



## 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](http://www.hchealth.org)

Facebook: [www.facebook.com/hocohealth](https://www.facebook.com/hocohealth)

Twitter: HowardCoHealthDep

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

---

### MEMORANDUM

TO: CMS Associates LLC  
4925 Ellis Lane  
Ellicott City, Maryland 21043

FROM: Robert Freemon *RIF*  
Well & Septic Program

RE: Ten Oaks Farm, Lot 3  
5022 Ten Oaks Rd.  
Clarksville, MD 21029  
(OSDS Comments)

DATE: 11/22/2023

---

After review of the OSDS plan here are my comments.

1. A legend with symbols used on the plan needs to be created. Legend should include well sites/alt/boxes, percs (passing & failing), sewage disposal area w/ sqft.
2. Change the SDA border line to not match the private use in common access. The SDA boundary line should be clear and noticeable.
3. Show failing holes with different symbol. The legend can show which holes passed and failed. The test # and elevation can be labeled next to the test location.
4. Perc locations 6004, 6003 & 5022 need to be shown on the plan.
5. Label all existing wells with their tag number. Any existing wells with no tag number can be labeled "Ex. Drilled Well" or "Ex. Pit Well". This will be required on all PC and OSDS plans.
6. If you want to show the alternate well sites for the neighboring properties that is fine just make sure to label them that way. Otherwise only the existing wells need to be shown.
7. Show the existing septic systems on the neighboring lots.
8. Extend the contour onto 5020 Ten Oaks.

9. Trenches proposed should be shown straight and along contour as much as possible. PVC sch 40 does not bend. If the degree in which the contour changes require the trench/s to turn, fittings can be placed on the lateral/s.
10. Label the force main.
11. Revise "Private Sewage Easement" to "Ex. Sewage Disposal Area (sqft)". Health is trying to get away from calling SDA's easements. This will be required on all PC and OSDS plans.
12. To receive the full sidewall credit for each trenching system the trench inlet and max depths shown on the spec sheet must be used. The plan shows the trench bottoms stopping earlier than 8ft.
13. The septic sizing calculations are incorrect. Double check the sidewall credit and application rates.
14. Are we sure there are 11 x 1/8<sup>th</sup> bends between the pump and d-box?
15. In the septic profile chart show the elevations for the pr. ground, top of tanks and the invert at the d-box.
16. Label all roads and driveways.
17. Below note #3 add the note, "An electrical permit must be pulled by a licensed electrician prior to septic permit issuance."

## Oswald, Hank

---

**From:** Oswald, Hank  
**Sent:** Thursday, January 12, 2017 2:25 PM  
**To:** Stephanie Tuite (Stephanie@fcc-eng.com)  
**Subject:** Ten Oaks Farm Septic Specs Lots 1 - 3  
**Attachments:** Septic Spec\_Ten Oaks Farm\_Lot 1.pdf; Septic Spec\_Ten Oaks Farm\_Lot 2.pdf; Septic Spec\_Ten Oaks Farm\_Lot 3.pdf

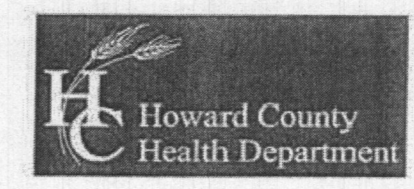
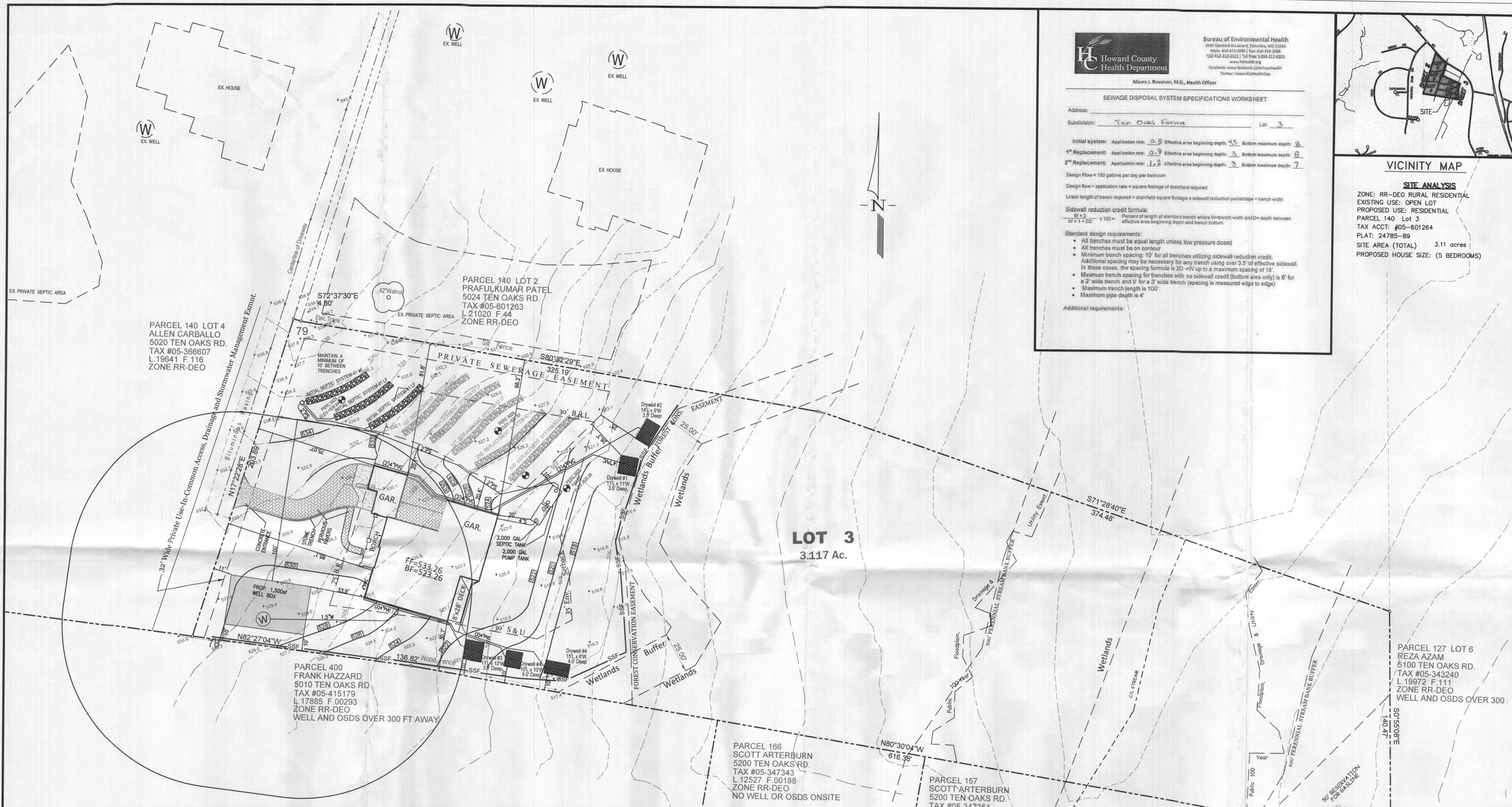
Hi Stephanie:

Attached, please find septic specs for Ten Oaks Farm, Lots 1 – 3.

Hank

Hank Oswald, L.E.H.S.  
Howard County Health Department  
Bureau of Environmental Health  
Well & Septic Program  
8930 Stanford Boulevard  
Columbia, MD 21045  
410.313.1786 (Office)  
410.313.2648 (Fax)





Bureau of Environmental Health  
 8935 Standard Boulevard, Columbia, MD 21046  
 Main: 410-313-2660 Fax: 410-313-2668  
 Toll Free: 1-800-313-6300  
 www.hchealth.org  
 Facebook: www.facebook.com/hchealth  
 Twitter: @HowardHealthDep

SEWAGE DISPOSAL SYSTEM SPECIFICATIONS WORKSHEET

Address: \_\_\_\_\_  
 Subdivision: Ten Oaks Farms Lot: 3

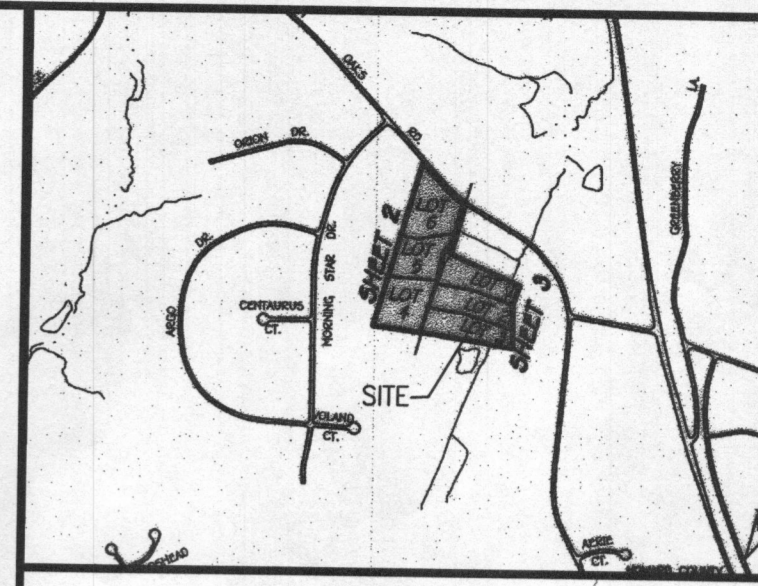
Initial system: Application rate: 0.8 Effective area beginning depth: 4.5 Bottom maximum depth: 8  
 1<sup>st</sup> Replacement: Application rate: 0.9 Effective area beginning depth: 3 Bottom maximum depth: 8  
 2<sup>nd</sup> Replacement: Application rate: 1.2 Effective area beginning depth: 3 Bottom maximum depth: 7

Design flow = 150 gallons per day per bedroom  
 Design flow = application rate x square footage of drainfield required  
 Linear length of trench required = drainfield square footage x sidewall reduction percentage ÷ trench width

Side wall reduction credit formula:  
 $W + 2$  = Percent of length of standard trench where W=trench width and D=depth between effective area beginning depth and trench bottom.

- Standard design requirements:
- All trenches must be equal length unless low pressure dosed
  - All trenches must be on contour
  - Minimum trench spacing: 10' for all trenches utilizing sidewall reduction credit. Additional spacing may be necessary for any trench using over 3.5' of effective sidewall. In those cases, the spacing formula is  $2D + W$  up to a maximum spacing of 18'.
  - Minimum trench spacing for trenches with no sidewall credit (bottom area only) is 6' for a 2' wide trench and 9' for a 3' wide trench (spacing is measured edge to edge)
  - Maximum trench length is 100'
  - Maximum pipe depth is 4'

Additional requirements:



VICINITY MAP

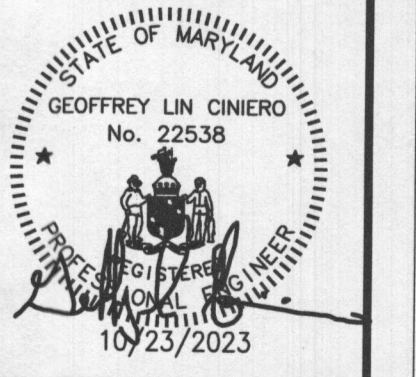
ZONE: RR-DEO RURAL RESIDENTIAL  
 EXISTING USE: OPEN LOT  
 PROPOSED USE: RESIDENTIAL  
 PARCEL 140 Lot 3  
 TAX ACCT: #05-601264  
 PLAT: 24785-89  
 SITE AREA (TOTAL) 3.11 acres  
 PROPOSED HOUSE SIZE: (5 BEDROOMS)

CIVIL ENGINEER

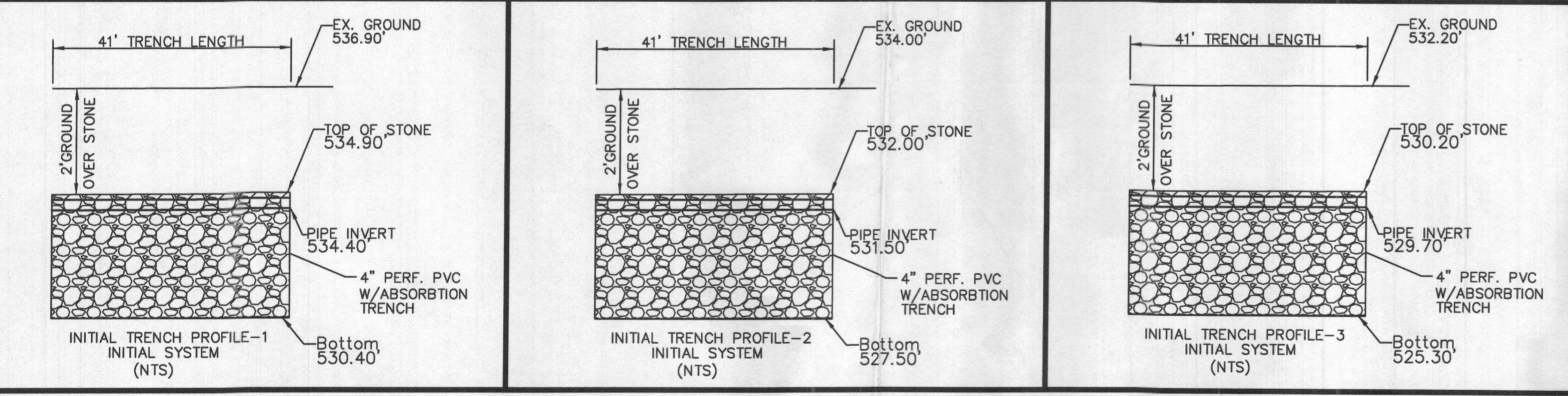
**CMS**  
 CMS ASSOCIATES LLC  
 4925 Ellis Lane  
 Ellicott City, Maryland 21043  
 Tel: (410) 988-2436  
 Contact: Geoffrey L. Chiero, PE  
 www.cms-engineering.net

REV. NO.	DATE	REVISIONS PRIOR TO APPROVAL

5022 TEN OAKS ROAD  
 ONSITE SEWAGE DISPOSAL SYSTEM DESIGN PLAN  
 PARCEL 140 LOT 3 TAX MAP 28 GRID 14  
 (LIBER 2106 FOLIO 121)  
 5th ELECTION DISTRICT  
 HOWARD COUNTY, MARYLAND



PLAN NO.: \_\_\_\_\_  
 SCALE: AS NOTED  
 DATE: 10/23/2023  
 SHEET 1 OF 2  
 FILE NO: 22-044



SEPTIC CALCULATIONS—Addition to Initial System

Residential Home (5 Bedrooms @ 150gpd) = 750 gallons/day  
 Trench Width = 3 ft  
 Trench Spacing = 10 ft (min)  
 Application Rate = 0.8 gpd/ft<sup>2</sup>  
 sf of Trench required = 750 gpd / 0.8 gpd/ft<sup>2</sup> = 938 ft<sup>2</sup>  
 Deep Trench Length =  $[(w+2) / (w+1+2d)] \times 100$   
 Deep Trench Length =  $[(3+2) / (3+1+2(3))] \times 100$   
 Deep Trench Length = 38.5%  
 Deep Trench Length =  $(938 \times 0.385) = 362 \text{ ft}^2$   
 Deep Trench Length =  $(469 \text{ ft}^2 / 3 \text{ ft}) = 157 \text{ ft}$   
 Use 3 - 41' Trenches = 123'

SEPTIC CALCULATIONS—1st Replacement System

Residential Home (5 Bedrooms @ 150gpd) = 750 gallons/day  
 Trench Width = 3 ft  
 Trench Spacing = 10 ft (min)  
 Application Rate = 0.8 gpd/ft<sup>2</sup>  
 sf of Trench required = 750 gpd / 0.8 gpd/ft<sup>2</sup> = 938 ft<sup>2</sup>  
 Deep Trench Length =  $[(w+2) / (w+1+2d)] \times 100$   
 Deep Trench Length =  $[(3+2) / (3+1+2(3))] \times 100$   
 Deep Trench Length = 50.0%  
 Deep Trench Length =  $(938 \times 0.50) = 469 \text{ ft}^2$   
 Deep Trench Length =  $(469 \text{ ft}^2 / 3 \text{ ft}) = 157 \text{ ft}$   
 Use 3 - 53' Trenches = 159'

SEPTIC CALCULATIONS—2nd Replacement System

Residential Home (5 Bedrooms @ 150gpd) = 750 gallons/day  
 Trench Width = 3 ft  
 Trench Spacing = 10 ft (min)  
 Application Rate = 0.8 gpd/ft<sup>2</sup>  
 sf of Trench required = 750 gpd / 1.2 gpd/ft<sup>2</sup> = 625 ft<sup>2</sup>  
 Deep Trench Length =  $[(w+2) / (w+1+2d)] \times 100$   
 Deep Trench Length =  $[(3+2) / (3+1+2(3))] \times 100$   
 Deep Trench Length = 50.0%  
 Deep Trench Length =  $(625 \times 0.50) = 313 \text{ ft}^2$   
 Deep Trench Length =  $(313 \text{ ft}^2 / 3 \text{ ft}) = 105 \text{ ft}$   
 Use (2) Two Trenches of 53 ft in Length = 106 ft.

