SPECIFICATIONS & SCOPE OF WORK

FOR A

GROUND ABSORPTION SEWAGE DISPOSAL SYSTEM USING SEPTIC

TANK,

PUMP TANK, PRESSURE MANIFOLD

AND GRAVELLESS CHAMBER NITRIFICATION LINES

FOR

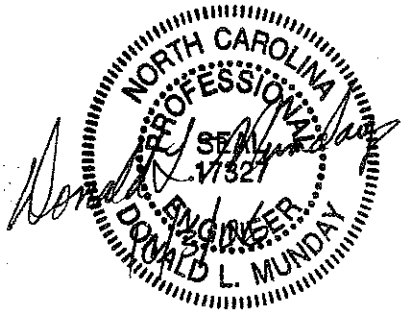
ELROD CUSTOM HOMES
LOT #826 THE POINT

Mooresville, Iredell County, North Carolina

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Care shall be taken to insure that a minimum amount of disturbing of the soil takes place in the nitrification field area. The terrain shall be graded to minimize any flow of surface water onto the nitrification field areas. Once the nitrification field and repair area are established, they shall be barricaded to prevent any vehicular traffic from passing over the area. No grading shall be allowed in these areas.

Establish final grade in the area of the septic tank, dosing tank, and supply pipes before excavation for tanks or burying of the supply lines.

The septic tank shall be 1,500-gallon capacity, precast concrete with full baffle. The tank must have approved access risers with lids to allow easy access to each chamber from ground level. The first chamber of the septic tank shall consist 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 its height. Locate the septic tank at such elevation to accept drainage from the collection system. Access holes and covers shall be DEH approved as called for on the plan. The tank shall bear a manufacturer's serial number and be supplied by a manufacturer approved by DEH. The outlet tee of the tank shall have an effluent filter as specified on the plans.

A Zabel Filter Model A-1800 micro-filter with 1/16" infiltration shall be at the outlet end in the septic tank. The filter shall be manufactured by ZABEL or approved equal, Zabel Environmental Technology, 10409 Watterson Trail, Louisville, KY 40299, 1-800-221-5742, Fax: 502-267-8801.

The pump/dosing tank shall be 1,500-gallon capacity. The tank must have approved access risers with lids to allow easy access to each chamber from ground level. Locate the pump/dosing tank at such elevation to accept drainage from the collection system. Access holes and covers shall be DEH approved as called for on the plan. The tank shall bear a manufacturer's serial number and be supplied by a manufacturer approved by DEH.

As called for herein, the tanks shall be filled with water and allowed to set for 24 hours to determine possible leakage and any leaking shall be corrected.

All precast tanks shall be tested for water tightness by an approved method such as 24-hour water tightness test with maximum allowable leakage not to exceed 1/2" drop in water level per 24 hours. The testing shall begin after the water level in the tank has stabilized. Any leaks shall be corrected and the tanks re-tested.

All pressurized piping and fitting materials shall be as called for on the plans and meet the following specifications. Pipe shall meet the requirements of ASTM D1784 for PVC compounds, National Sanitation Foundation Standard 14, ASTM D2241 for PVC pipe; ASTM D3139 and F477 for push on joints and gaskets. The force main shall be SCH 40 PVC pressure 2" diameter. Minimum bury depth shall be 36". Contractor shall place a tracer wire in the trench with the force main.

Pressure manifold shall be 4" diameter SCH 80 PVC, constructed as detailed on the plan. The manifold shall be placed in a manifold protective box. The manifolds shall have a clean out, a ½" pressure monitoring port and be securely anchored to the pressure manifold box as detailed on the plan. The supply pipe shall be fed from the manifold by 1/2" diameter SCH 80 PVC orifice pipes spaced at 6" centers, each having an adjustable true union ball valve. The supply pipe shall have a 3" clean-out/observation port as detailed on the plan. The pressure manifold box shall be precast concrete or masonry with steel removable lids as called for on the plans. A 6 inch bed of washed stone or gravel shall be placed under the manifold box to provide an outlet for water through the drain hole. The box shall be sized and constructed to accommodate the pressure manifold and lateral supply line as detailed on the plan.

The gravity flow supply pipe from the pressure manifold to the nitrification lines shall be solid or cellular core, SDR 26 PR 160 PVC pipe. These lines shall be secured by the pressure manifold boxes, have a slope of not less than 1% to the nitrification lines.

Nitrification fields shall conform to paragraph .1956 of the Laws and Rules for Ground Absorption Sewage Treatment & Disposal Systems. See 15A NCAC 18A .1956(3). Nitrification trenches shall be constructed, as level as possible, but in no case shall the fall in a single trench bottom exceed 1/4" in 10 ft as determined by an Engineer's level. The nitrification trenches shall not exceed a width of 3 ft and a depth of 18 inches. This is a gravelless chamber system therefore there is a 25% reduction in the drain field size. The minimum backfill over lines shall be 6 inches. Trenches shall be placed a minimum of 9 ft on centers. A 3 foot earth dam shall separate the fields and the pressure manifold. The finished grade over the nitrification

The pump and high water alarm must be placed on separate electrical circuit breakers. (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 inside the NEMA 4X control panel.

Wiring between the pumping chamber and the electric panel board shall meet State and local code requirements. Conductors shall be conveyed in 1-1/2" conduit or as called for with seal off. One for power cord and one for float control cords.

