

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: 3/29/16 **ONSITE SEWAGE DISPOSAL SYSTEM** P 558054

APPROVAL DATE: 6/17/16 **PERMIT: CONSTRUCTION** A _____

PROPERTY ADDRESS: 723 Woodbine Crossing

SUBDIVISION: Woodbine Crossing LOT: 4 TAX ID: _____

CONTRACTOR: WTC Contractors EMAIL: _____

CONTRACTOR ADDRESS: 3033 Salem Bottom Road, Westminster, MD 21157 PHONE: 443-458-7024

CONTRACTOR CERTIFIED FOR BAT INSTALLATION: MDE MANUFACTURER:

PROPERTY OWNER: Catonsville Homes EMAIL: _____

OWNER ADDRESS: 11175 Stratfield Court, Marriottsville, MD 21104 PHONE: _____

BAT UNIT MODEL: Norweco TNTLP-500 PUMP SIZE: 1/2 hp PUMP TANK CAPACITY: 1250 gal

OPERATION & MAINTENANCE AGREEMENT DATE SIGNED: 6/9/14 DATE RECORDED: 6/18/14

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

TRENCHES:	LINEAR FEET REQUIRED: <u>210</u>	INLET DEPTH: <u>2'</u>
	TRENCH WIDTH: <u>3</u>	MAXIMUM BOTTOM DEPTH: <u>6</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.**

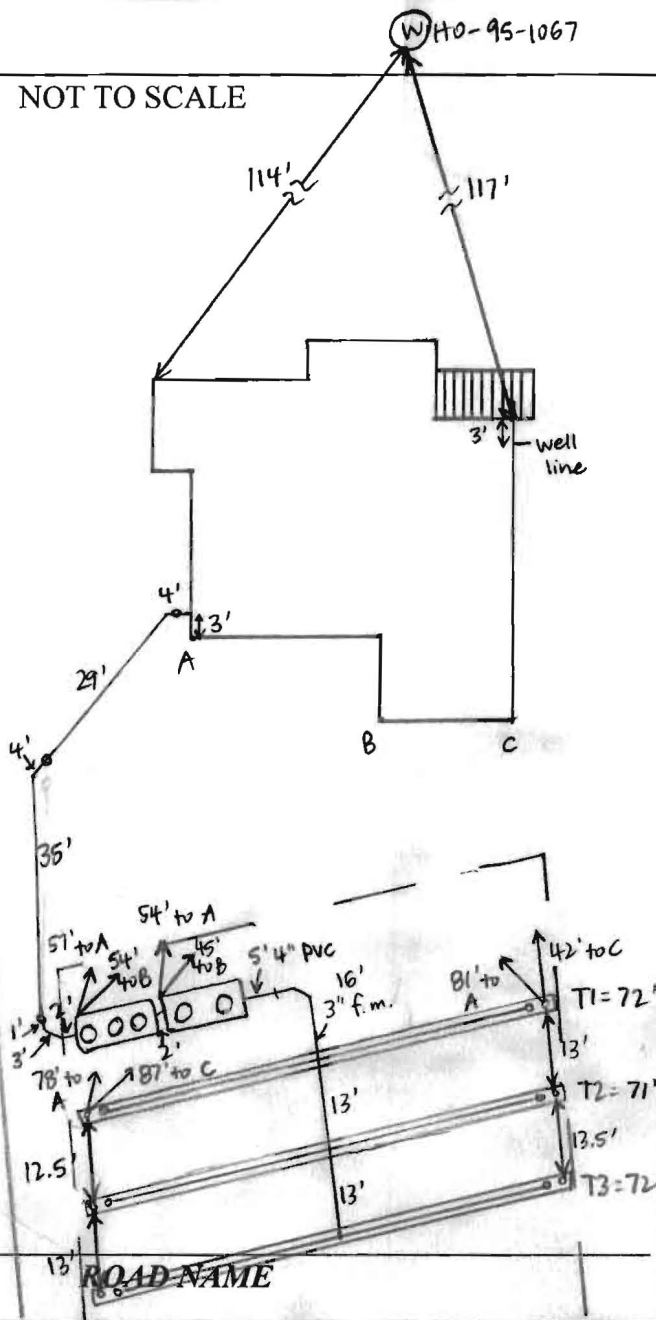
NOTES: 788-0808

ISSUED BY: Hank Oswald ISSUE DATE: 4/5/16 EXPIRATION DATE: 3/29/17

- 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 DOWNGRADIENT 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 16000470
- 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



TRENCH/DRAINFIELD DATA

WIDTH	INLET	BOTTOM
3'	2'	6'
NUMBER OF TRENCHES		3
TOTAL LENGTH		215'
ABSORPTION AREA		645' + SIDEWALL
DISTRIBUTION BOX LEVEL		—
DISTRIBUTION BOX BAFFLE		—
DISTRIBUTION BOX PORT		—

SEPTIC TANK DATA

SEPTIC TANK 1 LEVEL	YES
MANUFACTURER	BACKRIVER/ NORWECO
CAPACITY	1300 GAL
SEAM LOC	TOP
TANK LID DEPTH	2'
BAFFLES	No
BAFFLE FILTER	N/A
MANHOLE LOC	Front, Middle + Rear
6" PORT LOC	None
WATERTIGHT TEST	No
SLOTTED	N/A
DATE ON LID	2-30-16

PUMP/SEPTIC TANK LEVEL

SEPTIC TANK LEVEL	YES
MANUFACTURER	BACKRIVER
CAPACITY	1250 GAL
SEAM LOC	TOP
TANK LID DEPTH	2'
BAFFLES	NO
BAFFLE FILTER	NO
MANHOLE LOC	FRONT + REAR
6" PORT LOC	NONE
WATERTIGHT TEST	NO
SLOTTED	NO
DATE ON LID	2-21-16

PRE-CONSTRUCTION:

4/6/16 Met WTC on site for layout. All SDA + BAT tank stakes present. Trench stakes all present except for end of T3-L5 - measured off T2 and shot elevations to find location. End of trenches all a couple inches elevation difference to other end. (SC)

INSTALLATION: 4/8/16 WTC starting to dig T2. T1 dug + stoned, 2' to stone. Drilled holes in laterals - 7' hole spacing. Using transit while digging. Tanks set + house connection made + covered (measurements of pipe to tank are approximate. Norweco tank outlet is bedded with #57 stone. (SC) 4/8/16 T2 + T3 dug + stoned, WTC installing force main + laterals. 2' to stone, 3' wide. BAT startup received. Need pump + alarm. (SC)

6/17/2016

FINAL INSPECTOR

B. Baker

DATE OF APPROVAL

6/17/16

Back River Pre-Cast, LLC

PO BOX 329
Glyndon, MD 21071
Phone # 410-833-3394
Fax # 410-833-4116

Letter of Certification

This is to certify that the Norweco Singlair TNT 600 GPD Septic Tank installed at 723 Woodbine Rd., MT.Airy, MD 21777 April 06, 2016 was installed according to the manufacture's specifications.

Installer: Walter Coon

Property Owner: Catonsville Homes, LLC

Permit #

THIS CERTIFICATION IS FOR INSTALLATION ONLY. THE 5-YEAR OPERATIONS & MAINTENANCE AGREEMENT FROM DATE OF INSTALLATION WILL ONLY GO INTO EFFECT AFTER BACK RIVER PRE-CAST, LLC RECEIVES FINAL AND FULL PAYMENT FOR THE SYSTEM.



MATTHEW GECKLE

Vice-President

5428

Ron Thompson

From: Oswald, Hank <hoswald@howardcountymd.gov>
Sent: Friday, December 04, 2015 12:11 PM
To: Ron Thompson
Subject: BAT Plan_723 Woodbine Crossing Road
Attachments: BP Response Letter_BAT Plan Review Letter_723 Woodbine Crossing Road_2015.pdf;
Table 4.4.pdf

Hi Ron:

Please see attached letter regarding the BAT Plan review for 723 Woodbine Crossing Road.

Thanks,

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)



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

December 4, 2015

Ron Thompson
Vanmar Associates, INC.
310 South Main Street
Mount Airy, MD 21771

Sent via email to: ron@vanmar.com

RE:

**BAT Plan_Woodbine Crossing, Lot 4
723 Woodbine Crossing Road
Mount Airy, MD 21771**

Ron:

This letter is in response to the BAT Plan submitted for 723 Woodbine Crossing Road. I just wanted to obtain more information about the plan and make a few recommendations.

- 1.) On the plan, the lateral pipe volume is 210. According to the low pressure dosing chart, it seems like it should be $33.25 \text{ (FT)} \times 6 = 199.5 \text{ LF}$.
- 2.) It's unclear to me where the # of fittings came from. If you could provide more information in the Lateral Detail drawing, I think this would help with the installation of the system and clarify how connections are made. For instance, show how the FM enters the manifold etc.
- 3.) Dynamic Head – If there is almost 100 (FT) of 3 inch pipe, the friction loss should be 2.03 (not 0.78) according to the table 4.44 in the Sand Mound Manual (See attached table).
- 4.) Distal Head figures should all be the same (probably all = 2.0), if the pipe inverts are the same.
- 5.) Based on the GPM, the pump is placed at the end of the performance curve. It's recommended that the # of orifices is decreased to 5 and the spacing increased accordingly so the point on the Hydraulic Graph falls under the ½ or 1/3 HP performance curve. This will make the dose smaller and kick the pump on more often which is better for the system. Also,
- 6.) Trench Design Chart – The depth of stone to the ground for L5 and L6 should be 1.5 (not 2).

Should you have any questions, please don't hesitate to ask.

Respectfully,

Hank Oswald

Hank Oswald, L.E.H.S.
Bureau of Environmental Health
Well & Septic Program



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Vanmar Associates, INC.
310 South Main Street
Mount Airy, MD 21771

Sent via email to: ron@vanmar.com

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723 Woodbine Crossing Road
Mount Airy, MD 21771**

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- 5.) Based on the GPM, the pump is placed at the end of the performance curve. It's recommended that the # of orifices is decreased to 5 and the spacing increased accordingly so the point on the Hydraulic Graph falls under the $\frac{1}{2}$ or $\frac{1}{3}$ HP performance curve. This will make the dose smaller and kick the pump on more often which is better for the system. Also,
- 6.) Trench Design Chart - The depth of stone to the ground for L5 and L6 should be 1.5 (not 2).

Should you have any questions, please don't hesitate to ask.

