Specifications and Scope of Work

for

INDIVIDUAL RESIDENCE

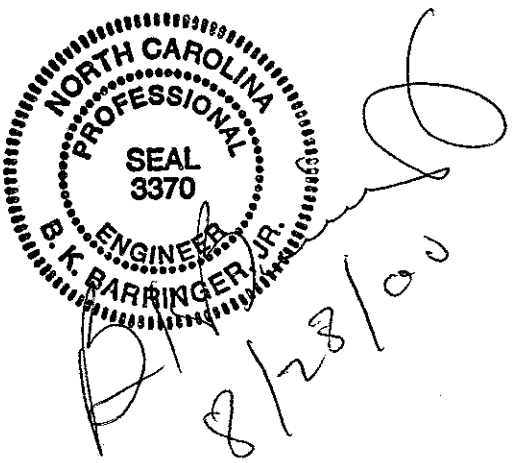
REPAIR OF LOW PRESSURE PIPING

GROUND ABSORPTION, WASTEWATER

DISPOSAL SYSTEM

for

Kevin Nienke Residence
183 Louise Drive
Mooresville, (Iredell County), NC



PREPARED FOR:

Accent Mobil Homes
6315 North Tryon Street
Charlotte, NC 28213
Phone: (704) 597-1802

PREPARED BY:

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August 29, 2000

NARRATIVE

This LLP system permitted September 27, 1985 #421 and installed soon thereafter is failing.

Field observation by the Sanitarian and Engineer indicate hydraulic overloading in approximately one third to one half the field. Other areas of the field appear to be dry. Of the eight existing LPP lines, five of the risers were I place. Other lines were located by probing.

The existing system tank and pump tank appear in acceptable condition. The pump riser bed is broken and must be replaced.

This LPP system, approximately 15 years old was designed and installed using then present day knowledge. From knowledge gained from other similar installation problem it can be expected that failure has been caused by several conditions those being 6"-8" wide trenches, no perforated sleeve or orifice guard to prevent blocking of orifice by aggregate no effluent filter, no low flow fixtures or water management policy and probably the major cause of failure no scheduled maintenance of the system.

The Sanitarian has made additional onsite soil investigations to identify areas where additional nitrification lines may be placed.

Scope of Work

The preposed scope of work for the LPP system should include the following:

- Pump existing septic tank and pump tank and inspect for damage and make repairs.
- Install new access risers over inlet and outlet of the septic tank.
- Replace existing outlet with slotted filter.
- Inspect effluent pump and service as necessary. Inspect power cord and plug. Replace if necessary
- Inspect float switches and replace as necessary. Build and install float tee.
- Furnish and install inline filter in effluent force main.
- Install new LPP lines, valves, risers per plans, details and specifications.
- After field investigation by engineer, sanitarian and contractor, rework existing LPP lines per plans, details & specifications.
- Install low flow fixture in the residence.

The attached specifications are for a new system. The contractor shall use them as a guide to achieve the intended results.

LOW PRESSURE PIPING SYSTEM

REFERENCE MATERIAL:

(1) DESIGN AND INSTALLATION (Manual) OF LOW PRESSURE PIPE WASTE WATER TREATMENT SYSTEMS, By: Craig Cogger; Bobby L. Carlisle; Dennis Osborne; Ed Holland; Published by: UNC Sea Grant College Pub. UNC-SC-82-03, May, 1982.

(2) LAWS AND RULES FOR GROUND ABSORPTION SEWAGE DISPOSAL SYSTEMS. SECTION .1900 OF THE N.C. Administrative Code: Title 10 Health Services; Environmental Health; Subchapter 10a; Sanitation. Published by: N.C. Dept. of Human Resources; July 1, 1982.

(3) EPA 625/1-80-012 Design Manual - On-site Wastewater Treatment and Disposal System; Oct.1980; Chapter 7.

OWNERSHIP RESPONSIBILITY FOR A LOW PRESSURE PIPING SYSTEM:

The Owner must enter into a contract with a certified operator to provide system reviews and/or maintenance a minimum of 2 times per year. The operator and maintenance procedure shall include the steps outlined herein in the Operation and Maintenance procedure.

The Owner shall have the operating agreement before obtaining an improvement permit or otherwise as agreed by the County Health Department.

It must be kept in mind that this system is designed to accept a moderate amount of waste water (which is called the EFFLUENT), in a minimal water absorbing soil.

Conservation measures must be undertaken by all members of the facility to minimize the volume of waste water entering the disposal system, including, but not limited to, the following precautions:

1. Provide water conserving plumbing fixtures within the facility; including toilets with flush volume not exceeding 1.6 gallons/flush.
2. Develop conservative water use habits;
3. Monitor and maintain the system as necessary for proper operation;
4. Check and pump the septic tank sludge on a regular basis or approximately every three years, otherwise as required by the regulations.
5. Make rapid repairs to leaking plumbing fixtures and faucets.
6. Avoid excessive watering of the lawn in the vicinity of the disposal field and prevent the growth of weeds.
7. Check system filters and clean initially after one month of operation, and; thereafter, as determined by the system operator.

CONSTRUCTION SEQUENCE AND COMPONENTS OF THE SYSTEM:

Furnish and install all items required for a complete system in accordance with plans and specifications; for requirements of the County Dept. of Environmental Health (CDEH); the NC Dept. of Environmental Health (NCDEH); the N. C. Building Code, Plumbing Code and Electrical Code; and the National Electric Code. System must be properly installed by a qualified, competent contractor.

COMPONENTS OF SYSTEM:

1. Two compartment septic tank (existing) with new slotted filter and risers
2. Pumping chamber (exist) with new riser
3. Submersible effluent pump with filter and level controls
4. High water alarm signals (audible and visible)
5. Supply pipe - Schedule 40
6. Distribution laterals - PR160 (SDR 26) with corrugated plastic sleeve

CONSTRUCTION SEQUENCE

Rule of Thumb: "If soil is too wet to plow, it is too wet to disturb for LPP system construction."

1. Locate Septic Tank and Pump Tank. Lay out nitrification field network area with stakes and flagging. As soon as the absorption area is designated, it should be flagged, roped off and isolated from construction traffic. This barrier should be maintained until the system is accepted by the Owner. Refer to site plan for the size of absorption area and field locations. The Engineer has located and flagged the laterals as shown on the site plan.
2. Clear site of any and all man-made debris, construction materials, etc. Dispose of legally. Cut all trees in the area of the nitrification field flush with the ground. Do not remove any stumps. Consult with Owner before cutting any trees.
3. Prior to actually beginning construction of the system, carefully locate, lay out and identify disposal site, manifolds and the lateral piping networks, using a tripod mounted engineer's leveling instrument to accurately establish each lateral along a level contour. Note: Lateral pipe runs which conflict with cut-off-in-place stumps or trees shall "snake" by with a 12" minimum trench clearance and then continue along its projection run. (A 5' minimum trench separation must be maintained centerline to centerline.)
4. The septic tank shall consist of a 1,000 gallon capacity, reinforced, pre-cast concrete tank with full baffle and shall have easy access to each chamber from ground level for checking and pumping. The first chamber of the septic tank shall consist ⅔ to ¾ of the volume of the total tank and the baffle shall contain a horizontal opening across the tank at about midway its height. The outlet of the tank shall have a effluent filter as called for herein. Locate the septic tank at such height as to provide approximately 8" of cover soil over top of the tank.

