

LAYOUT _____ INSP 4 _____
INSP 2 _____ INSP 5 _____
INSP 3 _____ INSP 6 _____

ISSUE DATE: 8/24/09
APPROVAL DATE: _____

SEPTIC PERMIT

DRIP SYSTEM WITH PRETREATMENT

P 526743
A 526743 *REPAIR*

**ON-SITE SEWAGE DISPOSAL SYSTEM
HOWARD COUNTY HEALTH DEPARTMENT
BUREAU OF ENVIRONMENTAL HEALTH
Tax I.D. 5342058**

Farm and Home (Bill Ingram) IS PERMITTED TO INSTALL ALTER

ADDRESS: 901 Driver Road, Marriottsville, MD 21104 PHONE NUMBER: 410-984-0189

SUBDIVISION _____ LOT _____

ADDRESS: 12170 Hall Shop Road PROPERTY OWNER: Wilson Hobbs

MicroFAST 0.5 (Effluent Pretreatment Unit) _____ **Top Seamed**

PUMP CHAMBER CAPACITY (GALLONS): 1500 **Top Seamed**

Drip Distribution System – see detailed design plans by Innova, LTD., dated June, 2009.

LOCATION:	Flow to be divided between two plowed beds. Bed locations to be marked in the field. Check topography of beds before plowing to assure that they follow contour. Bed locations must be dry before plowing and covered before precipitation.
NOTES:	Call for layout inspection prior to beginning construction. System must be approved and I&A agreement signed prior to release of funding. MicroFAST unit is rated for no more than 8 dwelling occupants. Water conservation is highly recommended.

PLANS APPROVED: Brian Baker DATE: 8/24/2009

NOTES: PERMIT VOID AFTER 2 YEARS
CONTRACTOR IS RESPONSIBLE FOR SCHEDULING A PRE-CONSTRUCTION INSPECTION FOR ALL INSTALLATIONS
WATERTIGHT SEPTIC TANKS REQUIRED
ALL PARTS OF SEPTIC SYSTEM SHALL BE 100 FEET FROM ANY WATER WELL UNLESS SPECIFICALLY AUTHORIZED
MANHOLE RISERS REQUIRED ON ALL SEPTIC TANKS AND PUMP CHAMBERS UNLESS SPECIFICALLY AUTHORIZED
CONTRACTOR RESPONSIBLE FOR COMPLIANCE WITH APPLICABLE REGULATIONS, GUIDELINES AND THE TERMS OF THIS PERMIT

**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 FOR INSPECTIONS**

**Contacts: Dale Gray – (410)346-7386
Mike Robbins – (410)259-6158
Karen Ferguson – (800)828-3388
Steven Krieg – (410)660-7199**

NOT TO SCALE

6/7/10

6/23/10

See As-Built
Drawing On
Separate Sheet

BED DATA -

BED 1

BED 2

MicroFAST 0.5

SEAM LOC Top
TANK LID DEPTH 0.5-1'
BAFFLES Middle
BAFFLE FILTER No
MANHOLE LOC Middle
6" PORT LOC Front + Middle
WATERTIGHT TEST No
BLOWER TEST Working
BLOWER ALARM TEST

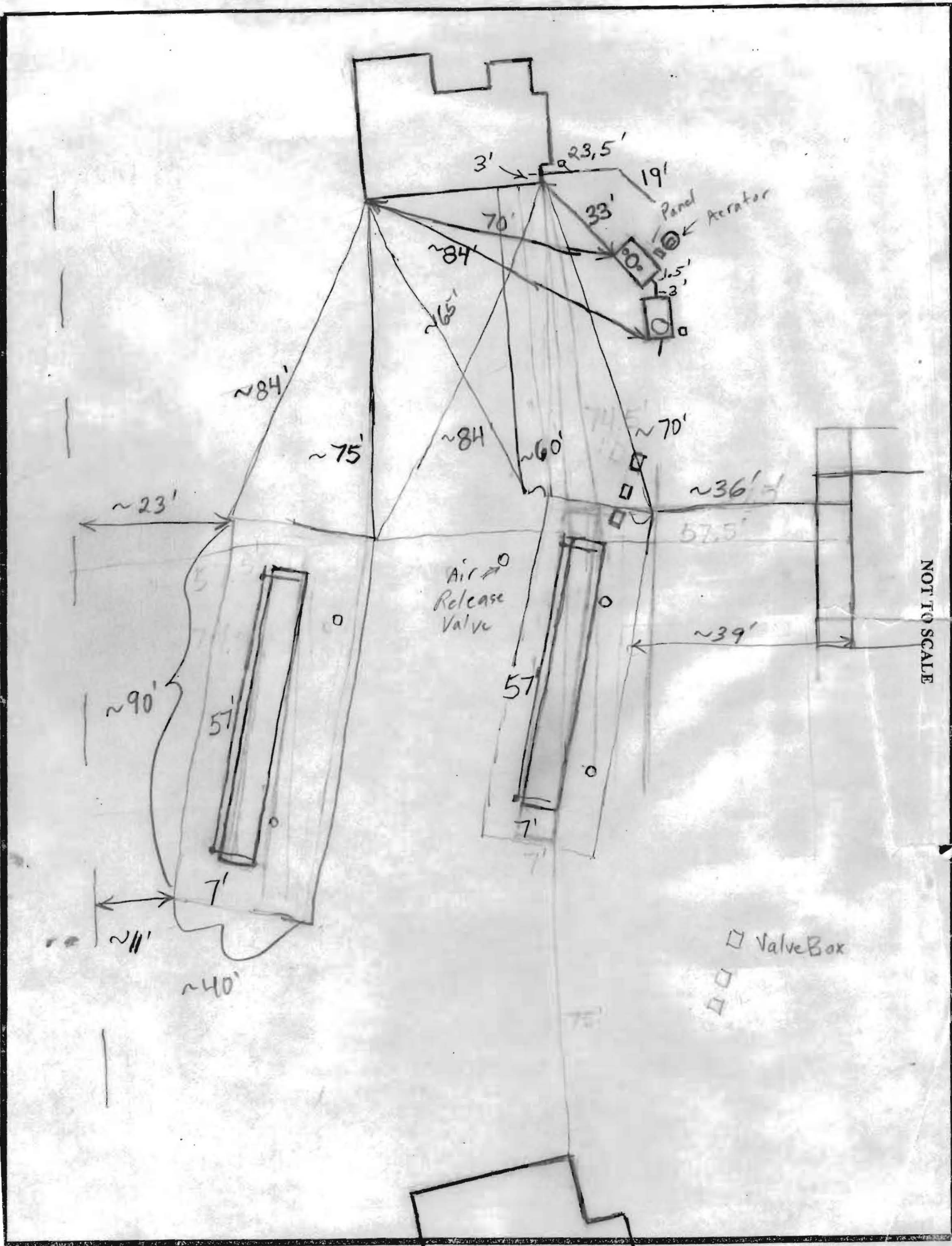
PUMP TANK LEVEL Yes
CAPACITY 1500 GAL
SEAM LOC Top
TANK LID DEPTH 0.5-1.5'
BAFFLES Front
MANHOLE LOC Rear
6" PORT LOC None
WATERTIGHT TEST No
PUMP TEST O.K.
PUMP ALARM TEST

8/27/09 Did preliminary layout at site. Beds cannot be installed per plan since contour on plan is wrong. Need to cut down a few trees at new bed locations and stake out all corners of area to be plowed and bed locations and call for a final pre-construction meeting. (BB) 9/17/09 Did second layout with Steve and also Barry this time. Staked out drip mound and bed areas. (BB) 9/25/09 Mound sites plowed and covered with sand. (BB) 9/28/09 Tanks set. Started on drip networks and

FINAL INSPECTOR _____

DATE OF APPROVAL _____

manifolds in beds, Dale Gray present. (BB)



NOT TO SCALE

Inspection Date/Inspection Notes/Inspector's Initials & Others Present:

9/30/09 No one working. Lower bed drop network installed
Started installing vacuum breakers on upper manifold. (RW)

DATE SYSTEM
APPROVED _____

**AGREEMENT AND EASEMENT FOR
INSTALLATION OF AN INNOVATIVE AND ALTERNATIVE
ON-SITE SEWAGE DISPOSAL SYSTEM WITH THE USE OF
BEST AVAILABLE TECHNOLOGY THROUGH
BAY RESTORATION FUNDS**

THIS AGREEMENT is made this 11th day of February, among Wilson L. Hobbs, hereinafter referred to as "Owner", the Howard County Health Department hereinafter collectively referred to as the "County", and the Department of the Environment, hereinafter referred to as the "Department".

WHEREAS, Owner owns a tract of land located on 12170 Hall Shop Road, in the 5th Election District of Howard County, Maryland, and the deed to same is recorded among the Land Records of Howard County, Maryland, in Ellicott City, and in Liber 839 Folio 110.

WHEREAS, Owner's land is improved and the existing means of sewage disposal has been found to be prejudicial to the environment and/or public health.

WHEREAS, Owner's land is unsuitable for the installation of a conventional on-site sewage disposal system and owner has requested the Department's approval to install an innovative/alternative system of sewage disposal.

WHEREAS, Owner understands that participation in the Bay Restoration Fund and the innovative/alternative program is voluntary.

NOW, THEREFORE, the parties hereto agree as follows:

- A. Owner must install and maintain a water meter on the incoming side of the water system or an event counter on the sewage pumping system.
- B. Owner hereby grants to the Department and the County the right to enter upon the property at any reasonable time for access to the system to make periodic inspections and the Owner agrees to provide any information and data requested and needed by the Department to develop accurate and thorough test results.

C. Owner acknowledges and agrees that the proposed innovative/alternative system is experimental and that his or her participation is voluntary. Owner agrees that there shall be no liability on the part of the County or Department to Owner if this innovative/alternative system fails, and that the County and the Department do not warrant or guarantee that the system will adequately or properly function.

D. Owner acknowledges and agrees that a manufacturer-approved installer will install the best available technology (BAT) system.

E. Owner acknowledges and agrees the manufacturer will provide for Operation and Maintenance of the BAT for a period of 5 years as a condition of sale of the BAT. After the 5-year period the Operation and Maintenance contract can be further extended at the behest of the property owner. The Department and County encourage the property owner to continuously maintain an Operation and Maintenance contract during the lifetime of the system.

F. Owner acknowledges and agrees that the manufacturer appointed Operation and Maintenance provider will have access to the BAT system at all times.

G. Owner acknowledges and agrees that neither the County nor the Department nor any of its agents or employees, either officially or individually, underwrites the operation of any system approved by them.

H. The Owner will devote such care and effort to the maintenance of the whole system so that a system malfunction is not the result of poor maintenance, faulty operation, or neglect.

I. The Department and/or County agree to grant \$ 10,004.70 toward the cost of installation of the BAT System, and financial responsibility is limited to this amount. Owner will present to the County at least 3 proposals from manufacturer and County certified system installers demonstrating the total cost of installation. Operating costs will be at the Owner's expense.

J. The Owner acknowledges that the BRF grant can only be used for that portion of the OSDS attributable to (BAT) for the removal of nitrogen.

K. Owner acknowledges in the event the total BRF project cost is greater than \$25,000 the proposal will have to be approved by the Maryland State Board of Public Works.

L. The Owner must install BAT system according to the manufacturer recommended plans and specifications approved by the Department.

M. The Owner agrees and acknowledges that if installation deviates substantially from the approved plans or changes such that performance of the system is compromised or reduced, BRF funding will not be provided.

N. The Owner agrees, that, should the system be determined by the Department to pose a threat to the public health, safety or comfort, the Department may order any necessary changes or corrections and the Owner agrees to pay for all such changes or corrections. System modifications may include requirements for holding of sewage waste in tanks and regular pumping from the holding tanks. Upon the Department's request, the Owner agrees to enter into a contract acceptable to the Department to allow and pay either Howard County, Maryland, its agents or a private entity to pump on a regularly scheduled basis an approved holding tank system.

O. The Owner agrees to contact both the Water Management Administration, On-Site Systems Division of the Wastewater Permits Program and the County at least forty-eight (48) hours prior to system installation, so that the Department may lay out the system in the field with the contractor. The Owner must install this system according to the plans and specifications approved by the Department and any changes required by the Department as a result of the field layout. If installation deviates substantially from the approved plans or changes such that experimental data will be compromised or reduced, the Owner agrees to pay for all necessary corrections.

P. This agreement shall run with the land and binds the Owner, his heirs, successors, assigns except that the provisions of paragraph A & B shall be binding for a period of 5 years only after installation of the system and occupation of the home. Owner further agrees that he shall inform in writing

any purchaser or lessee of the property that the system may require maintenance or other attention. The Owner agrees to record this agreement in the land records of Howard County.

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

R. This agreement may be voided at the discretion of the Department if the system construction is not completed within six (6) months of the effective date of this agreement.

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

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

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

DATE: 6/26/09

Wilson & Hobbs
Owner

DATE: 2/11/09

Jay Prager
Jay Prager, Deputy Director
Wastewater Permits Program
Maryland Department of the Environment

DATE: 8/27/09

Bill Nijem
Howard County Health Department

55601
Completed 11/10/09
2035 - Paper
10/16/09



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

990765

THIS AGREEMENT is made this 26th day of August, among Wilson L. Hobbs, hereinafter collectively referred to as "Owner" and the Howard County Health Department hereinafter referred to as the "County".

WHEREAS, Owner is the owner or contract owner of a parcel of land located at 12170 Hall Shop Rd, in the 5th Election District of Howard County, Maryland, and the deed to same is recorded or shall be recorded among the Land Records of Howard County, Maryland, in Liber 839 Folio 110.

WHEREAS, The Lot is suitable for the installation of a conventional on-site sewage disposal system, but an advanced pre-treatment system, utilizing best available technology to perform nitrogen reduction, must be installed as part of the sewage disposal system for a 4 bedroom home with 1350 square feet of finished living space and 800 square feet of unfinished living space. Advanced pre-treatment has been required (pick one):

 To minimize the potential impact of the on-site sewage disposal system on down grade wells.

 For an existing lot of record that does not have enough area available for an initial and two replacement on site sewage disposal systems.

X For the purpose of repairing a failing on site sewage disposal system on an existing lot of record.

NOW, THEREFORE, the parties hereto agree as follows:

A. Owner hereby grants to the County the right to enter upon the Lot at any reasonable time for access to the system to make periodic inspections and the Owner agrees to provide any information and data in Owner's possession reasonably requested and needed by the County to develop accurate and thorough test results.

- B. Owner acknowledges and agrees that neither the County nor any of its agents or employees, either officially or individually, underwrites the operation of any system approved by them.
- C. The Owner will devote reasonable care and effort to the operation and maintenance of the system in perpetuity or until a public sewer connection is made so that a system malfunction is not the result of poor maintenance, faulty operation, or neglect.
- D. The Owner agrees to enter into a contract reasonably acceptable to the Owner and the County with a private entity to operate and maintain on a regularly scheduled basis an approved advanced pre-treatment system. The owner shall supply a copy of the contract to the County when it is renewed or altered.
- E. This agreement shall run with the land and upon Owner's taking title to the Lot shall bind the Owner, their heirs, successors, and assigns to the provisions of the agreement as long as the property is in existence and after installation of the system. Owner further agrees that they shall inform in writing any subsequent purchaser or lessee of the Lot that the system shall require maintenance or other attention. Upon taking title to the Lot, the Owner agrees to cause this agreement to be recorded in the Land Records of Howard County and assure that it becomes part of the Deed for the subject property in order that prospective buyers may be aware of the special conditions affecting this property.
- F. This agreement shall not be construed to limit any authority of the County to protect the public health, safety or comfort or to issue any other orders to take any other action which is now or may hereafter be within its authority.
- G. This agreement may be voided at any time at the discretion of the County.
- H. This agreement contains the entire agreement and understanding between the County and the Owner. There are no additional terms other than as contained in this agreement. This agreement may not be modified, except in writing signed by each of the parties or by their authorized representatives.
- I. The laws of the State of Maryland govern the provisions of all transactions pursuant to this agreement.

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

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

DATE: 9/9/09

Wilson L Hobbs
Owner

DATE: 9/9/09

WILSON L HOBBS
Owner

DATE: 9/9/09

B. Wilson for Peter Beilenson
Howard County Health Department
Peter L. Beilenson, M.D., M.P.H., Health Officer

IMP FID SURE & 20.00
RECORDING FEE 20.00
TOTAL 40.00
Rec'd Cash Rec'd # 52107
MDR KLB Blk # 409
Sep 09 2009 11:23 am

RECEIVED
HOWARD COUNTY HEALTH DEPT
ENVIRONMENTAL HEALTH
2009 SP 17 PM 12:54

**AGREEMENT AND EASEMENT FOR
INSTALLATION OF AN INNOVATIVE AND ALTERNATIVE
ON-SITE SEWAGE DISPOSAL SYSTEM WITH THE USE OF
BEST AVAILABLE TECHNOLOGY THROUGH
BAY RESTORATION FUNDS**

000164

THIS AGREEMENT is made this 11th day of February, among Wilson L. Hobbs, hereinafter referred to as "Owner", the Howard County Health Department hereinafter collectively referred to as the "County", and the Department of the Environment, hereinafter referred to as the "Department".

WHEREAS, Owner owns a tract of land located on 12170 Hall Shop Road, in the 5th Election District of Howard County, Maryland, and the deed to same is recorded among the Land Records of Howard County, Maryland, in Ellicott City, and in Liber 839 Folio 110.

WHEREAS, Owner's land is improved and the existing means of sewage disposal has been found to be prejudicial to the environment and/or public health.

WHEREAS, Owner's land is unsuitable for the installation of a conventional on-site sewage disposal system and owner has requested the Department's approval to install an innovative/alternative system of sewage disposal.

WHEREAS, Owner understands that participation in the Bay Restoration Fund and the innovative/alternative program is voluntary.

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- A. Owner must install and maintain a water meter on the incoming side of the water system or an event counter on the sewage pumping system.
- B. Owner hereby grants to the Department and the County the right to enter upon the property at any reasonable time for access to the system to make periodic inspections and the Owner agrees to provide any information and data requested and needed by the Department to develop accurate and thorough test results.

C. Owner acknowledges and agrees that the proposed innovative/alternative system is experimental and that his or her participation is voluntary. Owner agrees that there shall be no liability on the part of the County or Department to Owner if this innovative/alternative system fails, and that the County and the Department do not warrant or guarantee that the system will adequately or properly function.

D. Owner acknowledges and agrees that a manufacturer-approved installer will install the best available technology (BAT) system.

E. Owner acknowledges and agrees the manufacturer will provide for Operation and Maintenance of the BAT for a period of 5 years as a condition of sale of the BAT. After the 5-year period the Operation and Maintenance contract can be further extended at the behest of the property owner. The Department and County encourage the property owner to continuously maintain an Operation and Maintenance contract during the lifetime of the system.

F. Owner acknowledges and agrees that the manufacturer appointed Operation and Maintenance provider will have access to the BAT system at all times.

G. Owner acknowledges and agrees that neither the County nor the Department nor any of its agents or employees, either officially or individually, underwrites the operation of any system approved by them.

H. The Owner will devote such care and effort to the maintenance of the whole system so that a system malfunction is not the result of poor maintenance, faulty operation, or neglect.

I. The Department and/or County agree to grant \$ 10,004.70 toward the cost of installation of the BAT System, and financial responsibility is limited to this amount. Owner will present to the County at least 3 proposals from manufacturer and County certified system installers demonstrating the total cost of installation. Operating costs will be at the Owner's expense.

J. The Owner acknowledges that the BRF grant can only be used for that portion of the OSDS attributable to (BAT) for the removal of nitrogen.

K. Owner acknowledges in the event the total BRF project cost is greater than \$25,000 the proposal will have to be approved by the Maryland State Board of Public Works.

L. The Owner must install BAT system according to the manufacturer recommended plans and specifications approved by the Department.

M. The Owner agrees and acknowledges that if installation deviates substantially from the approved plans or changes such that performance of the system is compromised or reduced, BRF funding will not be provided.

N. The Owner agrees, that, should the system be determined by the Department to pose a threat to the public health, safety or comfort, the Department may order any necessary changes or corrections and the Owner agrees to pay for all such changes or corrections. System modifications may include requirements for holding of sewage waste in tanks and regular pumping from the holding tanks. Upon the Department's request, the Owner agrees to enter into a contract acceptable to the Department to allow and pay either Howard County, Maryland, its agents or a private entity to pump on a regularly scheduled basis an approved holding tank system.