Respectfully,

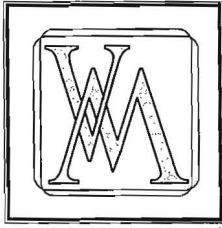
Hank Oswald

Hank Oswald, L.E.H.S
Bureau of Environmental Health
Well & Septic Program

TABLE 4.4
FRICITION LOSS IN SCHEDULE 40 PLASTIC PIPE, C = 150 (ft / 100 ft)

Flow gpm	Pipe Diameter (In.)								
	1	1-1/4	1-1/2	2	3	4	6	8	10
1	0.07								
2	0.28	0.07							
3	0.60	0.16	0.07						
4	1.01	0.25	0.12						
5	1.52	0.39	0.18						
6	2.14	0.55	0.25	0.07					
7	2.89	0.76	0.36	0.10					
8	3.63	0.97	0.46	0.14					
9	4.57	1.21	0.58	0.17					
10	5.50	1.46	0.70	0.21					
11		1.77	0.84	0.25					
12		2.09	1.01	0.30					
13		2.42	1.17	0.35					
14		2.74	1.33	0.39					
15		3.06	1.45	0.44	0.07				
16		3.49	1.65	0.50	0.08				
17		3.93	1.86	0.56	0.09				
18		4.37	2.07	0.62	0.10				
19		4.81	2.28	0.68	0.11				
20		5.23	2.46	0.74	0.12				
25			3.75	1.10	0.16				
30			5.22	1.54	0.23				
35				2.05	0.30	0.07			
40				2.62	0.39	0.09			
45				3.27	0.48	0.12			
50				3.98	0.58	0.16			
60					0.81	0.21			
70					1.08	0.28			
80					1.38	0.37			
90					1.73	0.46			
100					2.09	0.55	0.07		
150						1.17	0.16		
200							0.28	0.07	
250							0.41	0.11	
300							0.58	0.16	
350							0.78	0.20	0.07
400							0.99	0.26	0.09
450							1.22	0.32	0.11
500								0.38	0.14
600								0.54	0.18
700								0.72	0.24
800									0.32
900									0.38
1000									0.46

Source: EPA Design Manual



VANMAR
ASSOCIATES, INC.

Engineers • Surveyors • Planners

310 South Main Street, P.O. Box 328, Mount Airy, Maryland 21771

(301) 829-2890
(301) 695-0600

(301) 831-5015

(410) 549-2751
Fax (301) 831-5603

December 15, 2015

Mr. Hank Oswald, L.E.H.S.
Howard County Health Department
Bureau of Environmental Health
8930 Stanford Blvd.
Columbia, MD 21045

RE: Lot 4 Site Plan for BAT Installation
723 Woodbine Crossing Road
Woodbine Crossing Subdivision

The following is a response to the December 4, 2015 comments.

1. *All On the plan, the lateral pipe volume is 210. According to the low pressure dosing chart, it seems like it should be $33.25 \text{ (FT)} \times 6 = 199.5 \text{ LF}$.*

Response 1: Using 5 orifices, the orifice spacing is 7-feet. The computation has been corrected to $31.5 \text{ ft} \times 6 = 189 \text{ LF}$.

2. *It is unclear to me where the # of fittings came from. If you could provide more information in the Lateral Detail Drawing, I think this would help with the installation of the system and clarify how connections are made. For instance, show how the FM enters the manifold etc.*

Response 2: A Fittings Diagram has been added.

3. *Dynamic Head – If there is almost 100 (FT) of 3 inch pipe, the friction loss should be 2.03 (not 0.78) according to the table 4.44 in the Sand Mound Manual (See attached table).*

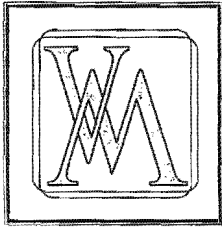
Response 3: The Friction loss has been corrected.

4. *Distal Head figures should all be the same (probably all = 2.0), if the pipe inverts are the same.*

Response3: Per discussions, a Distal Head of 3.0 was used.

5. *Based on the GPM, the pump is placed at the end of the performance curve. It's recommended that the # of orifices is decreased to 5 and the spacing increased accordingly so the point on the Hydraulic Graph falls under the 1/2 or 1/3 HP performance curve. This will make the dose smaller and kick the pump on more often which is better for the system.*

Response 5: The number of orifices was decreased to 5. This provided a 59.7 gpm at the 1/3 HP. We



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(410) 549-2751
Fax (301) 831-5603

have proposed using the WE03M

6. Trench Design Chart – *The depth of stone to the ground for L5 and L6 should be 1.5 (not 2).*

Response 6: The stone depth has been corrected for trench L5 and L6.

Thank you,

VANMAR ASSOCIATES

Ronald E. Thompson, P.E.

Oswald, Hank

From: Ron Thompson [REDACTED]
Sent: Thursday, December 10, 2015 3:04 PM
To: Oswald, Hank
Subject: RE: BAT Plan_723 Woodbine Crossing Road
Attachments: DOC121015-001.pdf

Hank: Thanks for your work and assistance on this LPD system. I have attached some computation pages for consideration. Please note the Hydraulic Graph is provided to compare the results.

I ran four options using either 7 or 5 orifices. Using 3' head, please note the following

OPTION 1 – Orifice Dia. = 5/16", 7 Orifices, total flow rate = 83.58 GPM, Run Time = 2.3 Minutes.
OPTION 2 – Orifice Dia. = 1/4", 7 Orifices, total flow rate = 58.73 GPM, Run Time = 3.3 Minutes. ✓
OPTION 3 – Orifice Dia. = 5/16", 5 Orifices, total flow rate = 59.7 GPM, Run Time = 3.2 Minutes.
OPTION 4 – Orifice Dia. = 1/4", 5 Orifices, total flow rate = 41.95 GPM, Run Time = 4.6 Minutes.

Looking at the above results – considering flow rate and run time, it would appear using either Option 2 or 3 would be acceptable. Both alternatives would be below the WE03M 1/3 HP pump which would be used. Option 4 would produce too long of a run time.

Please review and let me know your thoughts. Thank you.

[REDACTED]
[REDACTED]
210 South Main Street
PO BOX 528
M [REDACTED] 771
[REDACTED] (6)
[REDACTED] (6)
[REDACTED] (7)

From: Oswald, Hank [REDACTED]
Sent: Thursday, December 10, 2015 11:31 AM
To: Ron Thompson [REDACTED]
Subject: RE: BAT Plan_723 Woodbine Crossing Road

Ron:

If the trench length is 35 ft. then the spacing between orifices should be 5 FT (spacing x # of orifices = trench length). The lateral length would be 32.5 (# of orifices – 1 x 1/2(spacing) = lateral length).

It's also been suggested reducing the hole size to 1/4 inch and the # of holes per lateral to 5 and increasing the distal head to 3 (not 2 as I suggested) would pressurize the system quicker. Maintain the 1/2 HP pump.

Your choice of course. Please revise the plan one more time and email it to me to see how it looks before sending hard copies.

Thanks,

Hank

From: Ron Thompson [mailto:ron.thompson@va.gov]
Sent: Wednesday, December 09, 2015 1:08 PM
To: Oswald, Hank
Subject: RE: BAT Plan_723 Woodbine Crossing Road
Importance: High

Hank:

If you could, please see the attached proposed resubmission. If acceptable, I will send in the paper copies.

Thanks for your help!

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED] (C)
[REDACTED] (C)
[REDACTED] (F)

From: Oswald, Hank [mailto:hoswald@va.gov]
Sent: Friday, December 04, 2015 12:11 PM
To: Ron Thompson [mailto:ron.thompson@va.gov]
Subject: BAT Plan_723 Woodbine Crossing Road

Hi Ron:

Please see attached letter regarding the BAT Plan review for 723 Woodbine Crossing Road.

Thanks,

Hank

[REDACTED]
[REDACTED] Health Department
[REDACTED] Health
[REDACTED]
8000 Stanford Boulevard
Columbia, MD 21045
410.315.1700 (Office)
410.315.1200 (Fax)

Center Feed Lateral Length = 1/2 Bed Length - 1/2 Perforation Spacing

Bed Length = 70 ft
 Perforation Spacing = 5 ft
 Perforations = 7
 Lateral Length = 32.5

TOTAL DYNAMIC HEAD 8.5 FT
 Dose Volume 191.9 GAL

Trench	Relative Elevation (ft)	Trench Length (ft)	Lateral Length (ft)	Head (ft)	Orifice Dia. (in)	Orifice Flow Rate (gpm)	Orifice Spacing (ft)	Number of Orifices	Trench Flow Rate
T1-L1	684.5	70	32.5	3	5/16	1.99	5.0	7	13.93
T1-L2	684.5	70	32.5	3	5/16	1.99	5.0	7	13.93
T2-L3	684.5	70	32.5	3	5/16	1.99	5.0	7	13.93
T2-L4	684.5	70	32.5	3	5/16	1.99	5.0	7	13.93
T3-L5	684.5	70	32.5	3	5/16	1.99	5.0	7	13.93
T3-L6	684.5	70	32.5	3	5/16	1.99	5.0	7	13.93
TOTAL FLOW RATE									83.58
Run Time									2.3 Min.

Trench	Relative Elevation (ft)	Trench Length (ft)	Lateral Length (ft)	Head (ft)	Orifice Dia. (in)	Orifice Flow Rate (gpm)	Orifice Spacing (ft)	Number of Orifices	Trench Flow Rate
1	684.5	70	32.5	3	1/4	1.99	5	7.0	13.93
2	684.5	70	32.5	3	1/4	1.28	5	7.0	8.96
3	684.5	70	32.5	3	1/4	1.28	5	7.0	8.96
4	684.5	70	32.5	3	1/4	1.28	5	7.0	8.96
5	684.5	70	32.5	3	1/4	1.28	5	7.0	8.96
6	684.5	70	32.5	3	1/4	1.28	5	7.0	8.96
TOTAL FLOW RATE									58.73
Run Time									3.3 Min

Center Feed Lateral Length = 1/2 Bed Length - 1/2 Perforation Spacing

Bed Length = 70 ft
 Perforation Spacing = 5 ft
 Perforations = 7
 Lateral Length = 32.5

TOTAL DYNAMIC HEAD 8.5 FT
 Dose Volume 191.9 GAL

Trench	Relative Elevation (ft)	Trench Length (ft)	Lateral Length (ft)	Head (ft)	Orifice Dia. (in)	Orifice Flow Rate (gpm)	Orifice Spacing (ft)	Number of Orifices	Trench Flow Rate
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5	684.5	70	32.5	3	1/4	1.28	5	7.0	8.96
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TOTAL FLOW RATE									58.73
Run Time									3.3 Min