   Provide an approved access port over the effluent filter.

   The riser shall be furnished by the tank manufacturer and shall be placed as called for on the plans and shall extend a minimum of 6" above finish grade.

   Contractor shall refer to plans and site conditions to address loading of the tank and / or riser by vehicular traffic. If tanks are located in traffic area, access to septic tank shall be through 24" cast iron manhole frame and cover. Ground surface shall be graded to divert surface water away from the access ports.

   Tank and riser shall conform to paragraph .1952 of the regulations.

5. Effluent Filter: A slotted micro-filter, with 1/32" infiltration shall be installed in lieu of the outlet tee in the septic tank. The filter shall be a Zabel A300 as manufactured by ZABEL, Zabel Environmental Technology, 10409 Watterson Trail, Louisville, KY, 40299, 1-800-221-5742, Fax 502-267-8801 Fax or Zoeller P/N170-0017 as distributed by Confederate Sales, Charlotte, NC, 704-542-7096.

6. The dosing tank shall consist of a 1,000 gallon capacity, reinforced, precast concrete tank without baffle. Provide access for entry into the tank directly over the pump location, and extending 6" above final grade. The tank shall be supplied by a manufacturer approved by DHS and bear the manufacturer's serial number. Use 30" diameter approved concrete or corrugated plastic, access riser with bolted on or lockable lid extending a minimum of 6" above grade. In addition to the pump, the tank shall have a pressure filter with float controls and alarm floats as detailed. If located in a traffic area, the tank and lid shall meet H20 loading requirements.

7. Force Main and Manifold: The force main and manifolds from the pump tank to the laterals shall be Schedule 40 PVC sized as shown on the plans. Minimum bury depth shall be 30". All fittings and connections shall be as detailed. All valves within this piping system shall be True Union PVC ball valves capable of sustaining the working pressure and imposed loads. Each valve shall be accessible through a properly sized valve box brought flush with the ground surface.

7A. Force Main and Manifold shall be Schedule 40 PVC sized as shown on the plans. All lateral piping shall be PR160 PVC. (SDR26) Glue for all PVC pipe joints shall be as recommended by the pipe manufacturer.

8. True Union Swing Check Valves: All check valves shall be True Union design manufactured from Clear PVC Type I, Cell Class 16453. Valve shall be specifically designed to be disassembled by unscrewing the nuts in line leaving the tail pieces attached to the associated piping providing for cleaning of the check mechanism or replacement of the valve body. Valve shall be full-bore design and shall not restrict flow. Check valves shall contain no metallic components to insure corrosion resistance. Check valve flapper shall be weighted to allow either vertical or horizontal installation. Flapper shall be shielded to withstand back pressure to 125 psi. All valves shall be warranted against defects in material and workmanship for a period of one year. Check valves shall be swing check valves meeting requirements of ASTM - D1784 as supplied by Flo Control, Inc., Burbank, CA, 91510, Telephone 1-(800) 423-2741.

9. Prior to installation of PVC, force main, manifold and lateral piping, fabricate 1¼" diameter PR-160 lateral piping with orifices (holes) at scheduled locations along the top of the pipe. (See chart for size and spacing.) LPP lateral shall be 1-1/4" diameter PR 160 PVC pipe encased in 4" diameter corrugated plastic tubing and shall be certified as complying with applicable ASTM standards. The corrugated tubing shall have three rows of holes, each hole between 1/2" and 3/4" in diameter, and spaced longitudinally approximately 4" on centers. The rows of holes may be equally spaced 120° on centers around the periphery, or three rows may be located in the lower portion of the tubing, the outside rows being approximately on 120° centers.

Nitrification trench shall be constructed as level as possible, but in no case shall the fall in a single trench bottom exceed 1/4" in 10' as determined by an Engineer's level. The nitrification trench shall not exceed a width of 18" and be 18" deep, except as approved by the County Health Dept.

Rock used in nitrification trench shall be clean, washed gravel or crushed stone and graded or sized between 3/8" to 1" The rock shall be placed a minimum of 12" deep with at least 6" between the pipe and the trench bottom and 2" over the pipe, and distributed uniformly across the trench bottom and over the pipe.

a. Carefully backfill manifold trenches to finish grade with clean debris free earth (no stone).
b. Leave absorption area with a raked surface, ready fro grassing.
c. Construct up slope (grassy swale) and curtain drain as called for on site plan and details, maintain.

10. All joints in lateral and the manifold piping shall be water tight connections to ensure that the only source of the water seepage from the system is through the orifices as designed. See layout, details, and data sheet. Carefully install pressure piping and lateral network according to the attached designed layout using care to insure that holes shall be located at required intervals and as shown on the "typical section through the lateral trench." A larger diameter protective sleeve with cap or approved valve box with lid shall be placed over the turned up lateral and positioned level with the ground surface (so as not to be damaged by mowing machine). The lateral shall be positioned for easy removal of the end cap for flushing.

11. Pump: The submerged pump shall be Model ME 33 manufactured by F. E. Meyers Co., Ashland, OH, or equal, 1/3 hp, 230v/1ph; capable of pumping 41.08 gallons per minute at a 16.81' head. Pump shall be powered by a Simplex pump control properly sized, in a NEMA 4x enclosure. Install adjacent to the pump tank on a 4"x4" treated post or other approved method. Control shall accept signal from pump actuator float and alarms.

12. Pump installation: Details of pump installation are shown on the plan. The pump shall be elevated off the bottom of the tank by placement on two concrete blocks next to each other on the bottom of the tank. This prevents the pumping of any solid particles which can clog the system. A piece of nylon rope or other non corrodible material should be attached to the pump and to the outlet pipe for lifting the pump in and out of the chamber. (The PVC outlet pipe is too fragile to support the pump.)

13. Pump On-Off water level float switches shall be equal to Myers, Model MLC-20, mercury switch. High Water Alarm Switch shall be equal to Meyers, Model FLCA-30, mercury switch. Floats shall be mounted in the pump tank beside the pump and accessible from the riser. All control floats shall be mounted on a "Float Tree" constructed of 1-1/2" diameter PVC pipe and anchored by a concrete base sized to support the pipe with float switch strapped to a 2" pipe sleeve sliding over the 1-1/2" diameter pipe. The lower level control or "pump-on-off" must be positioned above the pump, so that the pump remains submerged at all times and is positioned to pump a specified volume of effluent. The high water control float is then mounted about 3" above the upper pump-on-off control. (Note: Care must be taken to insure that floats do not become fouled by other components in the tank such as the electric power cord or the lifting rope.)

14. A Warning Sign shall be located within the facility to inform the owner of what action to take in case the "High Water Alarm" is activated. This sign shall contain the name, address, telephone number, and emergency telephone number of the person to contract immediately upon malfunction of the system.

