Residential Subsurface Wastewater Treatment and Disposal System Proposal

for

The Farms – Phase 5, Lot 557
Silver Lake Trail
Mooresville, North Carolina

LHD OK
APPROVED MAR 04 2015

PIN: 4626581913.557
December 9, 2014

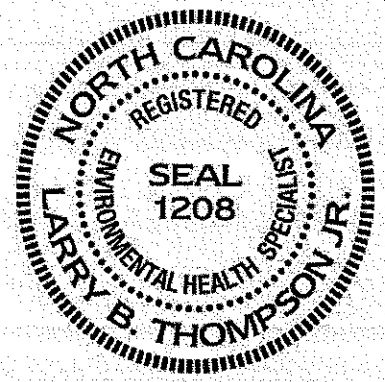
Prepared for:

True Homes
2649 Brekonridge Center Drive
Monroe, NC 28110
704-238-1229



Prepared by:

Larry Thompson, REHS, PWS, LSS
Thompson Environmental Consulting, Inc.
PO Box 541
Midland, NC 28107-0541
Phone: 704-301-4881
Fax: 206-350-8895
larry@thompsonenv.com



Details

True Homes has contracted with Thompson Environmental Consulting, Inc. (TEC) to prepare a septic proposal for a 5-bedroom single family residence to be located on Lot 557 of The Farms subdivision located in Mooresville, North Carolina.

Based upon an investigation performed by TEC on the offsite septic area identified as 609-557A, it was determined that a sufficient amount of "Suitable" Group IV soils were available for the installation of a pressure dosed prefabricated porous block panel system (LPP PPBPS) for a 5-bedroom residence at a 0.25 Long Term Acceptance Rate (LTAR). The proposed repair system will be a LPP PPBPS as well. The residence will be served by a municipal water supply.

True Homes would like to request that the Iredell County Health Department, Environmental Health Division, (ICHD) consider issuing the appropriate permits for a subsurface wastewater treatment and disposal system based upon the following proposal.

Location

The subject property is located on Silver Lake Trail in The Farms subdivision. From downtown Mooresville, take W. Wilson Avenue to Brawley School Road. Continue on Brawley School Road approximately 5.2 miles and turn right onto McKendree Road. Turn right onto Digh Circle, right onto Montclair Drive and right onto Silver Lake Trail. Lot 557 is located on the left just before the cul-de-sac.

References

Laws and Rules for Sewage Treatment and Disposal Systems, 15A NCAC 18A, Section .1900, Department of Environment and Natural Resources, Division of Environmental Health, On-Site Wastewater Section, October 2011.

Onsite Wastewater Treatment and Disposal Systems; EPA 625/R-00/008 Design Manual, February 2002.

Design, Installation and Maintenance of the T & J Panel Wastewater Treatment System; Sixth Edition, published by T & J Panel.

Primary Investigator's Credentials

NC Registered Sanitarian No. 1208
NC Licensed Soil Scientist No. 1287
SC Professional Soil Classifier No. 111
Professional Wetland Scientist No. 1346
NC Subsurface Septic System Operator No. 22199
NC Grade IV Wastewater System Installer No. 1762
NC Certified Wastewater System Inspector No. 17621

Plans and Specifications

A. Septic Tank

1. The septic tank shall be State approved (Section .1953 of 15A NCAC 18A), watertight, structurally sound, and 1500 gallons in capacity.
2. The septic tank will be fitted with an approved effluent filter.
3. It is the responsibility of the septic contractor to thoroughly inspect the septic tank prior to accepting delivery to assure that the tank has had time to properly cure and is free of cracks or other structural deficiencies.

