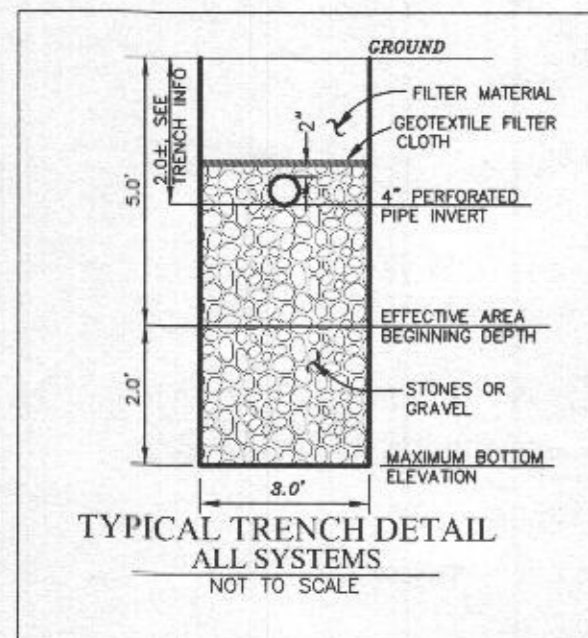


PLAN VIEW

1" = 50'



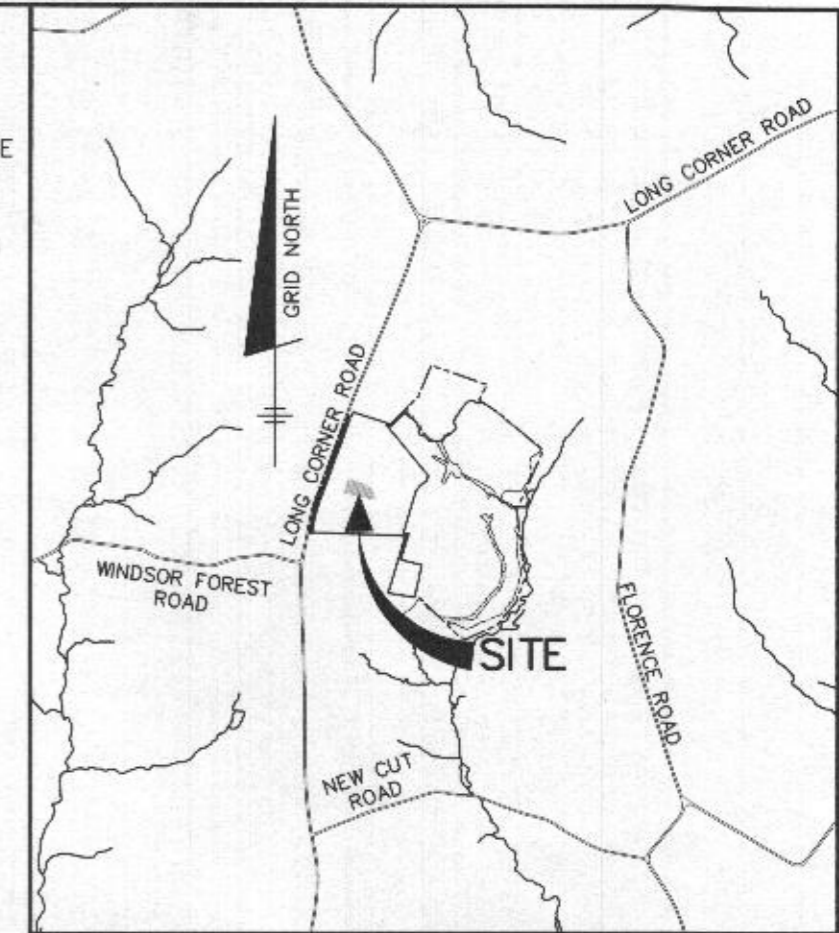
**TYPICAL TRENCH DETAIL
ALL SYSTEMS
NOT TO SCALE**

LEGEND

- 400 PROPOSED CONTOURS
- 400 EXISTING CONTOURS
- EXISTING PRIVATE SEWAGE DISPOSAL AREA
- EXISTING WELL BOX
- SOILS MAP SYMBOL
- SOILS DELINEATION LINE
- PERC TEST PASSED

