Engineers and Soil Scientists

Agri-Waste Technology, Inc.
1225 Crescent Green, Suite 250, Cary NC 27518
agriwaste.com | 919.859.0669

Septic System Inspection Report

13616 New Light Rd
Raleigh, North Carolina

Prepared for:	Dan & Nickie Ryan, Buyer
XCOPY:	Bryan Stinnett, Compass
Prepared By:	McLean Davis
Report Date:	February 9, 2026

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SEPTIC SYSTEM INSPECTION REPORT FOR:
13616 New Light Rd
Raleigh, North Carolina

PREPARED FOR: Dan & Nickie Ryan, Buyer

XCOPY: Bryan Stinnett, Compass

PREPARED BY: McLean Davis

DATE: February 9, 2026

The septic system serving the home at 13616 New Light Rd Raleigh, North Carolina was inspected by McLean Davis of Agri-Waste Technology, Inc., on February 9, 2026 The septic system is a conventional gravity system with a drainfield and a septic tank. The Wake County Department of Environmental Services documentation for the septic system is in Attachment 1. A copy of the septic system inspection checklist completed during the February 9, 2026 inspection is in Attachment 2. A detailed discussion of the inspection is below.

General septic system information can be found on the North Carolina State University Soil Science Department website. The address is www.soil.ncsu.edu. Some routine septic system maintenance information is in Attachment 3 following this report.

Septic Drainfield

No septic effluent was found at the soil surface within the septic drainfield (Attachment 4). The drainfield is part of a lawn area. Surface water did not appear to collect anywhere within the drainfield. Root intrusion was present within the distribution box. Vegetation was near the distribution box. The distribution box was marked on the detected location with a blue pin flag.

Septic Tank

The septic tank was accessible on the inlet end. The outlet end was excavated and opened during the inspection (Attachment 4). The concrete tank, baffle wall, inlet pipe, outlet pipe, and outlet baffle were in good condition. Effluent wastewater was noted to be consistently entering the septic tank during the inspection. The outlet lid was noted to be broken. The septic tank contains 4-5" of solids. Therefore, the septic tank does not need to be pumped at this time. Attachment 3 contains a table entitled *Estimated Septic Tank Inspection and Pumping Frequency in Years* that indicates the recommended pumping frequency based on the number of occupants in the house and the septic tank size.

Conclusions

1) Effluent wastewater was noted to be consistently entering the septic tank during the inspection.
2) The outlet lid was noted to be broken.
3) Root intrusion was present within the distribution box.
4) Vegetation was near the distribution box. The distribution box was marked on the detected location with a blue pinflag.

We appreciate the opportunity to assist you. Please contact us with any questions, concerns, or comments.

As indicated in the AGREEMENT FOR PROFESSIONAL ENVIRONMENTAL SERVICES "Point of sale well/septic system inspections constitute a snapshot evaluation in time of the system(s) and do not guarantee future performance of the system(s) due to numerous factors including, but not necessarily limited to, the following: water use patterns of the inhabitants of the dwelling, occupancy of the dwelling (no occupancy for an extended period of time or occupancy in excess of the system design parameters), acts of God or natural disasters, lack of visibility of many of the system components, placement of inappropriate items into the system (non-degradable items, water softener brine, etc.), physical disturbance of or damage to the system or system components, etc. Furthermore, only the aboveground components of the well that are visible from the soil surface are inspected."

ATTACHMENT 1: Wake County Health Department Documentation

Environmental Services - Water Quality
Onsite Wastewater Scan Data Entry Form

PERMIT #: D 0 3 9 9 1 1 PIN #: 1 8 0 1 1 6 1 5 5 0

OP DATE: 0 5 / 2 2 / 2 0 0 7

SYSTEM USE:
- [x] House
- [ ] Mobile Home
- [ ] Business
- [ ] Other

SEWAGE TYPE:
- [x] Domestic
- [ ] Industrial

PUMP/SIPHON?:
- [ ] Yes
- [x] No

PRESSURE MANIFOLD:
- [ ] Yes
- [x] No

SYSTEM TYPE:
- [ ] I
- [x] II
- [ ] III
- [ ] IV
- [ ] V
- [ ] VI
- [ ] Other

SUB TYPE:
- [x] A
- [ ] B
- [ ] C
- [ ] D
- [ ] E
- [ ] F
- [ ] G

NBR BEDROOMS:
- [ ] 1
- [ ] 2
- [ ] 3
- [ ] 4
- [ ] 5
- [ ] 6
- [x] Other

MAINT. SCHEDULE:
- [ ] Yes
- [x] No

CERT. OPERATOR
- [ ] Yes
- [x] No

GT	ST	PT	SIZE
☐	☐		750
☐	☐	☐	900
☐	☐	☐	1,000
☐	☐	☐	1,200
☐	☐	☐	1,500
☐	☐	☐	1,800
☐	☐	☐	2,100
☐	☐	☐	2,500
☐	☐	☐	3,000
☐	☐	☐	4,000
☐	☐	☐	5,000
☐	☐	☐	8,000
	☐	☐	10,000
☐	☒	☐	Other
☒		☒	None/NA GT or PT

DRAINFIELD SIZE(SQ. FT.)

0 0 0 0 0

DRAIN TYPE:
- [ ] Stone
- [x] EZ Flow
- [ ] Infiltrator
- [ ] Biodiffuser
- [ ] Cultec
- [ ] Drip
- [ ] Hancor
- [ ] Large Dia. Pipe
- [ ] Multi-Pipe
- [ ] Other

MAX DEPTH (IN.):
- [ ] 12 in. or less
- [ ] 18 in. or less
- [ ] 24 in. or less
- [ ] 26 in. or less
- [ ] 28 in. or less
- [ ] 30 in. or less
- [ ] 32 in. or less
- [ ] 36 in. or less
- [x] Other

STONE DEPTH (IN.):
- [ ] 8 in. or less
- [x] 12 in. or less
- [ ] 18 in. or less
- [ ] 24 in. or less
- [ ] Other

TRENCHES:
- [x] Individual
- [ ] Bed

TRENCH WIDTH (IN.):
- [ ] 12 in. or less
- [ ] 18 in.
- [ ] 24 in.
- [x] 36 in.
- [ ] 6 ft. or less
- [ ] 9 ft. or less
- [ ] Other

RM
10/18/13

WAKE COUNTY DEPARTMENT OF ENVIRONMENTAL SERVICES WELL AND SEWAGE SITE LOCATION PERMIT
NO PERMIT(S) FOR CONSTRUCTION, LOCATION OR RELOCATION ACTIVITY SHALL BE ISSUED
UNTIL AN AUTHORIZATION FOR WASTEWATER SYSTEM CONSTRUCTION HAS BEEN ISSUED
PERMIT VOID IF NOT IN COMPLIANCE WITH ZONING REGULATIONS AND/ OR IF SITE IS ALTERED OR INTENDED USE CHANGED

PERMIT#: **D039911** STATUS: **C** APP. DATE: **05/16/2007** BLDG. PERMIT#: **0073932**
PIN: **1801.01 16 1550 000** TAX MAP: **0187 0061** RECORDED: **Y** ORIG. PERMIT#:
TOWNSHIP: **02 BARTON"S CREEK** JURISDICTION: **WC** ZONING: **80W**
APPLICANT: **SOUTHERN RECONSTRUCTION**
1621 WAIT AVE
WAKE FOREST, NC 27587
(919) 868 - 7769
USE: HD USE: **434 ADD/ALT-HSEKEEPING SAME #**
EXIST USE: **101 ONE-FAMILY HOUSE**
DISPOSAL: BEDROOMS: **0** BASEMENT: **N** #EMPLOYEES: **0**
SITE: ADDRESS: **13616 NEW LIGHT RD**
SUBDIVISION: LOT: ACRES: **4.27**
DIRECTION: **US1N TO HWY 98W R NEW LIGHT RD HSE ON R**
BEDROOM ADDITION

Well System: WATER: **COMMUNITY** - TYPE:

WELL LOG INFORMATION: DEPTH: ____ CASING DEPTH: ___ YIELD: _____ STATIC LEVEL: _____
WELLI CONTRACTOR: _____ REG.# _____ PUMP CONTRACTOR: _____ REG.# _____
Construction Compliance GROUT APPROVED ☐ DATE _____ EHS _____
WELLHEAD APPROVED ☐ DATE _____ EHS _____
SYSTEM FINALIZED ☐ DATE _____ EHS _____
COMMENTS:

Operation Permit

DESIGN FLOW: _____ gal./min. ACTUAL FLOW: _____ INNOVATIVE LETTER:

INSTALLED BY: _____ INSTALLATION APPROVED BY: _____
PROPRIETARY SYSTEM: FILTER NO: _____
COMMENTS:

OPERATIONS PERMIT ISSUED? Y OP DATE: 5-22-07 BY: _____

This permit is based in part on information provided by the homeowner or his/her representative in the application submitted for this permit. The Environmental Health Specialist is not responsible for false or misleading information contained in the application. The Environmental Health Specialist is also not responsible for concealed conditions on the property or for statements in this report that may have resulted from false or misleading statements provided to him in the application. Neither Wake County nor the Environmental Health Specialist warrants that the septic tank system will continue to function satisfactorily in the future or that the water supply will remain potable.

As Built Information:

Date: _____ Benchmark: _____ Rod reading: _____ Distance to Structure: _____
ST: _____ gals ID#: _____ D.O.M.: _____ Elev.: _____ Distance to Well: _____
PT: _____ gals ID#: _____ D.O.M.: _____ Elev.: _____
D-box/FD/PM elev.: _____ Supply Line: _____ ft. Pump/Control Panel: _____

Line 1:	____	____	____	____	Date: ____	Line 6:	____	____	____	____	Date: ____
Line 2:	____	____	____	____	Date: ____	Line 7:	____	____	____	____	Date: ____
Line 3:	____	____	____	____	Date: ____	Line 8:	____	____	____	____	Date: ____
Line 4:	____	____	____	____	Date: ____	Line 9:	____	____	____	____	Date: ____
Line 5:	____	____	____	____	Date: ____	Line 10:	____	____	____	____	Date: ____

Distance to P/L: _____ Notes: _____

WAKE COUNTY DEPARTMENT OF ENVIRONMENTAL SERVICES WELL AND SEWAGE SITE LOCATION PERMIT
NO PERMIT(S) FOR CONSTRUCTION, LOCATION OR RELOCATION ACTIVITY SHALL BE ISSUED
UNTIL AN AUTHORIZATION FOR WASTEWATER SYSTEM CONSTRUCTION HAS BEEN ISSUED
PERMIT VOID IF NOT IN COMPLIANCE WITH ZONING REGULATIONS AND/ OR IF SITE IS ALTERED OR INTENDED USE CHANGED

PERMIT#: **D039911** STATUS: **C** APP. DATE: **05/16/2007** BLDG. PERMIT#: **0073932**
PIN: **1801.01 16 1550 000** TAX MAP: **0187 0061** RECORDED: **Y** ORIG. PERMIT#:
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APPLICANT: **SOUTHERN RECONSTRUCTION**
1621 WAIT AVE
WAKE FOREST, NC 27587
(919) 868 - 7769
USE: HD USE: **434 ADD/ALT-HSEKEEPING SAME #**
EXIST USE: **101 ONE-FAMILY HOUSE**
DISPOSAL: BEDROOMS: **0** BASEMENT: **N** #EMPLOYEES: **0** FOUND DRAIN: **Y**
SITE: ADDRESS: **13616 NEW LIGHT RD**
SUBDIVISION: LOT: ACRES: **4.27**
DIRECTION: **US1N TO HWY 98W R NEW LIGHT RD HSE ON R**
BEDROOM ADDITION

IMPROVEMENT PERMIT

TANK SIZE: **EXIST** gal. PUMP Tank: _____ gal. SQ FT: _____ STONE DEPTH: **in.** MAX DEPTH LINE: ___ in.
WASTEWATER: **INDIVIDUAL** SEWAGE: **DOMESTIC** TYPE SYSTEM: **II A** PUMP: **N** P/M: **N**
DAILY FLOW: **360** gal/day DESIGN FEE REQ?: PAID?: WATER: **COMMUNITY**

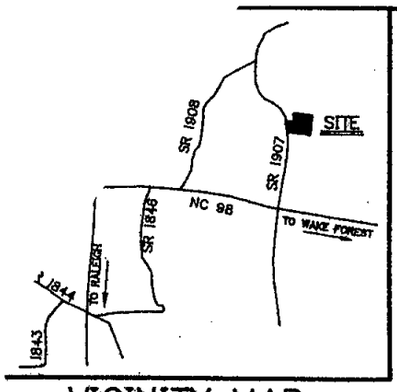
COMMENTS:

IP ISSUED? DATE: BY: ( )_____ PHONE#:

AUTHORIZATION FOR WASTEWATER/WATER SYSTEM CONSTRUCTION
VOID SIXTY (60) MONTHS FROM DATE OF ISSUANCE
AUTHORIZATION CONDITIONS:
Contractors shall install system on contours, see attached site plan for wastewater system design and well location. No underground utilities, water lines or sprinkler systems may be located in the original system or repair areas. A septic tank filter with a riser for access is required. The wastewater system shall not be covered or placed into use until inspected by the Wake County Department of Environmental Services and an Operation Permit issued. An Accepted Status System may be used in place of conventional system, if it can be placed in the permitted/authorized trench footprint (except reduction in line length and/or number as allowed for in approval) and the installation is in accordance with the accepted system approval, without unauthorized product alteration. If permit required use of an Accepted Status System, substitution with another accepted status system may be made, as long as no changes are necessary in the location of each nitrification line (including any increase in line length), trench depth or effluent distribution method. If changes are necessary, prior approval by this office is required before system installation. **OTHER CONDITIONS:**

TANK SIZE: **EXIST** gal. PUMP TANK: _____ gal. SQ FT: _____ STONE DEPTH: **in.** MAX DEPTH LINE: ___ in.
MAINT: **N** OPER: **N** L/O: **Y** TRENCH#: ____ LENGTH: ____ ft. WIDTH: ___ in. DESIGNER: ___
SUBFIELDS: __ DESIGN HEAD PRESSURE: _ DESIGN FLOW: _____ gal/min DOSE VOLUME: ____ gal.