B. Pump Tank

1. The pump tank shall be State approved, of one-piece construction, watertight, structurally sound and 1500 gallons in capacity. Again, it is the responsibility of the septic tank contractor to thoroughly inspect each pump tank prior to accepting delivery.
2. All pipe penetrations into the tank shall be booted (i.e., C-293 boot with a stainless steel strap).
3. The pump tank shall have access risers that extend, at a minimum, 6 inches above finished grade and must have less than 36 inches of fill over its top once finished grade has been established (a reinforced concrete tank will be required if finished soil cover is 36 inches or greater in depth).
4. Floats, pump and control circuits, and the control panel shall meet the requirements of Rule .1952(c). Panel and control equipment shall include lightning protection, be protected from unauthorized access, and remain accessible at all times to the system operator.
5. The pump and alarm controls shall be provided with manual circuit disconnects within a watertight, corrosion resistant, Nema 4x rated control panel. The control panel must be securely mounted outside, adjacent to the pump tank riser and at a minimum of 12 inches above finished grade. Pump and float control wiring should be long enough to reach from the tank to the control panel without splicing, routed through wire conduit, and sealed at the openings within the pump tank as well as the control panel enclosure. It is paramount that the conduit is properly sealed to prevent the escape of flammable gases from the pump tank. Furthermore, there must be two electrical circuits for the pump tank controls: one for the pump and one for the alarm controls.
6. Float switch tie downs must be made of a corrosion resistant material (per OWPS, all metal in the tanks shall be stainless steel). Floats should be mounted on a separate "float tree" rather than the pump supply line (see pump tank detail).
7. The pump removal system will be via a pump tether made of nylon rope or its equivalent. The tether material should be resistant to mildew and rot.

C. Pipes and Fittings

1. All discharge piping, connectors and supply lines should be made of SCH 40 PVC.

2. All joints must be properly "welded" utilizing the appropriate PVC cement for each application.
3. The supply line from the pump tank to the pressure manifold shall be 2.5 inch Schedule 40 PVC (approximate length of supply line is 850 feet).
4. The lateral distribution lines shall be 1¼ inch Schedule 40 PVC. Holes in the laterals should be drilled on site and at the 12 o'clock position (one hole per panel). Lateral hole size is 5/32 of an inch.
5. There shall be a threaded PVC union above each pump to facilitate easy removal of the pumps for maintenance or replacement.
6. The end of each lateral is to be provided with a "turn up", contained within a turf/gate valve box, that provides above ground access for periodic clean out and pressure head adjustment.

D. Valve Box

1. The control valves (gate valves) for each lateral distribution line shall be contained within one manifold box/vault of adequate size. The box should be placed upon a gravel base.
2. The supply manifold conveys effluent from the pump to the lateral distribution lines.
3. The supply manifold should be constructed by connecting a series of (2) 2" x 2" x 1 ¼" tees and (1) 2" to 1 ¼" coupling to the 2 inch supply line.

E. Backfill

1. Backfill sand shall be clean, washed, medium sand that is naturally occurring and falls within the gradation of ASTM C-33 specification (used in the ready mix industry and is readily available).

F. Drainfield Installation

1. The drainfield and the proposed septic tank location have been marked on-site utilizing metal stemmed flags. Once this area has been approved by the county, the property owner/builder should mark this area and isolate it as much as possible from construction traffic. Prior to the system installation, the septic contractor shall contact the county for a preconstruction conference at which time the drainfield area will be re-verified.
2. Under no circumstances shall any construction take place within the drainfield area while the soil is in a wet condition. If the installer has doubts as to whether or not the drain field area is dry enough to begin construction, the environmental health specialist for this area should be contacted for permission to proceed with the installation.
3. The specified system is a Type IIIe pre-fabricated permeable block panel system – specifically the 16 inch high panel system manufactured by T&J Panel Wastewater Treatment System, Patent No. 4013559; telephone: 1-800-222-2577. The installer must follow the manufacturer's guidelines for installing the T&J Panel System and

should request an installation manual from the manufacturer prior to beginning construction.

4. The initial drain field consists of five (5) lateral trenches 2 feet wide by 80 feet in length.
5. It is essential that the lateral trenches be constructed on contour with the land, with each trench being excavated level from beginning to end. The use of a tripod mounted engineer's level is essential to assure that each trench is constructed as level as possible.
6. The maximum trench depth for this system shall be **36 inches**. Each trench shall be placed on a minimum of 8 foot on centers.
7. Once trenches are dug, the side walls shall be raked and a light dusting of lime applied.
8. Backfill the trench with 6 inches of sand and level to grade. Once leveled, place 1 x 4 or 6 inch boards on top of the sand the entire length of each trench. Once the grade boards have been set, the panels may be set into the trench. The panels should be placed 6 inches apart.
9. Once the panels have been set, line the top chamber of each panel with 10 – 12 pounds of clean particle sand (medium sand blasting sand). Coverage depth should be approximately 1 inch thick. *Please note that this sand is not the same material specified for backfill.*
10. Tar seal rope, or approved foam, should be placed in the "U" outs of each end of the panel to form seals. Once the tar rope is in place, the 1¼ inch Schedule 40 PVC laterals can be added and the seal completed by the addition of more tar rope on the top and sides of the pipe. Now that the connection and seals are complete, a block cap is placed on each end of the panel so that all openings are covered.
11. The end of each lateral should be fitted with a short turn up topped by a threaded female coupling with cap. Each turn up must be fitted with a turf/gate valve box with lid fitted flush to finished grade.
12. Once the lateral has been installed and the panels closed, the trench is ready to be backfilled to the top with the sand used in the trench bottom. At this point, the trenches should be left open for the final inspection by the ICHD.

