

Hartwood District Town Hall Meeting

October 6, 2016



Outline

- Groundwater Concerns
- Cluster Development
- Area Road Projects Update
 - Rt. 17
 - Courthouse Road/Exit 140, I-95
 - Enon Road
- Other Issues



Groundwater

- The Board has received a number of concerns recently related to groundwater
 - Concerns about the adequacy of the groundwater supply
 - The effect of new development on future groundwater supply
 - Lack of groundwater monitoring wells in Stafford
 - Concerns about saltwater intrusion and groundwater quality
 - Concerns about the lack of a requirement to install a tested, approved well prior to issuing a building permit
 - No recent update to the 2004 Groundwater Management Plan
 - Can public water be extended to problem areas
- Effects of cluster development on groundwater supply

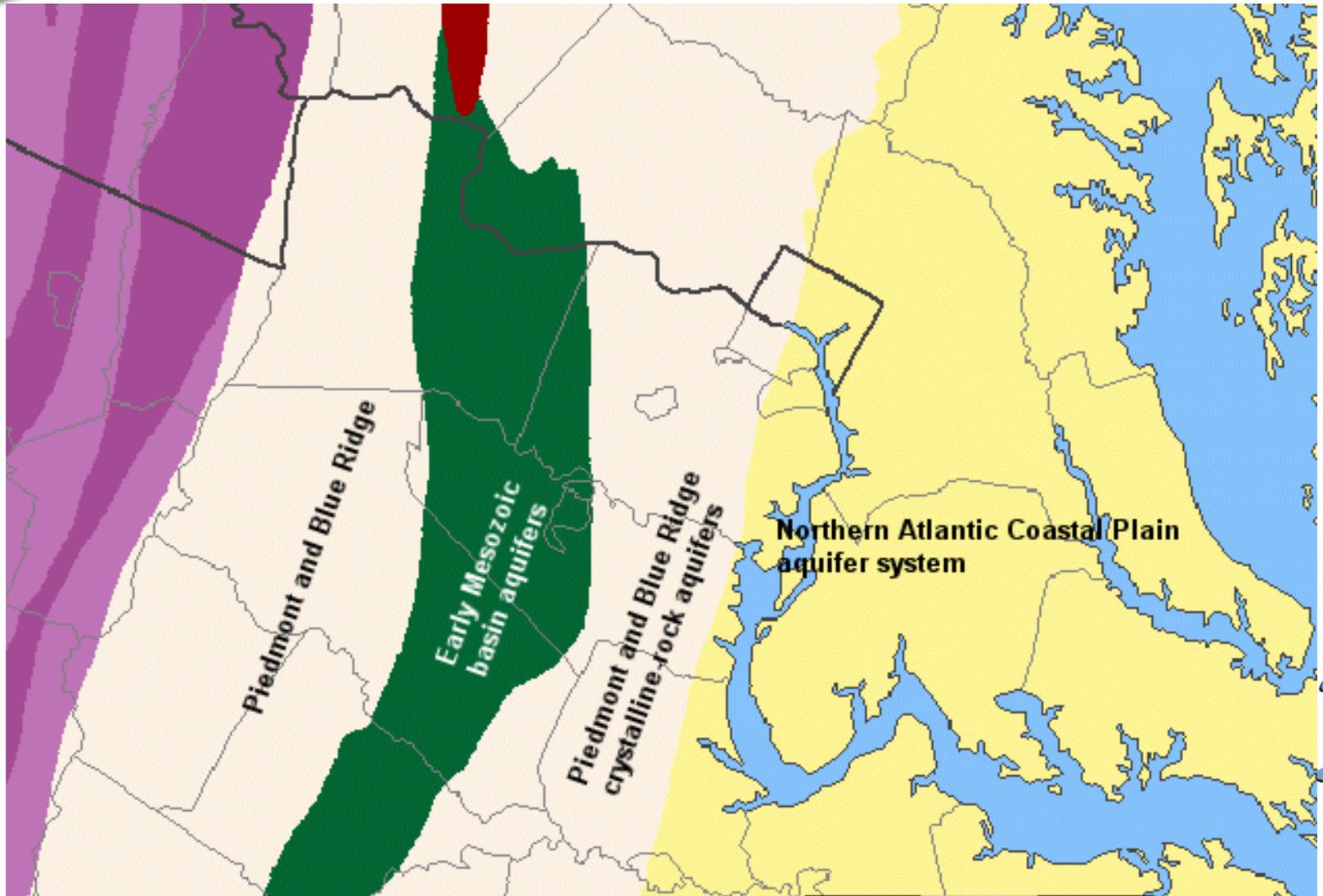


Groundwater Use in Stafford County

- There have been 3 studies of groundwater resources completed for Stafford County
 - 1991 Comprehensive Water Supply Study (Utilities)
 - 1994 Groundwater Supply Study (Utilities)
 - 2004 Groundwater Management Plan (Planning)
- In addition, there are multiple regional studies with information about groundwater resources in Stafford
- Two aquifers in Stafford
 - Coastal Plain (east of the Fall Line/I-95)
 - Piedmont (west of the Fall Line/I-95)
 - Also the Coastal Plain Recharge Zone (straddles I-95)
- Recent concerns are related to groundwater in the Piedmont aquifer