O. The Owner agrees to contact both the Water Management Administration, On-Site Systems Division of the Wastewater Permits Program and the County at least forty-eight (48) hours prior to system installation, so that the Department may lay out the system in the field with the contractor. The Owner must install this system according to the plans and specifications approved by the Department and any changes required by the Department as a result of the field layout. If installation deviates substantially from the approved plans or changes such that experimental data will be compromised or reduced, the Owner agrees to pay for all necessary corrections.

P. This agreement shall run with the land and binds the Owner, his heirs, successors, assigns except that the provisions of paragraph A & B shall be binding for a period of 5 years only after installation of the system and occupation of the home. Owner further agrees that he shall inform in writing

any purchaser or lessee of the property that the system may require maintenance or other attention. The Owner agrees to record this agreement in the land records of Howard County.

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R. This agreement may be voided at the discretion of the Department if the system construction is not completed within six (6) months of the effective date of this agreement.

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

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

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

DATE: 6/26/09

Wilson & Hobbs
Owner

DATE: 2/11/09

WILSON L HOBBS
Jay Prager, Deputy Director
Wastewater Permits Program
Maryland Department of the Environment

DATE: 8/27/09

Bev Nifon
Howard County Health Department

INSTRUMENT #	2009	52101
RECORDING FEE		20.00
TOTAL		40.99
Rec'd 09/06	Rec'd	52101
MRK ALB	SLK	458
Seq 09, 2009		11:23 am

RECEIVED
HOWARD COUNTY HEALTH DEPT
ENVIRONMENTAL HEALTH
2009 SP 17 PM 12:54



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

THIS AGREEMENT is made this 2 day of September, among Joseph E. Stubbings and Ellyn M. Sharkey, hereinafter collectively referred to as "Owner" and the Howard County Health Department hereinafter referred to as the "County".

WHEREAS, Owner is the owner or contract owner of a parcel of land located at 1909 Long Corner Rd., in the Election District of Howard County, Maryland, and the deed to same is recorded or shall be recorded among the Land Records of Howard County, Maryland, in Liber 11463 Folio 238

WHEREAS, The Lot is suitable for the installation of an innovative on-site sewage disposal system, but an advanced pre-treatment system, utilizing best available technology to perform nitrogen reduction, must be installed as part of the sewage disposal system. While the existing house with the addition will have 3 bedrooms, the septic system has been designed to accommodate a 4 bedroom home.

NOW, THEREFORE, the parties hereto agree as follows:

- A. Owner hereby grants to the County the right to enter upon the Lot at any reasonable time for access to the system to make periodic inspections and the Owner agrees to provide any information and data in Owner's possession reasonably requested and needed by the County to develop accurate and thorough test results.
- B. Owner acknowledges and agrees that neither the County nor any of its agents or employees, either officially or individually, underwrites the operation of any system approved by them.
- C. The Owner will devote reasonable care and effort to the operation and maintenance of the system in perpetuity or until a public sewer connection is made so that a system malfunction is not the result of poor maintenance, faulty operation, or neglect.
- D. The Owner agrees to enter into a contract reasonably acceptable to the Owner and the County with a private entity to operate and maintain on a regularly scheduled basis an approved advanced pre-

treatment system. The owner shall supply a copy of the contract to the County when it is renewed or altered.

E. This agreement shall run with the land and upon Owner's taking title to the Lot shall bind the Owner, their heirs, successors, and assigns to the provisions of the agreement as long as the property is in existence and after installation of the system. Owner further agrees that they shall inform in writing any subsequent purchaser or lessee of the Lot that the system shall require maintenance or other attention. Upon taking title to the Lot, the Owner agrees to cause this agreement to be recorded in the Land Records of Howard County and assure that it becomes part of the Deed for the subject property in order that prospective buyers may be aware of the special conditions affecting this property.

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

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

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

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

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

IN WITNESS WHEREOF, the parties have signed and sealed this agreement on the date indicated

above.

DATE: _____

Owner

DATE: _____

Owner

DATE: _____

B. Wilson for Peter Beilenson

Howard County Health Department

Peter L. Beilenson, M.D., M.P.H., Health Officer



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

THIS AGREEMENT is made this 26th day of August, among Wilson L. Hobbs, hereinafter collectively referred to as "Owner" and the Howard County Health Department hereinafter referred to as the "County".

WHEREAS, Owner is the owner or contract owner of a parcel of land located at 12170 Hall Shop Rd, in the 5th Election District of Howard County, Maryland, and the deed to same is recorded or shall be recorded among the Land Records of Howard County, Maryland, in Liber 839 Folio 110.

WHEREAS, The Lot is suitable for the installation of a conventional on-site sewage disposal system, but an advanced pre-treatment system, utilizing best available technology to perform nitrogen reduction, must be installed as part of the sewage disposal system for a 4 bedroom home with 1350 square feet of finished living space and 800 square feet of unfinished living space. Advanced pre-treatment has been required (pick one):

To minimize the potential impact of the on-site sewage disposal system on down grade wells.

For an existing lot of record that does not have enough area available for an initial and two replacement on site sewage disposal systems.

For the purpose of repairing a failing on site sewage disposal system on an existing lot of record.

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

or employ
the

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

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

DATE: _____

Owner

DATE: _____

Owner

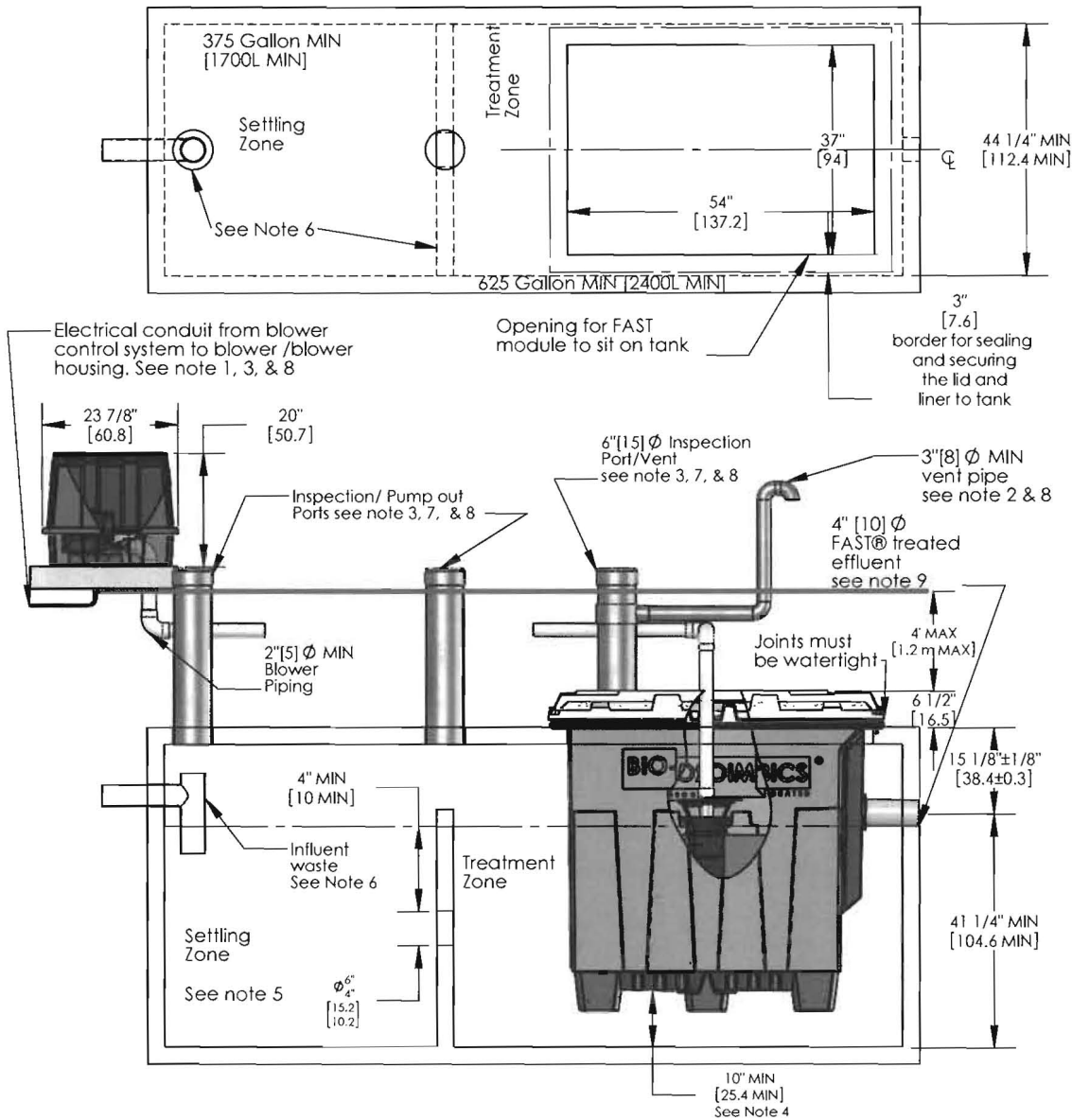
DATE: _____

B. Wilson for Peter Beilenson

Howard County Health Department
Peter L. Beilenson, M.D., M.P.H., Health Officer

NOTES

1. Blower piping to FAST® may not exceed 100 FT [30.5m] total length and use 4 elbows maximum. For distances greater than 100 FT [30.5m] - consult factory. Blower must be located above flood/standing water levels on a solid surface or concrete base 24" X 18" X 1" [61X45.7X2.6cm] minimum.
2. Vent to be located above finish grade or higher to avoid infiltration. Cap with vent grate w/at least 7.1 sq in. [45.8 sq. cm] open surface area. Secure with stainless steel screws (see sheet 4 of 4 *MicroFAST® 0.75 Details.*)
OR
Run vent to desired location and cover opening with vent grate w/at least 7.1 sq in. [45.8 sq. cm] of open surface area. Secure with stainless steel screws. Vent piping must not allow excess moisture build up or back pressure.
3. All appurtenances to FAST® (e.g. tank pump outs, etc.) must conform to all country, state, province, and local plumbing and electrical codes. The blower control system is provided by Bio-Microbics, Inc.
4. Tank volume must be increased by 20% if minimum of 10 inches [25.5cm] is used between the unit and the base of tank. Consult factory for approval.
5. The primary compartment may be a separate tank.
6. Either the influent pipe tee shall be fitted with a pipe cap or the baffle separating the two zones shall be extended to the top of the tank. If choosing to use the pipe cap, then the baffle shall be at least 3" [8] higher than the water level as shown on the drawing.
7. All inspection, viewing and pump out ports must be secured to prevent accidental or unauthorized access
8. Tank, anchors, piping, conduit, blower housing pad and vents are provided by others.
9. All piping and ancillary equipment installed after FAST® must not impede or restrict free flow of effluent.
10. No more than 4 FT [1.2 m] of fill may be placed over unit lid. Unit may stand inside tank. See sheet 2 of 4 *MicroFAST® 0.75 with feet.* Refer to installation manual for more details.



DO NOT SCALE
UNLESS NOTED
DIMENSIONS
ARE IN INCHES
[CENTIMETERS]
TOLERANCES
± 0.02 IN/IN
[± 0.05 CM/CM]



MicroFAST 0.75 FAST Unit

WEIGHT	ID	SIZE	DRAWING NUMBER	SHEET 1 OF 4
NAME	DATE	A	MicroFAST® 0.75 with lid	
DRAWN	CIC	12/18/2006		
CHECKED	PF	7/22/2008	REVISED Tuesday, July 22, 2008	REV. INI-02-E

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MARYLAND DEPARTMENT OF THE ENVIRONMENT

1800 Washington Boulevard • Baltimore MD 21230

410-537-3000 • 1-800-633-6101

Martin O'Malley
Governor

Shari T. Wilson
Secretary

Anthony G. Brown
Lieutenant Governor

Robert M. Summers, Ph.D.
Deputy Secretary

July 16, 2007

Mr. Bert Nixon, Acting Director
Bureau of Environmental Health
Howard County Health Department
7178 Columbia Gateway Drive
Columbia, Maryland 21046

RE: Wilson Property
12170 Hall Shop Road

Dear Mr. Nixon:

I have reviewed the site evaluation data from your file and further evaluated the site with Brian Baker of your office on June 19, 2007. The results of our site evaluation at the referenced property indicate the site is suitable for the installation of an innovative sand mound sewage disposal system. The property may also be suitable for a modified sand mound with drip irrigation and advanced pretreatment. Because of limitations on available area, the system will need to be constructed in two cells in order to be of adequate size to serve the residential use. Employing the modified mound design with drip dispersal may enhance the system's performance by allowing for greater flexibility in how effluent is dosed to each cell in the system. Also, this design may allow for a lower profile mound to be used.

Since there is increased risk associated with this site, the property owner may want to consider approval of this site for a holding tank if they can comply with the conditions set forth in Policy Directive R.S.# 7. An approval for an innovative system or holding tank for this property is for the sewage flow from the existing home only, and is not suitable for any expansion of the dwelling that could increase sewage flows. The property owner may wish to contact private consultants if they feel that other options for this property can be proposed. The following sections summarize requirements necessary for proceeding with the project.

Pretreatment

Employing advanced pretreatment on septic tank effluent is beneficial from the standpoint of enhancing the soil absorption component of the system's performance and extending its life. There are a variety of devices and methods for providing advanced pretreatment, including



Letter to: Mr. Bert Nixon
Re: Hobbs Property
Page Two

constructed wetlands, aerobic wastewater treatment plants, fabric biofilters, single pass and recirculating sand filters, peat filters, composting toilets, and greywater re-use systems. The property owner's consultant may have preferences for a pretreatment unit to complement the soil absorption system selected. Information on pretreatment units eligible for funding from the Bay Restoration Fund (BRF) is available on MDE's website – www.mde.state.md.us. I am available to provide further guidance as to how pretreatment options could be incorporated into a system design if requested by you, the property owner, or their consultant.

Soil Absorption Component

The soil loading rate and linear loading rates are based on a soil description approach since infiltrometer rates varied in the two locations tested. This information indicates that for similar sized subsystems, the upper system may have a greater capacity due to better soil permeability and the ability to make the subcell longer. Based on our infiltrometer tests and the attached Tyler reference, a 0.2 gpd/sq.ft. loading rate is recommended. Minimizing linear loading rates should be accomplished by installing two subsystems and maximizing the length of each along contour.

Plans and Specifications

A private consultant should be retained by the property owner to provide final plans and specifications for the system utilizing the design parameters contained here in. Once plans are complete, two sets of plans must be submitted to the Onsite Systems Division of the Wastewater Permits Program and to the local Approving Authority for review before final approval to construct the system can be given

Well Variance

A well variance to locate the system 60 ft from the existing well on 12160 Hall Road is required. COMAR contains a reasonable provision for such variances to be granted by MDE at the recommendation of the Approving Authority.

Agreement and Easement

An Agreement and Easement must be signed by all parties, recorded in the land records and returned to the local Approving Authority before permits to construct can be issued. The Agreement and Easement establishes the regulatory conditions associated with the experimental project and provides monitoring access for State and County personnel.

Letter to: Mr. Bert Nixon
Re: Hobbs Property
Page Three

Linked Deposit

Financial assistance may be available for this project through the Department of the Environment's Linked Deposit Program. Information concerning this loan program can be found by entering linked deposit in the search box on the MDE website at www.mde.state.md.us. The Bay Restoration Fund may also provide assistance for a pretreatment unit that reduces nitrogen.

A copy of the site evaluation data is enclosed. Please forward a copy of this letter and attachments to the property owner. For questions about this matter please call me at (410) 537-4156.

Sincerely,



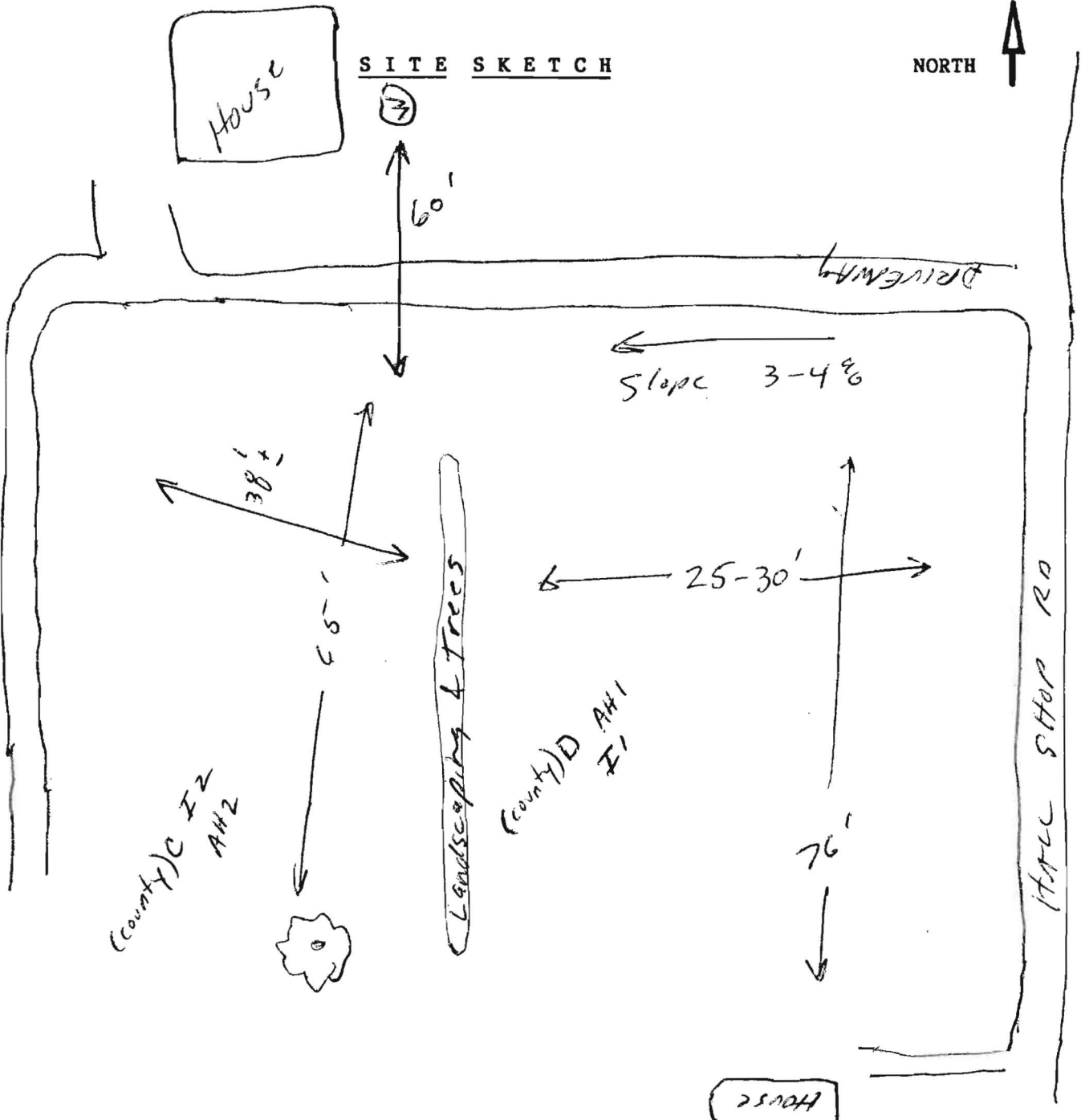
Barry Glotfelty, R.S., Chief
Onsite Systems Division
Wastewater Permits Program

Attachments

BG:je

cc: Mr. Eric Dougherty

410 -



NAME: Hobbs, William COUNTY: Howard DATE: 6-19-07

Note: Show the following items:

1. Property boundaries and dimensions.
2. Hand auger holes (AH), testpits (TP), boring (B) and tests (T).
3. Slope percent and direction.
4. Existing and proposed buildings, driveway, swimming pool, easements and right of ways on property.
5. Existing and proposed wells, septic systems, sewage disposal areas, ditches, water bodies and permanent stormwater control structures on property and within 150 feet of property lines.