G. Proper Operation Check

1. After all components of the waste water disposal system have been installed and connected, the system shall be checked for proper operation.
2. With the electrical power turned off, fill the pump tank with water until the liquid rises to a level high enough to activate the high water alarm float. Turn on the electrical power. The alarm, alarm light and pump should activate at this time. Turn off the electrical power once these checks have been performed and prepare to set the head pressure at the valve box.

H. Pressure Head Adjustment

1. The pressure head must be adjusted to match the design specifications. The pressure head is measured by the height of the liquid coming from the turn ups at the end of each lateral when the pump is running (utilizing stand pipes).

2. Prepare a length of pipe (stand pipe), cut to the desired head pressure height and fitted with a threaded adapter that will screw into the turn up couplings at the end of each lateral. Thread the stand pipes into each lateral and then turn the power on to the pump, allowing the water to rise within the stand pipes. Adjust the gate valves within the supply manifold box to achieve the specified head pressure (liquid height in the stand pipes should equal the design head pressure).
3. Once the pressure head has been adjusted, allow the pump to run through the remainder of the cycle. The pump float switch will automatically turn the pump off if it is operating properly. Make sure that the effluent pump is completely submerged in the remaining water, making adjustments to the float switch(es) as needed. This completes the checks for proper operation of the pump, alarm and float switches.
4. At this point, the standpipes may be removed and replaced with the threaded turn up caps.

I. Final Landscaping

1. The drainfield shall be shaped to shed rainwater and be free from low spots.
2. The entire area of the drainfield should be planted with grass as soon as possible to prevent erosion. The soil should be properly tilled, limed (if necessary) and fertilized prior to planting. After applying grass seed, the area should be heavily mulched with straw or other suitable material.

J. Utility Conflicts

1. The builder and property owner must take special care in planning for utilities (water, power, gas, telephone, cable lines, etc.). All utilities shall be kept clear of the septic system and its proposed repair area. Improper planning for underground utilities can negatively impact the installation and, in some cases, cause irreparable damage and permit revocation.
2. Water lines must be kept at least ten (10) feet from any portion of the septic system.
3. Irrigation systems should not be placed in the drain field area.

Maintenance

K. Operation and Maintenance

The designed system is classified as a Type IVa wastewater treatment and disposal system and will require ongoing maintenance. State regulations require that a system of this type be managed by a person certified (Certified Subsurface System Operator) by the North Carolina Department of Environment and Natural Resources to operate subsurface wastewater systems (Section .1961 Maintenance of Sewage Systems). A "Maintenance Contract" between the system owner and a Certified Operator will be required by ICEH prior to the issuance of a final system approval or Operation Permit.

1. The minimum inspection/maintenance and reporting frequency for a Type IVa system is twice a year by the Certified Operator. The local health department is required to inspect the system once every three years.
2. The septic and pump tanks shall be pumped out when the solids within the septic tank reach an elevation that is equivalent to 25% of the volume of the tank. In some situations, the tanks may need to be pumped more frequently; for example, if you are using a garbage disposal, it is recommended that the septic and pump tanks be cleaned out annually. Regardless, the Certified Operator will be able to advise when it is necessary to pump out tank solids.
3. Pressure head for laterals should be checked and adjusted semi-annually, flushing with clean water as necessary to remove any accumulated solids.
4. The effluent filters should be inspected semi-annually. When it becomes necessary to clean the effluent filters, the filters should be removed and the accumulated debris washed back into the septic or pump tank – not onto the lawn.
5. All piping and valves should be inspected semi-annually for damage and corrections/repairs made immediately.
6. The pump and float controls/switches should be inspected semi-annually to assure proper operation.
7. The drain field area should be maintained to prevent over growth of vegetation. Any damp areas, leakages or malfunctions should be addressed immediately.
8. Divert gutter downspouts and surface water runoff away from the septic and pump tanks.