PURPOSE/STATEMENT

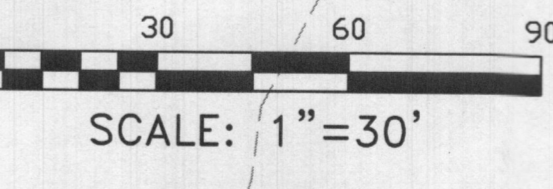
INSTALL A NEW SEPTIC SYSTEM TO ACCOMMODATE THE CONSTRUCTION OF A NEW FIVE BEDROOM HOUSE. SEPTIC INSTALLATION INCLUDES A 2,000 GALLON TANK AND 2,000 GALLON PUMP TANK WITH PUMP.

NOTES

- ANY CHANGES TO 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 EARTH COVER OVER THE TANK IS 3 FEET GREATER EARTH COVER WILL REQUIRE A HEAVY LOAD BEARING TANK.
- ELECTRICAL WORK FOR THE INSTALLATION MUST BE PERFORMED BY A LICENSED ELECTRICIAN.
- ALL WELLS, SEPTIC SYSTEMS, AND SEWAGE DISPOSAL AREAS WITHIN 100' OF THE PROPERTY AND WELLS WITHIN 200' DOWN GRADIENT OF EXISTING OR PROPOSED SEPTIC SYSTEMS OR SEWAGE DISPOSAL AREAS HAVE BEEN SHOWN USING ALL REASONABLE EFFORTS.

OWNER

ETA STEPHEN TATAW  
 8501 TRAFALGAR CIRCLE APT 480  
 HANOVER, MD 21076



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.  
 Expiration Date: 11-24-25

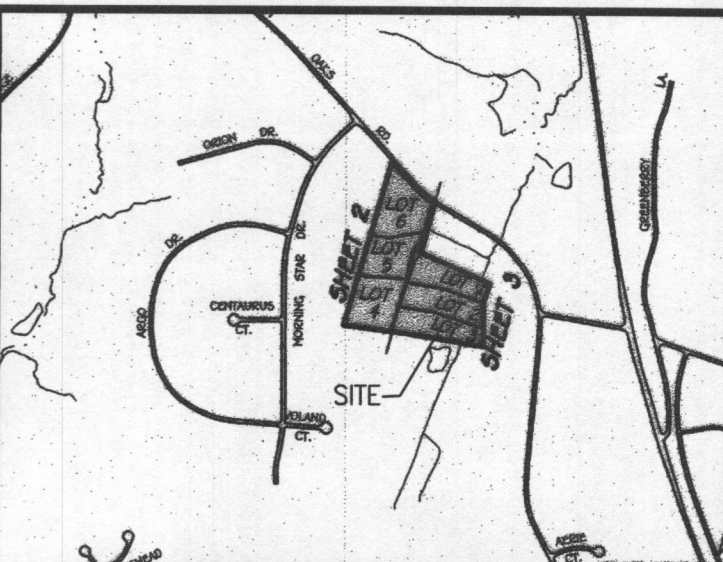




**Howard County Health Department**  
 Bureau of Environmental Health  
 8830 Stanford Boulevard, Columbia, MD 21045  
 Phone: 410-313-2660 | Fax: 410-313-2668  
 100 410-313-2223 | Toll Free: 1-800-313-6300  
 www.hchealth.org  
 Facebook: www.facebook.com/hchealth  
 Twitter: @HowardCountyDep  
 Maura J. Rossman, M.D., Health Officer

SEWAGE DISPOSAL SYSTEM SPECIFICATIONS WORKSHEET  
 Address: \_\_\_\_\_  
 Subdivision: Ten Oaks Farms Lot: 3

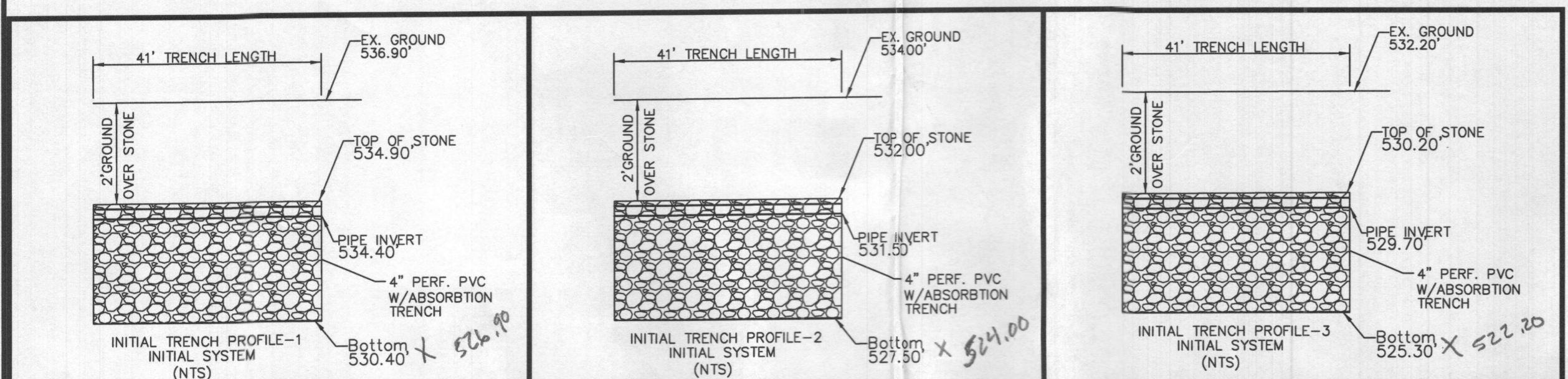
Initial system: Application rate: 0.8 Effective area beginning depth: 4.5 Bottom maximum depth: 8  
 1<sup>st</sup> Replacement: Application rate: 0.8 Effective area beginning depth: 3 Bottom maximum depth: 8  
 2<sup>nd</sup> Replacement: Application rate: 1.2 Effective area beginning depth: 3 Bottom maximum depth: 7  
 Design Flow = 150 gallons per day per bedroom  
 Design flow = application rate = square footage of drained required  
 Linear length of trench required = drainfield square footage x sidewall reduction percentage ÷ trench width  
 Sidewall reduction credit formula:  
 $W = 2$   
 $W + 1 = 25$  x 100 = Percent of length of standard trench where W=trench width and O= depth between effective area beginning depth and trench bottom.  
 Standard design requirements:  
 • All trenches must be equal length unless low pressure dosed  
 • All trenches must be on contour  
 • Minimum trench spacing: 10' for all trenches utilizing sidewall reduction credit.  
 Additional spacing may be necessary for any trench using over 3.5' of effective sidewall. In those cases, the spacing formula is  $2D + W$  up to a maximum spacing of 18'.  
 • Minimum trench spacing for trenches with no sidewall credit (bottom area only) is 6' for a 2' wide trench and 9' for a 3' wide trench (spacing is measured edge to edge)  
 • Maximum trench length is 100'  
 • Maximum pipe depth is 4'  
 Additional requirements:



**VICINITY MAP**  
 SITE ANALYSIS  
 ZONE: RR-DEO RURAL RESIDENTIAL  
 EXISTING USE: OPEN LOT  
 PROPOSED USE: RESIDENTIAL  
 PARCEL 140 Lot 3  
 TAX ACCT: #05-601264  
 PLAT: 24785-89 3.11 acres  
 SITE AREA (TOTAL)  
 PROPOSED HOUSE SIZE: (5 BEDROOMS)

