SPECIFICATIONS, CALCULATIONS, SOIL'S REPORT AND MANUFATURER'S CUT SHEETS FOR A FLOW EQUALIZATION SUBSURFACE SEWAGE EFFLUENT DISPOSAL SYSTEM

FOR

EARNHARDT PROPERTIES, LLC CABIN

1701 CODDLE CREEK ROAD
MOORESVILLE, IREDELL COUNTY, NC

March 8, 2012

As Built 5/10/2012

PREPARED FOR:

Earnhardt Properties, LLC
1675 Coddle Creek Road
Mooresville, NC 28115
Phone: 704-662-8978

PREPARED BY:

PIEDMONT DESIGN ASSOCIATES, P.A.
Suite 101 Westfield Center
125 East Plaza Drive
Mooresville, NC 28115
Phone: (704) 664-7888
Fax: (704) 664-1778
NCBELS: C-1007



EARNHARDT REAL PROPERTIES, LLC CABIN
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SECTION I - GENERAL

Earnhardt Real Properties, LLC is proposing to remodel the residence behind DEI Shop on Coddle Creek Road in east Mooresville, Iredell County, North Carolina in order to handle special events limited to 250 persons maximum with 15 part time employees. Since the proposed lodge is only capable of handling 150 persons, events with more than 150 persons will be limited to outside use. Catering to events will be required to be brought in. No commercial kitchen will be installed at this facility. Activity will be limited to a maximum of four days per week (Thursday through Sunday) and only on days of events, there will be 15 employees. Due to this system operating only a portion of every week, the Engineer is proposing to use a flow equalization system to reduce the size of the drainfield. The design flow is 1,625 gallons per day four days per week and 928.57 gallons per day (flow equalized) An LTAR acceptance rate of 0.30 gallons per day per square foot is recommended by the local health department.

Daily Design Flow Table

Day of the Week	Flow (GPD)
Thursday	1,625
Friday	1,625
Saturday	1,625
Sunday	1,625
Monday	0
Tuesday	0
Wednesday	0

Directions to the property: From Highway 150 in Mooresville head east on Highway 3. Pass through downtown Mooresville and continue east. Just past Rocky River Road on right, Dale Earnhardt, Incorporated will be on your left. Proceed to security checkpoint and they will direct you to the location. The facility is to be served by municipal water supply with water sources located more than 100 feet from any septic system component. There are no several existing wells on the property and care shall be take to observe all setbacks.

Paul Penninger, LSS with S&ME has evaluated the area for the primary and repair disposal areas. A maximum application rate of 0.30 G/D/SF has been recommended for this system.

These specifications and design plans have been prepared for a flow equalized on-site subsurface effluent disposal system using a septic tank, pump tank/flow EQ tank, pump & time dose control panel, force main, pressure manifold and gravel-less chamber laterals.

The system is designed to accept and treat domestic waste only. No other discharge is allowed, including condensate water from HVAC systems, etc.

The Engineer has designed a time dose flow equalization system that pumps effluent to a pressure manifold to 10 laterals located at 9 foot centers using design criteria intended to comply with NC DEM Administrative Code 15A NCAC 2H.0200 and 15A NCAC 18A .1969, and IWWS-2004-1 (Flow Equalization).

Until plan acceptance and construction, the drain field site shall be maintained undisturbed. This shall include placement of signs, ribbons and barricades to avoid traffic, storage, or parking in the area. Encroachment by any utility or others is not permitted.

The Contractor shall be prohibited from working while the site is wet. The Contractor shall contact the Engineer prior to commencement of work after rainfall.

The Engineer or the Soil Scientist has the right to suspend work until soil moisture conditions are favorable to optimal installation.

The installer shall be knowledgeable of the type of system to be installed, and shall have prior instruction on the installation of the various components of the system, and shall have the prior approval of the component manufacturers, and the approval of the design engineer.

Scope of the Project: The scope of this project is to construct a system to collect the waste from the proposed facility via gravity collection system. The waste will flow to a 3,000 gallon two-compartment septic tank. The outlet at the second

compartment of the tank will have a slotted wastewater effluent filter. From the 3,000 gallon septic tank, the effluent flows through a 6,000 gallon flow EQ/pump tank adequate to allow for peak flow day and for time release of the effluent via pump. A time dose control panel will pump treated effluent through headworks box to the pressure manifold and laterals.

The pumping system will have a time dose simplex pumping system with floats controls to allow the automatic dosing of the pressure manifold and laterals.

The pump controls will have a 24-hour clock, programmable as determined by the Engineer and the Operator. Controls shall also have elapsed run time clock and cycle counter for the pump. The controls shall also have manual operating capabilities and alarms. The controls are to be located at a readily accessible location at the facility.

SECTION II - REGULATIONS

A. In addition to compliance with laws, rules and regulations as required under the General Conditions of these Documents, the Contractor shall comply with the following specific regulations as applicable to the nature of work included under this Contract.

Reference Material:

(1) 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; Amended effective January 10, 1997.

(2) EPA 625/1-80-012 Design Manual - Onsite Wastewater Treatment and Disposal System; Oct.,1980; Chapter 7

(3) NC DEM Administrative Code: 15A NCAC 2H.0200., 15A NCAC T15A Section .1900

(4) NC DEH - Onsite Wastewater approval: IWWS-2004-1

SECTION III - BASIS OF DESIGN

DEVELOPMENT DESCRIPTION

Location

DEI Lodge

1701 Highway 3 (Coddle Creek Road)
Mooresville, Iredell County, NC

Water Supply
Municipal

Sewage Disposal
Simplex Flow Equalized Dosing System with Pressure Manifold

Proposed Application Rate
0.30 G/D/Sq. Ft (0.30 G/D/Sq. Ft Repair)

PROJECTED WASTEWATER FLOWS

Proposed Use
Special Event Center

Base Design Flow
1,625 G/D (Actual Flow) for 4 peak days/week
928.57 G/D Flow Equalized

DESIGN BASIS - TREATMENT SYSTEM

Septic Tank
3,000 gallon pre-cast tank with baffle SRTC (STB-920)

Effluent Filter
Polylok PL-525 or approved equal

Pump/Flow EQ Tank
6,000 Gallon precast tank SRTC (PT-165)

Forcemain
~~+/-975 LF~~ 1029 LF 2-Inch Dia. SCH 40 PVC (Pressure Rated)

DESIGN BASIS - DISPOSAL SYSTEM

Area
12,000 Sq. Ft. Minimum (12,000 Sq. Ft. w/ Repair)

Nitrification Lines
Ten laterals with a total of 1,040 LF (104 LF ea.) installed at a minimum of 9 ft centers. See LHD for trench depth.

Pressure Manifold
8-Inch Diameter SCH 80 with 10-1/2" SCH 80 Taps

SYSTEM HEAD

Elevation Head:
~~46.46~~ Ft. 34.36

Operation Head:
3.00 Ft.

Friction Head:
~~24.23~~ Ft. (Includes minor losses) 25.52

Total Dynamic Head (TDH):
~~73.69~~ Ft. 62.88

Effluent Pump:
GOULDS WE2012H
~~Zoeller Model 189~~ 2 HP/230 V/1 Ph
(54.8 GPM @ ~~73.69~~ 62.88' TDH) Effluent Pump or approved equal

Control Panel:
~~SJE – Rhombus – TD – Simplex – Panel – Model IFS11W114H10B15A18A~~ or Approved Equal
AQUAWORX ICP-SCB02

Flow Rate Through System:
54.80 Gallons per minute

Dosing Time per Day
15.40
~~16.94~~ min/day (2 doses per day)

Pump Run
2 times a day for ~~8.47~~ 7.7 minutes each dose

Check Valve:
2 Inch Diameter

Siphon Break Hole:
5/32 Inch Diameter

SECTION IV - COMPONENTS OF SYSTEM

- Gravity Collection system from lodge
- 1 - 3,000 gallon septic tank with slotted filter and access port
- 1 –6,000 gallon pump/flow EQ tank
- Simplex time dose control panel, pump, floats, valves, etc
- Forcemain (2-Inch Diameter SCH 40 PVC)
- 1 – Drainfield with pressure manifold and laterals

*Adequate area is available for repair and is shown on site plan.

A. TREATMENT SYSTEM

1. General Requirements - The Contractor shall furnish, install, test, and place into service and warrant the complete system. The major system components including precast tanks, effluent filter, pump, controls, pressure manifold and drain field. Accessories shall be supplied by a single operating entity and shall be equal to that as specified.

2. Five sets of submittal documents and shop drawings for all mechanical equipment and major materials including piping, tanks, and all other accessories shall be furnished to the Engineer for approval. No equipment shall be installed prior to approval by the Engineer.

3. Precast Structures - General: This section shall apply to the septic tank and pump/flow EQ tank as shown on the Contract Drawings.

4. Approvals: The tank designs shall have been approved by the Division of Environmental Health of NCDENR and shall have the approval number imprinted on the delivered tank. All tanks shall be State Approved and equal to that manufactured by Stay Right Precast, Inc., or Engineer and Division of Environmental Health of NCDENR approved. Openings or inserts shall be cast in during manufacture. Concrete shall have a minimum compressive strength of 4,000 psi @ 28 days. Shop drawings shall be submitted to the Engineer for approval. If tanks are to be located in traffic area, then tanks shall be constructed to meet H-20 highway loadings.

5. Septic Tank shall consist of a 3,000-gallon capacity, reinforced, precast 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 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. The PVC outlet tee shall extend one-fourth depth of liquid level and contain an effluent filter. Locate the septic tank at such height as to provide approximately 8" of cover soil over top of the tank or as necessary to receive gravity flow from the collection system. Provide access at each end of the tank. All pipe penetrations through precast concrete tanks shall be PRESS-SEAL CAST-A-SEAL 402 rubber boots and grouted or approved equal.

6. Slotted Effluent Filter: A Polylok model PL-525 micro-filter with 1/16" infiltration shall be at the outlet end of the septic tank and septic/recirculation tanks. The filters shall be manufactured by Polylok, Inc or Engineer approved equal.

7. Pump/Flow Equalization Tank shall be a 6,000-gallon capacity, reinforced, precast concrete tank without baffle. Provide access for entry into the tank directly over the outlet using OSI lids, risers, and tank adapters, and extending 6" above final grade. Provide access for entry into the tank directly over the pump location. Use a state approved riser and lid system including lid, risers and tank adapter or approved alternate. Riser shall be made watertight at the tank. If tank is to be installed in traffic areas, the access shall be through 24" cast iron manhole frame and cover. The PVC outlet tee shall extend one-fourth depth of liquid level and contain an effluent filter. Locate the tank at such height as to provide approximately 8" of cover soil over top of the tank or as necessary to receive gravity flow from the collection system. Provide access at each end of the tank. All pipe penetrations through precast concrete tanks shall be PRESS-SEAL CAST-A-SEAL 402 rubber boots and grouted or approved equal. A stainless steel chain or nylon lifting rope shall be mounted to side of riser lid within 12 inches of lid to and attached to pump to allow to removal of pump from tank. PVC outlet pipe is too fragile to lift pump out by.

8. Pumps: The new submerged pump shall be ~~Zoeller~~ GOULDS Model ~~189~~ WE2012M 2 HP/230 V/1 Ph capable of pumping 54.80 G/M at 62.88' ~~73.69~~' TDH or engineer approved equal. The pump power cord shall be adequate length cord to reach the control panel without splicing (20 ft maximum). The pump shall have a stainless steel lift chain attached to the access riser or access rail system as shown on the plans.