15. Effluent Filter: An effluent filter shall be placed in the pump tank connected directly to the pump discharge. The filter shall be equal to the GAG Sim/Tech filter and shall include the following component STF 101 Filter, STF 101 Pressure Alarm Switch, STF 102 Filter Screen, STF 102 Lid/Screen Removal Wrench, STF 103A Screen Removal Tool, STF104 Sock, STF 107 Tank Alert XT with Latching Light. The contractor shall demonstrate that filter screens function as intended and are serviceable. The pressure alarm switch shall be wired to the high water alarm. The filter is available through Zoeller Pump Representative, Confederate Sales, 704/ 542-7096.

    The pump outlet pipe filter should be connected to the supply manifold with a threaded PVC union (or dresser coupling) to allow quick removal. The valve must also be installed in the supply line (within the pump chamber) to allow final adjustment of the pressure. If effluent will be pumped down hill, a 1/4" siphon-breaker hole must be drilled in the bottom of the supply line before it leaves the pump tank. This breaks any vacuum in the system and prevents the inadvertent siphoning of effluent out of the tank. This hole is very important.

16. Electrical Connections: The pump and high water alarm must be placed on separate electrical circuits. (If the pump circuit fails, the alarm must still be able to operate.) Follow the manufacturers' recommendations for the proper fuses or circuit breakers. All electrical connections must be made outside the pumping chamber. Power cords from the pumps and controls should enter into a NEMA-4X approved outdoor pump control / alarm panel mounted outside of the pumping chamber.

    Wiring between the pumping chamber and the facility should meet State and Local Code Requirements. A lightning arrester is recommended to protect the pump and controls from electrical surges.

17. Leave absorption area with a raked surface, ready for grassing.

18. Proper Operation Check: After all components have been installed and connected, the system should be checked for proper operation. With electrical power turned off, fill the pumping chamber with water from a garden hose (or allow effluent to accumulate) until the liquid rises to the level of the high-water alarm float. Turn on the electrical power. The alarm light should go on in the facility, and the pump should start operating. The alarm light should go off when the liquid level falls below the high water float. The pump should turn off when the liquid reaches the lowest float control. Be sure the pump is still completely submerged.

19. Pressure Head Adjustment: The pressure head must be adjusted to match that specified in the design. The pressure head is measured as the height liquid will rise above the turn-up elbow when the pump is running. To adjust the head:

    (a) Glue a 4' length of pipe (preferably clear) to a threaded adapter that will screw onto the turn-up adapters. (Call this the "test tube").

    (b) Replace the turn-up cap with the "test tube".

(c) Turn the power on to allow liquid to rise in the "test tube".

(d) Adjust the valves at the manifolds and/or in the pumping tank until the effluent reaches the desired height in the "test tube". Remember to include the distance below the ground surface to the lateral line when measuring the height. Refer to the flow calculation chart relative pressure head (h) for each line. This is the height above the lateral liquid should be in the temporary "test tube".

20. Final Landscaping: After the LPP is installed, the following should be checked to insure that the system will not be overloaded with excess rain water and run off:

a. The distribution field is shaped to shed rain water and is free of low area.

b. Curtain drains, grassy swales or ditches for diverting ground and surface water are properly installed.

c. Gutter and downspout drains are directed away from the system.

21. Any problems should be corrected before approving the system.

22. Finally, the entire area should be planted with grass according to specifications.

OPERATION AND MAINTENANCE PROCEDURE:

The system is classified as a Type IV. The Regulations require that the system be operated by a person certified by the N.C. Department of Environmental Health to operate this type of system.

Operating, Maintenance and Inspection procedures shall be submitted to the County Health Department for approval. Procedures shall include but not be limited to the following:

- Minimum inspection/maintenance frequency shall be 2 times/year, with reporting frequency of 1 time/year to the local Health Department.
- Septic system shall be pumped every 4 years or when solids accumulate to ⅓ the volume of the tank.
- On a scheduled basis, clean and inspect Biofilter in the septic tank and the sock filter in the pump tank. When washing the filter, debris must be sprayed directly back into the septic tank and not onto the lawn.
- The LPP system should be observed by the regulatory agency one, three, six and nine months after initial installation, and then every 3 years. An inspection report should be completed and filed each time the system is checked.
- All laterals shall be pressure flushed annually with clean water.
- Pressure head for laterals should be checked and adjusted one month after installation and annually thereafter.
- All piping, fittings turn-ups and valve boxes shall be checked annually for damage and/or proper operation and corrections made immediately.
- The property should be inspected to insure all surface water is deflected away from the fields and tank. Any ponding of surface water should be corrected.
- Grasses shall be mowed and maintained and any erosion shall be corrected promptly.
- The nitrification field area shall be checked for leakages, blowouts or malfunction, indications of damp or mushy areas compared to surrounding area or evidence of noticeable odor of sewage. Repairs shall be made immediately.
- The pump electrical should be checked to insure tight, clean connections with no corrosion and proper operation.
- Pump switches shall be checked for free operation and proper level set.
- Pump draw down depth and delivery rate shall be checked twice a year.
- Check septic tank and pump tank for evidence of damage or leakage. Check the quality of effluent including grease and sludge accumulation.

The management entity in conjunction with the local Health Department shall establish an operation and maintenance program and procedure based on experience obtained from similar installations.

SEEDING SPECIFICATIONS
SLOPES 3:1 or FLATTER

1. Apply agricultural lime at the rate of 90 lb/1000 sf.
2. Apply 10-10-10 commercial fertilizer at the rate of 20 lb/1000 sf.
3. Seed in accordance with the following schedule and application rate:

DATE	TYPE	PLANTING RATE
Aug 15 - Nov 1	Tall Fescue	200 lb/ac or 7 lb/1000 sf
Nov 1 - Mar 1*	Tall Fescue and	200 lb/ac or 7 lb/1000 sf
	Abruzzi Rye	25 lb/ac or ½ lb/1000 sf
Mar 1 - Apr 15	Tall Fescue	200 lb/ac or 7 lb/1000 sf
Apr 15 - Jul 30	Hulled Common or Bermuda	30 lb/ac or 1 lb/1000 sf
Jul 15 - Aug 15	Tall Fescue and	200 lb/ac or 7 lb/1000 sf
	Brown Millet or	35 lb/ac or ⅞ lb/1000 sf
	Sorghum-Sudan Hybrids	30 lb/ac or ¾ lb/1000 sf

4. Mulch with straw applied at the rate of 75-100 lb/1000 sf.

* Heavily mulched during January - March period.

SLOPES GREATER THAN 3:1 TO 2:1

1. Apply agricultural lime at the rate of 90 lb/1000 sf.
2. Apply 10-10-10 commercial fertilizer at the rate of 20 lb/1000 sf.
3. Seed in accordance with the following schedule and application rate.