CIVIL ENGINEER  
**CMS ASSOCIATES LLC**  
 4925 Ellis Lane  
 Ellicott City, Maryland 21043  
 Tel: (410) 988-2436  
 Contact: Geoffrey L. Ciniero, PE  
 www.cms-engineering.net

5022 TEN OAKS ROAD  
 ONSITE SEWAGE DISPOSAL SYSTEM DESIGN PLAN  
 PARCEL 140 LOT 3 TAX MAP 28 GRID 14  
 (LIBER 21106 FOLIO 121)  
 5th ELECTION DISTRICT  
 HOWARD COUNTY, MARYLAND

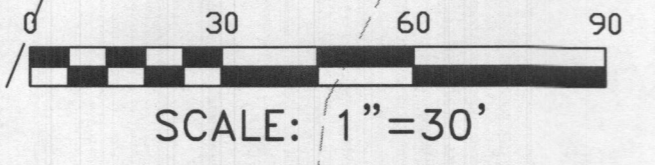


**SEPTIC CALCULATIONS-Addition to Initial System**  
 Residential Home (5 Bedrooms @ 150gpd) = 750 gallons/day  
 Trench Spacing = 10 ft (min)  
 Trench Width = 3 ft  
 Application Rate = 0.8 gpd/ft<sup>2</sup>  
 sf of Trench required =  $750 \text{ gpd} / 0.8 \text{ gpd/ft}^2 = 938 \text{ ft}^2$   
 Deep Trench Length =  $[(w+2) / (w+1+2d)] \times 100$   
 Deep Trench Length =  $[(3+2) / (3+1+2(3))] \times 100 = 34\%$   
 Deep Trench Length =  $(938 \times 0.34) = 322 \text{ ft}$   
 Deep Trench Length =  $(362 \text{ ft}^2 / 3 \text{ ft}) = 121 \text{ ft}$   
 Use 3 - 41' Trenches = 140'

**PURPOSE/STATEMENT**  
 INSTALL A NEW SEPTIC SYSTEM TO ACCOMMODATE THE CONSTRUCTION OF A NEW FIVE BEDROOM HOUSE.  
 SEPTIC INSTALLATION INCLUDES A 2,000 GALLON TANK AND 2,000 GALLON PUMP TANK WITH PUMP.

**SEPTIC CALCULATIONS-1st Replacement System**  
 Residential Home (5 Bedrooms @ 150gpd) = 750 gallons/day  
 Trench Spacing = 10 ft (min)  
 Trench Width = 3 ft  
 Application Rate = 0.8 gpd/ft<sup>2</sup>  
 sf of Trench required =  $750 \text{ gpd} / 0.8 \text{ gpd/ft}^2 = 938 \text{ ft}^2$   
 Deep Trench Length =  $[(w+2) / (w+1+2d)] \times 100$   
 Deep Trench Length =  $[(3+2) / (3+1+2(3))] \times 100 = 34\%$   
 Deep Trench Length =  $(938 \times 0.34) = 322 \text{ ft}$   
 Deep Trench Length =  $(362 \text{ ft}^2 / 3 \text{ ft}) = 121 \text{ ft}$   
 Use 3 - 53' Trenches = 159'

**SEPTIC CALCULATIONS-2nd Replacement System**  
 Residential Home (5 Bedrooms @ 150gpd) = 750 gallons/day  
 Trench Spacing = 10 ft (min)  
 Trench Width = 3 ft  
 Application Rate = 1.2 gpd/ft<sup>2</sup>  
 sf of Trench required =  $750 \text{ gpd} / 1.2 \text{ gpd/ft}^2 = 625 \text{ ft}^2$   
 Deep Trench Length =  $[(w+2) / (w+1+2d)] \times 100$   
 Deep Trench Length =  $[(3+2) / (3+1+2(3))] \times 100 = 34\%$   
 Deep Trench Length =  $(625 \times 0.34) = 212 \text{ ft}$   
 Deep Trench Length =  $(313 \text{ ft}^2 / 3 \text{ ft}) = 105 \text{ ft}$   
 Use (2) Two Trenches of 53 ft in Length = 106 ft.

