

Preliminary Feasibility for
New Onsite Wastewater Dispersal Areas

Walton Middle School Property
TMP 101-56A

Albemarle County Schools
Building Services Department
2751 Hydraulic Road
Charlottesville, VA 22901

Analysis Performed By:

Gooch Engineering and Testing, Inc
1821 Broadway St
Charlottesville, VA 22902

Old Dominion Engineering
2036 Forest Drive
Waynesboro, VA 22980

September 10, 2009

Investigation

The Walton Middle School property was investigated to determine new suitable areas for onsite dispersal of treated wastewater and the initial feasibility of the site's ability to accept greater effluent quantities from an elementary school in addition to the middle school. Specifically, the property was studied to determine if it had the capability to support wastewater treatment for the resulting effluent from an additional 650 students at a new elementary school. The investigation included topographical assessment, landscape suitability, soil identification through auger borings, and saturated hydraulic conductivity measurements. The investigation did not include the existing parking area or a capacity analysis of the existing drainfield.

Topographical and Landscape Assessment

The property has large areas that are unusable for onsite dispersal of treated wastewater due to either topographical features or their locations in Albemarle County's critical resource protection areas.

- The Hardware River is designated with a 100' setback by the county. This eliminates the areas adjacent to the north and east property lines for onsite dispersal of treated wastewater.
- The property also has areas with critical slopes over 25% primarily adjacent to the 100' setback from the Hardware River.
- During the construction of the middle school the property was significantly graded with cut areas. The area behind the school adjacent to the tennis courts and the parking areas were areas that were cut. The tennis court area has only shallow acceptable soils and the parking areas were not investigated.
- The back of the track is in an area with fill grading.
- There are several drainage swales on the property.

These sections are highlighted in Exhibit 1.

Available Soils for Onsite Dispersal

Steve Gooch AOSE identified three potential drainfield areas on the property. The approximate locations of the dispersal areas are shown in Exhibit 2. All these areas are located in wooded sections of the property. A summary of the drainfield areas are presented below.

Drainfield Area	Estimated Average Slope (%)	Area		Depth of Installation (inches)	Estimated Infiltration Area Available (sqft)	Type of Drainfield
		Width (ft)	Length (ft)			
1	12	200 to 325	120 to 360	12	48,000	Drip Dispersal
2	15	160 to 310	300 to 550	12	84,500	Drip Dispersal
3	15	84 to 140	270 to 350	48	9,300	Pressure Trench

Old Dominion Engineering analyzed the hydraulic saturated conductivity of the dispersal soil horizon with a Johnson Permeameter in order to determine preliminary long term acceptance rates of the identified drainfield areas. Tests were run at the infiltration zone and below.

Summary of Ksat results

Area 1 Walton School

Test	Depth (inch)	Representative Ksat (cm/day)
10	16	44.6
8	16	44.3
13	16	154.3
2	16	129.7
5	16	46.7

Area 2 Walton School

Test	Depth (inch)	Representative Ksat (cm/day)
21B	12	150.1
20B	12	436
19B	12	117.1
43A	13	259.5
40A	14	148.1
18A	15	58.9
25B	18	14.6
18B	21	42.3
43B	21	282.4
40B	22	3.3
25A	26	7.8
21A	36	7.7
20A	36	23.3
19A	36	3.7
18C	54	30.1
40C	54	3.1
43C	54	57.8

Area 3 Walton School

Test	Depth (inch)	Representative Ksat (cm/day)
36A	48	13.8
34A	48	7.6
32A	48	13
31A	48	9.8
30A	48	17.8
30B	63	100.7
36B	72	47.5
34B	72	11
32B	72	46.4
31B	73	22.4

Preliminary Representative Ksats for Test Areas

The drainfields for the Walton property will be classified as “Mass Drainfields” under Virginia Department of Health Regulations because of the potential amount of effluent being dispersed on the site per day (around 16,000 gallons per day). Therefore all representative Ksats should be considered preliminary until a mass drainfield analysis is performed. The preliminary representative Ksats for the dispersal soil horizon for the drainfield areas are:

- Area 1 - 46.7 cm/day
- Area 2 – 12.4 cm/day
- Area 3 – 11.9 cm/day

Preliminary Allowable Effluent Quantity, Sewage Treatment Facilities, and Allowable Student Occupancy

As mentioned before, the drainfield areas will fall under VDH Mass Drainfield Regulations. Because of this, significant additional analysis and coordination with VDH will be required before the exact treatment scheme and the maximum allowable flow of wastewater effluent that can be disposed of on the site can be determined. Based upon the soil type, preliminary representative Ksats, area available, and depth of suitable soils, the potential drainfield areas on the Walton property will require tertiary treatment in order to meet Virginia Department of Health regulations for Nitrate concentrations and to provide for system reliability/longevity and groundwater protection. This means that significant treatment of the wastewater must be done before dispersal in the drainfields.