9. Pump Control: The pumps shall be controlled by a simplex timer controlled pump control. The control shall be manufactured by ~~SJE Rhombus~~ model ~~Model IFS11W114H10E15A18A~~ or NCDENR-OSWW approved equal and have the following features: AQUAWORX ICP-SCB02

- Incoming pump power shall be single-phase, 60 Hz, 120/208/240 volts AC.
- Incoming control/alarm power shall be single-phase, 60 Hz, 120 volts AC.
- Easy to use touch pad for programming pump control.
- The control panel is to have models available that interface with float input and models available that interface with transducer input.
- Float-operated models shall incorporate three (3), or four (4), normally open, mercury or mechanically-activated control switches with pipe clamps. Inputs shall be labeled in the panel as stop, lead, lag/alarm, and alarm for demand dose and redundant off, timer enable, high alarm, and timer override (timed dose models). Floats shall be SJE-Rhombus control switches or approved equal.
- The control panel is to have a means to be configured in the field to operate as either a time dose or demand dose panel.
- The control panel is to be equipped with separately fused alarm and control circuits.
- The control panel is to be equipped with float status indicators, pump run indicators, Hand – Off – Auto status indicators, and power on indicators.
- Panel must log the following data: Pump run time, cycle counts, alarm counts, float out of sequence counts, and timer override counts (time dose only).
- Alarm must activate if floats operate out of sequence (float model)

10. **CONTROL PANEL OPERATION:** The pump control panel shall have flow equalization capabilities. Dosing of drain field will be accomplished on a timed basis to allow for flow equalization. The pressure manifold will receive a specific dose volume. The pump run time shall always be ~~8.47~~ 7.7 minutes per dose. The dosing volume to the manifold will be restricted by the number and size of the orifices in the pressure manifold. These dose events will be timer controlled and set to occur 2 times per day. If there is not enough effluent in the pump tank to activate the pump enable switch, the control panel will not call for a pump run event. If this continues to occur, the operator shall consult the Design Engineer about adjusting the dosing schedule to correct this issue. Each pump run event shall be controlled by a programmable timer with pump run time set according to system specifications. Once a pump run event begins the pump will turn on and run the time set on the "pump run timer" even after the pump enabler float drops back to its normal position or until the "redundant low water off switch" is activated. The control panel shall be programmed to generate an alarm condition "Pump Failure" when the pump enable float is up and the pump timer calls for pump activation but the pump does not function. (Condition detected by use of a current sensor.)

The control system shall be equipped with a timer override circuit to manage peak flows and excess water use. If the water continues to rise enough to overcome the "Timer Override" (third) float and the override selector switch is on, the pump shall be activated, regardless of the time clock position. The pump will continue to run until a full dose has been discharged to the field. Once a full dose from the timer override has been executed, the pump will shut off and the normal pumping cycle shall resume. The control shall be provided with a cycle counter attached directly to the "Timer Override" float to register the number of override events. If the water level engages the "Alarm" (fourth float), 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 automatically reset.

In case of power off, the controls shall remember the last time to operate so that the indexing sequence is not lost by power off. The control panel shall be micro-processor based with a user friendly data entry keypad mounted on the hinged inner door, which shall allow easy input and export of pump run times, event counts and any necessary time delays. Changes or reconfiguration of the program shall not be necessary to alter any of the above-mentioned data, including the number and sequence of pump and/or fields. The controller shall be configured so that fields may be left out of the pumping sequence by simply leaving its respective H-O-A switch and alarm switch in the off position.

11. **FLOAT SWITCHES:** Provide four liquid sensor float switches ("redundant pump off", "pump enabling", "timer override" and "alarm") in the dosing tank for pump operation and alarm. Such float switches shall be equal to SJE Rhombus Super Single, or approved equal, and shall be a sealed mercury switch with adjustable operating weights. Cables shall be of adequate length to reach the control pump without splices. The floats shall be hung from a stainless steel mounted bracket inside the access hatch.

All controls and power wiring for the entire wastewater disposal system shall be in compliance with all local, state and federal regulations, codes and ordinances, and shall be confined on the site generally to the area of the pumps, control floats, control panel. The wiring shall be run in gas and watertight conduits from the pump tank to the control panel as

shown on the plan. After the installation of the wiring, each conduit shall be sealed to prevent septic fumes from reaching the control panel. The seal and cables shall be removable for replacement. The installation contractor shall be responsible for coordinating with other Contractors and Owner for a source of the correct power (voltage and phase) and adequately sized breaker in the panel; the costs of obtaining all power and control wiring for this system and shall coordinate his work with the electrical contractor and with the Owner.

Pump power wires and control wires shall run in PVC conduits from the access openings at the dosing tanks to the location of the pump control panel mounted nearby. Bury conduit to a minimum depth of 24-inch below grade.

12. **FITTINGS AND VALVES:** All fittings and valves within this piping system shall be PVC ball valves capable of sustaining the working pressure and imposed loads. The fittings and valves shall be compatible with the pipe used. Valves shall be PVC Ball Valves with seats of self-lubricating Teflon and seals of Viton "O" rings with bell and spigot connections or as approved by the engineer.

13. **PRESSURE FORCE MAIN:** within the tank shall be 2-inch diameter SCH 40 PVC. Pressure force main from the tank to the H-Valves and pressure manifolds shall be 2-inch diameter SCH 40 PVC as called for on the plans. These pipes shall be buried with 3 feet minimum cover. A 2-inch diameter gate valve shall be installed at the end of the pipe before the manifold (within the concrete vault) to allow for final pressure adjustment at the manifold.

14. **PRESSURE MANIFOLD:** shall be an 8-inch diameter Schedule 80 PVC, ASTM D-1785, constructed as detailed on the plan. The manifold shall be located above the nitrification field and placed in a precast concrete manifold protective box. The manifold shall have a clean-out, a 1/2-inch pressure head monitoring port with valve and be securely anchored to the pressure manifold box. Pressure manifold taps shall be securely anchored to the pressure manifold box. Pressure manifold taps and the manifold shall be constructed as detailed on the plan.

15. **PRESSURE MANIFOLD BOX:** Shall be precast concrete as constructed by Stay Right Tank Company, or approved equal, lockable aluminum lid sized to allow removal. The box shall be sized and constructed to accommodate the pressure manifold cleanout, lateral supply lines, the flow adjustment valves and inspection ports in each lateral. The precast box shall have a drain hole in the bottom over a bed of washed stone to allow the box to drain. The lockable lid shall have a checked aluminum plate with or be reinforced concrete with removable access hatch over the test port as called for on the plan.

16. **GRAVITY DISTRIBUTION LINE:** The gravity flow distribution pipe from the distribution manifold to the chambers shall be solid-core 3-inch SCH 40 PVC pipe. These lines shall be secured by the pressure manifold box, have a slope of not less than 1/4-inch per foot to the gravel-less chamber lines.

17. **NITRIFICATION FIELD:** Lay out the nitrification field network area with stakes and flagging. As soon as the absorption area and repair areas are designated, they should be identified, barricaded 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. Maintain 25 foot separation between nitrification fields and 10 feet from any property lines and 15 feet from top of cut slopes greater than 2 feet. Each nitrification lateral may be gravel-less chambers or Engineer and NCDENR-OSWPS approved equal. If no reduction will be given for use of a innovative trench technology, the installer, with permission from the local health department, install the chambers at conventional length.

18. **NITRIFICATION TRENCH:** Shall be constructed as level as possible, but in no case shall the fall in a single trench bottom exceed 1/4-inch in 10 feet as determined by an Engineer's level. The nitrification trench shall not exceed a width of 3 feet and shall be at a depth recommended by the Local County Health Department. An earthen dam shall separate the nitrification trench from the gravity supply pipe. Remove loose soil from bottom of trench. No rock shall be used in nitrification trenches. The soil cover over the nitrification fields shall be to a depth of at least 6-inch or as shown on the plan. The finished grade over the nitrification fields shall be landscaped to prevent the ponding of surface water; and runoff of surface water shall be diverted away from the nitrification fields. Install inspection ports (if needed) and diversion swales as called for on the plans.

Carefully backfill supply pipe trenches to finish grade with clean (debris free) earth (no stone).

SECTION V - SYSTEM INSTALLATION

- Prior to actually beginning construction of the system, entire system shall be staked by a NC Licensed Surveyor.
- Contractor shall contact the Local Health Department, Design Engineer, Manufacturer's representative and Soil Scientist for a preconstruction meeting.

- Contractor shall verify all elevations of all system components.
- As soon as the absorption area is designated, limits of laterals and drainfield shall be flagged by a Licensed Surveyor, roped off and isolated from construction traffic. This barrier should be maintained until the Owner accepts the system. Refer to site plan for the size of absorption area and field locations.
- Observe all side yard, building, and other setback restrictions. Installation of the system shall be performed under the supervision of the Local Health Department.
- Installation of the septic system shall be coordinated with the owner and scheduled as necessary to comply with overall facility operation.
- Installation of the system shall be performed to the satisfaction of the Owner, Design Engineer and Health Department.
- The Contractor shall install all components of the system in strict accordance with the plans and specifications. Upon completion of the system construction, the Contractor shall charge the system with water and go through a complete cycle. Any failure or discrepancy shall be corrected.
- The manufacturers of the components and the contractor shall warrant the components and system for one year from the date of acceptance by the Owner.

Utility Crossings & Locations

The contractor is responsible for locating all services before beginning work on the site. The plans are approximate and may not show all utilities.

- Water Line Vertical Separation: Clear separation distance when a water line crosses over a sewer must be at least 18-inches at the closest point. When conditions prevent an 18-inch clear separation from being maintained, or whenever it is necessary for the water line to cross under the sewer, both the water line and sewer shall be constructed of ferrous materials with mechanical joints equivalent to water main standards for a distance of at least 10 feet on each side of the point of crossing, with full sections of pipe centered at the point of crossing.

- Storm Drain Separation: Horizontal separation between sewer lines and storm drains shall be at least five feet. Vertical separation between sewer lines and storm drains at crossings shall be at least one foot at the closest point unless the sewer is of cast iron pipe or encased in concrete for at least five feet on either side of the crossing.

Tank Installation

- Have Surveyor locate tank corners from site engineering plans.
- Excavate to 8" below tank base. De-water excavation if required.
- Add 6 to 8 inches of clean #57 washed stone.
- Check to ensure stone base is level and elevation is correct.
- Carefully lower bottom section of tank into position with proper rigging and lifting techniques.
- Add butyl seal around tank seams.
- Install next or upper section until tank installation is complete.
- If tank is installed in groundwater, contact design engineer.
- If tanks are not installed in groundwater backfill excavation with clean material and to within 12" of the inlet pipe.
- Check level of tanks.

  NOTE: Use care while backfilling to prevent tank movement and/or damage to tanks.
- Seal inside tank to ensure tank is watertight.
- Seal all pipe penetrations and fill with water to 12 inches over riser attachment on tank and perform water tight test.
- Once testing (See Section on Tank Testing) has been approved by the design engineer, install all piping, pumps, etc within tanks as called for on the plans.
- Install wiring with water tight conduit from control location to tanks.
- Back fill around tanks with clean material to final grade.
- All components shall be checked and proper flow verified.

Electrical Installation

Install the control system and wire per NC Building Code and NEC by a licensed electrical contractor. Contractor shall verify available electrical power and before ordering components. Provide and connect to properly sized and number breakers in the main control panels as called for.

Drain Field Installation

Laterals shall be flagged by a NC Licensed Surveyor on contour along the centerline. As soon as the absorption area is designated, it should be roped off and isolated from construction traffic. This barrier should be maintained until the Owner accepts the system. Refer to site plan for the size of absorption area and field locations. Observe all side yard,

building, and other setback restrictions.

Site shall be cleared of any and all man-made debris, construction materials, etc., larger diameter and small diameter trees at the hub and other vegetation and debris by system installer only. Dispose of legally. If a tree is unable to be removed, the contractor shall raise the canopy on tree to a minimum of 8 feet above the existing ground surface so that sunlight can reach the ground surface. Do not remove any stumps with any earth moving equipment. Stumps shall be ground up with minimal distribution to surrounding soil.

Laterals shall be installed in the ground after the ground surface has been scarified and raked smooth as directed herein. The laterals shall be installed at a depth of as directed by the Local Health Department on contour. After installation, the area shall be raked smooth to drain and to prepare for grassing. A 9 foot minimum lateral separation must be maintained centerline to centerline. Refer to the site plan for the size of the absorption area and zone locations. Observe all setback restrictions.

No work shall be performed on the drain field under wet conditions. "If it is too wet to plow," it is too wet to work on the drain field. The Contractor shall avoid the smearing of the wetted surface and should this occur, work shall be suspended. After installation of the lines, the ground surface shall be shaped to allow good surface drainage to prevent ponding of surface water. All disturbed areas shall be raked smooth and seeded according to specifications.

Force Main Installation

Contractor shall have a Licensed Surveyor shall stake the alignment of the force main. Forcemain shall be buried with 3' minimum cover. Fill material shall be clean and free of any roots, rocks, etc. that could potentially damage the pipe. Install thrust blocking at bends as required.

Continuous warning tape shall be buried above all buried plastic pipe. Warning tape shall be 6" wide, 4 mils thick blue/green polyethylene. This warning tape shall be installed 12" to 18" below finished grade. The words "caution - water/sewer line buried below" shall be printed on the tape in 3" high letters at approximately 3' intervals on centers. Warning tape shall be placed printed side up, essentially parallel to finished grade. The top of the pipe shall be installed 18" to 24" below the warning tape. A copper tracing wire shall be zip tied to the pipe for locating.

Trenches shall not be opened for more than 300 feet in advance of the complete pipe nor more than 100 feet in the rear thereof.

