# Loudoun County Onsite System Maintenance 2015 Annual Report

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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 amended in October 2015. The recent amendment to Chapter 1066 allows an inspection in lieu of pump-out option for the five year septic tank pump out requirement for onsite conventional systems. Chapter 1066 is currently undergoing a substantial rewrite. 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.) 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 1). In 2015, 27% of applications for new and replacement on-site systems were for alternative systems. In 2015, 51 new alternative and 189 new conventional systems were installed. Currently approximately 11.3% of known existing systems in Loudoun County are alternative.

Administration of the oversight, compliance, assurance and enforcement program for these alternative systems has become standardized. Owners of systems are notified by postcard of the need for 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 2015 approximately 35% of inspected systems were experiencing deficiencies although many of these inadequacies 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 1.8% (28) of the systems inspected in 2015 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 were drip dispersal (14 of 277 drip systems, 5.1%), which failed at six times the average for other alternative systems, followed by low pressure (9 of 377 low pressure systems in Loudoun.

There were a variety of factors reported for the higher rate of drip failures, most commonly cut/broken shallow drip lines, broken hydraulic units, severed air relief valves, and pump failures (Table III). Most of these failures could be readily repaired and were likely associated with freezing, aggressive mowing, system damage and installation defects.

# 2015 Program Changes

Focus on large system management

The changes to Chapter 1067 in 2013 eliminated the reporting exclusion for communal systems and systems maintained by a public entity. Steps have been made to bring systems into compliance with their treatment limits. Willisville was taken off line during the summer due to exceedance of nitrogen limits. It was subsequently restarted but continues to exceed nitrogen limits. Operation permits have been issued for Creighton Farms, Lenah Farms, Willisville and Meadowkirk and the Loudoun Golf permit is being renewed. A zoning determination has been requested to clarify which systems must be operated by a utility (Loudoun Water) and which can be operated by private operators. St. Francis has been issued a Notice of Alleged Violation for not reporting results and exceeding nitrogen limits.

#### Onsite verification

This was the second year staff was tasked to field verify alternative system reports from operators. The goal was 10% verification of alternative systems. Twenty percent were randomly selected so the 10% goal would more likely be reached and allow for verification inspections to be spread more uniformly throughout the year. 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. Mid-season it was discovered that many owners were receiving their notifications with very short notice or even after the visit and adjustments were made in the inspection schedule to correct this. 9.8 % of operator reports were field verified with 15.4% of system conditions not matching the operators report (Table VI). The bulk of deficiencies identified by Health Department Staff were lids (10), over growth (6), alarms (3) and control panels (3). Also identified was SOG (1), blower (1), saturated media (1), missing T (1), and settling around components (1).

## 2009-2015 Findings

The number of alternative systems in the LCHD database continued to increase. The increase initially involved locating systems that were not previously included in the database as well as new installation of alternative systems. Surprisingly, this occurred again in 2015 as only 51 new alternatives were installed but the number of alternative systems increased by 112. (See Table I).

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%

Table I: Number of alternative systems identified in Loudoun County

The 2009 calendar year (Figure I, below), 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) 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.



By 2010 (Figure II), many of the deficiencies had been corrected as demonstrated by the increased percentage of Category 1 reports.



Cleanup of deficiencies continued to improve in 2011 (Figure III). However 2011 results were influenced by underreporting of deficiencies by some operators.



In 2012, inspection reports included a lower number of Category 3 systems (Figure IV) potentially due to a large volume operator inaccurately reporting systems as having no deficiencies. This operator performed 399 or 28% of total visits. The reports from this operator had only 5% deficiencies while other operators inspecting similar systems had an 8% to 67% deficiency rate.



More accurate reporting by operators in 2013 resulted in an increased reported number of category 2/3 systems.





In 2015, systems reported with deficiencies (category 2/3) reached their highest level since 2010. It is surmised to be due to better reporting of conditions as they are found by the operators. If the 15.4% verification inspection underreporting is included then as many as 39% of systems may have been deficient in 2015.