GENERAL NOTES

1. THE LOT SHOWN HEREON WAS RECORDED ON THE PLAT FOR WINDSOR FOREST KNOLLS, PLAT NUMBER 19395. REFER TO THE PLAT FOR LOT DIMENSIONS, LOT AREA, ALL EASEMENTS AND CONDITIONS.
2. THE EXISTING WELL SHOWN ON THIS PLAN (HO-95-1030) HAS BEEN FIELD LOCATED BY BENCHMARK ENGINEERING INC. JULY 2020 AND IS ACCURATELY SHOWN.
3. THERE ARE NO EXISTING WELLS OR SEPTIC SYSTEMS WITHIN 100' OF THIS PROJECT'S BOUNDARY EXCEPT AS NOTED.
4. TOPOGRAPHY SHOWN WAS BASED ON FIELD RUN TOPOGRAPHY BY C.B. MILLER & ASSOCIATES IN APRIL, 2002, AND WAS SUPPLEMENTED BY FIELD RUN TOPOGRAPHY BY BENCHMARK ENGINEERING, INC. JULY 2020.
5. SEDIMENT AND EROSION CONTROLS WILL BE SUBMITTED BY HOWARD SOILS CONSERVATION DISTRICT AS A CUSTOM GRADING PLAN.
6. ALL DRAINAGE AND STORMWATER MANAGEMENT FEATURES USED ON THIS SITE MUST COMPLY WITH THE APPROVED BUILDING PERMIT AND CUSTOM GRADING PLANS.
7. ANY CHANGES TO A PRIVATE SEWAGE DISPOSAL AREA OR WELL BOX SHALL REQUIRE A REVISED PERCOLATION CERTIFICATION PLAN.
8. ANY CHANGES 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.
9. ANY ELECTRICAL WORK FOR THE INSTALLATION MUST BE PERFORMED BY A LICENSED ELECTRICIAN.
10. THE BAT TANK WILL BE NORWECO BAT TANK, MODEL TNTLP-500 GPD. THE PUMP TANK WILL BE A 2000 GALLON ONE COMPARTMENT TANK.
11. THE MAXIMUM EARTH COVER OVER THE TANKS IS 3 FEET. GREATER EARTH COVER WILL REQUIRE A HEAVY LOAD BEARING TANK.
12. ALL WELLS AND SEPTIC SYSTEMS LOCATED WITHIN 100' OF THE PROPERTY BOUNDARIES AND 200' DOWN GRADIENT OF ANY WELLS/OR SEPTIC SYSTEM HAVE BEEN SHOWN.



VICINITY MAP

SCALE: 1" = 2000'

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 28376, Expiration Date: 01-01-2023.



