

Building Address: 11033 Hunters View Rd.

Suite/Apt. # \_\_\_\_\_ SDP/WP/BA #: \_\_\_\_\_

Census Tract: \_\_\_\_\_ Subdivision: \_\_\_\_\_

Section: \_\_\_\_\_ Area: \_\_\_\_\_ Lot: \_\_\_\_\_

Tax Map: \_\_\_\_\_ Parcel: \_\_\_\_\_ Grid: \_\_\_\_\_

Zoning: \_\_\_\_\_ Map Coordinates: \_\_\_\_\_ Lot Size: \_\_\_\_\_

Existing Use: \_\_\_\_\_

Proposed Use: \_\_\_\_\_

Estimated Construction Cost: \$ \_\_\_\_\_

Description of Work: \_\_\_\_\_

Occupant or Tenant: \_\_\_\_\_

Was tenant space previously occupied?  Yes  No

Contact Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Email: \_\_\_\_\_

Property Owner's Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Home Phone: \_\_\_\_\_ Work Phone: \_\_\_\_\_

Applicant's Name & Mailing Address, (If other than stated herein): \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Email: \_\_\_\_\_

Contractor Company: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

License No. : \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Email: \_\_\_\_\_

Engineer/Architect Company: \_\_\_\_\_

Responsible Design Prof.: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Email: \_\_\_\_\_

**BUILDING DESCRIPTION - COMMERCIAL**

Building Characteristics	Utilities
Height:	<u>Water Supply</u>
No. of stories:	<input type="checkbox"/> Public
Gross area, sq. ft./floor:	<input type="checkbox"/> Private
	<u>Sewage Disposal</u>
Area of construction (sq. ft.):	<input type="checkbox"/> Public
	<input type="checkbox"/> Private
Use group:	Electric: <input type="checkbox"/> Yes <input type="checkbox"/> No
	Gas: <input type="checkbox"/> Yes <input type="checkbox"/> No
<u>Construction type:</u>	<u>Heating System</u>
<input type="checkbox"/> Reinforced Concrete	<input type="checkbox"/> Electric <input type="checkbox"/> Oil
<input type="checkbox"/> Structural Steel	<input type="checkbox"/> Natural Gas <input type="checkbox"/> Propane Gas
<input type="checkbox"/> Masonry	<u>Sprinkler System:</u>
<input type="checkbox"/> Wood Frame	<input type="checkbox"/> N/A
<input type="checkbox"/> State Certified Modular	<input type="checkbox"/> Full
<input checked="" type="checkbox"/> <b>Roadside Tree Project Permit</b>	<input type="checkbox"/> Partial
<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Other Suppression
<b>Roadside Tree Project Permit #</b>	No. of Heads:

**BUILDING DESCRIPTION - RESIDENTIAL**

Building Characteristics	Utilities
<input type="checkbox"/> SF Dwelling <input type="checkbox"/> SF Townhouse	<u>Water Supply</u>
<u>Depth</u> <u>Width</u>	<input type="checkbox"/> Public
1 <sup>st</sup> floor:	<input type="checkbox"/> Private
2 <sup>nd</sup> floor:	<u>Sewage Disposal</u>
Basement:	<input type="checkbox"/> Public
<input type="checkbox"/> Finished Basement	<input type="checkbox"/> Private
<input type="checkbox"/> Unfinished Basement	Electric: <input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Crawl Space	Gas: <input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Slab on Grade	<u>Heating System</u>
No. of Bedrooms:	<input type="checkbox"/> Electric
<u>Multi-family Dwelling</u>	<input type="checkbox"/> Oil
No. of efficiency units:	<input type="checkbox"/> Natural Gas
No. of 1 BR units:	<input type="checkbox"/> Propane Gas
No. of 2 BR units:	
No. of 3 BR units:	
Other Structure:	
Dimensions:	
Footings:	<input checked="" type="checkbox"/> <b>Roadside Tree Project Permit</b>
Roof:	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> State Certified Modular	<b>Roadside Tree Project Permit #</b>
<input type="checkbox"/> Manufactured Home	

THE UNDERSIGNED HEREBY CERTIFIES AND AGREES AS FOLLOWS: (1) THAT HE/SHE IS AUTHORIZED TO MAKE THIS APPLICATION; (2) THAT THE INFORMATION IS CORRECT; (3) THAT HE/SHE WILL COMPLY WITH ALL REGULATIONS OF HOWARD COUNTY WHICH ARE APPLICABLE THERETO; (4) THAT HE/SHE WILL PERFORM NO WORK ON THE ABOVE REFERENCED PROPERTY NOT SPECIFICALLY DESCRIBED IN THIS APPLICATION; (5) THAT HE/SHE GRANTS COUNTY OFFICIALS THE RIGHT TO ENTER ONTO THIS PROPERTY FOR THE PURPOSE OF INSPECTING THE WORK PERMITTED AND POSTING NOTICES.

Applicant's Signature

Email Address

Title/Company

Print Name

Date

Checks Payable to: DIRECTOR OF FINANCE OF HOWARD COUNTY  
 \*\*PLEASE WRITE NEATLY & LEGIBLY\*\*  
**-FOR OFFICE USE ONLY-**

AGENCY	DATE	SIGNATURE OF APPROVAL
State Highways		
Building Officials		
PSZA ( Zoning )		
PSZA ( Engineering )		
Health	5/16/10	
Fire Protection		

**DPZ SETBACK INFORMATION**

Front: \_\_\_\_\_

Rear: \_\_\_\_\_

Side: \_\_\_\_\_

Side St.: \_\_\_\_\_

All minimum setbacks met?  Yes  No

Is Entrance Permit Required?  Yes  No

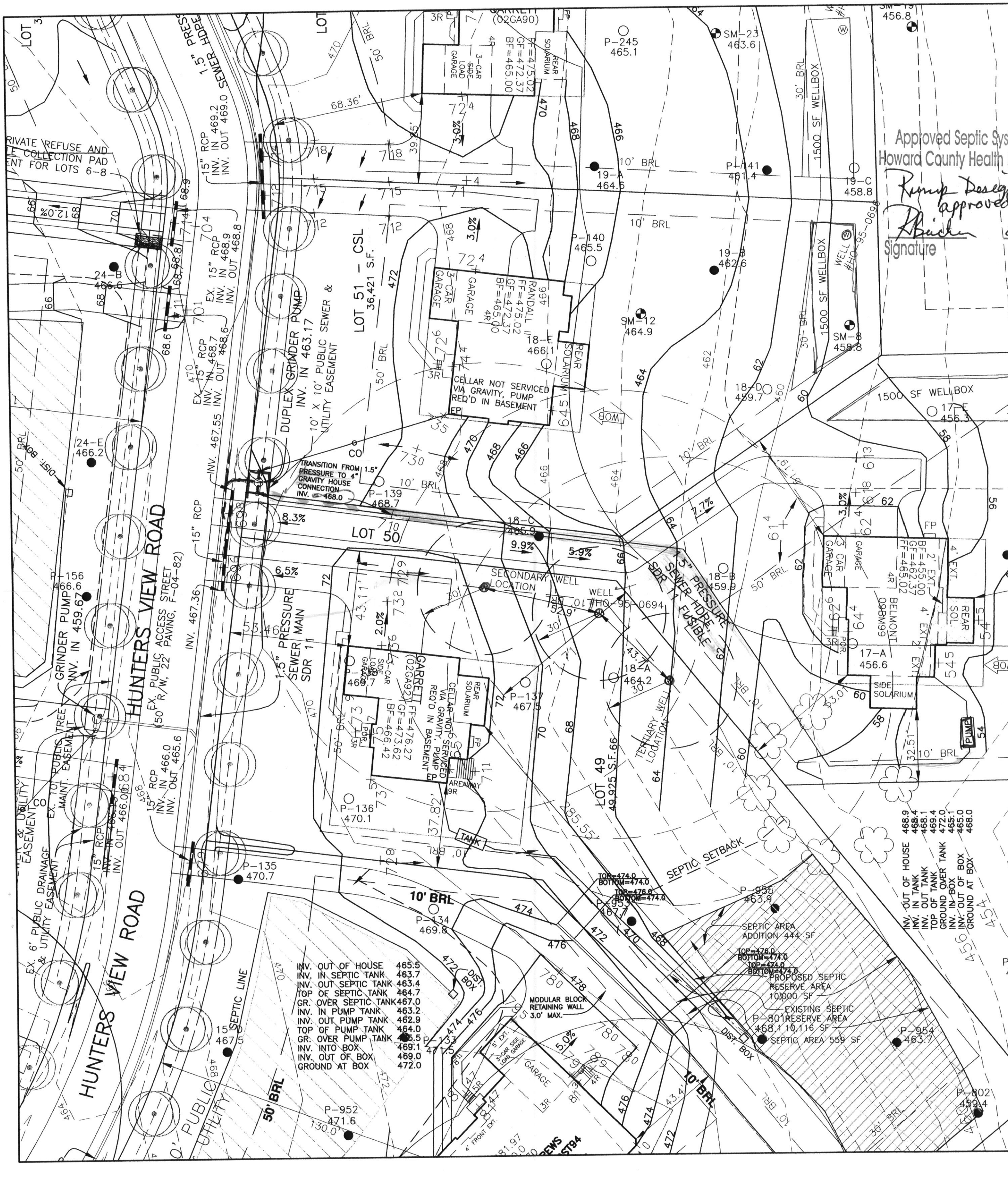
Historic District?  Yes  No

Lot Coverage for New Town Zone: \_\_\_\_\_

SDP/Red-line approval date: \_\_\_\_\_

Filing Fee	\$
Permit Fee	\$
Tech Fee	\$
Excise Tax	\$
PSFS	\$
Guaranty Fund	\$
Add'l per Fee	\$
Total Fees	\$
Sub- Total Paid	\$
Balance Due	\$