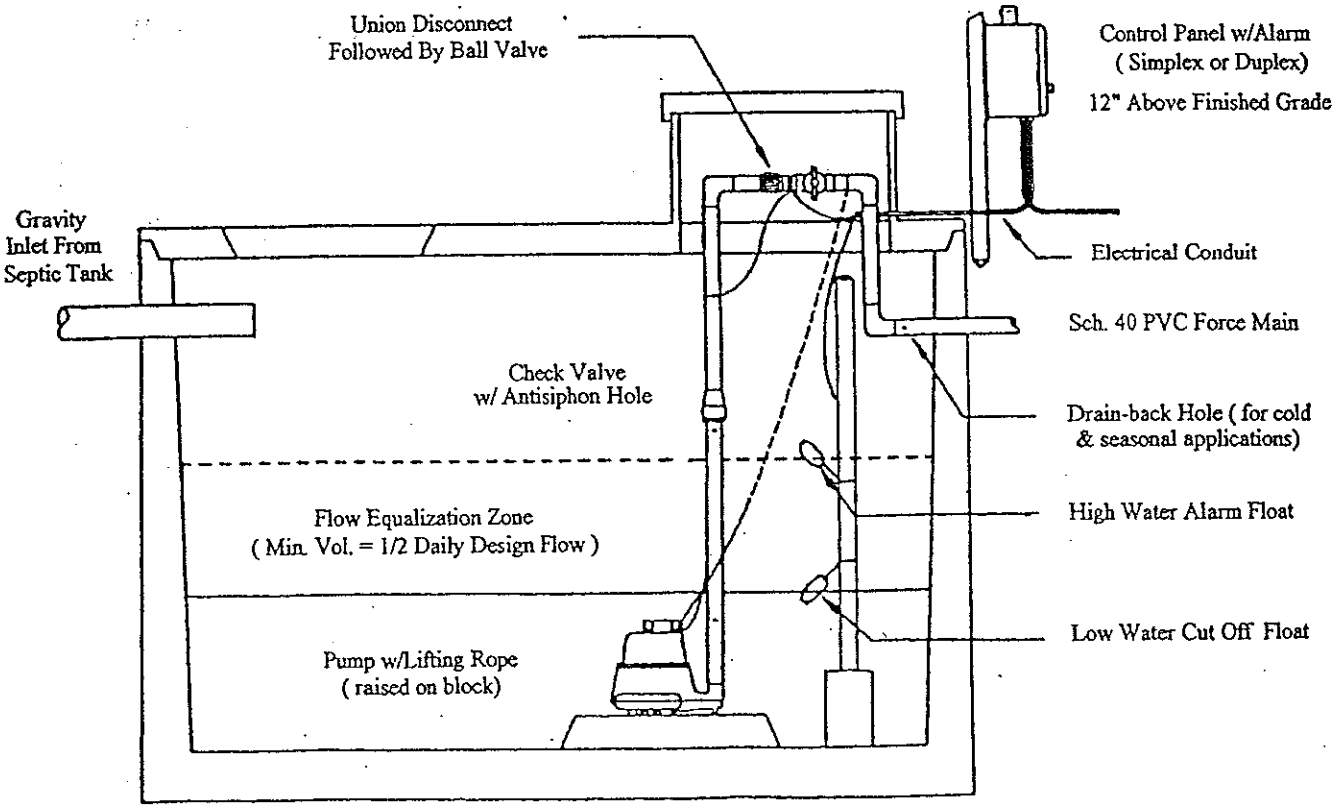
DATE	TYPE	PLANTING RATE
Mar 1 - Jun 1	Sericea Lespediza (scarified) &	50 lb/ac or 11 lb/1000 sf
Mar - Apr	Add Tall Fescue or	150 lb/ac or 3½ lb/1000 sf
Mar - Jun	Add Weeping Lovegrass	5 lb/ac or ⅛ lb/1000 sf
Jun - Sep 1**	Tall Fescue and	60 lb/ac or 1½ lb/1000 sf
	Brown Top Millet	35 lb/ac or ⅞ lb/1000 sf
	Sorghum Sudan Hybrids	30 lb/ac or ¾ lb/1000 sf
Sep - Mar 1	Sericea Lespediza (unhulled-unscarified)	70 lb/ac or 1¾ lb/1000 sf
	Tall Fescue	150 lb/ac or 3½ lb/1000 sf
	Millet or Sudan	20 lb/ac or ½ lb/1000 sf

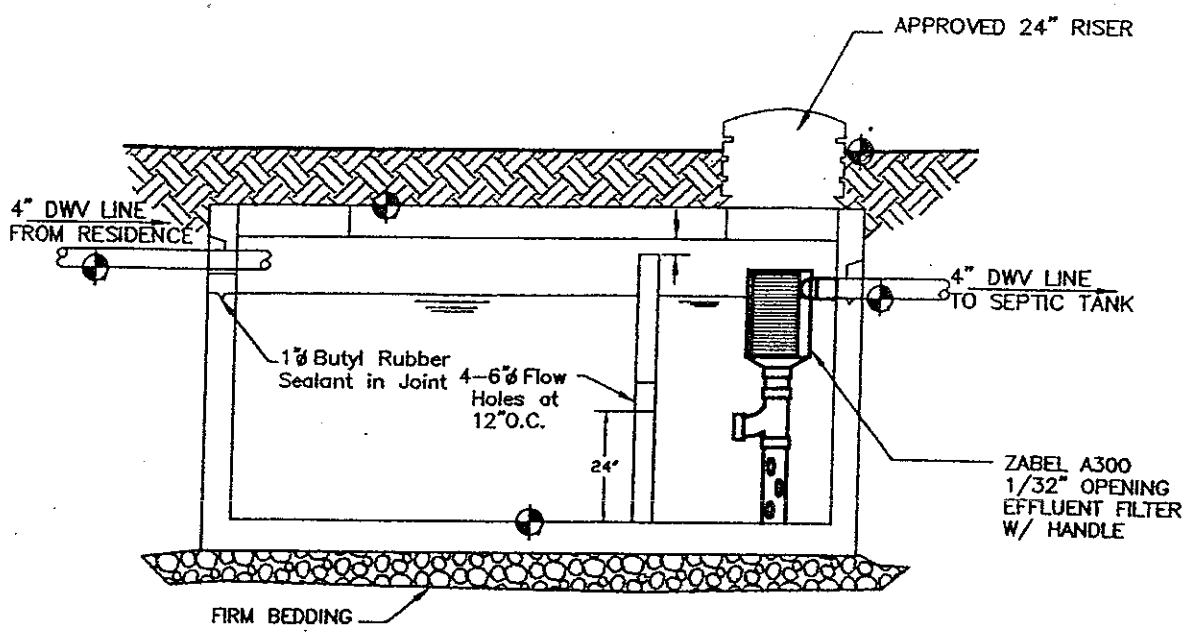
** Temporary - Reseed September 1 at recommended rates.

4. Mulch with 3" straw applied at the rate of 50-90 lb/1000 sf and anchor with asphalt emulsion tack coat applied at the rate of 5-7 gal/1000 sf or 200-300 gal/ac.