The following components will require removal in the treatment process:

- Biochemical Oxygen Demand (< 10 mg/l)
- Suspended Solids (< 10 mg/l)
- Fats, Oils, and Grease
- Nitrates (< 10 mg/l or <5 mg/l depending upon the amount of impervious area on the fully developed site)

The drainfield areas 1 and 2 (both primary and reserve) are shallow installations. This will prevent the use of these areas for any other activities. The areas may be permitted to stay wooded as they are now if the mass drainfield analysis allows. The pressure trench dispersal area (drainfield area 3) can be filled over and used for additional play fields or parking.

Based upon our preliminary analysis, it appears that the amount of tertiary treated effluent that can be disposed of on the property will accommodate the existing middle school as well as a new elementary school on the property. This is a preliminary finding since all mass drainfield analysis and permitting has not been done. Additional analysis will need to be done to determine the exact number of students that can be accommodated in both schools including:

- Deep soil borings
- Backhoe pit soil evaluations
- Monitoring well installation
- Underlying geologic investigation
- Groundwater analysis
- Additional Ksats including deep Ksats

The expected number of students the site can support via a new drainfield is between 1,000 and 1,200. Since the exact number of students will not be known until a complete mass drainfield evaluation and wastewater characterization study is complete, I would rate the possibilities as follows:

1000 students in 2 schools – High, 90%

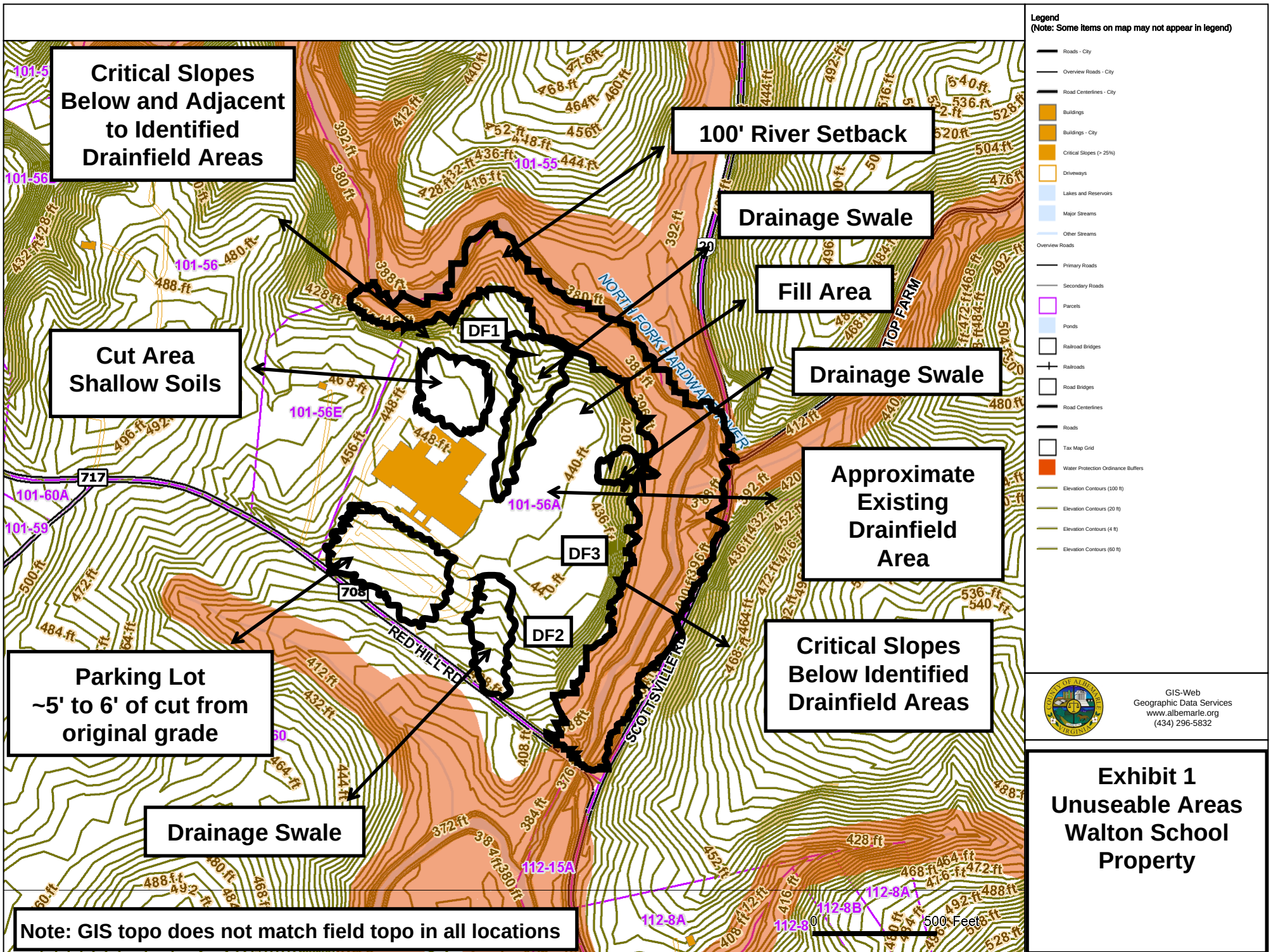
1200 students in 2 schools – Good, 80%

The 1000 students in 2 schools could be divided as 550 students in elementary, and 450 students in middle school. The 1200 students in 2 schools could be divided as 650 students in elementary and 550 students in middle school.

