LOW PRESSURE PIPE SEPTIC SYSTEM PLAN

FOR LOT 8 - THE HARBOUR - PHASE III

IREDELL COUNTY-NORTH CAROLINA

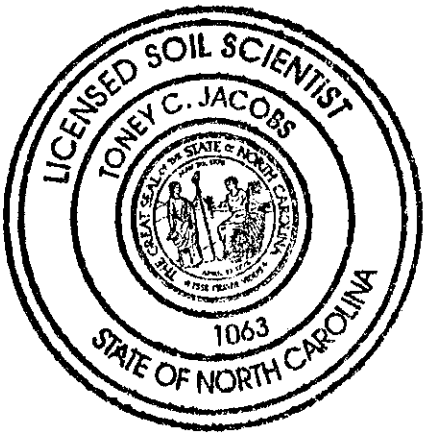
by

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Lot #8 - Harbour III

LOW PRESSURE PIPE SEPTIC SYSTEM

Design Considerations

This system is proposed for a single family residential lot of approximately 1.5 acres in a subdivision of single family homes in Iredell County. The system is designed for a 3 bedroom home to be served by community water. On July 25, 1996, backhoe pits were placed in the drainfield area and evaluated by Mr. David Hinson of the Iredell County Health Department, and Paul Penninger of Toney C. Jacobs & Associates, Inc. Overall, there was a seasonal high water table at 25-40" deep in the drainfield. Soil texture ranged from a sandy clay loam to a light clay. Because of limited soil depth and topographical difficulties, most of the lot is unsuitable for wastewater disposal. The soil evaluation determined there was an area provisionally suitable for a low-pressure pipe system (LPP). This area was only large enough for the initial system designed at a conservative loading rate. If the system requires repairing in the future, this will be on an off-site repair area located off of Lake Spring Loop. Crescent Resources, Inc. has installed the pipe run from Lot 8 to the septic area 8A.

There is a drainageway to the right of the drainfield area that is to be cleaned and filled with clean clay loam fill material. Runoff which did flow in this drainageway is to be ditched to the larger drainageway downslope. A french drain and surface water diversion will be required as an up-slope interceptor of run-on water.

Extreme caution should be used to not adversely impact the drainfield by working during wet conditions. There should be no cutting or leveling except by fill to the surface.

Location

The approximately 1.5 acre building lot is the first lot on the right on Morrows Ridge Lane, next to Chuckwood Road.

Reference

(1) *Design and Installation of Low Pressure Wastewater Treatment Systems,* by Craig Cogger, Bobby L. Carlisle, Dennis Osborne, and Ed Holland. UNC Sea Grant UNC-SC-82-03, May 1982.

(2) *Laws and Rules for Ground Absorption Sewage Disposal Systems 15A NCAC 18A. 1900,* NCDEHNR-DEH.

Recommendation

Six hundred and six (606) lineal feet of LPP lines in 18" trenches. Infiltrator (chambered) off-site repair.

Ownership Responsibility for a LPP Distribution System

Conservation measures should be undertaken in plumbing fixture specifications to minimize the volume of wastewater entering the disposal system, including, but not limited to the following precautions:

(a) Provide water conserving plumbing fixtures within the facility. Waterclosets must be 1.6 gal. flush (per code). Shower head should also have restrictions or be of low volume design.

(b) Develop conservative water use habits.

(c) Monitor and maintain the system as necessary for proper operation. An Operation Permit will require a maintenance contract to be filed with the Iredell County Health Department. It is recommended that the owner aggressively utilize this requirement because of its importance to system longevity. The management entity (certified operator) should be a part of installation process. If installed by other, it would be best if operator was consulted for a preclosure inspection.

System must be properly installed by a *qualified* and *competent* contractor following the requirements of the Iredell County Department of Environmental Health, DEH, the N.C. Building Code, Plumbing Code, and the Electrical Code. This plan, as any, is a guide to a minimum standard, but cannot take the place of experience and common sense. County inspector should allow additional inspection time because of complexity of system and need for exacting levels.

Components of System

1. Two compartment septic tank - 1000 gal.
2. Pumping tank - 1000 gal.
3. Submersible effluent pump and level controls - SSOMA certified
4. High water alarm signals which are UL approved
5. Supply pipe
6. Gate valves
7. Laterals with LPP distribution in trenches 18 inches wide, level end to end, and placed to the exact relative level specifications in plan. Each hole is to be protected by an 18" piece of 4" corrugated pipe. If the installer does not

understand this or its importance, he should not begin construction until certain of all requirements.

8. Valve box, turn-up stand pipe covers, miscellaneous elbows/bends as required.

Construction Sequence

1. Lines have been flagged as noted on drawing and in specifications.

2. Clear the area of all organic material with minimum soil disturbance (do not grade). Backfill any low areas or depressions with clean imported sandy loam and tamp to surrounding compaction and look. This includes soil evaluation pits and stump holes.

3. Install trenches per cited reference material and this plan. Top grade on pipes to be "level" from end to end and vertically from manifold and checked by sanitarian. (Note: This is a three valve designed system and uses two size holes).

4. All joints in lateral manifold piping shall be watertight connections to insure that the only source of water seepage from the system is through the orifices as designed. Carefully install manifold and lateral network according to the attached design layout. Protect valves with valve box. A larger diameter protective sleeve with cap or approved 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). Turn-up with two 45 degree elbows, not one 90. Area around pipe should be stabilized with crushed stone, both inside and outside of riser. Stone allows for infiltration of waste and wash water when system is maintained.