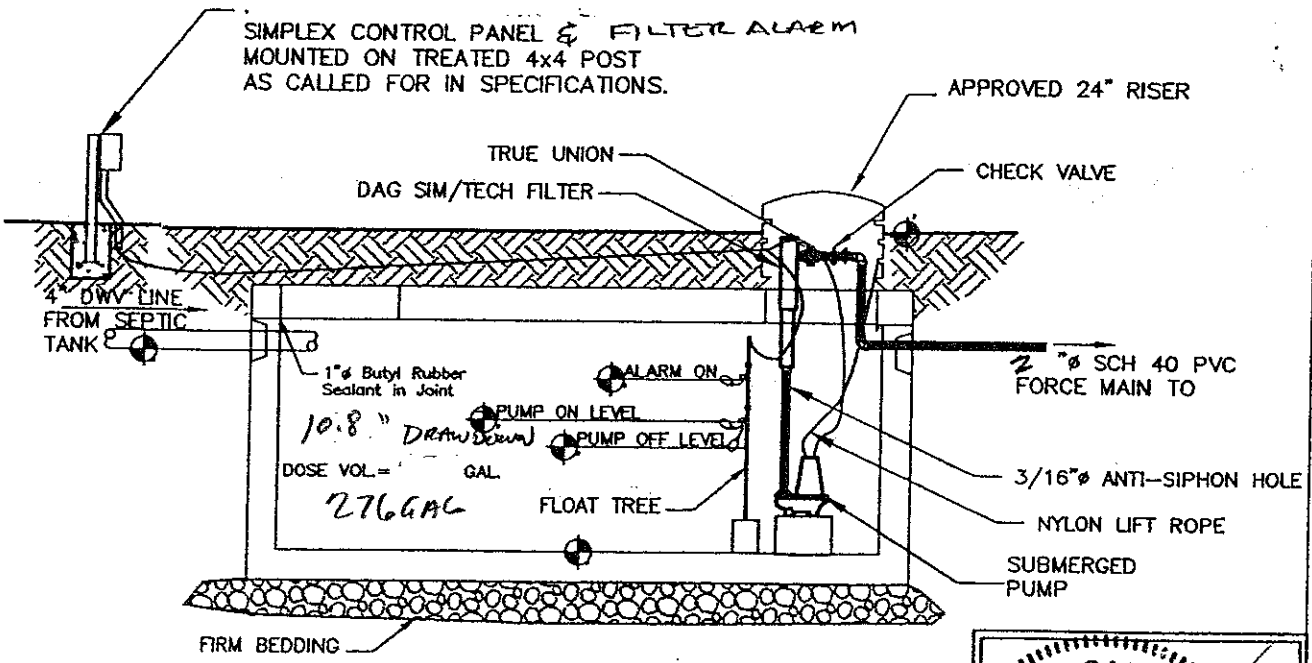
TYPICAL PUMP TANK DETAIL

1. Pump tank shall have an access manhole extending at least 6 inches above finished grade.
2. Pump and control circuits shall be provided with manual circuit disconnects within a watertight, corrosion-resistant, outside enclosure (NEMA 4X or equivalent) adjacent to the pump tank, securely mounted at least 12 inches above finished grade. The pump(s) shall be manually operable without requiring the use of special tools or entrance into the tank for testing purposes. Conductors shall be conveyed to the disconnect enclosure through waterproof, gasproof, and corrosion-resistant conduits, with no splices or junction boxes provided inside the tank. Wire grips, duct seal, or other suitable material shall be used to seal around wire and wire conduit openings inside the pump tank and disconnect enclosure.
3. The pump tank shall have a properly functioning high-water alarm. The alarm circuit shall be supplied ahead of any pump overload and short circuit protective devices. The alarm shall be audible and visible by system users and included in the pump and control enclosure (Simplex or Duplex Control Panel).
4. Float switch for the high water alarm shall be set no more than 3 inches above the high water level of pump cycle.
5. Pump floats should be set so that level of water at end of pump cycle is above the top of the pump.
6. Float switch tie downs to be made of corrosion resistant material, no tape or metal hose clamps.
7. Pump discharge shall have a check valve.
8. Anti-siphon hole (three-sixteenth inch) is required between the pump and the check valve.
9. Watertight testing will be required on two piece pump tanks.

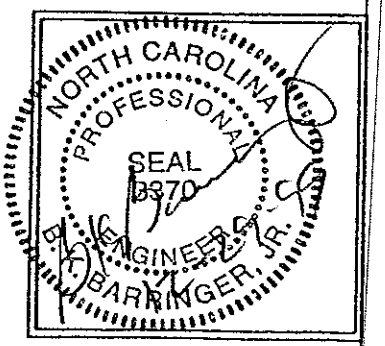




1/W SECTION VIEW- DEH APPROVED 1000 GAL SEPTIC TANK
N.T.S.



2/W SECTION VIEW- DEH APPROVED 1000 GAL PUMP TANK
N.T.S.



Publication or reuse of this drawing must be with the written consent of the Architect/ Engineer

SCALE:	1000 GAL SEPTIC TANK & 1000 GAL PUMP TANK Co., North Carolina	B.K. BARRINGER & ASSOCIATES, P.A. ARCHITECTURE/PLANNING/ENGINEERING SUITE 104 WESTFIELD CENTER 125 EAST PLAZA DRIVE MOORESVILLE, NC 28115 PH:704-664-7888 FAX:664-1778	REVISIONS
DATE: / /			
DRAWN BY: JSI			
CHK'D. BY: BKB			
DATE OF ISSUE:			

ZABEL Filters Out Perform *All* Others!

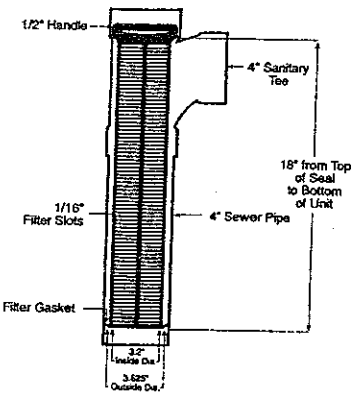
A-1800 Residential

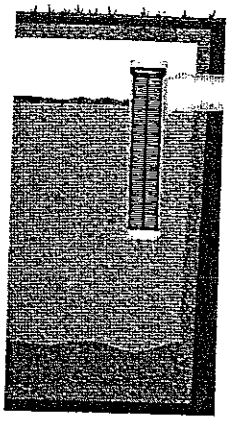
LOWER COST: Lower cost than any other filter or screen.

FINER FILTRATION: 61 Lineal feet of 1/16" filtration.

EASIER INSTALLATION: Fits any 4" outlet T & pipe.

FLOW RATE: 800 GPD





U.S. Patent 5,382,357
5,482,621
Canadian Patent 2,135,937

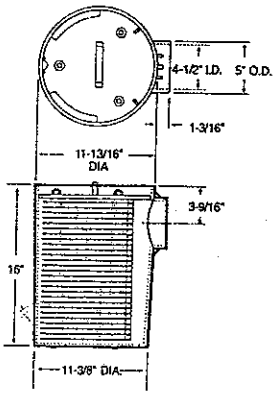
A-100 Commercial & Residential

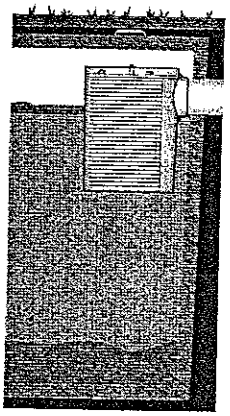
BETTER PROTECTION: 198 Lineal feet of 1/16" filtration.

EASIER TO SERVICE: Reusable cartridge removes easily for cleaning.

PROVEN EFFECTIVE: 30 years of successful performance.

FLOW RATE: 3,000 GPD





U.S. Patent 4,710,295

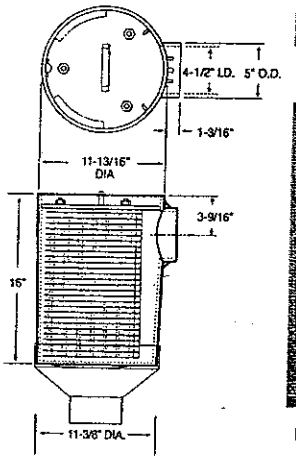
A-300 Industrial & Commercial

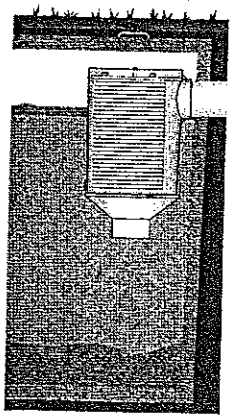
100's OF APPLICATIONS: Filters grease, hair, lint, flour, wastewater and more.

VERY BEST FILTRATION: 205 Lineal feet of 1/32" filtration.

HIGHEST EFFICIENCY: Removes up to 90% grease & solids and 45% BOD.

FLOW RATE: 3,000 GPD





U.S. Patent 4,710,295

For More Information Contact:

ZABEL environmental technology

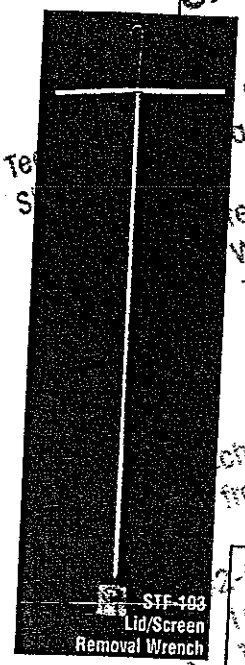
Manufactured by Zabel Environmental Technology • 10409 Watterson Trail • Jeffersontown, KY 40299

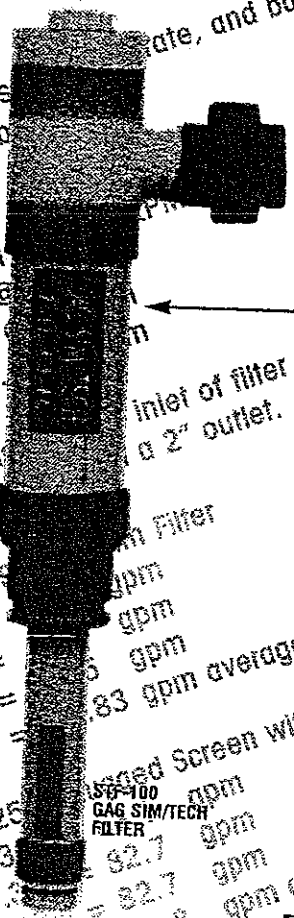
Recycled Paper

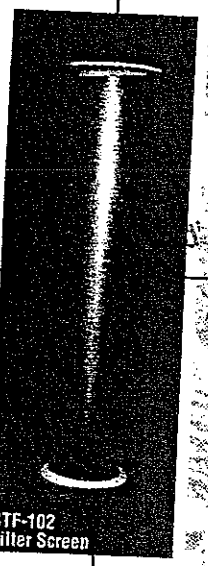
Engineered For Performance

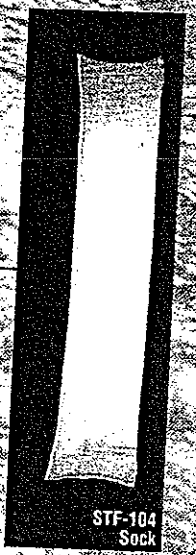
TEST DATA

GAG SIM/TECH FILTER



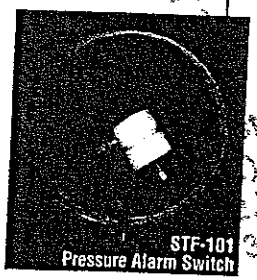


















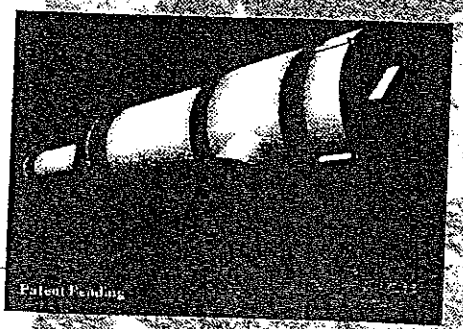
Equipment List

- STF-100 GAG Sim/Tech Filter
- STF-101 Pressure Alarm Switch
- STF-102 Extra Filter Screen
- STF-103 Lid/Screen Removal Wrench
- STF-103A Screen Removal Tool
- STF-104 Sock
- STF-105 Wire Cage
- STF-106 Fully Enclosed Orifice Shield
- STF-107 Tank Alert XT w/Latching Light

Restrictions and Specifications

Total Head Loss .5002ft. or .21psi
Flow Rate with a Clean Screen = 120,672 GPD at 1psi
Flow Rate with a 95% Plugged Screen = 114,912 GPD at 1.8psi

Pump chamber detailed drawings and/or CAD disks for the Sim/Tech Filter are available upon request, at no cost, to help aid in your blueprint and drafting needs.



B. K. BARRINGER & ASSOCIATES, P.A.
Suite 104 Westfield Center
125 East Plaza Drive
Mooresville, North Carolina 28115
Telephone (704) 664-7888 Fax (704) 664-1778

Architecture
Engineering
Planning

December 14, 2000

Accent Mobile Homes
6315 North Tryon Street
Charlotte, NC 28213
Attn: Ms. Mary Craig

RE: Kevin Nienke Residence Project
183 Louise Drive; Mooresville, Iredell County, NC

Dear Ms. Craig:

This letter is to certify that the LPP (Low Pressure Piping) Ground Absorption Wastewater Disposal System for the referenced project has been repaired in accordance with approved specifications prepared by B.K. Barringer & Associates.

Repair laterals (1¼" Ø) were placed in 2' wide stone trenches with $^{5}/_{32}$" Ø orifices at 5' centers. The system was adjusted to allow the pumps to deliver the required flow at 2 feet of operating head.

Thank you for allowing us to service your project. Please contact us if there are any questions or if we may be of assistance on your future engineering needs.

Yours truly,

B.K. Barringer & Associates, PA

B.K. Barringer, Jr., PE
NC Registration No: 3370
Chairman of the Board

NORTH CAROLINA PROFESSIONAL SEAL 3370 ENGINEER B. K. BARRINGER, JR.

cc: Wesley Sparks – Iredell County Health Dept.
FJ Ervin – FJ Ervin Construction Company

all state and local codes performed by a licensed electrical contractor. Conduit shall be rigid poly vinyl chloride conduit. Minimum bury is 2'.

11. All piping shall be schedule 40 PVC including fittings. Gate valves shall be bronze or PVC.
12. The drainfields shall not be installed during saturated soil conditions.
13. Contractor shall evenly spread agricultural lime and fertilizer over the drainfield area. Application rates shall be 180 lbs. agricultural lime/1000 sq. ft. (4.0 tons/acre), 2.3 lbs. of nitrogen/1000 sq. ft. (100 lbs./acre), 21.8 lbs. P205/1000 sq. ft. (950 lbs./acre) and 2.3 lbs. K20/1000 sq. ft. (100 lbs./acre). Contractor shall thoroughly pulverize the ground surface to a depth of six (6) inches and thoroughly incorporate lime and fertilizer into the soil by tillage to a six (6) inch depth over the entire area.
14. Contractor shall create a uniform smooth debris-free seed bed over the ground absorption fields and all other areas contractor disturbed. Contractor shall evenly apply Kentucky 31 tall fescue N.C. certified seed at a rate of 3.0 lbs./1000 sq. ft. and lightly rake the seed bed. Mulch shall be applied over entire soil surface using 75 lbs./1000 sq. ft. of wheat straw.
15. All pressure piping shall be tested to 1.5 times the working pressure for a period of two hours. Leaks shall be repaired and the test repeated. No permanent connection to the facilities shall be made until such tests are complete. The leakage test shall conform to AWWA C-600-77 The pumps to be installed in the effluent pump tanks may not be used for testing the force main piping.
16. The contractor shall install such apparatus as meters, gauges, etc. as shall be necessary to demonstrate the performance of the pumps at the direction of the Engineer at no extra cost. Such tests shall also demonstrate the proper operation of the pump controls and float switch settings.
17. At the direction of the Engineer the contractor shall perform leakage tests on all or any of the septic tanks or pump tanks. Leakage test shall consist of filling the tank or tanks with clean water for a period of 24 hours and measuring the change in liquid level in the tanks. Allowable leakage shall not exceed 1% of the tank volume.
18. Upon completion of all construction of the septic tanks and drainfields no other construction traffic shall be permitted across the drainfields nor permanent driveways constructed across the drainfields.

1. Survey and topo by Keith R. Moen, RLS (L-585).
2. All materials and workmanship shall be subject to approval by the Iredell County Health Department.
3. All work shall be performed in accordance with all state and local codes, rules, and regulations.
4. Contractor shall contact the Iredell County Health Department and the Engineer 48 hours prior to commencing work. The actual field location of tanks, drainlines, etc. shall be staked and Health Department approval of the location obtained prior to beginning construction.
5. Any clearing required shall be done in such a manner as to avoid traffic on or damage to the drainfield areas.
6. The septic tanks and pump tanks shall comply with the requirements of the Iredell County Health Department and the N.C. Division of Health Services. Tanks shall be prefabricated in a maximum of two sections by a manufacturer liscensed by N.C. Division of Health Services. All tanks shall bear an imprint identifying the manufacturer, serial number assigned by Health Services to the design, and the liquid working capacity of the tank. Minimum liquid capacity shall be 1,500 gallons.
7. An access hatch shall be furnished with each pump tank as shown on the plans. The hatch shall be fabricated of steel, fiberglass, or aluminum with an angle frame for anchoring to the built up access way, hinged on one side and lift handle on the opposite side. Minimum thickness shall be ¼ inch. The lid shall be installed level and provided with neoprene or acceptable alternative gasket. The hatch shall also be equipped with locking hasp. Steel hatch if provided shall be coal-tar epoxy coated.
8. The effluent pumping facilities shall be located in the pump tanks as shown on the plans. All components including pumps, controls and float switches shall be provided by a single supplier. The contractor shall furnish five sets of shop drawings on the equipment he proposes to furnish. Also furnished shall be five sets of operation and maintenance manuals and parts list. The intent of the plans and specifications is that the contractor shall provide a complete operating pumping facility for each system. Each installation shall be complete including all piping and electrical connections.
9. A control panel shall be furnished for each pump system. The controls shall be housed in a Nema 4x fiberglass enclosure. Controls shall be designed for a simplex alternating mode of operation and shall include starters, relays, circuit breakers, ~~pump alternator~~, and alarm circuit with audible alarms for high water condition. Starters shall provide pump overload protection. Pumps shall be mercury float switch equal to Hydr-o-Matic Model 3900. The control panel shall be factory pre-wired ready for installation by the electrical contractor and five copies of the wiring schematic shall be furnished to the Engineer. Power cables and float switch cables shall be sealed to prevent vapors entering the enclosure from the pump tank. Stainless steel cable support shall be provided for the power and float cables.
10. All electrical work shall be in strict accordance with the plans and all state and local codes performed by a licensed electrical contractor. Conduit shall be rigid poly vinyl chloride conduit. Minimum bury is 2'.
11. All piping shall be schedule 40 PVC including fittings. Gate valves shall be bronze or PVC.
12. The drainfields shall not be installed during saturated soil conditions.
13. Contractor shall evenly spread agricultural lime and fertilizer over the drainfield area. Application rates shall be 180 lbs. agricultural lime/1000 sq. ft. (4.0 tons/acre), 2.3 lbs. of nitrogen/1000 sq. ft. (100 lbs./acre), 21.8 lbs. P205/1000 sq. ft. (950 lbs./acre) and 2.3 lbs. K20/1000 sq. ft. (100 lbs./acre). Contractor shall thoroughly pulverize the ground surface to a depth of six (6) inches and thoroughly incorporate lime and fertilizer into the soil by tillage to a six (6) inch depth over the entire area.
14. Contractor shall create a uniform smooth debris-free seed bed over the ground absorption fields and all other areas contractor disturbed. [illegible] Kentucky 31 tall fescue N.C. certified [illegible] seed bed.

AGRICULTURAL
EXTENSION
SERVICE

North Carolina State University
School of Agriculture and Life Sciences

Department of Biological and
Agricultural Engineering
Box 7625, Raleigh, NC 27695-7625
Telephone (919) 737-2675

Mr. S. L. Brattain, President
Acreage Investments, Inc.
4530 Park Road, Suite 111
Charlotte, NC 28209

Dear Mr. Brattain:

Ref: Your March 25, 1985 letter concerning my soil evaluation and recommendations for lots 28, 29, 30, 31 and 32 at Carroll Woods Subdivision, Iredell County, North Carolina.

This is to confirm receipt of your letter and the request for clarification of the contents of my original evaluation and recommendations. I do believe that a low pressure pipe alternative waste treatment and disposal system with some form of positive drainage upslope from these systems is necessary on lots 28, 29, and 30.

The low pressure pipe alternative is required for several reasons. The primary reasons are:

1. to utilize shallow placement and take most advantage of the permeable topsoil, and

2. to provide a means of transportation of effluent from the homes to the proposed soil absorption areas located on these lots.

The low pressure alternative may require the design services of a registered professional engineer. This registered professional engineer should be familiar with the design and operation of low pressure pipe systems.

My evaluation concerning lots 31 and 32 indicates that the sites appear to be well suited for a modified or conventional soil absorption system. The only modification which would be required on lots 31 and 32 would be shallow placement of the system and perhaps some form of serial distribution down the slope.