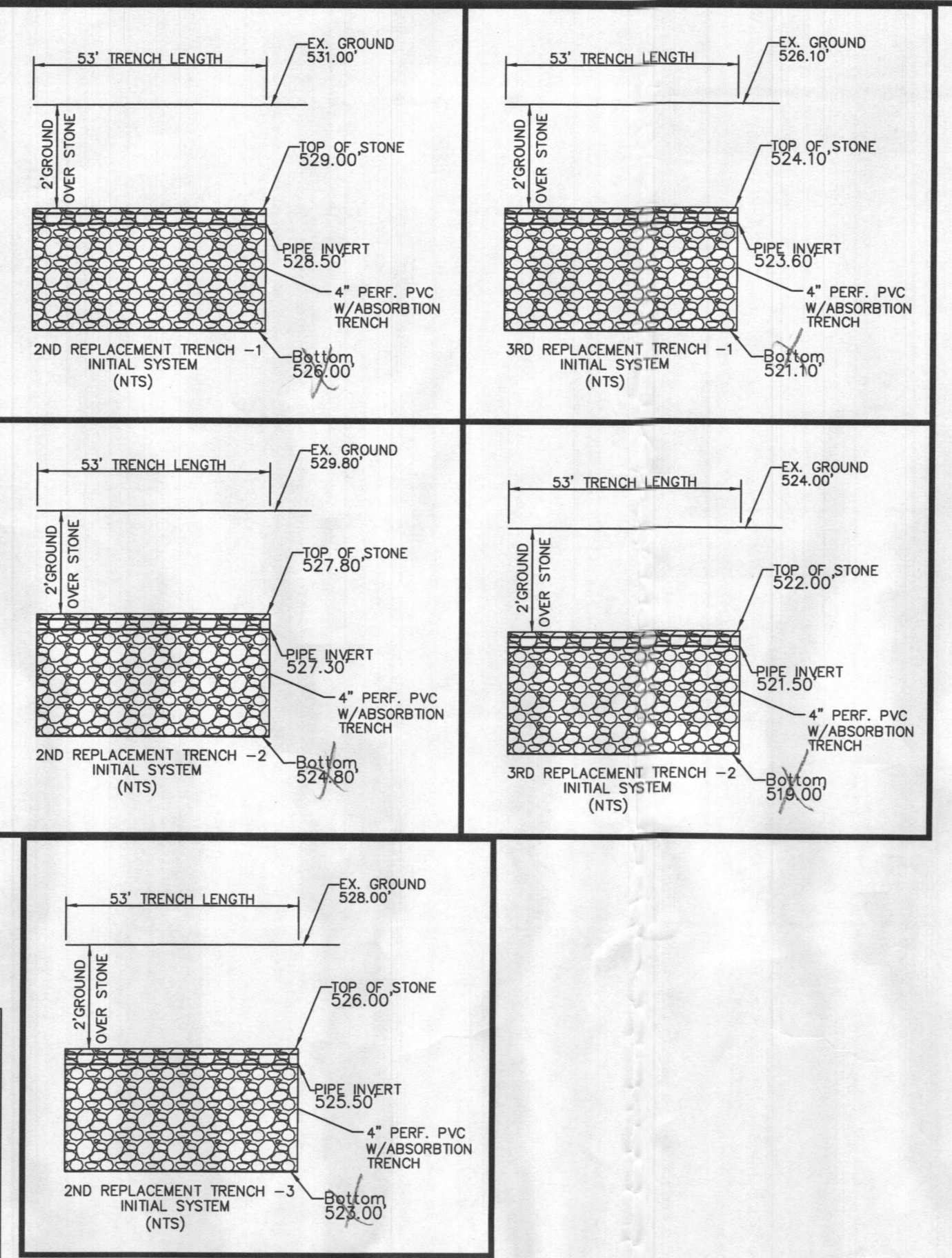
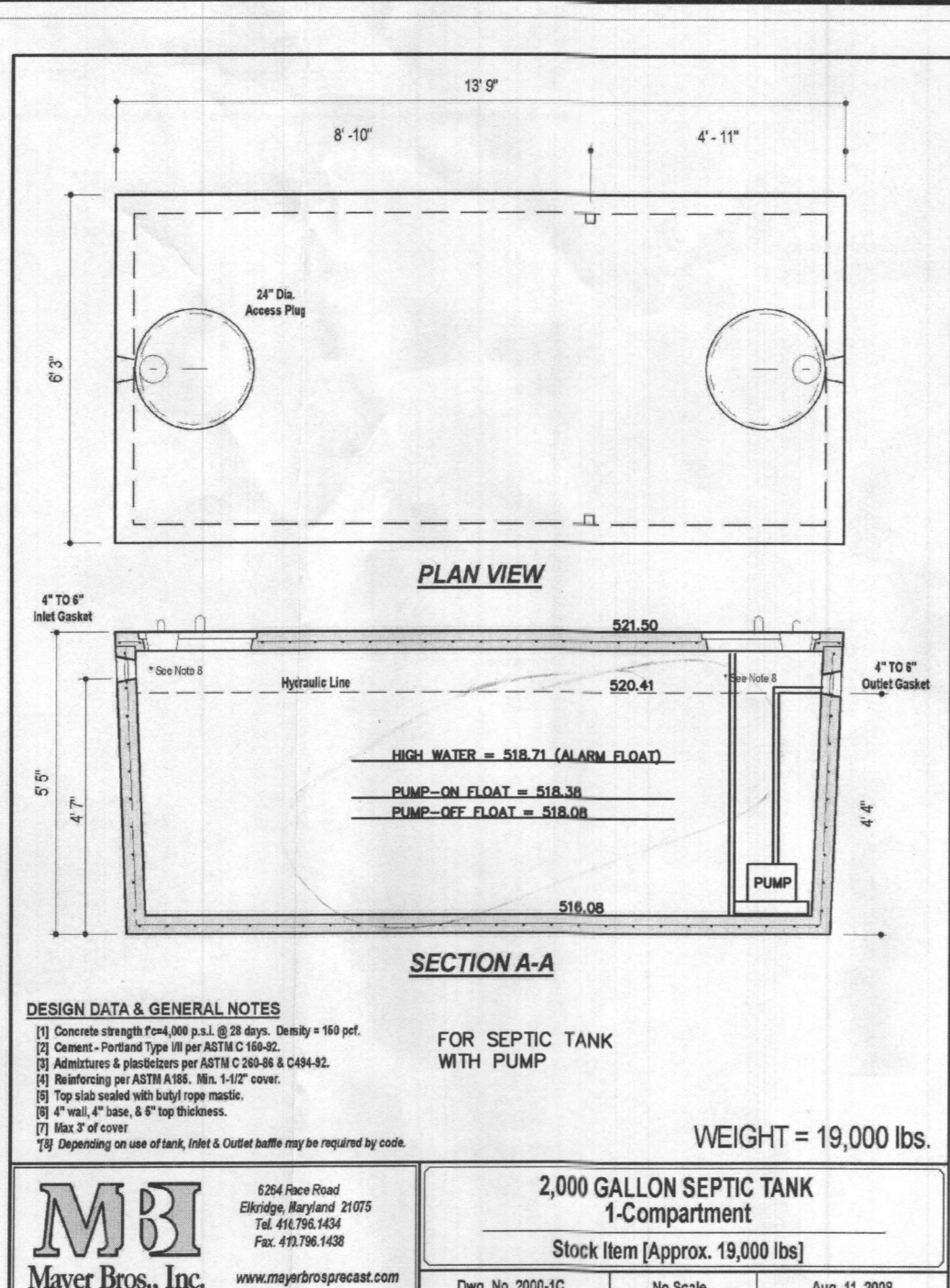
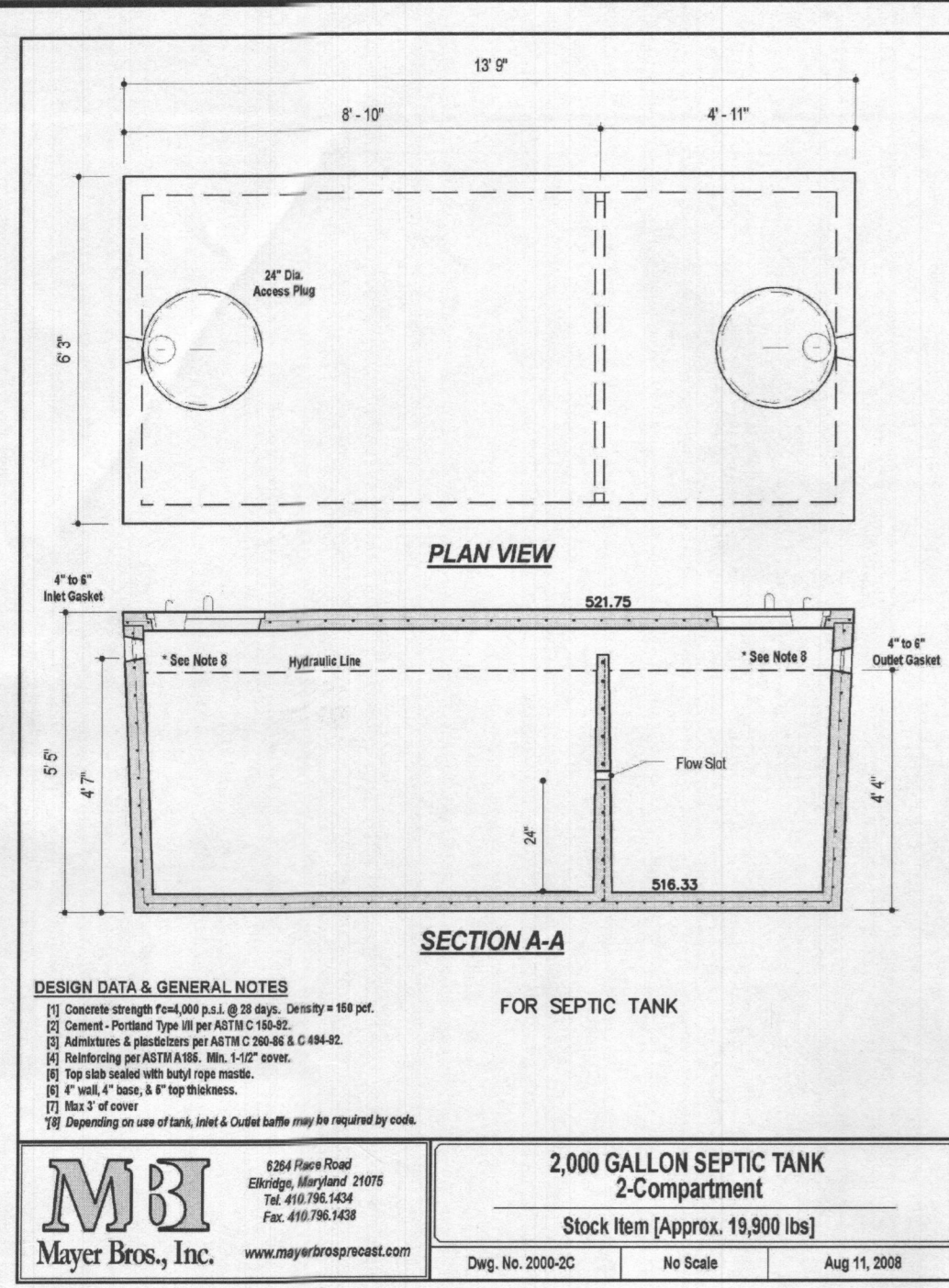


**Professional Certification**  
 I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.  
 22538  
 11-24-25

- NOTES**
- ANY CHANGES TO 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 EARTH COVER OVER THE TANK IS 3 FEET. GREATER EARTH COVER WILL REQUIRE A HEAVY LOAD BEARING TANK.
  - ELECTRICAL WORK FOR THE INSTALLATION MUST BE PERFORMED BY A LICENSED ELECTRICIAN.
  - ALL WELLS, SEPTIC SYSTEMS, AND SEWAGE DISPOSAL AREAS WITHIN 100' OF THE PROPERTY AND WELLS WITHIN 200' DOWN GRADIENT OF EXISTING OR PROPOSED SEPTIC SYSTEMS OR SEWAGE DISPOSAL AREAS HAVE BEEN SHOWN USING ALL REASONABLE EFFORTS.