Pump Control: The pump shall be controlled by a simplex pump control as manufactured by SJE Rhombus or approved equal. The control shall have the following features:

- 230 volt, 1 phase, 3 wire (contractor verify).
- NEMA 4X fiberglass enclosure with locking hasp.
- Full size hinged inner door assembly for lights, switches, gauges, non-conductive, etc.
- NEMA Type 1 Size 00 contractor – Motor Starter.
- 110 Volt control circuit with breaker.
- Auto reset high water alarm test-normal-silence switch and inner door mounted indicator light.
- HOA switch each pump.
- Separate breaker for alarm circuit.
- 360-degree red flashing external top mounted alarm light at panel.
- 90 DB alarm horn with silence switch at panel.
- Terminal block for power supply, control switches and pump power wiring with individual terminals provided for each wire.
- Surge protection.
- Redundant low level off, pump enabler, alarm (three floats).
- Utility receptacle with GFI breaker.
- Color coded wiring with numbered terminal blocks.
- All components (switches, lights, etc) labeled.

The panel shall be permanently mounted a minimum of 24" above the ground in close proximity to the tank to insure no splicing of pump power leads or float control leads between the control box and the pump or floats. 1-1/2" diameter conduit with vapor seals shall run from the pump tank to the panel.

FLOAT ADJUSTMENT: After all components have been installed and connected, the system shall be checked for proper operation. The check shall be performed in the presence of the Design Engineer, representative of DEH, systems operator and owner. With electrical power turned off, fill the pumping chamber with water until the liquid rises to the level of the **high-water alarm** float. Turn on the electrical power. The alarm light and horn should activate, and the pump should start operating. The alarm will go off when the liquid level falls below the **high-water alarm float** level and the pump will go off when the liquid level falls below the **pump enabler** float.

CONTROL PANEL OPERATION: If the water level continues to rise enough to engage the **"Alarm"**, the audiovisual alarm shall activate and remain latched until the silence switch is pressed. When the silence switch is pressed, the audible alarm shall be silenced, and the top mounted alarm light will remain lit until the water level drops below the **"Alarm"** float, at which time the alarm circuit must be manually reset.

PRESSURE HEAD ADJUSTMENT: With the pump running and all air out of the supply line and manifold, a temporary ½" diameter by 3' long clear plastic pipe or test tube shall be connected to the test port on the pressure manifold and the effluent allowed to rise in the test tube. The valve at the head of the manifold should be adjusted to cause the effluent to stabilize at 2' above the pressure manifold. The pressure head is then correctly set. Turn off the pump, remove the test tube and plug the test port. All valves leading from the manifold to the nitrification lines shall be left in the open position. These valves will be used only if it is determined that certain nitrification lines should be deleted from the system at a later date.

DESIGN SPECIFICATIONS
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Design Flow:	480 gallons per day
Septic Tank size:	1 – 1,500 gal (two compartment) precast concrete with effluent filter w/ risers
Effluent Filter:	1 - Zabel A-1800 w/ 1/16" slots
NITRIFICATION FIELD:	
Field Pumping Tank Size:	1 – 1,500 gal (single compartment) precast concrete tank w/ risers
Effluent loading rate:	0.3 GPD/SF
Total length and diameter of Supply force main:	325 LF 2" diameter SCH 40 PVC pressure pipe
Total linear feet of laterals:	400 LF, 5 lines at 81.25' @ 9' CTS min.
Number of Chambers:	65 - 6.25' gravelless chamber units
Pressure Manifold:	4" SCH 80 PVC w/ 5-½" Dia SCH 80 orifices
Manifold placement:	Above field
Flow rate through the system:	25.55 GPM
Elevation head: Operation head: Friction head: Total head:	6 ft 2.0 ft 4.22 ft 12.22 ft
Pump requirements:	25.55 GPM @ 12.22' head; use Goulds Model 3885 1/3 HP – 115V – 1 Phase (Contractor to verify)
Control Panel:	SJE Rhombus Simplex Panel or approved equal.
Dosing volume:	180 gallons
Depth of water pumped per dose:	5.24 inches (Contractor to Field Verify)
Pump run per dose:	7.04 min. per dose
Check valve:	Yes
Siphon break hole:	Yes

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DESIGN FLOW = 4 BR x 120 G/D = 480 G/D

$\frac{480\ G/D}{0.3\ G/D/SF} = 1600\ SF / 3 = 533.33\ LF \times 0.75\ (25\%\ REDUCTION) = 400\ LF$ CHAMBERS

USE 5 LINES @ 80 LF EA 13 panels each line @ 6.25 LF EA
13 x 5 = 65 TOTAL PNLS

USE 4"Ø SCH 80 PVC PRESSURE MANIFOLD w/ 5 - ½"Ø SCH 80 PVC TAPS

5 x 5.11 GPM/ORIFICE = 25.55 GPM

DOSE 60-75% VOLUME
GAL/100 LF 4" PIPE = (65.3 GALLON x 400 LF)/100 = 261.20 GALS

60% - 172.39 GALS
75% - 195.90 GALS

∴ DOSE 180 GALLONS

USE 1500 SEPTIC TANK w/ NICDENE-ENK MULTI-APPROVED FILTER
USE 1500 GAL PUMP TANK

FLOW = 25.55 GPM
FRICT. HD = 4.22 FT
OPER. HD = 2 FT
STATIC HD = 6 FT
25.55 GPM @ 12.22 'TDH
USE GOULDS MODEL 3885 ½ HP, 115V 1PH OR APPROVED EQUAL

FRICTION LOSS =
FM LENGTH = 320 LF
= 320 x (1.10/100) x 1.2
= 4.22

TANK
64" x 124" = 5.33 x 10.33 x 2.48 x .08333 = 34.33 GAL/IN
DRAWDOWN = 180 GAL / 34.33 GAL/IN = 5.24"

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD