Specifications and Scope of Work

for

INDIVIDUAL RESIDENCE

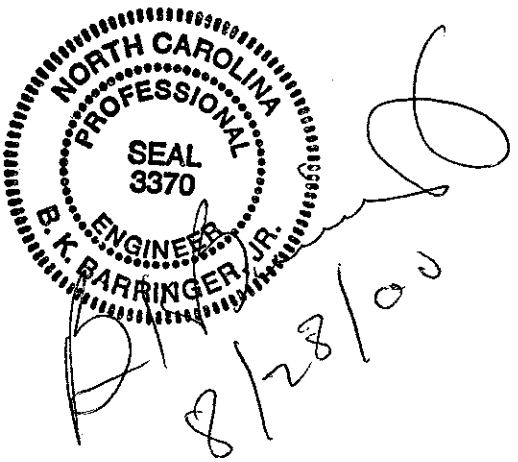
REPAIR OF LOW PRESSURE PIPING

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:

B. K. BARRINGER & ASSOCIATES, P.A.
N. C. Registration No. 3370
Suite 104 Westfield Center
125 East Plaza Drive
Mooresville, N. C. 28115
Phone (704) 664-7888
Fax (704) 664-1778

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.