MARYLAND DEPT. OF THE ENVIRONMENT
 ONSITE SEWAGE DISPOSAL SYSTEM
 SITE EVALUATION REPORT
 SOIL PROFILE DESCRIPTION

FILE NO.
 MD. GRID: Hobbs, William
 12170 Hall Shop Rd.
 TAX MAP/B/P:
 SUBDIVISION:
 DATE: 6-19-07
 BY: G. Joffe

@ County D & C

LOT	SECTION	MATRIX COLOR	MOTTLES DESCRIPTION	STRUCTURE	CONSISTENCE	% ROCK BY VOL.	REMARKS (Caving, moisture, etc.)
HOLE AH1 @ County D							
0-15	sil	reddish brown					
15-18	sil						
18-24	sil	yell brown					
HOLE AH2 @ County C							
0-8"	sil	reddish br					
8-18	sil	yell br					
18+			some white/grey				maybe lithochromatic
Slope%-		EL. (ft)-		Chroma 2-		Least Permeable Layers-	
Landscape Position-		Water BLS-		Limiting Zones-			
Additional Remarks-							

D-3

Hobbs, W.

Recommended loading rates

Table 1. Infiltration rates in gal/da/ft² for wastewater of >30 mg L⁻¹ or wastewater of <30 mg L⁻¹ and hydraulic linear loading rates in gal/da/ft for soil characteristics of texture and structure and site conditions of slope and infiltration distance. Values assume wastewater volume of >150 gal/da/bedroom. If horizon consistence is stronger than firm or any cemented class or the clay mineralogy is smectitic, the horizon is limiting regardless of other soil characteristics

Soil Characteristics					Hvdraulic Linear Loading Rate. gal/da/ft										Row				
					Infiltration Loading Rate, gal/da/ft ²					Slope									
					Structure				0-4%			5-9%				>10%			
Texture	Shape	Grade	>30 mg/L	<30 mg/L	Infiltration Distance, in.			Infiltration Distance, in.			Infiltration Distance, in.								
					8-12	12-24	24-48	8-12	12-24	24-48	8-12	12-24	24-48						
COS, S, LCOS, LS	--	OSG	0.8	1.6	4.0	5.0	6.0	5.0	6.0	7.0	6.0	7.0	8.0	1					
FS, VFS, LFS, LVFS	--	OSG	0.4	1.0	3.5	4.5	5.5	4.0	5.0	6.0	5.0	6.0	7.0	2					
CSL, SL	--	OM	0.2	0.6	3.0	3.5	4.0	3.6	4.1	4.6	5.0	6.0	7.0	3					
	PL	1	0.2	0.5	3.0	3.5	4.0	3.6	4.1	4.6	4.0	5.0	6.0	4					
		2,3	0.0	0.0	-	-	-	-	-	-	-	-	-	5					
	PR/BK /GR	1	0.4	0.7	3.5	4.5	5.5	4.0	5.0	6.0	5.0	6.0	7.0	6					
		2,3	0.6	1.0	3.5	4.5	5.5	4.0	5.0	6.0	5.0	6.0	7.0	7					
FSL, VFSL	--	OM	0.2	0.5	2.0	2.3	2.6	2.4	2.7	3.0	2.7	3.2	3.7	8					
	PL	1,2,3	0.0	0.0	-	-	-	-	-	-	-	-	-	9					
		1	0.2	0.6	3.0	3.5	4.0	3.3	3.8	4.3	3.6	4.1	4.6	10					
	/GR	2,3	0.4	0.8	3.3	3.8	4.3	3.6	4.1	4.6	3.9	4.4	4.9	11					
L	--	OM	0.2	0.5	2.0	2.3	2.6	2.4	2.7	3.0	2.7	3.2	3.7	12					
	PL	1,2,3	0.0	0.0	-	-	-	-	-	-	-	-	-	13					
		1	0.4	0.6	3.0	3.5	4.0	3.3	3.8	4.3	3.6	4.1	4.6	14					
	/GR	2,3	0.6	0.8	3.3	3.8	4.3	3.6	4.1	4.6	3.9	4.4	4.9	15					
SIL	--	OM	0.0	0.2	2.0	2.5	3.0	2.2	2.7	3.2	2.4	2.9	3.4	16					
	PL	1,2,3	0.0	0.0	-	-	-	-	-	-	-	-	-	17					
		1	0.4	0.6	2.4	2.7	3.0	2.7	3.0	3.3	3.0	3.5	4.0	18					
	/GR	2,3	0.6	0.8	2.7	3.0	3.3	3.0	3.5	4.0	3.3	3.8	4.3	19					
SCL, CL SICL	--	OM	0.0	0.0	-	-	-	-	-	-	-	-	-	20					
	PL	1,2,3	0.0	0.0	-	-	-	-	-	-	-	-	-	21					
		1	0.2	0.3	2.0	2.5	3.0	2.2	2.7	3.2	2.4	2.9	3.4	22					
/GR	2,3	0.4	0.6	2.4	2.9	3.4	2.7	3.0	3.3	3.0	3.5	4.0	23						
	SC, C, SIC	--	OM	0.0	0.0	-	-	-	-	-	-	-	-	-	24				
PL		1,2,3	0.0	0.0	-	-	-	-	-	-	-	-	-	25					
		1	0.0	0.0	-	-	-	-	-	-	-	-	-	26					
/GR		2,3	0.2	0.3	2.0	2.5	3.0	2.2	2.7	3.2	2.4	2.9	3.4	27					
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O					

MOUND TEST DATA SHEETS

Property I.D. 12160 Hall Shop Rd, Lot #

Date 6/26/07

Sanitarian B. Baker

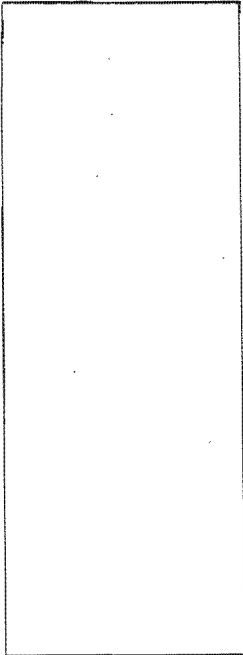
Landscape Position Front Yard

% Slope Slight

Soil Type _____

Contractor _____

I₁ HOLE # Upper DEPTH OF TEST 15" START TIME 1:28



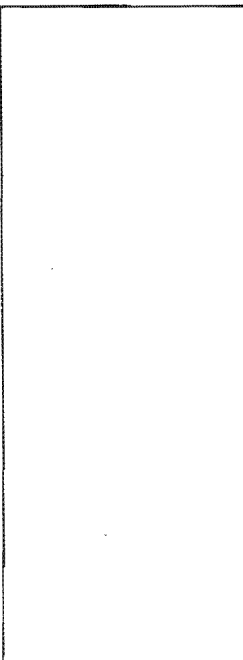
Hook Gauge Reading	Elapsed Time (min)	Measured Drop	Estimated Rate	% Change
19"	0	0	0	
18"	10	1"		
17 1/2"	10	1/2"		
17 1/16"	10	7/16"		
16 3/4"	10	5/16"		
16 7/16"	10	5/16"		
15 15/16"	25	8/16"		
15 11/16"	15	4/16"		
15 9/16"	10	2/16"		Added
18 14/16"	10	2/16"		

~ 2" of Water and set Back to 19"

18 11/16" 10 3/16" -
 18 17/32" 10 5/32"
 18 6/16" 10 5/32"
 18 7/32" 10 5/32"

(~ 64 mpi)

I₂ HOLE # Lower DEPTH OF TEST 15" START TIME 1:22



Hook Gauge Reading	Elapsed Time (min)	Measured Drop	Estimated Rate	% Change
43"	0	0	0	0
42 10/16"	10	6/16"		
42 6/16"	10	4/16"		
42 3/16"	10	3/16"		
42 1/16"	10	2/16"		
41 15/16"	10	2/16"		
41 14/16"	10	1/16"		
41 9/16"	30	5/16"		
41 8/16"	10	1/16"		
41 7/16"	10	1/16"		

41 6/16" 10 1/16"
 41 4/16" 10 2/16"
 41 3/16" 10 1/16"
 41 5/32" 10 1/32"
 41 3/32" 10 1/16"

41 1/16" 10 1/32"

(~ 320 mpi)



INNOVA, LTD
INNOVATIVE WASTEWATER TREATMENT SYSTEMS
 P.O. BOX 363, NEW WINDSOR, MD 21776
 (410) 875-9370 Office (410) 635-2883 Fax
 H. Dale Gray, Principal

40-3339

GEOFLOW
DRIP IRRIGATION WASTEWATER
DISPOSAL SYSTEM

Steve Must Be
 At Pre
 Construction

Project Title: WILSON HOBBS PROPERTY

Address: 12170 HALL SHOP ROAD CLARKSVILLE, MARYLAND 21029

Co-reviewed by: MDE'S ON-SITE SYSTEMS DIVISION & COUNTY Approving Authority
 Project Name/Address: _____
 Steven R. Krieg, R.S., MDE Regional Consultant
 Brian Baker, R.S., County EHS

The On-Site Systems Division must be notified at least 48 hours in advance prior to anticipated system installation so that a pre-installation field layout can be conducted. System installation is not to proceed until a final field layout has been conducted and approved by MDE.

Date Plan Approved: _____
 Date/s of Pre-installation layout meeting: _____
 Date Pre-installation layout approved: _____
 Approved By: _____

The permit to construct an on-site sewage disposal system is not valid for more than 2 years from the date of issuance, but may be renewed at the discretion of the Approving Authority.

Must be prior to
 Staffed per
 5/10

6/1/09

VENDOR LIST

Freemire & Associates, Inc. 1215 Old Dorsey Road, Harmans, Maryland 21077
(410) 768-8500

Bio Microbics® MicroFAST® 0.5 Wastewater Treatment System and
Containment Tank [Babylon Vault Co.]

MILBY Company, 6201 South Hanover Road, Elkridge, Maryland 21075
800-796-7700
Gould Blaster, 12EB Filtered Effluent Pump
SJE Rhombus Float Control Switches

Babylon Vault CO., 925 Wakefield Valley Rd, New Windsor, Maryland 21776
(410) 848-0393
1250 gallon Top Seam Pump Tank

ORENCO Systems, 814 Airway Avenue, Sutherlin, Oregon, 97479
(800) 348-9843
Effluent Screen (with flow inducer) for Dosing Tank

INNOVA Ltd., 207 High Street, New Windsor, Maryland 21776
(410) 875-9370
Dripline Irrigation System (GeoFlow)

HOBBS PROPERTY
12170 HALL SHOP RD.
CLARKVILLE, MD

Sheet Title:
WASTEWATER
SYSTEM
PLAN

Sheet# **VENDOR**
WWT-1
of Sheets



INNOVA, LTD

INNOVATIVE WASTEWATER TREATMENT SYSTEMS

P.O. BOX 363, NEW WINDSOR, MD 21776

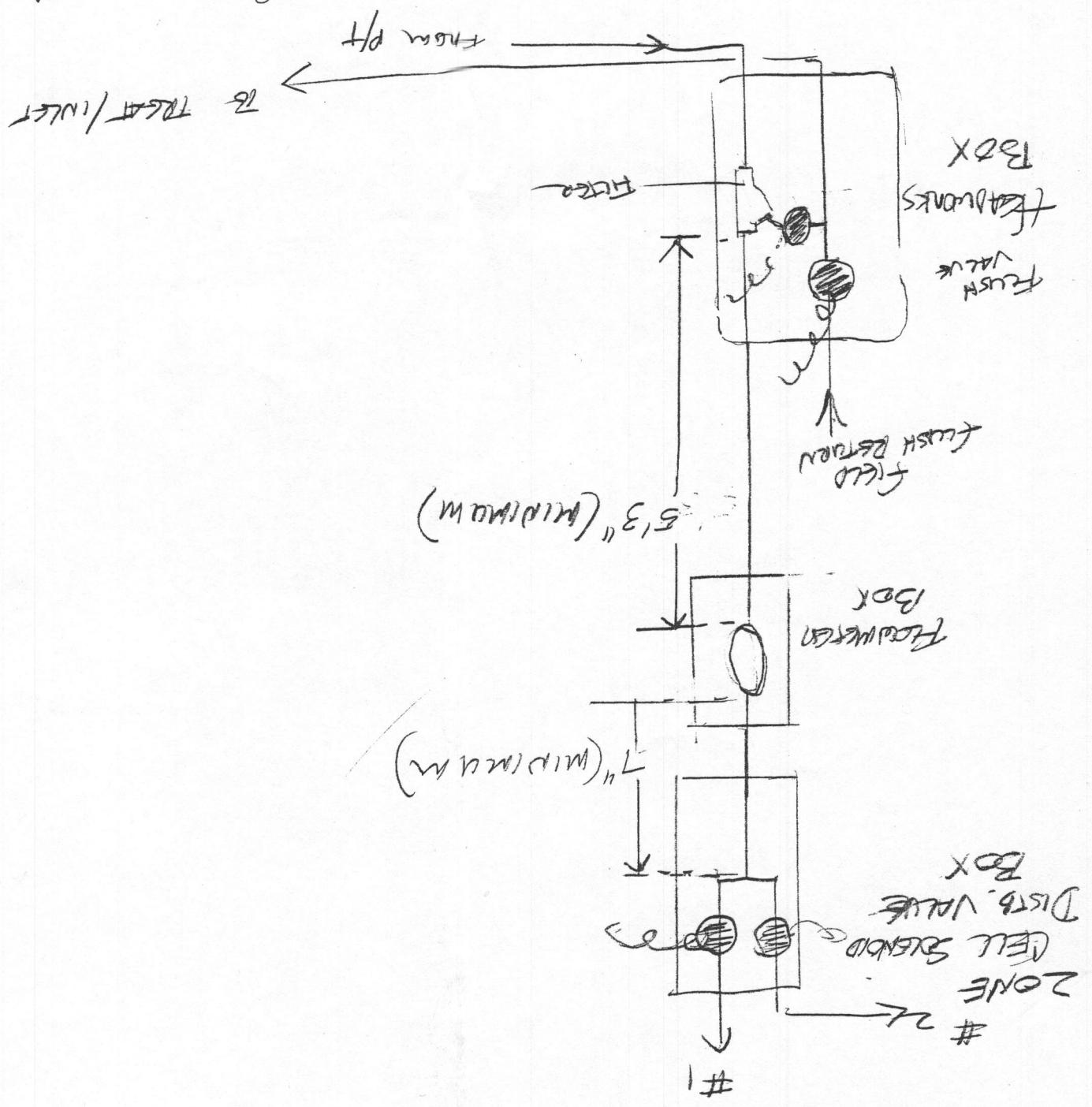
(410) 875-9370 Office

(410) 635-2883 Fax
H. Dale Gray Principal

Scale: 1" = 10'

HEAD WORKS 9/28/09

11/20



HOBBS PROPERTY, 12170 HALL SHOP RD. CLARKSVILLE, MD
 Wastewater Treatment/Disposal System
 Submittal Index

<u>SHEET</u>	<u>DESCRIPTION</u>
1 & 1a	PROJECT OVERVIEW / MDE correspondence
2	DESIGN elements
3	SYSTEM PLAN VIEW [scale: 1"=20']
4	SYSTEM PROFILE VIEW[scale Horizontal 1"=10 Vertical 1"=2']
5	Bio Microbics® MicroFAST® 0.5 Treatment unit / 1500 Gallon Containment Tank
6	Regenerative Blower/Venting/ Treatment unit Specifications
7	Mound/Cell Dripline Distribution & Pump Sizing Worksheets
8	Pump Specifications/Operating Curves/ 1500 Gallon Pump Tank
9	System Component Elevations - Dripline Specifications
10	Generic Dripline Installation and Maintenance Notes
11	Dripline Distribution Schematic for the Sand Mound Cells
12	Sand Mound Plan View / Cell #1
13	Sand Mound Plan View / Cell #2
14	Sand Mound Work Sheet/ Plan and Profile View Schematics
15	Headworks BOX (Vortex Filter, Field & Filter Flush Solenoids) and Valve BOX (Pulse Flow Meter , Field Supply Line Solenoids)
16	Air Relief / Field Flush Check Valve Drawings
17	Control Panel (Pump & Fields) GeoTS / Simplex - Autoflush
18	MDE - General Construction Procedures for Sand Mound and Similar Type Disposal Structures

VENDOR LIST

HOBBS PROPERTY 12170 HALL SHOP RD. CLARKSVILLE, MD
Sheet Title: WASTEWATER SYSTEM PLAN
Sheet# WWT-1 INDEX of Sheets

6/11/09

Scale: 1" = 1'



INNOVA, LTD
INNOVATIVE WASTEWATER TREATMENT SYSTEMS
 P.O. BOX 363, NEW WINDSOR, MD 21776
 (410) 875-9370 Office
 (410) 635-2883 Fax
 H. Dale Gray Principal

4 Bedroom Residence
well & septic [septic repair]

OVERVIEW / ONSITE WASTEWATER DISPOSAL

Representatives from Howard County Bureau of Environmental Health [HCBEH] the "Remitting Authority", and Maryland Department of the Environment, Well & Septic Program [MDE] investigated the landscape conditions, and soil infiltration values on the property June 19, 2007. Infiltration test results and soils analysis persuaded Messrs. Glottelty [MDE], and Baker [HCBEH] that pretreatment of sewage with controlled distribution of effluent to disposal would be required if soil disposal was selected by the owner. These steps were proscribed to preserve and protect the property's limited ability to sustain wastewater disposal on site. Infiltration test results and soils evaluation defined the area(s) which the authorities felt had the best chance for positive function. Elevated bed (s) disposal was recommended in order to provide temporary effluent storage prior to slow release into the soils of the area(s).

HCBEH agreed with the owner that potential relief might be available on one of the surrounding properties, and that Mr. Hobbs would have to seek permission of those owners to test possibilities. If results were suitable, he would be required to make legal arrangement for a protracted use. Mr. Hobbs, did pursue that course of action in early 2008. A potential disposal area was found on an adjacent property. After consideration, property use for wastewater disposal was denied by the owner. Mr. Hobbs then decided to accept the initial HCBEH/MDE on-site recommendation (7/16/2007), and proceed with pretreatment / elevated disposal bed design.

APPROVING AUTHORITY REQUIREMENTS

PRETREATMENT

The selected Bio-Microbics MicroFAST® 0.50 S Wastewater Treatment [aerobic] System secured in cooperation with the Maryland Department of the Environment's, Chesapeake Bay Restoration Fund Program. The MicroFAST system reduces the home's Biologic Oxygen Demand contaminants (BOD₅) and Total Nitrogen (TN) content prior to the treated sewage discharge (effluent) to the site's soil.

SOIL DISPOSAL [specified soil loading rate*]

Two disposal areas were identified, during site test and evaluation (HCBEH/MDE). The area(s) exhibit the best infiltration characteristics available on the site. An effluent application (loading) rate of *0.2 gpd/ft² was designated for the property. Understood with this loading rate, disposal areas are to be dosed as lightly as possible (alternating application), and function as a united structure.