L. Suggestions to the Homeowner

1. As previously mentioned, a garbage disposal is not recommended. The ground up garbage adds large amounts of solids into a septic tank that tend to degrade at a very slow rate.
2. Grease, cooking oils, coffee grounds and non-degradable solids (disposable diapers, cigarettes and solid paper wastes) should never be put into a septic tank.
3. Used motor oil or any oily liquids should not be disposed of in a septic tank.
4. Be aware of the amount of water that you are using in your home. Water saving fixtures and devices can be installed on sinks, toilets and showers to reduce the volume of wastewater that you are sending to your drain field.
5. Run dishwashers and washing machines only when you have a full load.
6. Use liquid detergents. Powdered detergents have binding agents in them that tend to solidify in the wastewater disposal system.
7. Repair leaky faucets and toilets. Small drips equal large volumes of water over time and can over burden your drain field.
8. Do not use chemical additives in your system. Studies have indicated that they do not increase the biological activity that naturally occurs in the septic system and in some cases certain additives have been found to be detrimental to the life of a system.

Design Specifics

Daily Design Flow:	600 GPD – 5 bedroom house
Septic Tank Size:	1500 Gallons
Pump Tank Size:	1500 Gallons
Effluent Loading Rate:	Design = 0.25 GPD per sq. ft. (50 % reduction - PPBPS)
Supply Line Length:	Approximately 850 Feet
Supply Line Diameter:	2.5 Inches – Sch. 40 PVC
Number and Size of Drainlines:	(5) 2' Wide x 80' Long
Trench Width:	24 Inches Wide
Maximum Trench Depth:	36 Inches Deep
Drainline Spacing:	8 Foot on Centers
Total Length of Drainline:	400 feet
Total Number of Panels:	90
Lateral Hole Size:	5/32 inch
Hole Spacing:	1 per panel = 90 total
Dosing Volume:	324 gallons per dose
Flow Rate Through System:	36.9 gallons per minute
Elevation/Friction Head:	55 feet
Pressure Head:	2 feet
Friction Head:	8 feet
Contingency:	13 feet
Total Dynamic Head:	78 feet

Pump Requirements:	36.9 GPM at 78 Feet TDH
Recommended Pump:	Little Giant 20E or equiv.
Check Valve Required:	Yes
Pump Run Time:	8.78 minutes
Depth of Water Pumped:	Approx. 15.43 inches - check with individual tank manufacturer (1 cu. Ft. of water equals 7.5 gal.)
Repair System:	400 LF of LPP PPBPS

PPBPS Design Worksheet												
								File #:	139650			
								Tax #:	4626581913.557			
System Requirements								Address:	The Farms - Lot 557			
Design Flow	600	gpd							Mooresville, NC			
LTAR	0.250	gpd/ft.^2						Consultant:	Larry Thompson			
Linear footage	800	ft. (conventional)						Phone:	704-301-4881			
Linear footage	400	ft. (50% Reduction)										
								Reviewed By:				
Design Layout								Date:				
Laterals	Length (ft)	# Panels										
Line # 1	80	18										
Line # 2	80	18										
Line # 3	80	18										
Line # 4	80	18										
Line # 5	80	18										
Totals	**400**	**90**										
Absorption Area												
Length (ft)	Width (ft)	Area (ft^2)										
400	2	800										
System Pressure Head	2	ft.	Value selected by system designer (must be between 2-5 ft.)									
Orifice Diameter	5/32	in.	Size selected by system designer (1/8 in. minimum)									
Flow Rate per Orifice	0.41	gpm	Determined from orifice flow design table (value dependent on pressure head & orifice diameter)									
Total System Flow Rate	36.9	gpm	Total number of panels required multiplied by the orifice flow rate									
System Dose Volume	324.00	gal.	Total number of panels required multipled by 3.6 gal./panel									
Pump Run Time	8.78	min.	System dose volume divided by the total system flow rate									
Pump Tank Drawdown	15.43	in.										
Comments:												
1. Install system using 2 ft. wide trenches.												
2. Install drainlines on 8 ft. centers, level, and on contour.												
3. System design requires effluent pump for distribution.												
4. 100% repair area required for property.												