CA ISSUED? **Y** DATE: **05/22/2007** BY: **(EFG)** _____ PHONE#: **795-3144**



VICINITY MAP

SURVEY FOR

LABIN THADIES WOODLIEF JR. & BARBARA M. WOODLIEF

REF: D.B. 2221, PG. 166

BARTON'S CREEK TOWNSHIP

WAKE COUNTY, NORTH CAROLINA

JULY 24, 1992

ADOPTED FROM D.B. 2221, PG. 166

0073932
Improvements D39911
Driveway 1935
Out Bldg 800
House 1805
4740
Lot - 205200 = .023

I certify that the location of planned or existing structure(s) are accurately shown. I understand failure to locate structures in accordance with this plot plan may require the relocation of structure(s) regardless degree of completion. I hereby grant permission to Municipal/County Representatives the right of entry to make evaluations or inspections upon this property.

Signature of Owner or Authorized Agent

(FALLS LAKE PROJECT) U. S. A.

N/F
EURALEE H. HARRISON
& LOIS H. HARRISON
D.B. 2221, PG. 377

AXLE

S 83°29'48" E
400.60'

CM

S 17°05'10" E
171.55'

N 06°49'29" W
214.51'

4.263 AC.

410.23'

S 06°47'00" W

EIP

S 83°27'55" E
207.86'

EIP

FENCE

WELL

2SFD

N 06°46'58" W
206.37'

TEL

ASPHALT DRIVEWAY

OHL

EIP

193.25'

EIP

509.58'

311.74'

N 83°24'40" W

METAL STORAGE BUILDING

56.9'

4.59'

EIP

EIB

16.3'

TRAVEL RIDGE RD.

NEW LIGHT ROAD

60' R/W

S.R. 1907

Zoning R40W By SJL
Approved ✓ Date 05.16.07
Revised Use 433
Rejected MBL 101
Front 40 Rear 30
Side 20 Corner
Comments: Bedroom Add'l

N/F
EURALEE H. HARRISON
& LOIS H. HARRISON
D.B. 3943, PG. 9

ATTN: ED DUKE

Pin: 1801.01161550

LEGEND:

EIB – EXISTING IRON BAR
EIP – EXISTING IRON PIPE
CM – CONCRETE MONUMENT
EPK – EXISTING PK NAIL
R/W – RIGHT OF WAY
TEL – TELEPHONE PEDESTAL
OHL – OVERHEAD ELEC. LINE
– POWER POLE
FENCE

THE SUBJECT PROPERTY IS NOT LOCATED IN A SPECIAL FLOOD HAZARD AREA AS DETERMINED BY THE DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT.

NORTH CAROLINA REGISTERED SEAL L-2923 LAND SURVEYOR W. GRAHAM CAWTHORNE, JR.

100 50 0 100 200

SCALE 1"=100'

W. GRAHAM CAWTHORNE JR.

Registered Land Surveyor

239 E. Owen St.
Post Office Box 1253
Wake Forest, N.C. 27588
(919)556-3148

I, W. GRAHAM CAWTHORNE JR., CERTIFY THAT UNDER MY DIRECTION AND SUPERVISION THIS MAP WAS DRAWN FROM AN ACTUAL FIELD SURVEY, THAT THIS MAP IS PREPARED IN ACCORDANCE WITH THE MANUAL OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA, THAT THIS PROPERTY IS FREE OF ENCROACHMENTS UNLESS NOTED ABOVE AND THE SOURCE OF INFORMATION FOR THE SURVEY IS SHOWN HEREON. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER AND SEAL THIS 29th DAY OF July, 1992

W Graham Cawthorne Jr.
REGISTERED LAND SURVEYOR (L2923)

ATTACHMENT 2: Septic System Inspection Checklist

SUBSURFACE WASTEWATER SYSTEM INSPECTION REPORT

2/9/26		McLean Davis		9220I
Date of Inspection		Inspector's Name		Certification Number
D039911		05/22/2007		-
Permit Number		Date of Operation Permit		Advertised # of Bedrooms
Ryan		13616 New Light Rd Raleigh, North Carolina		WOODLIEF
Buyer		Address of Property		Current Owner
0187 0061	-	-	1801161550	Well/Community
Tax Map	Parcel	Lot #	PIN	Water Source

INSPECTION RESULTS:

COLLECTION/TANK SYSTEM:	YES	NO	NA	REMARKS
Evidence of leaks ?	☐	☑	☐	
Water level in tank: Full				-Effluent wastewater was noted to be consistently entering the septic tank during the inspection.
Tank risers accessible, free of infiltration and surface water diverted ?				
Inlet riser?	☑	☐	☐	
Type: Concrete Square				-The outlet lid was noted to be broken.
Outlet riser?	☐	☑	☐	
Type: Not Present				
Estimated distance from soil surface to Top of tank: 18-2(inches				
Tank has baffle wall?	☑	☐	☐	
Outlet T is present/intact?	☑	☐	☐	
Roots present in tank?	☐	☑	☐	
Inlet pipe clear/unobstructed?	☑	☐	☐	
Outlet pipe clear/unobstructed?	☑	☐	☐	
Septic tank needs pumping?	☐	☑	☐	
Inches of solids: 4-5				
Date of last tank pumping known?	☐	☑	☐	
If known, when: / /				
Estimated Distance From:				
House/Structure: 10+ ft				
Well: 50+ ft				
Water Line: - ft				
Property Line: 10+ ft				
Septic tank filter cleaned?	☐	☐	☑	

PRETREATMENT SYSTEM: (Sand Filter or Peat Biofilter)				
Certified operator required?	☐	☐	☐	
Filter surface maintained ?	☐	☐	☐	
Evidence of ponding ?	☐	☐	☐	
Filter effluent free of excess solids ?	☐	☐	☐	
Peat modules free of damage, accessible, properly ventilated & free of insects ?	☐	☐	☐	
Samples collected at this inspection ?	☐	☐	☐	

EFFLUENT DOSING SYSTEM:				
Required pumps present & functional ?	☐	☐	☐	
High water alarm operating properly ?	☐	☐	☐	
Floats, valves, etc. in good condition ?	☐	☐	☐	
Control panel & components in good condition ?	☐	☐	☐	
Evidence of leaks ?	☐	☐	☐	
Water level in tank:				
Tank riser accessible, free of infiltration and surface water diverted ?	☐	☐	☐	
Type:				
Roots present in tank?	☐	☐	☐	
Estimated distance from soil surface to Top of tank: inches				

Date of last tank pumping known? ☐ / ☐ / ☐
If known, when:___/___/
Estimated Distance From:
House/Structure:_____ft
Well:__-__ft
Water Line:__-__ft
Property Line:_____ft
Septic Tank:_____ft
Effluent free of excess solids ? ☐ / ☐ / ☐
Inches of solids(pump/dose tank):_____
Elapsed time readings ?_____-_____
Counter readings ?_____-_____

DISPOSAL FIELD:

Evidence of effluent surfacing ?	☐	☑	☐
Evidence of effluent ponding in trenches?	☐	☑	☐
Surface water effectively diverted ?	☑	☐	☐
Diversions/swales properly maintained ?	☑	☐	☐
Vegetative cover maintained ?	☑	☐	☐
Protected from traffic/unauthorized uses ?	☑	☐	☐
Distribution devices in good condition ?	☐	☐	☑
Field free of settled or low areas ?	☑	☐	☐

-Root intrusion was present within the distribution box.

-Vegetation was near the distribution box. The distribution box was marked on the detected location with a blue pinflag.

Estimated Distance From:
House/Structure:__10+__ft
Well:__50+__ft
Water Line:__-__ft
Property Line:__10+__ft
Septic Tank:__5+__ft

PRESSURE DISTRIBUTION SYSTEM:

Certified operator required?	☐	☐	☐
Turnups/cleanouts/valves intact & accessible ?	☐	☐	☐
Laterals free of excess solids ?	☐	☐	☐
Laterals flushed this inspection ?	☐	☐	☐
Pressure heads properly adjusted ?	☐	☐	☐

SYSTEM PERFORMANCE:
Design Pressure Head (ft):_____ Adjusted Pressure Head (ft):_____
Design Delivery Rate (gpm):_____ Measured Delivery Rate (gpm):_____ % of Design:_____
Dosing Volume (gal.):_____
Note: Delivery Rate(gpm) = (_____ inches drawdown _____gallons/in) ____minutes of run time
Dose Volume(gal.) = _____ inches between float on & float off _____gallons/in.

"Client requesting this inspection has been advised that for a complete inspection to be performed, the tank needs to be pumped. Client has declined to have the tank pumped at inspection and hereby acknowledges they have so declined."

See Electronic Form
_____
Signature

ADDITIONAL COMMENTS:_____

Rhonda Barker

From: info@agriwaste.com on behalf of Agriwaste <info@agriwaste.com>
Sent: Monday, February 2, 2026 3:11 PM
To: Info
Subject: Inspection Request - Agent: Bryan Stinnett / Client: Dan & Nickie Ryan
Attachments: septic-permit.pdf; 13616-New-Light-Survey.pdf

INSPECTION REQUEST FORM

REQUESTED BY

Agent

INSPECTION TYPE

Both Septic & Well

AGENT INFORMATION

AGENT NAME

Bryan Stinnett

COMPANY NAME

Compass

COMPANY ADDRESS

211 E Six Forks Rd Suite 222
Raleigh, North Carolina 27609
United States
Map It

AGENT PHONE NUMBER

(919) 601-1641

AGENT EMAIL

bryan@sinnettrealty.com

IF AWT CANNOT REACH YOU BY PHONE OR EMAIL, DO WE HAVE PERMISSION TO TEXT THE AGENT?

Yes

CLIENT INFORMATION

CLIENT NAME

Dan & Nickie Ryan

CLIENT BILLING ADDRESS

12608 Old Creedmoor Rd
Raleigh, North Carolina 27613
United States
Map It

CLIENT PHONE NUMBER

(919) 434-1638

CLIENT EMAIL

daniel.patrick.ryan@gmail.com

IF AWT CANNOT REACH YOU BY PHONE OR EMAIL, DO WE HAVE PERMISSION TO TEXT THE CLIENT?

Yes

WHO IS RESPONSIBLE FOR PAYING THE INVOICE?

Client

PROPERTY INFORMATION

PROPERTY ADDRESS

13616 New Light Rd
Raleigh, North Carolina 27614
United States
Map It

SUBDIVISION NAME / LOT NUMBER

None / No Lot - Norwood Land

COUNTY

Wake

WILL ANYONE MEET AWT DURING INSPECTION

No

ADDITIONAL INFORMATION

YEAR HOUSE WAS BUILT

1976

HOW MANY BEDROOMS ON PERMIT

Unknown

CURRENT OWNER NAME

WOODLIEF, LADIN T

IS THE PROPERTY OCCUPIED

No

IS POWER / WATER ON

Yes

DO YOU HAVE A COPY OF THE PERMIT

Yes

PLEASE ATTACH PERMIT HERE

- septic-permit.pdf
- 13616-New-Light-Survey.pdf

Well Inspection/Lab Analysis DURING THE SAME VISIT with a Septic Inspection (price added onto septic inspection cost below)

$410.00 - Level 1 (Everything in FHA/VA/HUD – PLUS: Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Copper, Iron, Magnesium, Manganese, Mercury, Nickel, Selenium, Silver, Sodium, Thallium, Uranium, Vanadium, Zinc, Hardness) (10 business days)

COMMENTS

Water is NOT currently on. I will need to notify clients of inspection date, to ensure the water is turned on for well test.

Notes about the property: Previously a mobile home with conv septic, homeowner did an upgrade then constructed a single-family residence. Buyers want to remodel/upgrade. We're working with another company to do soil eval to get bedroom count.

PUMPING AUTHORIZATION

I decline to have the Septic Tank pumped as part of the Inspection. Client requesting this Inspection has been advised that for a complete Inspection to be performed, the tank needs to be pumped. Client has declined to have the tank pumped at Inspection and hereby acknowledges they have so declined." [per 21 NCAC 39 .1006 (b)(2)(S)]

Your Signature

Dan & Nickie Ryan

DATE SIGNED

02/02/2026

CONTRACT AUTHORIZATION

- I Agree To The Above Contract

INSPECTION CONSENT

I/We the potential buyers (or buyers representative) have obtained written permission from the current homeowner(s) to complete the septic system inspection.

Address

13616 New Light Rd
Raleigh, NC 27614
Map It

ATTACHMENT 3: Industry Standard Septic System Maintenance Information – Authored by North Carolina State University Personnel, North Carolina Cooperative Extension Service Personnel, and Wake County Department of Environmental Services Personnel.

No endorsement from the North Carolina Onsite Wastewater Contractors & Inspectors Certification Board

HOMEOWNER GUIDE FOR UTILIZATION AND MAINTENANCE OF ON-SITE WASTEWATER DISPOSAL SYSTEMS

What is an On-site Wastewater Disposal System?

There are a number of different types of on-site wastewater disposal systems each designed for a specific set of site conditions. However, there are several system components that are common to most systems. These include the following:

1. A septic tank - a concrete tank that is designed to receive wastewater from the house and to provide a degree of pretreatment for the waste, chiefly through removal of some of the solids in the waste. Note that these solids accumulate over time and necessitate periodic pumping of the septic tank. Currently septic tanks are equipped with two access risers (normally constructed of concrete) which are designed to be at least 6 inches above the ground surface to prevent surface and shallow groundwater from entering the septic tank and to provide access for maintenance. **Care must be taken not to damage or cover these risers so that water inflow / infiltration can be prevented and the tank can be accessed for maintenance.**

2. In some installations, a pump tank - a concrete tank, very similar to the septic tank, which contains a pump along with the associated controls / componentry. The pump tank and pump is designed to receive effluent from the septic tank, and pump the effluent to a disposal field located at a higher elevation and/or to a pressurized distribution network in the disposal field. **The pump tank also has an access riser which must be protected in a similar manner to that indicated for the septic tank.** Servicing of the pump tank components often necessitates the assistance of a professional such as a septic tank installer or Certified Subsurface System Operator. The latter is required for operation and maintenance of certain types of systems.

3. A disposal field - a series of subsurface trenches and lines that are designed to distribute the effluent into the soil and provide for the ultimate treatment and disposal of the effluent. There are numerous variations on the design of the disposal field, related chiefly to the type of system chosen, site constraints, etc. Dependent on the type of disposal system, you may have to maintain a contract with a Certified Subsurface System Operator for operation and maintenance of your wastewater disposal system.

Utilization of Your Wastewater Disposal System

In order to obtain the maximum efficiency and life expectancy from your system, the following simple procedures must be adhered to:

1. **Practice water conservation.** This can include many practical considerations such as not leaving the water running while you brush your teeth, not overfilling the tub, limiting time in the shower, not replacing low flow fixtures with those of higher flows, over rinsing dishes (allow the dishwasher to do its job), immediate repair of any leaking fixtures, running washing machines and dishwashers only when full, etc.

NOTE: Washing machines generate significant volumes of wastewater. As a result, laundry activities should be spread over the week as opposed to accumulating all of laundry until the weekend.