Is Sediment Control approval required for issuance?  Yes  No  
 CONTINGENCY CONSTRUCTION START  
 ONE STOP SHOP

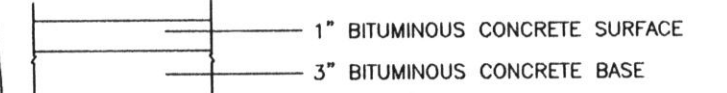


**NOTES:**

1. THE LOT SHOWN HEREON WAS RECORDED ON THE PLAT FOR RIVERWOOD, PLAT No. 19722. REFER TO THE PLAT FOR LOT DIMENSIONS, LOT AREAS AND ALL EASEMENTS.
2. THIS AREA DESIGNATES A PRIVATE SEWERAGE EASEMENT OF 10,000 SQUARE FEET AS REQUIRED BY THE STATE DEPARTMENT OF THE ENVIRONMENT FOR INDIVIDUAL SEWER DISPOSAL. IMPROVEMENTS OF ANY NATURE IN THIS AREA IS RESTRICTED UNTIL PUBLIC SEWER IS AVAILABLE. THIS EASEMENT 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 SEWERAGE EASEMENT. ANY CHANGES TO A PRIVATE SEWERAGE EASEMENT SHALL REQUIRE A REVISED PERCOLATION CERTIFICATION PLAN. RECORDATION OF A MODIFIED SEWERAGE EASEMENT PLAT SHALL NOT BE NECESSARY.
3. SEDIMENT AND EROSION CONTROLS WERE APPROVED BY HOWARD SOIL CONSERVATION DISTRICT UNDER A GRADING PLAN AND MODIFIED FOR THIS SPECIFIC HOUSE.
4. TOPOGRAPHY SHOWN HEREON IS TAKEN FROM THE APPROVED ROAD CONSTRUCTION PLANS AND HAS BEEN FIELD VERIFIED BY J.A. RICE, INC. ON OR ABOUT SEPTEMBER 2002.
5. EXACT LENGTH OF SEPTIC TRENCHES ARE TO BE DETERMINED BY THE HEALTH DEPARTMENT AT THE TIME OF TRENCH LAYOUT AND INSPECTION.
6. SPOIL FROM THE TRENCHING OF THE SEPTIC AREA IS TO BE PLACED ON THE UPHILL SIDE OF THE EXCAVATION FOR EACH INDIVIDUAL LOT.
7. ALL SEDIMENT AND EROSION CONTROL FEATURES USED ON THIS SITE SHALL COMPLY WITH 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL.
8. ALL DRAINAGE AND STORMWATER MANAGEMENT FEATURES USED ON THIS SITE MUST COMPLY WITH THE APPROVED ROAD CONSTRUCTION PLANS.
9. SEPTIC TANK FOR THIS LOT TO BE 2,000 GALLONS IF REQUIRED. THE EXISTING WELL SHOWN ON THIS PLAN, HO-95-0695 HAS BEEN FIELD LOCATED BY BENCHMARK ENGINEERING, INC. AND IS ACCURATELY SHOWN.
11. THERE ARE NO EXISTING WELLS OR SEPTIC SYSTEMS WITHIN 100' OF THIS PROJECT'S BOUNDARY EXCEPT AS NOTED.
12. ANY CHANGES TO A PRIVATE SEWERAGE EASEMENT OR WELL BOX SHALL REQUIRE A REVISED PERCOLATION CERTIFICATION PLAN.
13. STORMWATER MANAGEMENT FOR THIS HOUSE IS PROVIDED BY FACILITY #4 CONSTRUCTED UNDER PHASE 1 (F-04-082) BY USE OF A WET EXTENDED DETENTION FACILITY.
14. THE CULVERT FOR THIS LOT'S DRIVEWAY AS DESIGNED UNDER A REPORT SUBMITTED SIMULTANEOUSLY WITH THIS PERMIT PLAN.

Approved Septic System Plan  
Howard County Health Department

*Rump Design*  
approved with date  
*Abich* 8/30/2012  
Signature Date



FULL DEPTH BITUMINOUS CONCRETE  
**PAVING SECTION**  
NOT TO SCALE

**LEGEND**

- EXISTING CONTOURS ESTABLISHED UNDER F-04-082
- FIELD SURVEYED WELL LOCATION
- PASSED PERCOLATION TEST PER TEST NOTES
- FAILED PERCOLATION TEST PER TEST NOTES
- EXISTING APPROVED SEPTIC RESERVE AREA

GRID NORTH

**BENCHMARK**  
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS  
**ENGINEERING, INC.**

8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418  
ELLICOTT CITY, MARYLAND 21043  
PHONE: 410-465-6105 ▲ FAX: 410-465-6644  
B@B@B@-C@I@ENGINEERING.COM



*File copy*

OWNER/BUILDER:

CAMBERLEY HOMES, INC.  
6905 ROCKLEDGE DRIVE  
SUITE 800  
BETHESDA, MD 20817  
PHONE: 301-803-4800  
FAX: 301-803-4929

PROJECT:

**RIVERWOOD  
LOT 50**

LOCATION:

11033 HUNTERS VIEW ROAD  
ELLICOTT CITY, MD 21042  
TAX MAP No. 29 - BLOCK Nos. 3, 4, 9 & 10 - PARCEL No. 20  
3rd ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

TITLE:

**REVISED BUILDING PERMIT PLAN**

HOUSE TYPE:

**BELMONT**

DATE:

MARCH 26, 2012  
AUGUST 24, 2012

PROJECT NO.

1950

SCALE:

1" = 30'

DRAWING

1 OF 2

DESIGN: JMC

DRAFT: JMC

## Martin, Sharhonda

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**From:** Pickett, Tom  
**Sent:** Tuesday, September 18, 2012 10:28 AM  
**To:** Scott, Heidi; Day, Lori; Martin, Sharhonda  
**Subject:** FW: U&O Release

Thanks

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**From:** Pickett, Tom  
**Sent:** Tuesday, September 18, 2012 5:45 AM  
**To:** Scott, Heidi; Day, Lori  
**Cc:** Hart, Amy; Tuder, Matt; Pickett, Tom  
**Subject:** Pump Start -Up