Hobbs, W.
Recommended loading rates

Table 1. Infiltration rates in gal/da/ft² for wastewater of >30 mg L⁻¹ or wastewater of <30 mg L⁻¹ and hydraulic linear loading rates in gal/da/ft for soil characteristics of texture and structure and site conditions of slope and infiltration distance. Values assume wastewater volume of >150 gal/da/bedroom. If horizon consistency is stronger than firm or any cemented class or the clay mineralogy is smectitic, the horizon is limiting regardless of other soil characteristics

Soil Characteristics		Infiltration Loading Rate, gal/da/ft ²		Hydraulic Linear Loading Rate, gal/da/ft									Row	
Texture	Structure	>30 mg/L	<30 mg/L	0-4% Slope			5-9% Slope			>10% Slope				
	Shape Grade			8-12	12-24	24-48	8-12	12-24	24-48	8-12	12-24	24-48		
COS, S, LCOS, LS	OSG	0.8	1.6	4.0	3.0	6.0	5.0	6.0	7.0	6.0	7.0	8.0	1	
FS, VFS, LFS, LVFS	OSG	0.4	1.0	3.5	4.5	5.5	4.0	5.0	6.0	5.0	6.0	7.0	2	
CSL, SL	OM	0.2	0.6	3.0	3.5	4.0	3.6	4.1	4.6	5.0	6.0	7.0	3	
	PL	1	0.2	0.5	3.0	3.5	4.0	3.6	4.1	4.6	5.0	6.0	4	
	2,3	0.0	0.0	-	-	-	-	-	-	-	-	-	5	
	PR/BK /GR	1	0.4	0.7	3.5	4.5	5.5	4.0	5.0	6.0	5.0	6.0	7.0	6
FSL, VFSI	OM	0.2	0.5	2.0	2.3	2.6	2.4	2.7	3.0	2.7	3.2	3.7	7	
	PL	1,2,3	0.0	0.0	-	-	-	-	-	-	-	-	8	
	PR/BK /GR	1	0.2	0.6	3.0	3.5	4.0	3.3	3.8	4.3	3.6	4.1	4.6	9
	2,3	0.4	0.8	3.3	3.8	4.3	3.6	4.1	4.6	3.9	4.4	4.9	10	
L	OM	0.2	0.5	2.0	2.3	2.6	2.4	2.7	3.0	2.7	3.2	3.7	11	
	PL	1,2,3	0.0	0.0	-	-	-	-	-	-	-	-	12	
	PR/BK /GR	1	0.4	0.6	3.0	3.5	4.0	3.3	3.8	4.3	3.6	4.1	4.6	13
	2,3	0.6	0.8	3.3	3.8	4.3	3.6	4.1	4.6	3.9	4.4	4.9	14	
SIL	OM	0.0	0.2	2.0	2.5	3.0	2.2	2.7	3.2	2.4	2.9	3.4	15	
	PL	1,2,3	0.0	0.0	-	-	-	-	-	-	-	-	16	
	PR/BK /GR	1	0.4	0.6	2.4	2.7	3.0	2.7	3.0	3.3	3.0	3.5	4.0	17
	2,3	0.6	0.8	2.7	3.0	3.3	3.0	3.5	4.0	3.3	3.8	4.3	18	
SCL, CL, SICL	OM	0.0	0.0	-	-	-	-	-	-	-	-	-	19	
	PL	1,2,3	0.0	0.0	-	-	-	-	-	-	-	-	20	
	PR/BK /GR	1	0.2	0.3	2.0	2.5	3.0	2.2	2.7	3.2	2.4	2.9	3.4	21
	2,3	0.4	0.6	2.4	2.9	3.4	2.7	3.0	3.3	3.0	3.5	4.0	22	
SC, C, SIC	OM	0.0	0.0	-	-	-	-	-	-	-	-	-	23	
	PL	1,2,3	0.0	0.0	-	-	-	-	-	-	-	-	24	
	PR/BK /GR	1	0.0	0.0	-	-	-	-	-	-	-	-	25	
	2,3	0.2	0.3	2.0	2.5	3.0	2.2	2.7	3.2	2.4	2.9	3.4	26	
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O

UNTREATED > 30 mg/L 0.2*
TREATED < 30 mg/L 0.3
* MDE PREFERRED FOR THIS SYSTEM

MARYLAND DEPT. OF THE ENVIRONMENT
ONSITE SEWAGE DISPOSAL SYSTEM
SITE EVALUATION REPORT

FILE NO. Hobbs, William
MD. GRID: 12170 Hall Shop Rd.
TAX MAP/BIP:
SUBDIVISION:
DATE: 6-19-07
BY: G. Jottelty

LOT: @ County D & C

DEPTH	TEXTURE	MATRIX COLOR	MOTTLES DESCRIPTION	STRUCTURE	CONSISTENCE	ROCK BY VOL.	REMARKS (Caving, moisture, etc.)
0-15"	Sil	reddish brown					
15-24"	scl						
24-34"	scl	Yell brown					
34-44"							
44-54"							
54-64"							
64-74"							
74-84"	Sil	reddish br					
84-94"	scl	Yell					
94-104"			some white/grey				maybe lithoclastic

Slope % - EL. (ft) - Chroma 2 - Limit Permeable Layers -
Landscape Position - Water BLS - Limiting Zones -
Additional Remarks -

HOBBS PROPERTY
12170 HALL SHOP RD.
CLARKVILLE, MD

Sheet Title:
WASTEWATER
SYSTEM
PLAN

Sheet #
WWT-
1 of 8 Shee

Martin O'Malley
Governor
Anthony G. Brown
Lieutenant Governor

Shari T. Wilson
Secretary
Robert M. Summers, Ph.D.
Deputy Secretary

July 16, 2007

Mr. Bert Nixon, Acting Director
Bureau of Environmental Health
Howard County Health Department
7178 Columbia Gateway Drive
Columbia, Maryland 21046

RE: Wilson Property
12170 Hall Shop Road

Dear Mr. Nixon:

I have reviewed the site evaluation data from your file and further evaluated the site with Brian Baker of your office on June 19, 2007. The results of our site evaluation at the referenced property indicate the site is suitable for the installation of an innovative sand mound sewage disposal system. The property may also be suitable for a modified sand mound with drip irrigation and advanced pretreatment. Because of limitations on available area, the system will need to be constructed in two cells in order to be of adequate size to serve the residential use. Employing the modified mound design with drip dispersal may enhance the system's performance by allowing for greater flexibility in how effluent is dosed to each cell in the system. Also, this design may allow for a lower profile mound to be used.

Since there is increased risk associated with this site, the property owner may want to consider approval of this site for a holding tank if they can comply with the conditions set forth in Policy Directive R.S.# 7. An approval for an innovative system or holding tank for this property is for the sewage flow from the existing home only, and is not suitable for any expansion of the dwelling that could increase sewage flows. The property owner may wish to contact private consultants if they feel that other options for this property can be proposed. The following sections summarize requirements necessary for proceeding with the project.

Pretreatment

Employing advanced pretreatment on septic tank effluent is beneficial from the standpoint of enhancing the soil absorption component of the system's performance and extending its life. There are a variety of devices and methods for providing advanced pretreatment, including

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Letter to: Mr. Bert Nixon
Re: Hobbs Property
Page Two

constructed wetlands, aerobic wastewater treatment plants, fabric biofilters, single pass and recirculating sand filters, peat filters, composting toilets, and greywater re-use systems. The property owner's consultant may have preferences for a pretreatment unit to complement the soil absorption system selected. Information on pretreatment units eligible for funding from the Bay Restoration Fund (BRF) is available on MDE's website - www.mde.state.md.us. I am available to provide further guidance as to how pretreatment options could be incorporated into a system design if requested by you, the property owner, or their consultant.

Soil Absorption Component

The soil loading rate and linear loading rates are based on a soil description approach since infiltrometer rates varied in the two locations tested. This information indicates that for similar sized subsystems, the upper system may have a greater capacity due to better soil permeability and the ability to make the subcell longer. Based on our infiltrometer tests and the attached Tyler reference, a 0.2 gpd/sq.ft. loading rate is recommended. Minimizing linear loading rates should be accomplished by installing two subsystems and maximizing the length of each along contour.

Plans and Specifications

A private consultant should be retained by the property owner to provide final plans and specifications for the system utilizing the design parameters contained here in. Once plans are complete, two sets of plans must be submitted to the Onsite Systems Division of the Wastewater Permits Program and to the local Approving Authority for review before final approval to construct the system can be given.

Well Variance

A well variance to locate the system 60 ft from the existing well on 12160 Hall Road is required. COMAR contains a reasonable provision for such variances to be granted by MDE at the recommendation of the Approving Authority.

Agreement and Easement

An Agreement and Easement must be signed by all parties, recorded in the land records and returned to the local Approving Authority before permits to construct can be issued. The Agreement and Easement establishes the regulatory conditions associated with the experimental project and provides monitoring access for State and County personnel.

Letter to: Mr. Bert Nixon
Re: Hobbs Property
Page Three

Linked Deposit

Financial assistance may be available for this project through the Department of the Environment's Linked Deposit Program. Information concerning this loan program can be found by entering linked deposit in the search box on the MDE website at www.mde.state.md.us. The Bay Restoration Fund may also provide assistance for a pretreatment unit that reduces nitrogen.

A copy of the site evaluation data is enclosed. Please forward a copy of this letter and attachments to the property owner. For questions about this matter please call me at (410) 537-4156.

Sincerely,

Barry Glotfelty, R.S., Chief
Onsite Systems Division
Wastewater Permits Program

Attachments

BG:je

cc: Mr. Eric Dougherty

HOBBS PROPERTY
12170 HALL SHOP RD.
CLARKVILLE, MD

Sheet Title:
WASTEWATER
SYSTEM
PLAN

Sheet#

WWT-
12 of 18 Shee

ate: 6/11/09
sale: 17 =



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H. Dale Gray, Principal

INNOVA Ltd.
Wastewater System Design
Wilson Hobbs Property
12170 Hall Shop Road
Clarksville, MD

4 Bedroom Residence
well & septic [septic repair]

OVERVIEW / ONSITE WASTEWATER DISPOSAL

Representatives from Howard County Bureau of Environmental Health [HCBEH] the "Permitting Authority", and Maryland Department of the Environment, Well & Septic Program [MDE] investigated the landscape conditions, and soil infiltration values on the property June 19, 2007. Infiltration test results and soils analysis persuaded Messrs. Giottfelty [MDE], and Baker [HCBEH] that pretreatment of sewage with controlled distribution of effluent to disposal would be required if soil disposal was selected by the owner. These steps were proscribed to preserve and protect the property's limited ability to sustain wastewater disposal on site. Infiltration test results and soils evaluation defined the area(s) which the authorities felt had the best chance for positive function. Elevated bed (s) disposal was recommended in order to provide temporary effluent storage prior to slow release into the soils of the area(s).

HCBEH agreed with the owner that potential relief might be available on one of the surrounding properties, and that Mr. Hobbs would have to seek permission of those owners to test possibilities. If results were suitable, he would be required to make legal arrangement for a protracted use. Mr. Hobbs, did pursue that course of action in early 2008. A potential disposal area was found on an adjacent property. After consideration, property use for wastewater disposal was denied by the owner. Mr. Hobbs then decided to accept the initial HCBEH/MDE on-site recommendation (7/16/2007), and proceed with pretreatment / elevated disposal bed design.

APPROVING AUTHORITY REQUIREMENTS

PRETREATMENT

The selected Bio-Microbics MicroFAST® 0.50 S Wastewater Treatment [aerobic] System secured in cooperation with the Maryland Department of the Environment's, Chesapeake Bay Restoration Fund Program. The MicroFAST system reduces the home's Biologic Oxygen Demand contaminants (BOD₅) and Total Nitrogen (TN) content prior to the treated sewage discharge (effluent) to the site's soil. See Pgs. #5 & #6

SOIL DISPOSAL [specified soil loading rate*]

Two disposal areas were identified, during site test and evaluation (HCBEH/MDE). The area(s) exhibit the best infiltration characteristics available on the site. An effluent application (loading) rate of "0.2 gpd/ft² was designated for the property. Understood with this loading rate, disposal areas are to be dosed as lightly as possible (alternating application), and function as a united structure.

HOBBS PROPERTY
CLARKSVILLE, MD

SYSTEM DESIGN

REPAIR ELEMENTS

House → 1500 Gal. Pretreatment →
→ 1500 Gal Pump Tank → Sand Mound Disposal Cells (two), using Drip
Irrigation tubing for effluent distribution across the Infiltration Beds of the
Cells

COMPONENT SIZING*

Septic / Treatment Tank, 4 Bedroom home:
existing 1 1/2 storey, Cape Cod style home has approx. 1620 ft² useable
living area floor space.
capacity: County Regulations/ 1501 - 3500 ft² home = 1500 gallon Tank
see Pg. #5

*Treatment based on BOD₅ max loading of 1.5 lbs@30 mg/L contaminant strength.

Disposal Field (s) Area: innovative, repair - Dripfield Irrigation Parameters
4 bedroom @ 150 gal./bedroom = 600 GPD (hydraulic) Design Flow
Soil loading (Specified MDE/HCBEH) rate (LR): 0.2 gpd/ ft²/day for >30 mg/L

Disposal Area Needed:

600 ÷ 0.2 LR = 3000 ft² disposal surface area
[new construction standard: 3 fields - 9000 ft²]

Potential Area Available: (identified per testing by HCBEH/MDE) [Pg. #3]

Cell #1 ("upper") Length: 76', Width: 28' [2128 ft²]
Test 'D' / AH1 (HCBEH / MDE)

Cell #2 ("lower") Length: 65', Width: 38' [2470 ft²]
Test 'C' / AH2 (HCBEH / MDE)

Total Disposal Area : 4598 ft²

Disposal Method:

Sand Mound structure with dripline distribution preferred by authorities.
Mound absorption beds are formed by sand (depth 12") (not gravel)
placed on the ploughed soil surface. For this sloped site the minimum
sand depth is 12" deepening down slope, across the 7" beds and tapering
to the basal area setback (s) delineation. The Dripline Tubing Laterals
rest on the upper surface of the level sand bed area. The absorption bed,
and tapered sand fill that extends to the Mound set-back lines is
blanketed by spun geotextile covered and graded with clean
uncompacted top soil seeded for structural stability.
See pages #12, #13, & #14

Pretreated Effluent Distribution: Timed, pressure dosed dripline irrigation.
12 events/24 hr.

SYSTEM DESIGN
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DISPOSAL CELLS:

Sand Mound sizing is based on most restrictive area tested (Cell #2 location)
see page #14, Sand Mound Work Sheet.

Effluent Distribution the infiltration bed width was specified at 7' by the
authorities to reduce the site linear loading impact as much as possible. From
the Sand Mound work sheet the resulting cell beds are found to each be 57' X 7',
with appropriate bed edge and bed end setbacks, [with an 6" lateral spacing
interval requested by the authorities] produces requirement for 728 linear feet of
dripline configured as thirteen 56' Laterals for each cell absorption bed.

Flow Rate

Application rate: 728 ln ft +1' emitter(e) spacing = 728 (e) X 0.53gph = 385.8gph
385.8 ÷ 60 min = 6.43 gpm flow distribution rate

Flushing rate: Reynolds 4000 1/2" tubing = 0.67gpm X lateral terminations
13 X 0.67 = 8.71gpm field flow flush rate

Headworks - Receives pressured effluent flow through 1 1/4" PVC Sh 40 force
main from the pump tank. Filters the flow directing it to the open solenoid
supply valve in the valve box. Depending on which valve is open, the flow is
directed by 1 1/4" PVC Sh 40 (press.) submains to the 3/4" lateral manifold of
Cell #1, or #2 for distribution to that Mound. The Headworks contains the field
flush solenoid which activates for the periodic field flush routine, or for the
system drain down following each dose. Any debris accumulated in the
Headworks filter and the dripline laterals is flushed back to the treatment tank for
further processing.

Valve Box holds the two, 1" solenoid valves which control supply to the 1 1/4"
PVC Sh 40 (press.) Cell submain piping.

SYSTEM DOSING/FLUSHING

Design Flow: 600 gal. / day

Total Dosing Events: Timed Dosing with 12 Events / 24 hr.

Dose Volume / Event: 600 ÷ 12 = 50 gal.

Pump Run Time/ Dose @ 50gal. ÷ 6.43 gpm (flow rate) = 7.78 min.

Daily pump run time: 12 X 7.78 minutes = 93.6 minutes/24 hr. day

Individual Cell Rest Time(between doses) approx. 3.87 hrs. (232 min.)

SYSTEM DESIGN
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SYSTEM DOSING (continued)

Linear Loading Rate on contour = 5.26 gal./ft /day*

[600 gal ÷ 114' total disposal length]

*MDE memo 9/28/94: 60-120 minute sand mounds/ observe <6 gal.day/ft linear loading limit.

Drain Down

Near the conclusion of a Cell dose event, with the pump running, the
operating program will open the field flush valve at the Headworks Box,
initiating a very short (.8 gal.) pressured field flush. The pump will stop
and draindown will commence. The Factory set (default) field flush valve
open time is 5 minutes. At startup the installer must time the cell
drain-down at the inlet to the treatment tank to determine if open time is
adequate. Each cell must be timed. The longest drain-down time of
the two is then entered into the Programmable Logic Controller (PLC)
the GeoTS - Simplex Automatic control panel, as actual field flush
time, in place of the factory default number. Full drain-down is a strong
precautionary for line freeze prevention.
See pg #17

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Sheet Title:
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Sheet#

WWT-1
2 of 18 Sheet:



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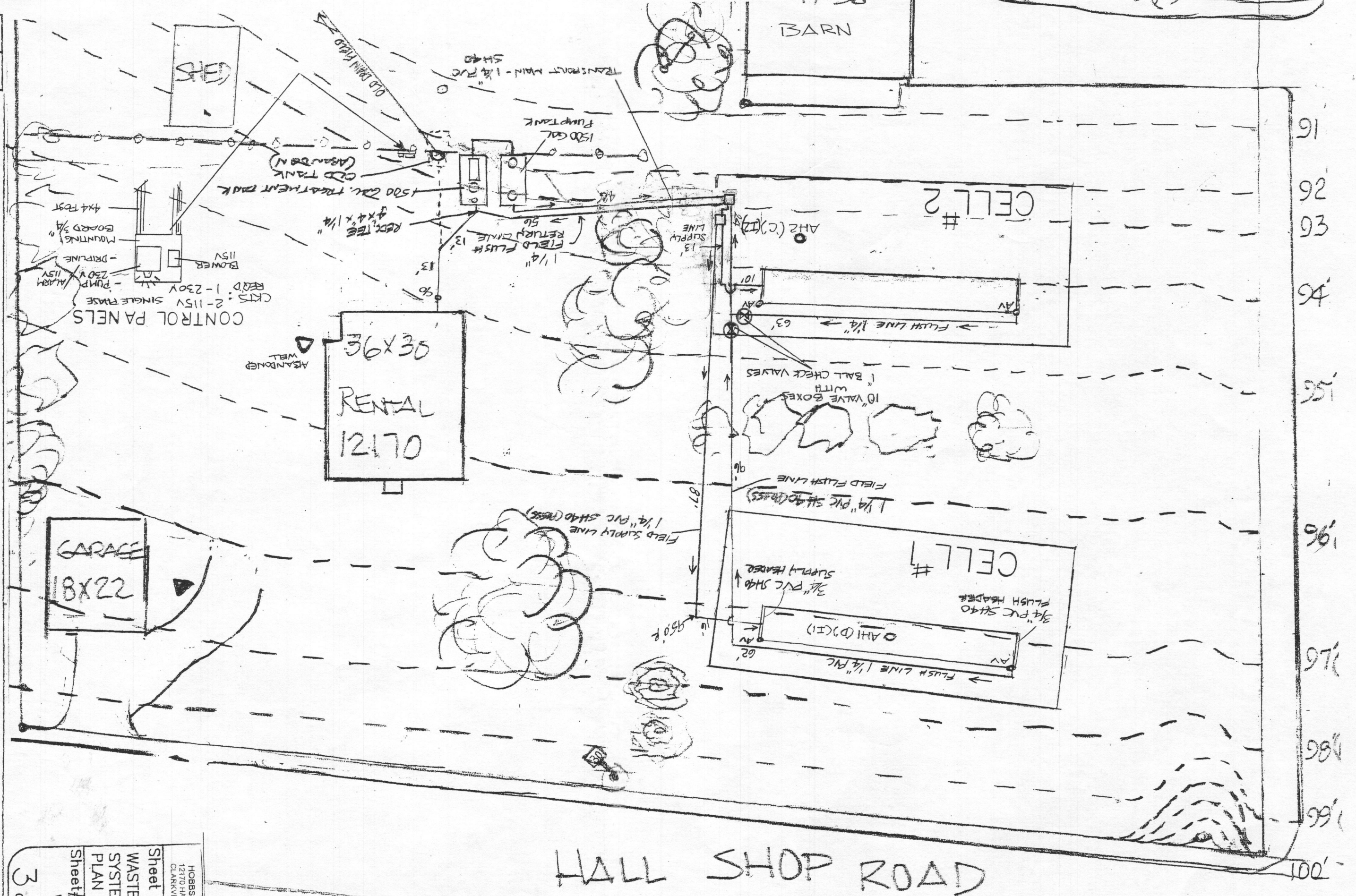
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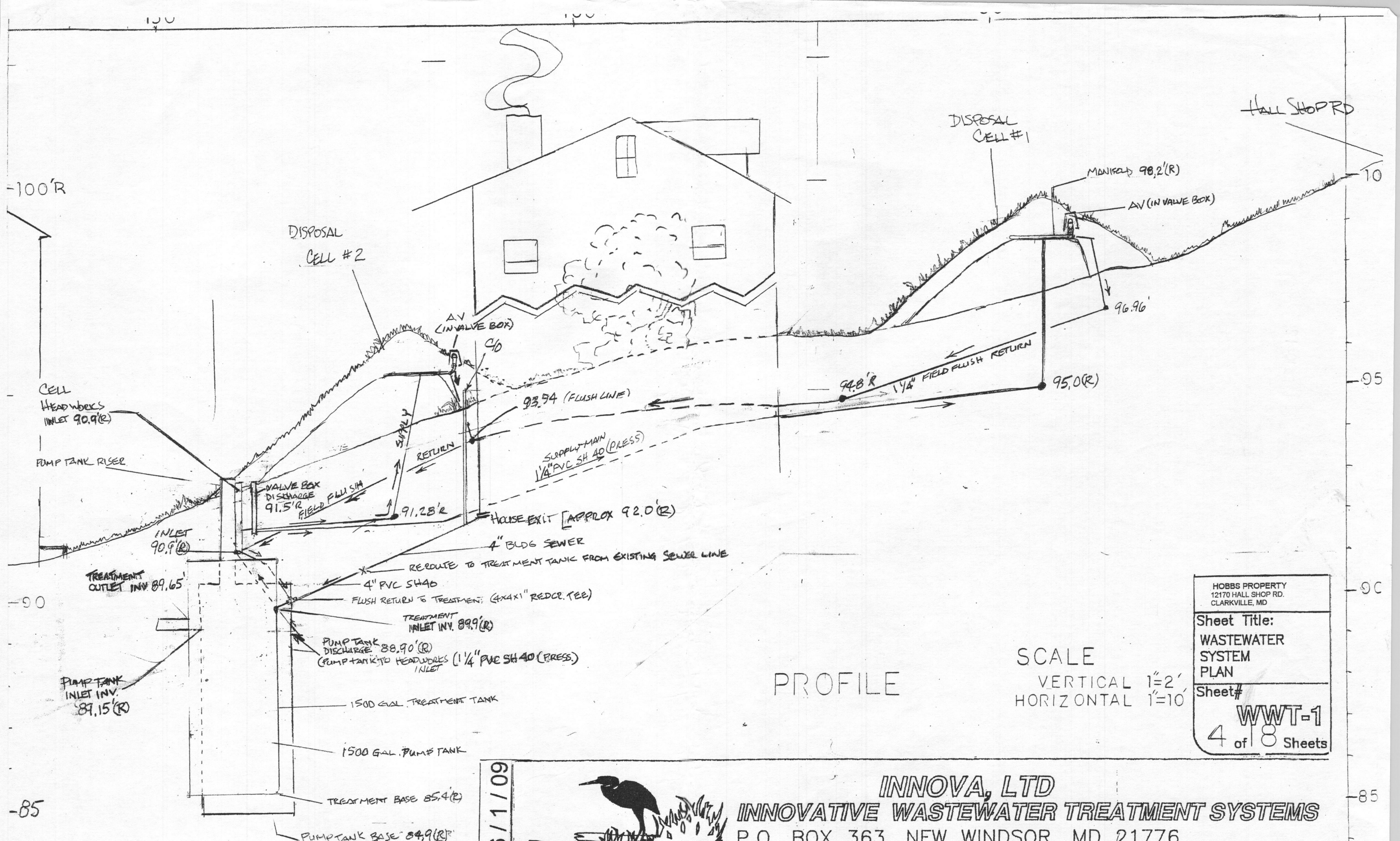
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date: 6/1/09
 scale: 1" = 20'