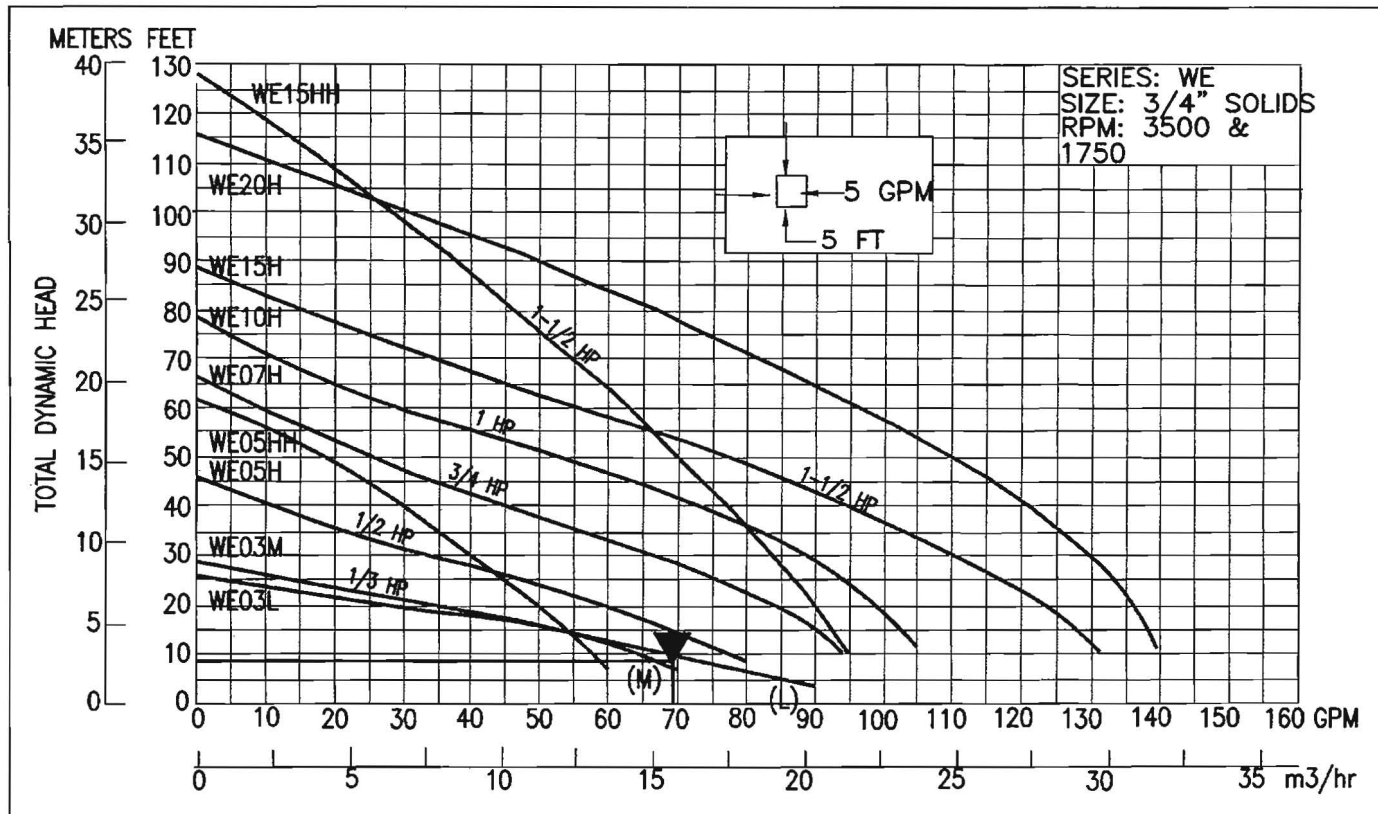
Center Feed Lateral Length = 1/2 Bed Length - 1/2 Perforation Spacing

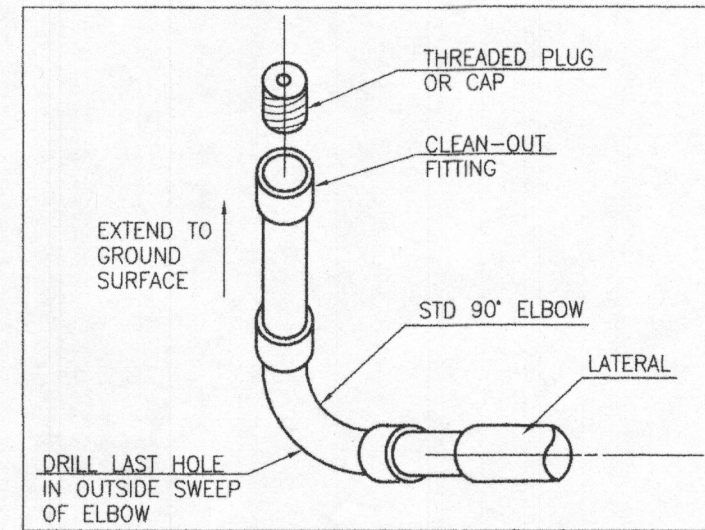
Bed Length = 70 ft
 Perforation Spacing = 7 ft
 Perforations = 5
 Lateral Length = 31.5

TOTAL DYNAMIC HEAD 8.5 FT
 Dose Volume 191.9 GAL

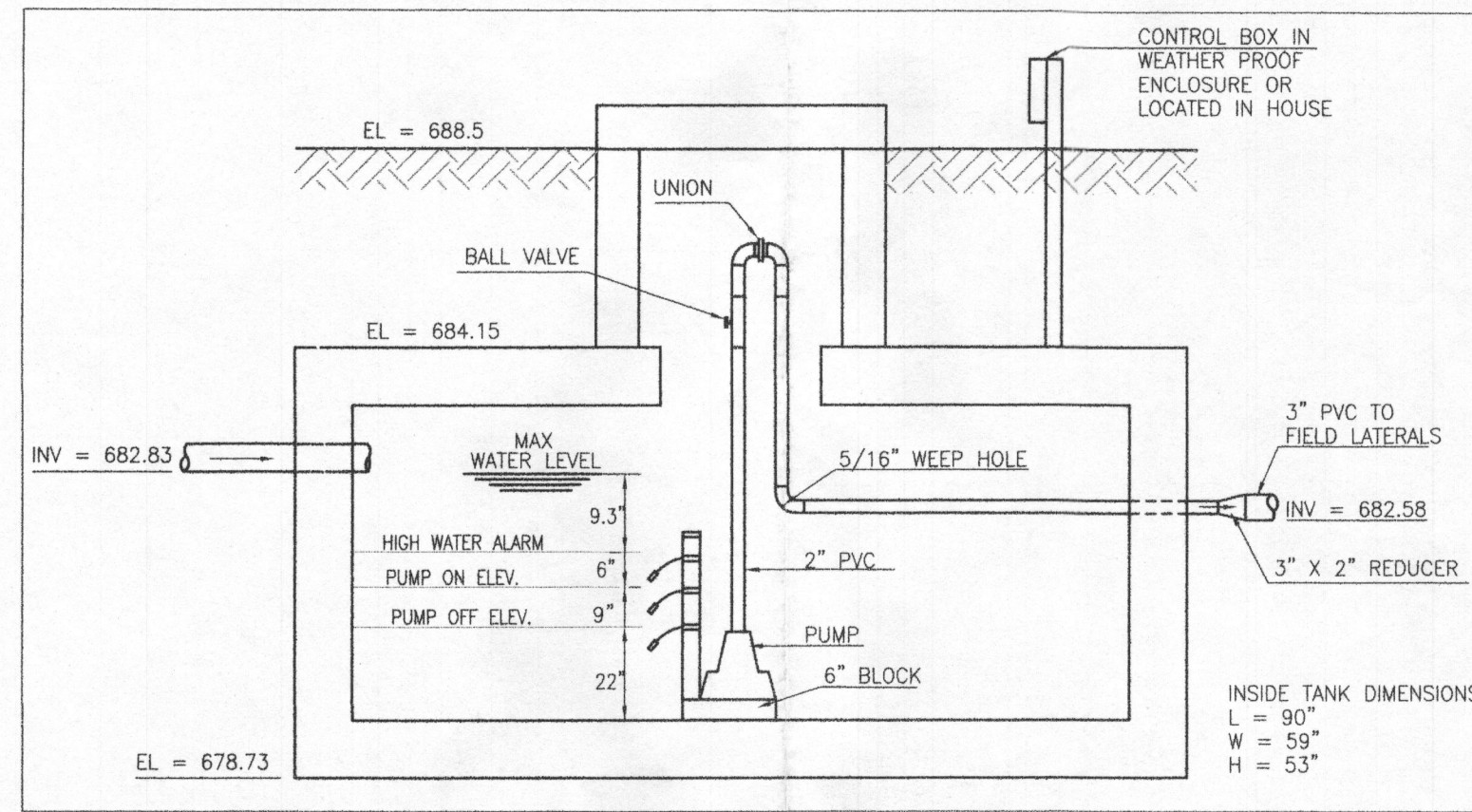
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T2-L4	684.5	70	31.5	3	5/16	1.99	7.0	5	9.95
T3-L5	684.5	70	31.5	3	5/16	1.99	7.0	5	9.95
T3-L6	684.5	70	31.5	3	5/16	1.99	7.0	5	9.95
TOTAL FLOW RATE									59.7
Run Time									3.2 Min.

Trench	Relative Elevation (ft)	Trench Length (ft)	Lateral Length (ft)	Head (ft)	Orifice Dia. (in)	Orifice Flow Rate (gpm)	Orifice Spacing (ft)	Number of Orifices	Trench Flow Rate
1	684.5	70	31.5	3	1/4	1.99	7	5.0	9.95
2	684.5	70	31.5	3	1/4	1.28	7	5.0	6.4
3	684.5	70	31.5	3	1/4	1.28	7	5.0	6.4
4	684.5	70	31.5	3	1/4	1.28	7	5.0	6.4
5	684.5	70	31.5	3	1/4	1.28	7	5.0	6.4
6	684.5	70	31.5	3	1/4	1.28	7	5.0	6.4
TOTAL FLOW RATE									41.95
Run Time									4.6 Min

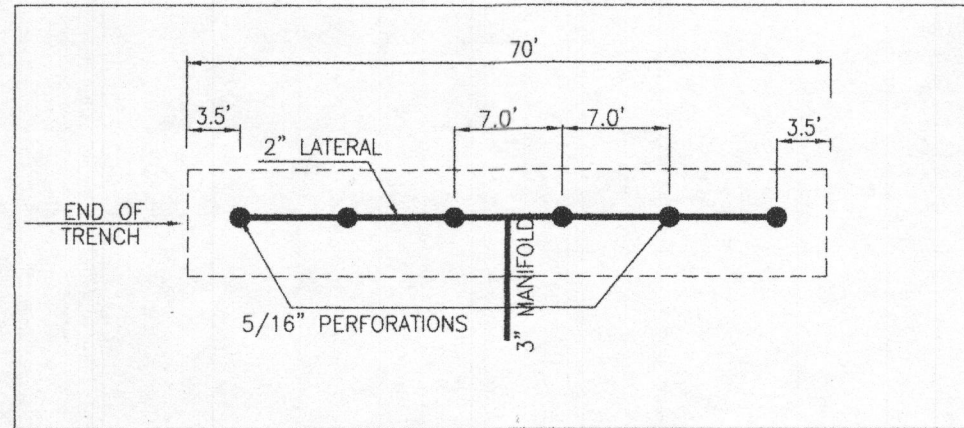




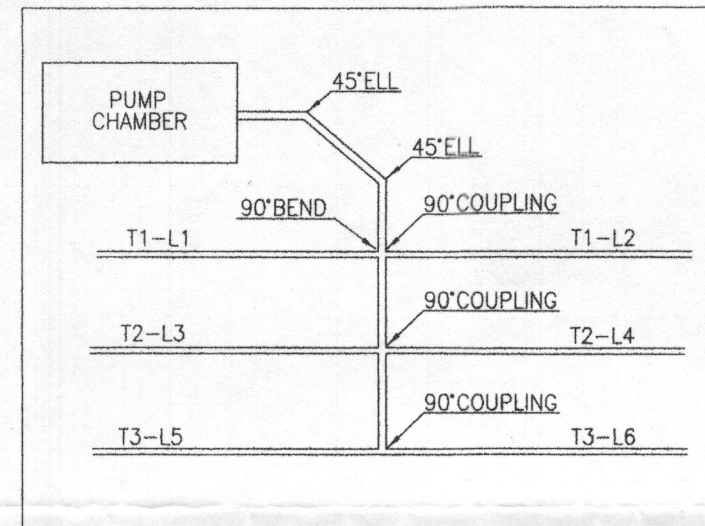
LATERAL END TURN-UP
USE ON LATERAL FARTHEST FROM PUMP AND ON LATERAL DIAGONALLY ACROSS BED
NOT TO SCALE



**TOP SEAM
1250 GAL. PUMP CHAMBER**
NOT TO SCALE



LATERAL DETAIL
NOT TO SCALE



FITTINGS CHART

LOW PRESSURED DOSE SYSTEM SPECIFICATIONS

1. ALL PIPING TO BE SCHEDULE 40 PVC OF SIZES SHOWN.
2. A SUBMERSIBLE PUMP TO REMOVE 68.4 GPM AGAINST 8 TDH TO BE PROVIDED. PUMP TO BE A GOULDS MODEL 3885-WED3M OR EQUAL.
3. A TEST OF THE PUMP SYSTEM AND DISTRIBUTION PIPING IS REQUIRED PRIOR TO COVERING THE SYSTEM.
4. THE HIGH WATER ALARM IS TO BE ON A SEPARATE CIRCUIT ALARM TO BE LOCATED IN THE HOUSE.

LOW PRESSURE DOSE SYSTEM DESIGN CRITERIA

DOSE VOLUME

1. MINIMUM DOSE = (5 X LATERAL PIPE VOLUME) + (FORCE MAIN & MANIFOLD) = (5 X 32.89) + 18.4 = 182.9 GALLONS
2. 182.9 GALLONS IS MORE THAN 1/6 DESIGN FLOW (4 BDRMS X 150 GALLONS)/6 = 100 GALLONS USE 182.9 GALLONS DOSE (3.1 MIN RUN TIME X 59.7 GPM FLOW)

PIPE VOLUMES

1. 48 LF (3\"/>

FRICITION LOSS IN 3\"/>

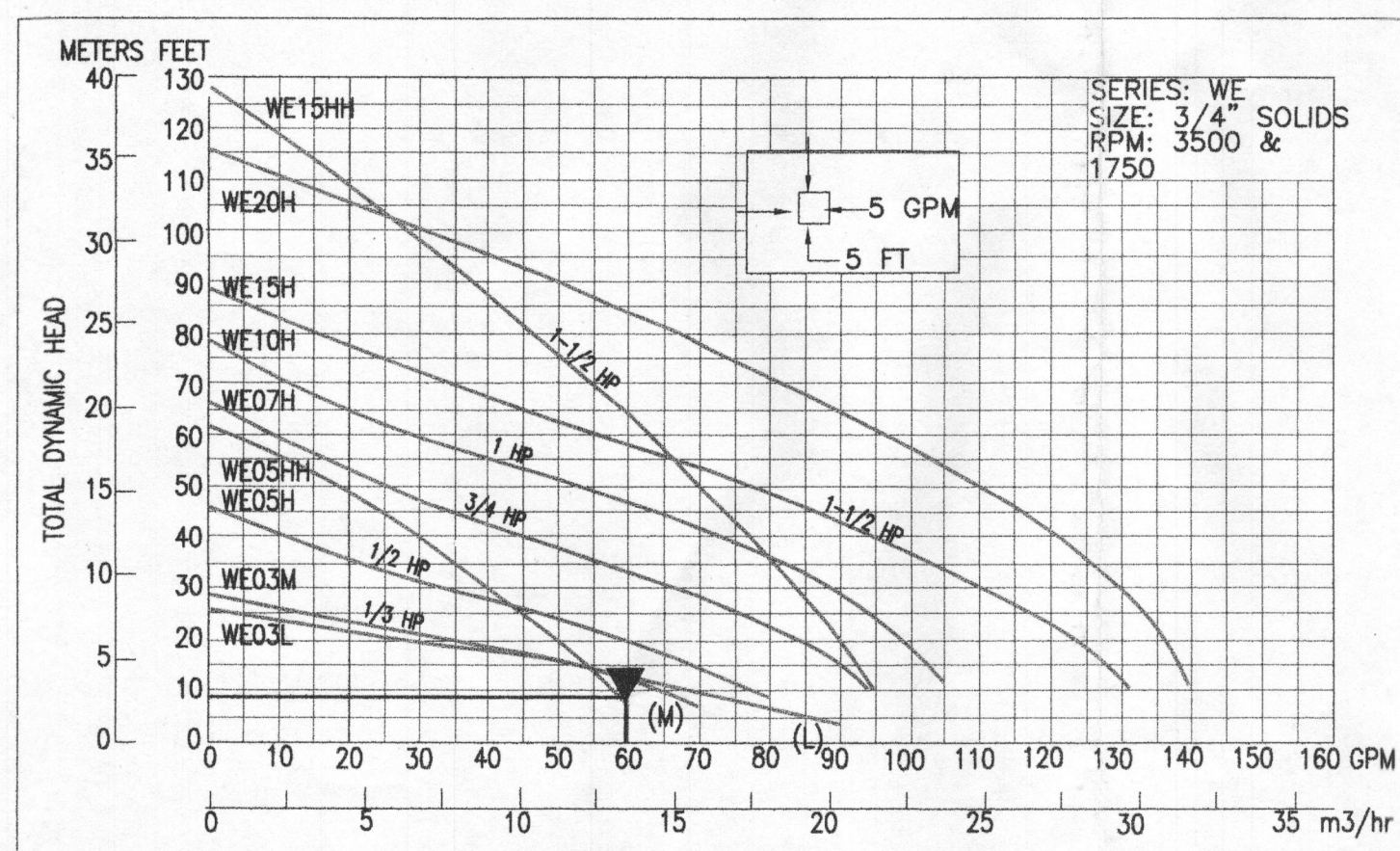
- 3 - COUPLING X 3 FT PER FITTING = 9 EQUIVALENT FT OF PIPE
- 1 - 90\"/>

DYNAMIC HEAD

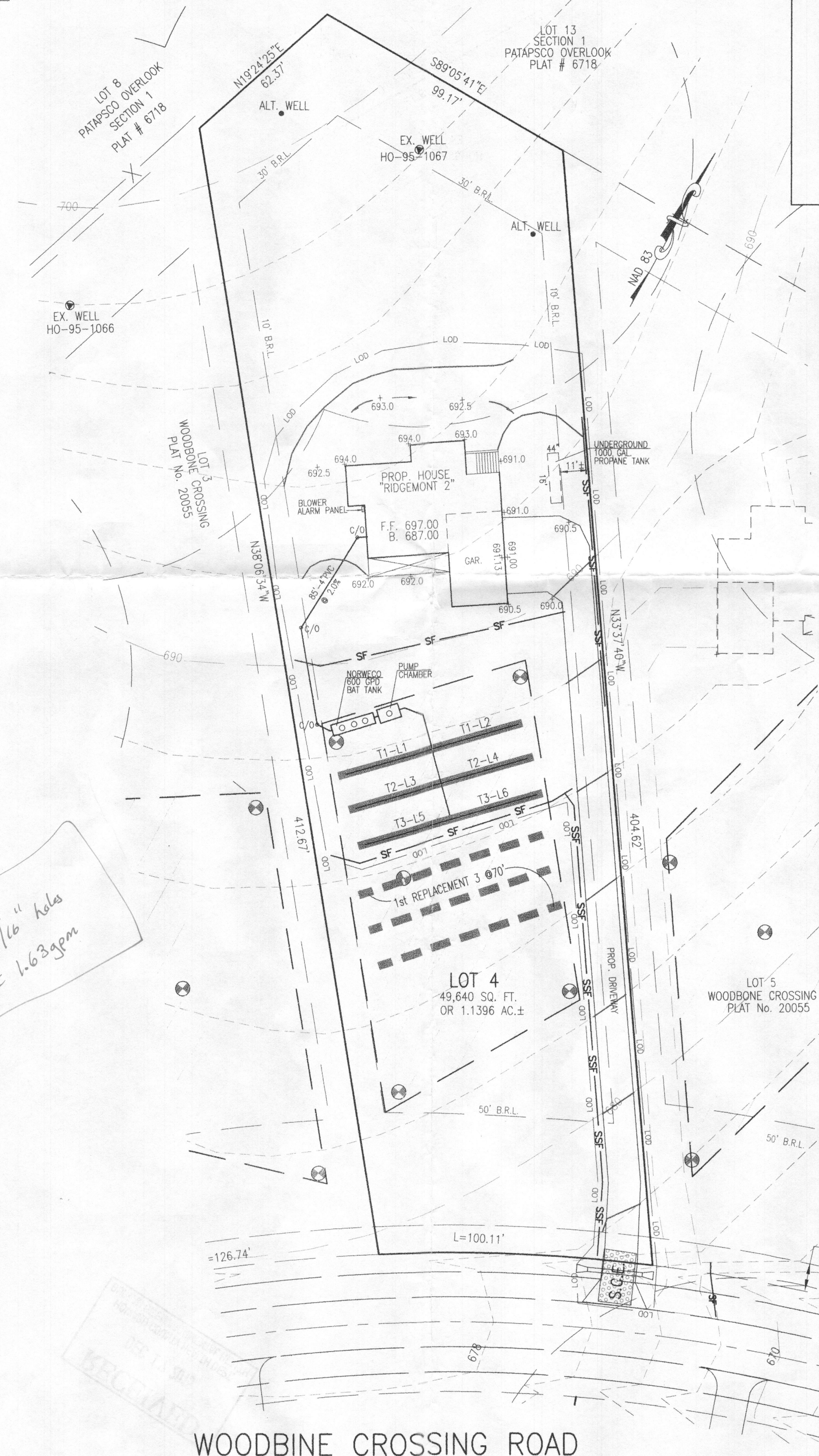
- 84 LF X 2.09 PER 100 LF OF PIPE = 1.75 FT OF FRICTION HEAD
- DISTAL HEAD = 3.0 FT
- VERTICAL FROM PUMP OFF TO DISCHARGE = 1.78 FT
- VERTICAL FROM DISCHARGE TO UPPER TRENCH = 1.92 FT
- TOTAL DYNAMIC HEAD = 8.45 FT (USE 8.5 FT)

LOW PRESSURE DOSING SYSTEM										
TRENCH	GROUND ELEV.	PIPE INVERT ELEV.	TRENCH LENGTH (FT)	2\"/>						
T1-L1	687.6	684.5	35.0'	31.5'	5/16	3.0	1.99	7.0'	5	9.95
T1-L2	687.6	684.5	35.0'	31.5'	5/16	3.0	1.99	7.0'	5	9.95
T2-L3	687.0	684.5	35.0'	31.5'	5/16	3.0	1.99	7.0'	5	9.95
T2-L4	687.0	684.5	35.0'	31.5'	5/16	3.0	1.99	7.0'	5	9.95
T3-L5	686.5	684.5	35.0'	31.5'	5/16	3.0	1.99	7.0'	5	9.95
T3-L6	686.5	684.5	35.0'	31.5'	5/16	3.0	1.99	7.0'	5	9.95
									TRENCH FLOW RATE	59.7