Professional Engineer  
**GEOFFREY LIN CINIERO**  
 No. 22538  
 10/23/2023

PLAN NO.: \_\_\_\_\_  
 SCALE: AS NOTED  
 DATE: 10/23/2023  
 SHEET 1 OF 2  
 FILE NO: 22-044



**CLARUS** ENVIRONMENTAL

**Zoeller Company**  
System Head Curve and Pump Selection Tool

**ZOELLER** PUMP COMPANY

**Static Head Information**

Static Head - elevation difference from low water to outlet: 12.2 feet

System high point above outlet? No

**Friction Head Information**

How many different pipes in the system (not counting laterals)? 1

Pipe 1 Length: 230 feet

Pipe 1 Size: 2 inches SCH 40

Pipe 1 Class: SCH 40

Pressurized Laterals? No

**Fittings & Discharge Assemblies**

Type	Size	Quantity	Flow
90 Elbow	2 inches	1	100%
Check Valve	2 inches	1	100%
45 Elbow	2 inches	11	100%

**Special Friction Considerations**

Wrap Holes: Yes (18")

Add-in Friction: 15% of Pipe Loss

Automatic Multisize Valve? No

Pressure Filter? No

**Operating Head Information**

System Type: Non-Pressurized

Specify Flow Requirement? Yes

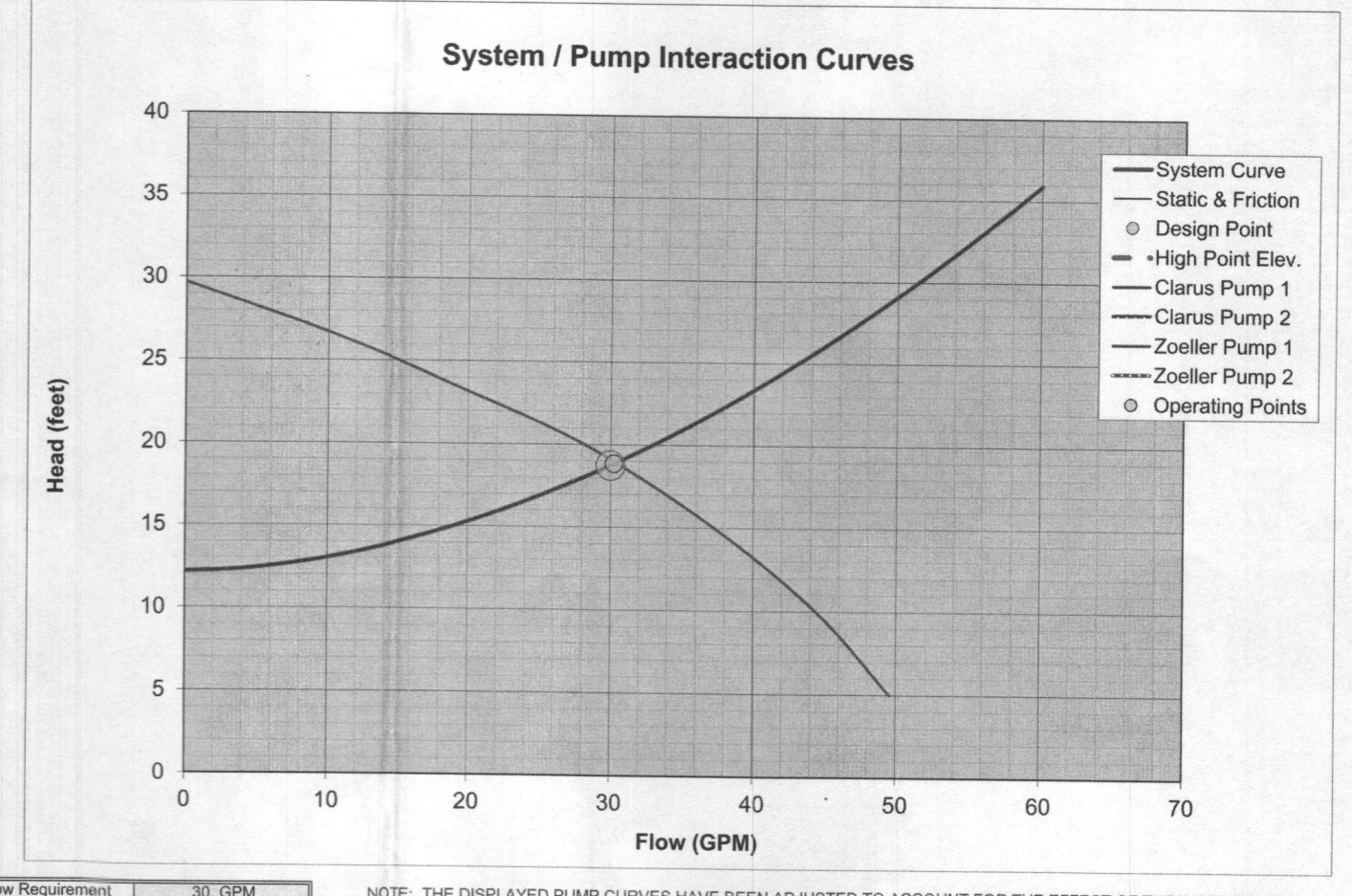
Flow Requirement: 30 GPM

**Factors and Coefficients**

Hazen-Williams C Factor: 130

Discharge Coefficient (Cd): 0.85

Lateral Design Mode: Off



Trusted Tested Tough™

**ZOELLER** PUMP COMPANY

**TECHNICAL DATA SHEET DOSE-MATE SERIES Models 151, 152, 153 Effluent Pumps**

**PRODUCT SPECIFICATIONS**

Model	151	152	153
Flow (GPM)	30	30	30
Flow (LPM)	1135	1135	1135
Head (ft)	15	15	15
Head (m)	4.57	4.57	4.57
Power (HP)	0.25	0.25	0.25
Power (kW)	0.18	0.18	0.18
Speed (RPM)	3450	3450	3450
Impeller	Thermoplastic ABS impeller	Thermoplastic ABS impeller	Thermoplastic ABS impeller
Insulation	Class B	Class B	Class B
Amperage	3.0	3.0	3.0
Connections	Automatic thermal overload	Automatic thermal overload	Automatic thermal overload
Discharge Size	1.5" (38.1 mm)	1.5" (38.1 mm)	1.5" (38.1 mm)
Socket Handling	3/4" (19 mm) spherical sockets	3/4" (19 mm) spherical sockets	3/4" (19 mm) spherical sockets
Control Type	15. level sensor cord	15. level sensor cord	15. level sensor cord
Max. Head	44 (13.4 m)	44 (13.4 m)	44 (13.4 m)
Max. Flow Rate	125 GPM (4735 LPM)	125 GPM (4735 LPM)	125 GPM (4735 LPM)
Max. Operating Temp.	130 °F (54 °C)	130 °F (54 °C)	130 °F (54 °C)
Control	Oil filled	Oil filled	Oil filled
Motor Protection	Automatic thermal overload	Automatic thermal overload	Automatic thermal overload
Cap	Cast iron	Cast iron	Cast iron
Motor Housing	Cast iron	Cast iron	Cast iron
Paint/Finishing	Cast iron	Cast iron	Cast iron
Base	Plastic or cast iron	Plastic or cast iron	Plastic or cast iron
Upper Bearing	Stainless bearing	Stainless bearing	Stainless bearing
Lower Bearing	Ball bearing	Ball bearing	Ball bearing
Mechanical Seal	Carbon and ceramic	Carbon and ceramic	Carbon and ceramic
Impeller Type	Non-clogging style	Non-clogging style	Non-clogging style
Impeller	Engineered thermoplastic	Engineered thermoplastic	Engineered thermoplastic
Motor Shaft	316L (316)	316L (316)	316L (316)
Coast	Non-cast	Non-cast	Non-cast

**MODEL 151**

**MODEL COMPARISON**

Model	Seal	Motor	Volts	Ph.	Amperage	HP	Flow	Head	Weight	Stroke	Displacement
BE151	Single	Non	115	1	8.8	1.2	30	15	22	16	2.0 x 3
BE152	Single	Non	230	1	8.8	1.2	30	15	22	16	2.0 x 3
BE153	Single	Non	115	1	8.8	1.2	30	15	22	16	2.0 x 3
BE154	Single	Non	115	1	8.8	1.2	30	15	22	16	2.0 x 3
BE155	Single	Non	115	1	8.8	1.2	30	15	22	16	2.0 x 3
BE156	Single	Non	115	1	8.8	1.2	30	15	22	16	2.0 x 3
BE157	Single	Non	115	1	8.8	1.2	30	15	22	16	2.0 x 3
BE158	Single	Non	115	1	8.8	1.2	30	15	22	16	2.0 x 3
BE159	Single	Non	115	1	8.8	1.2	30	15	22	16	2.0 x 3
BE160	Single	Non	115	1	8.8	1.2	30	15	22	16	2.0 x 3