T & J Panels	
Linear Feet	# Panels
50	11
60	14
70	16
80	18
90	21
100	23

Thompson Environmental Consulting, Inc.
PO Box 541
Midland, NC 28107-0541
704-301-4881

SHEET 1 OF 1

COUNTY: Iredell
PIN: 4626581913.557

OWNER: True Homes
LOCATION: Lot 557 - The Farms

DATE: December 9, 2014

PROFILES		SB-1	SB-2	SB-3	SB-4						
LANDSCAPE POSITION	.1940	ls	ls	ls	ls						
SLOPE (%)	.1940	5%	5%	5%	5%						
HORIZON 1 DEPTH	.1943	0-10	0-12	0-6	0-12						
TEXTURE	.1941 (a)(1)	scl	scl	scl	scl						
CONSISTENCE	.1941	fr	fr	fr	fr						
STRUCTURE	.1941 (a)(2)	sbk	sbk	sbk	sbk						
CLAY MINERALOGY	.1941 (a)(3)	se	se	se	se						
HORIZON 2 DEPTH	.1943	10-51	12-48	6-48	12-48						
TEXTURE	.1941 (a)(1)	c	c	c	c						
CONSISTENCE	.1941	fi	fi	fi	fi						
STRUCTURE	.1941 (a)(2)	sbk	sbk	sbk	sbk						
CLAY MINERALOGY	.1941 (a)(3)	se	se	se	se						
HORIZON 3 DEPTH	.1943										
TEXTURE	.1941 (a)(1)										
CONSISTENCE	.1941										
STRUCTURE	.1941 (a)(2)										
CLAY MINERALOGY	.1941 (a)(3)										
HORIZON 4 DEPTH	.1943										
TEXTURE	.1941 (a)(1)										
CONSISTENCE	.1941										
STRUCTURE	.1941 (a)(2)										
CLAY MINERALOGY	.1941 (a)(3)										
SOIL WETNESS	.1942										
RESTRICTIVE HORIZON	.1944										
SAPROLITE	.1943/.1956										
CLASSIFICATION	.1948	s	s	s	s						
L.T.A.R. (gpd/ft^2)	.1955	0.25	0.25	0.25	0.25						

OTHER FACTORS (.1946):
SITE LTAR (gpd/ft^2): 0.25

AVAILABLE SPACE (.1945): provisionally suitable

SITE CLASSIFICATION (.1948): provisionally suitable

SYSTEM TYPE: PPBPS

EVALUATED BY: Larry Thompson

OTHERS PRESENT:

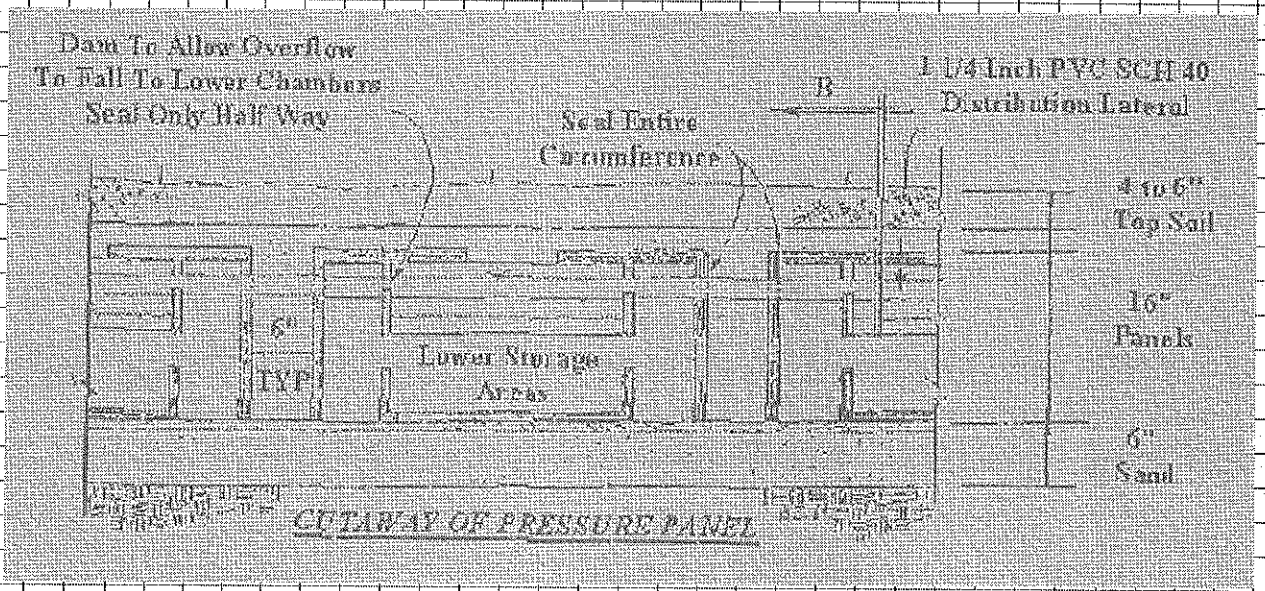
COMMENTS:

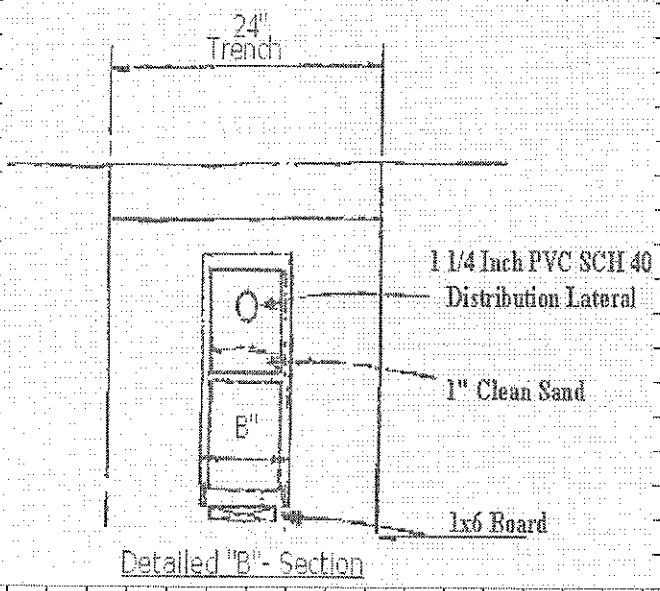
Thompson Environmental Consulting
PO Box 541
Midland, NC 28107-0541

Tax ID Number: 4626581913.557

Location: The Farms – Lot 557

Date: December 9, 2014





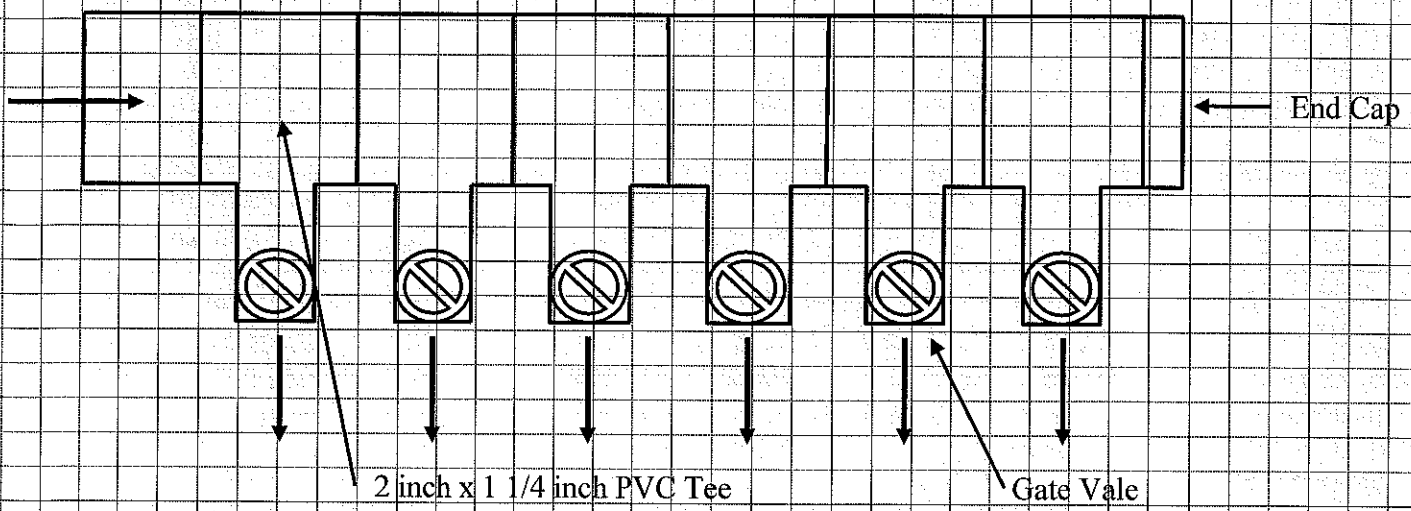
Thompson Environmental Consulting
PO Box 541
Midland, NC 28107-0541

Tax ID Number: 4626581913.557

Location: The Farms – Lot 557

Date: December 9, 2014

Recommended PPBPS Manifold Setup



Thompson Environmental Consulting
PO Box 541
Midland, NC 28107-0541

Tax ID Number: 4626581913.557

Location: The Farms – Lot 557

Date: December 9, 2014