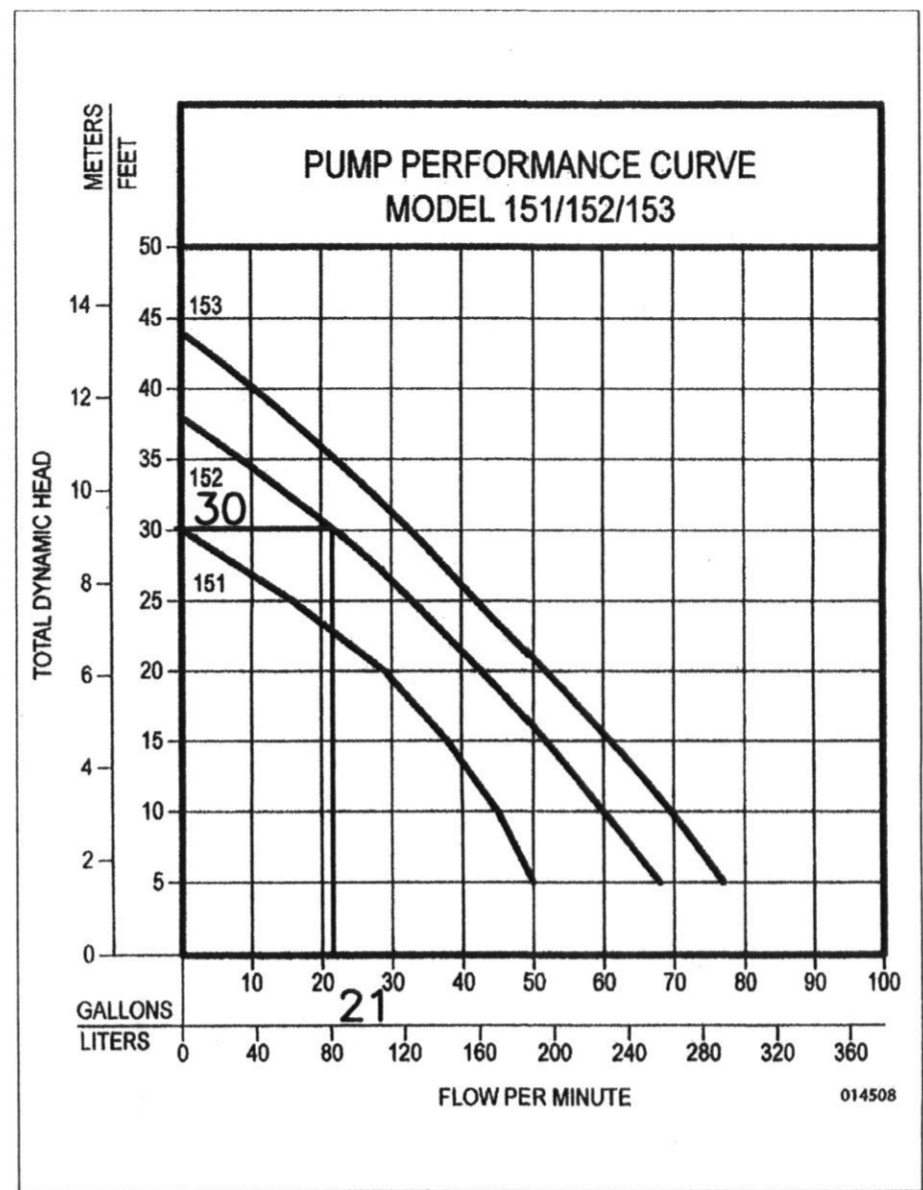
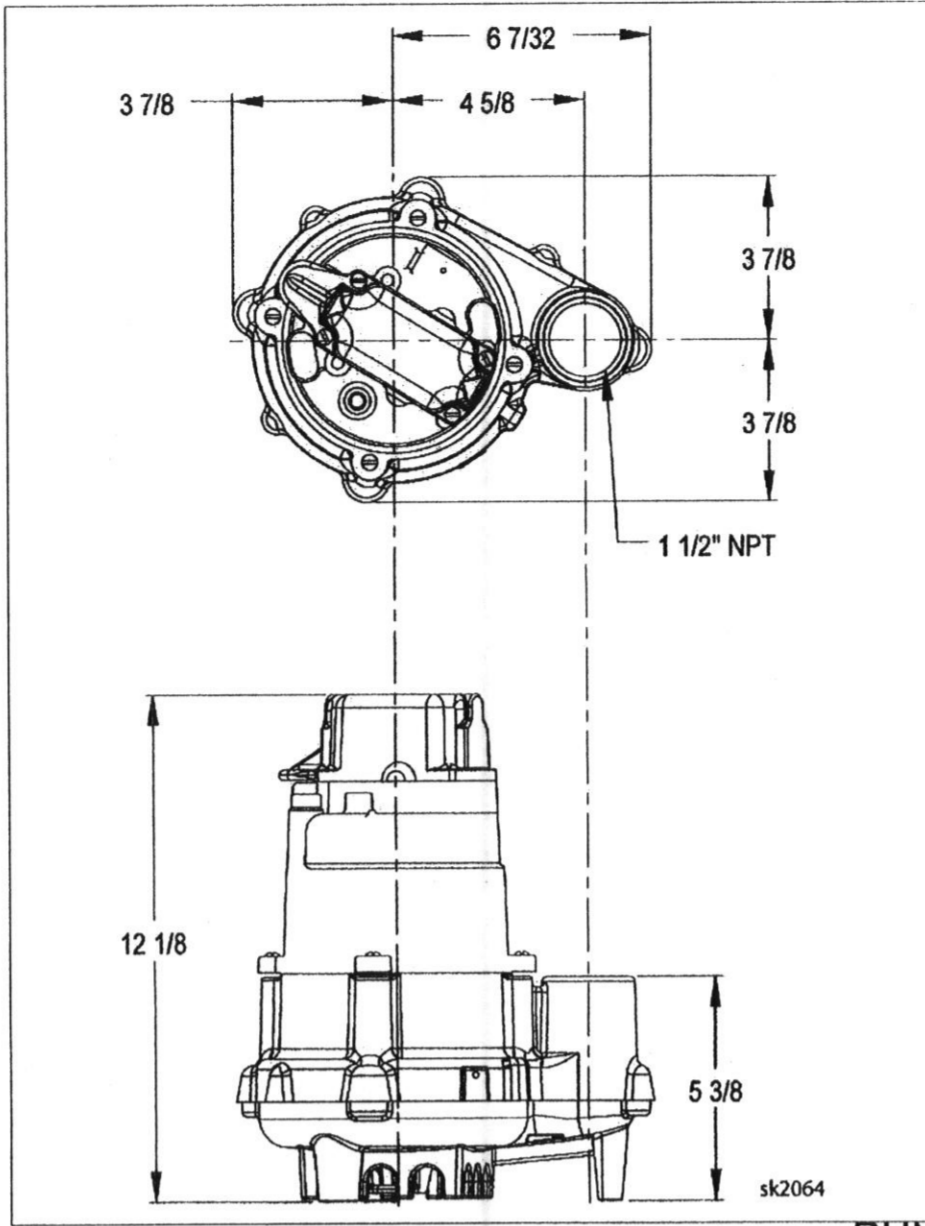
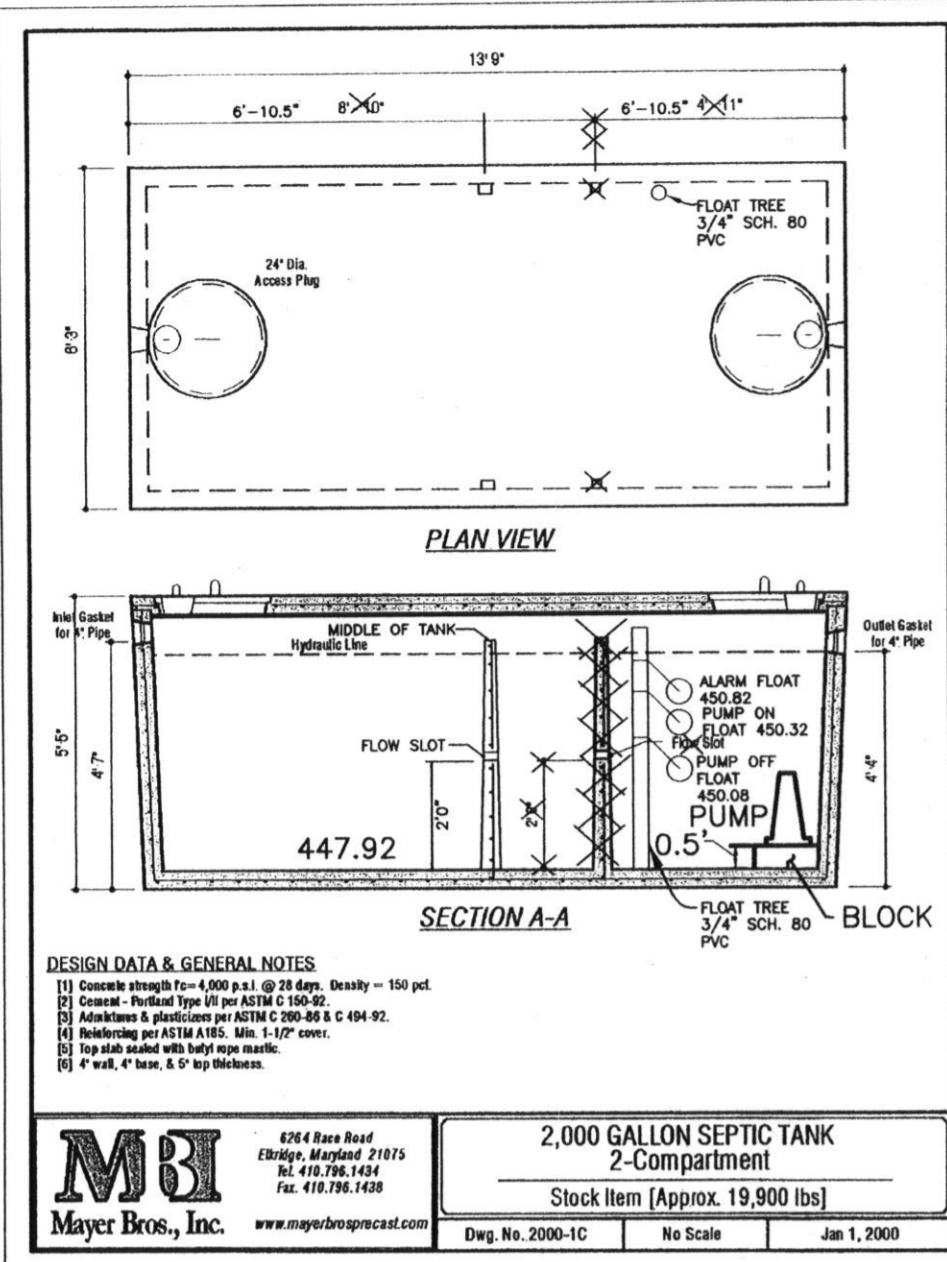
Yesterday morning, Shaun Vanderveer observed the start-up of a Sewage Grinder Pump at the River Wood Shared Septic System:

River Wood, Contract 50-4287-D  
Winchester Homes Lot 50  
11033 Hunter View Rd  
Ellicott City, MD 21042

The Sewage Grinder Pump test was successful ; the Bureau of Utilities releases its hold on this property for U & O.

This is the 2<sup>nd</sup> lot on the shared septic system at this location.

Matt  
410-313-4934 office  
410-978-1320 mobile



**Pumping Station**

Diameter of Force Main and Manifold = 1.5 of SDR 21 pipe  
 Length of Force Main = 315 feet SDR 21 gallons/100 feet = 40.9 Table 4.2

Volume of Main = 31.0 gallons ID = 1.554  
 length = 100 gallon/sq ft 7.480519  
 Total Volume = 31.0 gallons volume = 9.852834 gal/100 ft

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 31 gallons

Use minimum dose of 130 gallons okay

**Size Pump Chamber**

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

One day Capacity = 750 gallons  
 Dose = 130 gallons  
 Totals = 880 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: 4.75 feet	Top: 0.42 feet
	Area: 73.05 sf	Volume: 347.22 cf	Bottom to Inlet: 4.58 feet

**Sizing the Pump**

Flow runtime = 6.2 minutes  
 rate = 20.96774 gallons/minute

**Design Head:** Design Head = Static Head + Friction Head  
 Static Head = highest elevation of main - pump off elevation 468 Main HP  
 Highest component of system = 450.08  
 Pump off elevation = 17.92 feet  
 Static Head = 450.08  
 Friction Head = Head loss due to pipe friction  
 1.5" pipe = 315 feet  
 45° bends = 4 loss for bend 12 feet per table 4.3  
 90° Tee = 0 loss for tee 0 feet per table 4.3

Friction loss per table 4.4 = 3.75 (ft/100 ft)  
 Equivalent Length = 327 Friction loss = 12.26 feet  
 Total Friction Head = 12.26

Design Head = 30.18 feet

**Pump Requirements:**

Performance = 20.96774 gpm  
 Head of Water = 30.18 feet of head

**Pump Selection:** Zoeller Pump Company Effluent Series, Model 152  
 0.4 horse power

Pump Flow Rate = 21.00 gallons/minute per rating curve

**Design Pump Chamber**

Ground over Tank = 454.50  
 Top of Tank = 453.00  
 Invert of Tank = 447.91  
 6" Riser = 0.50 feet  
 12" Pump = 1.10 feet

Min. Pump off = 449.51  
 Selected Pump off = 450.08

Dose = 17.38 cf  
 Area of Pit = 73.05 sf

Pump on dist = 0.24  
 Pump on Elev = 450.32

Distance between Pump on and Highwater Alarm = 0.5 feet  
 Highwater Alarm Elevation = 450.82

Dist. for a dose above alarm = 1.37  
 Inlet Elev = 452.19  
 Tank Inlet = 452.15 less than one day flow  
 Dist. Alarm to Inlet = 1.36 Okay per Health Dept.

**Design Calculations**

**Design Input:**

Capacity requirements

number of lots	1	Max. Daily Flow	750 gpd
bedrooms per lot	5	Average Daily Flow	375 gpd
use rate per bedroom	150 gpd	Maximum Daily Flow	0.52 gpm
		Average Daily Flow	0.26 gpm

**Tanks and Capacities**

first chamber	1,000 gallons	req. capacity (1125+(0.75*MDF))	1687.5 gal.
pump chamber	1,000 gallons	design capacity	2000 gal.
		min. pump chamber capacity (ADF+Dose)	505 gal.

**Static Hydraulic Profile**

Ground Elev. at tank	454.50 ft	Tank #1 effluent elev	451.92 ft
Tank invert in	452.17 ft		
Tank top	453.00 ft	okay	
Fall in tank	0.25 ft		
inv. tank to top	5.08 ft		
Tank invert in	447.92 ft		
Pump Block Height	0.50 ft		
Height of Intake	0.45 ft		
Grinder Invert	448.87 ft		

**Dosing volume, flow rates and Pressures**

flow rate	26.00 gpm	Static Head	0.55 ft
Friction (C) for PVC	150	Friction Head	12.26 ft
Miscellaneous Losses	0 ft	Distal Head	0 ft
Estimated Run Time	5.00 Min.	Max. Total Dynamic Head	12.81 ft
		min. Dose (1xMain) Vol.	130.00 gal.
		Min. Runtime	5.00 min.
Pump tank Volume	1687.50 Gal	Total Dose Volume	130.00 gal.
		Average Doses	2.88 per day

**Tank and Float Design:**

Ground over Tank =	454.50 ft	Inside Tank Dimensions	
Top of Tank =	453.00 ft	Height =	4.75 ft
Invert of Tank =	447.91 ft	Width =	5.58 ft
6" Riser =	0.50 ft	Length =	13.08 ft
12" Pump =	1.00 ft	Number of Tanks =	1
minimum Pump off =	449.41 ft		
Pump Off Float =	450.08 ft		
Dose =	17.38 cf		
Area of Pit =	73.05 sf	Use 2,000 gallon pump tank	
Pump on dist. =	0.24 ft		
Pump on Elev. =	450.32 ft		
Distance between Pump on and Highwater Alarm =	0.5 ft		
Highwater Alarm Elevation =	450.82 ft		
High Water Alarm to Inlet =	1.35		
Volume Above Alarm Float to Inlet =	98.77 cf or 738.78 gallons		
One Day Flow =	750.00 gallons	less than one day flow	

**PUMP DETAIL**  
 ZOELLER PUMP - MODEL 152

*Approved Septic System Plan  
 Howard County Health Department  
 Pump Design Approved  
 with red line edit  
 8/30/2012  
 Date  
 RB  
 Signature*

NOTE: PUMP DESIGN AND SELECTION WAS APPROVED BY THE ZOELLER PUMP REPRESENTATIVE. THIS DESIGN HAS BEEN REVIEWED AND APPROVED BY THE HOWARD COUNTY HEALTH DEPARTMENT.

**BENCHMARK ENGINEERING, INC.**  
 ENGINEERS • LAND SURVEYORS • PLANNERS  
 8480 BALTIMORE NATIONAL PIKE • SUITE 418  
 ELLICOTT CITY, MARYLAND 21043  
 PHONE: 410-465-6105 • FAX: 410-465-6644  
 BEI@BEI-CIVILENGINEERING.COM