Stafford Aquifers



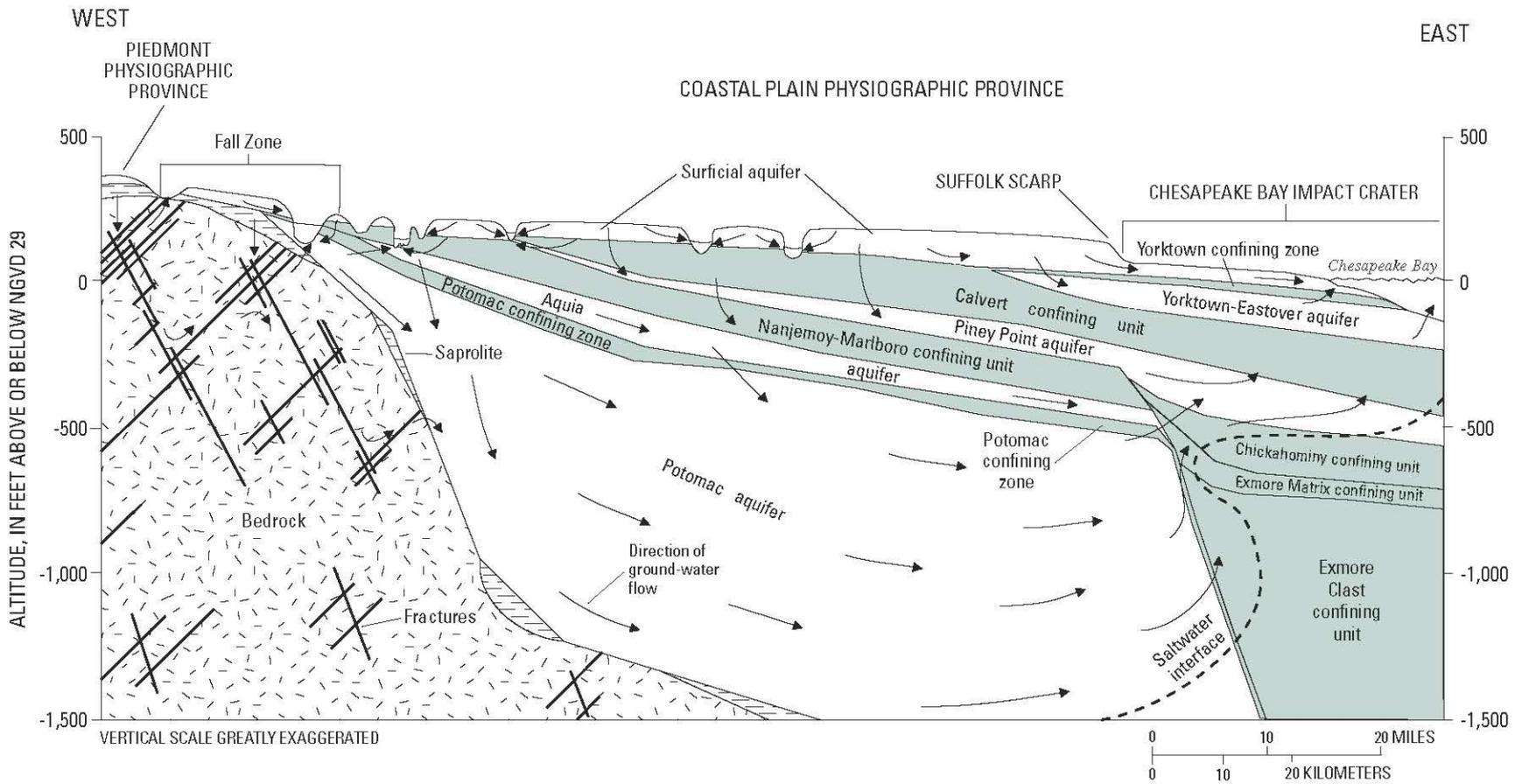


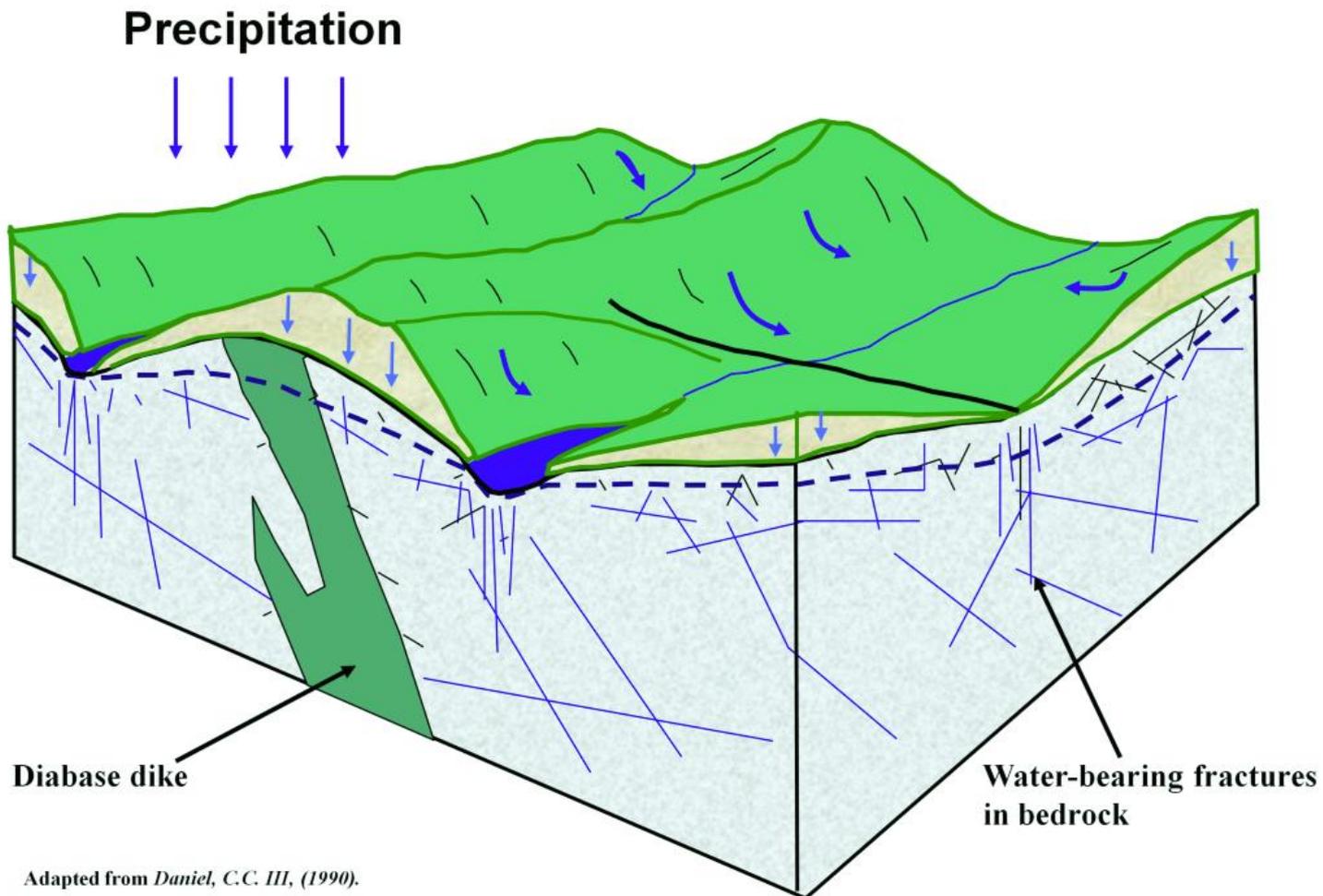
Figure 2. Generalized hydrogeologic section and directions of ground-water flow in the Virginia Coastal Plain (altitude relative to National Geodetic Vertical Datum of 1929).