# Table II: Results of 2015 Onsite System Maintenance (As of Dec 31, 2015)

Total known conventional systems	13051
Total known alternative systems	1670
Total alternative system required to be inspected	1601(96%)
(44 systems installed after inspection season cutoff,	
25 inspections deferred to following year)	
Total alternative systems with operator site visits	1594 (99.6%)
Properties receiving at least 1 ticket	31 (1.9%)
Total tickets issued for non-inspection	80
Total valid tickets	64
Total tickets rescinded	16
Total tickets for not completing repairs	15
Total Category 2/3 systems	537 (35%)
(not functioning as designed but not failing)	
Number of category 2/3 systems repaired by year end	515 (95.9%)
Total systems with sewage on ground (SOG)	28 (1.8%)
Total systems with sewage on ground not repaired	0
Total alternative system reports w/ tank pump out required	190 (11.9%)

Total alternative systems pumped out	411 (25.7%)
Total minor repairs requiring permits (alt & conv.)	254 (1.7%)
Total system replacement repairs of all systems (alt. &	26 (.018%)
conv.)	
Pump outs reported for all systems including P&H	3227
Verification inspections of alternative system reports	156 (9.8%)
Number of conventional systems > 5 years old reported as	5440 (44 %)
being pumped in last 5 years	
Number of conventional systems (> than 5 years since	6996
installation) with no record of pump-out in last five years	
Number of conventional systems pumped out	2004
Number of conventional systems installed	189
Number of alternative systems installed	51

In calendar year 2015, the 28 systems reported as failing (SOG) malfunctioned due to a variety of factors (see Table III). Most of these failures were easily repaired.

#### Table III: Primary Cause of Failure 2015 (28 Total)

Sewer line, force main, header or lateral break	
Broken air relief valves	
Valve box malfunction/leak	3
Zoner damage	3
Pump failure	3
Cut or broken drip lines	2
D box out of level	2
Unbalanced LPD	2
Broken hydraulic unit	1
Float/control box issue	

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 tanks needing to be pumped, lids and hatches not secure, panel/alarm malfunctioning, air filter needs cleaning and replacement, and infiltration and inflow (Table IV). Corrections of these deficiencies are tracked to completion by LCHD staff in cooperation with owners and operators.

Lids and access hatches not secure	124	
ATU pumping required	115	
Septic tank pumping required	113	
Pump tank pumping required	68	
Panel/alarm malfunctioning		
Air filter needs cleaning or replacement	56	
Dispersal area abused or not maintained	44	
Components not accessible for service	33	
Effluent pump not pumping at proper rate	32	
Distribution box in disrepair	29	
Peat media not functioning as intended	25	
Settling around components	20	
Distributing valve not dosing as intended	19	
Effluent pump not working	18	
Tank not structurally sound	18	
Drip dosing does not meet design requirements	16	
Media dosing not equalized		
Effluent level within septic tank not within operational	16	
limits		
Low pressure lines need cleaning or testing	13	
Drip zones not functioning properly	11	
Vegetation not managed	10	
Trash tank needs pumped	9	
Air release valves not functioning properly	7	
Encroachment by structures or surfaces	5	
Baffles missing	3	
Pressure gauges indicate abnormal operation	3	
Sand filter requires raking		
Air relief valves not accessible		
UV light not working		
Advantex <sup>®</sup> unit not vented properly	2	
Floats not set properly		

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

SBR cycle not set correctly	2
Drip system auto flush not working	1

\*More than 1 deficiency may have been identified per Category 2/3 system

#### Table V: Number of major alternative system components in Loudoun

#### Pretreatment

Aerobic treatment units	
Peat media filters	
Textile filters	
Sand filters	32
Textile filters Sand filters	70 32

#### Dispersal

Conventional trenches	
Low pressure	377
Drip	277
Mound	56
Spray	5

\* Alternative systems may have multiple components

#### Table VI: Verification Visits

Year	Number of	Visits % of	# of systems with	% visits with HD
	visits	total	deficiencies not	reports not
		inspections	reported by operator	matching operator
				report
2015	156	9.8%	24	15.4%

# 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

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

## 2015 program strengths

#### High number of operator visits

Of the existing eligible alternative systems in Loudoun County, 99.6% had operator site visits reported in 2015. Thirty-one owners in Loudoun County received at least one ticket for lack of an operator inspection. 1.9 % of alternative system owners who were required to have an operator visit were ticketed by the LCHD.