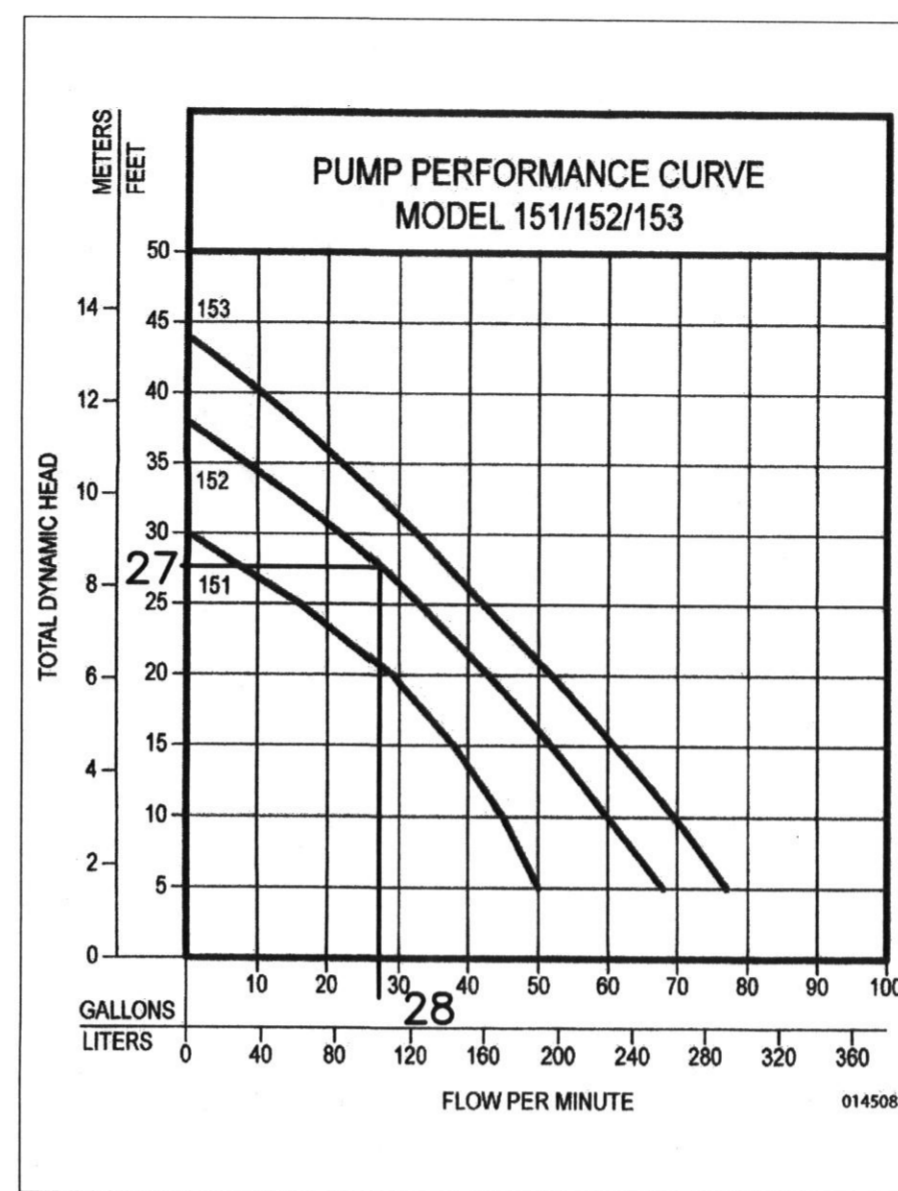
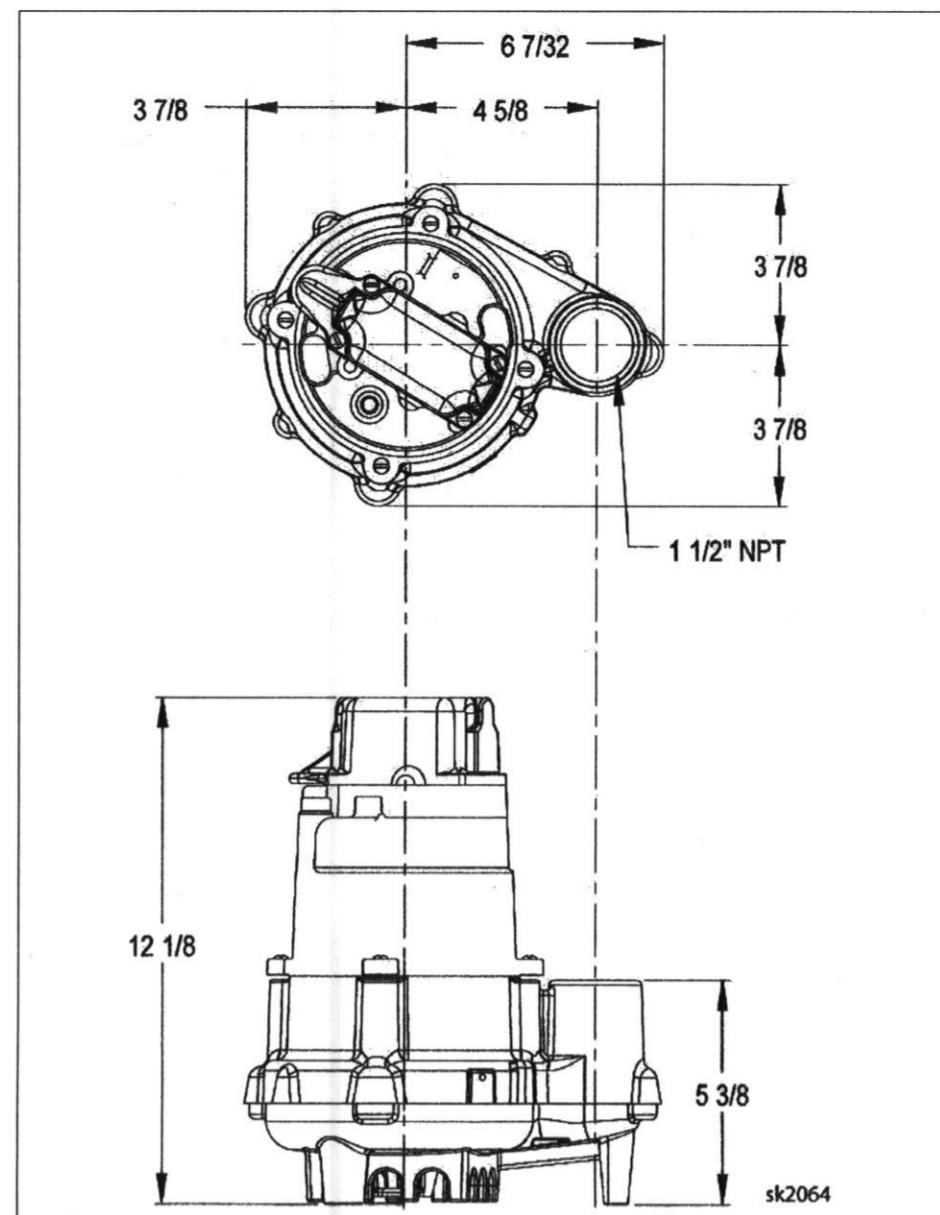
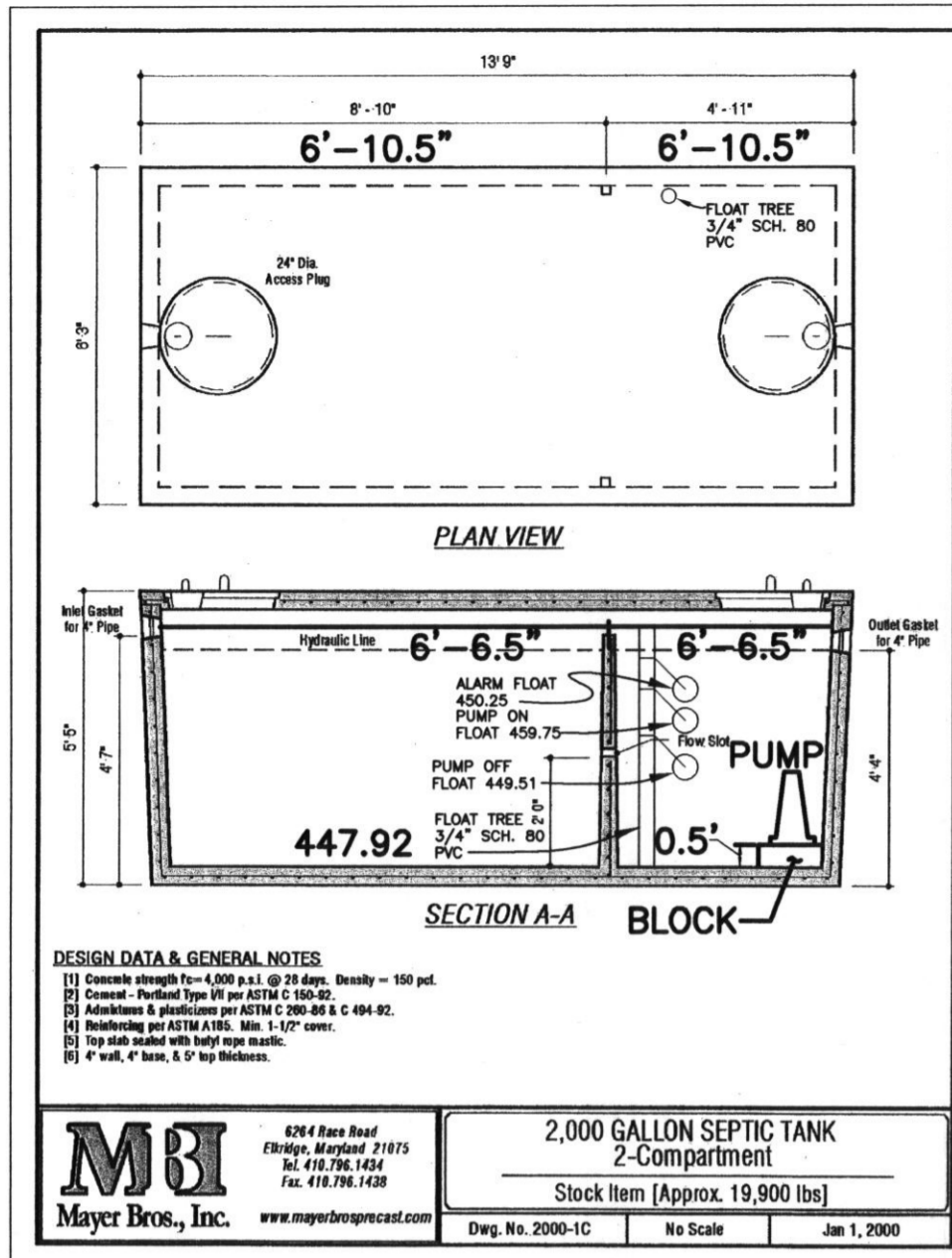
**STATE OF MARYLAND**  
 BIRIAN F. CLEARY  
 PROFESSIONAL ENGINEER  
 No. 28589  
 REGISTERED  
 8/27/2012  
 Professionals (Certification) I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 28589, Expiration Date: 7-22-2013.

OWNER/BUILDER:	CAMBERLEY HOMES, INC. 6905 ROCKLEDGE DRIVE SUITE 800 BETHESDA, MD 20817 PHONE: 301-803-4800 FAX: 301-803-4929	PROJECT:	RIVERWOOD LOT 50
DESIGN:	JMC	DRAFT:	JMC
LOCATION:	11033 HUNTERS VIEW ROAD ELLICOTT CITY, MD 21042 TAX MAP No. 29 - BLOCK Nos. 3, 4, 9 & 10 - PARCEL No. 20 3rd ELECTION DISTRICT, HOWARD COUNTY, MARYLAND	TITLE:	REVISED BUILDING PERMIT PLAN
HOUSE TYPE:	BELMONT	DATE:	MARCH 26, 2012 AUGUST 24, 2012
SCALE:	1" = 30'	PROJECT NO.:	1950
		DRAWING:	2 OF 2

**Waste Water Flows**

number of dwellings = 1  
 bedrooms = 5 gal/day/bedroom = 150  
 Total flow = 750 gallons/day

Howard County Code  
 COMAR tank sizing = 2,000 gallons  
 Design Size = 2,000 gallons



**Pumping Station**

Diameter of Force Main and Manifold = 1.5 of SDR 21 pipe  
 Length of Force Main = 315 feet SDR 21 gallons/100 feet = 40.9 Table 4.2  
 Volume of Main = 31.0 gallons ID = 1.554  
 Total Volume = 31.0 gallons length = 100 gallon/sq ft 7.480519  
 volume = 9.852834 gal/100 ft  
 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 31 gallons  
 Use minimum dose of 130 gallons okay

**Size Pump Chamber**

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

One day Capacity = 750 gallons  
 Dose = 130 gallons  
 Totals = 880 gallons

**Use 2,000 gallon pump tank**

Tank Dimensions:	Exterior	Interior	Walls:	0.33 feet
	Length: 13.75 feet	Length: 13.08 feet	Bottom:	0.33 feet
	Width: 6.25 feet	Width: 5.58 feet	Top:	0.42 feet
	Height: 5.42 feet	Height: 4.75 feet	Bottom to Inlet:	4.58 feet
		Area: 73.05 sf		
		Volume: 347.22 cf		

**Sizing the Pump**

Flow: runtime = 5 minutes  
 rate = 26 gallons/minute

**Design Head:**

Design Head = Static Head + Friction Head  
 Static Head = highest elevation of main - pump off elevation  
 Highest component of system = 464.4 Grinder Pump Invert in  
 Pump off elevation = 449.40  
 Static Head = 15.00 feet  
 Friction Head = Head loss due to pipe friction  
 1.5" pipe = 315 feet  
 45° bends 4 loss for bend 12 feet per table 4.3  
 90° Tee 0 loss for tee 0 feet per table 4.3  
 Friction loss per table 4.4 = 3.75 (ft/100 ft)  
 Equivalent Length = 327 Friction loss = 12.26 feet  
 Total Friction Head = 12.26  
 Design Head = 27.26 feet

**Pump Requirements:**

Performance = 26 gpm  
 Head of Water = 27.26 feet of head

Pump Selection: Zoeller Pump Company Effluent Series, Model 152  
 0.4 horse power

Pump Flow Rate = 28.00 gallons/minute per rating curve

**Design Pump Chamber**

Ground over Tank = 454.50  
 Top of Tank = 453.00  
 Invert of Tank = 447.91  
 6" Riser = 0.50 feet  
 12" Pump = 1.10 feet

Pump off = 449.51

Dose = 17.4 cf  
 Area of Pit = 73.05 sf

Pump on dist. = 0.24  
 Pump on Elev. = 449.75

Distance between Pump on and Highwater Alarm = 0.5 feet  
 Highwater Alarm Elevation = 450.25

High Water Alarm to Inlet = 1.37  
 Inlet Elev. = 451.62  
 Tank Inlet = 452.16 okay

**Design Calculations**

Design Input:	Calculations:
Capacity requirements	
number of lots	1
bedrooms per lot	5
use rate per bedroom	150 gpd
	Max. Daily Flow 750 gpd
	Average Daily Flow 375 gpd
	Maximum Daily Flow 0.52 gpm
	Average Daily Flow 0.26 gpm

Tanks and Capacities	
first chamber	1,000 gallons
pump chamber	1,000 gallons
	req. capacity (1125+(0.75*MDF)) 1687.5 gal.
	design capacity 2000 gal.
	min. pump tank capacity (ADF) 505 gal.

Static Hydraulic Profile	
Ground Elev. at tank	454.50 ft
Tank invert in	452.00 ft
Tank top	453.00 ft
Fall in tank	0.25 ft
	okay
inv. tank to top	5.08 ft
Tank invert in	447.92 ft
Pump Block Height	0.50 ft
Height of Intake	0.45 ft
Grinder Invert	448.87 ft

Dosing volume, flow rates and Pressures	
flow rate	28.00 gpm
Friction (C) for PVC	150
Miscellaneous Losses	0 ft
Estimated Run Time	5.00 Min.
	Max. Total Dynamic Head 12.81 ft
	min. Dose (1xMain) Vol. 130.00 gal.
	Min. Runtime 4.64 min.
	Total Dose Volume 130.00 gal.
	Average Doses 2.88 per day

Tank and Float Design:	
Ground over Tank =	454.50 ft
Top of Tank =	453.00 ft
Invert of Tank =	447.91 ft
6" Riser =	0.50 ft
12" Pump =	1.00 ft
	Inside Tank Dimensions
	Height = 4.75 ft
	Width = 5.58 ft
	Length = 13.08 ft
	Number of Tanks = 1

minimum Pump off =	449.41 ft
Pump Off Float =	449.51 ft

Dose =	17.38 cf
Area of Pit =	73.05 sf
	Use 2,000 gallon pump tank

Pump on dist. =	0.24 ft
Pump on Elev. =	449.75 ft

Distance between Pump on and Highwater Alarm =	0.5 ft
Highwater Alarm Elevation =	450.25 ft

High Water Alarm to Inlet =	1.50
Volume Above Alarm Float to Inlet =	109.72 cf or 820.74 gallons
One Day Flow =	750.00 gallons okay

**Waste Water Flows**

number of dwellings = 1  
 bedrooms = 5 gal/day/bedroom = 150  
 Total flow = 750 gallons/day