Piedmont Aquifer Characteristics

- Three zones
 - Shallow surface aquifer ($\leq 55'$)
 - Bedrock fracture zone ($\leq 300'$)
 - Bedrock zone w/o fractures ($> 300'$)
- Surface zone use common in older homes (bored wells)
 - Low yield (< 15 gpm)
 - Susceptible to drought and indications are they can be influenced by nearby high volume withdrawals (Augustine GC ~ 300 gpm)
 - Susceptible to contamination
 - Rarely used in new construction
- Bedrock fracture zone (drilled wells)
 - Low yield (< 15 gpm, although there are exceptions)
 - Variability in quality (hardness, sulfur, etc.)
 - Most common for SFD outside public water service area

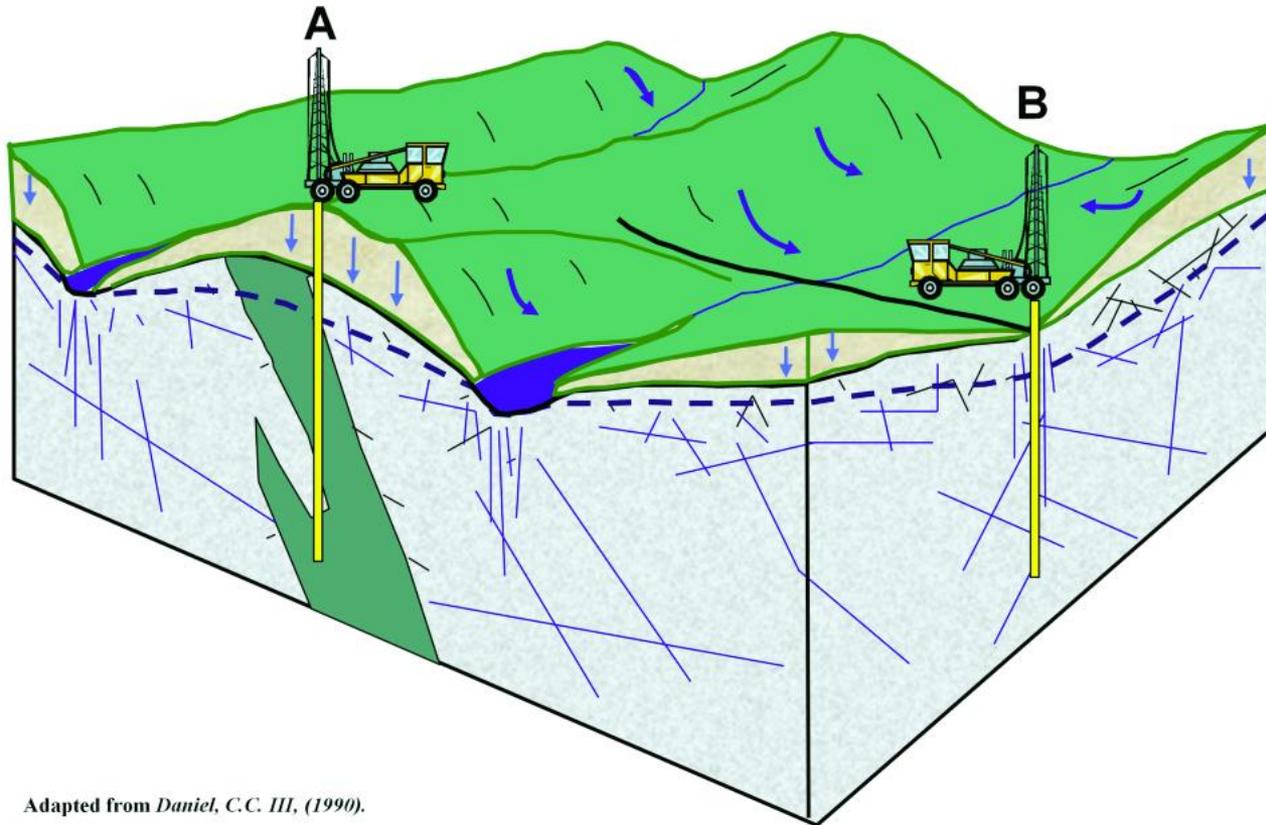


Piedmont Aquifer



Piedmont Aquifer

Why are some wells drilled dry?