Other options exist for this property for wastewater dispersal including using a combination of new drainfields and reuse of the existing drainfield or a direct discharge system permitted through Virginia Department of Environmental Quality. A preliminary rough order of magnitude cost estimate for the treatment and dispersal system will be between \$1.0 and \$1.2 million dollars depending upon treatment processes, dispersal mechanisms, and contractor selection.

Limitations

The soil characterization and analysis reflects our preliminary opinion as to the suitability of soils in the areas investigated to support an onsite wastewater system under the current VDH regulations. Final approval of any system will rest with the Albemarle County and State Health Department and be regulated under VDH Mass Drainfield Regulations.



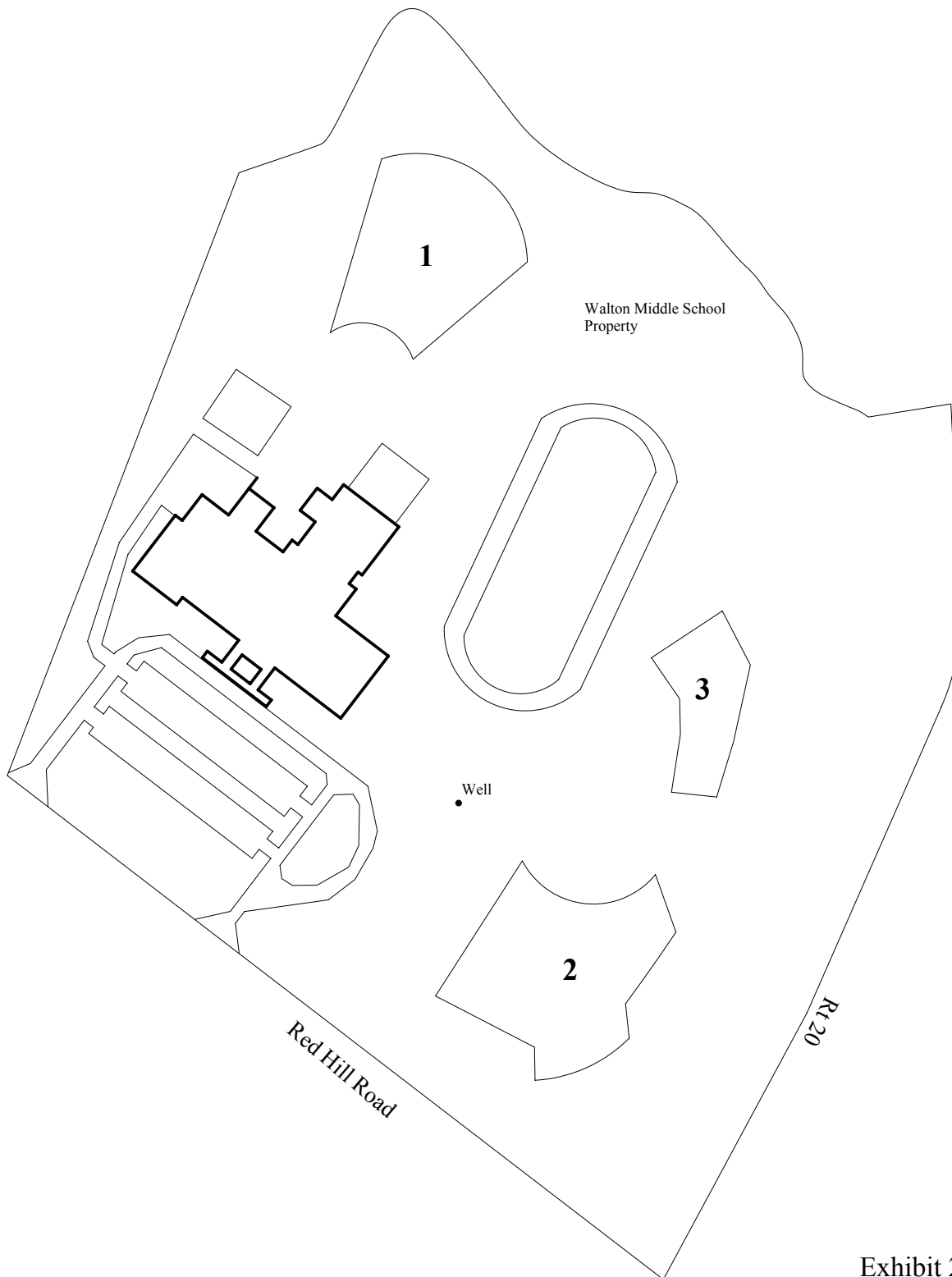


Exhibit 2
Approximate Drainfield Locations
Walton Middle School Property

NTS