

8218 CASTLESTONE DR

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Groundwater and Wastewater Services File Imaging Project
May 2007
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Groundwater & Wastewater Services
Septic Project File & Data Review Worksheet

GWS File #: 6873 B WASPS App #: 1694

Primary ES assigned to project: D C

Secondary ES assigned to project:

Project Type: New System ☑ Alteration ☐ Repair ☐ Modified Plot Plan ☐

I. File Review:

Rule or Law	Permit Application			
.1937(d)	Is the Application complete	Yes ☑	No ☐	N/A ☐
.1937(d)	Is there a Site plan/Plat with application	Yes ☑	No ☐	N/A ☐
.1937(d)	Is the Facility shown?	Yes ☑	No ☐	N/A ☐
.1937(d)	Are appurtenances shown	Yes ☑	No ☐	N/A ☐
	Site Evaluation Information			
.1939 (a)(1)	Topography and Landscape Position Recorded?	Yes ☑	No ☐	N/A ☐
.1940 (a-g)	Slope % Recorded?	Yes ☑	No ☐	N/A ☐
.1939 (a)(2)	Texture Class Recorded?	Yes ☑	No ☐	N/A ☐
.1939 (a)(2)	Structure type Recorded?	Yes ☑	No ☐	N/A ☐
.1939 (a)(2)	Consistence Recorded?	Yes ☑	No ☐	N/A ☐
.1939 (a)(2)	Mineralogy Recorded?	Yes ☑	No ☐	N/A ☐
.1939 (a)(3)	Soil Wetness Condition Recorded?	Yes ☑	No ☐	N/A ☐
.1939 (a)(4)	Soil Depth to Rock or Parent Material Recorded When Encountered	Yes ☑	No ☐	N/A ☐
.1939 (a)(5)	Depth to Restrictive Horizons Recorded When Encountered?	Yes ☑	No ☐	N/A ☐
.1939 (a)(6)	Sufficient Available Space Recorded?	Yes ☐	No ☐	N/A ☐
.1937(m)	Are the Profile Locations Shown?	✓ ☑		
.1939(a)	Are the S/PS Profiles in system & in repair area?	Yes ☑	No ☐	N/A ☐
& .1945(b)	Number of auger borings made: 5 Were sufficient auger borings made?	Yes ☑	No ☐	N/A ☐
.1939(d), .1955, .1956, .1957	LTAR 25	Yes ☐	No ☐	N/A ☐
	Improvement Permit/Construction Authorization			
.1937(g) 130A-336(a)	Proposed System Type stated-Initial	Yes ☑	No ☐	N/A ☐
.1945(b) 130A-336 (a)(3)	Proposed System Type stated-Repair System location identifiable by setbacks - Initial	Yes ☐ Yes ☑	No ☐ No ☐	N/A ☐ N/A ☐
.1937(g) .1945(b)	System components shown – Initial	Yes ☑	No ☐	N/A ☐
.1945(b)	Repair area shown	Yes ☑	No ☐	N/A ☐
.1937 (f)(g)	Does System design match facility, flow & WWcharacteristics?	Yes ☐	No ☑ ✓	N/A ☐
.1937 (f)(g)	Is System design consistent with soil/site conditions?	Yes ☐	No ☑ ✓	N/A ☐
.1937 (f)(g)	Is the System located in the approved area?	Yes ☑ ✓	No ☐	N/A ☐
130A-336(a)	Is the Design flow (gpd) indicated?	Yes ☑ ✓	No ☐	N/A ☐

Does not match w/ soil

130A-336(a)	Number of Bedrooms, employees, seats, etc. indicated?	Yes ☑	No ☐	N/A ☐
.1937(g)	Trench depth indicated?	Yes ☑	No ☐	N/A ☐
.1937(g)	Trench width indicated?	Yes ☑	No ☐	N/A ☐
.1937(g)	Trench length indicated?	Yes ☑	No ☐	N/A ☐
130A-336(a)(1)	Proposed/existing well shown?	Yes ☑	No ☐	N/A ☐
130A-336(a)(1)	Property line lengths shown?	Yes ☑	No ☐	N/A ☐
130A-336(a)	Facility/appurtenance setbacks shown from fixed points?	Yes ☑	No ☐	N/A ☐

Operation Permit

.1937(i)	System type as described in table V(a) of rule .1961	Yes ☐	No ☐	N/A ☐
.1937(i)	Conditions for system performance, operation, maintenance, monitoring and reporting.	Yes ☐	No ☐	N/A ☐

II. WASPS Review:

Construction authorization issued	Yes ☐	No ☐	N/A ☐
Installation approval issued	Yes ☐	No ☐	N/A ☐
Operation permit issued	Yes ☐	No ☐	N/A ☐
Other related documentation	Yes ☐	No ☐	N/A ☐

Items requiring correction/modification: 3

Comments:

IA issued date: _____

OP issued date: _____

Review performed by: _____ Date performed: _____

Mecklenburg County Groundwater & Wastewater Services
700 N. Tryon St, Suite 211 Charlotte, NC 28202
Phone: (704) 336-5103 Fax: (704) 336-6894

NC DENR
Division of Environmental Health
On-Site Wastewater Section

IMPROVEMENT PERMIT for a RESIDENTIAL ON-SITE WASTEWATER TREATMENT & DISPOSAL SYSTEM

Permit #: **30001694** GWS File #: **6873B** Tax Parcel #: **139-034-24**

- This IMPROVEMENT PERMIT is subject to revocation if site plans or the intended use change. There is to be **NO** grading, filling, or disturbance of the soil in the area of the septic tank system or repair area.
- CONSTRUCTION AUTHORIZATION must be obtained prior to receiving a Building Permit. The Construction Authorization is **NOT** transferable. Do not clear, grade, fill or disturb soil prior to obtaining a Construction Authorization.
- Domestic-type wastewater only. No industrial process wastewater may be discharged into the system.

I. This Improvement Permit Shall: Expire in Five (5) Years **Expiration Date (If Applicable):** 5/2/2012

Type of Installation: Residential - New System Lot Number: 105

Structure Type: HOUSE Size (ft^2): 3500 # Bedrooms: 5 # Occupants: 4

Building Foundation: Crawl Space Water Supply: Municipal

II. Initial System Type: PPBPS (pressurized) **System Classification:** IVa

Initial System Specifications:

Design Flow (gpd):	600	LTAR (gpd/ft^2):	0.25	Septic Tank Size (gal):	1500	Pump Tank Size (gal):	1500
Trench Width (ft):	3	Trench Spacing (ft):	9	Absorption Area (ft^2):	1200	Total Trench Length (ft):	400
Maximum Trench Depth (in):	28	Depth of Media (in):	N/A	Distribution Device:	valve box		

III. Repair System Type: Low Pressure Pipe (LPP) **System Classification:** IVa

Repair System Specifications:

Design Flow (gpd):	600	LTAR (gpd/ft^2):	0.125	Septic Tank Size (gal):	1500	Pump Tank Size (gal):	1500
Trench Width (ft):	3	Trench Spacing (ft):	9	Absorption Area (ft^2):	3600	Total Trench Length (ft):	1200
Maximum Trench Depth (in):	12	Depth of Media (in):	N/A	Distribution Device:	Manifold (LPP Distri		

IV. Permit Conditions/Comments:

(Please See the Following Page for Permit Conditions.)

The undersigned, an authorized agent of the MECKLENBURG COUNTY HEALTH DEPARTMENT, certifies that the Department is issuing an IMPROVEMENT PERMIT for the above referenced property. This permit is being issued in accordance with the *Laws and Rules For Sewage Treatment, and Disposal Systems* and is subject to the following provisions:

- No work shall be conducted on the septic system until an INSTALLATION APPROVAL is granted by the Department.
- The septic system installer shall be a registered septic contractor with Mecklenburg County Health Department.
- The permitted system shall be installed in accordance with the included PLOT PLAN.
- This IMPROVEMENT PERMIT is transferable.

DENR Authorized Agent: David Cornelius

Signature: [signature]

Date Issued: 5/2/2007

Owner/Legal Agent: Patrice Garner
Print Name

Signature: Patrice Garner

Mecklenburg County Groundwater & Wastewater Services
700 N. Tryon St, Suite 211 Charlotte, NC 28202
Phone: (704) 336-5103 Fax: (704) 336-6894

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IMPROVEMENT PERMIT for a RESIDENTIAL ON-SITE WASTEWATER TREATMENT & DISPOSAL SYSTEM

Permit #: **30001694** GWS File #: **6873B**

IV. Permit Conditions/Comments:

- This type of septic system requires an inspection once every 3 years by our office. The system owner is responsible for any fees, as determined by the Mecklenburg County Board of Commissioners, associated with this inspection.
- This type of septic system requires a Certified Operator to maintain the system. A system maintenance contract with a Certified Operator must be on file prior to issuance of an Operation Permit.
- Additional soil cover, as specified on the plot plan, required over the drain field must be inspected and approved prior to issuance of an Operation Permit.
- This Improvement Permit is being issued based on a supplemental soil investigation performed by staff from our office.
- The septic system shall be installed in accordance with the plans submitted by the wastewater system design consultant.
- All components of the septic system must be located at least 100 ft. (50 ft. minimum) from all private wells.
- Upon completion of the project the system designer shall provide Groundwater & Wastewater Services with a letter certifying that the system was installed in accordance with the approved design.
- The system must be water tested during the final inspection to verify proper operation and set system pressure.
- An effluent filter is required on the pump discharge pipe exiting the pump tank.
- All tanks (septic and/or dosing) must be water tested for 24 hours during the final inspection.
- 6" soil cover required over finished grade. Install system according to plans on file submitted by Larry Thompson and the Catena Group. Maintenance contract with certified operator required before CO release.

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- The permitted system shall be installed in accordance with the included PLOT PLAN.
- This IMPROVEMENT PERMIT is transferable.

DENR Authorized Agent: David Cornelius

Signature: _____

Date Issued: 5/2/2007

Owner/Legal Agent: Patrice Garner
Print Name

Signature: Patrice Garner

Residential Subsurface Wastewater Treatment and Disposal System Design

for

Lot 105 – Stonebridge at Mint Hill
8218 Castlestone Drive
Mint Hill, North Carolina

Tax Parcel # 139-034-24
Mecklenburg County File # 6873B
April 14, 2007

GWS Septic System Design Review

GWS File # 6873 B **Approved** ☒ **Disapproved** ☐

Design Review TCT 5-2-07 ☒ ☐

Field Review DC 4/23/07 ☒ ☐

*Projects are not considered "APPROVED" until both sections above are completed and indicate an APPROVED status.

Prepared for:

NVR, Inc.
10815 David Taylor Drive, Ste. 100
Charlotte, NC 28262

LICENSED SOIL SCIENTIST
MICHAEL G. WOOD
1219
STATE OF NORTH CAROLINA

Prepared by:

Larry Thompson, RS, PWS, SSIT
Michael Wood, LSS
Gary Kreiser, LSS
The Catena Group, Inc.
410-B Millstone Drive
Hillsborough, NC 27278
Phone: 704-301-4881
Fax: 704-888-1496

NORTH CAROLINA
REGISTERED
1208
SANITARIAN
LARRY B. THOMPSON, JR.

CC: Mr. David Cornelius, RS
Mecklenburg County Environmental Health

Details

The following proposal is submitted to the Mecklenburg County Health Department (MCHD), Ground Water Section, to help assist the county in the issuance of an Improvement Permit for a 5-bedroom residence served by a municipal water supply on Lot 105 of the Stonebridge at Mint Hill Subdivision.

Based upon an investigation by The Catena Group, Inc. (TCG), it was determined that Lot 105 would be considered "Unsuitable" under the *Laws and Rules for Sewage Treatment, and Disposal Systems* 15A NCAC 18A .1900 (North Carolina Department of Environment and Natural Resources, Division of Environmental Health, On-Site Wastewater Section). There is, however, a sufficient amount of "Suitable" Group IV soils located on the property which would allow for the installation of a shallow placed Type IV pressure dosed prefabricated porous block panel system (PPBPS) for a 5-bedroom residence (repair will be a low pressure pipe system). It is the desire of the owner that the MCHD consider issuing an Improvement Permit, based upon the following proposal.

Location

The subject property is located in Stonebridge Subdivision (Lot 105 – 8218 Castlestone Drive) in the town of Mint Hill, North Carolina. From NC 51, travel south on NC 218 approximately 0.9 mile, turn left onto SR 3109 (Bartlett Road). Stonebridge is the first subdivision on the right after crossing the I-485 overpass. Turn right onto Stonebridge Way and right onto Castlestone Way. Lot 105 is the third lot on the left.

References

Laws and Rules for Sewage Treatment and Disposal Systems, 15A NCAC 18A, Section .1900, Department of Environment and Natural Resources, Division of Environmental Health, On-Site Wastewater Section, June 2006.

Onsite Wastewater Treatment and Disposal Systems; EPA 625/R-00/008 Design Manual, February 2002.

Design, Installation and Maintenance of the T & J Panel Wastewater Treatment System; Sixth Edition, published by T & J Panel.

Design and Installation of Low Pressure Pipe Wastewater Treatment Systems; by Craig Cogger, Bobby Carlisle; Dennis Osborne and Ed Holland. Published by UNC Sea Grant College Pub. UNC-SC-82-03, May 1982.

Plans and Specifications

Septic Tank

- The septic tank shall be State approved (Section .1953 of 15A NCAC 18A), watertight, structurally sound, and 1500 gallons in capacity.
- The septic tank will be fitted with an approved effluent filter and riser for easy access and periodic maintenance.
- It is the responsibility of the septic contractor to thoroughly inspect the septic tank prior to accepting delivery to assure that the tank has had time to properly cure and is free of cracks or other structural deficiencies.

Pump Tank

- The pump tank shall be State approved, of one-piece construction, watertight, structurally sound and 1500 gallons in capacity. Again, it is the responsibility of the septic tank contractor to thoroughly inspect each pump tank prior to accepting delivery.
- The pump tank shall have access risers that extend, at a minimum, 6 inches above finished grade and must have less than 36 inches of fill over its top once finished grade has been established (a reinforced concrete tank will be required if finished soil cover is 36 inches or greater in depth).
- The pump and alarm controls shall be provided with manual circuit disconnects within a watertight, corrosion resistant, Nema 4X rated control panel. The control panel must be securely mounted outside, adjacent to the pump tank riser and at a minimum of 12 inches above finished grade. Pump and float control wiring should be long enough to reach from the tank to the control panel without splicing, routed through wire conduit, and sealed at the openings within the pump tank as well as the control panel enclosure. It is paramount that the conduit is properly sealed to prevent the escape of flammable gases from the pump tank. Furthermore, there must be two electrical circuits for the pump tank controls: one for the pump and one for the alarm controls.
- The pump tank shall have a properly functioning high water alarm incorporated into the control panel. The alarm circuit shall be supplied separate from any pump overload and short circuit devices. The alarm shall be both audible and visible by the system users.
- The float switch for the high water alarm should be mounted at a location slightly above the "pump on" elevation for the pump float control switch. The high water alarm float switch shall not be set more than 3 inches above this elevation.
- Pump float(s) shall be mounted so that the effluent at the end of a pump cycle is above the top of the effluent pump. The septic contractor must determine pump draw down and set the float switch accordingly.
- Float switch tie downs must be made of a corrosion resistant material (do not use electrical tape or metal hose clamps to secure these switches). Floats should be mounted on a separate "float tree" rather than the pump supply line (see pump tank detail).

- The pump must be placed on two 4-inch concrete blocks to allow for some settling of solid particulates within the pump tank.

Pump Tank Effluent

- The pump discharge piping shall be fitted with a pressure effluent filter. The filter must be equivalent to the GAG Sim Tech Filter, Boyne City, Michigan, 49712, telephone: 1-888-999-3290. This device provides a very high degree of filtration and is highly recommended.

Pipe and Fittings

- All discharge piping, supply lines, valves and disconnects should be made of PVC and pressure rated.
- All joints must be properly "welded" utilizing the appropriate PVC cement for each application.
- The supply line from the pump tank to the pressure manifold shall be 2 inch Schedule 40 PVC (approximate length of supply line is 78 feet).
- The lateral distribution lines shall be 1¼ inch Schedule 40 PVC. Holes in the laterals should be drilled on site and at the 12 o'clock position (one hole per panel). Lateral hole size is 5/32 of an inch.
- There shall be a threaded PVC union above each pump to facilitate easy removal of the pumps for maintenance or replacement.
- The end of each lateral is to be provided with a "turn up", contained within a turf/gate valve box, that provides above ground access for periodic clean out and pressure head adjustment.

Valve Box

- The control valves (gate valves) for each lateral distribution line shall be contained within one manifold box/vault of adequate size. The box should be placed upon a gravel base.
- The supply manifold conveys effluent from the pump to the lateral distribution lines.
- The supply manifold should be constructed by connecting a series of (6) 2" x 2" x 1 ¼" tees to the 2 inch supply line.

Backfill

- Backfill sand shall be a clean, washed, medium sand that is naturally occurring and falls within the gradation of ASTM C-33 specification (used in the ready mix industry and is readily available).

Drain Field Installation

- The drain field has been previously laid out on-site utilizing metal stemmed flags. Once this area has been approved by the MCHD, the property owner/builder should mark this area and isolate it as much as possible from construction traffic. Prior to the system installation, the septic contractor shall contact the MCHD and the system designer for a preconstruction conference at which time the drain field area will be re-verified.
- Under no circumstances shall any construction take place within the drain field area while the soil is in a wet condition. If the installer has doubts as to whether or not the drain field area is dry enough to begin construction, the Mecklenburg County Health Department should be contacted for permission to proceed with the installation.
- The specified system is a Type IVa, pressure dosed, pre-fabricated permeable block panel system – specifically the 16 inch high panel system manufactured by T&J Panel Wastewater Treatment System, Patent No. 4013559; telephone: 1-800-222-2577. The installer must follow the manufacturer's guidelines for installing the T&J Panel System and should request an installation manual from the manufacturer prior to beginning construction.
- The initial drain field consists of (6) six lateral trenches 3 feet wide by 67 feet in length. It is essential that the lateral trenches be constructed on contour with the land, with each trench being excavated level from beginning to end. The use of a tripod mounted engineer's level is essential to assure that each trench is constructed as level as possible.
- The maximum trench depth for this system shall be 28 inches. Each trench shall be placed on a minimum of 9 foot on centers. Additional soil cover may be required. * 6" COVER REQUIRED
- Once trenches are dug, the side walls shall be raked and a light dusting of lime applied.
- Backfill the trench with 6 inches of sand and level to grade. Once leveled, place 1 x 4 or 6 inch boards on top of the sand the entire length of each trench. Once the grade boards have been set, the panels may be set into the trench. The panels should be placed 6 inches apart.
- Once the panels have been set, line the top chamber of each panel with 10 – 12 pounds of clean particle sand (medium sand blasting sand). Coverage depth should be approximately 1 inch thick. *Please note that this sand is not the same material specified for backfill.*
- Tar seal rope, or approved foam, should be placed in the "U" outs of each end of the panel to form seals. Once the tar rope is in place, the 1 ¼ inch Schedule 40 PVC laterals can be added and the seal completed by the addition of more tar rope on the top and sides of the pipe. Now that the connection and seals are complete, a block cap is placed on each end of the panel so that all openings are covered.
- The end of each lateral should be fitted with a short turn up topped by a threaded female coupling with cap. Each turn up must be fitted with a turf/gate valve box with lid fitted flush to finished grade.
- Once the lateral has been installed and the panels closed, the trench is ready to be backfilled to the top with the sand used in the trench bottom. At this point, the trenches should be left open for the final inspection by the MCHD.

Proper Operation Check

- After all components of the waste water disposal system have been installed and connected, the system shall be checked for proper operation.
- With the electrical power turned off, fill the pump tank with water until the liquid rises to a level high enough to activate the high water alarm float. Turn on the electrical power. The alarm, alarm light and pump should activate at this time. Turn off the electrical power once these checks have been performed and prepare to set the head pressure at the valve box.

Pressure Head Adjustment

- The pressure head must be adjusted to match the design specifications. The pressure head is measured by the height of the liquid coming from the turn ups at the end of each lateral when the pump is running (utilizing stand pipes).
- Prepare a length of pipe (stand pipe), cut to the desired head pressure height and fitted with a threaded adapter that will screw into the turn up couplings at the end of each lateral. Thread the stand pipes into each lateral and then turn the power on to the pump, allowing the water to rise within the stand pipes. Adjust the gate valves within the supply manifold box to achieve the specified head pressure (liquid height in the stand pipes should equal the design head pressure).
- Once the pressure head has been adjusted, allow the pump to run through the remainder of the cycle. The pump float switch will automatically turn the pump off if it is operating properly. Make sure that the effluent pump is completely submerged in the remaining water, making adjustments to the float switch(es) as needed. This completes the checks for proper operation of the pump, alarm and float switches.
- At this point, the standpipes may be removed and replaced with the threaded turn up caps.

Final Landscaping

- The drainfield shall be shaped to shed rainwater and be free from low spots.
- The entire area of the drainfield should be planted with grass as soon as possible to prevent erosion. The soil should be properly tilled, limed (if necessary) and fertilized prior to planting. After applying grass seed, the area should be heavily mulched with straw or other suitable material.

Utility Conflicts

- The builder and property owner must take special care in planning for water, power, gas, telephone and cable lines. These utilities shall be kept clear of all parts of the septic system and its proposed repair area. Improper planning for underground utilities can negatively impact the installation and, in some cases, cause irreparable damage. If there are any questions regarding preferred routes, contact the MCHD as soon as possible. Irrigation systems should not be placed in the drain field area.

Maintenance

Operation and Maintenance

The designed system is classified as a Type IVa wastewater treatment and disposal system and will require ongoing maintenance. State regulations require that a system of this type be managed by a person certified (Certified Subsurface System Operator) by the North Carolina Department of Environment and Natural Resources to operate subsurface wastewater systems (Section .1961 Maintenance of Sewage Systems). A "Maintenance Contract" between the system owner and a Certified Operator will be required by the MCHD prior to the issuance of a final system approval or Operation Permit.

- The minimum inspection/maintenance and reporting frequency for a Type IVa system is twice a year by the Certified Operator. The local health department is required to inspect the system once every three years.
- The septic and pump tanks shall be pumped every 4 years or when the solids within the septic tank reach an elevation that is equivalent to 1/3 of the volume of the tank. In some situations, the tanks may need to be pumped more frequently; for example, if you are using a garbage disposal, it is recommended that the septic and pump tanks be cleaned out annually. Regardless, the Certified Operator will be able to advise when it is necessary to pump out tank solids.
- Pressure head for laterals should be checked and adjusted semi-annually, flushing with clean water as necessary to remove any accumulated solids.
- The effluent filters should be inspected semi-annually. When it becomes necessary to clean the effluent filters, the filters should be removed and the accumulated debris washed back into the septic or pump tank – not onto the lawn.
- All piping and valves should be inspected semi-annually for damage and corrections/repairs made immediately.
- The pump and float controls/switches should be inspected semi-annually to assure proper operation
- The drain field area should be maintained to prevent over growth of vegetation. Any damp areas, leakages or malfunctions should be addressed immediately.
- Divert gutter downspouts and surface water runoff away from the septic and pump tanks.

Suggestions to the Homeowner

- As previously mentioned, if you plan to use a garbage disposal in your home you should plan to have your septic and pump tanks cleaned out annually. The ground up garbage adds large amounts of solids into a septic tank that tend to degrade at a very slow rate.
- Grease, cooking oils, coffee grounds and non-degradable solids (disposable diapers, cigarettes and solid paper wastes) should never be put into a septic tank.
- Used motor oil or any oily liquids should not be disposed of in a septic tank.

- Be aware of the amount of water that you are using in your home. Water saving fixtures and devices can be installed on sinks, toilets and showers to reduce the volume of wastewater that you are sending to your drain field.
- Run dishwashers and washing machines only when you have a full load.
- Use liquid detergents. Powdered detergents have binding agents in them that tend to solidify in the wastewater disposal system.
- Repair leaky faucets and toilets. Small drips equal large volumes of water over time and can over burden your drain field.
- Do not use chemical additives in your system. Studies have indicated that they do not increase the biological activity that naturally occurs in the septic system and in some cases certain additives have been found to be detrimental to the life of a system.
- Finally, taking good care of your septic system will help to assure that you experience years of trouble free service at a relatively low cost. On-site wastewater treatment and disposal is still the most environmentally friendly method of treating residential/commercial waste and you should keep your system in use for as long as it is properly functioning! If you have additional questions, please feel free to contact your system designer or the MCHD.

√TET

Design Specifics

Daily Design Flow:	600 GPD -- 5 bedroom house
Septic Tank Size:	1500 gallons (2 compartments)
Pump Tank Size:	1500 gallons
Effluent Loading Rate:	Design = 0.25 GPD per sq. ft. (50 % reduction for the PPBPS)
Supply Length and Diameter:	Approx. 100 ft. of 2 in. SCH 40
Number and Size of Laterals:	(6) 1 ¼ inch x 67 feet in length
Hole Size:	5/32 inch
Hole Spacing:	1 per panel = 90 total
Number of Panels:	90
Dosing Volume:	324.00 gallons per dose
Flow Rate Through System:	36.9 gallons per minute
Elevation Head:	12 feet (may vary, please see note at the bottom of this page)
Pressure Head:	2 feet
Pump Requirements:	38.9 GPM at 14 Feet TDH (2 GPM added for vapor lock)
Depth of Water Pumped:	14.08" check with individual tank manufacturer (1 cu. Ft. of water equals 7.5 gal.)
Pump Run:	8.78 minutes
Check Valve:	Yes
Vapor Lock Hole:	Yes (A vapor lock hole can reduce vibrations in the discharge pipe upon start up and shut down)

* Please note that supply line and elevation head measurements are approximate. It is the contractor's responsibility to confirm these values based upon the actual house and plumbing location. If there is a discrepancy, contact the system designer prior to beginning construction.

PPBPS Design Worksheet

File #:	6873B
Tax #:	139-034-24
Address:	8218 Castlestone Drive
	Charlotte, NC 28227
Consultant:	Larry Thompson
Phone:	704-301-4881
Reviewed By:	TCT
Date:	5-2-07 ✓

System Requirements

Design Flow	600	gpd
LTAR	0.250	gpd/ft.^2
Linear footage	800	ft. (conventional)
Linear footage	400	ft. (50% Reduction)

Design Layout

Laterals	Length (ft)	# Panels
Line # 1	67	15
Line # 2	67	15
Line # 3	67	15
Line # 4	67	15
Line # 5	67	15
Line # 6	67	15
Totals	**402**	**90**

Absorption Area

Length (ft)	Width (ft)	Area (ft^2)
402	3	1,206

System Pressure Head	2	ft.	Value selected by system designer (must be between 2-5 ft.)
Orifice Diameter	5/32	in.	Size selected by system designer (1/8 in. minimum)
Flow Rate per Orifice	0.41	gpm	Determined from orifice flow design table (value dependent on pressure head & orifice diameter)
Total System Flow Rate	36.9	gpm	Total number of panels required multiplied by the orifice flow rate
System Dose Volume	324.00	gal.	Total number of panels required multipled by 3.6 gal./panel
Pump Run Time	8.78	min.	System dose volume divided by the total system flow rate
Pump Tank Drawdown	14.08	in.	1,500 gal. Pump tank, volume is approximately 23 gallons per inch

Comments:

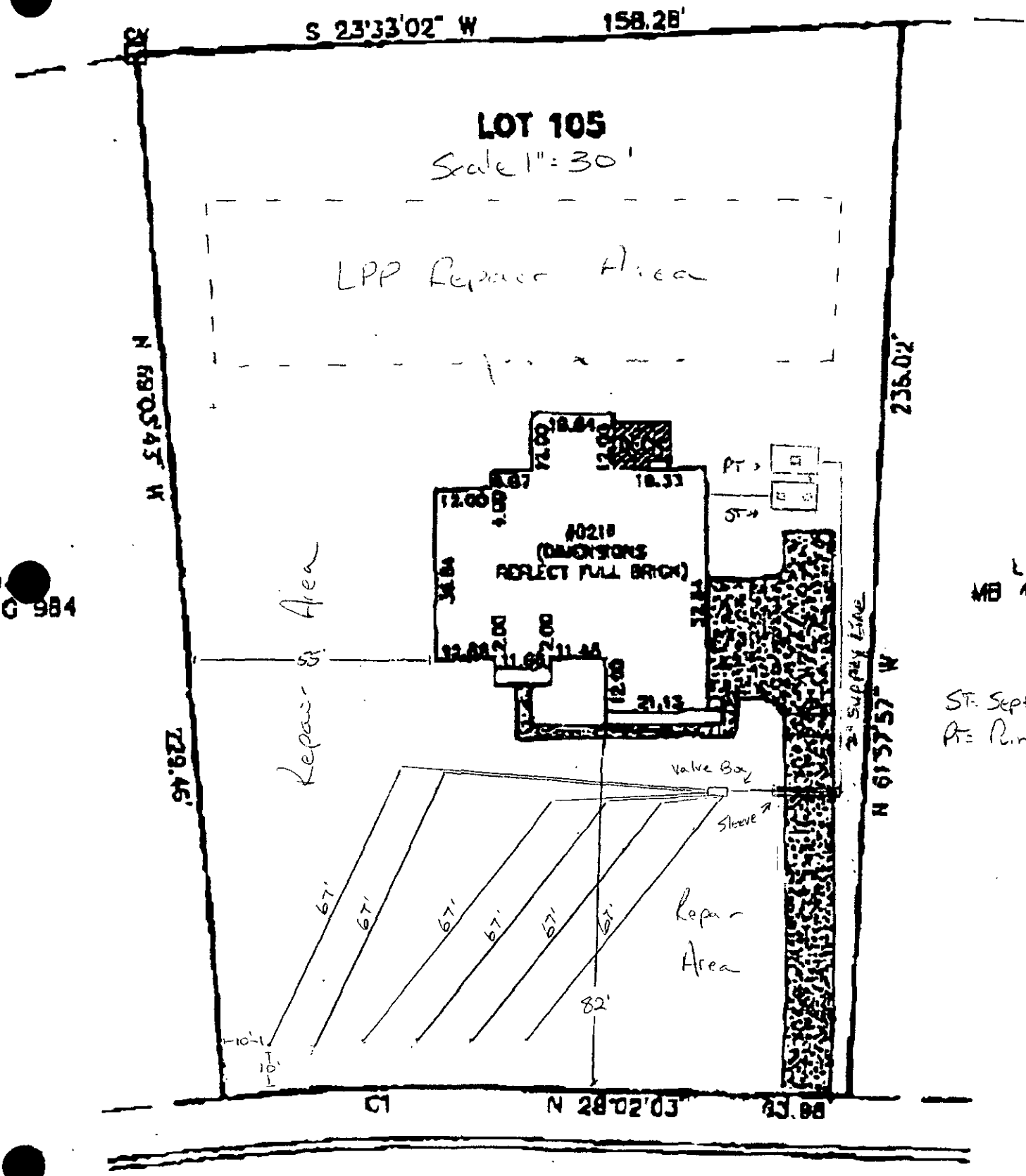
1. Install system using 3 ft. wide trenches.
2. Install drainlines on 9 ft. centers, level, and on contour.
3. System design requires effluent pump for distribution.
4. 100% repair area required for property.

T & J Panels

Linear Feet	# Panels
50	11
60	14
70	16
80	18
90	21
100	23

A LAND SERVICES
PONSIBLE FOR ANY
JE TO UNRECORDED
AND RESTRICTIONS

NOW OR FORMERLY
STONEBRIDGE OF MINT HILL, LLC
DB 5480 PG 518



CASTLESTONE DRIVE
60' PUBLIC R/W

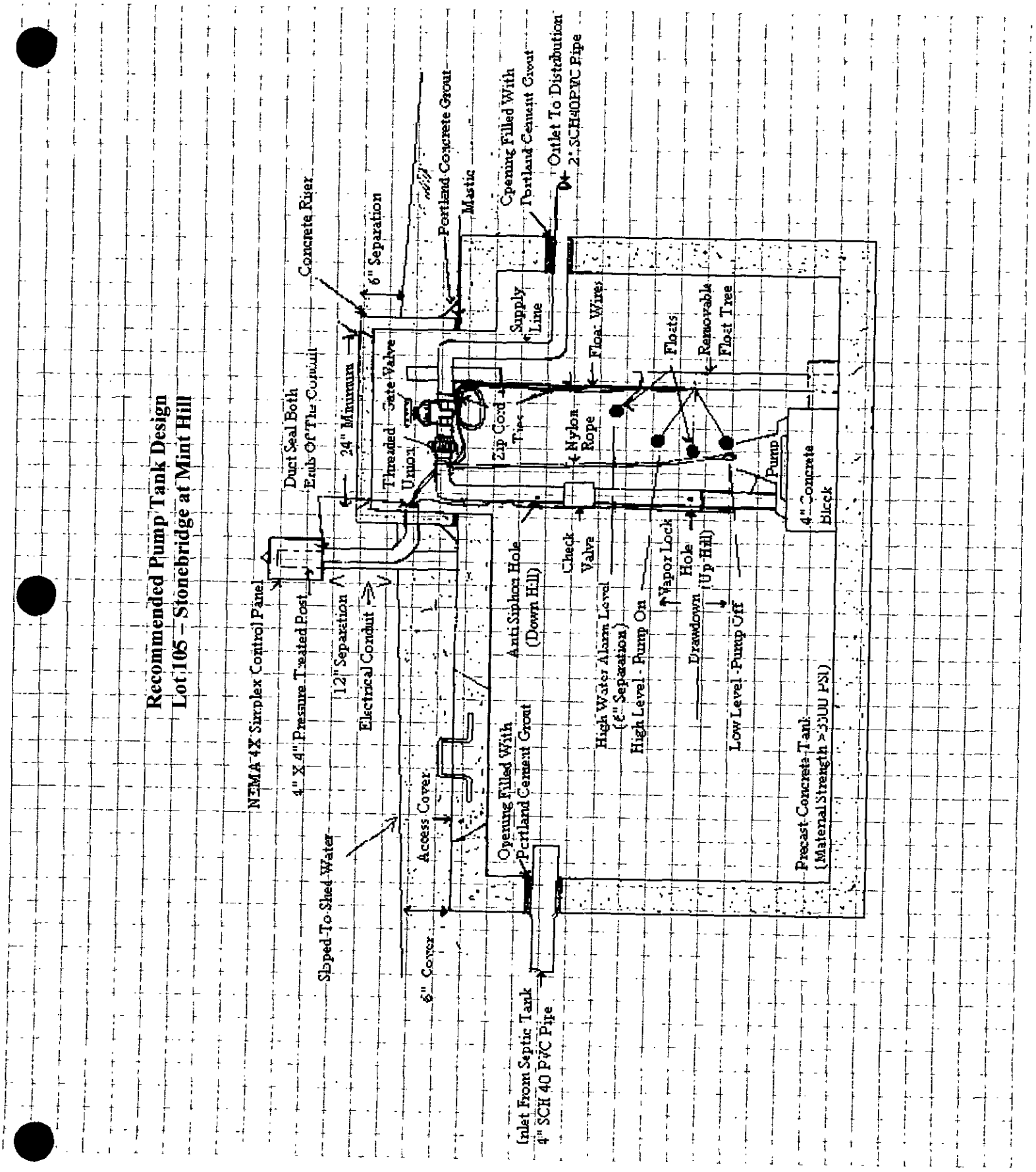
The Catena Group
410-B Millstone Drive
Hillsborough, NC 27278

File Number: 6873B

Location: Lot 105 – Stonebridge

Date: April 14, 2004

Recommended Pump Tank Design
Lot 105 – Stonebridge at Mint Hill



Department of Environment, Health, and Natural Resources
Division of Environmental Health
On-site Wastewater Section

Sheet: 1 of 2
Property ID: 139-034-24
Lot #: 105
File #: 68738
AppID: 1694

SOIL/SITE EVALUATION for ON-SITE WASTEWATER SYSTEM

Owner: NVR, Inc.
Address: 10815 David Taylor Drive, Suite 100, Charlotte, NC 28262
Proposed Facility: Residence Design Flow (.1949): 600 gpd
Location of Site: 8218 Castlestone Way
Water Supply: [x] Public [ ] Individual [ ] Well [ ] Spring [ ] Other
Evaluation Method: [x] Auger Boring [ ] Pit [ ] Cut
Type of Wastewater: [x] Sewage [ ] Industrial Process [ ] Mixed

Applicant: Kim Stanley
Date Evaluated: 2/9/2007
Property Size:
Property Recorded:

PROFILE #	.1940 Landscape Position/ Slope%	Horizon Depth (IN.)	SOIL MORPHOLOGY .1941 .1941 Structure/ Texture	.1941 Consistence Mineralogy	b PROFILE FACTORS .1942 Soil Wetness/ Color	.1943 Soil Depth (IN.)	.1956 Sapro Class	.1944 Restr Horiz	Profile Class & LTAR
1	LS,8	0-8	GR/SCL	FR/SS/SP/SEXP	32"	35	NA	NONE	US,IV
		8-32	ABK/SBK/C	FI/S/P/SEXP	7.5YR 6/2				.25 GPD/FT²
		32-35	PL/C	FI/S/P/SEXP					
2	"	0-2	GR/SCL	FR/SS/SP/SEXP	>28" TO SOIL WETNESS	28	"	"	US,IV
		2-28	ABK/SBK/C	FI/S/P/SEXP					.125 GPD/FT²
		28+	M/SAP						
3	"								
		0-7	GR/SCL	FR/SS/SP/SEXP	>40" TO SOIL WETNESS	40	"	"	PS,IV
		7-40	ABK/SBK/C	FI/S/P/SEXP					.25 GPD/FT2
		40+	M/SAP						
4	"	0-10	GR/SCL	FR/SS/SP/SEXP	43"	46	"	"	"
		10-46	ABK/SBK/C	FI/S/P/SEXP	7.5YR 6/2				
5	"	0-17	GR/SCL	FR/SS/SP/SEXP	>48" TO SOIL WETNESS	48	"	"	"
		17-48	ABK/SBK/C	FI/S/P/SEXP					
					SITE LTAR				.25 GPD/FT²

Description	Initial System	Repair System
Available Space (.1945)		
System Type(s)		
Site LTAR		

Other Factors (.1946): None
Soil Evaluation By: Chris Sherrill, RS, LSS 2/6/07
Others Present: None
Site Classification (.1948):
Site Evaluation By:
Others Present:

COMMENTS: 100% Repair Area Required

Landscape Position	Group	Texture	.1955 LTAR
R-Ridge	I	S-Sand	1.2 - 0.8
SS-Shoulder Slope		LS-Loamy Sand	
LS-Linear Slope			
FS-Foot Slope	II	SL-Sandy Loam	0.8 - 0.6
NS-Nose Slope		L-Loam	
HS-Head Slope			
CC-Concave Slope	III	SI-Silt	0.6 - 0.3
CV-Convex Slope		SICL-Silty Clay Loam	
T-Terrace		CL-Clay Loam	
FP-Flood Plain		SCL-Sandy Clay Loam	
	IV	SC-Sandy Clay	0.4 - 0.1
		SIC-Silty Clay	
		C-Clay	

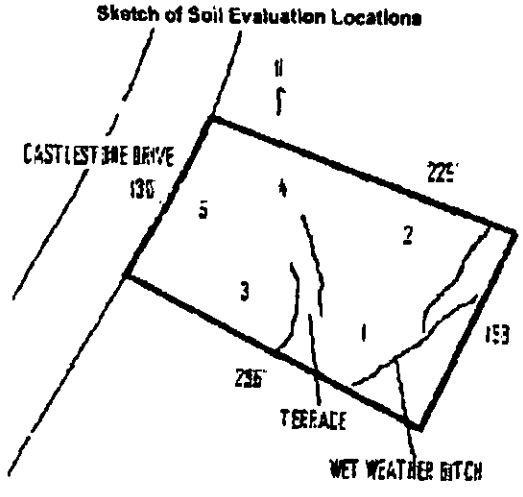
Structure
SG-Single Grain
M-Massive
CR-Crumb
GR-Granular
SBK-Subangular Blocky
ABK-Angular Blocky
PL-Platy
PR-Prismatic

Consistence Moist
VFR-Very Friable
FR-Friable
FI-Firm
VFI-Very Firm
EFI-Extremely Firm

Consistence Wet
NS-Non-Sticky
SS-Slightly Sticky
S-Sticky
VS-Very Sticky
NP-Non-Plastic
SP-Slightly Plastic
P-Plastic
VP-Very Plastic

Mineralogy
SEXP-Slightly Expansive
EXP-Expansive

Sketch of Soil Evaluation Locations



MECKLENBURG COUNTY
LAND USE AND ENVIRONMENTAL SERVICES
Payment Receipt

Receipt Information

Date: 05/08/07
Receipt #: 50521
Check / Auth #: CHARGE
Received By: AIDOOJK

Amount: 150.00
Tendered: 0.00
Returned: 0.00

Account Information

Account #: X33575
Contractor: NVR INC (EAST)
Attn:
Address: 10815 DAVID TAYLOR DR 100
Address:
City/State/Zip: CHARLOTTE, NC 28262

Item	Description	Permit#	Quantity	Unit Price	Total Price
0734	Auth for Waste Wtr Sys Constr 8218 CASTLESTONE DRIVE		1	150.00	150.00

Outstanding Balances

Month-To-Date	Prior Month	30 Days	60 Days	90 Days	Balance
14,786.99	24,518.18	1,820.71			

MECKLENBURG COUNTY
LAND USE AND ENVIRONMENTAL SERVICES
Payment Receipt

Receipt Information

Date: 05/08/07
Receipt #: 50533
Check / Auth #: CHARGE
Received By: AIDOOJK

Amount: 150.00
Tendered: 0.00
Returned: 0.00

Account Information

Account #: X33575
Contractor: NVR INC (EAST)
Attn:
Address: 10815 DAVID TAYLOR DR 100
Address:
City/State/Zip: CHARLOTTE, NC 28262

Item	Description	Permit#	Quantity	Unit Price	Total Price
0703	Installation/Final Approval 8218 CASTLESTONE DRIVE		1	150.00	150.00

----------Outstanding Balances----------

Month-To-Date	Prior Month	30 Days	60 Days	90 Days	Balance
14,936.99	24,518.18	1,820.71			

Department of Environment, Health, and Natural Resources
Division of Environmental Health
On-site Wastewater Section

Sheet: 1 of 2
Property ID: 139-034-24
Lot #: 105
File #: 6873B
AppID: 1694

SOIL/SITE EVALUATION for ON-SITE WASTEWATER SYSTEM

Owner: NVR, Inc.
Applicant: Kim Stanley
Address: 10815 David Taylor Drive, Suite 100, Charlotte, NC 28262
Date Evaluated: 2/9/07
Proposed Facility: Residence
Design Flow (.1949): 600 gpd
Property Size:
Location of Site: 8218 Castlestone Way
Property Recorded:
Water Supply: [x] *Public* [ ] *Individual* [ ] *Well* [ ] *Spring* [ ] Other
Evaluation Method: [x] Auger Boring [ ] Pit [ ] Cut
Type of Wastewater: [x] Sewage [ ] Industrial Process [ ] Mixed

PROFILE #	.1940 Landscape Position/ Slope%	Horizon Depth (IN.)	SOIL MORPHOLOGY .1941 .1941 Structure/ Texture	.1941 Consistence Mineralogy	b PROFILE FACTORS .1942 Soil Wetness/ Color	.1943 Soil Depth (IN.)	.1956 Sapro Class	.1944 Restr Horiz	Profile Class & LTAR
1	LS,8	0-8	GR/SCL	FR/SS/SP/SEXP	32"	35	NA	NONE	US,IV
		8-32	ABK/SBK/C	FI/S/P/SEXP	7.5YR 6/2				.25 GPD/FT^2
		32-35	PL/C	FI/S/P/SEXP					
2	"	0-2	GR/SCL	FR/SS/SP/SEXP	>28" TO SOIL WETNESS	28	"	"	US,IV
		2-28	ABK/SBK/C	FI/S/P/SEXP					.125 GPD/FT^2
		28+	M/SAP						
3	"								
		0-7	GR/SCL	FR/SS/SP/SEXP	>40" TO SOIL WETNESS	40	"	"	PS,IV
		7-40	ABK/SBK/C	FI/S/P/SEXP					.25 GPD/FT2
		40+	M/SAP						
4	"	0-10	GR/SCL	FR/SS/SP/SEXP	43"	46	"	"	"
		10-46	ABK/SBK/C	FI/S/P/SEXP	7.5YR 6/2				
5	"	0-17	GR/SCL	FR/SS/SP/SEXP	>48" TO SOIL WETNESS	48	"	"	"
		17-48	ABK/SBK/C	FI/S/P/SEXP					
					SITE LTAR				.25 GPD/FT^2

Description	Initial System	Repair System
Available Space (.1945)	PS	PS
System Type(s)	Iva	Iva
Site LTAR	0.25	0.125

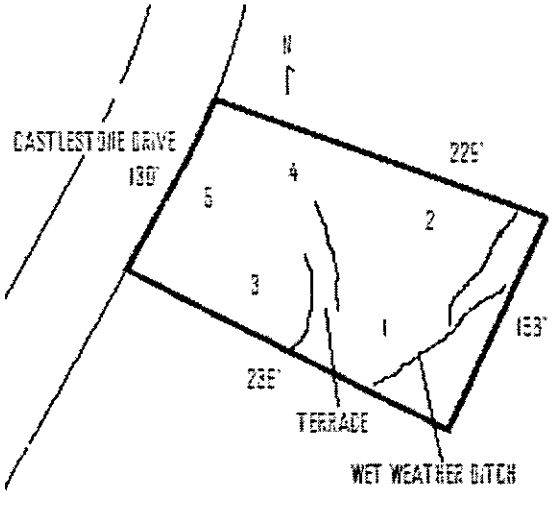
Other Factors (.1946): None
Soil Evaluation By: Chris Sherrill, RS, LSS 2/6/07
Others Present: None
Site Classification (.1948):
Site Evaluation By: David Cornelius, RS
Others Present:

COMMENTS: 100% Repair Area Required

Landscape Position	Group	Texture	.1955 LTAR	Structure
R-Ridge	I	S-Sand	1.2 - 0.8	SG-Single Grain
SS-Shoulder Slope		LS-Loamy Sand		M-Massive
LS-Linear Slope				CR-Crumb
FS-Foot Slope	II	SL-Sandy Loam	0.8 - 0.6	GR-Granular
NS-Nose Slope		L-Loam		SBK-Subangular Blocky
HS-Head Slope				ABK-Angular Blocky
CC-Concave Slope	III	SI-Silt	0.6 - 0.3	PL-Platy
CV-Convex Slope		SICL-Silty Clay Loam		PR-Prismatic
T-Terrace				
FP-Flood Plain		CL-Clay Loam		
		SCL-Sandy Clay Loam		
	IV	SC-Sandy Clay	0.4 - 0.1	
		SIC-Silty Clay		
		C-Clay		

Consistence Moist	Consistence Wet	Mineralogy
VFR-Very Friable	NS-Non-Sticky	SEXP-Slightly Expansive
FR-Friable	SS-Slightly Sticky	EXP-Expansive
FI-Firm	S-Sticky	
VFI-Very Firm	VS-Very Sticky	
EFI-Extremely Firm	NP-Non-Plastic	
	SP-Slightly Plastic	
	P-Plastic	
	VP-Very Plastic	

Sketch of Soil Evaluation Locations



#1694

GWS – RES. APP 07/05

SEPTIC FEE: 200 ck
DATE: 12/05/06
CRT [ ]

WELL FEE: _____
DATE: _____
CRT [ ]

PERMIT APPLICATION FOR A RESIDENTIAL SITE IMPROVEMENT PERMIT / CONSTRUCTION AUTHORIZATION FOR ON-SITE WASTEWATER SYSTEM NEW WELL INSTALLATION OR REPAIR OF EXISTING WELL MECKLENBURG COUNTY GROUNDWATER & WASTEWATER SERVICES

FILE # 6873B

SEPTIC / TYPE APPLICATION: ☐ NONE ☐ NEW SYSTEM ☐ ALTERATION ☐ REPAIR ☐ MODIFY PLOT PLAN

WELL / TYPE APPLICATION: ☐ NONE ☐ NEW WELL ☐ MAJOR REPAIR ☐ ABANDONMENT

JOB LOCATION INFORMATION:
TAX/PARCEL #: ~~[illegible]~~ 139-034-24
STREET ADDRESS: 8218 Castle Stone Dr
CITY: Mint Hill
STATE: NC ZIP: 28227
SUBDIVISION OR MOBILE HOME PARK NAME:
LOT #: 105
TOWNSHIP:
☐ 0-MECKLENBURG ☐ 4-PINEVILLE
☐ 1-CHARLOTTE ☐ 5-MATTHEWS
☐ 2-DAVIDSON ☐ 6-HUNTERSVILLE
☐ 3-CORNELIUS ☒ 7-MINT HILL

BUILDING INFORMATION:
TYPE OF BUILDING:
☐ SINGLE MOBILE HOME (S) ☐ MODULAR HOME (M)
☐ DOUBLE WIDE (D) ☐ MULTIPLE FAMILY (U)
☒ HOUSE (H) ☐ OTHER
HEATED SQUARE FOOTAGE: 3500
NUMBER OF BEDROOMS: 5
NUMBER OF OCCUPANTS: 7

FOUNDATION FOR RESIDENCE:
☐ CONCRETE SLAB ☐ BASEMENT WITH PLUMBING
☒ CRAWLSPACE ☐ BASEMENT WITH NO PLUMBING

IF PLANNING TO EXPAND/ALTER THE EXISTING SYSTEM INDICATE THE FOLLOWING CHANGES:
NUMBER OF BEDROOMS TO BE ADDED: NUMBER OF ADDITIONAL OCCUPANTS IN THE RESIDENCE:
WILL THERE BE A HOME BUSINESS IN THE RESIDENCE? ☐ YES ☐ NO TYPE:

WATER SUPPLY:
☒ MUNICIPAL (M) ☐ PUBLIC (C) ☐ PRIVATE WELL (P) ☐ SHARED WELL (S) ☐ OTHER SPRINGS (O)
PROPOSED USE OF WELL: ☒ N/A ☐ IRRIGATION ☐ POTABLE ☐ GEOTHERMAL ☐ OTHER

ARE ANY OF THE FOLLOWING LOCATED ON THE PROPERTY? IF SO, PLEASE SHOW LOCATION ON SITE PLAN/PLAT

BURIED CABLES, LANDFILLS, STUMPHOLES	☐ YES	☒ NO	WELLS, SPRINGS, OR WATER LINES	☐ YES	☒ NO
EXISTING WASTEWATER SYSTEMS	☐ YES	☒ NO	DESIGNATED WETLANDS	☐ YES	☒ NO
EASEMENTS OR RIGHT-OF-WAYS	☒ YES	☐ NO	GRADING/SOIL REMOVAL PERFORMED	☐ YES	☒ NO

PROPERTY OWNER:
NAME: Ryan Homes
ADDRESS: 10315 David Taylor Dr Suite 100
CITY: Charlotte
STATE: NC ZIP: 28262
HOME PHONE: WORK PHONE: 704 548 3039
MOBILE PHONE: FAX:

LEGAL AGENT FOR PROPERTY OWNER, IF APPLICABLE:
NAME: Kim Stanley
ADDRESS:
CITY:
STATE: ZIP:
HOME PHONE: WORK PHONE
MOBILE PHONE 704 791 6852 FAX

WHAT DATE WAS THE PROPERTY ORIGINALLY DEEDED AND RECORDED? Aug 2006
WHAT IS THE ANTICIPATED CLOSING DATE FOR THIS PROPERTY? Mar 2007

"An Improvement Permit is subject to suspension or revocation if site plans or the intended use change or if information submitted in this application is falsified or changed. The undersigned, owner, or legal agent for the owner, of the property described above as the "Job Location" has read the foregoing application, acknowledges that the contents of same are true, and authorizes the Mecklenburg County Health Department to enter onto the property for the purpose of processing this request.

Kim Stanley 11-29-06
Owner's/Agent's Signature Date

NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT & NATURAL RESOURCES DIVISION
OF ENVIRONMENTAL HEALTH ON-SITE
WASTEWATER SECTION

"A Well Permit is subject to suspension or revocation if site plans or the intended use change or if information submitted in this application is falsified or changed. The undersigned, owner, or legal agent for the owner, of the property described above as the "Job Location" has read the foregoing application, acknowledges that the contents of same are true, and authorizes the Mecklenburg County Health Department to enter onto the property for the purpose of processing this request.

Owner's/Agent's Signature Date

MECKLENBURG COUNTY HEALTH DEPARTMENT
GROUNDWATER & WASTEWATER SERVICES
700 N. TRYON ST., SUITE 211
CHARLOTTE, NC 28202 704-336-5133 / FAX: 704-336-6894

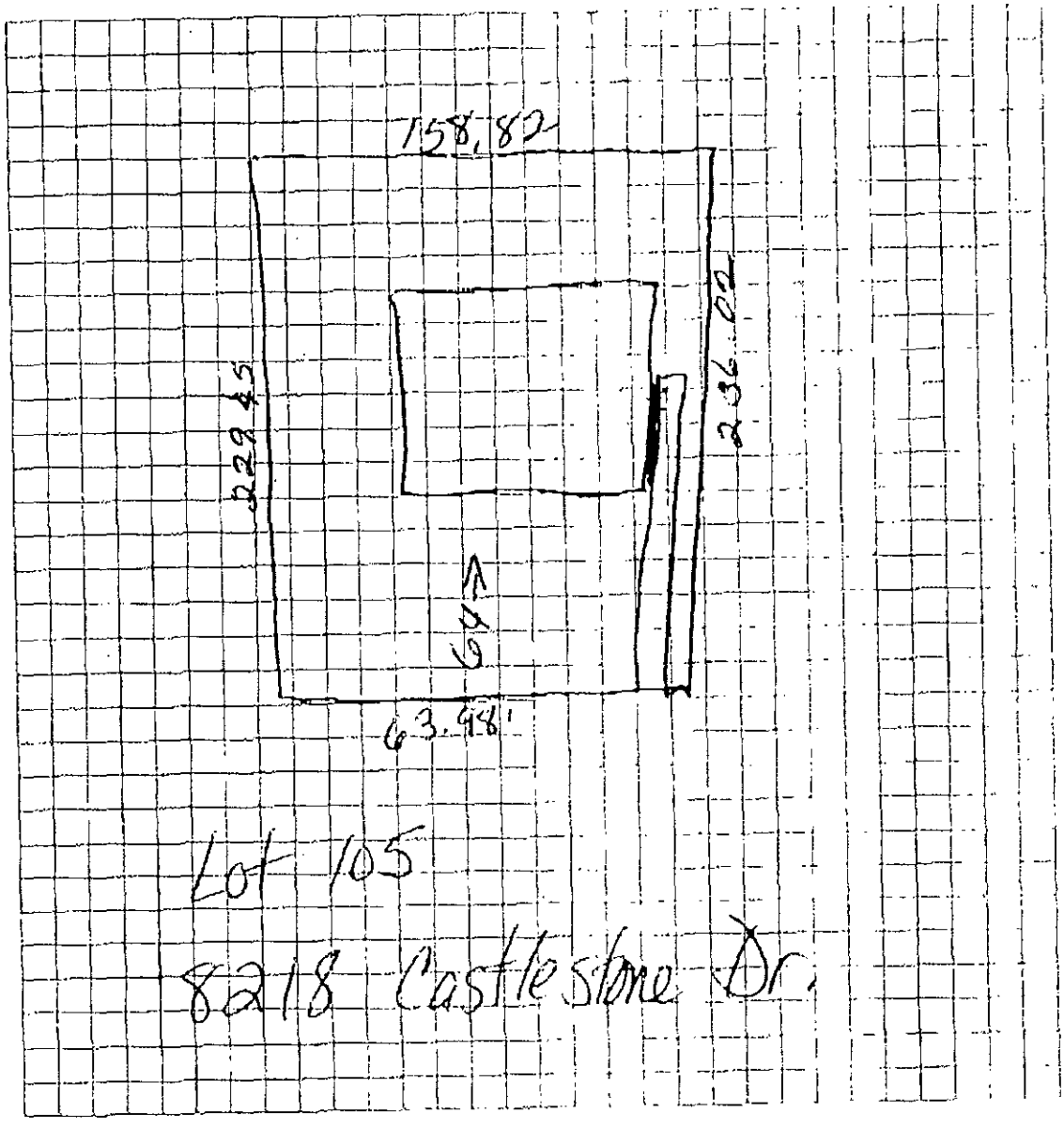
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Mecklenburg County
Land Use & Environmental Service Agency
Groundwater & Wastewater Services
700 N. Tryon St., Suite 211
Charlotte, NC 28202
Phone: (704) 336-5103
Fax: (704) 336-6894

File #____
Date_____

PROPOSED PLOT PLAN

A map showing existing and proposed property lines and easements with dimensions, the location of the single family residence, non-single family residence, or other facility, and appurtenances, the site for the proposed well, and the location of existing or proposed sewer lines and/or sewage disposal systems, surface water bodies, aboveground or underground storage tanks. Name all roads adjoining the property. If this a repair indicate the type of repair.



Owner/Agent Signature Kim Whitley

Date 11-29-06

LBC 12/15/04