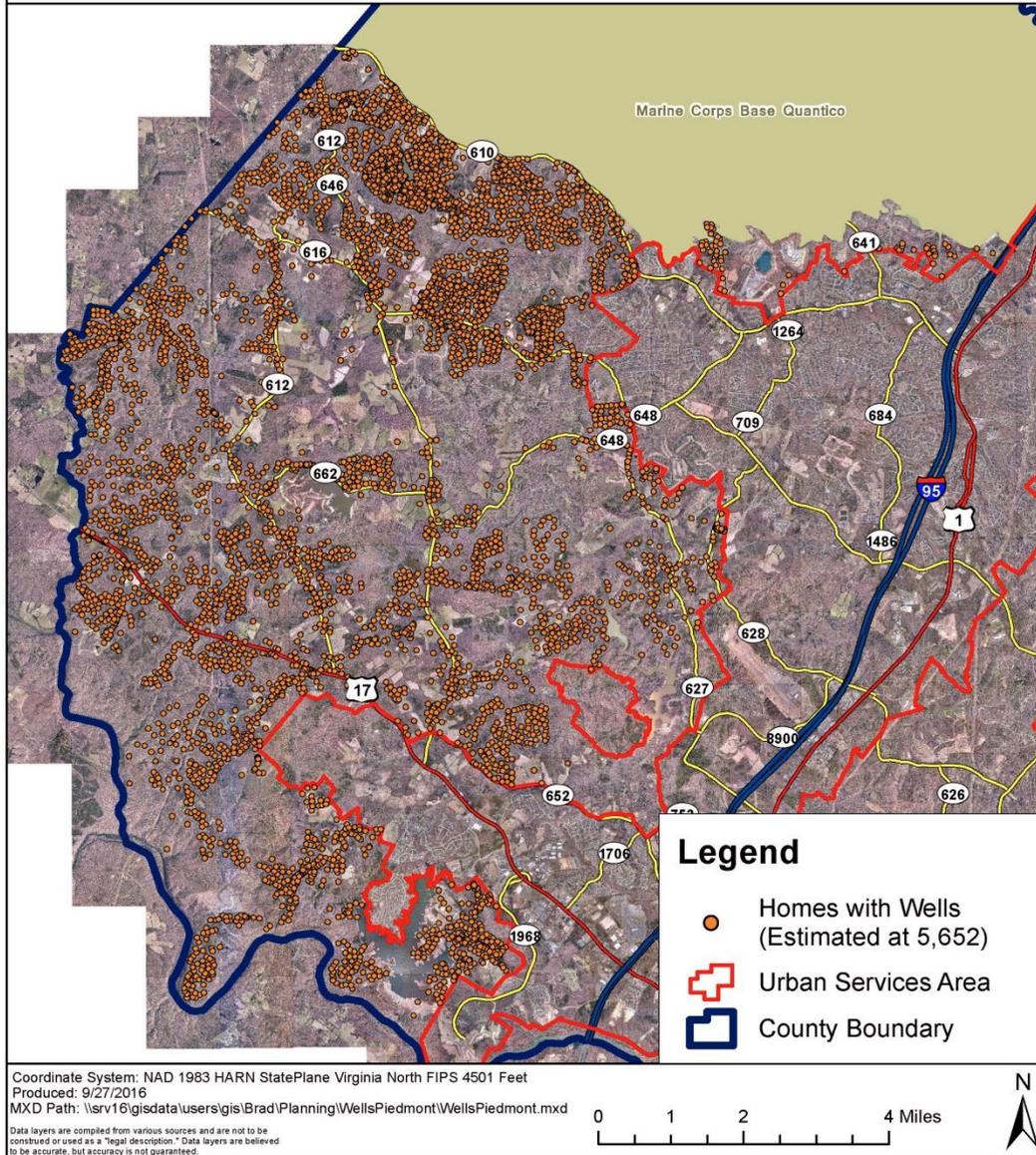


Adapted from Daniel, C.C. III, (1990).