## Improved reporting

Deficiency reporting was more consistent in 2015 than in previous years, however large discrepancies in reporting remained. Of the 11 operators with more than 30 reports filed, deficiencies were reported at 0%, 7%, 13%, 19%, 20%, 26%, 36%, 41%, 44%, 50% and 55%. Improved reporting especially by larger operators has caused the reported deficiency rate to increase from previous years. Staff continues to instruct operators to report deficiencies as they were observed upon arrival at the site. The five operators reporting less than 7% will be contacted to ensure that deficiencies are being accurately reported.

#### Deficient System Repairs

Timely repair of deficiencies in 2015 was greatly improved. Of 565 systems reported by the operator as having a deficiency, which included the 28 with SOG, 543 were corrected by year end, a 95.9 % correction rate. The credit for this excellent percentage is shared by owners who are committed to maintaining their systems, professional committed operators, and diligent Health Department staff. Only 15 tickets for not completing repairs were issued.

#### Complete reports

Instances of incomplete reports were few and staff typically returned them to operators for correction as they were received.

#### Unreported tank pump outs

Tank pump out reporting and/or the total number of pump-outs significantly improved in 2015 with 3254 pump-outs of all systems reported compared to 2423 in 2014 (a 34% increase). Conventional system pump-outs have improved from 1571 to 2004, a 27.6% increase. Reminder postcards were sent out to the next group of owners to include the oldest 60% of systems and those who had not been recorded as having pumped since the 2014 reminder. 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. The result has been a tremendous drop in the number of known active conventional systems from 14839 at the end of 2014 to 13051 at the end of 2015, a 12% decrease. The decrease is largely the result of identifying and removing systems that have been abandoned due to sewer connection or being replaced by another onsite system. If the number of conventional systems continues to decrease, and the number of reported pumpouts continues to increase, the percentage of conventional systems reported as being pumped-out appears to be bound for around 80%. With the 2004 conventional systems pumped-out last year multiplied by 5 and 13051 conventional systems, the percentage would be 76.8%.

#### Verification visits

2015 was the second year of alternative onsite verification visits. The goal is for Health Department Staff to field verify 10% of operator reports annually. 9.8% of operator reports were field verified by Health Department staff. Systems were randomly identified for verification prior to the inspection season. Of the 156 verification visits, 24 systems were found to have deficiencies not reported by the operator. These visits have improved reporting and fostered communication between regulators, operators and owners.

# 2015 Challenges

#### Septage dumping

The Fairfax County wastewater authority has effectively stopped out of county (Fairfax County) septage from being dumped at the Colvin Mill Run facility. This is a result of stricter enforcement of local ordinance. The result has been a marked increase in septage being received at Loudoun Water's Broad Run Wastewater Receiving Facility, the only septage receiving facility in Loudoun County. Colvin Mill Run has accordingly been removed from the pick list of septage receiving facilities in OnlineRME.

#### Pump-outs

Loudoun implemented a 5 year pump-out requirement in 2012. Of the 12490 conventional systems greater than five years old, 5440 (44%) have been reported as pumped. As reporting improves and the poor reporting numbers for 2011 and 2012 are replaced with higher numbers in 2016 and 2017, the percentage should improve.

The need for pump-out of alternative systems is determined by the operator. Pump-out of aerobic treatment units has become 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 to have access to the septic tank. 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

Although pump-out reporting has improved in 2015, it is still not universal. Enforcement efforts directed at pumper-operators will need to continue. It is anticipated that the implementation of civil penalties directed at non-reporting operators will improve reporting.

# Initiatives for 2016

## 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 regarded 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 Estate is sampling 1/3 of systems annually and making system adjustments to improve nitrification.

#### Large systems

Loudoun has five large communal systems that are operated by Loudoun Water. One owner is seeking to contract with a private operator. The zoning ordinance stipulates that certain large systems must be operated by a utility (ie. Loudoun Water). The Loudoun County Zoning Division is responsible for enforcement of this requirement and will be providing a list of systems that are required to be managed by a utility (Loudoun Water). Two other large systems have private operators. It has been determined that some of these systems are not consistently meeting treatment limits; staff is meeting with the operators of these systems to determine steps to bring them into compliance. Enforcement of violations for large systems is anticipated to increase in 2016.

#### Civil penalties

Guidance on enforcement using the Virginia Department of Health statewide schedule of civil penalties should be released in 2016. In addition, the Loudoun County government is seeking legislation that would allow localities to develop schedules of civil penalties for conventional and alternative discharging systems. If passed by the General Assembly, 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 and motivating timely reporting of tank pump-outs.