COMAR tank sizing = 2,000 gallons

Design Size = 2,000 gallons

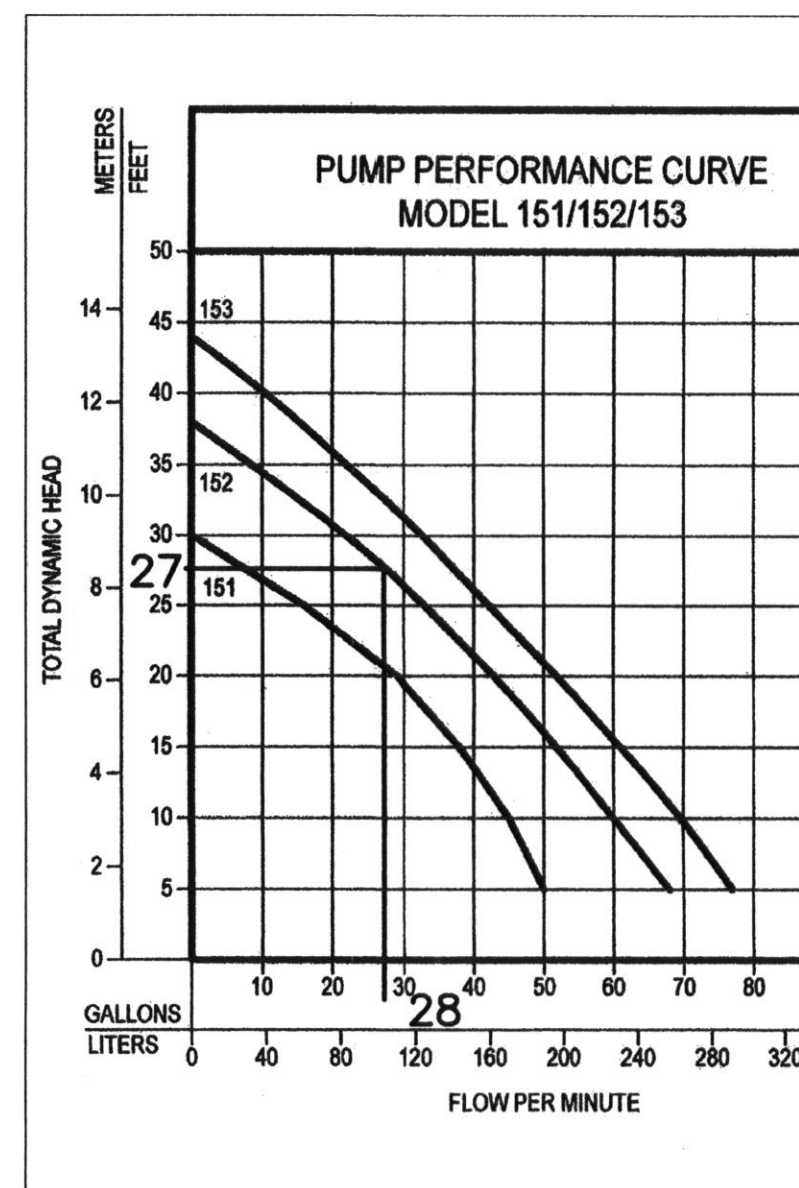
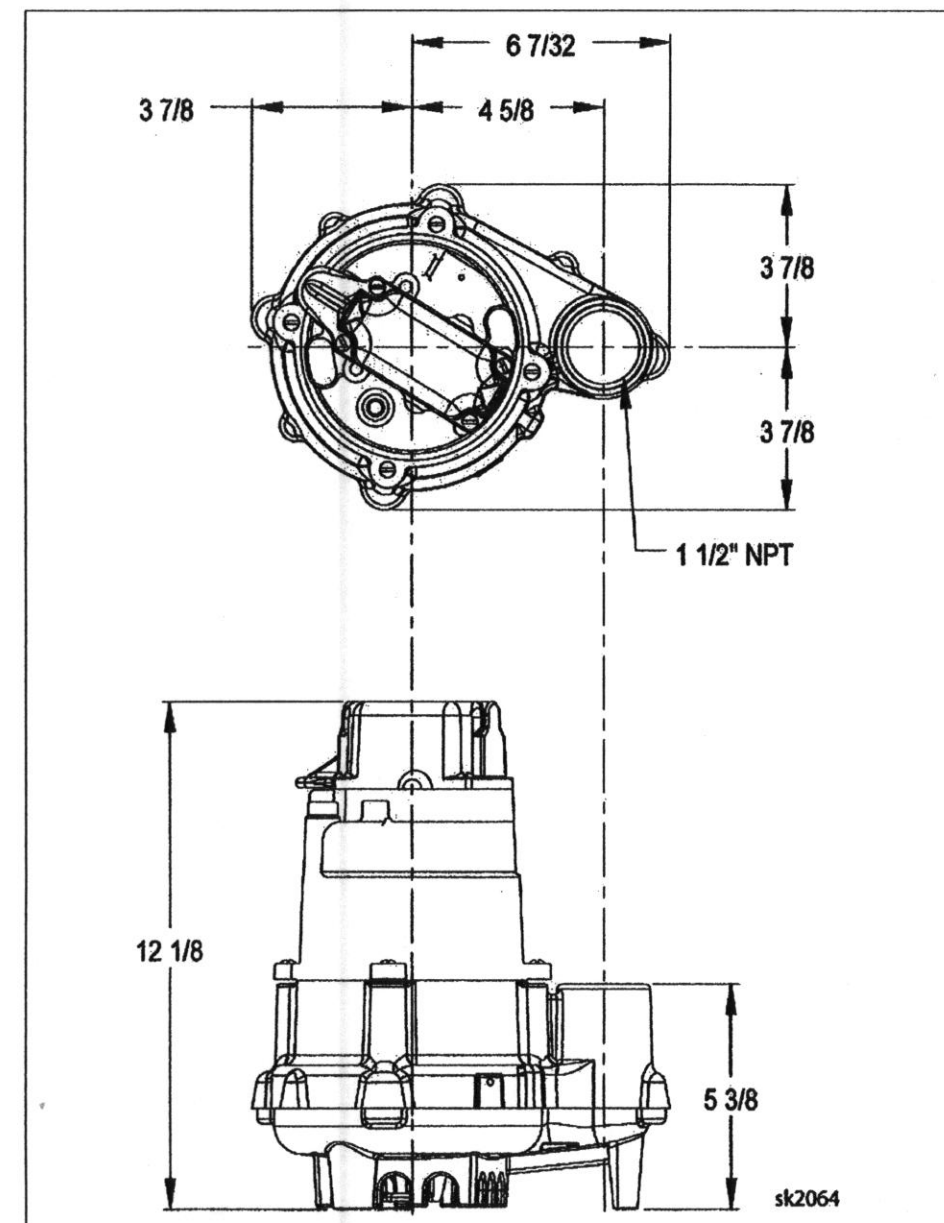
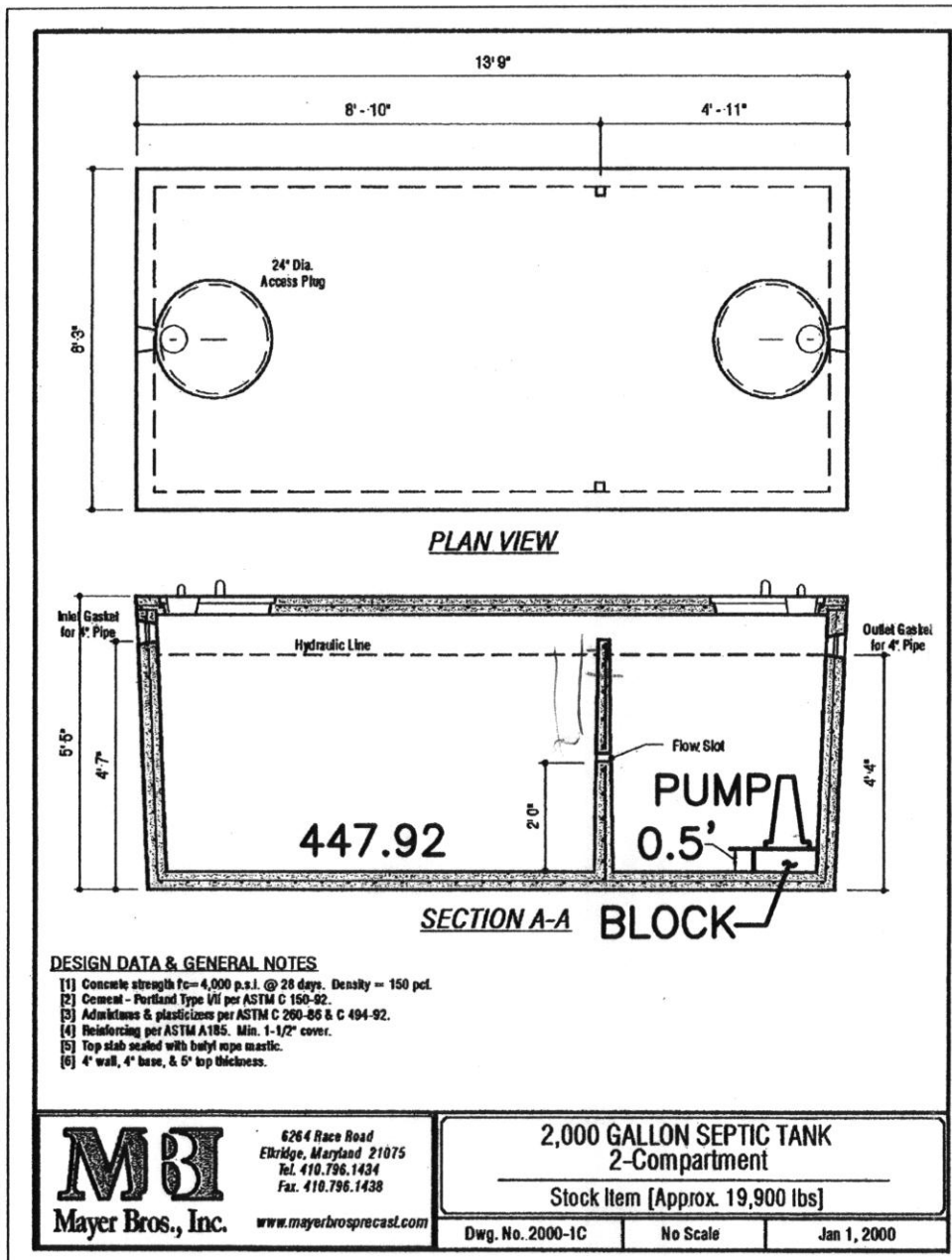
**BENCHMARK**  
 ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS  
**ENGINEERING, INC.**