**SELECTION GUIDE**

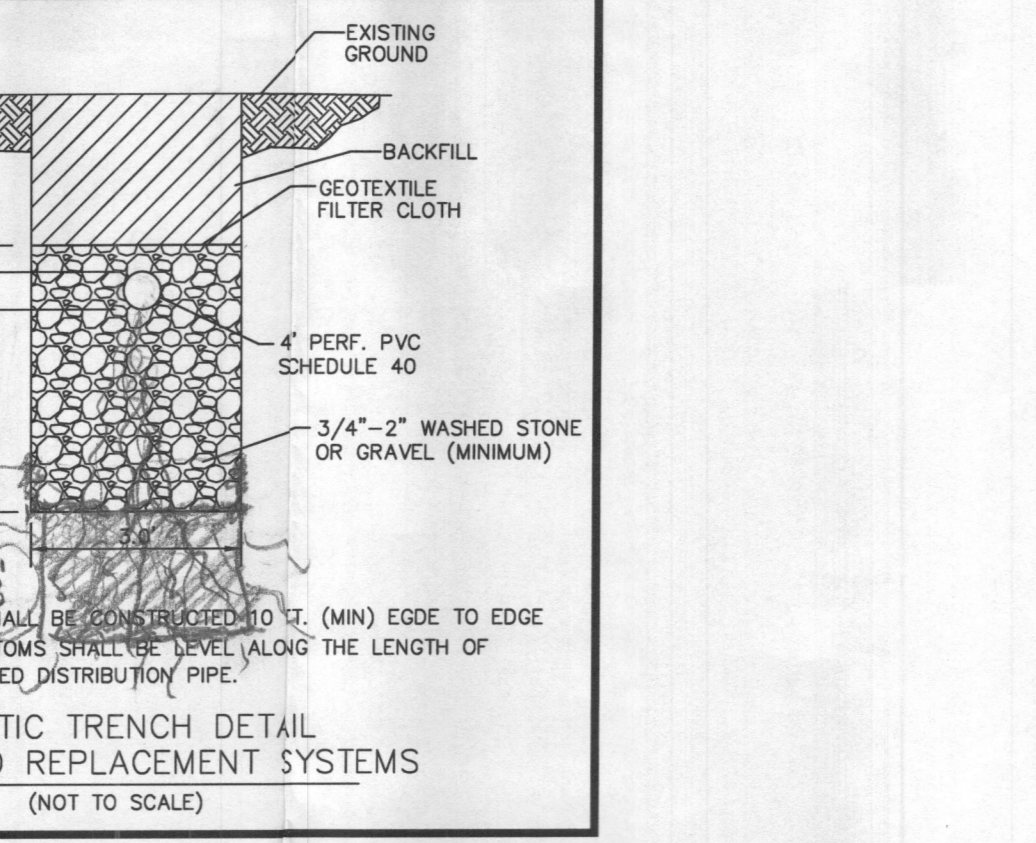
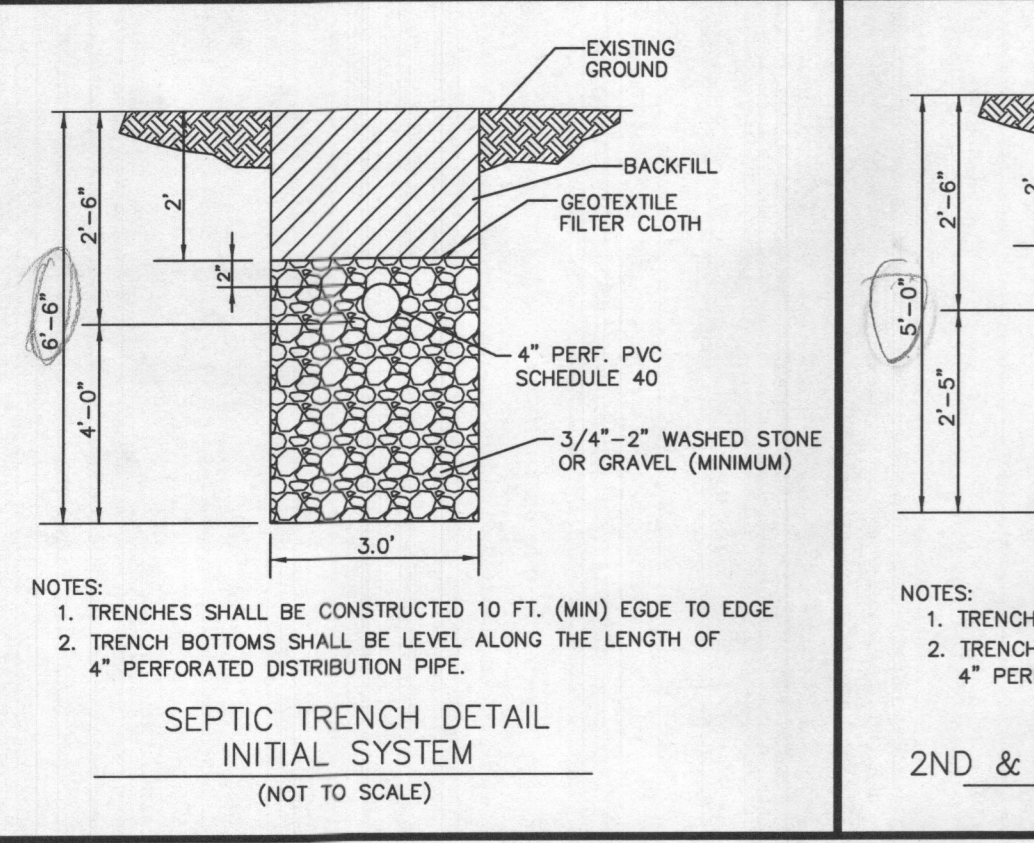
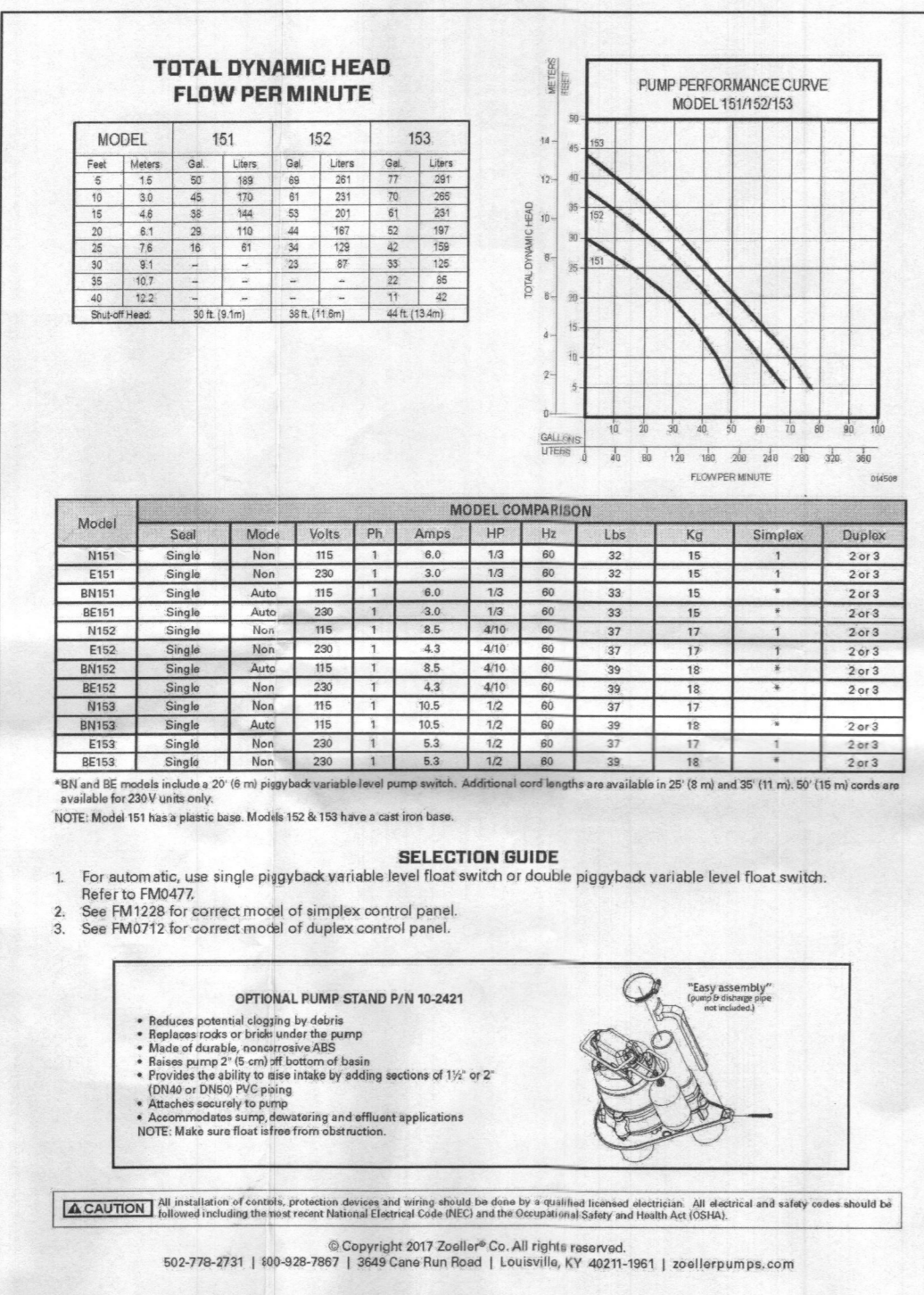
- For automatic, use single piggyback variable level float switch or double piggyback variable level float switch. Refer to FM477.
- See FM1228 for correct model of simplex control panel.
- See FM2712 for correct model of duplex control panel.