2. **Do not utilize your wastewater disposal system as a trash can by dumping nondegradables down your drains or toilet.** These include cigarette butts, sanitary products, grease, plastics, disposable diapers, etc. Avoid use of garbage disposals. Do not retrofit garbage disposals unless the system is specifically permitted for their use. Also, do not dump harmful chemicals down the drain. These include petroleum products, paint, paint thinner, pesticides, antifreeze, etc.

Maintenance of Your Wastewater Disposal System

Every wastewater disposal system requires maintenance in order to function properly. The specific maintenance required is related to the type of system. The following are general considerations that apply to all systems.

1. **Protect your wastewater disposal system components including the tanks, access risers, disposal field and associated components.** Do not drive or park on any portion of the system. The area over the disposal field should be left undisturbed with the grass cover being maintained as you would your lawn. Location of trees and shrubs on or in close proximity to the disposal field is not recommended since roots may clog or damage your drain lines. Additionally, great care must be exercised when considering the addition of any structure(s) to the site. The location of any appurtenances cannot encroach on the installation or repair areas for your system. It is not recommended that irrigation systems be located in proximity to the disposal system since their construction can cause system damage and/or result in additional hydraulic load on the disposal field.

2. **Protect the system from excess surface and shallow groundwater.** The land surface on and around the wastewater disposal system should be landscaped to shed rainfall and runoff and prevent ponding. Be sure that foundation drains, runoff from roofs and drives, etc. are diverted away from the disposal system.

3. **Regularly have the septic tank / pump tank pumped and cleaned by a permitted septage hauler.** Although the necessary frequency of pumping varies with the household and system, most tanks need **pumping at a frequency of 3-5 years** and at any time solids occupy one-fourth to one-third of the septic tank liquid depth.

Note that all septic tanks being currently installed incorporate an effluent filter within the outlet compartment of the septic tank. This filter is to be cleaned anytime the septic tank is pumped. If plumbing becomes sluggish, this filter should be checked. If filter service is found to be necessary, the tank is to pumped, the filter cleaned and the filter reinstalled.

4. **Be alert to warning signs that your system may not be functioning properly.** These include sewage surfacing over the disposal system, sewage backups / slow draining in the house, lush growth over the disposal system, sewage odors, etc.

5. **Do not make or allow repairs to your system unless all necessary permits are obtained from Wake County Department of Environmental Services.**

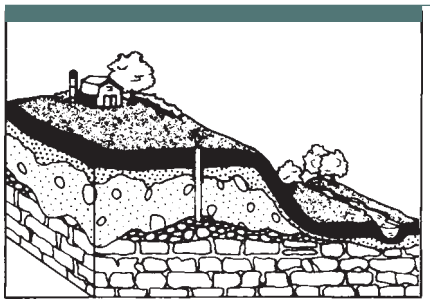
6. **Commercial additives for septic tank systems** - It has generally not been demonstrated that these additives enhance the function of septic systems or reduce the need for tank pumping and other necessary maintenance.

7. **Special maintenance considerations** - As already alluded to, some of the more complex wastewater disposal systems require that you retain / maintain the services of a Certified Wastewater System Operator in order to comply with Laws and Rules and maintain a valid operation permit for your system. In Wake County this maintenance requirement should be recorded with Register of Deeds if applicable.

Where Do I Obtain Information and Assistance?

If you are purchasing a new home, you should request a copy of your wastewater system permit from the builder / seller along with information regarding any special maintenance requirements. You may also obtain information and assistance from the **Wake County Department of Environmental Services,** 336 Fayetteville Street Mall, Raleigh, NC, Telephone (919) 856-7400. The County also maintains an Internet web site at http://www.wakegov.com/directory/wwds. This site contains much useful information and a number of links.

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Soil Facts

Septic Systems and Their Maintenance

The septic tank, soil-treatment system (also called a septic system) is an effective, long-standing method for collecting, treating, and disposing of sewage from rural and suburban homes and businesses. Septic systems are used in every county in North Carolina. Nearly 50 percent of the state's homes have them, and new systems are being installed at a rate of more than 40,000 per year. This fact sheet will answer some typical questions about septic systems and their maintenance.

Why Use a Septic System?

Septic systems are used when centralized sewage treatment plants are not accessible in a community. They safely treat and dispose of wastewaters produced in the bathroom, kitchen, and laundry. These wastewaters may contain disease-causing germs and pollutants that must be treated to protect human health and the environment. Septic systems are usually a permanent solution to wastewater treatment and disposal. Therefore, they must be properly used, operated, and maintained by the homeowner to assure the long-term performance of these systems. Even when used as a temporary wastewater treatment solution until sewer lines are extended to a community, special care and maintenance are needed for septic systems so that they don't pose a risk to public health or the environment.

What Is a Septic System?

Several different types of septic systems are available, each with its own design. The traditional, conventional system is the one that has been most commonly used in North Carolina up until the past decade (Figure 1). *It consists of three main parts: the septic tank, the drainfield, and the soil beneath the drainfield.*

The septic tank is a watertight container about 9 feet long and 5 feet tall. It is buried in the ground just outside the home. The tank is usually precast from reinforced concrete, although tanks made from plastic or fiberglass may be seen on occasion. While a tank is typically designed with a 1,000-gallon liquid capacity, its size is legally determined by the number of bedrooms in the home. The tank temporarily holds household wastes and allows a small amount of pretreatment to take place (Figure 2).

What Takes Place in the Septic Tank?

All of the wastewaters from the home should flow into the septic tank. Even waters from the shower, bathtub, and washing machine can contain disease-causing germs or environmen-

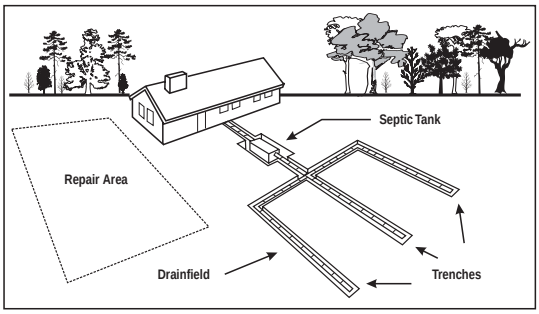


Figure 1. A conventional septic system.

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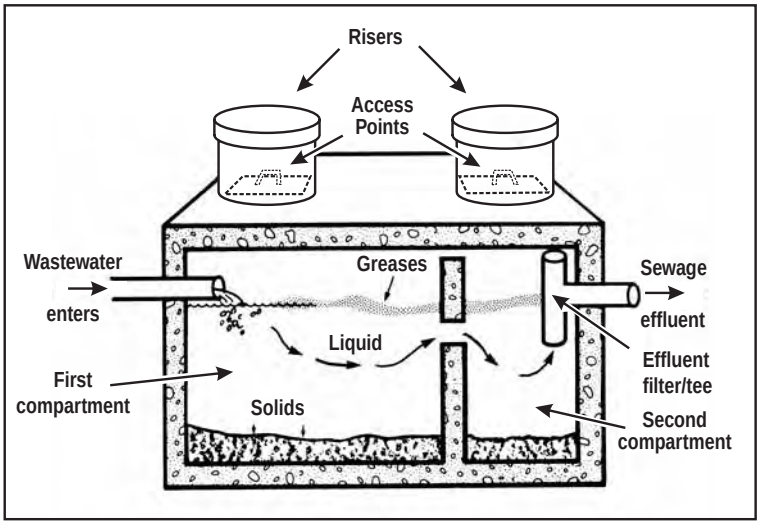


Figure 2. A two-compartment septic tank.

tal pollutants. As wastewater flows into the tank, the heavier solid materials settle to the bottom (forming a sludge layer), and the lighter greases and fats float to the top (forming a scum layer). The tank's primary purpose is to retain the solids. After a retention time of about two days, the liquid portion (the sewage effluent) flows out of the tank through the outlet pipe. The retention time is necessary for separation of the solids from the liquid and for anaerobic digestion of the solids to begin in the septic tank.

An outlet baffle (or a sanitary tee at the outlet end) prevents solids from flowing out with the liquids. Newer septic systems installed since 1999, however, include an effluent filter in the septic tank. These are installed in place of the sanitary tee at the outlet end of the septic tank (in the second compartment shown in Figure 2).

What Happens in the Drainfield and the Soil?

The purpose of the drainfield is to deliver the liquid sewage effluent to the soil. The real treatment of the wastewater occurs in the soil beneath the drainfield. Sewage effluent flows out of the tank as a cloudy liquid that still contains many disease-causing germs and environmental pollutants. Effluent flows into the perforated pipe in the trenches, passes through the holes in the pipe, and then trickles down through the gravel to the soil (Figure 3). There are also "gravel-less" trenches used where plastic louvered chambers, polystyrene aggregate, tire chip aggregate, large diameter pipes, or multiple small pipes are used in place of the gravel aggregate. These materials provide a void space in the trench to allow distribution of the effluent to the trench bottom. As sewage effluent enters and flows through the ground, soil particles filter out many of the bacteria that can cause diseases. The soil adsorbs some of the smaller germs, such as viruses, until they are destroyed. The soil can also retain certain chemicals, including phosphorus and some forms of nitrogen.

A special zone, called a biomat, forms in the upper 1 to 6 inches of the soil at the soil/trench interface just below the trench bottom. This biomat zone is useful. It helps remove many of the germs and chemical pollutants. If the solids accumulating in the septic tank are never pumped out, however, they can flow into the trenches and accumulate into an intensive biomat that becomes too thick. When that happens, the biomat completely clogs the soil and does not allow the sewage effluent to flow out of the trench. An improperly maintained system will fail and cause untreated sewage to completely fill the trenches and come out on top of the ground or back up into the home in its plumbing system.

Where Can a Septic System Be Used?

A centralized sewer system with a large sewage treatment plant usually

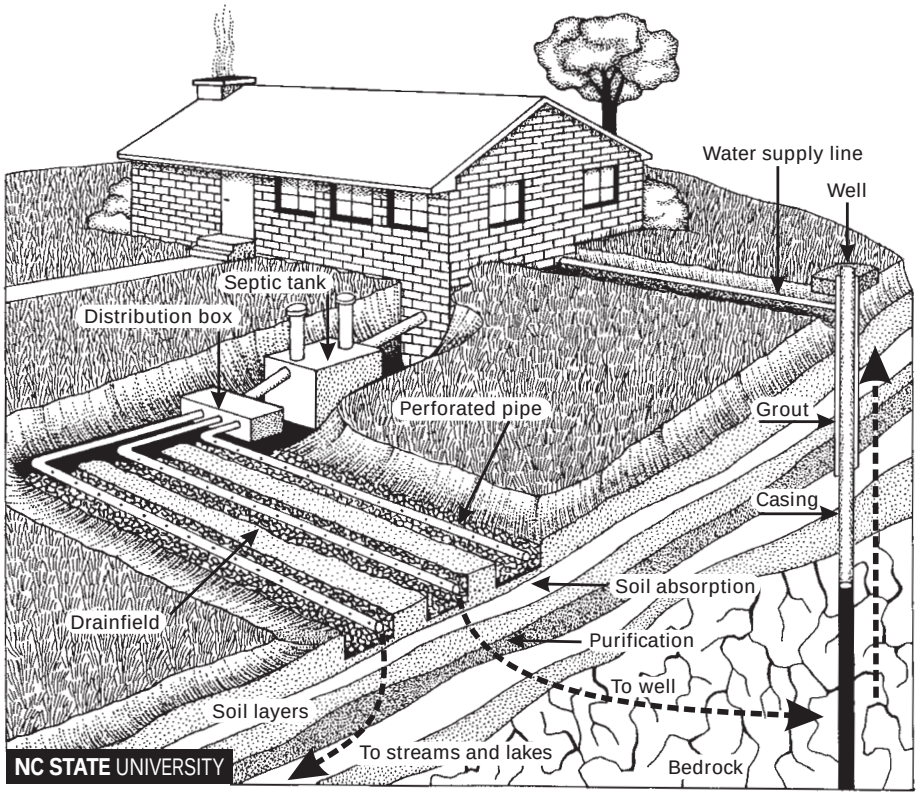


Figure 3. Wastewater treatment and disposal in the soil.

discharges treated wastewater into a body of water. On the other hand, a septic system depends on the soil around the home to treat and dispose of sewage effluent (Figure 3). For this reason, a septic system can be used only on soils that will adequately absorb and purify the effluent. If a septic system is installed in soil that cannot do so, the effluent will seep out onto the soil surface overlying the drainfield or back up into the home. In addition to causing an unpleasant smell, this untreated sewage can pose health problems.

In some cases where the soils do not adequately absorb the wastewater, the toilets and sinks might not drain freely. If the soil can absorb the effluent, but not treat it, or if the trenches are installed directly into groundwater or bedrock, the sewage may contaminate the groundwater. Because the underlying groundwater serves as the source of drinking water for your well or possibly your neighbors' wells (Figure 3), it is very important that the system be installed in the proper soil conditions and that the septic system is correctly used, operated, and maintained.

What Kinds of Soil Conditions Are Best Suited To a Conventional Septic System?

Gently sloping, thick, permeable soils with deep water tables make the best sites for the traditional, conventional septic system and simple modifications of it. The soil should be a uniform brown, yellow, or bright red color. It should not have spots of gray colors that often indicate the soil becomes excessively wet or that groundwater comes up close to the ground surface during the wet times of the year. The soil texture should be neither too sandy nor too clayey, and it should have good aggregation, or structure (that is, a handful of the soil should easily break apart into small aggregates).

Areas that are unsuitable for conventional septic systems have rock close to the surface, very sticky clays, soil layers that restrict the downward flow of water, or areas with shallow groundwater. These factors would prevent a conventional septic system from working properly.

What About Other Types of On-Site Systems That Are Alternatives to the Conventional System?

Other types of on-site systems are sometimes used on sites where the soil is not suited to a conventional system. Where soils are too wet or too shallow for the conventional system, the drainfield might be placed very close to the ground surface in the upper layers of the soil. In some wet soils, artificial drainage around the septic system lowers the level of the shallow water table. On some clayey soils that have a thick sandy surface, the low-pressure pipe (LPP) system provides an alternative.

On some soils that are not deep enough to provide adequate treatment of the sewage effluent, it may be possible to use an advanced pretreatment unit to supplement the soil's treatment capacity. Examples are fixed media biofilters such as a sand filter, peat filter, textile filter, or porous foam biofilter or mechanical aerobic treatment units that bubble air into the sewage itself. Most of these pretreatment units are installed between the septic tank and drainfield. They provide better purification of the wastewater than is provided by the traditional septic tank alone. Some sites may need more sophisticated methods of distributing the sewage effluent within the drainfield itself using a pressure manifold, LPP, or drip irrigation system. These systems use pumps, special controls, and specially designed pipe networks that can improve the wastewater treatment in the soil. In other situations, it may be cost effective to collect the wastewater from several homes in an area or subdivision by using a cluster system. This type of system has a drainfield located in a common area within the best-suited soils in the tract of land. These newer and more sophisticated types of on-site system options can often provide a better wastewater treatment solution for a particular building lot, or a tract of land, than either the traditional, conventional septic tank system or large-scale, centralized public sewers.

How Do I Know if My Site is Suitable for a Septic System?

North Carolina has more than 400 different kinds of soil, and a 1-acre lot can contain several different soil types. Because many of these soils are unsuitable for conventional septic systems and even unsuitable for more advanced or alternative on-site systems, you should always obtain an improvement permit (I.P.) before purchasing a lot that you intend to build on. You will submit an application and a site plan to the county health department. The environmental health specialist (sanitarian) will conduct a comprehensive soil and site evaluation and either issue or deny the permit. If an I.P. can be issued, you will also need to obtain a construction authorization (C.A.) before a building permit can be issued.

If you are interested in developing a tract of land to subdivide, you should hire a licensed soil scientist to conduct preliminary evaluations and advise you on the location of suitable soils and lot configuration. You can obtain additional information from the Cooperative Extension publication (AG-439-12), *Investigate Before You Invest*, available online at www.soil.ncsu.edu/publications/Soilfacts/AG-439-12/.

How Large is a Typical Drainfield?

Usually, the drainfield for a home can fit within the front yard or the backyard of a typical 1-acre home site. Sometimes smaller lots can be used. The precise area requirements will depend upon the kinds of soils at the home site, the size of the house (the number of bedrooms), the topography of the lot, and the type of on-site

system used there. A site with clayey, slowly permeable soils needs a larger drainfield to absorb the sewage effluent than does a site with sandy, permeable soils. A home with five bedrooms will need a larger tank and drainfield area than a home with three bedrooms. A rental property at the beach may require a larger drainfield than a similar-sized permanent residence with the same number of bedrooms. A home using one of the newer, more advanced types of on-site technologies may be able to use a smaller area for the drainfield than if a conventional septic system is installed. Adequate land area must be available to achieve adequate setback distances from any nearby wells, springs, streams, lakes, or other bodies of water located either on the lot or off-site.

There also must be enough area to install a second system, called a replacement system, in case it is ever needed. This replacement area (sometimes called a repair area) also must have acceptable soil and site conditions and must be left undisturbed and available for system replacement. Be aware that the type of on-site system required for use in the repair area could be a completely different, more sophisticated type of on-site system. Hence, if that repair area is ever needed, you might have to install a more expensive system than the original system installed when the lot was first developed.

What Legal Requirements Regulate Septic Systems?

State law requires that soils be evaluated by the local health department and that an I.P. and a C.A. be issued before house construction begins or the septic system is installed. The I.P. allows the site to be used, while the C.A. determines what type of system must be installed. Sometimes these are issued at the same time by the health department. An I.P. is good only for five years unless it is renewed, or unless it is issued under special conditions for a lot that has been professionally surveyed. If a permanent I.P. is issued, then you have some limited guarantee that the lot can be used (even if the state rules change), assuming that the conditions on the lot or the intended use don't change. Nevertheless, the type of system that will be required as well as home size and location are not assured until the C.A. is issued. Contact your local health department to be sure that you follow the correct procedures and that you are fully aware of the limitations that will protect your investment. Also, the installation must be approved by the health department and an operation permit (O.P.) must be issued by the health department before electrical service can be permanently connected to the home and the septic system put into use.

Once the home has been occupied and the system put into use, you will need to contact the county health department if you plan to add on to the home, install a pool, build an outbuilding, or engage in activity that requires a building permit. First, obtain an authorization from the county health department to make sure that the septic system and repair area remain intact and are properly sized for the proposal.

What Maintenance Is Needed?

Both the septic tank and the drainfield must be properly maintained for the standard conventional septic system. With conscientious maintenance, the system should work correctly for many years. Such maintenance begins with water use and waste disposal habits. Your family will determine which materials enter the system, so you should establish family rules for proper use and maintenance. The suggestions outlined in the box will save you anguish and money when applied to most conventional systems.

If your system has an effluent filter, it will need checking and servicing approximately every 2 to 3 years. While this could be done by a homeowner, it is a messy, unpleasant task and there are potential safety issues because of the germs in the sewage and toxic gases. For most people, it would be appropriate to hire a company that specializes in septic system maintenance and service to inspect and clean the effluent filter.

Special types of pretreatment units and drainfield distribution technologies also must be carefully maintained for the more advanced, newer tech-

Tips for Maintaining Your Septic System

- Do not put too much water into the septic system; typical water use is about 50 gallons per day for each person in the family.
- Do not add materials (chemicals, sanitary napkins, applicators, and so on) other than domestic wastewater.
- Restrict the use of your garbage disposal.
- Do not pour grease or cooking oils down the sink drain.
- Make a diagram showing the location of your tank, drainfield, and repair area.
- Install a watertight riser over the septic tank to simplify access.
- Have the effluent filter in the septic tank cleaned periodically by a professional.
- Have the solids pumped out of the septic tank periodically.
- Maintain adequate vegetative cover over the drainfield.
- Keep surface waters away from the tank and drainfield.
- Keep automobiles and heavy equipment off the system.
- Do not plan any building additions, pools, driveways, or other construction work near the septic system or the repair area.

nologies described earlier. These newer technologies will be more expensive to operate and maintain than the traditional, conventional septic system. Most advanced on-site and cluster wastewater treatment systems require regular inspections and professional maintenance. Research conducted in North Carolina has shown that about 40 to 50 percent of the advanced systems will fail within 6 years if this maintenance is not provided. Therefore, in North Carolina, a professionally trained, state-certified "subsurface system operator" hired by the homeowner is required by the O.P. to provide the needed inspections and maintenance for advanced technologies. For more information about these requirements, contact your local health department or the state Water Pollution Control Systems Operator Certification Commission.

Note, however, that individual homeowners are allowed to take the same training programs and state licensing exam as the professional operators. If they pass the exam, they can operate their own system by themselves. Because this generally is not done, most homeowners will have to pay for this service if they have one of these more advanced technologies.

Regardless of whether a professional operator is hired, it is the homeowner's responsibility to assure proper use, inspection, operation, and maintenance of any type of on-site wastewater system.

Will I Need to Pump the Tank?

Yes. After a few years, the solids that accumulate in the septic tank should be pumped out and disposed of at an approved location. If not removed, these solids will eventually overflow, accumulate in the drainfield, and clog the pores (openings) in the soil.

This blockage severely damages the drainfield. Although some clogging of soil pores slowly occurs even in a properly functioning system (the biomat described earlier), excess solids from a poorly maintained tank can completely close all soil pores so that no wastewater can flow into the soil. The sewage effluent will then either back up into the house or flow across the ground surface over the drainfield. If this happens, you may need to construct a new drainfield on a different part of your lot. Pumping the septic tank after the soil drainfield has become completely clogged will not rejuvenate the system. It will provide only a few days of reprieve until the tank fills up again. Once the soil has become completely clogged, it is usually necessary to install a new drainfield or an advanced pretreatment unit, or both. This can have a significant negative effect on your landscaping and yard, as well as being expensive. An ounce of prevention is worth a pound of cure with septic systems.

How Will I Know When to Pump the Tank?

The frequency with which you will need to pump depends on three variables: the tank size, the amount of water used by your family, and the solids content of your wastewater. If you are unsure about when to have the tank pumped, have a professional operator observe the rate of solids accumulation in the tank each year. He or she can clean and replace the effluent filter cartridge in the tank at the same time. The tank should be pumped if the sludge layer at the bottom of the septic tank has built up to within 25 to 33 percent of the tank's liquid capacity or if the scum layer in the tank is more than 4 to 6 inches thick. Therefore, a typical 1,000-gallon tank with a 4-foot liquid capacity should be pumped when the solids reach 1-foot thick in the tank bottom. If the tank is not easily accessible and the rate of solids accumulation cannot be checked yearly, then you may wish to inspect and pump it according to the frequency guidelines in Table 1. Your local health department should be able to tell you the size of your tank. When inspecting the tank, check the effluent filter (or for older systems check the sanitary tee or the outlet baffle to be sure that it has not broken off and dropped into the tank). **Also, be sure to have both compartments of the tank pumped (note the two compartments shown earlier in Figure 2).**

If the septic system is not used very often (as in an infrequently used vacation home with a correctly sized tank), it will probably not need to be pumped as frequently as indicated in Table 1. If you use a garbage disposal, the tank may need to be pumped more frequently. After a few inspections, you should be able to adjust the schedule according to the rate at which solids accumulate.

What Should Not Be Put into the Septic System?

Make sure you are aware of the types and amounts of extra waste materials that are poured down the drain. Limiting the use of your garbage disposal will minimize the flow of excess

Table 1. Estimated Septic Tank Inspection and Pumping Frequency (in Years)

Tank Size (gallons)	Number of People Using the System				
	1	2	4	6	8
900	11	5	2	1	<1
1,000	12	6	3	2	1
1,250	16	8	3	2	1
1,500	19	9	4	3	2

Source: Adapted from "Estimated Septic Tank Pumping Frequency," by Karen Mancl, 1984, *Journal of Environmental Engineering.* Vol. 110(1):283-285.

solids to your tank. Garbage disposals usually double the amount of solids added to the tank.

Do not pour cooking greases, oils, and fats down the drain. Grease hardens in the septic tank and accumulates until it clogs the inlet or outlet. Grease poured down the drain with hot water may flow through the septic tank, but then it can clog soil pores completely and ruin the drainfield.

Pesticides, paints, paint thinners, solvents, disinfectants, poisons, and other household chemicals should not be dumped down the drain into a septic system because they may kill beneficial bacteria in the septic tank and soil microorganisms that help purify the sewage. Also, some organic chemicals will flow untreated through the septic tank and the soil, thus contaminating the underlying groundwater.

If your home has a water treatment system, such as a water softener, the discharge pipe from the backwash should not be connected to the waste plumbing system or septic tank.

Are Septic-Tank Additives Necessary?

No. These products include biologically based materials (bacteria, enzymes, and yeast), inorganic chemicals (acids and bases), or organic chemicals (including solvents). Research conducted to date on three of these types of bacterial additives has not shown any reduction in the rate of solids buildup nor increases in bacterial activity in the septic tank. Therefore, they do not seem to reduce the need for regular pumping of the septic tank. Some additive products contain organic chemicals and may even damage the drainfield or contaminate the groundwater and nearby wells.

Is Special Care Needed for the Drainfield?

Yes. The drainfield does not have an unlimited capacity. The more water your family uses, the greater the likelihood of problems with the septic system.

Water conservation practices can help reduce the amount of wastewater generated in the home. Periodically check your plumbing for leaky faucets and toilets. Uncorrected leaks can more than double the amount of water you use. Many soils can absorb the 200 to 250 gallons of sewage usually produced each day by a family of four, but these soils would become waterlogged if an extra 250 gallons were added. For more information on this subject, see North Carolina Cooperative Extension Service publications WQWM-75/HE-250, *Focus on Residential Water Conservation* and WQWM-76/HE-213, *Water Management Checklist for the Home*. These publications can be viewed and printed online at www.bae.ncsu.edu/programs/extension/publicat/wqwm/usewtr.html.

Be sure that foundation drains, roof waters, gutter waters, and surface waters from driveways and other paved areas do not flow over the septic tank or the drainfield. Careful landscaping can help direct excess surface waters away from the system.

Summary

The septic system is an efficient, inexpensive, and convenient method for treating and disposing of household wastewater. Because not all soils are suited for conventional systems, comprehensive soil and site investigations must be performed before you purchase any land.

Septic systems will adequately absorb and purify wastewater if they are properly maintained.

Contrary to popular belief, septic systems are not maintenance free. Money that is saved by not paying a monthly sewer bill should be set aside for regular inspections and maintenance. A few precautions can save you anguish and money. Reducing water use, avoiding grease, cleaning the effluent filter, pumping the tank periodically, and properly landscaping the yard to keep surface water away from the tank and drainfield are inexpensive precautions that can help assure your system a long life. The North Carolina Cooperative Extension publication AG-439-22, *Septic System Owner's Guide*, summarizes some important day-to-day management and periodic maintenance activities to improve your system's longevity. When properly located and maintained, your system should provide years of trouble-free, low-cost service.

Reference

Mancl, K.M. 1984. *Journal of Environmental Engineering*, Vol. 110(1):283-285.

Prepared by

***Michael T. Hoover**, Extension Soil Science Specialist, Department of Soil Science, North Carolina State University*

***Tom Konsler**, Environmental Health Supervisor, Orange County Health Department*

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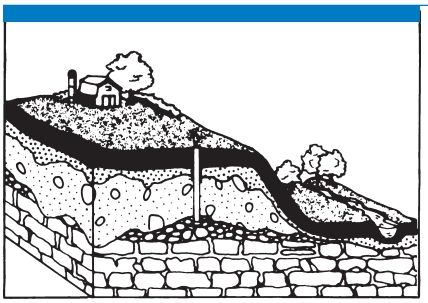
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SoilFacts

Septic System Owner's Guide

If you use a septic system, or if you are buying a home with a septic system, this owner's guide can help you be sure that your septic system is used and maintained properly. This folder also provides a place to record and keep important information, such as a copy of your permit, a sketch of your system, maintenance records, and other fact sheets.

Know the Ins and Outs of Your System

What type of system do you have?

Many different kinds of septic systems are used in North Carolina, but most of the nearly 2 million systems in use throughout the state are slight modifications of the conventional septic system. This system has a septic tank and a drainfield with gravel-filled trenches (usually two to six trenches). Since the mid to late 1990s, however, the traditional gravel aggregate trenches used in the past have given way to newer gravel-less trench designs.

These gravel-less trench designs rely on alternative materials in place of the gravel. The most common gravel-less trenches now used include either long, narrow, tunnel-shaped chambers in the trenches or gravel substitutes such as expanded polystyrene aggregate.

Other alternative trench materials that are also being used extensively in some parts of the state include large diameter pipes and permeable concrete panel block trench materials. In addition, since about 2003, some gravel-less septic system trenches use bundles of plastic pipes or other materials such as recycled rubber tires (chopped into chips or pieces to meet specific size requirements) to replace the gravel aggregate.

Cooperative Extension Service publication *AG-439-13, Septic Systems and Their Maintenance,* describes the conventional system, simple modifications of it, and important maintenance needs.