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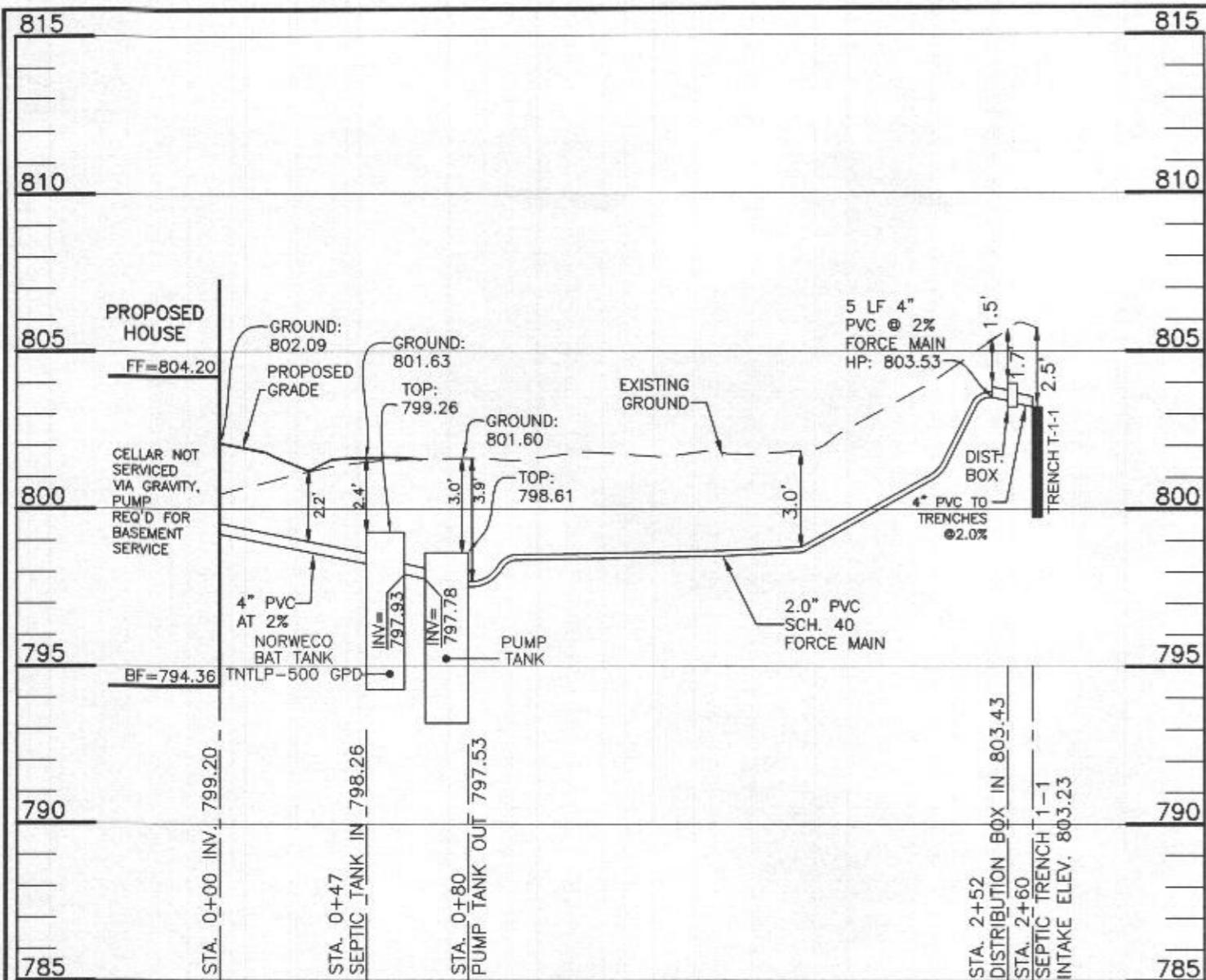
Approved Septic System Plan
Howard County Health Department

Hank Osweh 6/14/21
Signature Date

OWNER/BUILDER:
KEYSTONE CUSTOM HOMES, INC.
227 GRANITE RUN DR.
SUITE 100
LANCASTER, PA 17601
717-464-9060

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 315
ELLCOTT CITY, MARYLAND 21043
(P) 410-465-6105 ▲ (F) 410-465-6644
WWW.BEI-CIVILENGINEERING.COM

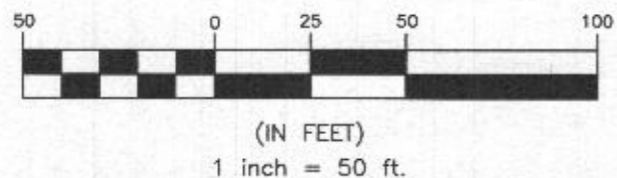
PROJECT:		WINDSOR FOREST KNOLLS LOT 3	
LOCATION:		TAX MAP: 6 - GRID: 16 - PARCEL: 57 18422 HIDDEN CREEK WAY - TAX ID: 04-373189 ELECTION DISTRICT NO. 4 - HOWARD COUNTY, MARYLAND	
TITLE:		BAT SITE PLAN	
HOUSE TYPE:		CUSTOM - KEYSTONE HOMES	
DATE:	MAY, 2021	PROJECT NO.	2986
SCALE:	AS SHOWN	DRAWING	1 OF 4



LOT 3 SEPTIC PROFILE
SCALE: 1"=50' HORIZ., 1"=5' VERT.

