



Experts in non-sewered development

■ CASE STUDY:

Fluvanna County, Virginia

Fox Glen Residential Subdivision

Background:

Fox Glen is a 25 acre 25 home subdivision located in Fluvanna County Virginia approximately 15 miles east of Charlottesville. Neither water nor sewer service is available in the area. Southern Development (developer) and Church Hill Homes (builder) contracted with NCS Wastewater Solutions to design, permit, build and operate a private sewer system for the subdivision.

Challenges:

Providing each home with individual well and septic is not practical at the site. Soils are slowly permeable, requiring large individual drainfields that leave inadequate separation distances between well and septic even with 1-acre lot sizes. Many of the lots would not perc at all. Developing the site with traditional well and septic would support just 12 to 13 residences while county zoning supports a higher density of up to 25 residences on the property.

Soils in the area are particularly dense in the top 4' of the soil horizon, making placement of drainfield trenches in the upper horizon infeasible. Areas of the site with suitable soils even at 5' or deeper are limited and scattered around the property.

The Solution:

Fortunately, Fluvanna County zoning ordinances permit the clustering of homes on smaller lots. Rather than require 25 homes on 25 1-acre lots, ½ acre lot sizes can be used so long as density is limited to a total of 25 homes on the 25 acres. This preserves substantial green space in perpetuity and further limits the investment required in roads and utilities infrastructure.

Working with Gooch Engineering and Testing Inc., NCS conducted a soils survey of the site and identified 8 areas as potentially suitable for use as community drainfield.

NCS further conducted a groundwater mounding analysis and nitrogen balance as required by the Virginia Department of Health (VDH). Based on these factors, NCS staff engineer, Robert Albornoz Jr., P.E. then designed a wastewater treatment and disposal system as needed to support the full zoning density of 25 residences. A central community sewer fully preserves 37% of the subdivision as open green space.

VDH permits to construct were received within 90 days after beginning design – lightning fast by any state's standards. NCS installed the system during late summer/fall 2006 and proceeded with startup in May 2007 as homes were built and occupied. NCS now operates the site as a private utility, billing homeowners for sewer service at competitive rates.

Details of the system, picture of the site plan and collection station on the back

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The System:

Wastewater is collected by conventional gravity sewer, flowing to the central treatment plant facility located in the southwest quadrant of the property. There, wastewater is treated by two Bioclere Model 30/24 trickling filters placed in series to achieve secondary treatment standards for BOD and TSS and reduce total Nitrogen to < 15 mg/L as required by the nitrogen balance.

For disposal, 5' deep trenches 2' wide were installed to achieve optimum soil permeability rates. The drainfield is separated into 6 zones each controlled by a zone valve and located on two of the 8 potential drainfield areas with the remaining areas held as reserve should they ever be needed.

Drip tubing with pressure compensating emitters placed every 2' along the tubing is used to provide uniform distribution of treated wastewater in the trenches. A Surflo model DICP 02-412 drip controller meters flows to each zone at proscribed dosing rates and schedule for that zone and provides SCADA remote monitoring capability.



Treatment Facility



Overall Site Plan