If you have any questions concerning the contents of this letter, please do not hesitate to contact me at the letterhead address. I have enjoyed working on this project and look forward to working with you in the future.

Sincerely,

A. R. Rubin, Extension Specialist
Biological and Agricultural Engineering

ARR:wm

Cooperative Extension Work in Agriculture and Home Economics A&T and N.C. State Universities, 100 Counties and U. S. Department of Agriculture

ACREAGE INVESTMENTS, INC. AND AFFILIATES

March 25, 1985

Dr. A. R. Rubin
Department of Biological &
Agricultural Engineering
Box 7625
Raleigh, North Carolina 27695-7625

re: Soil Evaluation & Recommendations
Lots 28, 29, 30, 31 & 32
Carolwoods Subdivision

Dear Dr. Rubin:

Thank you for your report on the above referenced lots.

From your report, we interpret it to mean that you recommend low pressure systems on all of the above lots.

Per our on site conversation and our conversation this date by telephone, it is our understanding that Lots 31 and 32 do not fall in this category and would be suitable for standard systems.

Please clarify this by mail so that we may discuss it with the local health department.

Thanks again and we will look forward to your response to the above and to your recommendations on our Lot 12, Polson Estates, Lincoln County.

Sincerely,

ACREAGE INVESTMENTS, INC.

S. L. Brattain
President

AI
4530 PARK ROAD, SUITE 111, CHARLOTTE, N.C. 28209
(704) 525-4848

Received 3-23-85 AK
Inspection made 3-10-85

AGRICULTURAL EXTENSION SERVICE

North Carolina State Univer
School of Agriculture and Life Scien

Department of Biological and
Agricultural Engineering
Box 7625, Raleigh, NC 27695-7625
Telephone (919) 737-2675

Mr. S. L. Bratton
Acreage Investments, Inc.
4530 Park Road
Charlotte, NC 28209

Dear Mr. Bratton:

The purpose of the brief report which follows is to describe the conditions encountered on proposed residential development lots #28, 29, 30, 31 and 32 in Carrollwoods Development, Iredell County, North Carolina. The predominant soil encountered on the site appears to be a Cecil-like sandy clay loam. The sites are described in the attached report. If you have any questions concerning the contents of this report, please do not hesitate to contact me at the letterhead address.

I have enjoyed working with you on this project and look forward to working with you in the future.

Sincerely,

A. R. Rubin, Extension Specialist
Biological and Agricultural Engineering

ARR:wm
Enclosure

SITE INVESTIGATION

Carrollwoods Development
Iredell County, North Carolina

Five proposed building lots were investigated in Iredell County, North Carolina. Three of the lots had previously been investigated by the local health department and the Human Resources Soil Scientist for the western regional office. The lots in question are lots 28, 29, 30, 31 and 32 in Carrollwoods Development, Iredell County, North Carolina. The investigation revealed that the sites can be utilized as receivers for septic tank effluent provided certain provisions are realized prior to the installation of and during the installation of these facilities. These provisions are:

1. installation of upslope, subsurface drainage to catch and divert shallow subsurface run-on.
2. installation of shallow low pressure pipe systems per provisions of the engineering plans and specifications.
3. utilization of moderate water conservation in all homes placed on these sites.

The purpose of this brief report is to describe the conditions encountered and to make recommendations regarding appropriate wastewater loadings onto the site.

Topography

The five sites investigated were characteristic of the Piedmont physiogeographic province of the state. Sites 28, 29 and 30 were gently rolling, and the maximum slope appeared to be approximately 2-3%. Lots 31 and 32 were nearly level and the maximum slope appeared to be between 1 and 2%. A shallow drainageway exists between Lots 31 and 32. The shallow subsurface run-on flowing along the A/B interface appears to be the most significant drainage/topographic limitation to utilization of these sites. Installation of french drains along property lines and upslope from the proposed on-site

wastewater treatment systems can provide outlets for this run-on and greatly facilitate the operation of these wastewater treatment facilities.

Soils

The predominant soil encountered on the site appears to be a mix of Cecil and possibly Wilkes or Vance-like soil. The area of Wilkes or Vance-like soil appears in a relatively small area adjacent to Lots 29 and 30 and utilization of this shallow Wilkes-like soil will be limited because of the soil depth and the effluent treatment will, therefore, be limited. The areas of Ceil-like loamy soil appear very well suited as receivers for the wastewater generated on the site. A characteristic soil profile description for the Cecil soil encountered on the site is:

A_p	0-8"	brown sandy loam; weak fine granular structure; very friable; few fine roots; few fine fragments of quartz.
B_1	8-12"	yellowish red sandy clay loam; weak medium subangular blocky structure; friable; few fine roots and root channels; few thin faint patchy clay films on faces of peds.
B_{21t}	12-34"	red clay; weak medium subangular blocky structure; firm, sticky and plastic; few fine roots; few fine root channels; few to common medium pores; few thin faint discontinuous clay films on ped faces.
B_{22t}	34-48"	red clay; weak medium subangular blocky structure; firm sticky and plastic; few medium root channels; few to common medium pores; few thin faint discontinuous clay films on ped faces; few fine mica flakes.
	48"	boring terminated.

The primary limitation to the use of Cecil-like soil is the moderately slow permeability. To correct this, the recommended soil hydraulic loading is approximately .2 gal/sq. ft./day. A second recommendation is to utilize pressure distribution of the septic tank effluent within the field. Utilization of pressure distribution in the field will greatly facilitate the treatment capabilities of the site and render the entire area the treatment system.

Recommendations

The area upslope from the proposed wastewater receiver sites is pasture. The pasture is approximately 5 acres in size. It lies immediately upslope from Lots 28, 29 and 30. If these lots are to be developed, some method of catching and diverting the shallow subsurface drainage is absolutely necessary. The installation of french drains to daylight and the placement of a plastic fiber-wrapped pipe placed in the bottom and backfilled to within one foot of the soil surface should be adequate to move this subsurface run-on. Maintenance of this drainage outlet carried to daylight is critical if these systems are to function effectively with time.

Conclusion

A pressure dosed system with site drainage and moderate water conservation can be effectively utilized to treat the wastewater generated by single family homes located on the proposed lots in Carrollwoods Development, Iredell County, North Carolina. The drainage outlet for the shallow subsurface drainage must be maintained. The maintenance of the pumps and associated controls for the pressure distribution system in these systems are to function effectively with time. Lastly, maintenance of the moderate water conservation effort will be

necessary for the long term successful life of these facilities. An engineer should be contacted to assist with the detailed plans and specifications required for the installation of these shallow low pressure pipe systems. A prototype drawing of a pressure dosed system is included with this report.

If you have any questions, please do not hesitate to contact me at the letterhead address provided on the cover letter.

	Lines	Elev	
Upper 3	60	5.10	5.11
	61	5.11	5.11
	62	6.5	6.6
	67	6.6 1/2	6.7
	69	7.0	6.11 1/2
	66	6.11	7.0 1/4
Lower	66	7.2 1/2	7.2 1/2
	451		

Carolwoods Lot #28