SEPTIC INVERT CHART - LOT 3	
INV @ HOUSE	799.2
GROUND @ HOUSE	802.1
INV IN BAT TANK	798.3
INV OUT BAT TANK	797.9
TOP OF BAT TANK	799.3
GROUND OVER SEPTIC TANK	801.6
INV IN PUMP TANK	797.8
INV OUT PUMP TANK	797.5
TOP OF PUMP TANK	798.6
GROUND OVER PUMP TANK	801.6
INV IN DIST BOX	803.4
INV OUT DIST BOX	803.3
GROUND AT DIST BOX	805.7

HEALTH DEPARTMENT SPEC SHEET INFORMATION - Lot 3			
System	Application Rate	Effective Depth	Bottom Depth
1st System	0.8	5.0	7.0
2nd system	0.8	5.0	7.0
3rd System	0.8	5.0	7.0



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INITIAL SYSTEM		
Number of Bedrooms	5	
Application Rate	0.8	gpd/sf
Effective Area Beginning Depth	5.0	ft
Bottom Max Depth	7.0	ft
Design Flow	750	gpd
Drainage Field square footage	937.5	sf
Sidewall Reduction Credit	0.63	
Trench width	3	ft
Effective Area Depth	2	ft
Trench Spacing	10	ft
Trench Length Required	195	lf

1ST REPLACEMENT SYSTEM		
Number of Bedrooms	5	
Application Rate	0.8	gpd/sf
Effective Area Beginning Depth	5.0	ft
Bottom Max Depth	7.0	ft
Design Flow	750	gpd
Drainage Field square footage	937.5	sf
Sidewall Reduction Credit	0.63	
Trench width	3	ft
Effective Area Depth	2	ft
Trench Spacing	10	ft
Trench Length Required	195	lf

2ND REPLACEMENT SYSTEM		
Number of Bedrooms	5	
Application Rate	0.8	gpd/sf
Effective Area Beginning Depth	5.0	ft
Bottom Max Depth	7.0	ft
Design Flow	750	gpd
Drainage Field square footage	938	sf
Sidewall Reduction Credit	0.63	
Trench width	3	ft
Effective Area Depth	2	ft
Trench Spacing	10	ft
Trench Length Required	195	lf

TRENCH DESIGN - Lot 3					
INITIAL SYSTEM					
T-1-1	LENGTH	48.9 ft	T-1-2	LENGTH	48.9 ft
	GROUND ELEVATION	805.7		GROUND ELEVATION	805.1
	INVERT ELEVATION	803.2		INVERT ELEVATION	803.1
	MAX BOTTOM ELEVATION	798.7		MAX BOTTOM ELEVATION	798.1
T-1-3	LENGTH	48.9 ft	T-1-4	LENGTH	48.9 ft
	GROUND ELEVATION	804.4		GROUND ELEVATION	804.0
	INVERT ELEVATION	802.4		INVERT ELEVATION	802.0
	MAX BOTTOM ELEVATION	797.4		MAX BOTTOM ELEVATION	797.0
1ST REPLACEMENT SYSTEM					
T-2-1	LENGTH	48.9 ft	T-2-2	LENGTH	48.9 ft
	GROUND ELEVATION	803.6		GROUND ELEVATION	803.3
	INVERT ELEVATION	801.6		INVERT ELEVATION	801.3
	MAX BOTTOM ELEVATION	796.6		MAX BOTTOM ELEVATION	796.3
T-2-3	LENGTH	48.9 ft	T-2-4	LENGTH	48.9 ft
	GROUND ELEVATION	803.0		GROUND ELEVATION	802.4
	INVERT ELEVATION	801.0		INVERT ELEVATION	800.4
	MAX BOTTOM ELEVATION	796.0		MAX BOTTOM ELEVATION	795.4
2ND REPLACEMENT SYSTEM					
T-3-1	LENGTH	48.9 ft	T-3-2	LENGTH	48.9 ft
	GROUND ELEVATION	802.4		GROUND ELEVATION	802.4
	INVERT ELEVATION	800.4		INVERT ELEVATION	800.4
	MAX BOTTOM ELEVATION	795.4		MAX BOTTOM ELEVATION	795.4
T-3-3	LENGTH	48.9 ft	T-3-4	LENGTH	48.9 ft
	GROUND ELEVATION	801.9		GROUND ELEVATION	801.7
	INVERT ELEVATION	799.9		INVERT ELEVATION	799.7
	MAX BOTTOM ELEVATION	794.9		MAX BOTTOM ELEVATION	794.7

I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 28376. Expiration Date: 01-01-2023.



AAM-BEI

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PROJECT:	WINDSOR FOREST KNOLLS LOT 3		
LOCATION:	TAX MAP: 6 - GRID: 16 - PARCEL: 57 18422 HIDDEN CREEK WAY - TAX ID: 04-373189 ELECTION DISTRICT NO. 4 - HOWARD COUNTY, MARYLAND		
TITLE:	BAT SITE PLAN		
HOUSE TYPE:	CUSTOM - KEYSTONE HOMES		
DATE:	MAY, 2021	PROJECT NO.	2986
SCALE:	AS SHOWN	DRAWING	2 OF 4

Pumping Station

Diameter of Force Main and Manifold = 2" PVC SCH. 40
 Length of Force Main = 169 feet SCH. 40 gallons/100 feet = 17.4 Table 4.2

Volume of Main = 29.4 gallons

Total Volume = 29.4 gallons

Minimum Dose must be greater than 1/6 of the design flow 125 gallons

Minimum Dose must be greater than the volume of the main 29 gallons

Use minimum dose of 135 gallons okay Doses per Day = 5.55656

Size Pump Chamber

Pump chamber must be able to hold one dose and one days design flow

One day Capacity = 750 gallons
 Dose = 135 gallons
 Totals = 885 gallons

Use 2,000 gallon pump tank

Tank Dimensions:

Exterior Length:	13.75 feet	Interior Length:	13.08 feet	Walls:	0.33 feet
Exterior Width:	6.25 feet	Interior Width:	5.58 feet	Bottom:	0.33 feet
Exterior Height:	5.42 feet	Interior Height:	4.67 feet	Top:	0.42 feet
		Area:	73.05 sf	Bottom to Inlet:	4.58 feet
		Volume:	340.89 cf		

Sizing the Pump

Flow runtime = 4.821 minutes
 rate = 28.00 gallons/minute

Design Head:

Design Head = Static Head + Friction Head

Static Head = highest elevation of main - pump off elevation

Highest component of system = 803.53 Main HP
 Pump off elevation = 794.90
 Static Head = 8.63 feet

Friction Head = Head loss due to pipe friction

2.0" pipe = 169 feet
 90° bends 3 loss for bend 21 feet per table 4.3
 45° bends 4 loss for bend 16 feet per table 4.3
 Gate Valve 0 loss for tee 0 feet per table 4.3

Friction loss per table 4.4 = 1.354 (ft/100 ft)

Equivalent Length = 185 Friction loss 2.52 feet

Total Friction Head = 2.52

Design Head = 11.15 feet

Pump Requirements:

Performance = 28.00 gpm
 Head of Water = 11.15 feet of head

Pump Selection: Zoeller Pump Company, Model 371
 1/3 horse power

Pump Flow Rate = 30.55 gallons/minute per rating curve. Run time: 4.42 Minutes
 TDH analysis 11.58 ft
 Between design and curve? Yes

Design Pump Chamber

Ground over Tank = 801.60 Cover = 2.89 ft
 Top of Tank = 798.61
 Invert of Tank = 793.52
 6" Riser = 0.50 feet
 Pump Height = 0.64 feet

Min. Pump off = 794.86
 Selected Pump off = 794.90

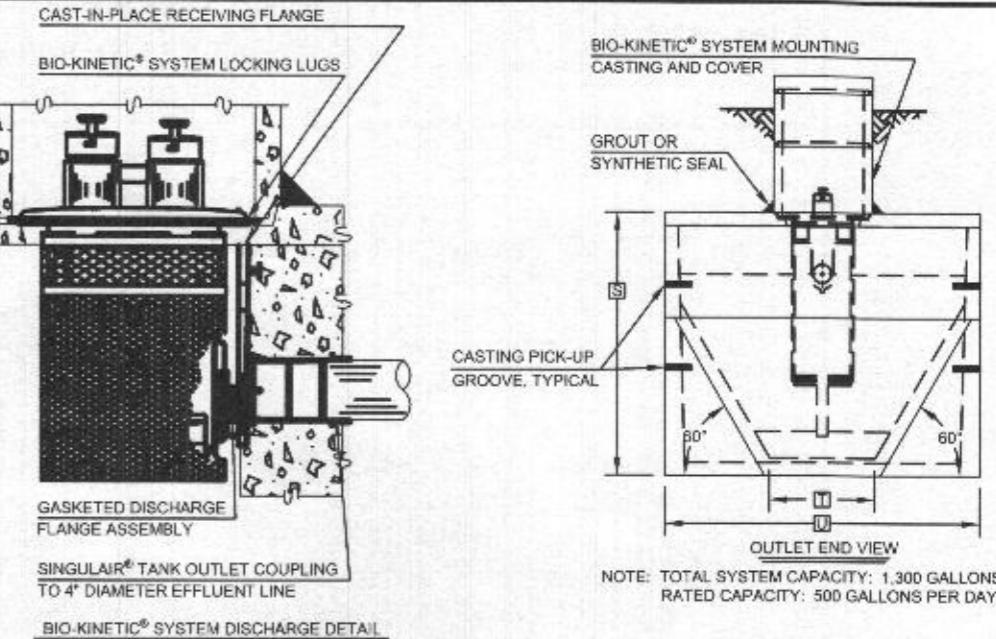
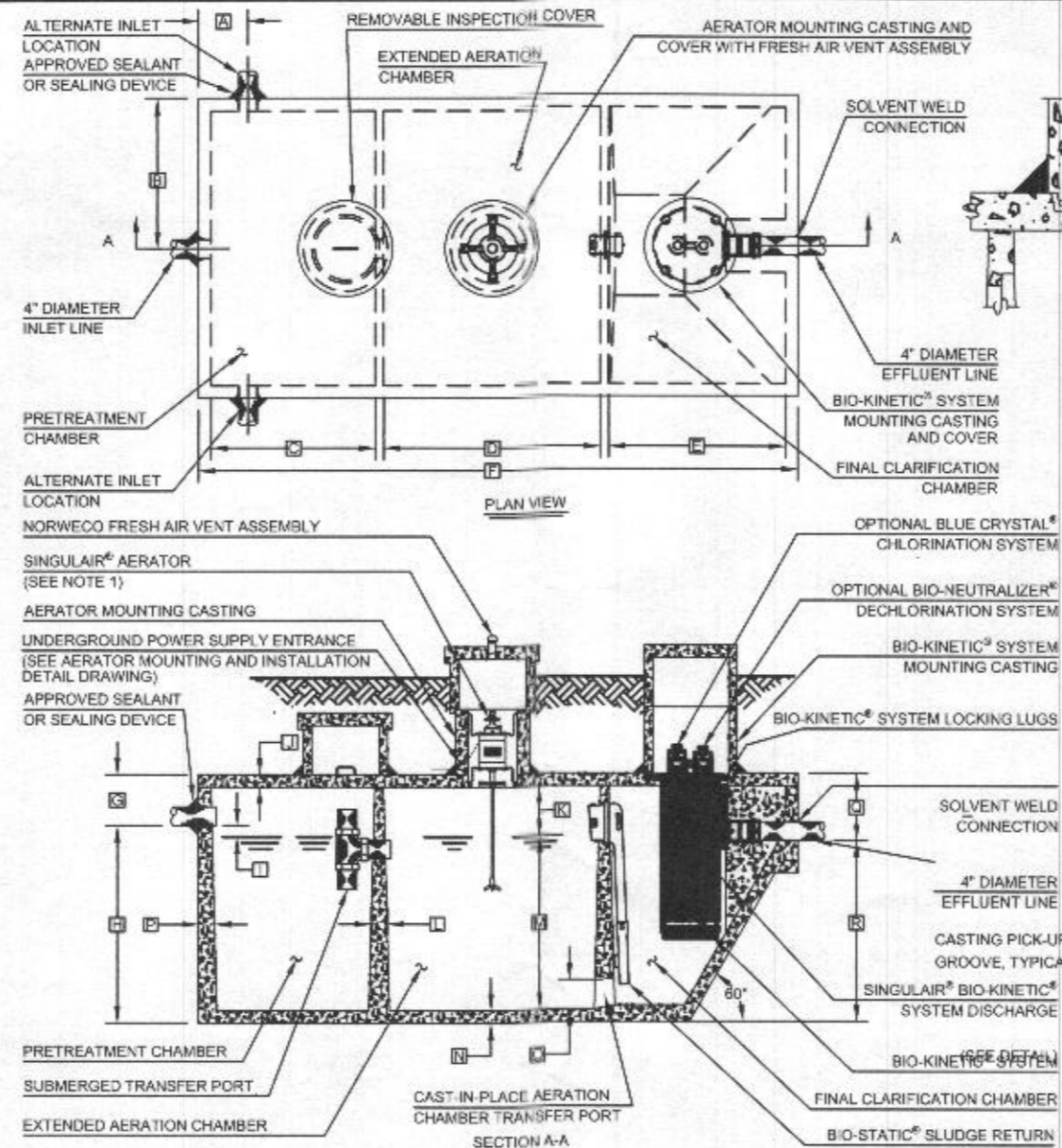
Dose = 18 of
 Area of Pit = 73.05 sf

