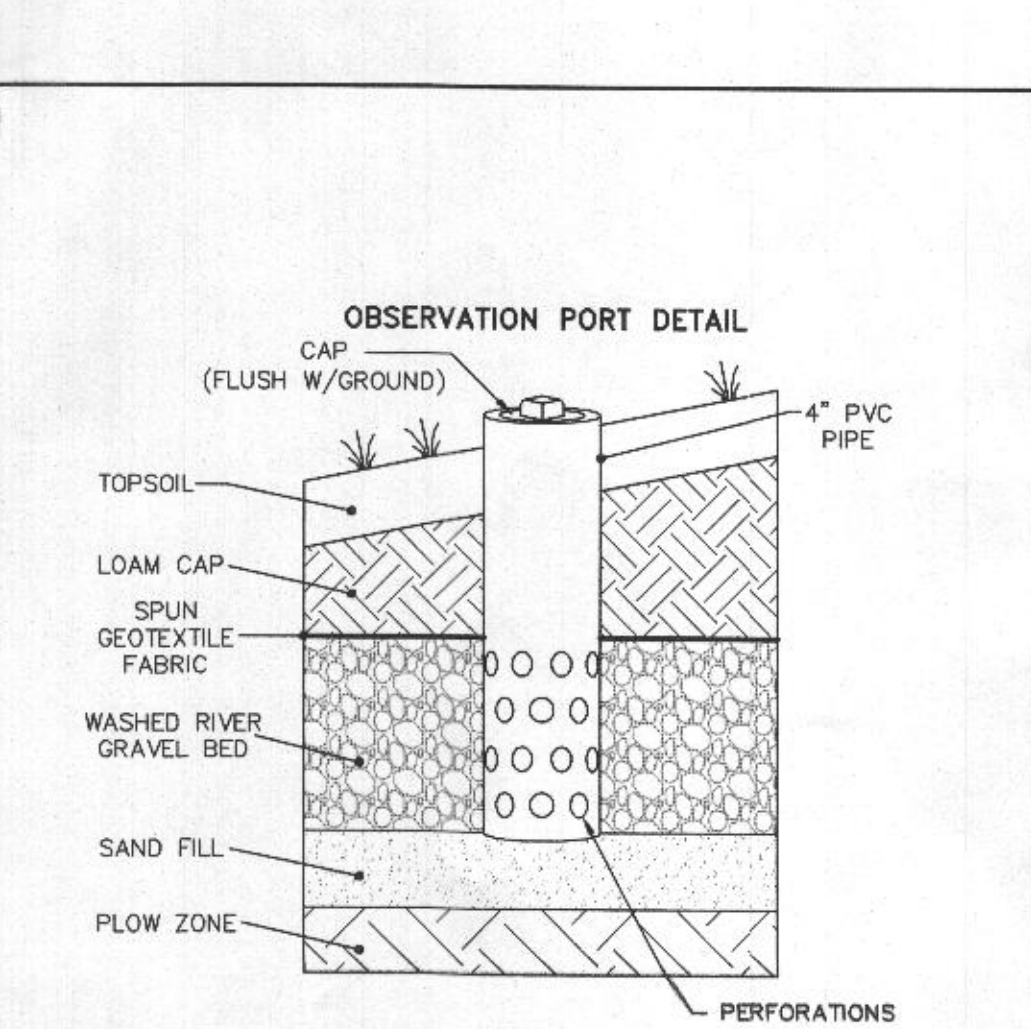
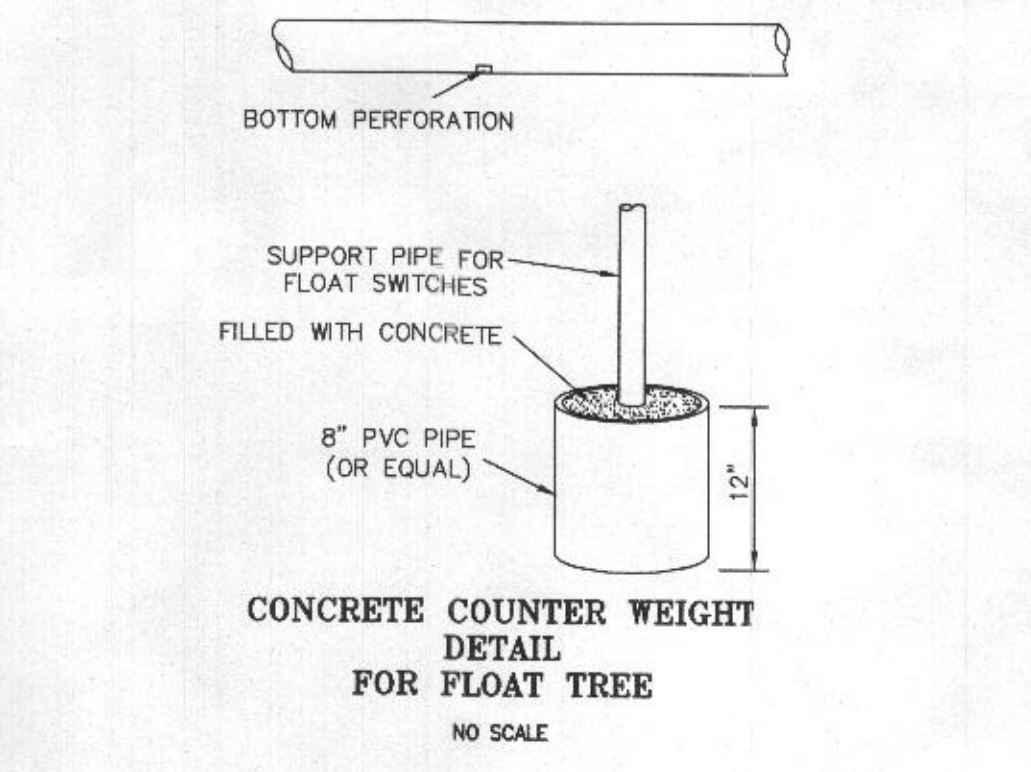
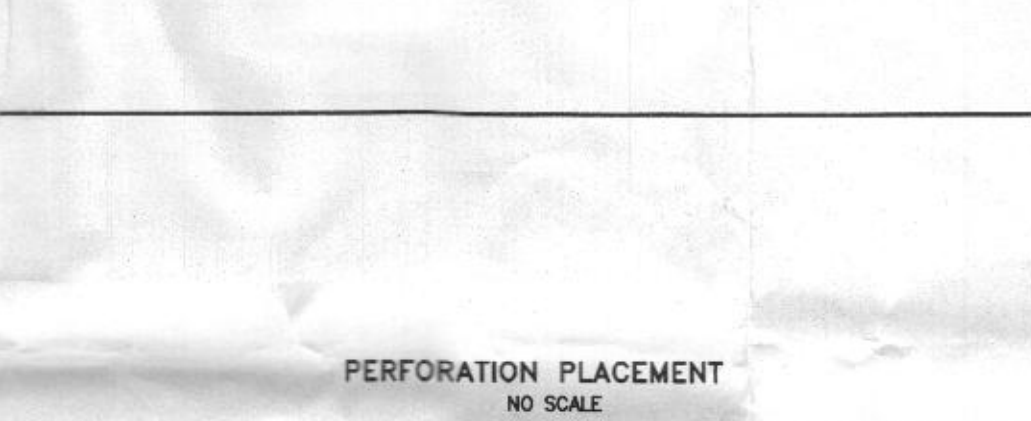
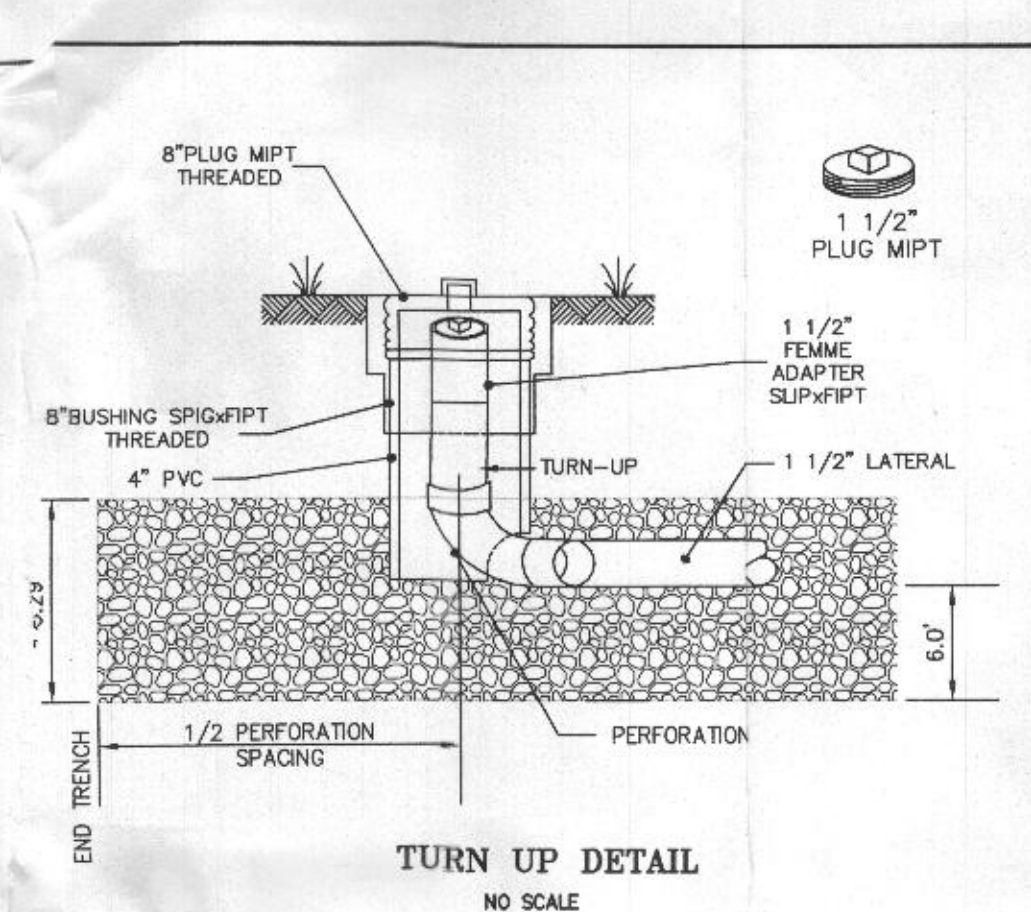
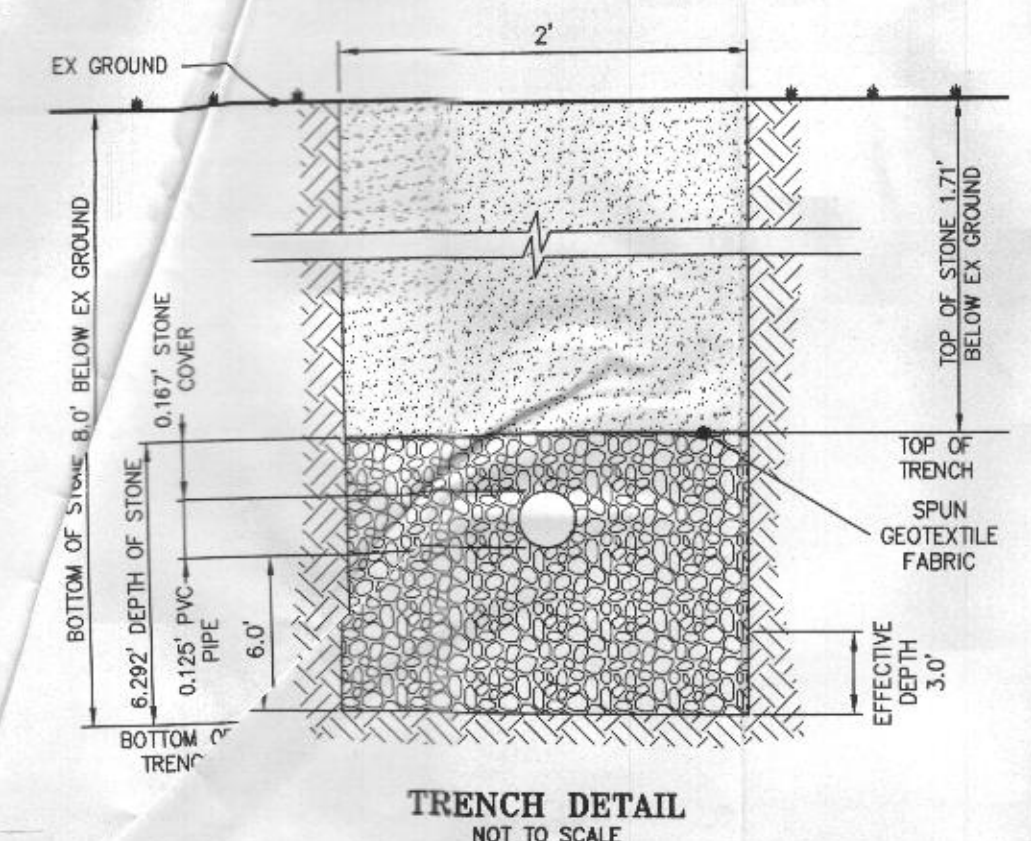
- SINGULAR® AERATOR, AS TESTED AND ACCEPTED BY NSF, OPERATING 80 MINUTES ON 80 MINUTES OFF.
- FALL THROUGH SINGULAR® PLANT FROM INLET INVERT TO OUTLET INVERT IS FOUR INCHES. INLET INVERT IS TWELVE INCHES BELOW TANK TOP.
- ON DEEPER INSTALLATIONS, PRECAST RISERS MUST BE USED TO EXTEND AERATOR MOUNTING CASTING AND BIO-KINETIC® SYSTEM MOUNTING CASTING TO GRADE.
- TANK REINFORCED PER ACI STD. 318-05.
- REMOVABLE COVERS ON RISERS WEIGH IN EXCESS OF SEVENTY-FIVE POUNDS EACH TO PREVENT UNAUTHORIZED ACCESS.
- CONTACT THE LOCAL LICENSED SINGULAR® DISTRIBUTOR FOR ELECTRICAL REQUIREMENTS.