Other more sophisticated types of on-site systems used for the last 20 to 25 years include systems with pumps, mechanical pretreatment units, or biofilters. These technologies are now being used in numerous new housing developments or to replace or repair failing septic systems at homes and businesses. Systems using these new technologies require a higher level of maintenance than the more traditional conventional septic systems.

For this reason, state rules have specific maintenance requirements for a number of these more sophisticated technologies. Often, homeowners will be required by state sewage rules to hire a state-certified operator to regularly inspect and maintain the system. In addition, state rules also require the health department to inspect these systems on a periodic basis.

Your local health department can tell you what type of system you have and what the

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legal requirements are for long-term maintenance.

Things You Need to Know About Your Septic System

- What type of septic system do you have?
- Where is it located?
- Where is the repair area located?
- Is the septic system working?
- Has it been maintained in the past?
- What can you do on a day-to-day basis to keep your system working properly?
- What maintenance is needed in the future?

Do you know the location of your septic system and repair area?

To properly maintain your septic system, you should know the location of both the septic tank (and any other pretreatment units) and the drainfield. Contact the local health department for a copy of your septic system permit and soil evaluation sheet. These forms indicate the approximate locations of each of the system's components and the size of the septic tank. Keep these items in this *Septic System Owner's Guide* file folder.

The location of the septic tank and drainfield can usually be determined with a copy of the permit and with the help of a septic contractor, consultant, or the local health department.

Most housing sites permitted since the early 1980s are legally required to have a "repair area or replacement area" in which a second drainfield could be built if needed. This repair area was identified by the health department when the site was permitted and should be shown on your septic system permit. The law also requires you to protect this area from excavation; building a house addition, garage or outbuilding over it; swimming pool construction; and any soil disturbance activities.

Sketch your home, septic system (both the tank and drainfield), repair area, and other important features (such as your driveway) on the grid labeled **Septic System Layout**. When you have your septic tank pumped, measure and record the distance from the house to the access port on the tank. This will help you find it again. You might also wish to mark your tank location and the drainfield boundaries in your yard. If a riser is not installed over the access port for your septic tank, you may want to have one installed. Be sure, though, that the riser is secured with a lock or a heavy lid to prevent children from opening it and endangering themselves or others. Even properly operating septic tanks contain poisonous gases and pollutants as well as bacteria and other germs that can cause serious diseases. NO ONE SHOULD EVER ENTER A SEPTIC TANK.

Is your septic system working properly?

Unfortunately, if house fixtures drain well, few people investigate whether their septic system works. Many people don't realize that untreated sewage on top of the ground can be a health hazard. If your system shows signs of problems, contact your local health department immediately.

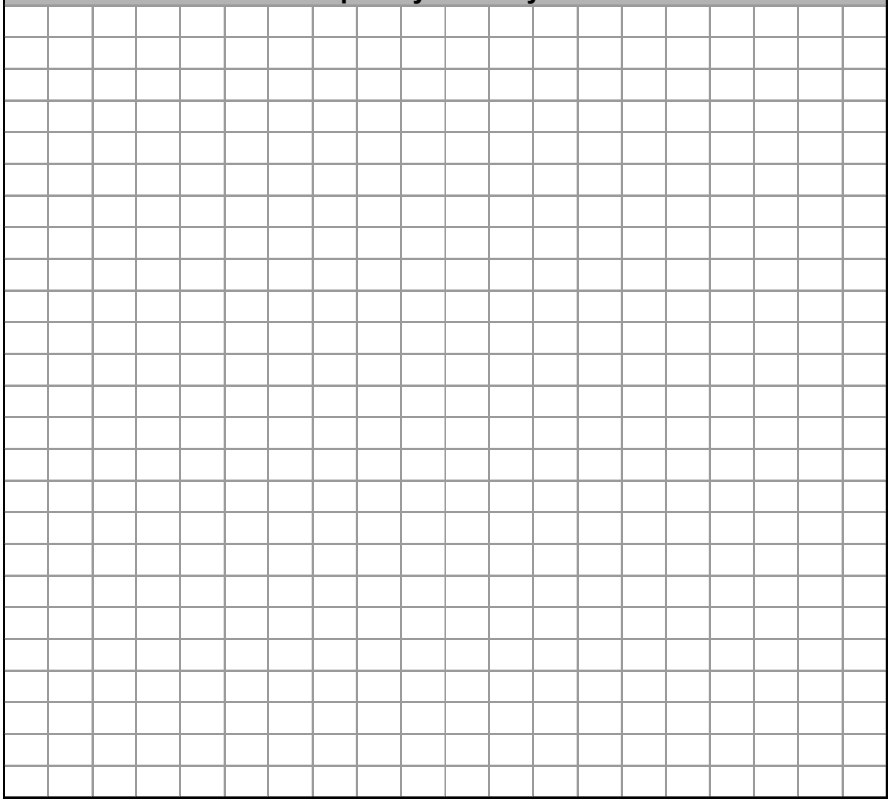
State law requires that you get a permit from the health department before repairing a failing septic system. Be wary of any contractor who wants to attempt a repair without a permit.

What maintenance has been done?

Before planning a maintenance program, find out what maintenance has already been done. If you are buying an existing home, ask the seller a few important questions:

- How old is the system?

Septic System Layout



- Where are the tank and drainfield located (they may not be at the same location or even on the same lot)?
- When was the tank last pumped?
- How frequently has it been pumped?
- How often has the "effluent filter" in the septic tank been cleaned (these effluent filters are required on systems installed since 1999).
- Have there been signs of possible failure?
- Where is a copy of the permit and records showing how well (or poorly) the system has been maintained?
- Have there been additions made to the house that would necessitate increasing the size of the system?
- Has the system ever been repaired, and if so, when, and by whom?

If the house has just been built, ask the septic system contractor to provide you an "as built" diagram that may show details not on the permit. If the house has a system with a pump, ask the contractor and health department to provide details concerning the initial pump setup.

Proper care of your septic system requires day-to-day management as well as periodic maintenance and repairs.

Day-to-Day Management

Don't use too much water.

- The drainfield does not have unlimited capacity.
- Typical daily water use is 50 gallons per person.
- The soil drainfield usually has a maximum daily design capacity of 120 gallons per bedroom, even for short periods of time.
- Overloads can occur seasonally, daily, or on the weekend.
- Water conservation will extend the life of your system.
- Repair dripping faucets and toilets.

Limit disposal to sewage.

- Don't use your septic tank as a trash can for cigarette butts, tissues, sanitary napkins, cotton swabs, cat box litter, coffee grounds, or disposable diapers.
- Restrict the use of your garbage disposal. These add quite a lot of extra solids.
- Don't pour grease or cooking oil down the drain.
- Don't poison your system with harmful chemicals such as solvents, oils, paints, thinners, discarded medications, disinfectants, pesticides, poisons, and other substances.
- Save money. Commercial septic tank additives are usually not necessary.

Protect the system from physical damage (site maintenance).

- Keep the soil over the drainfield covered with vegetation to prevent soil erosion.
- Don't drive vehicles over the system.
- Avoid construction over the system and repair area.
- Maintain the natural shape of the land immediately downslope of the system, and protect this area from excavation (cutting and filling).
- Don't cover the tank or drainfield with asphalt or concrete.

Dispose of all wastewater in an approved system.

- Don't put in a separate pipe to carry wash waters to a side ditch or the woods. This is illegal.

Periodic Maintenance and Repair

Home and yard (site maintenance):

- Protect and maintain the site of your septic tank and drainfield.
- Cut down and remove trees that like wet conditions. This includes willows, elms, sweetgums, and some maples.
- Landscape the yard to divert surface waters away from the tank and drainfield.
- Be sure that the water from the roof, gutters, and foundation drains does not flow over the system.
- If your system is at the base of a slope, then consider installing a french drain to divert underground waters.
- Maintain drainage ditches, subsurface tiles, and drainage outlets so that water can flow freely from them.

Septic tank:

- Install risers over the tank if it is buried 6 inches or deeper. They provide easy access for measuring and pumping solids as well as cleaning the effluent filter.
- Measure how quickly sludge and scum accumulate in the tank. Have your professional pumper record this information.
- Have solids pumped out of the tank as needed. Most septic tanks have two compartments; get both pumped.
- Cooperative Extension Service publication *AG-439-13, Septic Systems and Their Maintenance*, contains more information on pumping frequency.
- Don't wait until your drainfield fails to have your tank pumped. By then, the drainfield may be ruined. With septic systems, an ounce of prevention is worth a ton of cure!

Regulations and precautions:

- Hire a state-certified subsurface system operator for any system with a pump. One will be required by law for low pressure pipe (LPP) systems installed or repaired after July 1, 1992, any subsurface drip irrigation systems, aerobic treatment units (ATUs), peat biofolters, sand biofilters, textile

Preventative Maintenance Record			
Date	Work Done	Firm	Cost

Your Septic System Pumper
Name
Address
Phone

Your Septic System Installer
Name
Address
Phone
Date System Installed

Signs of Possible Septic System Problems

- Sewage backing up into your toilets, tubs, or sinks.
- Slowly draining fixtures, particularly after it has rained.
- The smell of raw sewage accompanied by soggy soil or sewage discharged over the ground or in nearby ditches or woods.
- Note: pump systems sewage may come to the ground surface when the pump is turned on and then disappear after the pump turns off. This is still a system failure and must be repaired.
- An alarm flashing (red light) or beeping in the house or in the yard indicating a pump is not working properly or that the water level in a pump tank is too high and close to failure.
- An increase in infections or illnesses associated with swimming in lakes or rivers next to the system.

biofilters, and other complex systems.

- A list of state-certified subsurface system operators can be obtained from the N.C. Water Pollution Control System Certification Commission at (919) 733-0026.
- Be sure the pump and electrical components continue working properly between scheduled maintenance visits.
- Sewage contains germs that can cause diseases. Never enter a septic tank. Toxic and explosive gases in the tank present a hazard. Old tanks may collapse. Electrical controls present a shock and spark hazard. Secure the septic tank lid so that children cannot open it.
- Don't attempt to repair a failing system yourself. Get a repair permit and hire an experienced contractor.

For more information about septic systems, contact your county Extension agent or local health department.

Prepared by

***Michael T. Hoover**, Extension Soil Science Specialist, Department of Soil Science, North Carolina State University*

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Farm*A*Syst
NORTH CAROLINA



Environmental Stewardship for Farmers — #4

Improving Septic Systems

Is your well protected from your septic system?

One of the easiest ways to protect well water from pollution is to check your septic system. Septic systems can pollute wells when they are placed too close to the well, are not properly maintained, or have not been properly installed. The major contaminants from septic systems that enter wells are disease-causing germs. These invisible germs — such as bacteria and viruses — can cause many human diseases. Another potential contaminant that can come from septic systems is nitrogen in the form of nitrate-nitrogen. If the nitrate level of your well water is too high, the water can be hazardous to infants in their first six months of life.

How can we help?

We have prepared this publication to help you focus on potential problems with your drinking water that may be caused by an improperly placed, constructed, or maintained septic system. Read the publication before you begin answering the questions in this publication. Gather any records you have about your septic system: the type of system you have, the location of the septic tank and the drainfield, and the location and type of well on your property. If you do not have records, contact your local health department for a copy of your septic system permit and soil evaluation sheet. Walk around the area near your septic system and look at it closely. Also look at the area around your well.

Each of the following sections deals with different topics. Next to each topic is a question for you to answer. Your answers will help you to see where you have potential problems.

- If you answer a question either a or b, you have few problems with your septic system.
- If you answer a question either c or d, there may be potential problems with the condition of your septic system.
- If you answer a question either c or d, you will want to consider making changes to your septic system in order to protect your drinking water.

If you would like further help in assessing the condition of your septic system, please visit your nearest Cooperative Extension Service Center and talk with your Extension agent.

Employment and program opportunities are offered to all people regardless of race, color, national origin, gender, age, or disability. North Carolina State University, North Carolina A&T State University, U.S. Department of Agriculture, and local governments cooperating.

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COOPERATIVE EXTENSION
Helping People Put Knowledge to Work

College of Agriculture & Life Sciences · NC State University
School of Agriculture and Environmental and Allied Sciences · NC A&T State University

How safe is your drinking water?

If you drink water from a well or spring, the water comes from the ground. Most groundwater in North Carolina is safe to drink. If pollution gets into groundwater, your well or spring water may not be safe. Many things we all do at our homes and farms can pollute the groundwater.

If groundwater becomes polluted, it is nearly impossible to clean up. Then, the only ways to get safe drinking water are to treat the existing water, drill a new well, or get water from another source. All of these options are expensive and inconvenient.

The North Carolina Farm*A*Syst program has a series of publications that can help you keep your drinking water safe. These publications will lead you through an evaluation of your farmstead to determine if your water is in danger of becoming or is already polluted with harmful substances from your farmstead area. If there is a problem or a potential problem, the Farm*A*Syst publications have information about how to solve the problems. The publications also list the North Carolina state agencies that can help you solve your drinking water problem.

The goal of the North Carolina Farm*A*Syst program is to help you protect the groundwater that North Carolina residents depend on for drinking water.

What is a septic system?

A septic system is an efficient, inexpensive, convenient, and safe method for treating and disposing of household wastewater if the system is properly installed and maintained. A septic system consists of three main parts:

1. The **septic tank** collects and stores the solids that come from the house.

2. The **drainfield** is made from pipe and gravel that are installed as trenches in the soil. The drainfield delivers wastewater to the soil.

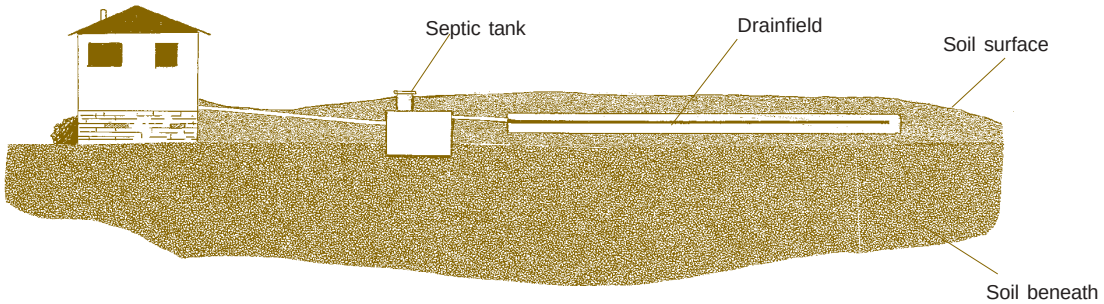
3. The **soil beneath the drainfield** purifies the wastewater before it flows to the underlying groundwater.