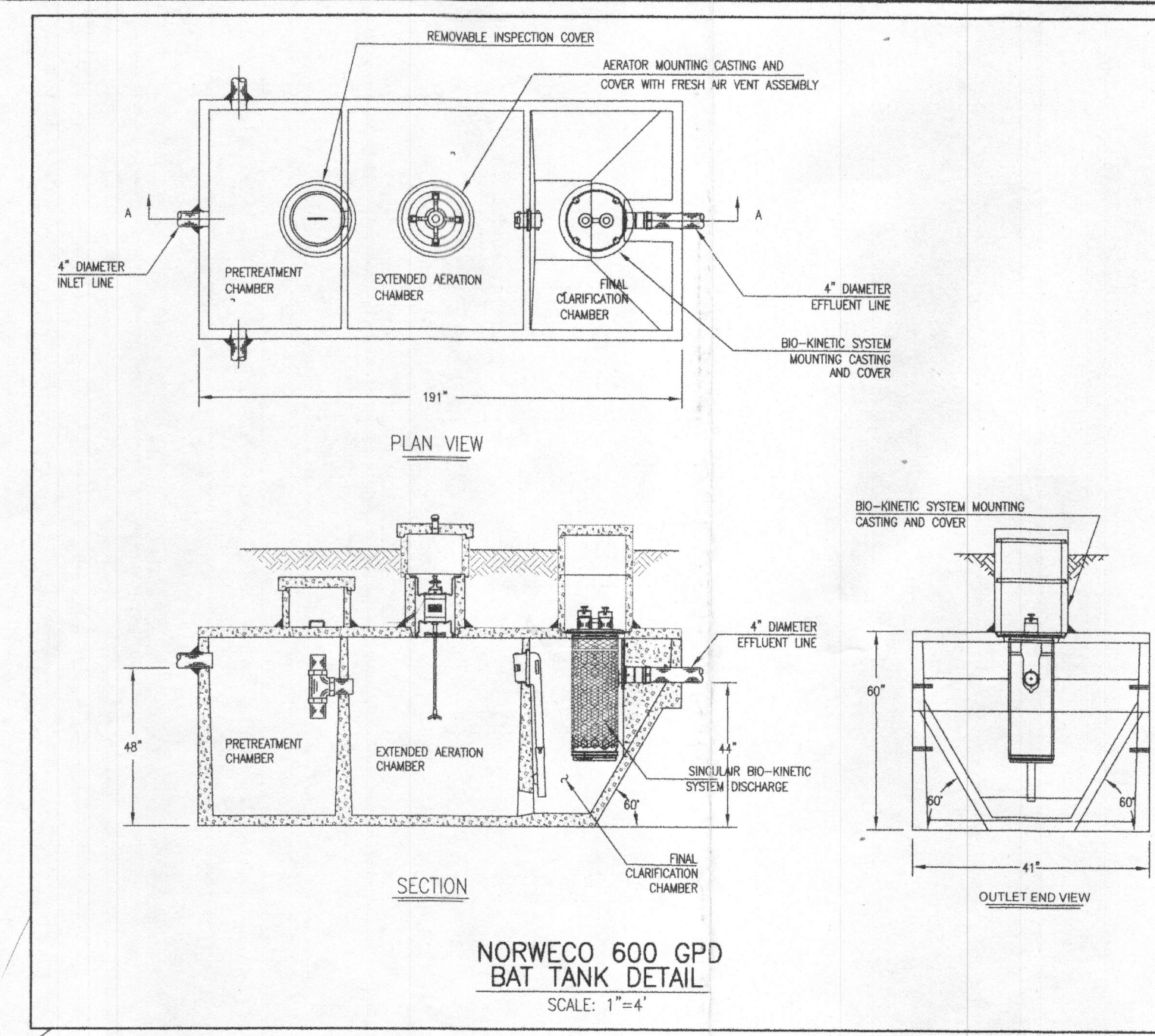
TRENCH DESIGN										
TRENCH	GROUND ELEV.	TOP OF STONE ELEV.	PIPE INVERT ELEV.	DEPTH OF STONE FROM GROUND	DEPTH OF TRENCH (FT)	BOTTOM OF TRENCH ELEV.	EFFECTIVE DEPTH BEGINS AT	EFFECTIVE DEPTH (D)	WIDTH OF TRENCHES (W)	TRENCH SPACING (FT)
T1-L1	687.6	685.6	684.5	2.0'	4.0'	681.6	682.6	1.0'	3.0'	10
T1-L2	687.6	685.6	684.5	2.0'	4.0'	681.6	682.6	1.0'	3.0'	10
T2-L3	687.0	685.0	684.5	2.0'	4.0'	681.0	682.0	1.0'	3.0'	10
T2-L4	687.0	685.0	684.5	2.0'	4.0'	681.0	682.0	1.0'	3.0'	10
T3-L5	686.5	685.0	684.5	1.5'	4.0'	680.5	681.5	1.0'	3.0'	10
T3-L6	686.5	685.0	684.5	1.5'	4.0'	680.5	681.5	1.0'	3.0'	10