**OPTIONAL PUMP STAND P/N 10-2421**

- Reduces potential clogging by debris.
- Eliminates need for manual pump.
- Made of durable, non-corrosive ABS.
- Flows pump 2" (51 mm) below basin.
- Provides the ability to site tanks by adding sections of 1" or 2" (25.4 or 50.8 mm) PVC piping.
- Attaches directly to pump.
- Appropriate for pump, float switch and effluent applications.

**CAUTION:** All applications of floats, pressure devices and wiring should be done by a qualified electrician. All electrical and wiring should be done in accordance with the most recent National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).

© Copyright 2017 Zoeller® Co. All rights reserved. 802-778-2731 | 800-829-7887 | 3569 Gene Run Road | Louisville, KY 40218-1961 | zoellerpumps.com



2" SCH 40 PVC = 184 FT  
 1 UNION @ 2 EQUIVALENT FEET = 2 FT  
 11 1/8 HB @ 4 EQUIVALENT FEET = 44 FT  
 TOTAL LINEAR FEET OF 2" SCH 40 PVC = 230 FT

**DYNAMIC HEAD**

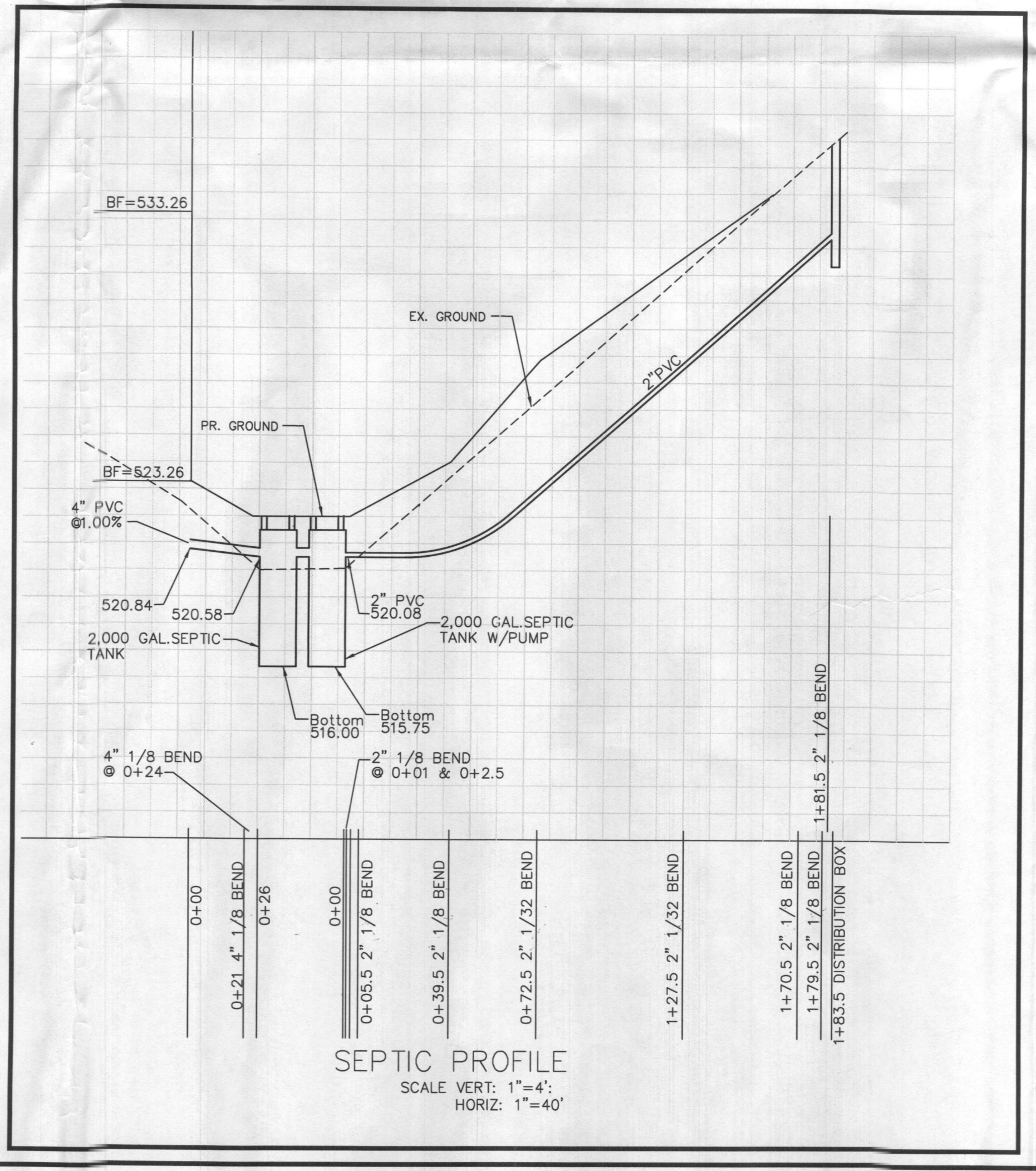
230 FT X 2.05 FT PER 100 LF OF 2" PIPE = 4.8 FEET OF FRICTION HEAD

VERTICAL FROM PUMP OFF TO HIGH POINT IN PUMP CHAMBER = 2.33 FT OF FRICTION HEAD

POINT IN SYSTEM TO HIGHEST ELEVATION OF SYSTEM = 12.18 FT

TOTAL DYNAMIC HEAD = 19.31 FT

1/6 DESIGN FLOW (750 / 6 = 125)  
 USE 125 GALLON DOSE  
 DOSE: 1/6 DESIGN FLOW + VOLUME IN PIPE  
 125 + 60 = 185 GAL  
 (RUN TIME = 6.2 MIN (30 GPM X 6.2 = 186 GALLON DOSE))



CIVIL ENGINEER

**CMS ASSOCIATES LLC**

4925 Ellis Lane  
 Ellicott City, Maryland 21043  
 Tel: (410) 988-2436  
 Contact: Geoffrey L. Ciniero, PE  
 www.cms-engineering.net

REVISIONS PRIOR TO APPROVAL

REV.	DATE	DESCRIPTION

**5022 TEN OAKS ROAD**

**ONSITE SEWAGE DISPOSAL SYSTEM DESIGN PLAN**

PARCEL 140 LOT 3 TAX MAP 28 GRID 14  
 (LIBER 2106 FOLIO 121)  
 5th ELECTION DISTRICT  
 HOWARD COUNTY, MARYLAND

STATE OF MARYLAND

GEOFFREY LIN CINIERO  
 No. 22538  
 10/23/2023

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.

Expiration Date: 11-24-28

PLAN NO.:  
 SCALE: AS NOTED  
 DATE: 10/23/2023  
 SHEET 2 OF 2  
 FILE NO: 22-044