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 Sheet #
 WWWT-1
 3 of 18 Sheet
 HOBS PROPERTY
 12170 HALL SHOP RD
 CLARKVILLE, MD



PROFILE

SCALE
 VERTICAL 1"=2'
 HORIZONTAL 1"=10'

HOBBS PROPERTY 12170 HALL SHOP RD. CLARKVILLE, MD	
Sheet Title: WASTEWATER SYSTEM PLAN	
Sheet# WWT-1 4 of 8 Sheets	

DATE: 6/1/09

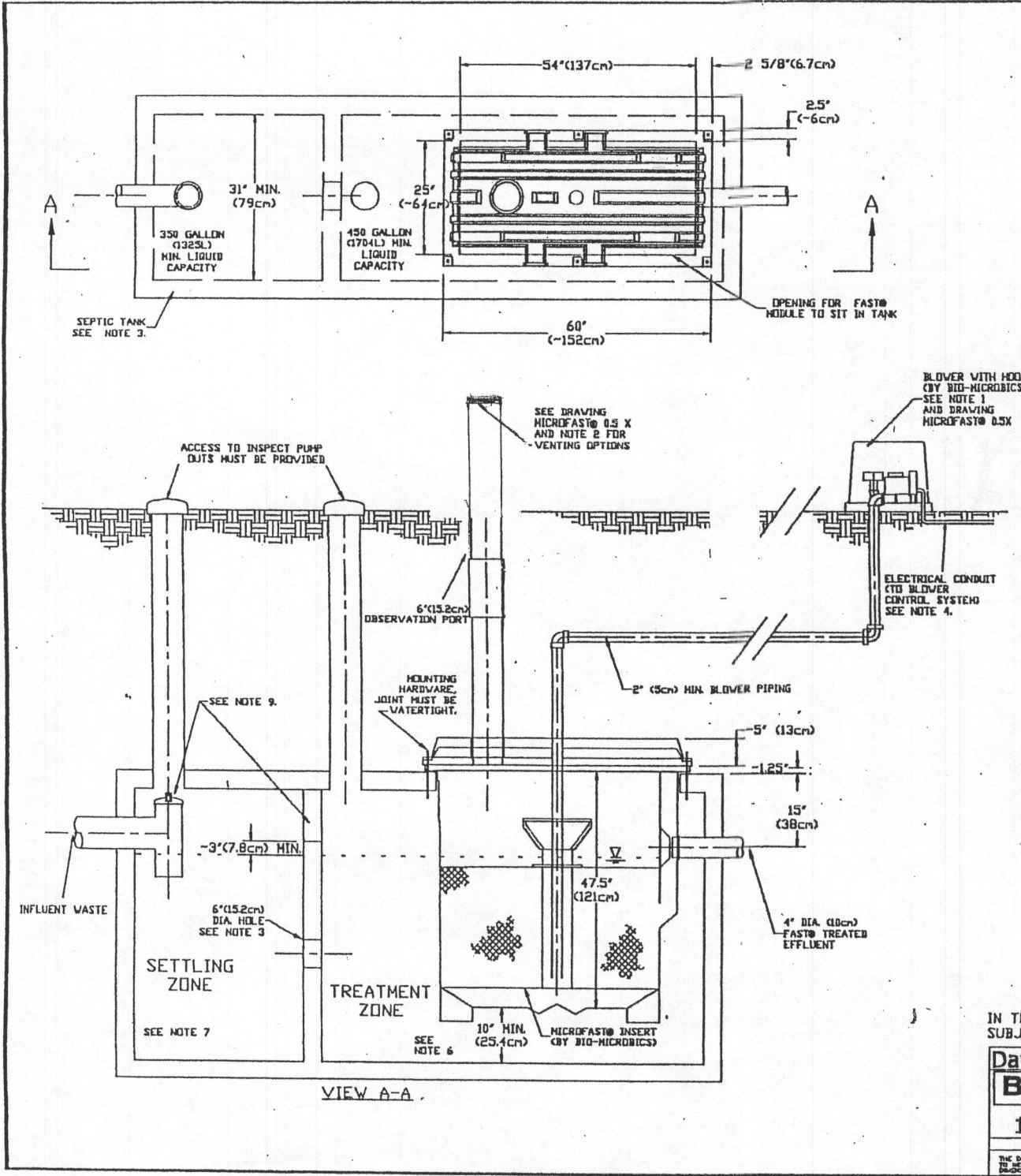


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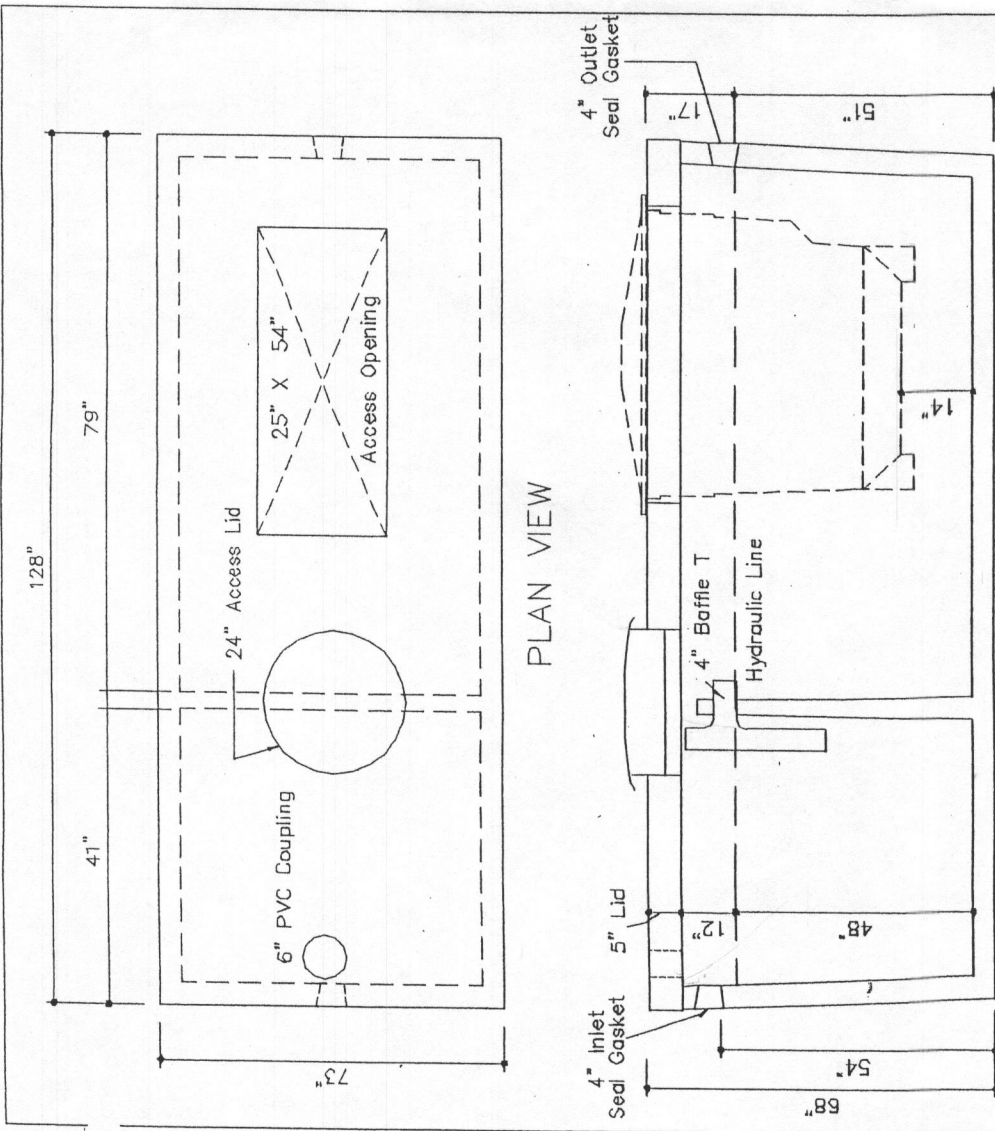


NOTES

1. BLOWER MUST BE WITHIN 100 FEET (30.5M) OF FASTO UNIT AND USE A MAXIMUM OF 4 ELBOWS IN THE PIPING SYSTEM (100FT). FOR DISTANCES GREATER THAN 100 FEET--CONSULT FACTORY. BLOWER BASE MUST BE LOCATED ABOVE NORMAL FLOOD LEVELS.
2. VENT TO BE LOCATED ABOVE FINISH GRADE OR HIGHER TO AVOID INFILTRATION. CAP WITH 6" VENT GRATE W/AT LEAST 7.1 SQ. IN. OPEN SURFACE AREA. SECURE WITH STAINLESS STEEL SCREWS (SEE MCF 0.5 X DRAWING).
OR:
RUN VENT TO DESIRED LOCATION AND COVER OPENING WITH 3" VENT GRATE W/AT LEAST 7.1 SQ. IN. OPEN SURFACE AREA. SECURE WITH STAINLESS STEEL SCREWS. VENT MUST NOT ALLOW EXCESS MOISTURE BUILDUP OR BACK PRESSURE.
3. ALL APPURTENANCES TO THE FASTO UNIT (e.g. SEPTIC TANK, PUMPOUTS, ETC.) MUST CONFORM TO ALL COUNTRY, STATE, PROVINCE, AND LOCAL CODES.
4. BLOWER CONTROL SYSTEM BY BIO-MICROBICS, INC.
5. COPYRIGHT (C) 2003, BIO-MICROBICS, INC.
6. MUST INCREASE TANK SIZE BY 20% IF MINIMUM OF 10 INCHES IS USED BETWEEN THE UNIT AND THE BASE OF THE TANK. CONSULT FACTORY FOR APPROVAL.
7. THE PRIMARY COMPARTMENT MAY BE A SEPARATE TANK.
8. FOUR LEG EXTENSIONS MAY BE USED TO STAND UNIT IN TANK ELIMINATING THE NEED FOR LID. SEE MCF 0.5 X & F DWGS AND REFER TO INSTALLATION MANUAL FOR MORE DETAILS.
9. EITHER PLACE A PIPE CAP ON THE TOP OF THE INFLUENT PIPE TEE, OR EXTEND THE BAFFLE SEPARATING THE TWO ZONES ALL THE WAY TO THE TOP OF THE CONCRETE TANK. IF USING THE PIPE CAP, THE BAFFLE MUST EXTEND PAST THE WATER LEVEL 3" MIN. AS SHOWN ON THE DRAWING.

IN THE INTEREST OF TECHNOLOGICAL PROGRESS, ALL PRODUCTS ARE SUBJECT TO DESIGN AND/OR MATERIAL CHANGE WITHOUT NOTICE.

Date	2-21-03	
BIO-MICROBICS INCORPORATED		MicroFAST® 0.5 L
1-800-753-FAST(3278)		
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		Drawn by BMI



GENERAL NOTES:
 Concrete strength 6500 psi @ 28 days
 Cement portland Type I & II
 Admixtures Adva Flow 340
 Reinforcing per ASTM A185
 Top Slab sealed with butyl tape
 5 Inch Walls 5 Inch Lid

1,500 GALLON PROCESSING TANK For MicroFAST 0.5 Unit Special Order [Approx Wt. 16,000 lbs.]	Babylon 1500-05 Not To Scale April 5, 2007
Babylon Vault 925 Wakefield Valley Road New Windsor, Maryland 21776 Phone: 410-848-0893 Fax: 410-848-3551	

HOBBS PROPERTY 12170 HALL SHOP RD. CLARKVILLE, MD
Sheet Title: WASTEWATER SYSTEM PLAN
Sheet# WWT- 5 of 18 Shee

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Specifications For MicroFAST 0.5 Wastewater Treatment System

1. GENERAL

The contractor shall furnish and install (1) MicroFAST 0.5 treatment system as manufactured by Bio-Microbics, Inc. The treatment system shall be complete with all needed equipment as shown on the drawings and specified herein.

The principal items of equipment shall include FAST System Insert, Insert lid (or leg extensions if that option is chosen), blower assembly, blower controls and alarms. The MicroFAST 0.5 unit shall be situated within a 450 gallon minimum compartment in a two compartment tank as shown on the plans, or in a 800 gallon one compartment tank. Tank(s) must conform to local, state, and all other applicable codes. The contractor shall provide coordination between the FAST system and tank supplier with regard to fabrication of the tank, installation of the FAST unit and delivery to the job site.

2. OPERATING CONDITIONS

The MicroFAST 0.5 treatment system shall be capable of treating the wastewater produced by typical family activities (bath, laundry, kitchen, etc.) ranging from (1) one to (8) eight persons and not to exceed 500 US Gallons per day (1893 LPD).

3. MEDIA

The FAST media shall be manufactured of rigid PVC, polyethylene or polypropylene and it shall be supported by the polyethylene insert. The media shall be fixed in position and contain no moving or wearing parts and shall not corrode. The media shall be designed and installed to ensure that sloughed solids immediately descend through the media to the bottom of the septic tank.

4. BLOWER

The MicroFAST 0.5 unit shall come equipped with a regenerative type blower capable of delivering 11-25 CFM. The blower assembly shall include an inlet filter with metal filter element.

5. REMOTE MOUNTED BLOWER

The blower shall be mounted remote, up to 100 feet (30.5 M) maximum with no more than four elbows, from the MicroFAST unit on a contractor supplied concrete base. The blower must not set in standing water and its elevation must be higher than the normal flood level. A two-piece, rectangular housing shall be provided with tamper-proof screws. The discharge air line from the blower to the MicroFAST shall be provided and installed by the contractor.

6. ELECTRICAL

The electrical source should be within 150 feet of the blower. Consult local code for longer wiring distances. All wiring must conform to code. The input power required for the blower is 115/230 Volts, Single Phase, 60/50 Hertz, 3.8/1.9 Full Load Amps, minimum wire size is 16 A.W.G. (Locked Rotor Amps are 18.6/9.3). All conduit and wiring between the electrical control panel (optional), the power supply, and the blower shall be furnished and installed by the contractor.

7. ALARMS

The alarm system shall consist of a visual and audible alarm to indicate loss of power to the blower and/or high water level. A manual silence switch is included.

8. INSTALLATION AND OPERATING INSTRUCTIONS

All work must be done in accordance with local codes and regulations. Installation of the MicroFAST 0.5 shall be done in accordance with the written instructions provided by the manufacturer. Operation manuals shall be furnished which will include a description of installation, operation, and system maintenance procedures. There shall be a separate manual for the installer, service provider, and owner, tailored to each.

9. WARRANTY

The manufacturer of the MicroFAST 0.5 treatment system shall warrant for three years from the date of shipment or two years from the date of start-up, whichever occurs first, that the equipment they provide will be free from defects in material and workmanship.

In the event a mechanical component fails to perform as specified or is proven defective in service during the warranty period, the manufacturer shall repair or replace such defective parts. (Cost of labor on repair/replacement is not covered, under this warranty.) The replacement or repair of those items normally consumed in service such as air filter, etc., shall be considered as part of routine maintenance and upkeep.

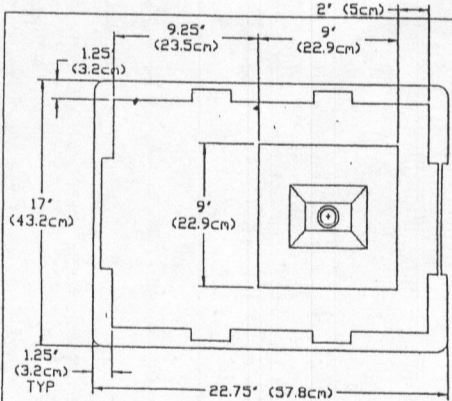
It is not intended that the manufacturer assume responsibility for contingent liabilities or consequential damages of any nature resulting from defects in design, material or workmanship, or delays in delivery, replacement, or otherwise.

10. FLOW AND DOSING

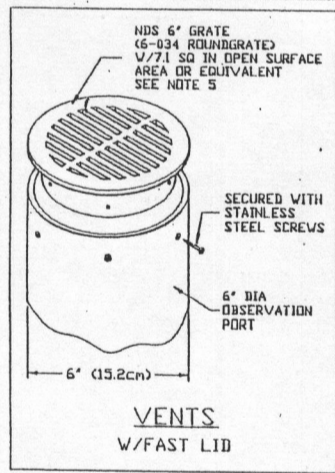
Wastewater treatment systems work best when influent flow is delivered as consistently as possible. FAST systems have been successfully designed, tested and certified relieving gravity demand-based influent flow. However when influent flow is controlled (either by pump or other means) to the FAST system to help with highly variable flow conditions, then multiple feeding events should be used to help assure even flow, optimum performance, and reliability.