Backfill material shall contain no organic material, rocks larger than 4-inches or construction materials. The material shall be relatively dry and shall have no tendency to flow when compacted. No rocks shall be installed against pipe.

All force mains shall have 3' min cover.

Final Landscaping: After the system is installed, the following should be checked to ensure that the system will not be overloaded with excess rainwater and run-off.

(a) The drain field is shared to shed rainwater 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.

Any problems should be corrected before approving the system.

Finally, all disturbed area should be planted with grass according to specifications.

Seeding: After completion of the drain fields, the site shall be stabilized with tall fescue grass. This should be seeded at the rate of 25 lbs. per acre each for a total of 50 lbs. per acre. Before seeding, lime should be added at the rate of 1.5 tons per acre. Fertilizer should be added at the rate of 100 units of Nitrogen, 120 lbs. of P_2O_5 and 120 lbs. of K_2O. Both the lime and fertilizer should be lightly incorporated into the soil before adding seed. After seeding, the area should be mulched until stand is established. Due to the erosion potential of this soil, this is an important part of the system.

CONSTRUCTION & INSTALLATION TESTING

Requirements for Leakage Testing Precast Tanks

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" rise or fall in water level per 24 hours. Test shall be run with risers/and inlet/outlet pipes in place. The testing shall begin after the water level in the tank has stabilized. Any leaks shall be corrected and the tanks re-tested. Installer shall ensure that the tank remains level and true to grade after placement and filling with water. Each tank shall be installed in the location and to the elevations shown on the plans.

Once testing of the tank has been completed, the tanks shall be backfilled in lifts with well compacted, debris free earth to a level, which directs surface water away from the tanks. All tank lids shall be lockable or constructed to prevent easy removal. Tank access in traffic area shall be 24" cast iron manhole frame and lid.

The Contractor shall be required to provide as many tests and/or certifications as the Engineer may deem necessary.

Requirements for Leakage Testing-Pressure Force Mains

Required testing of pipelines and valves shall be done under the direct supervision of the Project Engineer. Field-testing shall not negate the requirements for material certifications as contained in the material specification section of this contract. Unless otherwise directed by the Engineer, all testing and disinfection will be completed prior to connection to any existing line.

Hydrostatic & Leakage Tests

On completion of the line or sections of the lines, connections and appearances, the line shall be filled and hydrostatically tested. The water for testing purposes can be taken from the nearest available water main under the supervision of the Engineer's Inspector or the contractor may install a well on site and ensure that all setbacks are observed in doing so and leakage will be measured by the Inspector. All leaks and any defective material shall be repaired or replaced to the satisfaction of the Engineer and the tests repeated until the requirements of this specification are met. Any special equipment, pumps, etc., required to make the test shall be furnished and operated by the Contractor as directed by the Inspector.

The Contractor shall use great care to be sure that all air is expelled from each section under test. If service connection or other openings are not available for the purposes of expelling air, the Contractor shall provide air release of sufficient size (as determined by the Engineer).

Specific procedures for testing main are as follows:

- The test pressure will be 100 PSI at the low point of the section under test.
- Allowable leakage will be determined by Table 6, AWWA C-600 (see below) or by the formula $1 = 0.000106SD$ where S in the length of pipe under test and D is the pipe diameter.
- Pressure and leakage tests will be run concurrently and for duration of four hours except as modified below.
- The Contractor will pressurize the line and verify that it is within allowable leakage before the official test is started.
- The Inspector will begin the test and remain at the job for the first hour, making sure that the test pressure is maintained within 5 PSI. The Contractor is to maintain the pressure within 5 PSI for the duration of the test period. At the end of the first hour, with the line pumped to full test pressure, he will read the meter and record the first hour leakage. If the first hour leakage is within allowable, he will return at the end of the fourth hour and again read the meter. If the total leakage for the four-hour period does not exceed four times the first hour leakage, the test will be terminated. If the total leakage exceeds four times the first hour leakage, but is still within allowable, the test will be held an additional hour. If the fifth hour leakage does not exceed the average hourly leakage for the first four hours, the test will be terminated at the end of the fifth hour. Otherwise, the test will be held until the leakage is non-increasing and within allowable for two consecutive hours.
- If leakage exceeds allowable for the four-hour test, the test will be terminated and re-scheduled after the Contractor has verified that actual leakage is within the allowable leakage, but no earlier than the next working day.
- If the first hour leakage does not exceed 15% of the allowable, or if the allowable leakage rate does not exceed 0.4/gal/hr, the test may be terminated at the end of two hours provided the second hour leakage does not exceed the first hour leakage. If the second hour leakage exceeds the first hour leakage, the test will be held for an additional period as described in Paragraph (e) above.
- The maximum length of pipe testing in one test shall be 5,000 feet or as close to 5,000 feet as possible depending on valve spacing.
- During the last stages of the test and without any reduction in pressure progressing from the end opposite the test pump, each mainline valve will be closed and pressure released to determine if the valve is holding pressure (minimum 10 minutes per valve closing).

The Contractor shall be required to provide as many tests and/or certifications as the Engineer may deem necessary for materials, such as concrete, piping, valves, steel reinforcement, all fasteners and anchorage systems, etc. Testing for materials shall be made by a separate independent test laboratory employed by the Contractor and approved by the Engineer.

The contractor shall coordinate and schedule site visits, installation and startup assistance from the equipment manufacturers.

SECTION VI - OPERATING CHECKS AND ADJUSTMENTS (START-UP)

The system shall consist of: (1) 3,000-gallon precast baffled septic tank with effluent filter, (1) 6,000 gallon pump/flow EQ tank, pump, floats, controls, force main, pressure manifold & nitrification field.

1. After permanent power has been connected and all components of the system have been installed, the contractor shall schedule a time for the checking of the system for proper operation. The check shall be performed in the presence of the Design Engineer, installation contractor and owner. Any discrepancies shall be corrected until the system operates as designed.

It is the Clients responsibility to ensure that the Contractor checks the entire system and takes the system through a complete test cycle prior to Engineer making certification startup visit. This includes:

- Ensuring that all risers and lids are at grade and readily accessible
- Floats are set at the proper elevations as required
- Pumps are operable and delivering the required flow and head
- Panels are in operation and operate as called for herein
- Area around treatment and disposal area are at finished grade, raked fine with seed and straw as called for herein.
- Tanks are filled with water and ready for testing. Contractor is to dummy test entire system prior to final startup meeting with Engineer, Owner, LHD and ORC.

Once all of the items have been completed the Contractor shall run the system through an entire test in the presence of the Owner, Owner's Engineer, LHD and ORC and to their satisfaction. If the test fails, adjustments shall be made and the test repeated until the system is determined to operate properly.

Septic Tank: Ensure the tank is free of all trash and debris. Check water level, pipes and effluent filter. Verify that the effluent filter can be removed for service. Verify that the lids are 6" above finished grade.

Pump/Flow EQ Tank: Ensure the tank is free of all trash and debris. Check water level, pipes and effluent filter. Verify that the effluent filter can be removed for service. Verify that the lids are 6" above finished grade. Verify that all electrical conduits are sealed with duct seal or approved equal to prevent sewer gases from reaching control panels and other electrical devices.

Time Dose Pump Controls - Sequence of Operation: Effluent fills tank to level that will activate the "Pump Enabling" float. Pump can now operate. The control panel will be set to allow the prescribed pump cycles per day based on customer setting of the programmable timer. When a pump is called for service, and the level in the dosing tank permits, the pump will enable for the operator selectable time. If the timer override float is activated, the pump will be allowed to dose for ~~5.47~~ 7.7 minutes and disable for one hour. Then the pump will activate again until the water level in tank reaches normal again. Pumps will alternate between doses called for by the panel.

The pump shall operate delivering a timer controlled predetermined dose to the designated drain field. The pump shall also shut off when the low water level "pump off" switch is activated.

If the "high water alarm" float switch is activated, the controller shall activate audible and flashing alarm systems. Once energized, the flashing and audible alarm unit must be shut-off manually. After installation, pressure manifold field shall be pressurized and the function and operating pressure checked to verify compliance with the specifications. **The pressure and flow reading shall be recorded for comparison with future readings. The owner/operator cannot tell if the system is operating properly unless he has this info.**

SECTION VII - AS BUILTS

A set of as-built plans and specifications shall be prepared by a Professional Surveyor licensed to practice in the State of North Carolina.

- The Surveyor shall be hired by the Contractor to perform the work.
- The contractor shall provide the "As-Built" plans to the Engineer.
- The Engineer shall provide the signed and sealed "As-Built" plans to the Owner, ORC and the LHD which will show actual vertical and horizontal location and design of all system components, indicate any crossings of force mains, color of force mains and any deviations in installation of the force mains and plans. Exact locations of valves and cleanouts are required as well and contain a complete list of all mechanical equipment installed whenever any deviations were made from the approved plans and specifications.

- The Contractor shall forward to the Engineer two bound sets of all manufacturer's component data along with the "As Built" data.

SECTION VIII - OPERATING PERMIT

- The system shall not be operated until the Project Engineer certifies in writing that the system has been installed in accordance with the approved plans and specifications, and the installation is approved by the local Health Department.
- The operation permit shall include description of facilities served and sewage system components, as-built plans and specifications, legal documents, operation and maintenance manual, monitoring and performance requirements, and other operating conditions deemed appropriate.

SECTION IX - WARRANTY

The wastewater system installation contractor shall agree to provide a minimum of one year regular service to the Owner for maintenance and upkeep of this system at no additional cost to the Owner, and such one year period shall begin from the date of final inspection and acceptance of the system construction by the Owner, the Engineer, and representatives of the Division of Environmental Health. Any concerns by the owners' personnel shall be addressed promptly.

After the above one year period has expired, the installation contractor shall offer a continuation of maintenance and upkeep service at a reasonable charge as may be negotiated between the installation Contractor and the Owner. Such service shall include checking the entire system at least monthly, offering quick response servicing in case of a malfunction of the system (maximum of 24 hours after warning is given by the "Owner's Warning Panel") and performing such servicing of components and replacing of worn or defective equipment as may be necessary to keep the system operating in good condition.

In the event that the installation contractor will not be willing to agree to the above described one year maintenance period, then any other time period must be acceptable to the Owner, the Engineer, and to the Representative of the Division of Environmental Health.

SECTION X - OPERATION & MAINTENANCE

This work shall be performed only by operators knowledgeable of the system. Operation, maintenance and Inspection Procedures shall include but not be limited to the following:

- Enter into a contract with an ORC.
- Inspect and clean effluent filter in septic tank.
- Minimum system inspection/maintenance frequency shall be a minimum of every year, however more frequent inspection is recommended. This system is classified as a (Type IIIb) inspection by the health department five years.
- Septic system shall be pumped every 4 years or when solids accumulate to 1/3 the volume of the tank.
- The system should be observed by one, three, six and nine months after initial installation, and annually thereafter.
- The pump control timer shall be checked to verify that the pump run time is correct to ensure the correct dosing volume. Adjustment shall be made as required.
- The pressure manifold shall be pressure back-washed with clean water during system maintenance.
- Pressure head at the manifold should be checked and adjusted one month after installation and annually thereafter.
- All piping, fittings 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 panel and wiring 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.
- Check all tanks, valve boxes, etc. for evidence of damage or leakage. Check the quality of effluent including grease and sludge accumulation.

The current system owner (**Earnhardt Real Properties, LLC** and subsequent owners) shall establish an operation and maintenance program and procedure based on experience obtained from similar installations.

The current system owner (**Earnhardt Real Properties, LLC** and subsequent owners) shall be responsible to comply

with all above operating and maintenance procedures in addition to any so specified on the operation permit issued by the Iredell County Health Department or may be necessary in the future for the operation of the system to meet all public health laws, rules and regulation regarding the wastewater system.

Failure to comply with these operating and maintenance procedures will necessitate immediate legal action by the Iredell County Health Department to suspend or revoke the operation permit.

SECTION XI - OWNERSHIP RESPONSIBILITY FOR THE SYSTEM:

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

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

(a) Enter into a contract with a septic tank operator prior to operation.
(b) Provide water conserving plumbing fixtures within the facility. Installing water closets that require no more than 1.6 gallons per flush.
(c) Develop conservative water use habits.
(d) Monitor and maintain the system as necessary for proper operation. Establish a procedure to read and record water meter readings on a monthly basis. Retain records.
(e) Check and pump the septic tank sludge on a regular basis as will be specified in the operating permit or as may be required.
(f) Make rapid repairs to leaking plumbing fixtures and faucets.
(g) Tanks shall not be pumped during extremely wet conditions.