5. Carefully backfill manifold trenches to grade with clean clay or clay loam soil fill material which is carefully placed and compacted.

6. The installation contractor shall stabilize the area of construction by planting with Kentucky 31 tall Fescue and mulching. Area to be limed and fertilized with 0.5 tons lime, 75 units of N, 150 units P, and 100 units of K per disturbed acre.

7. The septic tank shall consist of an approved 1000 gallon capacity reinforced, precast watertight, concrete tank with full baffle and shall have easy access to each chamber from ground level for inspection. The first chamber of the septic tank shall consist of 2/3 to 3/4 of the volume of the total tank and the baffle shall contain a horizontal opening across the tank at about midway . Locate the septic tank at such height as to provide approximately 8" of cover soil over top of the tank.

8. The dosing tank shall consist of an approved 1000 gallon capacity, reinforced, precast, watertight concrete tank without baffle and shall have a concrete mounting pad (concrete blocks) for accommodating the pump. Test for leakage per regulations. Provide access for entry into the tank directly over the pump location, and extending 6" above final grade. Use a 30" diameter concrete well casing or equivalent and concrete well cap or other approved type cover. There must be a seal (masonry or seal rope) between well tile and top of tank.

9. All piping and fitting shall be SCH 40 PVC. Glue for all PVC pipe joints shall be as recommended by the pipe manufacturer. Note: On the distal end of each lateral turn-up should be 2 each, 45 degree elbows, rather than one 90 to facilitate maintenance.

10. Pump: The submerged pump shall be Model ME 50 manufactured by Myers or equal, 115 or 230 v/l phase; capable of pumping 37.2 gallons per minute at 28' of head.

11. Pump controls and alarm to meet specifications of .1952, all being compatible.

12. A "Warning Sign" shall be located within the house to inform the occupants of 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 contact upon malfunction of the system. This should be "management entity".

13. Pump and Controls: Details of pump installation are shown in the plan. The pump must be placed on concrete blocks on the bottom of the tank. This prevents the pumping of any solid particles which can clog the pipe system. A piece of nylon rope or other non-corrodible material should be attached to the pump and the outlet pipe for lifting the pump in and out of the chamber. Controls shall be fastened to a "tree" or the outlet pipe with clamps or brackets supplied by the manufacturer. The lower level control or "pump-off" must be positioned above the pump, so that the pump remains submerged at all times. The level control "pump-on" is positioned to pump a specified volume of effluent. The high water control float is then mounted about 3" above the upper pump-on 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. The pump outlet pipe should be connected to the supply manifold with a threaded PVC union (or dresser coupling) to allow quick removal.

14. 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 be plugged into a NEMA 4X approved outdoor receptacle. This must not be located inside the pumping chamber due to the corrosive and explosive gasses that may form from the sewage. This box must be a minimum of 1' above finished grade. Some level control switches have a box built into the housing, but are more expensive than the plug-in devices. Wiring between the pumping chamber and the station should meet State and local code requirements. A lightning arrester is recommended to protect the pump and controls from electrical surges.

15. 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 garden hose 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 house, and the pump should start operating. The alarm light should go off when the liquid reaches the lowest float control. Be sure the pump is still completely submerged.

16. 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) Adjust the gate valves until the effluent reaches the desired height in the "test tube". This may also be done with a weep hole in solid pipe at the desired height. Strive to be within 1/8" accuracy. Remember to include the distance below the ground surface to the lateral line when measuring the height. The pressure head should be as specified for each line. This is the height above the lateral where the liquid should be in the temporary "test tube".

17. Final Landscaping: After the system is installed, the absorption field should be reshaped to shed rainwater and be free of low areas to insure that the system will not be overloaded with excess rainwater and run-on.

Concluding Note:

This plan was done to facilitate permitting by the Iredell County Health Department by an agent of the owner. Any additions, or additional requirement(s), or deletions to enhance design or workability which will facilitate a permit are welcomed and may be made by note on this plan without returning entire design. The designer realizes that a plan with as many details as this can be changed and/or improved upon. The installer must realize that this is an exact plan and must be installed with exacting measurements. Should the installer desire a change, it must be approved by the health department in writing. Final inspection will also require more time and detail than a conventional system. If there are questions, please give me a call.

Design Specifications

Lots #8 - Harbour III

Daily design flow:	360 gpd. - 3bedroom house
Septic tank size:	1000 gal. (2 compartments)
Pumping tank size:	1000 gal.
Effluent loading rate:	0.12 gpd/sf for LPP system
Total length and diameter of supply manifold:	app. 245' lf of 2" sch 40 PVC
Number and length of laterals:	5 @ 96', 1 @ 76', and1 @ 50'
Hole size:	9/64", 5/32", and 11/64"
Hole spacing:	See design table
Total number of holes:	See design table
Flow rate through the system:	37.2 gpm
Elevation head:	10.7'
Pressure head:	2.0' - 4.6'
Friction head:	7.7'
20% contingency	4.6'
Total head:	28'
Pump requirements:	37.2 gpm at 28' of head; use Myers "ME 50" ½hp pump or equivalent with compatible electrical
Dosing volume:	234 gal. - 1.5 doses/day at design flow
Depth of water pumped per dose:	calculated to specific tank by measure or dealer engineering specifications(1 cubic ft. of water equals 7.48 gals.)
Pump run per dose:	approx. 6.3 min.
Check valve:	No
Siphon break hole:	Yes