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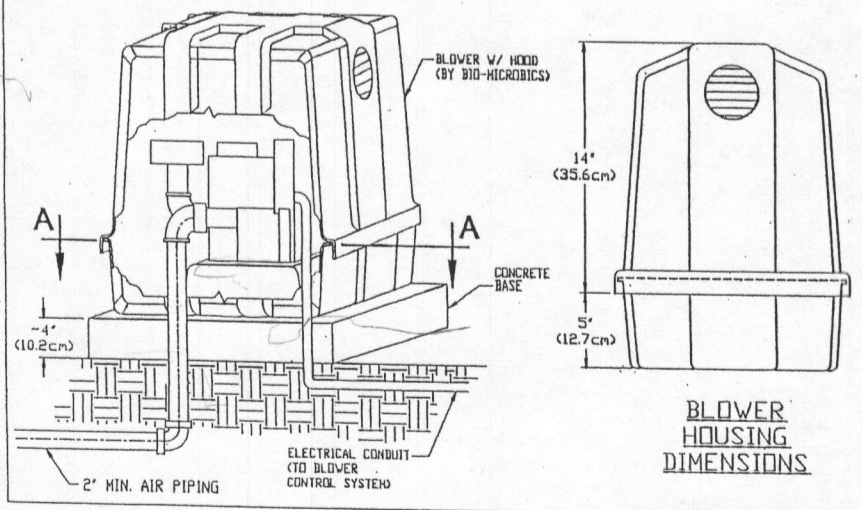
Date	2-21-03	MicroFAST® 0.5 S
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		BMI



BLOWER HOUSING BASE DIMENSIONS (SECTION A-A)



VENTS W/FAST LID



BLOWER HOUSING DIMENSIONS

NOTES

-
-
-
- ATTACH PIPES WITH STAINLESS STEEL SCREWS.
- VENT TO BE LOCATED ABOVE FINISH GRADE OR HIGHER TO AVOID INFILTRATION. CAP WITH 6' VENT GRATE W/AT LEAST 7.1 SQ. IN. OF OPEN SURFACE AREA. SECURE WITH STAINLESS STEEL SCREWS (SEE MCF 0.5 L DWG).

IN THE INTEREST OF TECHNOLOGICAL PROGRESS, ALL PRODUCTS ARE SUBJECT TO DESIGN AND/OR MATERIAL CHANGE WITHOUT NOTICE.

Date	2-21-03	MicroFAST® 0.5 X
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6 of 18 Shee



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(410) 635-2883 Fax

H. Dale Gray, Principa

Date: 6/1/09

Scale: 1" =

WORKSHEET:
The following worksheet is a simplistic guideline and is available as an Excel spreadsheet. It can be downloaded from Geoflow's homepage at www.geoflow.com. If you would like a copy sent to you at no charge, phone 800-828-3388.

To calculate the area required for your drip dispersal system you must know:

1. the quantity of effluent to be disposed of (in gallons per day) and
2. the soil acceptance rate (i.e. gallons per day per square foot).

Make a sketch of the dispersal area with contour lines.

WORKSHEET 1 - DISPERSAL FIELD DESIGN FOR SINGLE ZONE SYSTEM **WILSON HOBBS PROPERTY**
12170 HALL SHOP ROAD CLARKVILLE, MD

Worksheet Dispersal Field	Formula
A. Quantity of effluent to be dispersed per day <u>600</u> gpd <u>4 BEDROOMS - PRE-TREATED</u>	<u>150 GPD/BEDROOM</u> <u>SAND MOUND DISTRIBUTION</u>
B. Soil type or hydraulic loading rate <u>SL</u> <u>0.2</u> loading rate (gal/sq. ft./day) <u>SPECIFIED MIE/HCREH</u>	Based on soil analysis Refer to State or Local regulations. If none, refer to Table 1 and 2 on page 9 & 10
C. Determine the total area required <u>3000</u> square ft <u>SLOPE SITE 4212 FT² AVAIL (MOUND)</u>	Divide gpd by loading rate. A/B
D. Choose the spacing between each WASTEFLOW line and each WASTEFLOW emitter i) <u>0.5</u> ft. between WASTEFLOW lines ii) <u>1.0</u> ft. between WASTEFLOW emitters	Standard spacing is 2 ft.
E. How many linear feet of dripline in the total area? <u>2107</u> ft. <u>728</u> CELL#1 (BED ONLY) <u>728</u> CELL#2 (BED ONLY)	(Area / 2) for 2ft. line spacing. C/2.0 or (Area / 1) for 1 ft. line spacing. C/1.0 or (Area / 1.5) for 1.5ft line spacing. C/1.5
F. Calculate the number of emitters <u>CELL#1 728</u> emitters (e) <u>CELL#2 728</u> (e) SYSTEM: <u>1456</u>	(Linear ft. of dripline / 2) for 2 ft emitter spacing. E/2 or (Linear ft. of dripline / 1) for 1 ft emitter spacing. E/1 or (Linear ft. of dripline / 1.5) for 1.5 ft emitter spacing E/1.5

Worksheet Dispersal Field	Formula
G. Choose pressure compensating or Classic dripline <input type="checkbox"/> WASTEFLOW Classic dripline or <input checked="" type="checkbox"/> WASTEFLOW PC 1/2 gph dripline <input type="checkbox"/> WASTEFLOW PC 1 gph dripline	<u>WFPC 1/2 - 2 - 12</u> See page 4 and Appendix 1 for details
H. Determine dripfield pressure <u>20</u> psi	Standard pressure is 20 psi. WASTEFLOW Classic systems need between 15 and 45 psi (34.7 and 104 ft.) at the start of the dripfield. WASTEFLOW PC systems need between 10 and 45 psi (23.1 ft. to 104 ft.) at the start of the dripfield.
I. Determine feet of head required at dripfield <u>46.2</u> ft. of head	Multiply pressure by 2.31 to get head required. H x 2.31
J. What is the flow rate per emitter? <u>.53</u> gph / emitter <u>13/50' LATERALS / FIELD</u>	See WASTEFLOW flow rates in Appendix 1.
K. Determine total flow for the area <u>CELL#1: 385.8</u> gph <u>#2 6.43</u> gpm <u>FLUSH REQUIREMENT: REYNOLDS 4000 - 6.7 GPM</u>	Number of emitters multiplied by the emitter flow rate at the design pressure. <u>FLUSH GPM = FLUSH TERMINATIONS X REYNOLDS #</u> Gph = No of emitters (F) x gph per emitter (I) Gpm = gph/60 <u>FLUSH = 13 TERM. X 6.7 GPM = 87.1 GPM</u>
L. Select pipe diameters for manifolds and submains <u>1/4"</u> inches (SUBMAINS)	Based on total flow from (K) above, in gpm. See schedule 40 friction loss charts at the back of the appendices. Optimum velocity is between 2 and 5 ft. per second.
M. Select Filter or WASTEFLOW Headworks <input type="checkbox"/> Filter <input checked="" type="checkbox"/> WASTEFLOW Headworks	Based on total flow from (K) above, in gpm. See minimum and maximum flow recommendations for each filter in Appendix 2.
N. Sketch a layout of the WASTEFLOW lines in the dispersal plot to make sure that the maximum lateral length of each WASTEFLOW line is not exceeded.	See Maximum Length of Run table in Appendix 1.

WORKSHEET 2 - SELECT PUMP

Worksheet	Formula
O) Minimum pump capacity <u>15.14</u> gpm	From (K) above <u>DOSE + FLUSH</u>
P) Header pipe size <u>1/4"</u> inches	From (L) above
Q) Pressure loss in 100 ft. of pipe <u>1.42</u> psi	Refer to PVC charts on page 34.
R) Friction head in 100 ft. of pipe <u>3.28</u> ft. of head	Multiply psi from (Q) above by 2.31
S) Static head	
i) Height from pump to tank outlet <u>—</u> ft.	Number of ft.
ii) Elevation increase or decrease <u>1-11.2</u> ft.	Height changes from pump to dripfield. (OFF SEAT)
T) Total static head <u>USE 11.2</u> ft.	Add (Si) + (Sii)
U) Friction head	
i) Equivalent length of fittings <u>.6</u> ft.	Estimate loss through fittings - usually inconsequential for small systems.
ii) Distance from pump to field. <u>356</u> ft.	Measure length of sub-main (SUPPLY/RETURN)
iii) Total equivalent length of pipe. <u>356</u> ft.	Add (Ui) + (Uii)
iv) Total effective feet. <u>11.67</u> ft.	(Uiii) / 100 x (R)
v) Head required at dripfield <u>46.2</u> ft.	See line (I) in Worksheet 1 above.
vi) Head loss through filter or Headworks <u>13.3</u> ft.	See pressure loss for filters in Appendix 2 or see pressure loss for Headworks box in Appendix 7. Multiply pressure by 2.31 to get head loss.
vii) Head loss through zone valves <u>7.2</u> ft.	See pressure loss in Appendix 4 for electric valves. For manual or index valves check with the manufacturer. Multiply pressure loss in psi by 2.31 to get head loss.
V) Minimum Total friction head <u>75.37</u> ft.	Add (Uiv) + (Uv) + (Uvi) + (Uvii)
W) Minimum Total Dynamic Head <u>86.57</u> ft.	Add (T) + (V) From line item (O) above
X) Minimum pump capacity <u>15.14</u> gpm	
NOTE: Some States and Counties require additional flow for flushing. Please check your local regulations. If you need help on flushing design, see Geoflow's flushing worksheet at www.geoflow.com or call Geoflow at 800-828-3388.	
Y) Choose the pump. <u>BLASTER FILTERED EFFLUENT PUMP</u>	Based on pressure from line (W) above and flow from line (X) above.
<u>20EB0522J</u> Model Number	
<u>Gould Pumps</u> Manufacturer	

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Sheet Title:
WASTEWATER SYSTEM PLAN

Sheet#
WWT-1
7 of 18 Sheets

Date: 6/1/09
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H. Dale Gray Principal

BLASIER®

Filtered Effluent Pump

FILTERED EFFLUENT BLASTER.

Model 20EB

SPECIFICATIONS

Model	Flow Range GPM	Horsepower Range	Best Eff. GPM	Discharge Connection	Maximum Solids Size	Rotation ¹
8EB	1.5 - 10	1/2 - 1	7	1 1/2"	1/2" dia	CCW
12EB	3 - 16	1 1/2 - 1 1/2	10	1 1/2"	1/2" dia	CCW
20EB	6 - 28	1 1/2 - 1 1/2	16	1 1/2"	1/2" dia	CCW

¹ Rotation is counterclockwise when observed from pump discharge end

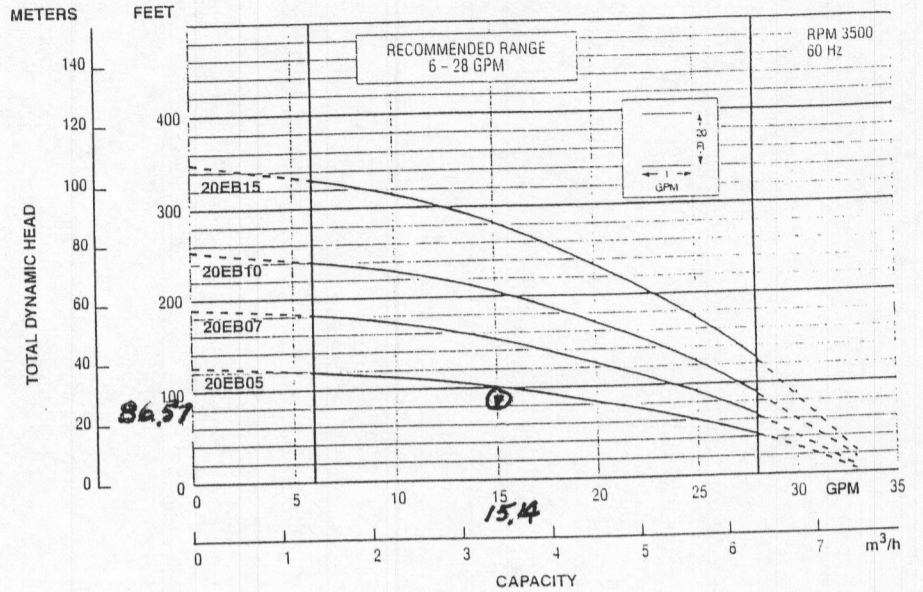
"EB" SERIES MATERIALS OF CONSTRUCTION

Part Name	Material
Discharge Head	Glass Filled Ultrathane
Check Valve Poppet	Ultrathane
Check Valve O-ring	E P Rubber
Bearing Spider - Upper	Glass Filled Polycarbonate
Bearing	Urethane
Klipring	AISI 301 SS
Diffuser	Glass Filled Polycarbonate
Impeller	Glass Filled Polycarbonate
Bowl	AISI 304 SS
Shim	AISI 304 SS
Spacer	AISI 304 SS Powder Metal
Inlet Strainer	Glass Filled Ultrathane
Motor Adapter	Glass Filled Ultrathane
Casing	AISI 304 SS
Shaft	AISI 304 SS
Coupling	AISI 304 SS Powder Metal

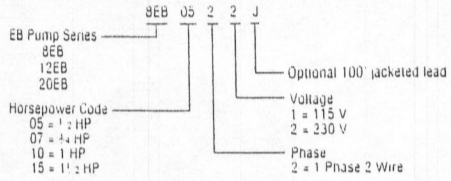


FEATURES

- Designed for pumping filtered effluent from processed septic systems only.
- Field Serviceable: Pump can be rebuilt in the field to like new condition with common tools and readily available spare parts.
- NOTE: The Model EB has left hand casing threads.
- Powered for Continuous Operation: All ratings are within the working limits of the motor as recommended by the motor manufacturer. Pump can be operated continuously without damage to the motor.
- Metal Parts are Stainless Steel: AISI types 301 and 304 are corrosion resistant.
- Non-Metallic Parts are Effluent Compliant: Impellers, diffusers and bearing spiders constructed of glass filled polycarbonate, an engineered composite. This material is corrosion resistant.
- Discharge Head: State of the art engineered composite material for superior strength and corrosion resistance. Loop for safety line molded into head.
- Motor Adapter: State of the art engineered composite material with high rigidity to provide accurate alignment of liquid end to motor. Generous space for removal of motor mounting nuts with regular open-end wrench.
- Bowls: Stainless steel for strength and abrasive resistance.
- 100' 3 wire motor lead standard.
- Consult factory for recommendations involving long run cycles followed by short off cycles to assure proper motor cooling flows.
- Check Valve: Built-in check valve assembly on all models.
- Warranted for one year against failure due to workmanship and materials. Solids plugged pumps are not covered. Pumps used for liquids other than filtered effluent are not covered.
- Stainless Steel Casing: Polished stainless steel is attractive and durable in the most corrosive effluent.
- Hex Shaft Design: Six sided shafts for positive impeller drive.
- Inlet Strainer: Molded suction strainer built into motor adapter.
- Urethane Upper Bearings: Fluted design for free passage of abrasives.
- Franklin Electric Motor:
 - Corrosion resistant stainless steel construction.
 - Built-in surge arrestor is provided on single phase motors.
 - Stainless steel splined shaft.
 - Hermetically sealed windings.
 - Replaceable motor lead assembly.
 - UL 778 and CSA recognized.
 - NEMA mounting dimensions.
 - Optional 100' jacketed power cord available.
- Agency Listings: All complete pump/motor assemblies are UL778 and CSA listed. All Franklin Electric Motors are UL778 recognized.
- All models have 1/4" diameter bypass in discharge head to ensure venting on start up.



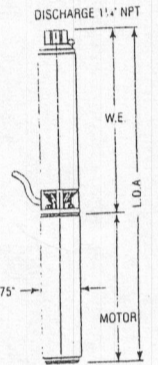
ORDER NUMBER CODE



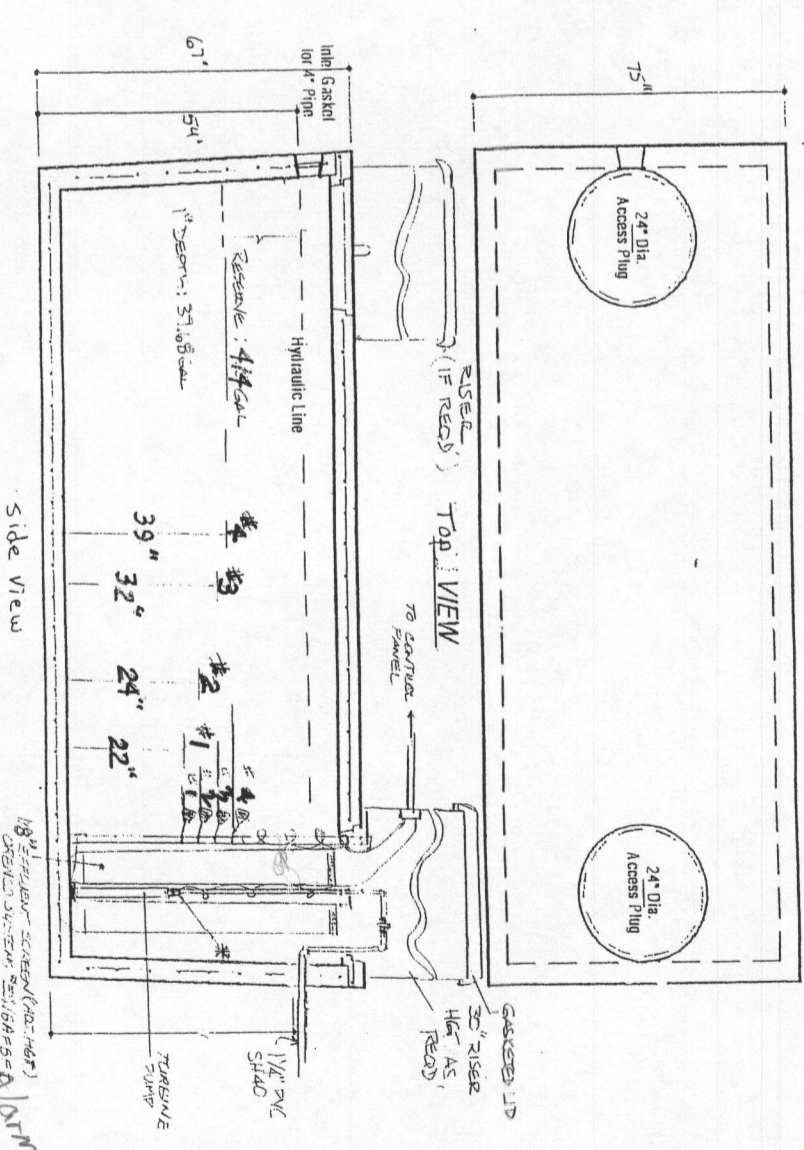
DIMENSIONS AND WEIGHTS

Order Number	HP	Phase	Stages	Length (inches)			Weight (lbs.)			
				W.E. ①	Motor	L.O.A. ②	W.E.	Motor	Total	
20EB0522	20EB0521	1/2	1	4	9.6	9.5	19.1	3	18	21
20EB0722		3/4	1	6	11.3	10.7	22.0	4	20	24
20EB1022		1	1	8	13.0	11.8	24.8	5	23	28
20EB1522		1 1/2	1	11	15.5	15.1	30.6	6	31	37

① W.E. = water end or pump without motor.
② L.O.A. = length of assembly - complete pump - water end and motor



Design Data & General INFO.
) Concrete Strengths = 6000 psi @ 28 days
) Cement Portland Type III per ASTM C-150-92
) Admixtures - Plasticizers per ASTM C-260 & C-494-92
) Reinforcing per ASTM A-185 with 1/2" inch cover
) Top slab sealed with Butyl Tape
) 4" walls, bottom, top



Member N. C. B. V. A.
Babylon
 SINCE 1930
 Burial Vaults - Septic Tanks
 1500 gallon septic or pump TANK
 130"
 925 WALKERDALE VALLEY ROAD
 NEW WINDSOR, MD 21776
 PHONE: 410-848-0393
 FAX: 410-848-3551

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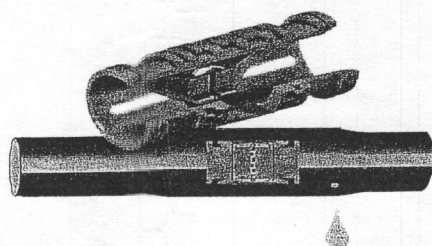
SYSTEM DESIGN
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ELEVATIONS - [All elevations relative - Hall Shop Road, pavement edge is Bench @ 100' (R)]

Element	Elevation (native surface)	Elevation/Element
Septic/Treatment Tank (1500 gal.)	93.5' (R) [tank center] burial/2.0'	top (lid) 91.0' (R)
		inlet invert 89.9' (R)
		outlet invert 89.65' (R)
		base 85.4' (R)
Pump Chamber (1500 gal.)	92.5' (R) [tank center] burial/2.02'	top (lid) 90.48' (R)
		inlet invert 89.15' (R)
		discharge 88.90' (R)
		pump off 87.06' (R)
		floor 85.23' (R)
base 84.90' (R)		
Headworks	92.2' (R)	lid 92.8' (R)
		inlet 90.9' (R)
		discharge (to valve box) 91.0' (R)
		field flush return (valve) 91.0' (R)
Valve Box	93.0' (R)	solenoid valves 91.5' (R)
Cell #1	97.2' (R) [Cell center]	supply manifold 98.2' (R)
		flush manifold 98.2' (R)
Cell #2	94.2' (R) [Cell center]	supply manifold 95.2' (R)
		flush manifold 95.2' (R)

NOTE: minimum 2% fall required to drain down all flushing lines from the cells through the Headworks field flush valve to the inlet side of the treatment unit. Also the supply lines must fall a minimum of 2% to the Headworks and from there to the pump chamber. The active cell supply solenoid valve remains open for 5 minutes following a dose permitting a complete drain-down. If the pump is fitted with a check valve it is to be removed to allow the supply line drain down into the pump chamber.