SECTION XII - 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 fertilizers 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 2 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 f lb/1000 SF
	Sorghum-Sudan Hybrids	30 lb/ac or : 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 fertilizers 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 32 lb/1000 SF
Mar - Jun	Add Weeping Lovegrass	5 lb/ac or c lb/1000 SF
Jun - Sep 1**	Tall Fescue and	60 lb/ac or 12 lb/1000 SF
	Brown Top Millet	35 lb/ac or f lb/1000 SF
	Sorghum Sudan Hybrids	30 lb/ac or: lb/1000 SF
Sep - Mar 1	Sericea Lespediza (unhulled-unscarified)	70 lb/ac or 1: lb/1000 SF
	Tall Fescue	150 lb/ac or 32 lb/1000 SF
	Millet or Sudan	20 lb/ac or 2 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 3-5 gal/1000 SF or 200-300 gal/ac.+

CALCULATIONS FOR A FLOW EQUALIZATION SUBSURFACE SEWAGE EFFLUENT DISPOSAL SYSTEM

FOR

EARNHARDT REAL PROPERTIES, LLC CABIN

1701 CODDLE CREEK ROAD
MOORESVILLE, IREDELL COUNTY, NC

MARCH 8, 2012

As Built 5/10/2012

PREPARED FOR:

Earnhardt Real Properties, LLC
1675 Coddle Creek Road
Mooresville, NC 28115
Phone: 704-662-8978

PREPARED BY:

PIEDMONT DESIGN ASSOCIATES, P.A.
Suite 101 Westfield Center
125 East Plaza Drive
Mooresville, NC 28115
Phone: (704) 664-7888
Fax: (704) 664-1778
NCBELS: C-1007

PIEDMONT DESIGN ASSOCIATES, P.A.
Suite 101 Westfield Center
125 East Plaza Drive
Mooresville, North Carolina 28115-8812
Telephone (704) 664-7888 Fax (704) 664-1778

Engineering
Surveying
Planning

Project: DEI Lodge Center, Iredell Co., North Carolina
Job No. 2011-10-02-EC **Date:** 03/08/2012 **Revision Date:** 03/12/2012

Design Data

15.00	Employees
25.00	G/D/Employee
375.00	G/D
5.00	G/D/Seat (Reduced Flow)
250.00	Seats
1,250.00	G/D for Seating

	Inflow	Outflow	Remainder
Thursday	1,625.00	928.57	696.43
Friday	1,625.00	928.57	1,392.86
Saturday	1,625.00	928.57	2,089.29
Sunday	1,625.00	928.57	2,785.71
Monday	-	928.57	1,857.14
Tuesday	-	928.57	928.57
Wednesday	-	928.57	-

Flow Equalization

Adjusted D.D.F.	1,625.00	G/D
Weekly Flow	6,500.00	Gal./Week
# of Days for Field Dosing	7.00	Days
Flow EQ Volume to Field	928.57	Gal./Day

Septic Tank Sizing

Peak Daily Flow	1,625	Gallons
Min. Tank Size	2,344	Gallons
∴ Use	3,000	Gallon Tanks

DELLINGER ~~Stay-Right~~ Precast Company STB-~~930~~ 447
or Engineer Approved Equal

Tank Sizing Calculations
600 G/D to 1,500 G/D
V = 1.17Q + 500
1,500 G/D to 4,500 G/D
V = 0.75Q + 1,125
4,500 G/D and up
V = Q

V = Tank Volume
Q = Design Flow

Pump Tank Volume

Pump submergence Volume	1,121.96 Gallons	18.00	Inches
Dose Volume	464.29 Gallons	7.45	Inches
Equalization Volume	2,785.71 Gallons	44.69	Inches
Emer. Storage Vol. (highest daily flow)	1,625.00 Gallons	26.07	Inches
	5,997 Gallons	96.21	Inches
Gal./Inch in Pump Tank	62.33 Gallons (6,000 Gallons - PT-~~465~~) 550		

~~Stay-Right~~ DELLINGER Precast Company (Others May be Substituted with Engineer Approval)

Interior Tank Dimensions

Length	
120.00	In
10.00	Ft
Width	
120.00	In
10.00	Ft

Drainfield Sizing

DDF	928.57	G/D
LTAR	0.30	G/D/SF
Trench Bottom Area	3,095.24	SF
Drainfield Lateral Length	1,031.75	LF
No. of Laterals	10.00	
Length of Each Lateral	103.17	LF Each

Flow EQ Tank Dosing Schedule

Daily Flow	928.57	G/D
Min Flow for 2-Inch Pipe	30.00	G/M
Pump to Recirc. Tank	7.00	Times Daily
Pump Run Time	4.00	Minutes
Pump Flow Rate	33.16	G/M
Volume to Recirc. Tank	132.65	Gallons per Dose

Determine Flow:	54.80	G/M	*Flow to Recirc Tank*
Length of FM:	1069 ~~977.00~~	Ft.	*Site Plan*
Elev:	24.36 ~~48.40~~	Ft.	*HI from pump to Manifold*
Oper:	3.00	Ft.	*Set by OSWW*
Friction:	25.52 ~~21.25~~	Ft.	*Friction Loss times length of FM*
TDH:	62.88 ~~72.65~~	Ft.	*Elev. HD + Oper. Head + Friction Head*
Pump Req'd:	54.80	G/M @ ~~72.65~~ 62.88	TDH

Use ~~Zoeller Model 108~~ Effluent Pump
2HP - 230V - 1PH
GOULDS WE2012H

Interpolation Calculation for friction head in PVC Pipe
FM Friction Head 2" Dia. SCH 40 PVC

gpmX	54.80
p1	1.74
p2	2.08
gpm1	50
gpm2	55
hX(ft.)	2.07

Fill In Shaded Boxes =

Dosing Volume

Drainfield Size	1,031.75	LF
Volume/100 LF in 4" Pipe	65.30	Gal./100 LF
Lateral Volume	673.73	Gallons
2/3 Volume of Laterals	449.11	Gallons
3/4 Volume of Laterals	505.30	Gallons
Daily Volume to Drainfield	928.57	Gallons
Dose	2.00	Times per Day – 12 HR REST TIME
Dose Volume	464 ~~464.29~~	Gallons per Dose
% of Lateral Volume	68.91%	Volume of Laterals
Flow Rate to Pressure Manifold	54.80	G/M
Pump Run Time	7.7 ~~8.47~~	Minutes

10.5 INCH DRAWDOWN

DELLINGER

3,000 Gallon Septic Tank — *Based on ~~Stay-Right~~ Precast STB-~~020~~ 947*

Outer Length	13.00	Ft.	
Inner Length	12.00	Ft.	
Outer Width	7.00	Ft.	
Inner Width	6.00	Ft.	
Outer Height	7.50	Ft.	
Inner Height	6.50	Ft.	
Wt. Water Displaced	42,588.00	Lb	Uplift Force
Wt of Tank	13,650.00	Lb	Top & Bottom
	5,850.00	Lb	Ends
	12,675.00	Lb	Sides
	2,925.00	Lb	Baffle
	35,100.00	Lb	Total Tank Wt.
Wt. Overburden	10,920.00	Lb	@ 12 Inches Min. Soil Cover Over Tank
Total	46,020.00	Lb	Total Tank & Overburden

Outer Length x Outer Width x Outer Length x 62.4 Lb/CF (Wt of Water)

Outer Length x Outer Width x 150 Lb/CF x 2 (Top & Bottom) x Slab Thickness
Inner Width x Inner Height x 150 Lb/CF x 2 (Ends) x Wall Thickness
Outer Height x Outer Length x 150 Lb/CF x 2 (Sides) x Wall Thickness
Inner Width x (Inner Height-3 Inches) x 150 Lb/CF x x Wall Thickness
Sum Above Four

Outer Length x Outer Width x 120 Lb/CF (Saturated Soil Wt) x Soil Thickness
Sum of Total Tank Wt. & Soil Overburden

Uplift	42,588.00	<	46,020.00	Tank

DELLINGER

6,000 Gallon Pump Tank — *Based on ~~Stay-Right~~ Precast PT-~~465~~ 550*

Outer Length	11.00	Ft.	
Inner Length	10.00	Ft.	
Outer Width	11.00	Ft.	
Inner Width	10.00	Ft.	
Outer Height	9.33	Ft.	
Inner Height	8.00	Ft.	
Wt. Water Displaced	70,470.40	Lb	Uplift Force
Wt of Tank	24,200.00	Lb	Top & Bottom
	12,000.00	Lb	Ends
	13,200.00	Lb	Sides
	49,400.00	Lb	Total Tank Wt.
Wt. Overburden	24,200.00	Lb	@ 20 Inches Min. Soil Cover Over Tank
Total	73,600.00	Lb	Total Tank & Overburden

Outer Length x Outer Width x Outer Length x 62.4 Lb/CF (Wt of Water)

Outer Length x Outer Width x 150 Lb/CF x 2 (Top & Bottom) x Slab Thickness
Inner Width x Inner Height x 150 Lb/CF x 2 (Ends) x Wall Thickness
Outer Height x Outer Length x 150 Lb/CF x 2 (Sides) x Wall Thickness
Sum Above Three

Outer Length x Outer Width x 120 Lb/CF (Saturated Soil Wt) x Soil Thickness
Sum of Total Tank Wt. & Soil Overburden

Uplift	70,470.40	<	73,600.00	Tank

GOULDS PUMPS

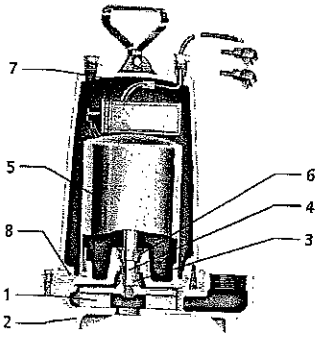
Submersible Effluent Pump

MODEL 3885

WE Series

COMPONENTS

Item No.	Description
1	Impeller
2	Casing
3	Mechanical Seal
4	Motor Shaft
5	Motor
6	Ball Bearings
7	Power Cable
8	Casing O-Ring



MODELS

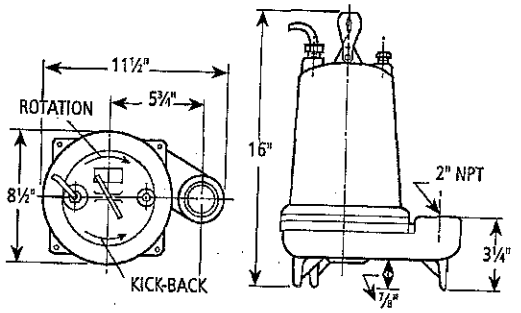
Order No.	HP	Volts	Phase	Max. Amp.	RPM	Solids	Wt. (lbs.)
WE0311L	⅓	115	1	10.7	1750	¾"	56
WE0318L		208		6.8			
WE0312L		230		4.9			
WE0311M		115		10.7			
WE0318M		208		6.8			
WE0312M		230		4.9			
WE0511H	½	115	1	14.5	3500		60
WE0518H		208		8.1			
WE0512H		230		7.3			
WE0538H		200	3	4.9			
WE0532H		230		3.3			
WE0534H		460		1.7			
WE0537H		575		1.4			
WE0511HH		115	1	14.5			
WE0518HH		208		8.1			
WE0512HH		230		7.3			
WE0538HH		200	3	4.9			
WE0532HH		230		3.6			
WE0534HH		460		1.8			
WE0537HH		575		1.5			
WE0718H	¾	208	1	11.0			70
WE0712H		230		10.0			
WE0738H		200	3	6.2			
WE0732H		230		5.4			
WE0734H		460		2.7			
WE0737H		575		2.2			
WE1018H	1	208	1	14.0			
WE1012H		230		12.5			
WE1038H		200	3	8.1			
WE1032H		230		7.0			
WE1034H		460		3.5			
WE1037H		575		2.8			
WE1518H	1½	208	1	17.5			80
WE1512H		230		15.7			
WE1538H		200	3	10.6			
WE1532H		230		9.2			
WE1534H		460		4.6			
WE1537H		575		3.7			
WE1518HH		208	1	17.5			
WE1512HH		230		15.7			
WE1538HH		200	3	10.6			
WE1532HH		230		9.2			
WE1534HH		460		4.6			
WE1537HH		575		3.7			
WE2012H	2	230	1	18.0			83
WE2038H		200	3	12.0			
WE2032H		230		11.6			
WE2034H		460		5.8			
WE2037H		575		4.7			

PERFORMANCE RATINGS (gallons per minute)

Total Head Feet of Water	Order No.	WE03L	WE03M	WE05H	WE07H	WE10H	WE15H	WE05HH	WE15HH	WE20H
	HP	⅓	⅓	½	¾	1	1½	½	1½	2
	RPM	1750	1750	3500	3500	3500	3500	3500	3500	3500
	5	86	–	–	–	–	–	–	–	–
	10	70	63	78	94	–	–	58	95	–
	15	52	52	70	90	103	128	53	93	138
	20	27	35	60	83	98	123	49	90	136
	25	–	–	48	76	94	117	45	87	133
	30	–	–	35	67	88	110	40	83	130
	35	–	–	22	57	82	103	35	80	126
	40	–	–	–	45	74	95	30	77	121
	45	–	–	–	35	64	86	25	74	116
	50	–	–	–	25	53	77	–	70	110
	55	–	–	–	–	40	67	–	66	103
	60	–	–	–	–	30	56	–	63	96
	65	–	–	–	–	20	45	–	58	89
	70	–	–	–	–	–	35	–	55	81
	75	–	–	–	–	–	25	–	51	74
	80	–	–	–	–	–	–	–	47	66
	90	–	–	–	–	–	–	–	37	49
	100	–	–	–	–	–	–	–	28	30

DIMENSIONS

(All dimensions are in inches. Do not use for construction purposes.)



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Goulds Pumps

ITT Industries

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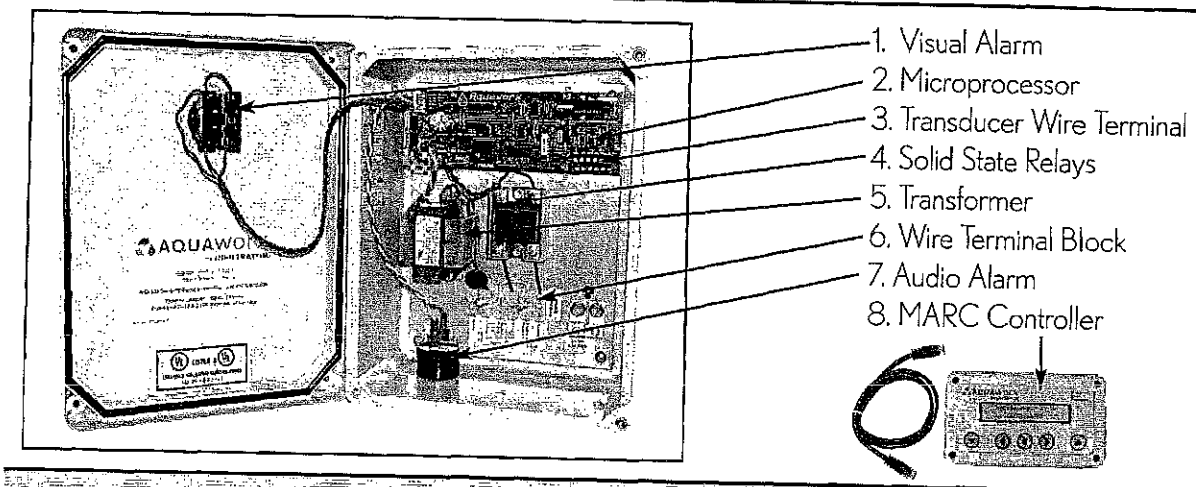
Aquaworx by Infiltrator
6 Business Park Road
P.O. Box 768
Old Saybrook, CT 06475

Ph: 860.577.7000
Toll Free: 1.877.278.2979
Fax: 860.577.7001
www.aquaworx.com

Technical Data Sheet

IPC-SM Simplex Control Panel

The Aquaworx Intelligent Pump Controller (IPC) Panel provides an innovative approach to time controlled pumping. It is used with a single pump operation - (on demand/time dose, lift stations, pump to gravity, etc.). Designed specifically for the onsite industry, the IPC Panel leverages floatless pressure transducer technology. The IPC Panel monitors liquid levels, controls pumping time intervals, and logs events in real time. Using the MARC (Mountable and Removable Controller) as the user interface, the Aquaworx IPC Panel offers a cost-effective solution with expanded capability. The data logging capabilities of the IPC Panel enables monitoring of multiple types of system events, which enhances operational assessment, troubleshooting, and maintenance of the onsite system.



Standard Specifications

- Enclosure dimensions: 11.31"(H) x 9.31"(W) x 5.43"(D)
- Weight: 14.5 lbs.
- 115 VAC, 20 FLA, 1-HP Max, single phase, 60Hz
  220 VAC, 20 FLA, 2-HP Max, single phase, 60Hz
- NEMA 4X rated - constructed of UV-resistant fiberglass, with stainless steel hinge
- Manual / Off / Auto Operation
- Audio / Visual Alarm - 95 decibel, w/push to silence
- UL/cUL listed
- Built-in dose counter and pump run timer
- Solid-state relay
- Pressure transducer: liquid level sensing with no floats.
- Transducer wire: 14-gauge, 3-wire connection (red, blue, black), rated for direct burial

Features and Benefits

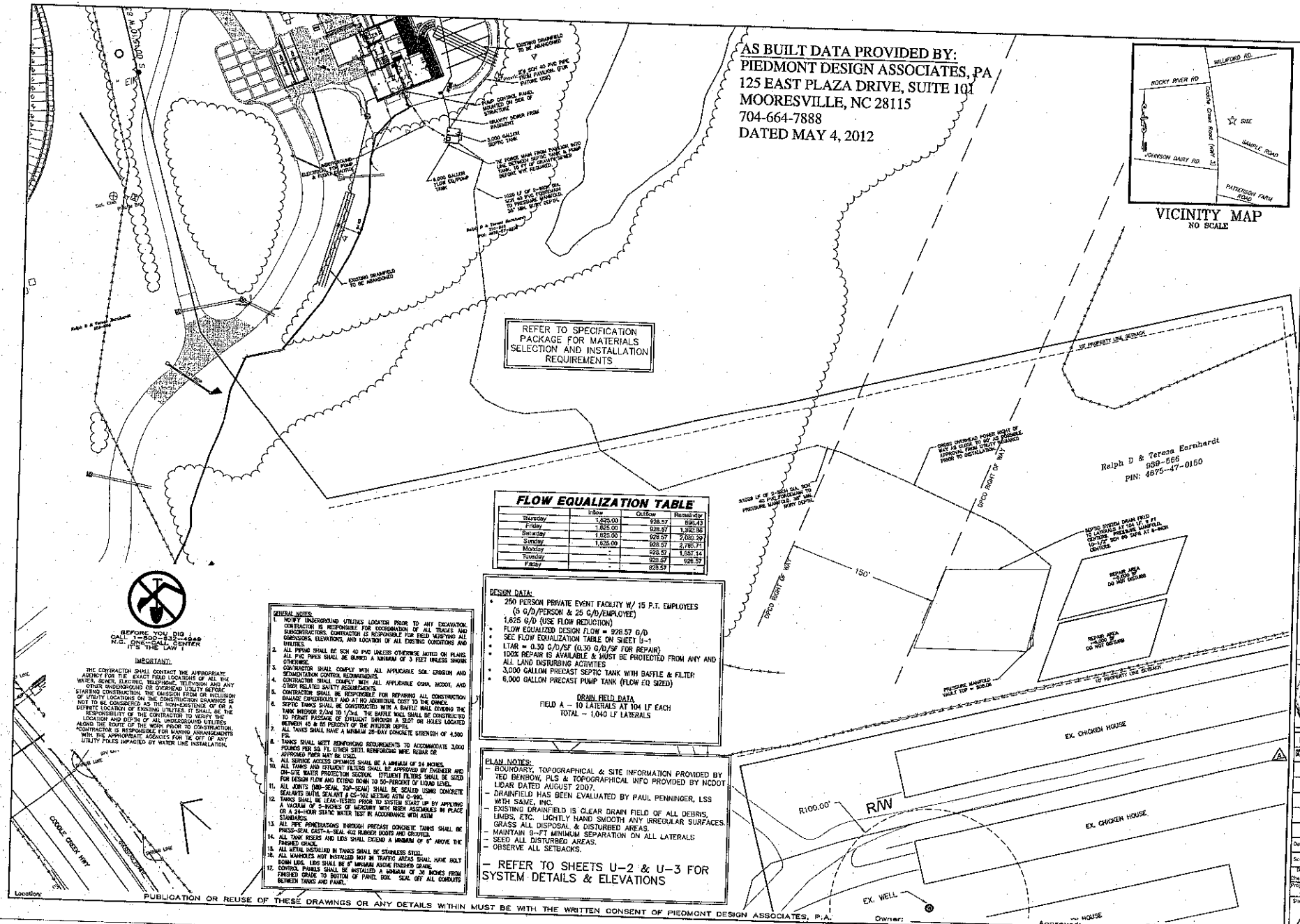
Programmable Interface - both mountable and removable
- Control liquid levels
- Allows for timed dosing
- Removable controller

Floatless Transducer - sensor mounted in pump chamber
- Simple 3-wire connection
- Reduces water tight connections in junction box
- Eliminates sewer gases in panel and crimped tubing

Data Logging - date and time stamp for 4,000+ events
- Allows for system troubleshooting and timely diagnostics
- Allows design vs. actual flow comparisons
- Identify water usage patterns

Veto Level Function
- Allows a programmable override

Ease of Installation
- Only basic tools required - screwdriver, pipe cutter, wirestripper, drill, step bit, tape measure, etc.



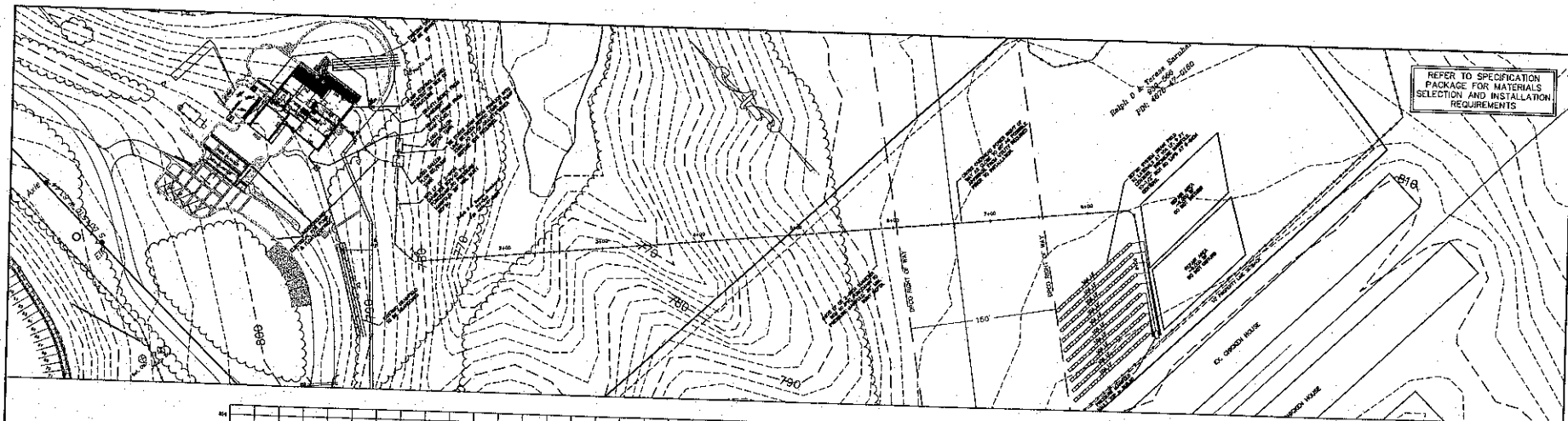
PIEDMONT DESIGN
ENGINEERING · SURVEYING · PLANNING
Associates, P.A.
Suite 101 Woodfield Center, 125 East Plaza Drive
Mooresville, North Carolina 28115
Phone:(704) 664-7888 Fax:(704) 664-7766 www.pdapa.com

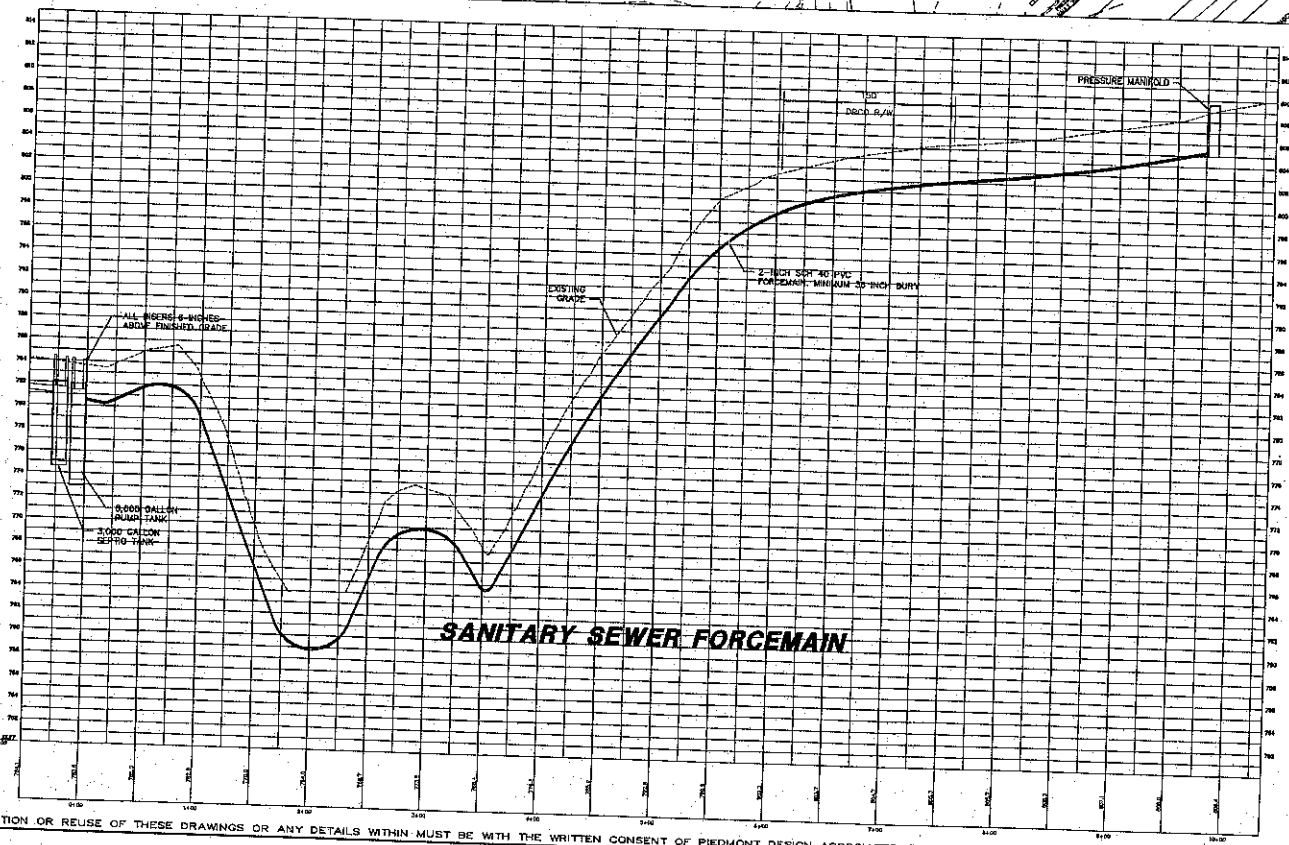
PREPARED FOR:
EARNHARDT REAL PROPERTIES, LLC
1575 CODDLE CREEK ROAD
MOORESVILLE, NC 28115
(704) 662-8978

SEPTIC SYSTEM SITE PLAN
EARNHARDT REAL PROPERTIES, LLC CABIN
1701 CODDLE CREEK ROAD
MOORESVILLE, IREDELL Co., NORTH CAROLINA

REVISIONS | BY
DMD

Date: 3/9/2012
Scale: 1" = 40' AS SHOWN
Drawn: DMD
Checked: DLM
Project: 2011-10-02
Job: 2011-10-02
Sheet: U-1
5/9/12





BEFORE YOU DIG ! CALL 1-800-632-4949 N.C. UNDERGROUND PROTECTION IT'S THE LAW !

IMPORTANT!

THE CONTRACTOR SHALL CONTACT THE APPROPRIATE AGENCY FOR EXACT FIELD LOCATIONS OF ALL THE WATER, SEWER, ELECTRICAL, TELEPHONE, NATURAL GAS AND ANY OTHER UNDERGROUND OR OVERHEAD UTILITY BEFORE STARTING CONSTRUCTION. THE OMISSION OR INCLUSION OF UTILITY LOCATIONS ON THE CONSTRUCTION DRAWINGS IS NOT TO BE CONSIDERED AS THE NON-EXISTENCE OR DEFINITE LOCATION OF EXISTING UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES ACROSS THE ROUTE OF THE WORK PRIOR TO CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR MAKING ARRANGEMENTS WITH THE APPROPRIATE AGENCIES FOR TIE OUT OF ANY UTILITY PLANS IMPACTED BY WATER LINE INSTALLATION.

See Sheet U-1 for As Built Plan Data

PIEDMONT DESIGN ASSOCIATES
Engineering • Surveying • Planning
Associates, P.A.
Suite 101 Westfield Center, 125 East Plaza Drive
Mooresville, North Carolina 28115
Phone: (704) 664-7388 Fax: (704) 664-1778 www.pdaonline.com

PREPARED FOR:
EARNHARDT REAL PROPERTIES, LLC
1675 CODDLE CREEK ROAD
MOORESVILLE, NC 28115
(704) 662-8978

SEPTIC SYSTEM FORCEMAIN PLAN/PROFILE
EARNHARDT REAL PROPERTIES, LLC CABIN
1701 CODDLE CREEK ROAD
MOORESVILLE, IREDELL Co., NORTH CAROLINA

REVISIONS	BY

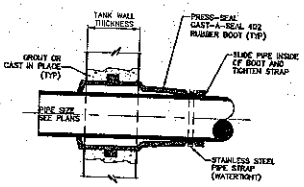
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Checked: DLM
Project: 2011-10-02
Job: 2011-10-02
Sheet: U-2
of 4 Sheets

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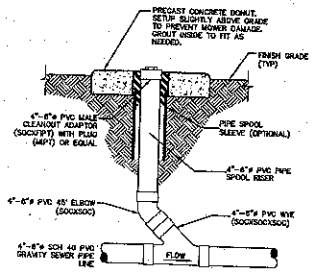
Location: Owner: Approved: Date of Issue:

GENERAL NOTES:

1. NOTIFY UNDERGROUND UTILITIES LOCATOR PRIOR TO ANY EXCAVATION. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF ALL TRADES AND SUBCONTRACTORS. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL DIMENSIONS, ELEVATIONS, AND LOCATION OF ALL EXISTING CONDITIONS AND UTILITIES.
2. ALL PIPING SHALL BE SCH 40 PVC UNLESS OTHERWISE NOTED ON PLANS. ALL PVC PIPES SHALL BE BURIED A MINIMUM OF 3 FEET UNLESS SHOWN OTHERWISE.
3. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SOIL EROSION AND SEDIMENTATION CONTROL REQUIREMENTS.
4. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE OSHA, NCDOT, AND OTHER RELATED SAFETY REQUIREMENTS.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ALL CONSTRUCTION DAMAGE EXPEDITIOUSLY AND AT NO ADDITIONAL COST TO THE OWNER.
6. SEPTIC TANKS SHALL BE CONSTRUCTED WITH A BAFFLE WALL DIVIDING THE TANK INTERIOR 2/3rd TO 1/3rd. THE BAFFLE WALL SHALL BE CONSTRUCTED TO PERMIT PASSAGE OF EFFLUENT THROUGH A SLOT OR HOLES LOCATED BETWEEN 45 & 55 PERCENT OF THE INTERIOR DEPTH.
7. ALL TANKS SHALL HAVE A MINIMUM 28-DAY CONCRETE STRENGTH OF 4,500 PSI.
8. TANKS SHALL MEET REINFORCING REQUIREMENTS TO ACCOMMODATE 3,000 POUNDS PER SQ. FT. EITHER STEEL REINFORCING WIRE, REBAR OR APPROVED FIBER MAY BE USED.
9. ALL SERVICE ACCESS OPENINGS WILL BE A MINIMUM OF 24 INCHES.
10. ALL TANKS AND EFFLUENT FILTERS SHALL BE APPROVED BY ENGINEER AND ON-SITE WATER PROTECTION SECTION. EFFLUENT FILTERS SHALL BE SIZED FOR DESIGN FLOW AND EXTEND DOWN TO 50-PERCENT OF LIQUID LEVEL.
11. ALL JOINTS (MID-SEAM, TOP-SEAM) SHALL BE SEALED USING CONCRETE SEALANTS BUTYL SEALANT # CS-102 MEETING ASTM C-990.
12. TANKS SHALL BE LEAK-TESTED PRIOR TO SYSTEM START UP BY APPLYING A VACUUM OF 5-INCHES OF MERCURY WITH RISER ASSEMBLIES IN PLACE OR A 24-HOUR STATIC WATER TEST IN ACCORDANCE WITH ASTM STANDARDS.
13. ALL PIPE PENETRATIONS THROUGH PRECAST CONCRETE TANKS SHALL BE PRESS-SEAL CAST-A-SEAL 402 RUBBER BOOTS AND GROUTED.
14. ALL TANK RISERS AND LIDS SHALL EXTEND A MINIMUM OF 6" ABOVE THE FINISHED GRADE.
15. ALL METAL INSTALLED IN TANKS SHALL BE STAINLESS STEEL.
16. ALL MANHOLES NOT INSTALLED NOT IN TRAFFIC AREAS SHALL HAVE BOLT DOWN LIDS. LIDS SHALL BE 6" MINIMUM ABOVE FINISHED GRADE.
17. CONTROL PANELS SHALL BE INSTALLED A MINIMUM OF 36 INCHES FROM FINISHED GRADE TO BOTTOM OF PANEL BOX. SEAL OFF ALL CONDUITS BETWEEN TANKS AND PANEL.



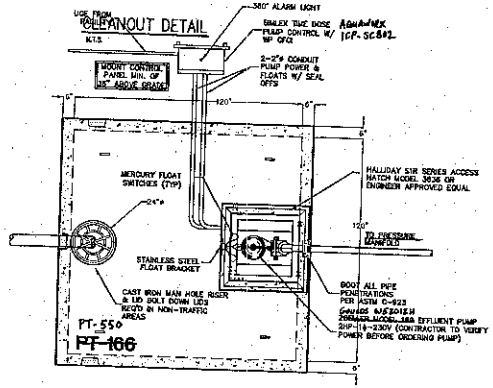
PIPE PENETRATION DETAIL
N.T.S.



NOTE: ALL PVC FITTINGS SHOWN ARE SCH 40 RATED

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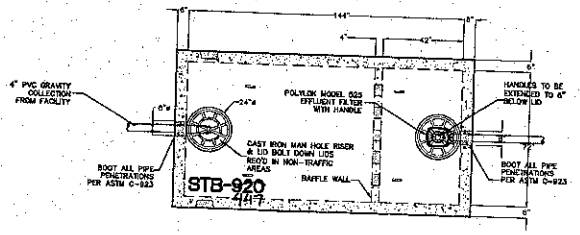
TANK SECURITY
ALL TANK ACCESS LIDS AND OPENINGS SHALL HAVE BOLT DOWN CAPABILITIES OR ENGINEER APPROVED LOCKING MECHANISM.



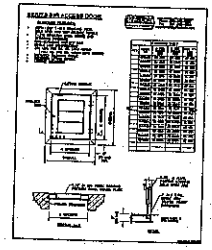
PLAN VIEW-DEH APPROVED 6,000 GAL FLOW EQ/PUMP TANK
N.T.S.

TANK ELEVATIONS

NOTE: TANK DIMENSIONS & ELEVATIONS BASED ON STAY-RIGHT PRECAST CONCRETE COMPANY, INC. (800-788-8265). OTHER STATE APPROVED TANKS MAY BE SUBSTITUTED BUT NOT WITHOUT PRIOR APPROVAL FROM THE ENGINEER. CONTRACTOR SHALL VERIFY DIMENSIONS AND ADJUST GRADES AND FLOAT SETTINGS AS REQUIRED TO CAUSE FLOW AND DOSING AS CALLED FOR.



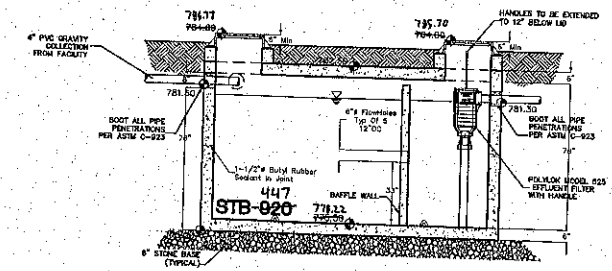
PLAN VIEW-DEH APPROVED 3,000 GAL SEPTIC TANK
N.T.S.
STB-920
447



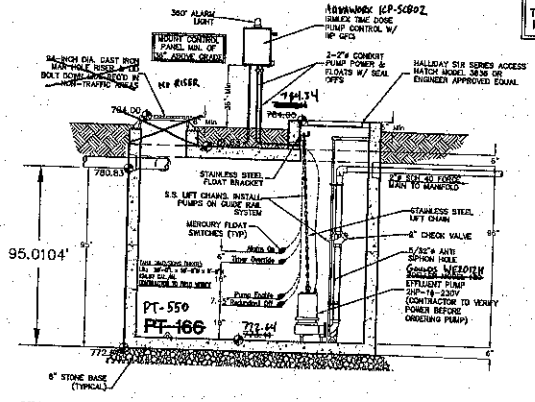
SEE SHEET U-1 FOR SYSTEM LAYOUT

REFER TO SPECIFICATION PACKAGE FOR MATERIALS SELECTION AND INSTALLATION REQUIREMENTS

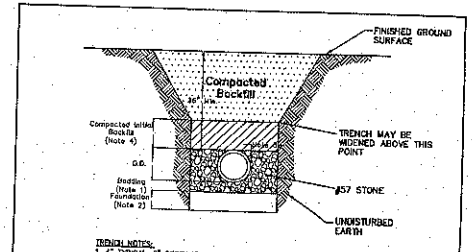
NOTE:
ALL GRAVITY PIPE BETWEEN TANKS SHALL BE SCH 40 PVC. MINIMUM SLOPE SHALL BE 1%



SECTION VIEW-DEH APPROVED 3,000 GAL SEPTIC TANK
N.T.S.
STB-920
447



SECTION VIEW-DEH APPROVED 6,000 GAL FLOW EQ/PUMP TANK
N.T.S.
PT-166
550



TRENCH NOTES:
1. 4" TYPICAL, 6" DEPTH IF IN ROCK
2. FOUNDATION STONE REQUIRED WHEN SOIL CONDITIONS ARE UNSTABLE
3. CLEAR DISTANCE NOT LESS THAN 6" OR MORE THAN 12" ON EITHER SIDE
4. INITIAL BACKFILL SHALL BE PLACED IN 6" LIFTS AND COMPACTED. INITIAL BACKFILL SHALL CONTAIN NO BACKFILL OVER 1.5", FROZEN LUMPS OR DEBRIS.
5. BACKFILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY
6. PVC PIPE SHALL BE SCH 40 PVC

PVC SEWER PIPE BEDDING DETAIL
N.T.S.

PIEDMONT DESIGN ASSOCIATES
Piedmont Design Associates, P.A.
Suite 101 Westfield Center, 135 Saw Mill Run Drive, Mooresville, North Carolina 28115
Phone: (704) 799-0000 Fax: (704) 799-0001 www.pdapa.com
NC Engineering Corporation Certificate of Authorization C-1170

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704-662-8978

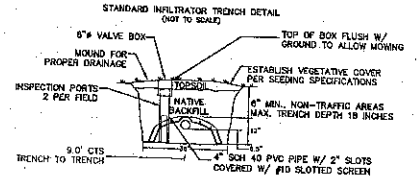
SEPTIC SYSTEM DETAILS
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REVISIONS	BY
As Shown 5/9/2012	DMD

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5/9/2012
Sheets

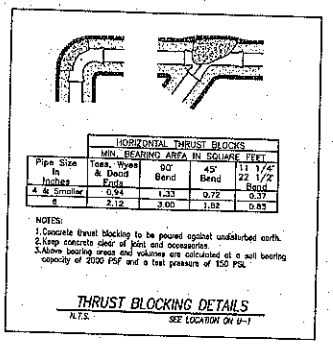
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3/U-4 N.T.S. GRAVELLESS CHAMBER NITRIFICATION LINE TYPICAL SECTION

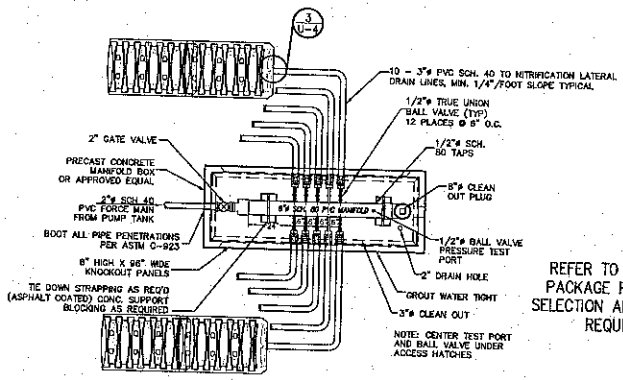
SEE SHEET U-1
FOR SYSTEM LAYOUT



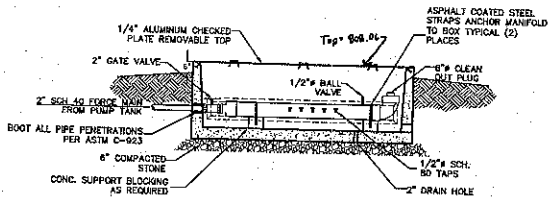
Pipe Size In Inches	HORIZONTAL THRUST BLOCKS MIN. BEARING AREA IN SQUARE FEET			
	Tees, Wyes & Dead Ends	90° Bend	45° Bend	11 1/4° 22 1/2° Bend
4 & Smaller	0.94	1.33	0.72	0.37
6	2.12	3.00	1.62	0.83

NOTES:
1. Concrete thrust blocking to be poured against undisturbed earth.
2. Keep concrete clear of joint and accessories.
3. Above bearing areas and volumes are calculated at a soil bearing capacity of 2000 PSF and a test pressure of 150 PSI.

THRUST BLOCKING DETAILS
N.T.S. SEE LOCATION ON U-1

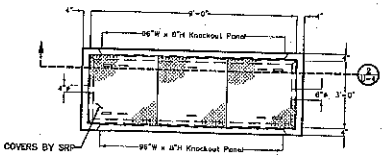


PLAN VIEW - PRESSURE MANIFOLD VAULT
N.T.S.

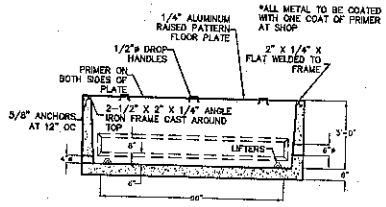


SECTION - PRESSURE MANIFOLD VAULT
N.T.S.

REFER TO SPECIFICATION PACKAGE FOR MATERIALS SELECTION AND INSTALLATION REQUIREMENTS

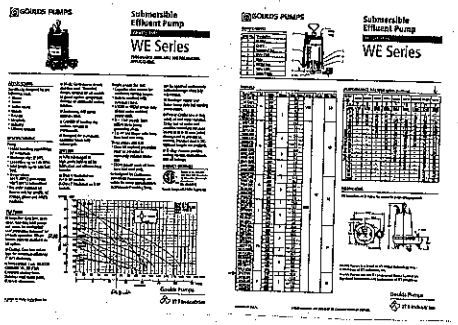


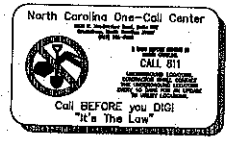
1/U-4 N.T.S. PLAN VIEW - PRESSURE MANIFOLD VAULT

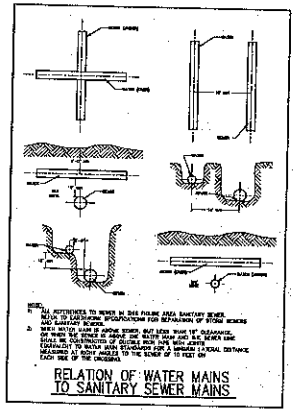


2/U-4 N.T.S. SECTION VIEW - PRESSURE MANIFOLD VAULT

MANIFOLD SPECIFICATIONS:
8" DIA. SCH 80 MANIFOLD W/ 10-1/2" DIA. SCH 80 TAPS
PRESSURE HEAD = 3 FT TOP ELEV = ~~808.60~~ 808.06







RELATION OF WATER MAINS TO SANITARY SEWER MAINS

PIEDMONT DESIGN ASSOCIATES
ENGINEERING · SURVEYING · PLANNING
Associates, P.A.
Suite 101 Westfield Center, 335 East Plato Drive
Mooresville, North Carolina 28115
Phone: (704) 662-4869 Fax: (704) 662-4867 www.pdapa.com
NC Board of Examiners for Engineers and Surveyors C-1787

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EARNHARDT REAL PROPERTIES, LLC
1675 COODLE CREEK ROAD
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5/14/2012
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Example #1 (Church):

Assume: 200-seat church with a kitchen. The daily design flow is 5 gallons/seat. The site has a clay (Group IV) soil. The church has services on Sunday and Wednesday with extracurricular events (weddings, reunions, suppers, etc.) on Saturdays. Sunday attendance: 200 members; Wednesday attendance: 100 members and Saturday events: 200 members.

Day	Attendance	Daily Flow
Sunday	200 members	1000 gallons
Wednesday	100 members	500 gallons
Saturday	200 members	1000 gallons
Weekly Total:		2500 gallons

Equalization cycle is 1 week (7 days)

Equalized Daily Flow: 2500 gallons/7 days = 358 gallons/day
The drainfield is sized for a daily waste flow of 358 GPD.
Trench bottom area is: 358 gpd/0.25 LTAR = 1432 ft².

Linear footage: 1432 ft²/3 feet wide trenches = 477 ft.

Dose Volume: 179 gallons (58% of 4" corrugated drainline capacity)

Flow Balance:

Day	In	Out	Residual
Saturday	**1000 gal.***	358 gal.	642 gal
Sunday	1000 gal.	358 gal.	**1284 gal.****
Monday	0	358 gal	926 gal.
Tuesday	0	358 gal	568 gal.
Wednesday	500	358 gal	710 gal
Thursday	0	358 gal	352 gal
Friday	0	358 gal	0
Total:	2500 gal.	2506 gal	0 gal

Pump Tank Sizing
Assuming a pump height of 18" and a tank with 30 gallons per inch:

Pump submergence volume = 540 Gallons
Dose Volume = 179 Gallons

Equalization Volume = 1284 Gallons **
Emergency Storage Volume = 1000 Gallons *(highest daily flow)
Adding the volumes yields a required dosing /equalization tank volume of 3003 Gallons.

Dosing Regime: 179 gallons every 12 hours. Given a measured pump delivery rate of 40 gpm, the repeat cycle timer would be set at 4.5 minutes "on" and 12 hours (or 11.9 hours) "off".

Example #2 (Day School):

Assume: 200-student day school (no food service or gym). The daily design flow is 10 gallons/student. The site has a clay (Group IV) soil. The school has classes Monday through Friday

Day	Attendance	Daily Flow
Monday	200 students	2000 gallons
Tuesday	200 students	2000 gallons
Wednesday	200 students	2000 gallons
Thursday	200 students	2000 gallons
Friday	200 students	2000 gallons
Weekly Total:		10,000 gallons

Equalization cycle is 1 week (7 days)

Equalized Daily Flow: 10,000 gallons/7 days = 1429 gallons/day
The drainfield is sized for a daily waste flow of 1429 GPD.
Trench bottom area is: 1429 gpd/0.3 LTAR = 4763 ft².

Linear footage: 4763 ft²/3 feet wide trenches = 1588 ft.

Dosing Volume: 714.5 gallons (69% of 4" corrugated drainline capacity)

Flow Balance:

Day	In	Out	Residual
Monday	2000*	1429 gal	571 gal.
Tuesday	2000	1429 gal	1142 gal
Wednesday	2000	1429 gal	1713 gal
Thursday	2000	1429 gal	2284 gal
Friday	2000	1429 gal	2855 gal**
Saturday	0	1429 gal.	1426 gal
Sunday	0.	1429 gal	**0 gal.**
Total:	10,000 gal.	10,003 gal	0 gal

Pump Tank Sizing
Assuming a pump height of 20" and a tank with 125 gallons per inch:

Pump submergence volume = 2500 Gallons
Dosing Volume = 715 Gallons
Equalization Volume = 2855 Gallons **
Emergency Storage Volume = 2000 Gallons *(highest daily flow)
Adding the volumes yields a required dosing / equalization tank volume of 8070 Gallons.

Dosing Regime: 714.5 gallons every 12 hours. Given a measured pump delivery rate of 62 gpm, the repeat cycle timer would be set at 11.5 minutes "on" and 12 hours (or 11.8 hours) "off".

Example #3 (Flea Market):

Assume: A 200-vendor flea market with 25,000 square feet of covered floor space (120 gpd/1000 sq.ft. of covered floor space). The site has a clay (Group IV) soil. The flea market operates on Friday, Saturday, and Sunday.

Day	Daily Flow
Friday	3000 gallons
Saturday	3000 gallons
Sunday	3000 gallons
Weekly Total:	9000 gallons

Equalization cycle is 1 week (7 days)

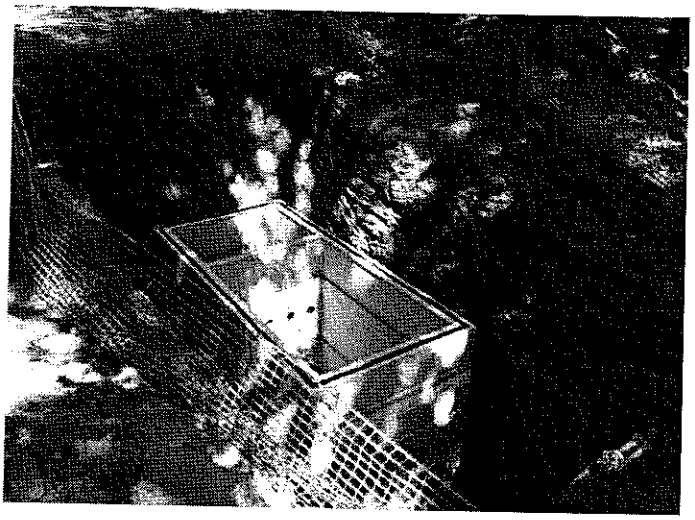
Equalized Daily Flow: 9000 gallons/7 days = 1286 gallons/day
The drainfield is sized for a daily waste flow of 1286 GPD.
Trench bottom area is: 1286 gpd/0.3 LTAR = 4287 ft².

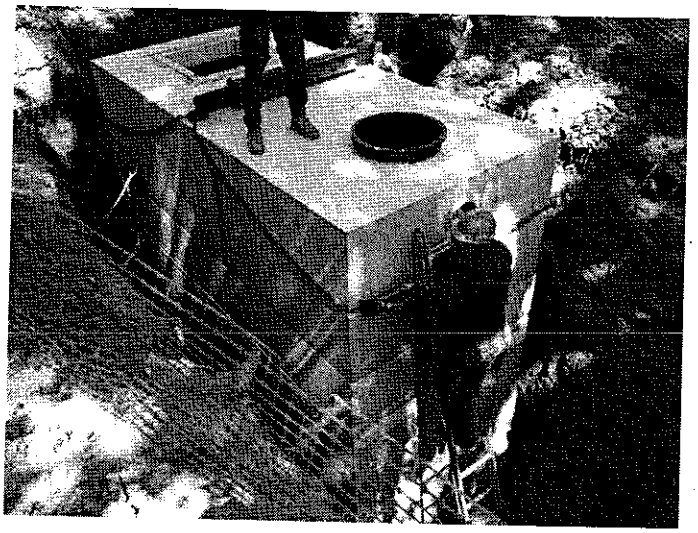
Linear footage: 4287 ft²/3 feet wide trenches = 1429 ft.

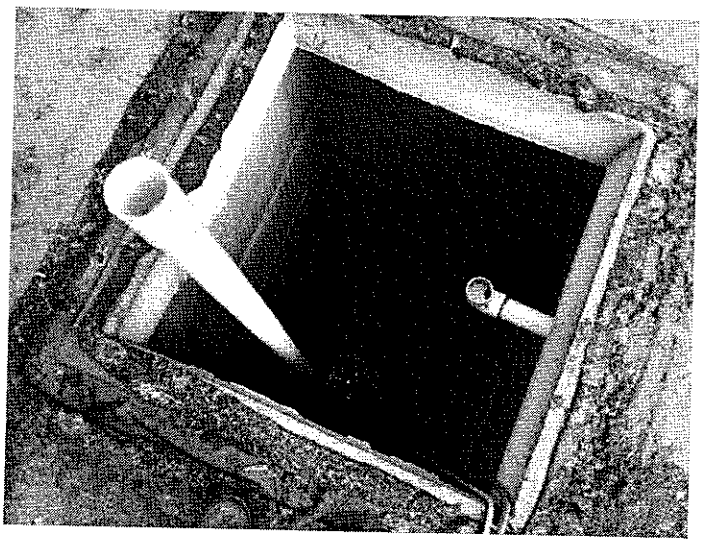
Dosing Volume: 429 gallons (46% of 4" corrugated drainline capacity)

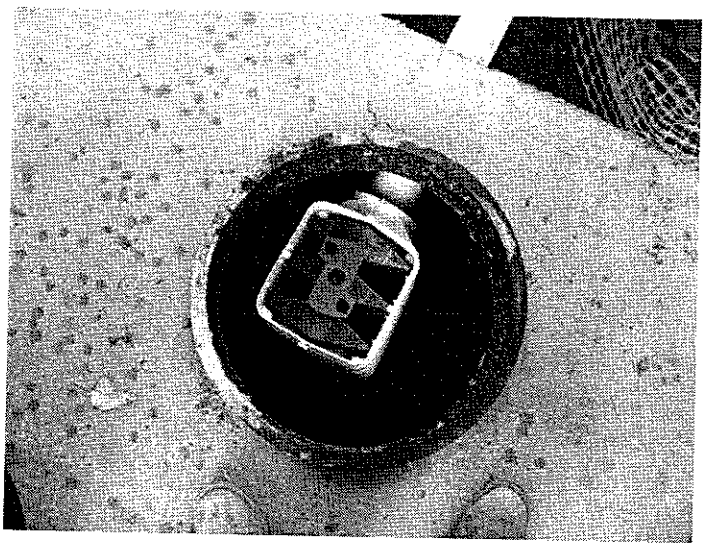
Flow Balance:

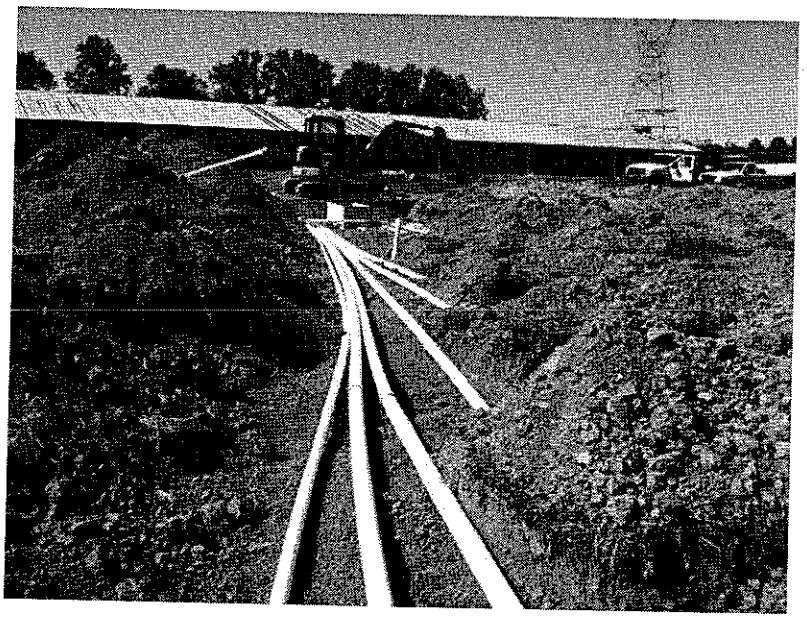
Day	In	Out	Residual
Friday	**3000 gal.***	1286 gal.	1714 gal
Saturday	3000 gal.	1286 gal.	3428 gal
Sunday	3000 gal	1286 gal	**5142 gal****
Monday	0	1286 gal	3856 gal.
Tuesday	0	1286 gal	2570 gal.
Wednesday	0	1286 gal	1284 gal
Thursday	0	1286 gal	0 gal
Total:	9000 gal.	9002 gal	0 gal

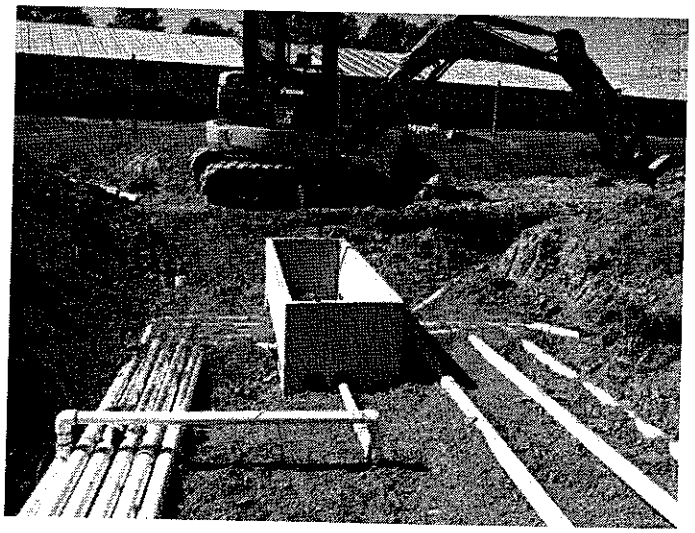


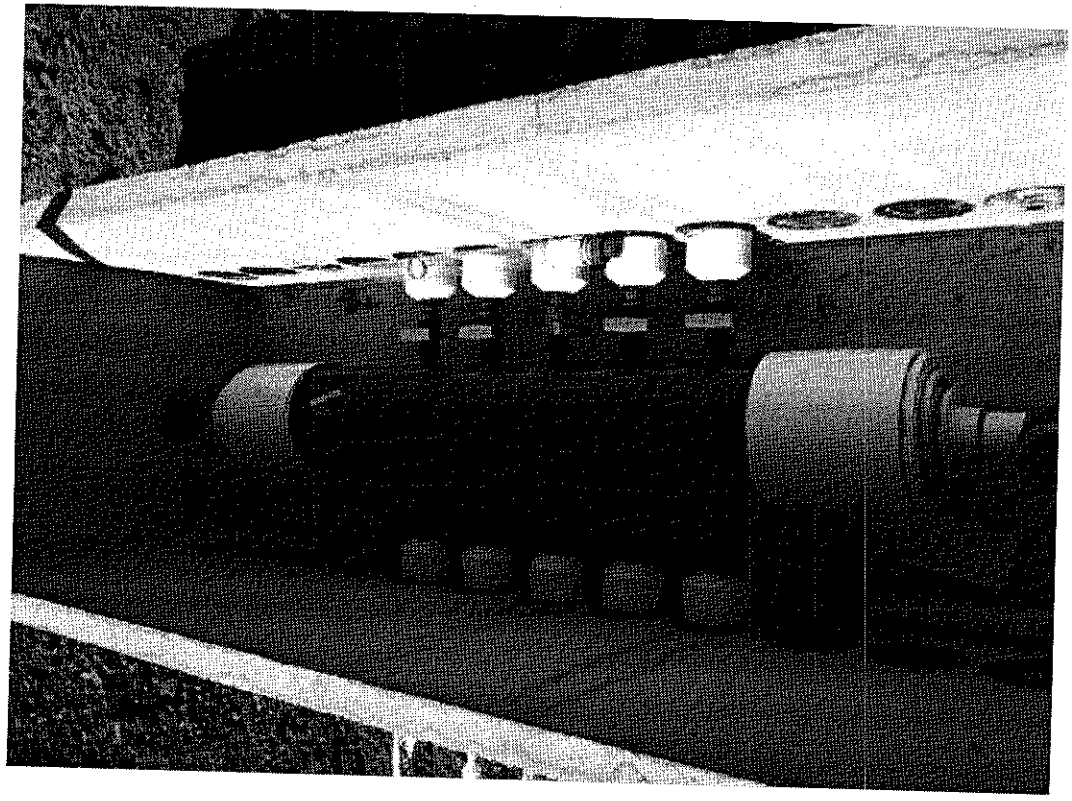












PIEDMONT DESIGN ASSOCIATES, P.A.
125 East Plaza Drive | Suite #101
Mooresville, NC 28115
Phone: 704-664-7888 | Fax: 704-664-1778
Email: dmunday@pdapa.com

Engineering
Surveying
Planning

May 11, 2012

Iredell County Health Department
Environmental Health Section
610 East Center Avenue
Mooresville, NC 28115
Attn: Mr. Benjamin Aldridge, R.S.

RE: Subsurface Sewage Effluent Disposal System
Earnhardt Real Properties Cabin
Mooresville, Iredell County, North Carolina

Dear Mr. Aldridge:

ENGINEERS CERTIFICATION

I, **Donald L. Munday**, as a duly registered Professional Engineer in the State of North Carolina, having been authorized to observe periodically the construction of the referenced project, a Subsurface Sewage Effluent Disposal System; Earnhardt Real Properties Cabin, Mooresville, Iredell County, NC, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the approved plans and specifications.

Sincerely,

PIEDMONT DESIGN ASSOCIATES, P.A.

Donald L. Munday

Donald L. Munday, P.E.
N.C. Registration No. 17327



cc: Cindy Sims, Property Manager
Sid Gaskins, Installer