Wastewater flows from the house into the septic tank. The solids sink to the bottom of the tank, the grease floats to the top, and the liquid portion of the wastewater flows out into the drainfield. The drainfield distributes the wastewater and allows it to slowly move into the soil. As it moves through the soil, the wastewater is purified by organisms that live in the soil.

State law requires that soils be evaluated by the local health department and that an improvement permit and an authorization to construct an on-site wastewater system (construction authorization) be issued before house construction begins or the septic system is installed. The purpose of this evaluation is to ensure that the soil can both absorb and treat the wastewater from your home. Septic system

North Carolina Farm*A*Syst Publications

- *Protecting Water Supply*, #1
- *Improving Fuel Storage*, #2
- *Improving Storage and Handling of Hazardous Waste*, #3
- *Improving Septic Systems*, #4
- *Improving Storage and Handling of Pesticides*, #5
- *Improving Storage and Handling of Fertilizer*, #6
- *Improving Storage, Handling, and Disposal of Livestock Waste*, #7
- *Grazing Livestock and Water Quality*, #8
- *Stream Management in the Piedmont and Mountains*, #9
- *Agriculture and Natural Resource Protection*, #10
- *Protecting Your Wetlands*, #11
- *Wildlife on Your Farm*, #12
- *Christmas Tree Production Best Management Practices to Protect Water Quality and the Environment*, #13
- *Managing Pests*, #14



Septic system

installation must be approved by the local health department before electrical service can be permanently connected to the home, the home occupied, and the septic system put into use.

General Conditions Of Your Septic System

1. How old is your septic system?

North Carolina rules regarding the placement and design of septic systems are being improved over time. Major changes to the state rules occurred in 1977, 1982, and 1992. Current rules require a comprehensive evaluation of the soil before a septic system can be approved for that location. State rules also require homeowners to employ a trained and certified subsurface system operator for certain types of septic systems installed or repaired after 1992. These operators ensure that the system is operating well. The changes in the rules have improved the chances that your septic system will work better.

If you do not know the age and type of your septic system, this information may be available from your local health department.

1. Circle the answer that best describes the age of your septic system.

a. Your septic system was installed after 1992.

b. Your septic system was installed between 1982 and 1992.

c. Your septic system was installed between 1977 and 1982.

d. Your septic system was installed before 1977; OR do not know.

2. What is the depth between your drainfield and the groundwater table?

Wastewater moves from the septic tank into the drainfield and then slowly into the soil. The drainfield trenches are normally installed 2-3 feet deep. The wastewater is purified as it moves down through the soil and into the groundwater.

North Carolina septic rules require that the groundwater table or soil wetness conditions be at least 12 to 18 inches deeper than the drainfield trenches. Soil above the groundwater table is considered to be *aerobic*. *Aerobic* means that the soil has some air in it and is not totally saturated (or filled with water). This aerobic soil is where most of the germs from the sewage are removed.

Call your local health department or United States Department of Agriculture Natural Resource Conservation Service for information about the soils on your lot.

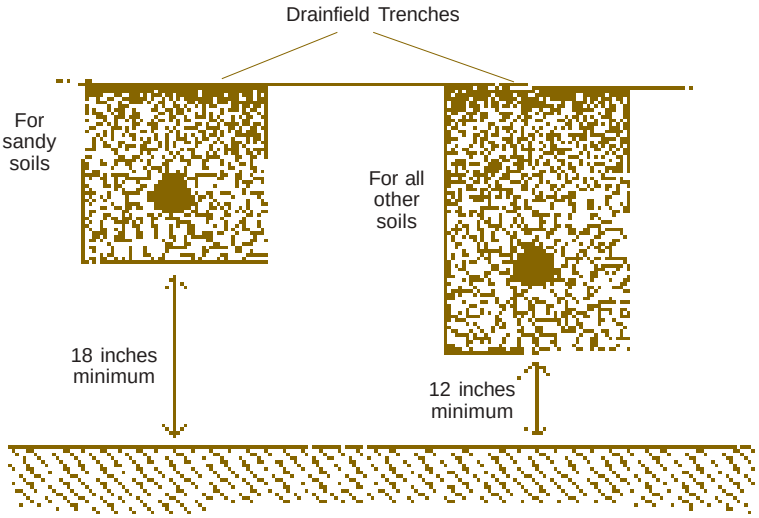
2. Circle the answer that best describes the relationship between the location of your septic system and the groundwater.

a. The groundwater always remains at least 4 feet below the surface.

b. The groundwater normally remains more than 4 feet below the surface except for very short periods of time (less than a week) during wet times of the year.

c. The groundwater normally remains more than 2 feet below the surface except for very short periods of time (less than a week) during wet times of the year.

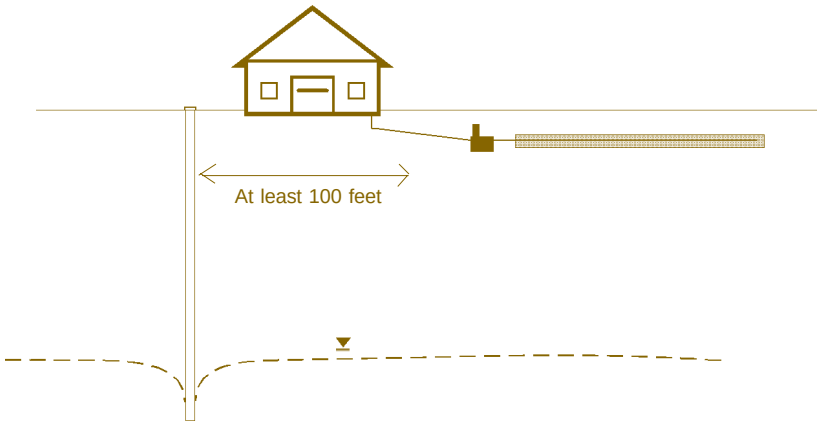
d. The groundwater periodically rises to within 2 feet of the surface; OR do not know.



Required distance between bottom of drainfield and groundwater table

3. Where are your septic system and well located?

Once the purified wastewater drains through the soil, it becomes part of the groundwater. The best way to protect your drinking water from your septic system is to separate the two. North Carolina law requires that septic systems be placed at least 100 feet away from a well or other water source.



Safe separation distance between septic system and well

4. What type of soil is your septic system installed in?

The type of soil in which your septic system is located is important for protecting the groundwater from pollution. Gently sloping, deep soils that aren't too clayey or too sandy with a deep groundwater table make the best sites. If the soil is too sandy, wastewater flows through the soil into the groundwater too fast and is not purified. On the other hand, if the soil is too clayey, wastewater flows too slowly, causing untreated sewage to collect on top of the ground. Avoid areas that have rock close to the surface, very sticky clays, or

3. Circle the answer that best describes the relationship between the location of your well and your septic system.

a. Your septic system is downhill from your well or other water source and is more than 100 feet away from it.

b. Your septic system is uphill from your well or other water source and is more than 100 feet away from it.

c. Your septic system is 50 to 100 feet away from your well or other water source.

d. Your septic system is less than 50 feet away from the well or other water source; OR do not know.

4. Circle the answer that best describes the type of soil and conditions in which your septic system drainfield is buried.

a. Your septic system is installed in deep, well-drained soil (not too clayey, not too sandy) to allow full absorption and treatment of wastewater or you have a low-pressure pipe system installed in sandy soil or a pretreatment system installed in any soil.

b. Your septic system drainfield is installed in deep red, clayey soil that drains reasonably well. If your soil is clayey, a handful of it easily breaks into small pieces when moist.

c. Your septic system drainfield is installed in sandy soil with a shallow groundwater and does not have a low pressure or pretreatment system.

d. Your septic system drainfield is installed in thin soil with hard rock, very sticky clay soils, or soil layers that restrict downward flow of water and the system does not include a pretreatment system, such as a sand filter; OR do not know.

soil layers that restrict the downward flow. Any of these conditions can keep water from flowing through the soil and cause untreated sewage to collect on the ground surface, where it can flow over to your water source.

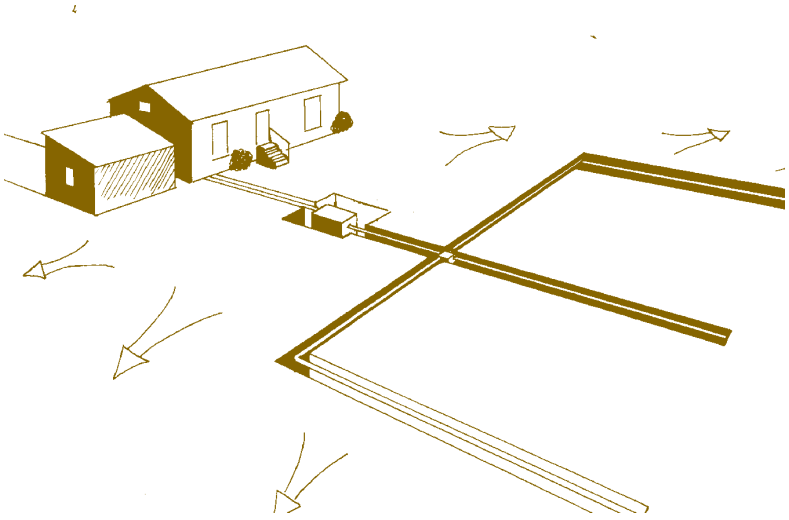
The soil should be uniform, yellow, yellowish-red, or bright red in color, and it should not have spots of gray. Gray spots indicate that the soil may be too wet to contain enough air (anaerobic conditions) during the winter and spring.

5. Are trees and shrubs planted near your septic system?

Trees or shrubs located closer than 100 feet to septic systems may cause problems. Roots from plants sometimes enter the septic tank drainfield, the tank, or the pipes, preventing the proper working of the septic system. Failing septic systems increase the likelihood of groundwater or surface water pollution.

6. Does runoff drain away from your septic system?

To reduce water that flows through the soil where the drainfield is buried, keep the water that runs off your foundation drains, gutters, driveway, and other paved areas away from the drainfield of your septic system. Careful landscaping can help direct excess surface water away from your septic system.



Runoff draining away from the septic system

5. Circle the answer that best describes the location between your trees and your septic system.

a. No trees are within 100 feet of your septic drainfield. You've never had a problem with roots in the drainfield, pipes, or tank.

b. No trees are within 50 feet of your drainfield.

c. The only trees within 50 feet of your septic drainfield are trees that grow poorly under wet conditions (most oaks, dogwoods).

d. Trees or shrubs within 50 feet of your drainfield that grow well under wet conditions (willows, willow oaks, some maples) or you've removed roots from drainfield lines at least once and make no effort to prevent root regrowth; OR do not know.



Trees should not be located too close to septic system

6. Circle the answer that best describes how surface water flows in your yard.

a. You have landscaped the yard to divert rain water and water from your roof, gutters, and foundation drains away from the septic system.

b. You have landscaped the yard to divert rain water away from your septic system. You're not sure where the roof, gutters, and foundation waters drain.

c. You have landscaped the yard to divert rain water away from your septic system. Your roof, gutters, and foundation drain across your septic system.

d. Water from the roof, gutters, foundation, driveway, and yard drains over your septic system; OR do not know.

Maintenance of Your Septic System

7. How much water do you use?

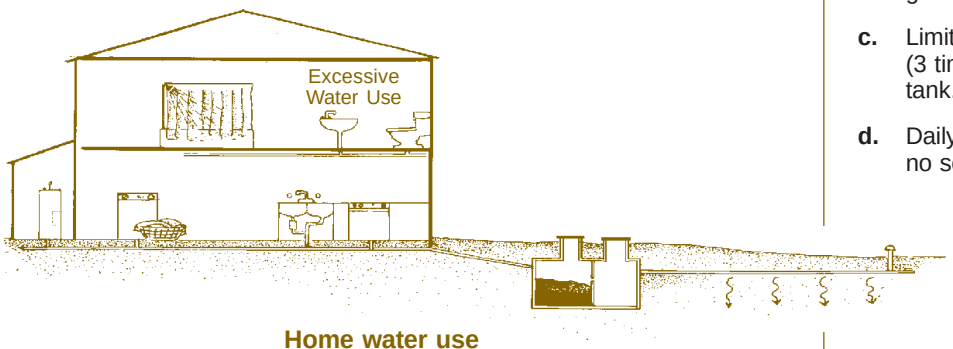
As with city sewers, there are limits to the amount of water septic systems can treat. However, if you have a city sewer and use too much water, a problem occurs far away at the city sewage treatment plant. If you have a septic system and use too much water, your wastewater may backup into your yard or house, since your septic system serves as your sewage treatment plant.

The soil drainfield can support no more than 120 gallons per bedroom per day. Most people use about 50 gallons per day of water. When the amount of water entering the septic system nears design capacity, your septic system may fail.

Problems caused by using too much water can occur throughout the year, seasonally, or from time to time. For example, the soil beneath your drainfield cannot absorb as much water in the spring, when the soil is naturally more moist, as it can absorb in the summer when the soil is drier. If you wash all your laundry in one day, you may have a temporary problem caused by overloading the soil.

Reduce your water use by doing the following:

- Use 1.6 gallon (or less) per flush toilets.
- Periodically check the toilets and faucets to make sure that they are not leaking; fix immediately if they are leaking.
- Use faucet aerators at sinks and flow reducer nozzles at showers.
- Limit the length of your shower to 10 minutes or less.
- Do not fill the bathtub with more than 6 inches of water.
- Do not wash more than 1 - 2 loads of laundry per day.
- Do not use the dishwasher until it is full.



Home water use

8. Do you use a garbage disposal?

To reduce the possibility of septic system failure, restrict the use of the garbage disposal unit. Garbage disposals usually double the amount of solids added to your septic tank.

7. Circle the answer that best describes the total amount of water you use in your house per day.

*Note: even if you have a well, you can have a water meter installed to measure your family's water use, or you may contact your local Cooperative Extension Service Center to get help estimating your family's water use.

a. You use less than 35 gallons per person per day.

b. You use between 35 and 50 gallons per person per day.

c. You use between 50 and 60 gallons per person per day.

d. You use more than 60 gallons per person per day, you have an in-home day care center or you take in wash for others, or your toilets or faucets have water leaks; OR do not know.

8. Circle the answer that best describes your garbage disposal.

a. No garbage disposal.

b. Have a garbage disposal but also have a separate tank that treats garbage disposal waste before it goes to the septic tank.

c. Limited use of garbage disposal (3 times per week) but no separate tank.