WASTEFLOW PC 1/2 gph



Flow Rate vs. Pressure

Pressure	Head	ALL WASTEFLOW PC 1/2 gph dripline
7-60 psi	16-139 ft.	0.53 gph

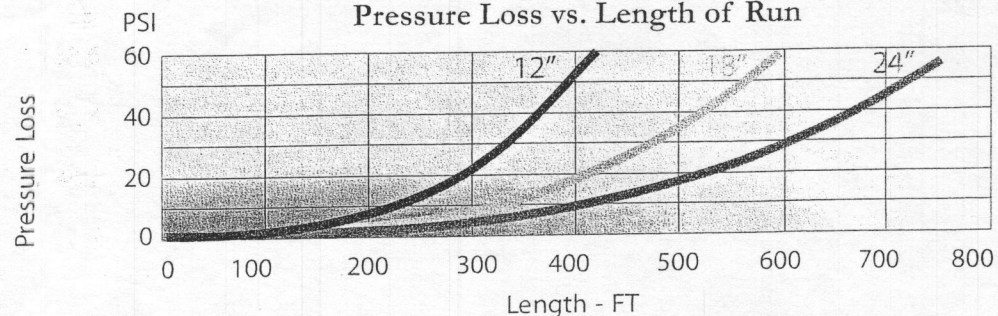
Maximum Length of Run vs. Pressure

Allows a minimum of 10 psi in the line.
 Recommended operating pressure 10-45 psi.

Pressure psi	Head ft.	Emitter Spacing			
		6"	12"	18"	24"
10 psi	23.10 ft.				
15 psi	34.65 ft.		174'	260'	321'
20 psi	46.20 ft.	120'	229'	330'	424'
25 psi	57.75 ft.		260'	377'	478'
30 psi	69.30 ft.	150'	288'	415'	535'
35 psi	80.85 ft.		313'	448'	576'
40 psi	92.40 ft.	172'	330'	475'	612'
45 psi	103.95 ft.		354'	501'	651'
50 psi	115.5 ft.		363'	523'	675'
55 psi	127.05 ft.		377'	544'	700'
60 psi	138.6 ft.		403'	563'	727'

Kd = 2.070

Wasteflow PC 1/2 gph
 Pressure Loss vs. Length of Run



Standard products:

- WFPC16-2-24 WASTEFLOW PC 24"/.53gph or 2lph
 - WFPC16-2-18 WASTEFLOW PC 18"/.53gph or 2lph
 - WFPC16-2-12 WASTEFLOW PC 12"/.53gph or 2lph
- Alternative spacing, flow rates and diameters available upon request.

WASTEFLOW PC 1/2 gph PC Specification

The dripline shall consist of nominal sized one-half inch linear low density polyethylene tubing, with turbulent flow drip emitters bonded to the inside wall. The drip emitter flow passage shall be 0.032" x 0.045" square. The tubing shall have an outside diameter (O.D.) of approximately .64-inches and an inside diameter (I.D.) of approximately .55-inches. The tubing shall consist of three layers; the inside layer shall be a Geoshield® protection, the middle layer shall be black and the outside layer shall be purple striped for easy identification. The dripline shall have emitters regularly spaced 24" (or 18" or 12") apart. The pressure compensating emitters shall be molded from virgin polyethylene resin with a silicone rubber diaphragm. The pressure compensating emitters shall have nominal discharge rates of 0.53 gallons per hour. The emitters shall be impregnated with Treflan® to inhibit root intrusion for a minimum period of fifteen years and shall be guaranteed by the manufacturer to inhibit root intrusion for this period. 0.53 gph WASTEFLOW PC pressure compensating dripline shall be Geoflow model number WFPC16-2-24 (or WFPC16-2-18 or WFPC16-2-12).

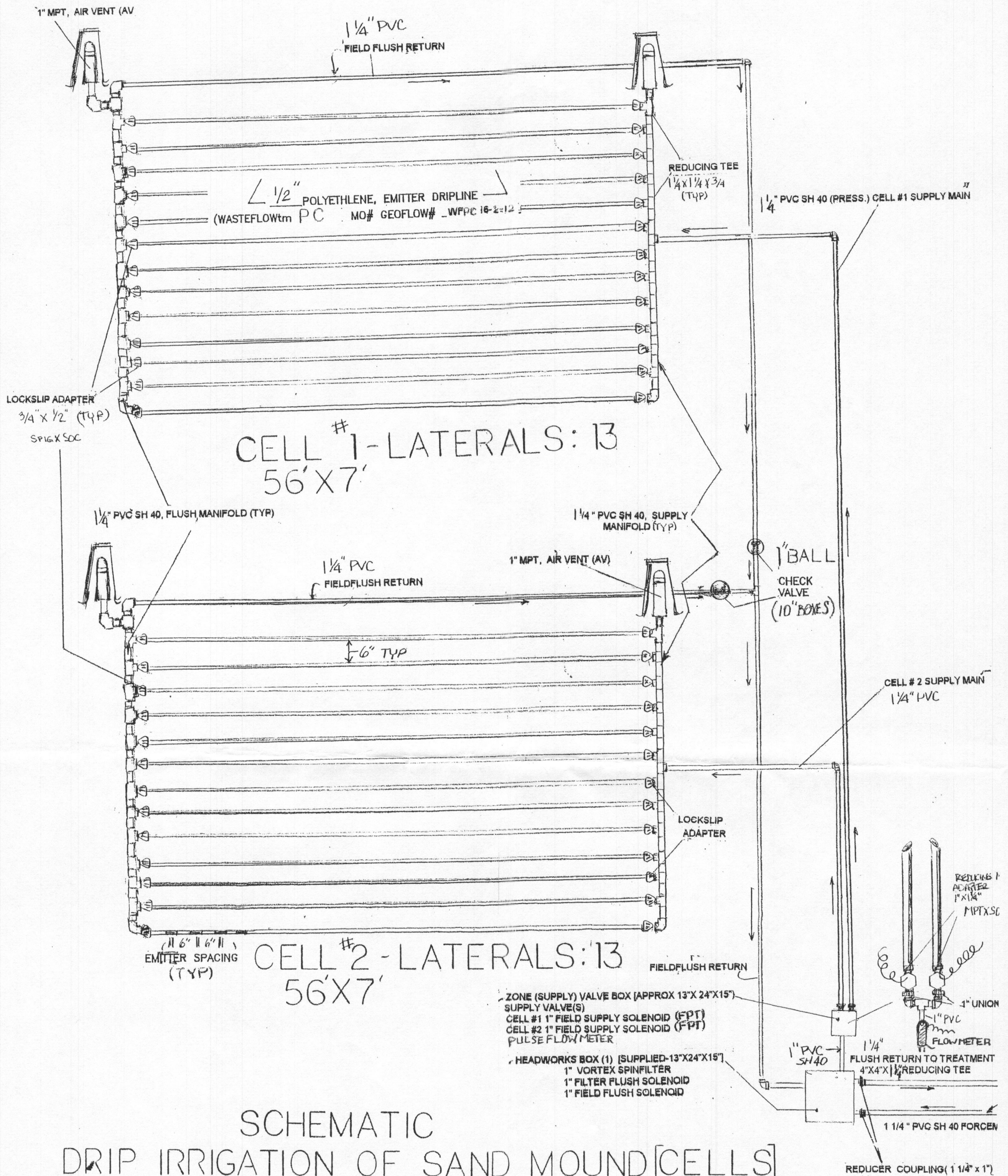
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Sheet #
 WWT-1
 9 of 18 Sheet

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Date: 6/1/9
 Scale: 1" = 10'



**SCHEMATIC
DRIP IRRIGATION OF SAND MOUND [CELLS]
INFILTRATION BEDS**

- ZONE (SUPPLY) VALVE BOX (APPROX 13"X 24"X15")
- SUPPLY VALVE(S)
- CELL #1 1" FIELD SUPPLY SOLENOID (FPT)
- CELL #2 1" FIELD SUPPLY SOLENOID (FPT)
- PULSE FLOW METER
- HEADWORKS BOX (1) [SUPPLIED-13"X24"X15"]
- 1" VORTEX SPINFILTER
- 1" FILTER FLUSH SOLENOID
- 1" FIELD FLUSH SOLENOID

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WASTEWATER
SYSTEM
PLAN

Sheet#
WWT-1
1 of 18 Sheets

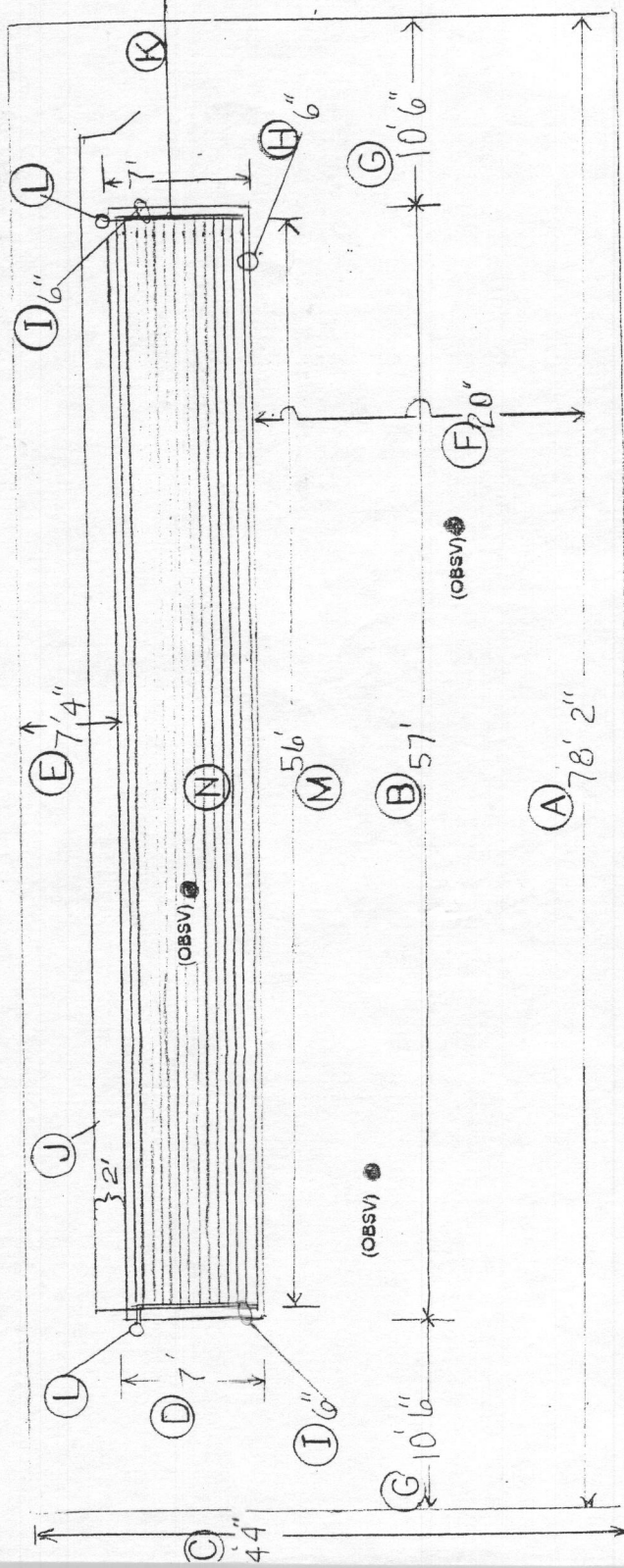
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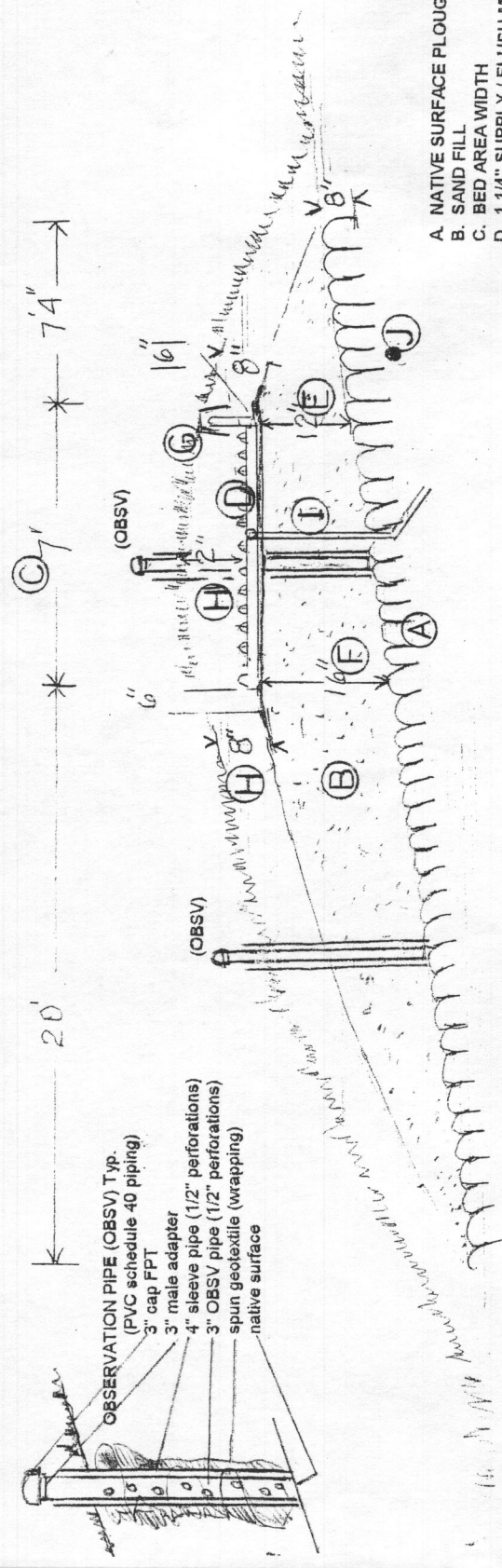


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- A. BASAL AREA LENGTH 78' 2"
- B. BED LENGTH 57'
- C. BASAL AREA WIDTH 7'
- D. BED WIDTH 7' 4"
- E. UPSLOPE SETBACK 20'
- F. DOWNSLOPE SETBACK 10' 6"
- G. SIDE SLOPE SETBACK 6"
- H. LATERAL/EDGE SETBACK 1"
- I. MANIFOLD(S) EDGE SETBACK 1"
- J. 1 1/4" FIELD FLUSH RETURN 1"
- K. 1" MPT AIR VACUUM RELIEF 1"
- L. 1/2" (16MM) POLYETHYLENE DRIPLINE TUBING 1"
- M. LATERAL SPACING 6" / EMITTER SPACING 12" (13 LATERALS EA CELL)



PLAN VIEW - SAND MOUND CELL [#1 & #2]



PROFILE VIEW - SAND MOUND CELL [#1 & #2]

- A. NATIVE SURFACE PLOUGH DEPTH 8"
- B. SAND FILL
- C. BED AREA WIDTH
- D. 1 1/4" SUPPLY / FLUSH MANIFOLDS
- E. UPSLOPE SETBACK - SAND FILL 12", TAPER TO BOUNDARY
- F. DOWNSLOPE SETBACK - SAND FILL 16", TAPER TO BOUNDARY
- G. AID VACUUM RELIEF VALVE
- H. UNCOMPACTED SOIL COVER (SEEDED) DEPTH 12" / BED CENTER DEPTH 8" / BED EDGES
- I. 1 1/4" SUPPLY SUBMAIN
- J. 1 1/4" FLUSH RETURN SUBMAIN

WILSON HOBBS PKOJ. = 1/2 HALL SHOP RD CLARKSVILLE, MD - REPAIR (LIMITED AREA)
 REQ'D - H/CBEH/MDE - SAND MOUND DISPOSAL USING DRIP IRRIGATION BED APPLICATION
 - PRE-TREATMENT REQUIRED
 - FORMAT AS TWO CELLS (NO GRAVEL BEDS)

TABLE 3.1
EQUATIONS FOR CALCULATING SAND MOUND DIMENSIONS

4 BEDROOM - 600 GPD / 5% SLOPE

$$\text{Absorption bed ft.}^2 (A \times B) = \frac{\text{Design flow}}{\text{Soil Loading}} = \frac{600}{0.75 \text{ gpd/ft.}^2 \text{ (H/CBEH/MDE)}} = 800 \text{ ft.}^2$$

$$\text{Bed length (B)} = \frac{800}{114.3} \text{ ft. (21 ft. to 101 ft. dependent on site)}$$

$$\text{Bed width (A)} = \frac{\text{Bed } 800 \text{ ft.}^2}{B \text{ 114.3 ft.}} = 7' \text{ (MDE SPEC.) (15 ft. or less)}$$

$$\text{Upslope sand fill depth (D)} = 48 \text{ in.} - Z \text{ in.} = 12 \text{ in. (12 in. min.)}$$

$$\text{Downslope sand fill depth (E)} = [12 A \times \% \text{ slope}] + D \text{ in.} = 16.2 \text{ in.}$$

$$\text{Cap + topsoil at bed center (H)} = 12 \text{ in. APEX HGT ABOVE SURFACE (BED CTR): 26"$$

$$\text{Cap + topsoil at bed edge (G)} = 8 \text{ in.}$$

$$\text{Total Bed Depth (ON SAND FILL) (F)} = \text{NA in.}$$

$$\text{Sideslope setback (K)} = \frac{[(D + E) + 28 \text{ in.}] \times 3}{2} = 126.3 \text{ in. (10'6")}$$

$$\text{Upslope setback (J)} = (22 \text{ in.} + D) \times 3 \times \text{upslope corr. factor} = 87.72 \text{ in. (7'4")}$$

$$\text{Downslope setback (I)} = (22 \text{ in.} + E) \times 3 \times \text{downslope corr. factor} = 240 \text{ in. (20")}$$

$$\text{Total Width of Mound (W)} = 12A + J + I = 411.72' \text{ in. (34'4")}$$

$$\text{Total Length of Mound (L)} = 12B + K + K = 938.28 \text{ in. (78'2") SYSTEM: 114'}$$

ADDITIONAL DATA [if required]
 Basal Area [Ft²] required: $\frac{\text{design flow (gpd)}}{\text{Soil perc. rate (loading rate)}} = \frac{600}{.2} = 3000 \text{ Ft}^2$
 Basal Area provided: $\text{Slope: } [7' + 20' \times 56] \times 2 = 3024 \text{ Ft}^2$
 Level: Mound length X width

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Sheet Title:
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 SYSTEM
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Sheet #
14 of **18** Sheets

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SYSTEM INSTALLATION

INSTALLATION GUIDELINES

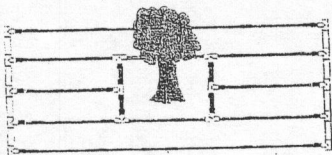
LATERAL INSTALLATION: SAND BED SURFACE

All Geoflow drip systems require:

- Filtration with 120 mesh/130 micron
- Filter flush valve
- Field flush valve
- 2 Air vents in each zone
- All Wasteflow Classic drip systems require pressure regulation

Handle your dripline and components with care. nano-ROOTGUARD® is temperature sensitive. To assure a long life, store the dripline out of direct sunlight in a cool place.