8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418  
 ELLICOTT CITY, MARYLAND 21043  
 PHONE: 410-465-6105 ▲ FAX: 410-465-6644  
 BEI@BEI-CIVILENGINEERING.COM

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. 28559, Expiration Date: 7-22-2013.

<p>OWNER/BUILDER:          CAMBERLEY HOMES, INC.          6905 ROCKLEDGE DRIVE          SUITE 800          BETHESDA, MD 20817          PHONE: 301-803-4800          FAX: 301-803-4929</p>	<p>PROJECT:  <b>RIVERWOOD LOT 50</b></p> <p>LOCATION: <b>11033 HUNTERS VIEW ROAD</b>          ELLICOTT CITY, MD 21042          TAX MAP No. 29 - BLOCK Nos. 3, 4, 9 &amp; 10 - PARCEL No. 20          3rd ELECTION DISTRICT, HOWARD COUNTY, MARYLAND</p> <p>TITLE: <b>REVISED BUILDING PERMIT PLAN</b></p> <p>HOUSE TYPE: <b>BELMONT</b></p> <p>DATE: <b>MARCH 26, 2012</b>  <b>AUGUST 22, 2012</b></p> <p>PROJECT NO. <b>1950</b></p> <p>SCALE: <b>1" = 30'</b></p> <p>DRAWING <b>2</b> OF <b>2</b></p>
DESIGN: <b>JMC</b>	DRAFT: <b>JMC</b>





**Pumping Station**

Diameter of Force Main and Manifold = 1.5 of SDR 21 pipe  
 Length of Force Main = 315 feet SDR 21 gallons/100 feet = 40.9 Table 4.2  
 Volume of Main = 31.0 gallons ID = 1.554  
 Total Volume = 31.0 gallons length = 100 gallon/sq ft 7.480519  
 volume = 9.852834 gal/100 lf

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 31 gallons

Use minimum dose of 130 gallons okay

**Size Pump Chamber**

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

One day Capacity = 750 gallons  
 Dose = 130 gallons  
 Totals = 880 gallons

Use 2,000 gallon pump tank

Tank Dimensions:

Exterior Length:	13.75 feet	Interior Length:	13.08 feet	Walls:	0.33 feet
Width:	6.25 feet	Width:	5.58 feet	Bottom:	0.33 feet
Height:	5.42 feet	Height:	4.75 feet	Top:	0.42 feet
		Area:	73.05 sf	Bottom to Inlet:	4.58 feet
		Volume:	347.22 cf		

**Sizing the Pump**

Flow: runtime = 5 minutes  
 rate = 26 gallons/minute

**Design Head:**

Design Head = Static Head + Friction Head  
 Static Head = highest elevation of main - pump off elevation 464.4 Grinder Pump Invert in  
 Highest component of system = Pump off elevation = 449.40  
 Static Head = 15.00 feet

Friction Head = Head loss due to pipe friction  
 1.5" pipe = 315 feet  
 45° bends = 4 loss for bend 12 feet per table 4.3  
 90° Tee = 0 loss for tee 0 feet per table 4.3

Friction loss per table 4.4 = 3.75 (ft/100 ft)

Equivalent Length = 327 Friction loss = 12.26 feet

Total Friction Head = 12.26

Design Head = 27.26 feet

**Pump Requirements:**

Performance = 26 gpm  
 Head of Water = 27.26 feet of head

**Pump Selection:** Zoeller Pump Company Effluent Series, Model 152  
 0.4 horse power

**Design Pump Chamber**

Ground over Tank = 454.50  
 Top of Tank = 453.00  
 Invert of Tank = 447.91  
 6" Riser = 0.50 feet  
 12" Pump = 1.10 feet

Pump off = 449.51

Dose = 17.4 cf  
 Area of Pit = 73.05 sf

Pump on dist. = 0.24  
 Pump on Elev. = 449.75

Distance between Pump on and Highwater Alarm = 0.5 feet  
 Highwater Alarm Elevation = 450.25

High Water Alarm to Inlet = 1.37  
 Inlet Elev. = 451.62  
 Tank Inlet = 452.16 okay

**Design Calculations**

**Design Input:**

Capacity requirements

number of lots	1	Max. Daily Flow	750 gpd
bedrooms per lot	5	Average Daily Flow	375 gpd
use rate per bedroom	150 gpd	Maximum Daily Flow	0.52 gpm
		Average Daily Flow	0.26 gpm

**Tanks and Capacities**

settling chamber	1,000 gallons	req. capacity (1125*(0.75*MDF))	1687.5 gal.
pump chamber	1,000 gallons	design capacity	2000 gal.
		min. pump tank capacity (ADF)	505 gal.

**Static Hydraulic Profile**

Ground Elev. at tank	454.50 ft	Tank #1 effluent elev	451.75 ft
Tank invert in	452.00 ft		
Tank top	453.00 ft	okay	
Fall in tank	0.25 ft		
inv. tank to top	5.08 ft		
Tank invert in	447.92 ft		
Pump Block Height	0.50 ft		
Height of Intake	0.45 ft		
Grinder Invert	448.87 ft		

**Dosing volume, flow rates and Pressures**

flow rate	28.00 gpm	Static Head	0.55 ft
Friction (C) for PVC	150	Friction Head	12.26 ft
Miscellaneous Losses	0 ft	Distal Head	0 ft
Estimated Run Time	5.00 Min.	Max. Total Dynamic Head	12.81 ft
		min. Dose (1xMain) Vol.	130.00 gal.
		Min. Runtime	4.64 min.
Pump tank Volume	1687.50 Gal	Total Dose Volume	130.00 gal.
		Average Doses	2.88 per day

**Tank and Float Design:**

Ground over Tank =	454.50 ft	Inside Tank Dimensions	
Top of Tank =	453.00 ft	Height =	4.75 ft
Invert of Tank =	447.91 ft	Width =	5.58 ft
6" Riser =	0.50 ft	Length =	13.08 ft
12" Pump =	1.00 ft	Number of Tanks =	1
minimum Pump off =	449.41 ft		
Pump Off Float =	449.41 ft		
Dose =	17.38 cf		
Area of Pit =	73.05 sf	Use 2,000 gallon pump tank	
Pump on dist. =	0.24 ft		
Pump on Elev. =	449.65 ft		
Distance between Pump on and Highwater Alarm =	0.5 ft		
Highwater Alarm Elevation =	450.15 ft		
High Water Alarm to Inlet =	1.60		
Volume Above Alarm Float to Inlet =	116.79 cf or	873.56 gallons	
One Day Flow =	750.00 gallons	okay	

**Waste Water Flows**

number of dwellings = 1  
 bedrooms = 5 gal/day/bedroom = 150  
 Total flow = 750 gallons/day

COMAR tank sizing = 2,000 gallons  
 Design Size = 2,000 gallons

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**PROJECT:** RIVERWOOD LOT 50

**LOCATION:** 11033 HUNTERS VIEW ROAD  
 ELLICOTT CITY, MD 21042  
 TAX MAP No. 29 - BLOCK Nos. 3, 4, 9 & 10 - PARCEL No. 20  
 3rd ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

**TITLE:** REVISED BUILDING PERMIT PLAN

**HOUSE TYPE:** BELMONT

**DATE:** MARCH 26, 2012  
**PROJECT NO.:** 1950

**DESIGN:** JMC **DRAFT:** JMC  
**SCALE:** 1" = 30' **DRAWING:** 2 OF 2

*Detail Plan for  
 Septic System Installation  
 OK' rd. 6/21/12*