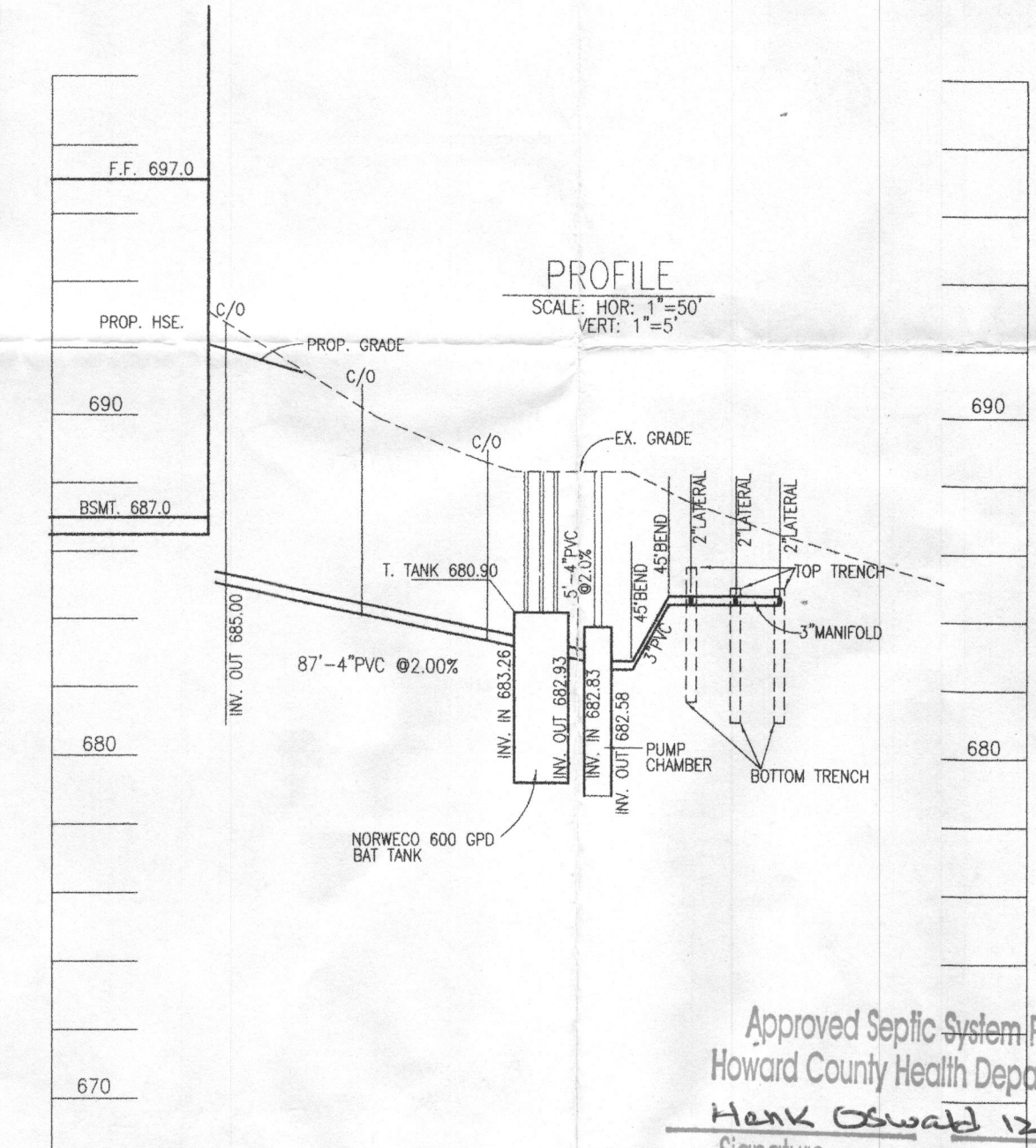
HYDRAULIC GRAPH



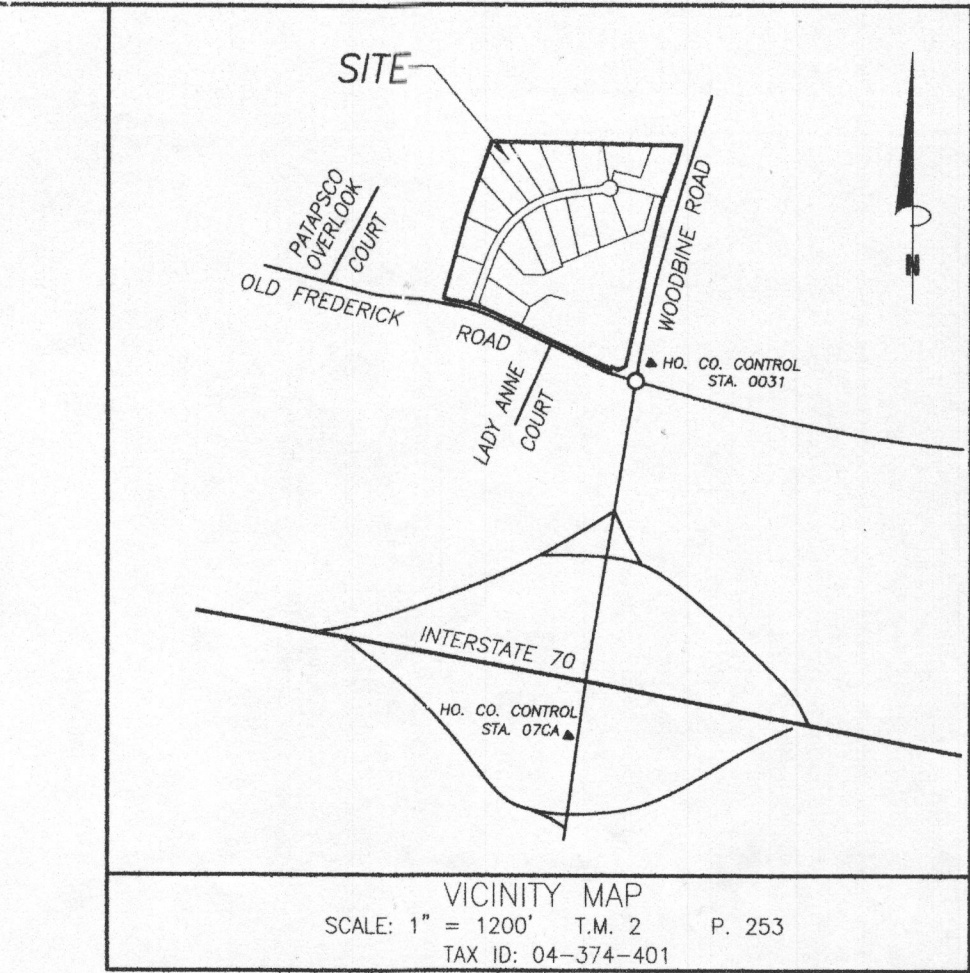
Q for 5/16\"/>



**NORWECO 600 GPD
BAT TANK DETAIL**
SCALE: 1\"/>



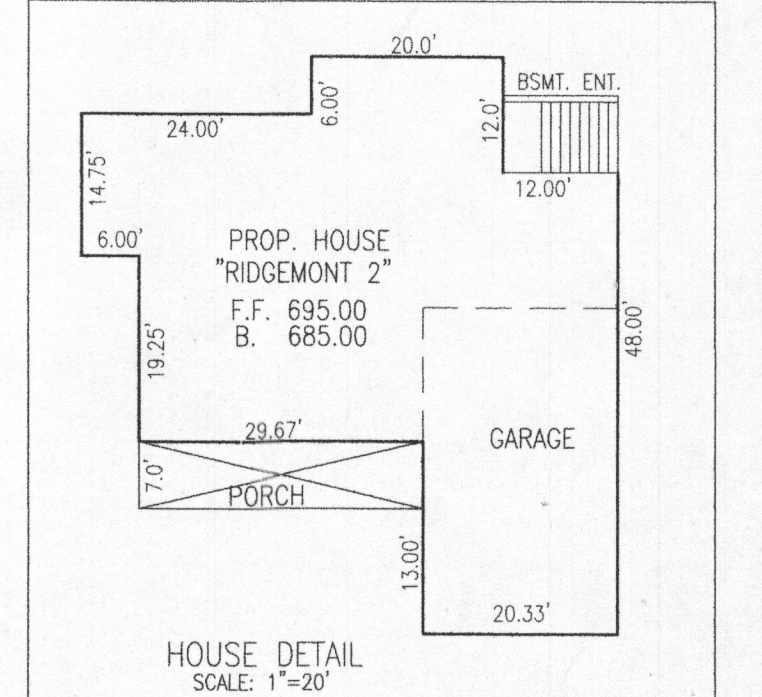
PROFILE
SCALE: HORIZ. 1\"/>



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 2. THE EXISTING WELLS SHOWN ON THIS PLAN HAVE BEEN FIELD LOCATED BY VANMAR ASSOCIATES OR TAKEN FROM AVAILABLE RECORDS AND ACCURATELY SHOWN.
 3. ZONING DISTRICT: RC-DEO
 4. LIMIT OF DISTURBANCE (LOD) = 19,750 SQ.FT.
 5. THERE ARE NO STREAMS, PONDS, FLOODPLAINS OR WETLANDS ON THIS LOT.
 6. STORM WATER MANAGEMENT FOR THIS LOT IS PROVIDED BY EXISTING WOODBONE CROSSING STORM WATER MANAGEMENT FACILITIES PROVIDED FOR AND CONSTRUCTED BY THE DEVELOPER UNDER PLAN F-07-103.
 7. DRIVEWAY CULVERT DESIGNED BY THE DEVELOPER UNDER PLAN F-07-103.

- SEPTIC SYSTEM TRENCH DESIGN**
- INITIAL NUMBER OF BEDROOMS = 4
 APPLICATION RATE = 0.8 GPD / sq.ft.
 DESIGN FLOW: 150 GPD X 4 BEDROOMS = 600 GPD
 600 GPD / 0.8 GPD/sq.ft. = 750 sq.ft.
 750 sq.ft. / 3 ft. WIDE TRENCH = 250 LF TRENCH
 250 LF TRENCH X 0.83 REDUCTION CREDIT = 207.5 LF TRENCH
- 1st REPLACEMENT APPLICATION RATE = 0.8 GPD / sq.ft.
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 9. THE HEALTH DEPARTMENT REQUIRES DOCUMENTATION FOR THE START UP CERTIFICATION FROM THE MANUFACTURER PRIOR TO FINAL APPROVAL OF INSTALLATION.



HOUSE DETAIL
SCALE: 1\"/>

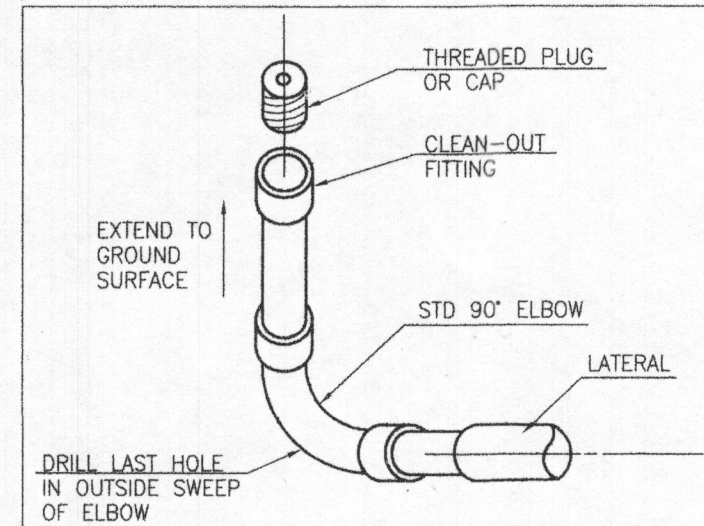
DATE: 12/16/15
 REVISIONS: BAT system design

**PLOT PLAN
SITE PLAN FOR BAT TECHNOLOGY
LOT 4
WOODBINE CROSSING**

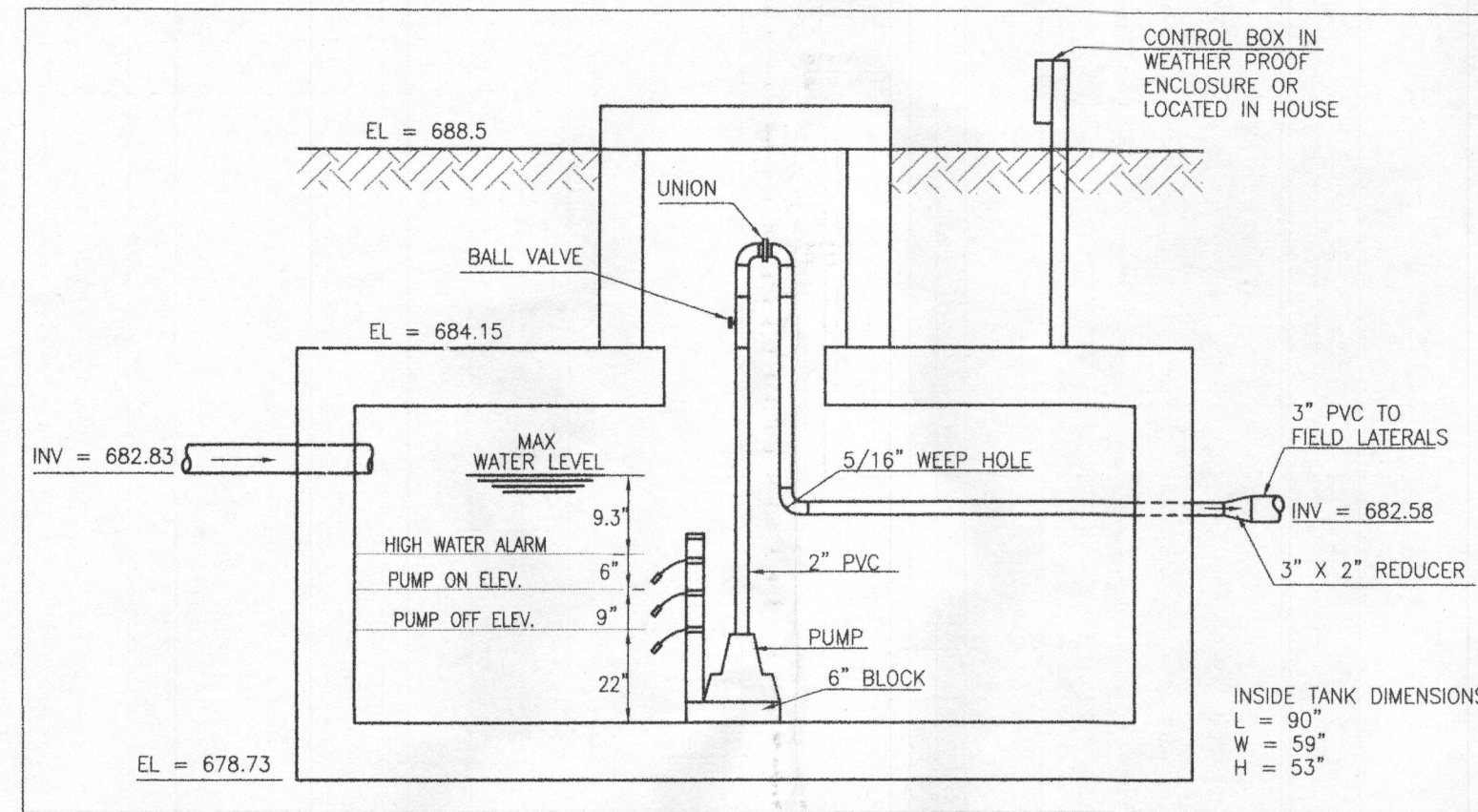
PLAT No. 20055
 723 WOODBINE CROSSING ROAD
 FOURTH ELECTION DISTRICT
 HOWARD COUNTY, MARYLAND
 SCALE: 1\"/>

VANMAR ASSOCIATES, INC.
 Engineers Surveyors Planners
 310 South Main Street Mount Airy, Maryland 21771
 (301) 829-2890 (301) 831-5015 (410) 549-2751
 Fax (301) 831-5603 ©Copyright, Latest Date Shown

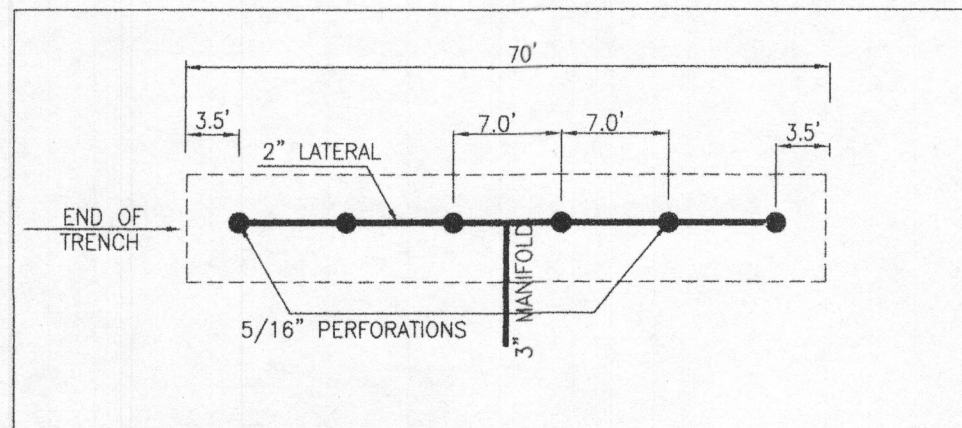
PROFESSIONAL CERTIFICATION
 I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 18417, Expiration Date: 9-18-17.



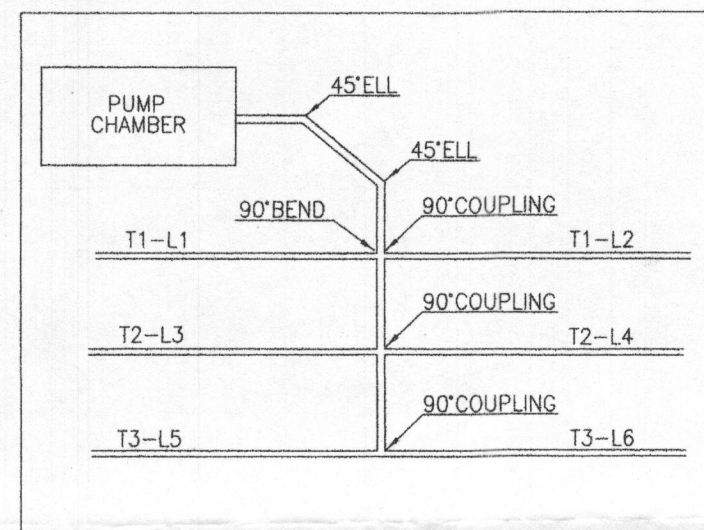
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PIPE VOLUMES

- 48 LF (3\"/>

FRICION LOSS IN 3\"/>

- 3 - COUPLING X 3 FT PER FITTING = 9 EQUIVALENT FT OF PIPE
- 1 - 90° X 15 FT PER FITTING = 15 EQUIVALENT FT OF PIPE
- 2 - 45° X 6 FT PER FITTING = 12 EQUIVALENT FT OF PIPE
- TOTAL EQUIVALENT FEET OF PIPE = 36 FEET
- TOTAL LINEAR FEET OF 3\"/>

DYNAMIC HEAD

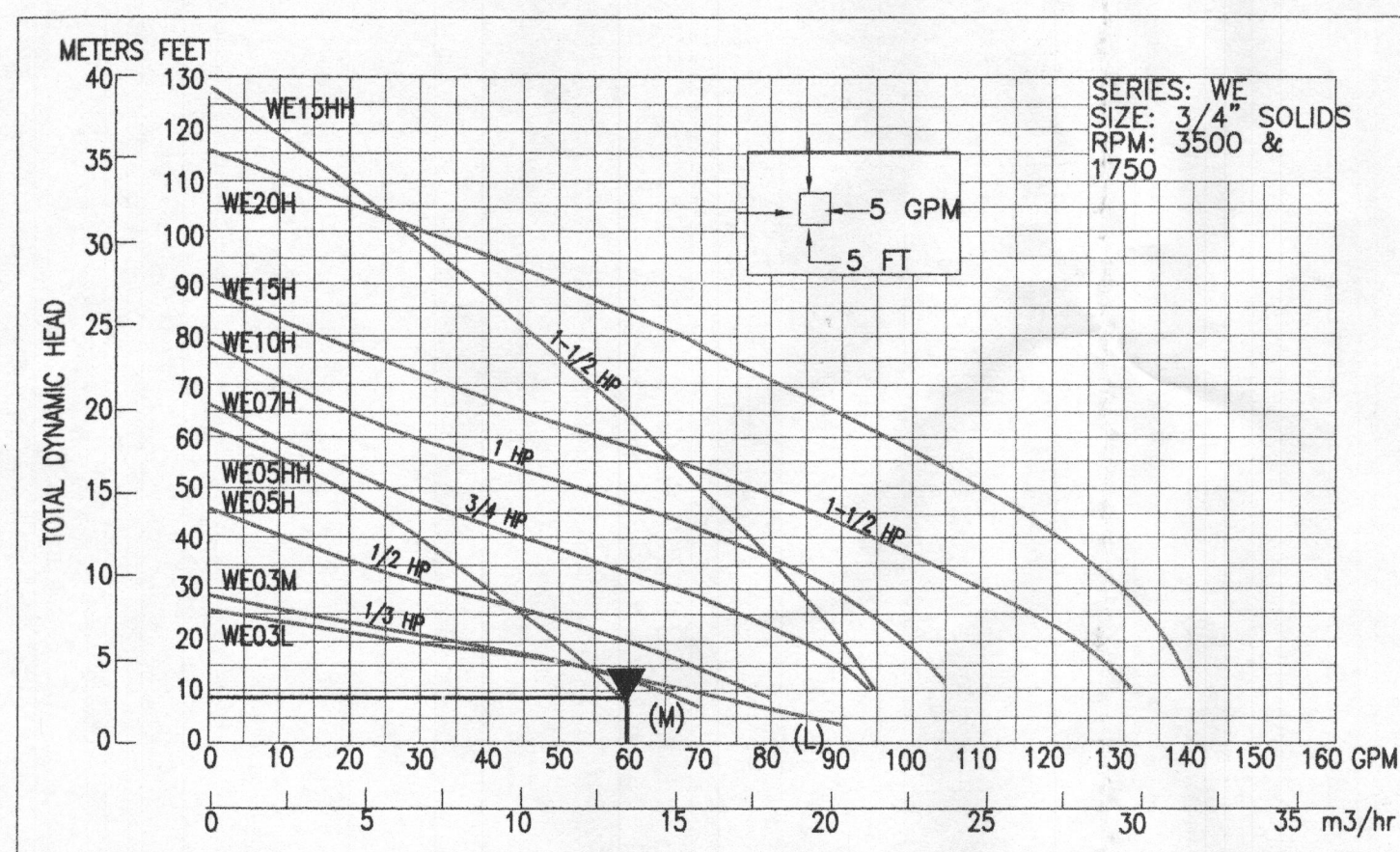
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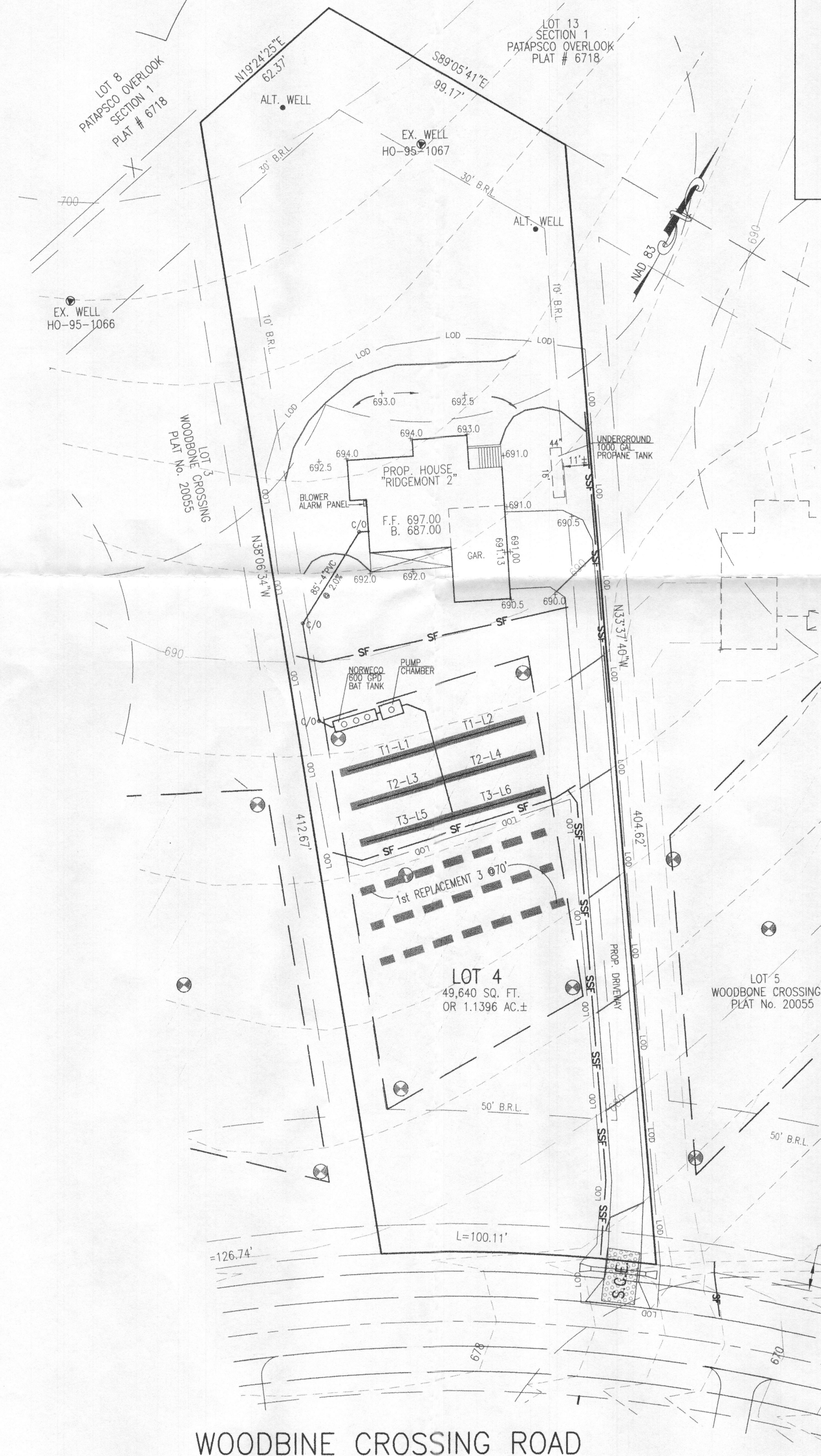
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										TRENCH FLOW RATE
										59.7

TRENCH DESIGN

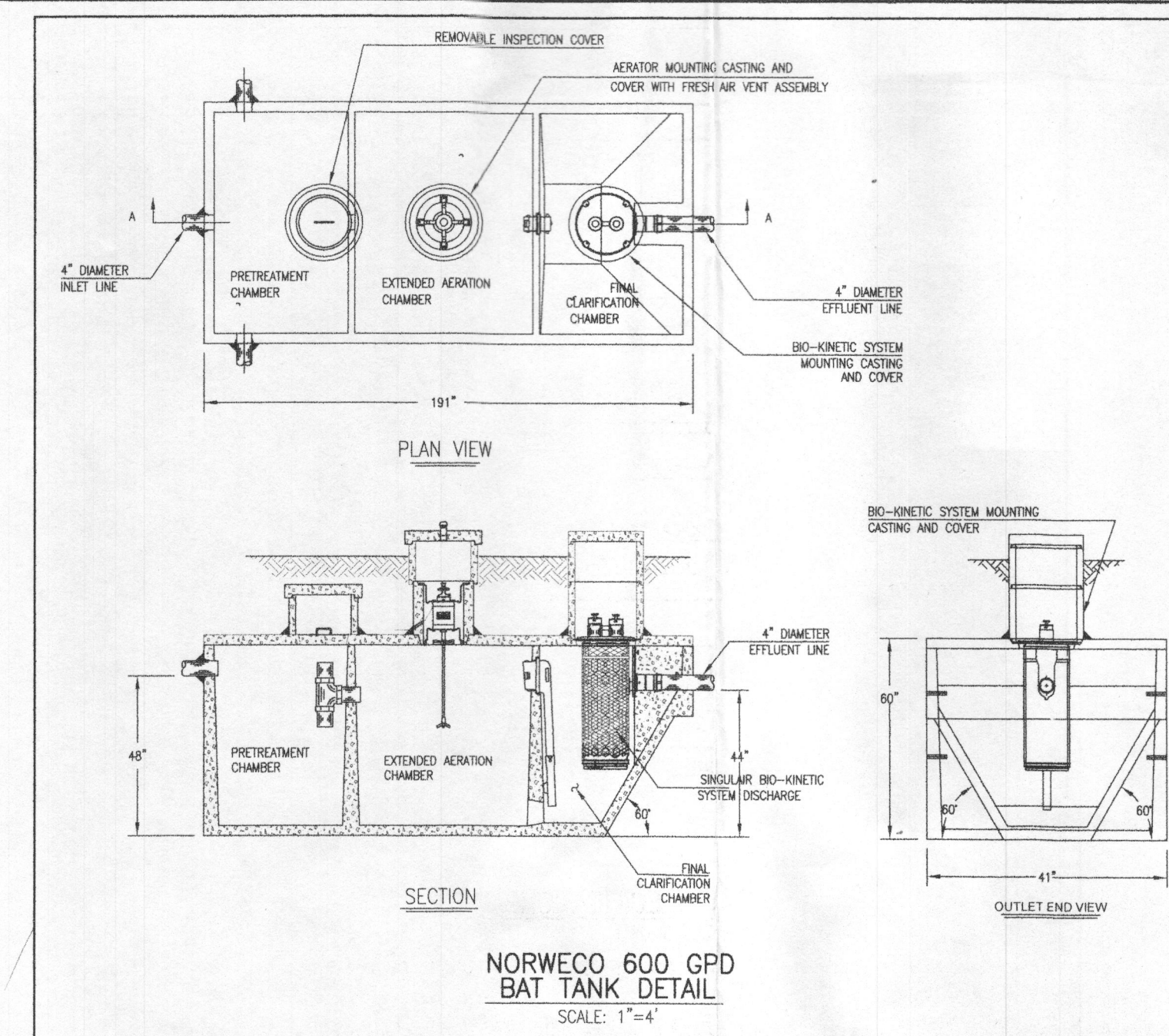
TRENCH	GROUND ELEV.	TOP OF STONE ELEV.	PIPE INVERT ELEV.	DEPTH OF STONE FROM GROUND	DEPTH OF STONE (FT)	BOTTOM OF TRENCH ELEV.	EFFECTIVE DEPTH BEGINS AT	EFFECTIVE DEPTH (D)	WIDTH OF TRENCHES (W)	TRENCH SPACING (FT)
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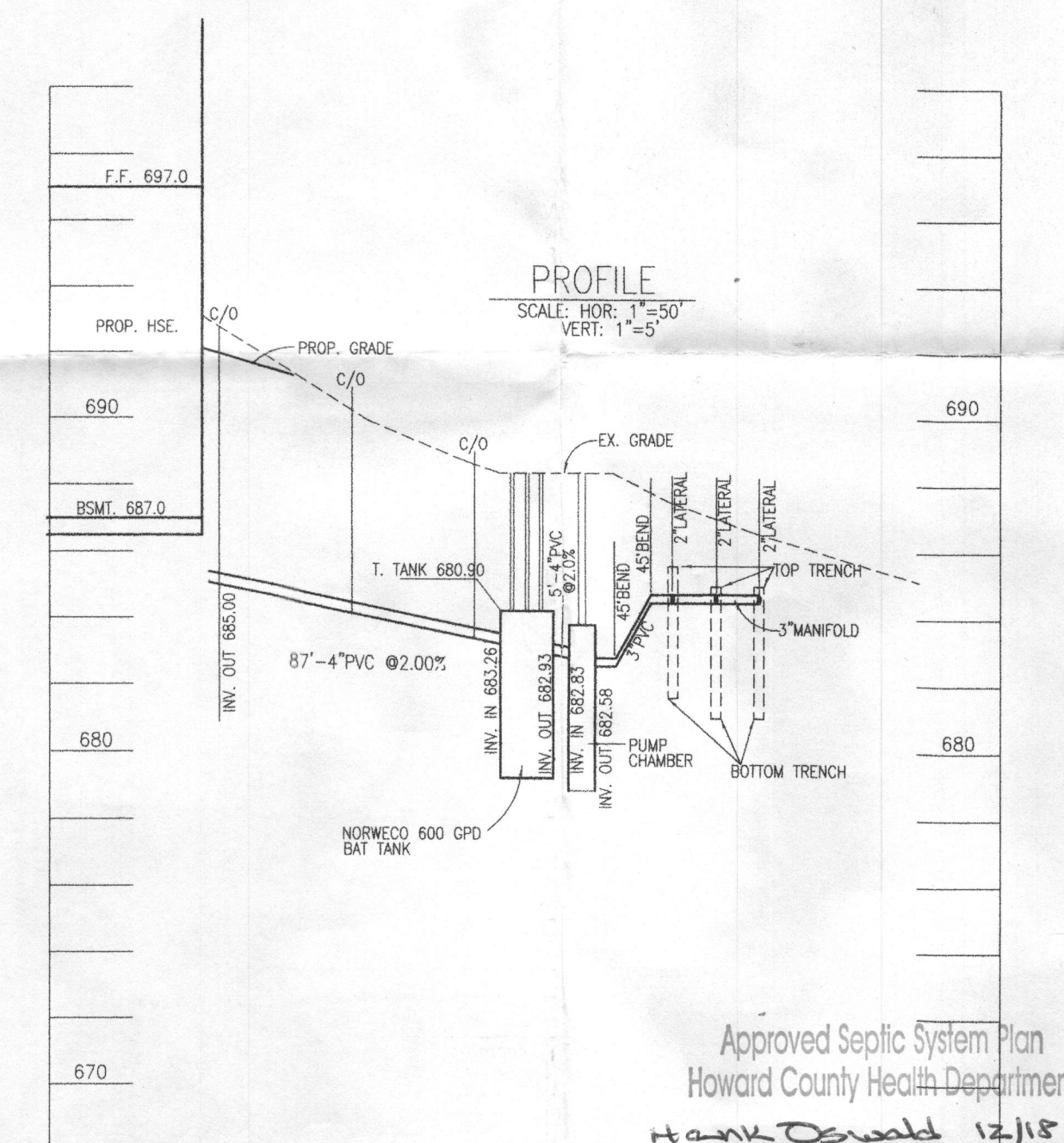
HYDRAULIC GRAPH



WOODBINE CROSSING ROAD
50' R/W



**NORWECO 600 GPD
BAT TANK DETAIL**
SCALE: 1\"/>



Approved Septic System Plan
Howard County Health Department
Signature: Hank Oswald
Date: 12/15/15

OWNER:
LDG INC.
LEE PLAZA, SUITE 200
8601 GEORGIA AVENUE
SILVER SPRING, MD 20910
301-585-7000

DEVELOPER:
CATONVILLE HOMES
11175 STRATHFIELD CT.
MARRIOTTSVILLE, MD 21104
410-442-2211



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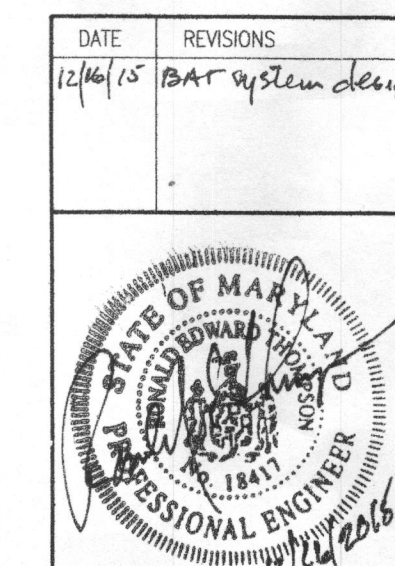
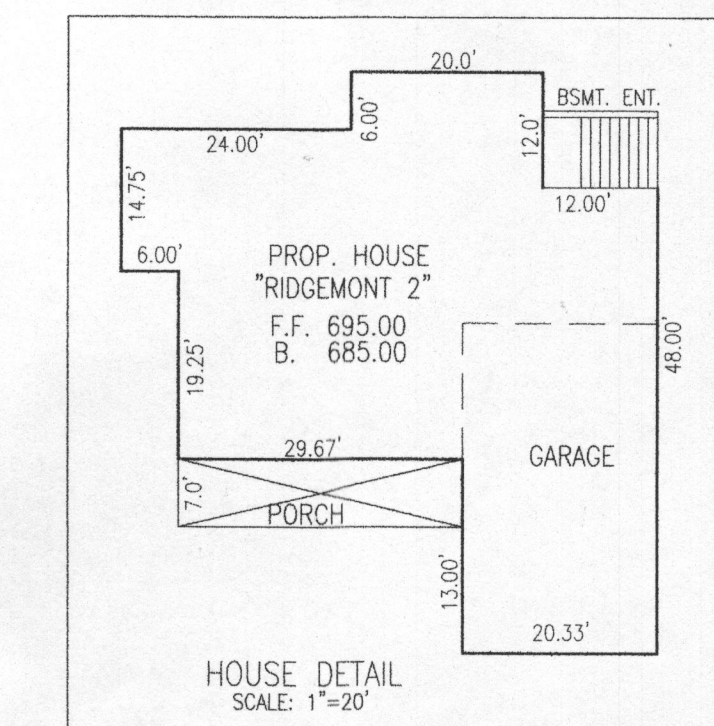
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- THE HEALTH DEPARTMENT REQUIRES DOCUMENTATION FOR THE START UP CERTIFICATION FROM THE MANUFACTURER PRIOR TO FINAL APPROVAL OF INSTALLATION.



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. 18417, Expiration Date: 9-18-17.

**PLOT PLAN
SITE PLAN FOR BAT TECHNOLOGY
LOT 4
WOODBINE CROSSING**
PLAT No. 20055
723 WOODBINE CROSSING ROAD
FOURTH ELECTION DISTRICT
HOWARD COUNTY, MARYLAND
SCALE: 1\"/>

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Engineers Surveyors Planners
310 South Main Street Mount Airy, Maryland 21771
(301) 829-2890 (301) 831-5015 (410) 549-2751
Fax (301) 831-5603 ©Copyright, Latest Date Shown