- a) All dripfield construction shall be done in accordance with Local rules and regulations.
- b) Protect the site prior to installation. Construction traffic and material stockpiling can change the soil profile. Fence off entire dripfield prior to any construction. No utilities, cable wire, drain tile, etc shall be located in dripfield.
- c) System is not to be installed when ground is wet or frozen. When the moisture in the soil is near the plastic limit (soils will ribbon and not easily crumble), it will be prone to smearing.
- d) Prior to construction note if any water is accessing the location of the dripfield. Dripfield should not be located at the low point of a site. Divert all downspouts and surface waters away from dripfield. If a curtain drain is to be used be sure it is serviceable and properly screened.
- e) Excavation, filling and grading should have been finished prior to installation of the subsurface drip system. Be sure to minimize soil disturbance when clearing and grubbing the dripfield. Preserve as many trees as possible. Use light track equipment for tree removal and grind out roots to below dripline depth rather than fully removing the entire root.
- f) Be sure you have everything required for the installation before opening trenches. Pre-assemble as many sets of components as practical above ground and in a comfortable place. Compression or Lockslip adapters should be glued to PVC tees, riser units should be pre-assembled, and the sub-main manifold with tees can be pre-assembled and used to mark the beginning and end of WASTEFLOW lines.
- g) For particularly tough soil conditions, soil moisture the day before opening trenches or installing WASTEFLOW. Remember it is much easier to install the system in moist soil. The soil should be moist but still allow the proper operation of the installation equipment and not cause smearing in the trenches. The soil surface should be dry so that the installation equipment maintains traction.
- h) Mark the four corners of the field. The top two corners should be at the same elevation and the bottom two corners should be at a lower elevation. In freezing conditions the bottom dripline must be higher than the supply and return line elevation at the dosing tank.
- i) Install the dosing tank. It is critical that the tank is waterproof. If installing a riser, check that it is watertight, and the entry and exit ports are completely sealed. In freezing conditions the dosing tank should be at the lowest elevation of the entire system. Lid should be placed at grade and water should be able to shed over it.



Loop dripline around trees

Geoflow Inc., Toll Free 800-828-3388, Fax: 415-927-0120, www.geoflow.com

- j) Install zone valves, solenoid or hydraulic index valves.
- k) Install the PVC supply line from the dosing tank, up hill through one lower and one upper corner stake of the dispersal field. Please refer to your State guidelines for depth of burial.
- l) Paint a line between the two remaining corner stakes.

See Page 18 of the attached Submittal (general construction procedures for Sand Mound and Similar Structures) for preparation and installation of the sand bed. Place the individual Dripline Laterals (properly spaced) on the sand beds, be very careful that no sand, or dirt leaks into the open Lateral tubing, or pipe manifolds [Duct Tape open ends, and fittings until you are ready to connect]. A blanket of spun geotextile is placed over the laterals and sand before the soil fill cover is applied.

- m) If the system is looped, install the looped ends with Geoflow plain tubing or flex PVC. If in a cold climate be sure to pitch these slightly so they do not hold water and freeze. The loops are to be installed on the outside of the measured field.
- n) Install the supply header with tees lined up at each Geoflow line. Hook up the Geoflow lines to the supply header. Do not glue WASTEFLOW dripline.

Lockslip Fittings Installations

- i. Hold the fitting in one hand and position the tubing with the other hand.
- ii. Move the sleeve back, and push the tubing onto the exposed stem as far as possible.
- iii. Push the sleeve out over the tubing and thread the sleeve onto tubing, as though tightening a nut to a bolt. Hand tighten. Do not use tools.
- iv. Test the connection to make sure the sleeve threads have gripped the tubing tightly.

- p) Install the filter headworks between the field and the pump tank on the supply line. Insulate the box in freezing conditions. When using an open bottom headworks box, place a rodent barrier down first. This can be made from bricks, paving stones, chicken wire, 3 layers of filter fabric or a 6" minimum depth of 1" gravel. Support the pipes entering and exiting the headworks with gravel.
- q) If using a pressure regulator, install it downstream of the filter headworks, just ahead of the dispersal field, on the supply line. Although the pressure regulator can be buried directly into the soil, it is preferable to install it inside a small valve box for easy access. *Insulate the box in freezing conditions.
- r) Install the floats in the dosing tank and wire up to the timer control. The timer control should be set to pump no more than the design flow, do not set to match the treatment capacity.
- s) Install the pump. Fill the dosing tank with fresh water and turn on the pump. Check for flow out the ends of all of the Geoflow lines. Let the pump run for about five minutes to flush out any dirt. Shut off the pump and tape the ends of the lines.
- t) Dig the return header ditch along the line painted on the ground and back to the pre-treatment tank. Start the return header at the farthest end from the dosing tank. The return line must have slope back to the treatment tank, septic tank or pump tank.
- u) Install the return header and connect all of the Geoflow lines. Care must be taken not to kink the dripline.

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- v) Install air vacuum breakers at the highest points in the dispersal field. Use pipe dope or Teflon tape and hand tighten. Use a 6" minimum depth of 1" gravel below the boxes to keep rodents out. Insulate in freezing climates.
- w) Install a ball or solenoid field flush valve on the return line to the pretreatment or pump tank unless a pre-assembled Wasteflow Headworks is being used. If a Headworks was installed on the supply line, connect the return line back through the Headworks box. Support the return pipe before it enters the Headworks with gravel. If using electric solenoid valves, connect the valve common and an individual output wire to the solenoid leads using watertight electrical connectors.
- x) Allow glue fittings 1 - 2 hours to set. Open the field flush valve and turn on the pump to flush lines then close the valve and check the field and all piping and connections for leaks. Turn off the system
- y) Check filters and valves for construction debris.
- z) Turn on the pump and check:
 - i. Pressure at the air vacuum breaker(s) against design pressure. Check the pressure in the WASTEFLOW HEADWORKS. It should be five PSI or higher. If pressure gauges are on each side of the filter, note these for benchmark differential pressure across the filter. If using a manual valve for field flushing, crack it open until at least on PSI is lost or design pressure is reached and leave in that position.
 - ii. Flow rates from flow meter or draw down on tank. Compare to design flow.
 - iii. ~~Wet spots in the field. If any sections are particularly wet, determine if they are caused by faulty connections, drippers or shallow burial.~~
 - iv. Check that solenoid valves are functioning. Close the internal manual bleed after flushing the system. If solenoid will not close, first clean the solenoid with caution not to lose small spring, and if this fails, open the bonnet and clean the inside.
- aa) Establish vegetation cover as specified.
- bb) Provide owner with final as-built diagrams flow measurements and pressure readings at startup.
- cc) Provide controller records at startup, including elapsed time meter, pump counts, secondary override counts, highwater counts and primary float counts.
- dd) **Solenoid Valve Installation and Operation**
 - i. Wrap male adapters with 2 wraps of Teflon tape and thread the adapters into the valve inlet and outlet 1 turn past hand tight. CAUTION: over tightening may cause damage to the valve. The solenoid is located on the downstream side of the valve.
 - ii. Flush the laterals by opening the internal manual bleed lever on the downstream side of the solenoid. Turn the flow control stem fully open (counterclockwise) for flow control models.
 - iii. Check that solenoid valves are functioning

SYSTEM MAINTENANCE

The best way to assure years of trouble free life from your system is to continuously monitor the system and to perform regular maintenance functions. For large systems or systems with a BOD > 30 mg/l automation of maintenance is essential. For smaller systems with a BOD < 30 mg/l inspection and maintenance should be performed every six months.

ROUTINE AND PREVENTATIVE MAINTENANCE

- 1) Clean the filter cartridge. This may be done with a pressure hose. The screen filter cartridge should be cleaned from the outside inwards, while the discs in the disc filter cartridge should be separated and then cleaned. If bacteria buildup is a problem, we advise first trying lye, and if the problem persists, soak the filter cartridge in a chlorine bath - a mixture of 50% bleach and 50% water.
- 2) Open the field flush valve and flush the field for 3-5 minutes by activating the pump in "manual" position. Close the flush valve. On automatic solenoid valves the manual bleed lever should always be in the closed position and the dial on top should be free spinning. This allows it to open when pulsed electrically. Clockwise rotation closes valve.
- 3) With the pump in the "manual" position, check the pressure in the drip field by using a pressure gauge on the schrader valve located on the air vents and by reading the pressure gauge located in the Wasteflow Headworks box. The pressure should be the same as shown on the initial installation records. On systems with manual flush valves, close the field flush valve completely and then open the valve slightly until there is a 1-2 psi drop or design pressure is reached. This will allow the field to drain after each dose to prevent the manifold lines from freezing.
- 4) Remove the lids on the vacuum breaker and check for proper operation. If water is seen leaking from the top of the vacuum breaker, remove the cap of the vacuum breaker and press down on the ball to allow any debris to be flushed out. Be careful not to come in contact with the effluent.
- 5) Turn off the pump and reset the controller for auto mode.
- 6) Periodically remove and clean the air vents, field flush and filter flush valves.
- 7) Visually check and report the condition of the drip field, including any noticeable wetness.
- 8) Treatment and distribution tanks are to be inspected routinely and maintained when necessary in accordance with their approvals.
- 9) Record the elapsed time meter, pump counter, override counter, high-level alarm and power failures. This information can be obtained from the controller.

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Sheet Title:
**WASTEWATER
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Sheet#

WWT-1
10 of 18 Sheets

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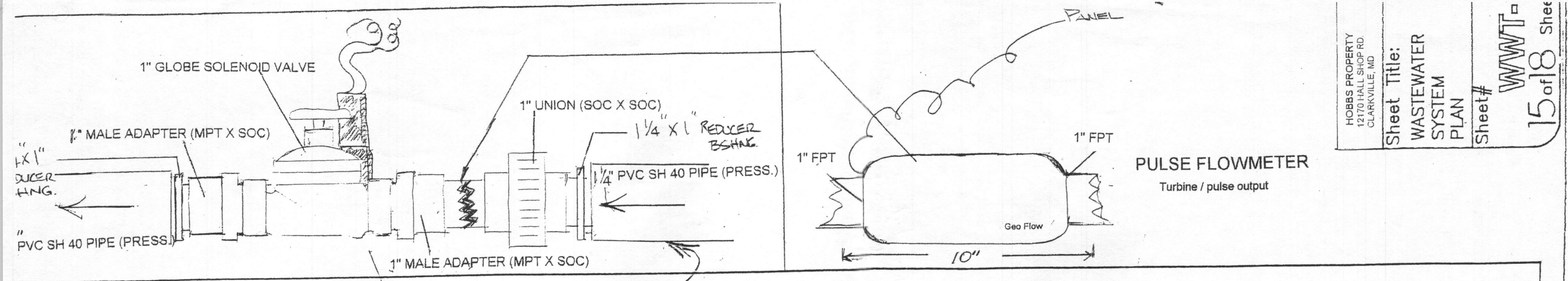
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H. Dale Gray, Principal

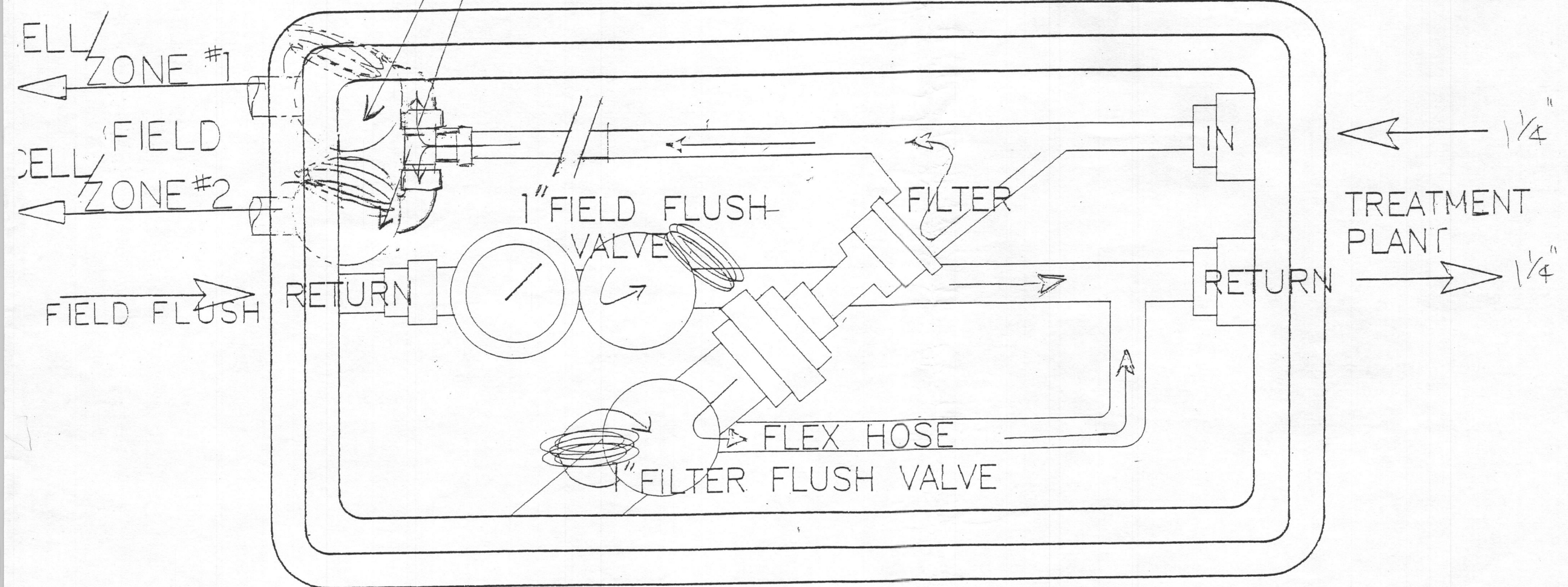
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Sheet Title:
WASTEWATER
SYSTEM
PLAN

Sheet #
WWWT-
15 of 18 Sheet



1" FIELD SUPPLY VALVES (IN VALVE BOX)
13x24"

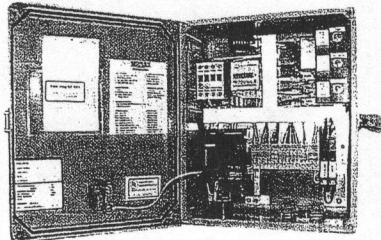


FIELD CONTROL UNIT (Top View)
13x24" Not To Scale

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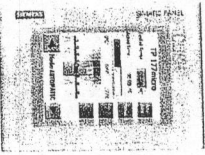
Date: 6/1/09
Scale: 1" = 1'

Geoflow's controllers are the brain in the system, utilizing a programmable logic controller (PLC) to activate the pump(s) cycles, zone valves and flush valves when needed. Telemetry and SCADA control systems available. Please contact Geoflow for custom panel information.







In 2007 Geoflow introduced a new touchscreen controller called the GeoTS. Geared towards commercial sites with multiple zones or inputs, the key features of the Geo TS are:

- 6" Touchscreen. Inputting parameters such as pump times and flush times is in plain English with help menus.
- Each zone can be set independently. Run times can vary from zone to zone, which is particularly beneficial when zones vary in size, soils, vegetation, topography etc.
- Measures flow data per zone. The amount of total water and average gallons per minute are logged by zone when using the flow meter option.

Feature	(GeoTS)
Interface	6" Touchscreen 
Programmable Logic Controller PLC	Yes
Programmed for 4-floats	Yes
Touch-safe panel	Yes
Each zone can have different run times	Yes
Measure flow rate for each zone	Yes
Manual or automatic flushing	Auto only
Enclosure	Nema 4X fiberglass
HOA switch - pump	Rotary 3-way
HOA switch - solenoids	Touchscreen
Features	Geo Touchscreen (GeoTS)
Lightning arrestor	Yes
Onscreen help menus	Yes
Log Functions	Yes
- Elapsed time meter (ETM)	Yes
- Pump events	Yes- time & date stamped
- Filter Flush Counter	Yes- time & date stamped
- Field Flush Counter	Yes- time & date stamped
- Peak timer events	Yes- time & date stamped
- High level alarm events	Yes- time & date stamped
- Power failure events	Yes
- Push to silence	Yes- time & date stamped
- Add-on parts such as pressure sensor	Yes - if installed
- Flow data (avg GPM & Total Flow by zone)	Yes- if Geoflow FM Pulse meter is installed
Programmable Parameters	Yes - new feature
Independent zone run times	Yes
Primary run and rest time	Yes
Secondary run and rest time	Yes
Filter Flush time & frequency	Yes
Field Flush time & frequency	Yes
Manifold Drain Back Time	Yes
Pre-built to accept the following optional parts:	
Flow meter	Geoflow FM-pulse meter
Remote alarm	Yes
Blower input	Yes
Ultraviolet non audible alarm	Yes with N/O contact
Rain Gauge	Yes with Geoflow gauge
Self diagnostics	Yes It has diagnosis capabilities for the floats, pumps, contactors and the PLC itself and any auxiliary components or standard features that have a sensor feedback wired to the panel.
Displays current status of equipment	Yes Gives the countdown on the screen to next event and what equip. is active.

Float Functions GEO Controllers

Floats	Functions
High Level Alarm Float 	Float raised - Alarm enable. Activates the audible and visual alarm when lifted. Audible alarm may be silenced by pressing the illuminated "PUSH TO SILENCE" button. The audible alarm reactivates after 12 hours if the alarm condition is not resolved. The alarm light will remain on until the float is lowered.
Secondary Timer On/Off Float 	Float raised - Peak Timer enable. The Peak timer will cycle the pump(s) more frequently. The Peak Timer function will remain active until the Primary Timer enable float lowers. When the Peak Timer function has been completed and the Primary Timer enable float is reactivated, normal timer operation will resume.
Primary Timer On/Off Float 	Float raised - Timer enable. The Primary Timer will control pump cycles, beginning with the off cycle. Note: On duplex panels the pumps will alternate with each timer cycle.
Redundant Off & Low Level alarm float 	Float raised - Pump enable. Float lowered - Pump disable. Flashing visual & audible alarm enable. This is a secondary off float that will prevent the operation of the pump if the water level in the tank gets too low. Pumping will be disabled in both the automatic and manual modes. This float also activates the visual and audible alarms. Audible alarm may be silenced by pressing the illuminated "PUSH TO SILENCE" button. The audible alarm reactivates after 12 hours if the alarm condition is not resolved. The flashing alarm light will remain on until the float is raised. When raised, this float will enable operation of the pump.

GEO AND GEOTS AUTOMATIC CONTROLLERS

The Primary Timer (float 2 activated) controls the pump dose cycle during normal operating conditions. During high flow conditions the pump dosing cycles will be controlled by the Peak Timer (float 3 activated).

If *duplex pump* option is chosen, the pumps are alternated every pump cycle and never operate simultaneously. There is a selection switch for pump 1, pump 2 or alternation. This allows one pump to be taken out of service for maintenance without affecting the operation of the system. The *Vortex Filter flush valve* will open for 15 seconds (operator adjustable) at the end of the pump cycle to allow the filter to self-flush.

Pump dosing cycles are controlled by the timers when the H-O-A switch is in the auto position. Under normal conditions the Primary Timer (float 2) will control the pump. During high flow conditions, the Peak Timer (float 3) will control the pump. The Peak Timer will cycle the pump more frequently than the Primary Timer. The pump will dose for the same amount of time as it does when operated by the Primary Timer but the time in between doses, or the Peak Timer "off time", will be 75% that of the Primary Timer "off time". Factory settings (field adjustable) are 1 hr 55 minutes off and 5 minutes on for Primary Timer and Peak Timer is set to 1 hr 25 minutes off (1 hr 55 mins x 75%) and 5 minutes on.

Zone valve(s) will open when the PLC calls for a dose or flush. These can be electrically operated solenoid valves (requires any controller other than the Geo-1 or GeoTS-1) or hydraulically activated index valves (used with Geo-1 or GeoTS-1). If hydraulically activated index valves are used in combination with a solenoid field flush valve, a field setting for number of zones and number of zone valves is available. With Geo controllers the total doses of all zones in a 24-hour period must be considered when setting the "off" timer(s). After the pump is deactivated the solenoid valve will remain open to allow for drainage of the supply line. If hydraulically activated index valve is used, be sure to drain the supply line in freezing climates.

Field flush valve will open at the end of the dosing cycle. The pump will continue to run for 5 seconds (field adjustable) to accommodate the opening of this valve. After the pump is deactivated the field flush valve will remain open for five minutes (field adjustable) to allow for drainage of the return line in freezing conditions. It is best to clock the length of time it takes the return flush line to drain and use this to set your drain time. The activated zone valve remains open at the end of the dose for same "# minutes as return flush and filter flush valves to accommodate drainage of supply line.

To periodically *flush the dripfield*, after 10 dosing cycles (operator adjustable) the pump will operate for # minutes (field adjustable) with the field flush valve open. The field flush cycle will repeat until all zones have been flushed.

In the event of a *power outage* the Geo-TS controller continues the program where it left off, even if it was in the middle of an event. The Geo-1 resets itself and begins with a flush cycle in field 1.

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Sheet Title:
**WASTEWATER
SYSTEM
PLAN**

Sheet#
**WWT
17 of 18**

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PHONE # 410-531-5033

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Septic Repair

12160 Hall Shop Rd

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8761

Three hundred thirty dollars

Dollars

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330⁰⁰

Received By

1/15 Mrs. H.