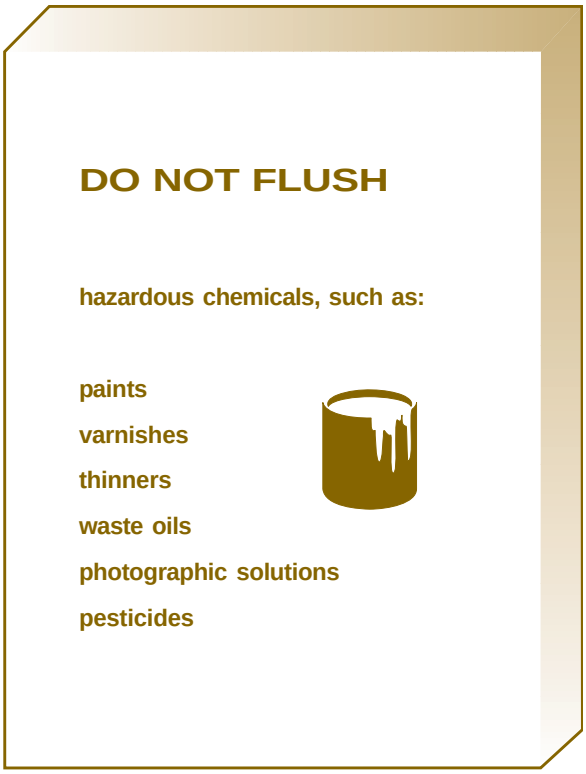
d. Daily use of garbage disposal and no separate tank; OR do not know.

9. Do you pour grease or oil down your sink?

Do not pour grease or cooking oils down the sink drain. Grease can harden in the drainfield and clog the soil so that no water can flow through the soil. If this happens you will need to install a new drainfield.

10. Do you use cleaning products?

Use moderate amounts of cleaning products and do not pour solvents or other poisons. Don't dispose of extra cleaning products by pouring them down the drain. Do not use toilet cleaners that are placed in the toilet tank. Such chemicals can kill the good bacteria in your septic tank and in the soil beneath your drainfield.



11. Do you dispose of solid waste materials?

Do not put items down the drain that may clog the septic tank or other parts of the system. These items include cigarette butts, sanitary napkins, tampons, condoms, disposable diapers, paper towels, egg shells, and coffee grounds. Do not use your toilet for disposal of facial tissues. This adds extra solids and water to the septic system.

9. Circle the answer that best describes how you dispose of your grease and oil.

a. No disposal of grease and oil down the drain, and oil and grease wiped from cooking items with a paper towel before washing.

b. Limited rinsing of grease and oil while cleaning cooking items during special occasions (holidays, or when entertaining).

c. Routine rinsing of grease and oil down the drain when cleaning cooking items.

d. Routine disposal of grease and oil down the drain from cooking pans, fryers, etc.; OR do not know.

10. Circle the answer that best describes your use of household cleaning products and how you dispose of solvents and poisons.

a. Minimal use of household chemicals (only 2 cups per week). No disposal of harmful chemicals such as solvents, paints, thinners, disinfectants, pesticides, poisons, and other substances that can kill the bacteria in the tank and soil.

b. Careful use of household chemicals only when needed to unclog pipes, clean fixtures, etc.

c. Daily use of household chemicals, such as degreasers, pipe decloggers or toilet bowl sanitizers.

d. Excessive amounts of cleaning agents poured down the drain or periodic disposal of solvents and other substances such as paints, paint thinners, poisons that can kill the bacteria in the tank and soil or pollute the groundwater; OR do not know.



12. Does all your wastewater drain into your septic system?

Make sure that all wastewater produced in the house is directed into the septic system. This includes not only the wastewater from the kitchen sink and the toilets, but also wastewater from tubs, showers, and laundry facilities.

13. Have you protected your septic system from physical damage?

To protect your septic system from physical damage:

- Keep the soil over the drainfield covered with grass to prevent soil erosion.
- Be careful not to mow the lateral turn-ups if you have a special type of septic system called a "low-pressure pipe system."
- Don't drive over the system.
- Maintain the natural shape of the land immediately downslope of the system. Protect this area from cutting and filling.
- Do not build over the drainfield area.

14. Have you built over your drainfield?

Do not cover the tank or drainfield with asphalt or concrete. Do not build any additions to your house over the drainfield without first checking with your local health department. For proper function and maintenance, your entire septic system must be accessible. Use a property layout sketch to help you place new facilities on your property away from the septic system.

11. Circle the answer that best describes how you dispose of solid products.

a. You never use your septic system as a trash can for any solid products such as cigarette butts, tissues, sanitary napkins, tampons, condoms, cotton swabs, cat litter, coffee grounds, or disposable diapers.

b. You occasionally (once or twice yearly) use your septic system as a trash can for cigarette butts, tissues, sanitary napkins, tampons, condoms, cotton swabs, cat litter, coffee grounds, or disposable diapers.

c. You use your septic system every month as a trash can for cigarette butts, tissues, sanitary napkins, tampons, condoms, cotton swabs, cat litter, coffee grounds, or disposable diapers.

d. You use your septic system every week as a trash can for cigarette butts, tissues, sanitary napkins, tampons, condoms, cotton swabs, cat litter, coffee grounds, or disposable diapers; OR do not know.

12. Circle the answer that best describes how you dispose of wastewater.

a. All of your wastewater is disposed of in an approved septic system.

b. All of your wastewater is disposed of in a septic system that was installed before state regulations went into effect but seems to be working okay.

c. Some of your wastewater, such as wash water or kitchen wastewater, goes to a separate pipe that discharges into a ditch or dry well or in the woods.

d. All of your wastewater goes to a pipe that discharges into a ditch or dry well or in the woods; OR do not know.

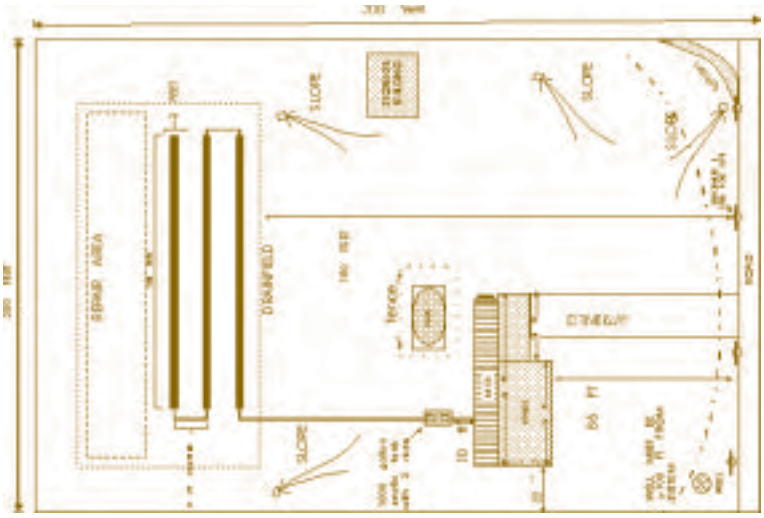
13. Circle the answer that best describes vehicular traffic over the septic system.

a. No vehicles or farm equipment are ever driven over your septic tank or drainfield, except lawnmowers.

b. You have carefully (once or twice) driven a car over your drainfield, but don't cross it with heavy farm equipment and have never driven over the tank or pipe network.

c. You have periodically driven vehicles over your drainfield, but don't ever cross it with heavy farm equipment.

d. You have driven over your septic tank or pipe network with vehicles or over any part of the system with heavy farm equipment, trucks, etc.; OR do not know.



Property layout sketch of the septic system

15. What safety precautions do you take around your septic system?

Some simple precautions should be taken to ensure the safety of you and your family around the septic system.

- Sewage in septic systems may contain germs that can cause disease. To prevent the spread of diseases, you should wash up after checking your septic system. If untreated sewage comes to the ground surface, you should contact your local health department to get a permit to repair your system.
- Be sure to avoid spark and shock hazards on systems with pumps or electrical controls, because sometimes there are toxic or explosive gases in septic systems that can be ignited.
- **The septic tank lid should be tight at all times to prevent children from opening the lid.**

16. Has your septic tank been cleaned recently?

After a few years, the solids that collect in your septic tank should be pumped out and disposed of at an approved location. If not removed, these solids will eventually block the soil in your system. The sewage will either back up into your house or flow across the ground surface over the drainfield. If this happens, it is too late to pump your tank and you will have to build a new drainfield on a different part of your lot.

How often your septic tank needs to be pumped depends on three things:

- The size of your tank
- The amount of wastewater you use
- The solids content of your wastewater

14. Circle the answer that best describes the placement of additions onto your house.

a. No additions to your home or construction of outbuildings, swimming pools, or driveways have been made since your septic system was installed.

b. Additions to your home or construction of outbuildings, swimming pools, or driveways have been preceded by contacting your local health department**.**

c. You have not contacted your local health department, but have a copy of your septic system permit and are sure that additions to your home or construction of outbuildings, swimming pools, or driveways have been located away from the septic system and repair area.

d. An addition to your home, a swimming pool, or driveway have been built over the septic system or repair area; OR do not know.

15. Circle the answer that best describes your work habits around the septic system.

a. You wash up after checking your system. You never enter your septic tank. You secure the septic tank lid so that children can not open it. You use caution to avoid shock and spark hazards on systems with pumps or electrical controls.

b. Not applicable

c. Not applicable

d. You don't wash up after checking your system. You enter your septic tank. You don't secure the septic tank lid so that children can not open it. You are not cautious with the electrical parts of your septic system; OR do not know.

WARNING

Use great caution when inspecting or even looking into a septic tank. Toxic gases that can kill in minutes are produced in septic tanks. Septic tanks should never be inspected alone.

Your local health department should be able to tell you the size of your tank. Then, using the table below, determine how often your tank should be pumped. For example, if there are 4 people living in your house and your septic tank can hold 1,000 gallons, the tank should be inspected and pumped at least every three years.

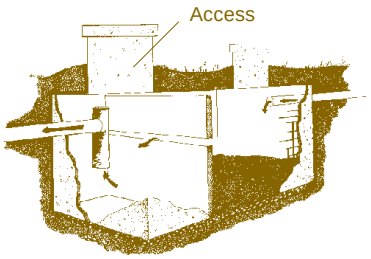
Time Table for Inspecting and Pumping Your Septic Tank (in years)

Tank Size (gallons)	Number of People Using the System				
	1	2	4	6	8
	Number of Years				
900	11	5	2	1	<1
1,000	12	6	3	2	1
1,250	16	8	3	2	1
1,500	19	9	4	3	2

Source: Adapted from "Estimated Septic Tank Pumping Frequency," by Karen Mancl. 1984. *Journal of Environmental Engineering.* Volume 110.

17. Do you have easy access to your septic system?

It is important to know the location of your septic system. It is also important to be able to check your septic system. Easy access to your septic system through an access riser allows it to be inspected and cleaned. The following diagram illustrates an access riser.



Access riser installed on septic tank

18. Have you hired a certified septic system operator?

Hire a certified operator when you have a system that uses a pump including the following:

- Low-pressure pipe system
- Pump-to-conventional system
- Pressure manifold system
- Mechanical aerobic treatment unit (ATU)
- Drip irrigation system

This operator will check the overall performance of your system and the operation of the pump, electrical controls, and alarm on a regular basis. Hiring a certified operator will cost some money, but can provide you with professional care for your septic system.

You are required by state law to hire a certified subsurface system operator if you have a low-pressure pipe system that was installed or repaired after July 1, 1992, or if you have an aerobic treatment unit (ATU).

16. Circle the answer that best describes how often your septic tank is cleaned.

a. You have your septic tank inspected and pumped as scheduled in the table at left.

b. You have septic tank scum and sludge levels checked each year and your septic tank pumped out as needed.

c. You have scum and sludge levels checked and your tank pumped out about once every 5-10 years.

d. It has been more than 5-10 years since you've had your septic tank checked and pumped out or you've never pumped out your septic tank, or you don't know if it has ever been pumped out; OR do not know.

17. Circle the answer that best describes your access to your septic tank.

a. You have a concrete riser or manhole over your septic tank that provides easy access to the tank.

b. You do not have a concrete riser, but the location of your tank is marked and the tank is less than six inches deep.

c. You do not have a concrete riser, but the location of your tank is marked. The top of your tank is more than six inches deep.

d. You do not know where your tank is located; OR do not know.

18. Circle the answer that best describes how you use a certified subsurface system operator if you have one of these four special types of septic systems: a pump-to-conventional, pressure manifold, low-pressure pipe system, or ATU system.

a. You have hired a certified subsurface system operator if you have a pump-to-conventional, pressure manifold, or low-pressure pipe system.

b. Not Applicable

c. Not Applicable

d. You have not hired a certified subsurface system operator to help operate and maintain your pump-to-conventional, pressure manifold, low-pressure pipe system, or ATU system; OR do not know.

19. Have you talked to a certified septic system operator?

Hiring a certified operator to inspect your pump system is important. It is also important to talk to your certified operator to find out what you should do to maintain your septic system between visits.

20. Are your drainage ditches maintained?

For septic systems that use ditches or subsurface drain tiles to drain excess water from the soil, it is important that the outlets from these ditches be cleaned. If the outlet becomes plugged up, water can no longer drain from the soil into the ditch. The soil will stay too wet for the drainfield to work properly and your septic system may fail.

For more information:

You must receive a permit from your local health department before installing or repairing any septic system.

Your county health department can be a valuable source of information on the following topics:

- Site selection and construction of septic systems
- Septic system inspection and maintenance
- List of registered septic system installers
- Construction records for existing septic systems
- Information on systems that legally require a certified subsurface system operator

Related publications available from the Cooperative Extension Service:

- *About Septic Systems: What You Need to Know*
- *Septic System Owner's Guide*, AG-439-22
- *Soil Facts: Septic Systems and Their Maintenance*, AG-439-13
- *Soil Facts: Investigate Before You Invest*, AG-439-12
- *Soil Facts: Management of Single Family and Small Community Wastewater Treatment and Disposal Systems*, AG-439-11

The publications listed above are available at your county Cooperative Extension Service Center. You may also order these publications from Communication Services, Campus Box 7603, North Carolina State University, Raleigh, NC 27695-7603.

19. Circle the answer that best describes how you obtain information from your certified operator about your septic system if you have a pump system.

a. You find out from your operator what you should be doing between visits to help the system work properly.

b. You do not discuss your system with your certified operator but do let him/her know immediately if the alarm is activated.

c. You turn off the alarm when it is activated, hope the problem goes away until the next scheduled visit by your certified operator.

d. You have a pump system, but have not hired a certified operator to help you manage the system; OR do not know.