Pump on dist. = 0.25
 Pump on Elev. = 795.15

Distance between Pump on and Highwater Alarm = 0.5 feet
 Highwater Alarm Elevation = 795.65

Dist. for day stored above alarm 1.37
 Minimum Inlet Elev. = 797.02
 Tank Inlet = 797.77 Okay
 Dist. Alarm to Inlet = 2.12 Okay

SEPTIC INVERT CHART - LOT 3	
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INV IN DIST BOX	803.4
INV OUT DIST BOX	803.3
GROUND AT DIST BOX	805.7



CRITICAL DIMENSIONS

A	1'-0"	N	0'-3"
B	3'-0"	O	0'-6"
C	3'-4"	P	0'-3"
D	4'-5"	Q	1'-4"
E	3'-7"	R	3'-8"
F	12'-2"	S	5'-0"
G	1'-0"	T	2'-0"
H	4'-0"	U	6'-0"
I	0'-3"	V	
J	0'-3"	W	
K	1'-0"	X	
L	0'-2"	Y	
M	3'-6"	Z	

norweco 3-25-07 B
 LOW PROFILE SINGLAIR BIO-KINETIC AERATOR TREATMENT SYSTEM MODEL TFLP-550 CPD
 10-15-06
 NTR
 PC-5-7091

- GENERAL NOTES:**
- SINGLAIR® AERATOR, AS TESTED AND ACCEPTED BY NSF, OPERATING 60 MINUTES ON / 60 MINUTES OFF.
 - FALL THROUGH SINGLAIR® 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 SINGLAIR® DISTRIBUTOR FOR ELECTRICAL REQUIREMENTS.

- Required BAT Site Plan Notes**
- 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 sit plan may be required.
 - The maximum depth of the BAT shall be per the manufacturer's specification, 3.0'.
 - The blower may not be located further from the tank than the manufacturer's specifications, 75'.
 - 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.
 - Electrical work for the BAT installation must be performed by a licensed electrician.
 - An agreement and Easement must be completed and signed by all applicable parties, and recorded in Land Records of Howard County.
 - The Health Department requires documentation for the start-up certification from the manufacturer prior to final approval of the installation.

SIGNATURE AND SEAL ARE FOR SEPTIC PROFILE AND CALCULATIONS ONLY, TANK, PUMP AND DETAILS WERE NOT DESIGNED OR REVIEWED BY THE ENGINEER:

THIS PLAN IS FOR SEPTIC DESIGN ONLY

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 28376, Expiration Date: 01-01-2023.



AAM-BEI
 2021.05.25 15:06:36 -04'00

OWNER/BUILDER:
 KEYSTONE CUSTOM HOMES, INC.
 227 GRANITE RUN DR.
 SUITE 100
 LANCASTER, PA 17601
 717-464-9060

BENCHMARK ENGINEERING, INC.
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 WWW.BEI-CIVILENGINEERING.COM

PROJECT: **WINDSOR FOREST KNOLLS LOT 3**

LOCATION: TAX MAP: 6 - GRID: 16 - PARCEL: 57
 18422 HIDDEN CREEK WAY - TAX ID: 04-373189
 ELECTION DISTRICT NO. 4 - HOWARD COUNTY, MARYLAND

TITLE: **BAT SITE PLAN**

HOUSE TYPE: **CUSTOM - KEYSTONE HOMES**

DATE: MAY, 2021 PROJECT NO. 2986

SCALE: AS SHOWN DRAWING 3 OF 4

