

Loudoun County Onsite System Maintenance
2016 Annual Report

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Virginia Department of Health

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Background and Summary

In Loudoun County Virginia, two primary local ordinances govern the onsite treatment and dispersal of sewage. The Loudoun County Board of Supervisors enacted Chapter 1067 of the Codified Ordinance in November of 2008, establishing a local program for the operation and maintenance of alternative onsite sewage systems; it was substantially amended on April 7, 2013. Loudoun County Ordinance Chapter 1066, which established county requirements for onsite sewage disposal systems, was re-enacted in its entirety in 1994 and most recently underwent major revision in January 2017. The Loudoun County Health Department (LCHD) also administers Virginia Department of Health (VDH) Sewage Handling and Disposal Regulations (12 VAC 5-610-10 et seq.). Alternative Discharging Sewage Treatment Regulations for Individual Single Family Dwellings (12VAC5-640-5 et seq.) and Regulations for Alternative Onsite Sewage Systems (12 VAC 5-613-10 et seq.).

The number of known alternative systems in the county continues to increase (Table I). In 2016, 28% of installed new and replacement on-site systems were alternative systems. In 2016, 52 new alternative and 131 new conventional systems were installed. Currently approximately 11.8% of known existing systems in Loudoun County are alternative.

Owners of alternative systems are notified by postcard of the need for their annual inspection in early April of each year. Overdue letters are sent in mid-July with notices of violation for the inspection requirement of Chapter 1067 in mid-August. If a report has not been received, ticketing occurs at least 30 days after receipt of the notices of violation. Repeat tickets may be issued as often as every 10 days but are typically issued every 14 days. Owners may also be ticketed for not completing system repairs; these tickets are typically preceded by a notification letter two weeks after the report, a reminder letter six weeks after the report, and a notice of violation 10 weeks after the report. The notice of violation must be received at least 30 days prior to initiation of ticketing.

Systems with sewage on the ground that are not immediately corrected by the operator are quickly visited. Owners are issued a notice of violation and placed on emergency pump and haul until corrections are made.

Notwithstanding the considerable efforts to ensure their proper operation, LCHD continues to see the importance of maintaining vigilance about how these systems are working. For example, in 2016 approximately 27% of inspected systems were experiencing deficiencies although many of these did not meet the definition of failure. Most of these deficiencies could be readily addressed (e.g., tank pump-out, insecure lids, malfunctioning alarm/panel, infiltration/inflow, air filter cleaning or replacement, etc.) but if not dealt with could eventually lead to ground water contamination, safety issues or system failure. Also, approximately 1.6% (27) of the alternative systems inspected in 2016 had failed as defined by sewage on the ground or backing into the house plumbing at the time of inspection (Table II). The majority of the systems reported as failing, as in previous years, were drip dispersal (13 of 289 drip systems, 4.5%), which failed at five times the average for other alternative systems, followed by low pressure (6 of 382 low pressure systems, 1.6%) systems.

2016 Program Changes

Large system management

Construction to expand the Willisville treatment system was completed in 2016 and the plant was put back on line as it had previously been taken off line due to exceedance of nitrogen limits. Extensive tank waterproofing of septic tanks and pump chambers was completed for both the pool and Starplex systems at Franklin Park along with extensive system repairs. The treatment plant for Creighton Farms is now reporting quarterly averages. The nitrate exceedance due to the fertilizer incident has resolved.

Onsite verification

This was the third year staff was tasked to field verify alternative system reports from operators. Staff's goal was to verify 10% of alternative system reports.

Once reports were received from operators for the preselected properties, a letter was generated to the homeowner notifying them of the scheduled verification site visit and offering the opportunity for owners and operators to attend. 10.1 % (167) of operator reports were field verified with 7.2% of system conditions not matching the operators report (Table VI). The bulk of deficiencies identified by Health Department Staff were lids not secure (4), over growth (2), spent /ponding Puraflo chambers (2) and compressors not functioning as designed (2). Also identified were issues with floats (1), alarm panel (1), clogged septic tank filter (1), and settling around components (1).

2009-2016 Findings

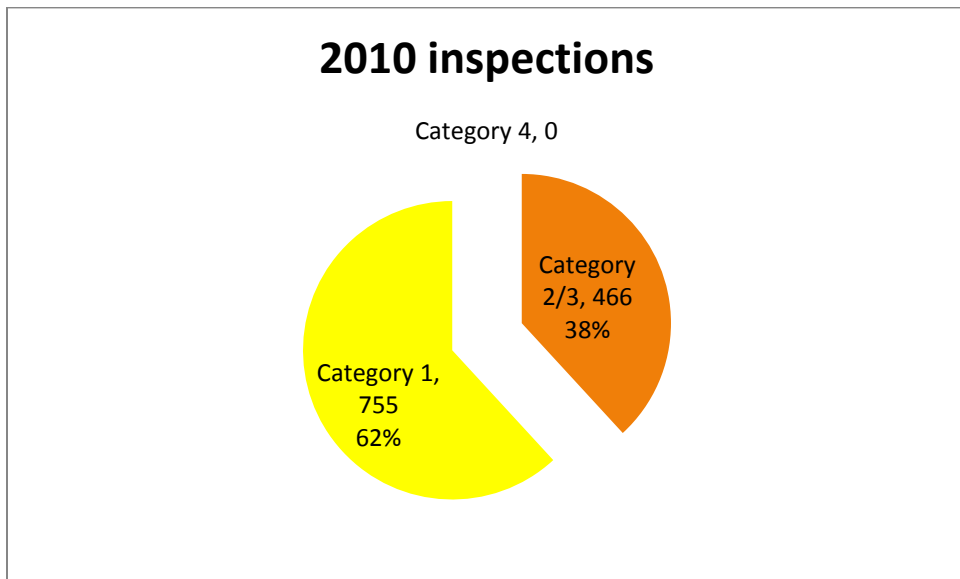
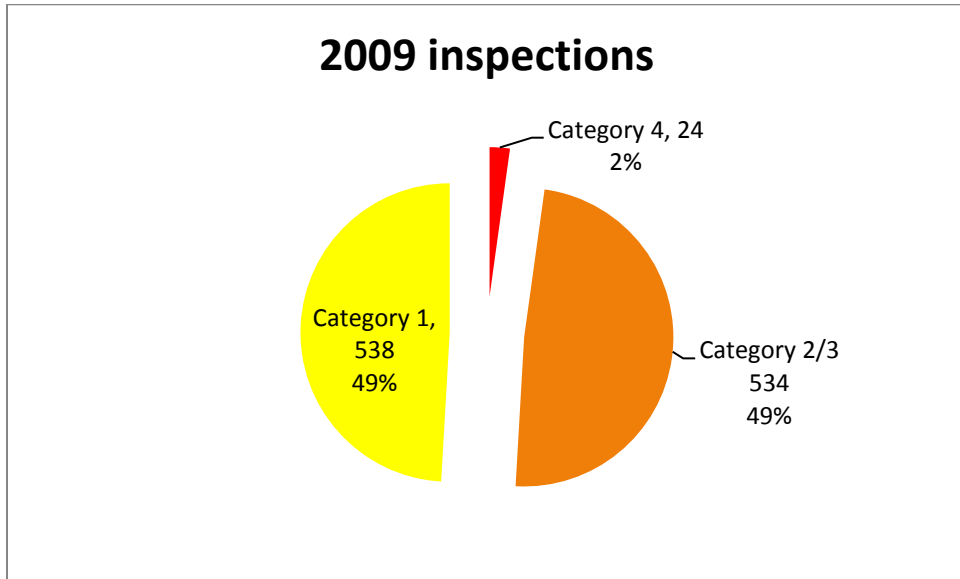
The number of alternative systems in the LCHD database continued to increase. The increase initially largely involved locating systems that were not previously included in the database as well as new installation of alternative systems. Although a few systems continue to be identified, most of the 2016 increase results from new systems.

Table I: Number of alternative systems identified in Loudoun County

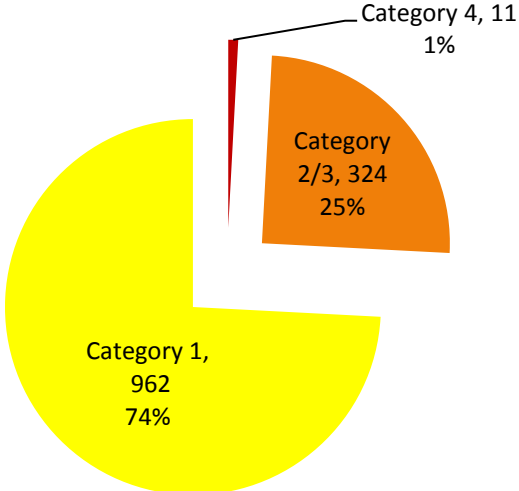
Year	Number	Annual Increase	Annual Increase %
2009	1096	-----	-----
2010	1221	125	11.4%
2011	1297	76	6.2%
2012	1436	139	10.7%
2013	1506	70	4.9%
2014	1558	52	3.4%
2015	1670	112	7.2%
2016	1723	52	3.1%

The 2009 calendar year was the first year of the program and many systems were identified that needed attention. The systems in Category 1 have no deficiencies. Those in Categories 2 and 3 have deficiencies but did not meet the definition of failure. (Note: After program initiation, information system changes resulted in Categories 2 and 3 being combined to deficient) Systems in Category 4 met the

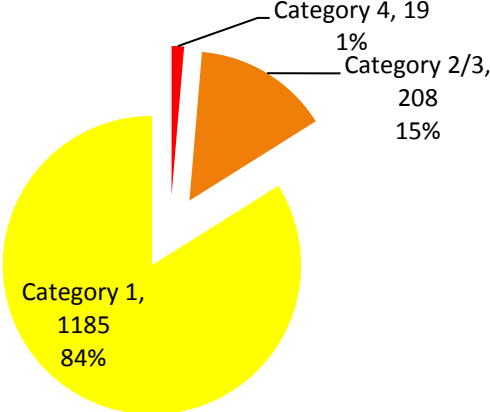
definition of failed due to identification of sewage on the ground (SOG) or backing into house plumbing at the time of the operator visit. The categories are locally defined and, with the exception of Category 4 (failure), are not recognized in local ordinance or state regulation.



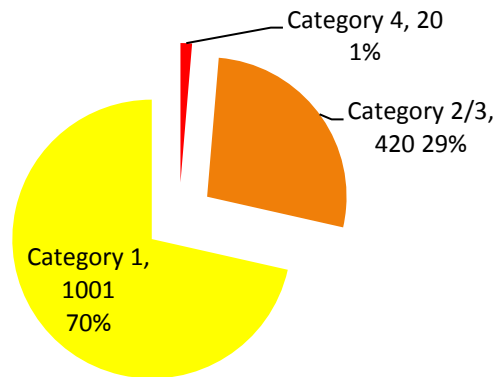
2011 inspections



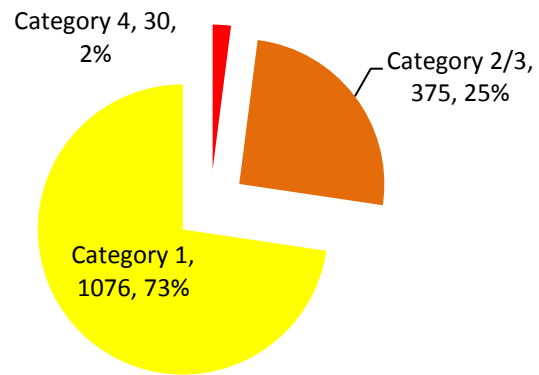
2012 inspections



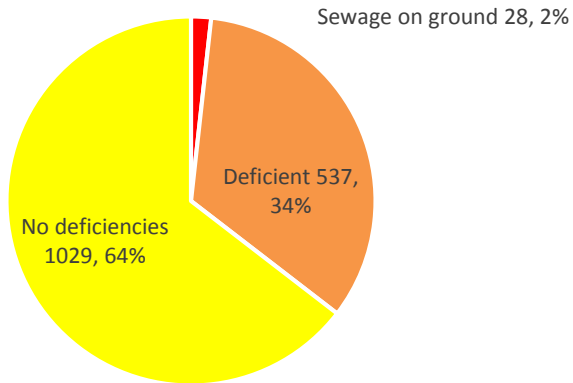
2013 inspections



2014 Inspections



2015 Inspections



2016 Inspections

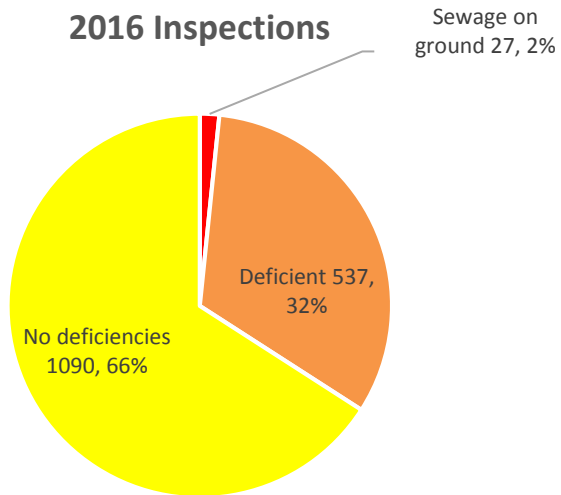


Table II: Results of 2016 Onsite System Maintenance (As of Dec 31, 2016)

Total known conventional systems	12914
Total known alternative systems	1723
Total known alternative discharging systems (<1000 GPD residential)	26
Total permitted pump and haul (temporary and permanent)	72

Total alternative systems required to be inspected (20 systems installed after inspection season cutoff, 39 inspections deferred to following year, 4 removed from database)	1660(96%)
Total alternative systems (required to be inspected) with operator site visits	1654 (99.6%)
Properties receiving at least 1 ticket	35 (2.1%)
Total tickets issued for non-inspection	60
Total valid tickets	57
Total tickets rescinded	13
Total tickets for not completing repairs	10
Total deficient systems (not functioning as designed but not failing)	537 (31%)
Number of deficient systems repaired by year end	508 (94.6%)
Total systems with sewage on ground (SOG)	27 (1.6%)
Total systems with sewage on ground not repaired by year end	2
Total alternative system reports with tank pump out required	227 (13.5%)
Total alternative systems pumped out	472 (28.0%)
Total minor repairs requiring permits (alt. & conv.)	217 (1.5%)
Total system replacement repairs of all systems (alt. & conv.)	23 (.016%)
Pump outs reported for all systems including P&H	3924
Verification inspections of alternative system reports	167 (10.1%)
Number of conventional systems > 5 years old reported as being pumped in last 5 years	7628 (59 %)
Number of conventional systems (>5 years since installation) with no record of pump-out in last five years	4679 (36%)
Number of conventional systems pumped out	2683
Number of conventional systems installed	131
Number of alternative systems installed	52

In calendar year 2015, the 27 alternative systems reported as failing (SOG) malfunctioned due to a variety of factors (see Table III). Most of these failures were easily repaired and did not result in absorption area replacement.

Table III: Primary Cause of Failure 2016 (27 Total)

Sewer line, force main, header or lateral break	5
Zoner damage	4
Pretreatment unit overflowing	3
Unbalanced LPD	3
Control box issues	3
Cut or broken drip lines	2
D box out of level	2
Leaking fixtures	1
Broken air relief valves	1
Broken/frozen hydraulic unit	1
Crushed headers	1
Drip needs ball valve	1

Operators reported a variety of deficiencies that did not result in system failure. Systems may have multiple deficiencies. The largest number of deficiencies reported were ATU's and tanks needing to be pumped, lids and hatches not secure, peat filter media not in good condition, and blower not working. Corrections of these deficiencies are tracked to completion by LCHD staff in cooperation with owners and operators.

Table IV: Types of Category 2/3 System Deficiencies*

ATU pumping required	117
Pump tank pumping required	98
Septic tank pumping required	90
Lids and access hatches not secure	67
Excessive sludge in ATU	51
Peat filter media not in good condition	45
Blower not working	44
Effluent pump not pumping at proper rate	39
Peat media not functioning as intended	32

Effluent pump not working	26
Panel/alarm malfunctioning	24
Dispersal area abused or not maintained	24
Distribution box in disrepair	24
Level sensor not operating correctly	23
Infiltration and inflow	20
Drip zones not functioning properly	17
Distributing valve not dosing as intended	15
Drip dosing does not meet design requirements	13
Settling around components	13
Components not accessible for service	11
Air filter needs cleaning or replacement	11
Tank not structurally sound	11
Vigorous boiling not occurring	11
Power to control panel off	9
Media dosing not equalized	8
Low pressure lines need cleaning or testing	8
Alarm not functioning	8
Gravity drain-field not functioning as intended	7
Trash tank needs pumped	6
Effluent not visually clear	6
Air release valves not functioning properly	5
Baffles missing	4
ATU clogging	4
Drip system auto flush not working	4
Encroachment by structures or surfaces	3
Sand filter requires raking	3
Check valves not functioning properly	3
Peat modules not level	2
Effluent level within septic tank not within operational limits	2
Advantex® unit not vented properly	2
Vegetation not managed	2
Spray irrigation not working as intended	1
Sand filter dosing not equal	1
UV light not working	1

*More than 1 deficiency may have been identified per deficient system

Table V: Number of major alternative system components in Loudoun

Pretreatment

Aerobic treatment units	813
Peat media filters	536
Textile filters	70
Sand filters	25

Dispersal

Conventional trenches	985
Low pressure	387
Drip	290
Mound	56
Spray	5

* Alternative systems may have multiple components

Disinfection (includes alternative discharging systems)

Chlorine	62
UV	12

Table VI: Verification Visits

Year	Number of visits	Visits % of total inspections	# of systems with deficiencies not reported by operator	% visits with HD reports not matching operator report
2016	167	10.1%	12	7.2%

Table VII: Total tank pump-outs reported by year (includes pump and haul systems)

2010	30
2011	124
2012	1411
2013	2089
2014	2618
2015	3254
2016	3924

Table VII: Conventional systems > 5 years old, tank pump-outs reported by year

2010	15
2011	94
2012	648
2013	1123
2014	1571
2015	2004
2016	2621

Some tanks may have been pumped more than once in last 5 years

2016 program strengths

High number of operator visits

Of the existing eligible alternative systems in Loudoun County, 99.6% had operator site visits reported in 2016. Thirty-five owners in Loudoun County received at least one ticket for lack of an operator inspection. 2.1 % of alternative system owners who were required to have an operator visit were ticketed by the LCHD.

Improved reporting

Staff continues to instruct operators to report deficiencies as they were observed upon arrival at the site. Deficiency rates for operators having more than 30 systems were 7%, 10%, 12%, 16%, 21%, 23%, 33%, 33% 47%, 48%, and 56%.

Deficient System Repairs

Of 564 systems reported by the operator as having a deficiency, which included the 27 with SOG, 508 were corrected by year end, a 90.1 % correction rate. The credit for this excellent percentage is shared by owners who are committed to maintaining their systems, committed operators, and diligent Health Department staff. Only 10 tickets for not completing repairs were issued.

Unreported tank pump outs

Tank pump out reporting and/or the total number of pump-outs significantly improved in 2016 with 3924 pump-outs of all systems reported compared to 3256 in 2015 (a 21% increase). Conventional system pump-outs improved from 2004 to 2683, a 34.4% increase. Reminder postcards were sent to all owners who had not been recorded as having pumped in the last five years. Some owners called indicating they had their systems pumped but the pumper had not entered the report. Unlicensed pumpers were also discovered. Enforcement action has been initiated against pumpers who do not consistently report and unlicensed pumpers. The pump-out program has had the effect of greatly improving the conventional system database by identifying abandoned systems and locating previously unknown systems.

Verification visits

2016 was the third year of alternative onsite verification visits. The goal is for Health Department Staff to field verify 10% of operator reports annually. 10.1% of operator reports were field verified by Health Department staff. Systems were randomly identified for verification prior to the inspection season. Of the 167 verification visits, only 12 systems were found to have deficiencies not reported by the operator. These visits have resulted in improved reporting and fostered communication between regulators, operators and owners.

2016 Challenges

Septage tipping

The Fairfax County wastewater authority has closed the Colvin Mill Run facility. The result has been a marked increase in septage being received at Loudoun Water's Broad Run Wastewater Receiving Facility, the only septage/sullage receiving facility in Loudoun County. Loudoun Water has been able to keep up with increased traffic due to the recent expansion, however traffic is often heavy during peak usage. Loudoun would benefit from another or access to another septic receiving facility on the Route 50 corridor. Currently some of Loudoun's septage is being discharged to the Upper Occoquan Service Authority (UOSA) Septage Receiving Facility. The tipping fee at UOSA is \$26 per 1000 gallons compared to Loudoun Water's \$40.

Pump-outs

Loudoun implemented a 5 year pump-out requirement in 2012. Of the 12307 conventional systems greater than five years old, 7628 (59%) have been reported as pumped. As reporting improves and the poor reporting numbers for 2012 are replaced with higher numbers in 2017, the percentage should improve. The need for pump-out of alternative systems is determined by the operator. Pump-out of aerobic treatment units continues as an issue as it is difficult to remove solids from many types of units. This has resulted in operators calling for annual pumping to ensure proper treatment which increases owner expense.

Tank access

Great progress has been made in upgrading systems for access to septic tanks. Most owners of older alternative systems have installed access risers allowing operators to inspect and service tanks. A few septic tanks were inspected by uncovering the tank.

Pump-out reporting

Pump-out reporting has greatly improved in 2016, with most operators now reporting consistently. Enforcement efforts directed at pumper-operators will continue as needed. It is anticipated that the implementation of civil penalties directed at non-reporting operators will improve reporting.

Puraflo®

With the high number of Puraflo® systems in Loudoun it has been anticipated for some time that peat replacements will increase. In 2016 the number of systems recommended for replacement increased dramatically with 45 out of 536 (8.4%) systems being recommended for peat replacement.

Initiatives for 2017

Consistency of operator reports

Efforts will continue to be made to ensure operators report conditions upon their arrival rather than after deficiencies have been corrected. This will provide more accurate information on which to base decisions regarding alternative onsite system manufacture, design, installation and operation.

Communities with required Nitrate reduction

Loudoun has two large communities on onsite sewage systems that have been designed for nitrate reduction systems. The communities were both developed prior to Chapter 1067 of the Loudoun County codified ordinance. Sampling has been done at Brook Stream Manor for both the nitrate treatment level and levels of nitrate in the ground water. The operator has agreed to monitor flows at Brooks Stream Manor in order to determine total nitrogen load. The operator at Hamilton Station Estates is sampling 1/3 of systems annually and making system adjustments to improve nitrification.

Civil penalties

Recent Chapter 1066 revisions include a schedule of local civil penalties as Loudoun successfully sought broadened authority for local civil penalties in the 2016 general Assembly session. Implementation of these civil penalties will provide useful and appropriate enforcement tools. Civil penalties should be especially useful in motivating correction of conventional system malfunctions, inspections and sampling of alternative discharging systems, and motivating timely reporting of tank pump-outs.

Alternative discharging systems

Changes in Chapter 1066 will allow greater local control of alternative discharging systems. Reporting of sampling and inspection results for discharging systems are required to be through OnlineRME®. Civil penalties will serve as motivation for having a required contract with an operator, and obtaining required sampling.

Operation/inspection of conventional systems

Maintenance of conventional systems has been proposed at the State level and has been discussed in stakeholder meetings. Conventional systems are less technically complex than alternative systems and should need less frequent inspection. However, they do have deficiencies and are a very important part of Loudoun's onsite sewage system infrastructure. The idea has been discussed of requiring an inspection of conventional systems in conjunction with the 5 year pump-out/tank inspection. If the inspection only involves a system walkover inspecting for surfacing effluent the cost should be reasonable. One issue is that staff physically operating the pump truck are often not operators. Another issue is that owners may desire to use these inspections for property transfer or refinance purposes for which they are not intended. Regulation of conventional system maintenance is allowed under 15.2-2157 B. Discussions will continue on the feasibility and desirability of initiating an inspection program for conventional systems.

Installation of most dependable pretreatment units

Discussions with alternative onsite operators reveal that certain alternative pretreatment units are more reliable than others. Some are easier to maintain, produce more consistent results, and/or are less subject to requiring repair. Discussions will continue with industry representatives and regulators to explore how the use of more reliable systems can be encouraged.