20. If you use drainage ditches, circle the answer that best describes how you maintain your drainage ditches.

a. Your drainage ditches and outlets are maintained on your property and on surrounding properties.

b. Your drainage ditches are well maintained on your property but not on surrounding properties.

c. Your drainage ditch still exists but is beginning to become filled with soil or with trees, or brush growing in it or your drainage outlet is partially covered by water, soil, or debris.

d. The outlet of your drainage ditch is blocked or your drainage ditches have filled in and water is not flowing freely through them; OR do not know.

WARNING

NEVER enter a septic tank.

The following publication is available from the North Carolina Department of Environment, Health and Natural Resources, Department of Environmental Health (919/733-5083):

- *On-Site Wastewater Management Guidance Manual,* 1996.

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College of Agriculture & Life Sciences · NC State University
School of Agriculture and Environmental and Allied Sciences · NC A&T State University

Prepared by

Deanna L. Osmond
Water Quality Extension Specialist

Michael T. Hoover
Extension Soil Science Specialist

Wilma S. Hammet
Extension Home Furnishing Specialist

Janet Young
Layout and Design Specialist

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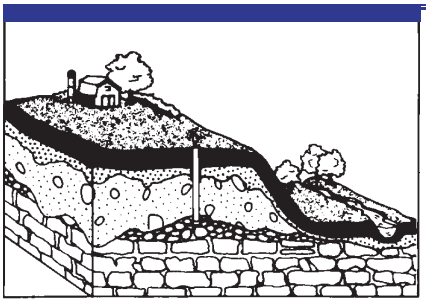
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SoilFacts

Why Do Septic Systems Fail?

A properly designed, constructed, and maintained septic system should treat and disperse wastewater effectively for many years. Unfortunately, septic systems sometimes fail.

Is My Septic System Failing?

How do you know if your septic system is failing? First, answer the following questions:

1. Do your drains empty slowly for reasons other than old, clogged pipes?
2. Does sewage back up into your house?
3. Have you noticed a wet, smelly spot in your yard?
4. Is your septic tank piped to a ditch or stream?
5. Is your washing machine or sink piped to a road or stream?
6. When it rains or the ground is wet, do you experience problems with your drains?
7. When you do laundry, does a wet spot appear in your yard?
8. Do you frequently have to pump your septic tank (more than once a year)?
9. Is the grass over or around your septic tank greener than the rest of your lawn?
10. Is the area around your septic tank or drainfield wet or spongy even when it has not rained for a week or more?

If you answered **"yes"** to any of these questions, your septic system has failed or is near failing. This means that it is not treating and disposing of sewage in a safe, environmentally sound fashion. You may also be able to tell your system is in trouble if noxious bacteria (fecal coliform) or large amounts of nutrients (particularly ammonia) are found in both nearby wells and surface water.

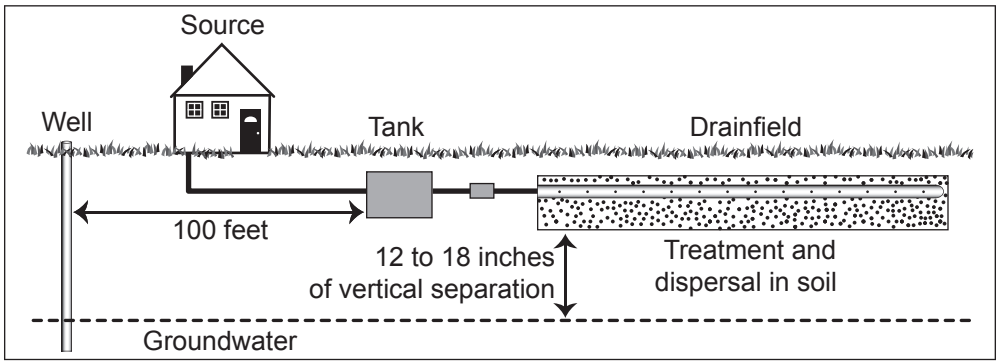


Figure 1. Wastewater treatment and dispersal in the environment (not to scale).

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What Is a Septic System?

A septic system consists of four basic components: the source (home), the septic tank, the drainfield or leach field, and the soil beneath the drainfield (Hoover, 2004; Figure 1). Several different septic system designs are used in North Carolina. The type of system used is based on the lot's soil and site conditions; however, the conventional system (as illustrated in Figure 1) is the most commonly used in the state.

Excessive Water Use

A common reason for septic system failure is overloading the system with more water than it can absorb. A septic system is designed for a specific wastewater flow rate based on the number of bedrooms (120 gallons per bedroom per day) in the house served by the system. When this flow rate is exceeded, the excess water backs up into the house or surfaces in the yard. This problem is often the result of a leaky fixture: either a toilet that has a slow leak or a dripping faucet. A change in water use, such as more people in the house or the addition of a water-using appliance, such as a dishwasher or washing machine, may add additional water to your septic system. Further problems can arise if a sump pump, icemaker, or dehumidifier drains into the septic tank. Each of these devices can add excess water and should not be connected into your septic system.

Along with excess water from inside the house, drainage or runoff water outside also may overload the septic system. In particular, water from roofs, roads, or paved areas may be diverted onto the system drainfield. This surface water will saturate the soil to the point that it can no longer absorb additional water. The result is sewage backing up into the house or on top of the ground. Finally, if the groundwater or surface water is allowed to enter the septic tank, it, too, can overload the system. For this reason, septic tanks are designed to be watertight, and surface water should be diverted from the access covers of the septic tank.

Poor Maintenance or None at All

As with all major appliances, septic systems require routine maintenance. The N.C. Cooperative Extension publications *Septic Systems and Their Maintenance,* AG-439-13, and *Septic System Owner's Guide,* AG-439-22, describe the proper maintenance of a septic system. The main purpose of the septic tank is to stop solids from entering into the drainfield. If solids do reach the drainfield, they will clog the small spaces or pores in the gravel and soil below, resulting in sewage backing up into the house or surfacing in the yard. The lack of septic tank maintenance is a key cause of premature septic system failure. You should have your tank pumped every 3 to 5 years depending on use (see *Septic Systems and Their Maintenance* (AG-439-13) for specific guidance on pumping frequency). Also, you should have the septic tank pumper inspect the sanitary tee outlet or effluent filter to ensure proper function. Houses with septic systems should not have a garbage disposal. But if your home has a garbage disposal or grinder pump, the tank should be pumped more frequently. Additives, whether biological or chemical, have not been shown to have any beneficial effect on the solids in the tanks or system in general. For this reason, they are not recommended.

If your system received its permit from your county health department after January 1, 1999, it must have an effluent filter. These filters are designed to prevent finer solids from reaching the drainfield. The filters require some additional maintenance. As the filters clog with solids, your drains may work more slowly. When this occurs, a septic tank pumper or the homeowner can clean the filter with a garden hose, making sure the waste on the filter is washed off into the inlet side of the tank, and replace the filter in the tank. If the filter is clogged, it is often a sign that the tank needs to be pumped.

Poor Design and Installation

An improperly designed septic system is a failure waiting to happen. It is critical that the system be designed with adequate space and has suitable soil. The space requirements are determined by the amount of sewage flowing into the system and by the soil and site conditions of the drainfield. In designing a septic system, it is assumed that there are two people per bedroom in a house and that each resident produces about 60 gallons of wastewater a day. Therefore, a septic system is designed to handle a flow rate of 120 gallons per day per bedroom (two people per bedroom x 60 gallons per person per day). For nonresidential property, the flow rate is determined by the proposed use. Soil and site conditions dictate the amount of sewage that can be safely applied to the soil. In general, sandy soils can accept more wastewater than clayey soils, which results in smaller drainfields for sandier soils. Finally, the location of a seasonal high water table or a restrictive layer (such as hard pan or rock) determines the depth below the soil surface that the bottom of the drainfield trenches can be placed.

The soil is the most important part of the septic system in treating and ultimately dispersing the treated sewage. If the soil beneath the drainfield is too wet, the sewage may not be adequately treated before it reaches groundwater. Furthermore, if a restrictive layer is too close to the trench bottom, the soil may not be able to absorb all of the sewage, thus forcing it to the surface or back up into the house. In North Carolina, there must be 12 to 18 inches of unsaturated soil beneath the drainfield trench bottom. This distance is referred to as the vertical separation distance. Environmental health specialists employed by the county or district health departments are trained to evaluate the soil and site to ensure that it is suitable for sewage treatment

and dispersal. Additional information can be obtained in the N.C. Cooperative Extension publication *Investigate before You Invest* (AG-439-12).

Even when a system is designed properly given the flow rate and soil and site conditions, problems can result from the construction and installation of the system. When systems are installed in soil that is too wet, the soil is significantly compacted and the soil pore space is smeared in excavated areas. In extreme cases this can seal the soil in the trenches, not allowing any wastewater to flow into the underlying soil for treatment and dispersal. With the reduced capacity for wastewater to flow into the soil, it is likely that the wastewater will back up into the house or emerge on top of the ground.

Septic systems must be installed according to the design. This includes checking the elevation of each component. If the trench bottoms, drain lines, or distribution box are not level, wastewater may not flow properly or be distributed evenly across the drainfield. Step-downs or other devices used on sloping sites must be properly installed, or one trench may be overloaded with wastewater. Interceptor drains or other drainage systems must have an outlet that allows groundwater to drain away from the drainfield. Finally, the soil cover over the drainfield should be uniform and crowned to prevent surface water from ponding on or flowing into the trenches. If the area is landscaped, use small, lightweight equipment because heavy machinery may compact the soil and even crush the pipes or septic tank.

Physical Damage

Driving, paving, or building on top of a septic system can damage or destroy it. The pipes and septic tank can shift position or be crushed from repeated or even occasional abuse. Furthermore, the soil can be compacted, or ruts may form, exposing system components and possibly untreated sewage to the ground surface. Paving over all or a portion of the drainfield may prevent air from getting into the soil, as well as limit access for repairs or maintenance. Building over the drainfield may cause compaction or even damage a line due to the weight of the structure or the location of building footings. Paving or building over the septic tank also will prevent required tank maintenance.

Tree roots may clog the drain lines and gravel in the trenches. The best way to prevent this from occurring is to remove or simply not plant trees or shrubs within 25 feet of the drainfield. Roots may also get into the septic tank or distribution box, so do not plant trees and shrubs over these devices. You should plant grass over the drainfield and all other outdoor system components. The grass aids in removal of water and helps to prevent soil from eroding over the components.

Most septic systems require that an area be set aside for possible repairs. This area should be treated and protected just as if it were currently in use.

Repairing a Failing Septic System

Septic systems may fail despite proper maintenance, design, and construction. If properly maintained, the life span of a septic system is similar to that of an asphalt shingled roof. If a failure does occur, the problem needs to be corrected swiftly and properly. Any failure, despite its cause, poses a nuisance, presents a public health hazard, and can degrade the environment.

If your system is failing or you suspect a failure, contact your local environmental health department. The department will send an environmental health specialist trained in assessing failing septic systems to determine the cause or causes of the failure and suggest how to repair the problem. Do not attempt to fix the failure without the approval of the local environmen-

Dos and Don'ts for Septic System Repairs

1. **Do** report problems to your local environmental health department and ask for an evaluation.
2. **Do** conserve water until a repair is made.
3. **Do** rope or fence off the area where sewage is on the ground surface to keep people and animals away from untreated sewage.
4. **Don't** place more soil over a wet smelly spot, which is probably where raw sewage has leaked. This will not solve the problem and may cause sewage to back up into your house. Raw sewage contains harmful bacteria that may cause sickness or death.
5. **Don't** pipe or ditch the sewage to a ditch, storm sewer, stream, sinkhole, or drain tile. This will pollute surface water, groundwater, or both, and cause a health hazard. **It is illegal.**
6. **Don't** pipe, ditch, or run the sewage into an abandoned well or other hole in the ground. This will pollute groundwater and cause a health hazard. **It is illegal.**
7. **Don't** ignore the problem. It will not go away. The longer you wait to fix the problem, the worse the situation may become, possibly making a simple repair into a very costly one.

tal health department. In some cases, the corrective measures could be as simple as installing water conservation devices. In the case of a complete system failure, construction of a new septic system may be the only solution.

Preventing Failures

Regular maintenance of your septic system is the best way to prevent a failure. As stated, the N.C. Cooperative Extension publications *Septic Systems and Their Maintenance* (AG-439-13) and *Septic System Owner's Guide* (AG-439-22) describe the proper maintenance of a septic system. Listed are some of the things you can do.

1. **Conserve water.** Use water-saving fixtures and conserve water in the kitchen, bath, and laundry to reduce the amount of wastewater the soil has to absorb. This is especially beneficial immediately after a heavy rain as well as during the winter and early spring.
2. **Repair or replace leaky fixtures.** Leaky fixtures add excess water to the drainfield, so fixing them promptly will reduce the amount of water the soil has to absorb.
3. **Maintain proper cover and landscape over the drainfield.** Make sure the drainfield is covered well with grass to prevent soil erosion. A crowned drainfield and surface swales will prevent excess surface water from entering the trench. Also, make certain that gutters, downspouts, patios, walkways, and driveways do not divert water over the drainfield or septic tank.
4. **Pump your tank regularly.** Regular pumping prevents solids from reaching the drainfield and causing it to clog. The tank should be pumped every 3 to 5 years depending on use. Additives have not been shown to significantly reduce the amount of solids in the tank. Do not use them in place of regular septic tank pumping.
5. **Limit what goes into the septic tank.** Do not dispose of chemicals, solvents, cleaning fluids, paint, motor oil, gasoline, and other such substances in the septic tank. They may kill all the beneficial bacteria in the tank and soil as well as pollute the environment. Dispose of these materials properly at your local recycling center or transfer station. Kitty litter, hygiene products, cooking oil, grease, and waste food may clog the system and should be disposed of in the trash. Waste from fruits and vegetables can be composted.
6. **Do not drive or build over any part of your septic system.**
7. **Inspect the system components routinely.** Check for signs of problems that can be corrected before a failure occurs.

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Prepared by
***David L. Lindbo**, Associate Professor and Soil Extension Specialist, Department of Soil Science*
***Diana Rashash**, Area Environmental Education Specialist. NC Cooperative Extension*
***Michael T. Hoover,** Professor and Soil Extension Specialist, Department of Soil Science*

Adapted from Ohio, Michigan, and Kansas Cooperative Extension Service publications

For more information, contact your local health department or county Cooperative Extension Service Center.

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ATTACHMENT 4: Pictures



Tank Opened for Inspection.



Inlet End of Septic Tank.



Wastewater Entering Tank Throughout The Inspection.



Outlet End of Septic Tank.



Distribution Box Camera Inspection.



Root Intrusion Within The Distribution Box.



Distribution Box Located Under The Fencing.



Outlet Lid Broken.



Septic Drainfield.