PROJECT ENGINEER'S APPROVAL:
 (WE) I HEREBY CERTIFY THAT THIS DRAWING HAS BEEN CHECKED AND IS APPROVED FOR USE IN CONFORMITY WITH THE CONTRACT DOCUMENTS.
 DATE: _____
 NAME: _____

CONTRACTOR'S CERTIFICATION:
 (WE) I HEREBY CERTIFY THAT THIS DRAWING HAS BEEN CHECKED AND IS APPROVED FOR USE IN CONFORMITY WITH THE CONTRACT DOCUMENTS.
 DATE: _____
 NAME: _____

CRITICAL DIMENSIONS	
1'-0"	0'-3"
3'-0"	0'-6"
3'-4"	0'-3"
0'-5"	0'-4"
3'-7"	3'-8"
0'-12'-2"	0'-0"
1'-0"	1'-6"
4'-0"	0'-9"
0'-3"	0'-0"
0'-3"	0'-0"
1'-0"	0'-2"
0'-2"	0'-0"
3'-6"	0'-0"

U.S. PATENT OFFICE
 NORWECO
 338-07
 10/11H SYSTEM CAPACITY: 1,386 GALLONS (841) CAPACITY: 600 GALLONS PER DAY



Site Plan for BAT Installation
TITHERINGTON PROPERTY
 LINTHICUM ROAD DAYTON
 HOWARD COUNTY, MARYLAND 21036

OWNER: Kenneth & Sarah Mueller
 7014 Mink Hollow Road
 Highland, MD 21777
 443-651-1470

DEVELOPER: Viking Development Corp.
 815 Windriver Drive
 Sykesville, MD 21784
 410-977-2188

MAP 22 BLOCK 19 PARCEL 561
 Account Number 435005
 ZONED RC-DEO COUNTY LAND RECORD 19202 Page 249
 5TH ELECTION DISTRICT

D.R.S. & ASSOCIATES
 LAND DESIGN CONSULTANTS
 52 WINTERS STREET WESTMINSTER, MARYLAND 21157
 410-848-4060 410-876-6040 F. 410-848-8818

REV. No.	DATE	BY	DESCRIPTION	DATE: 2020-02-10
1	2020-03-02	DRS/ebp	PER HCHD 2020-02-26/2020-02-07	SCALE: 1"=30'
2	2020-03-27	DRS/ebp	PER HCHD 2020-03-23	SHT. NO.: 2 OF 2

DWG: WS01-01
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