Homes with Wells in Piedmont Geologic Area

Produced by the Stafford County GIS Office
540-658-4033 | www.StaffordCountyGIS.org



Groundwater Supply

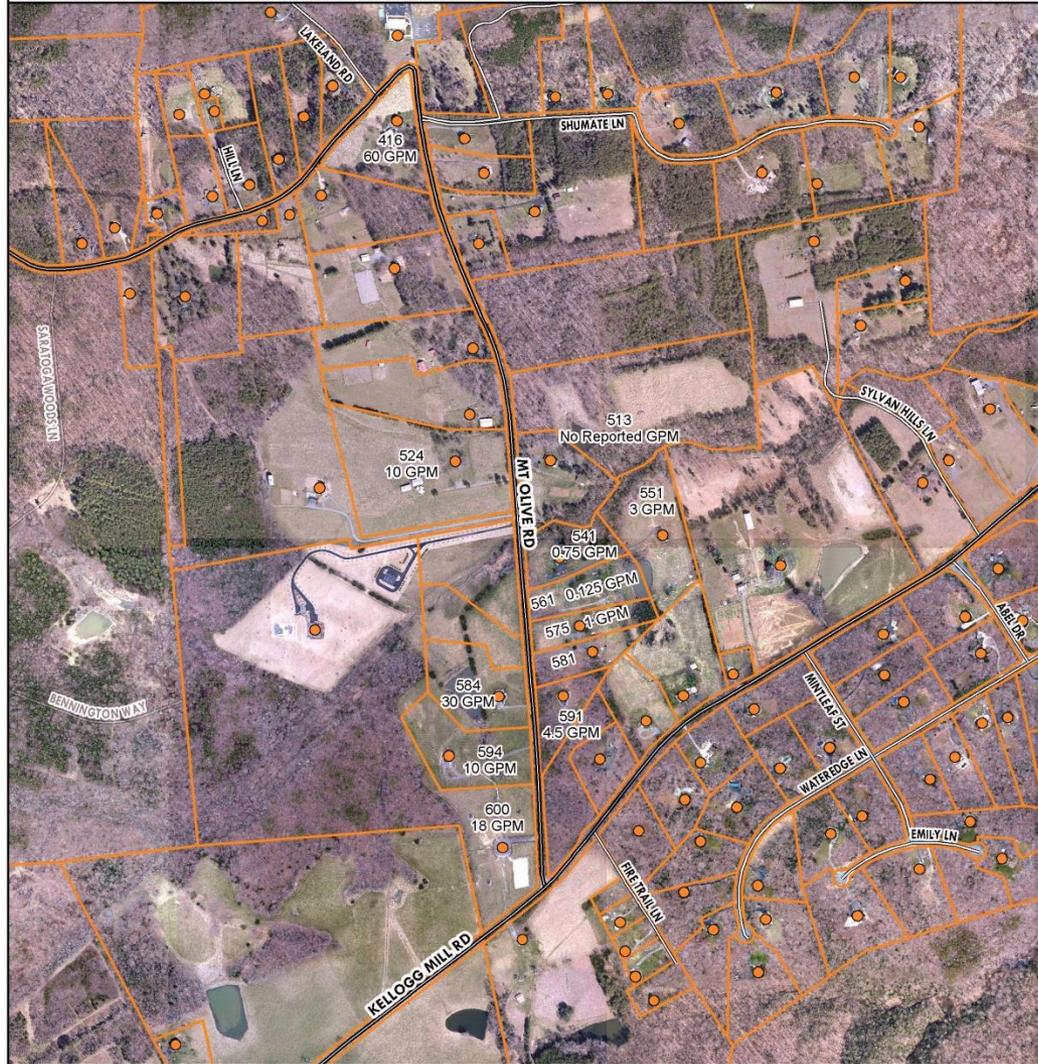
- Total groundwater supply of > 40 mgd (estimated 6 mgd in Piedmont)
- Estimated 5,652 Piedmont wells in 2016
- At 220 gallons/dwelling/day = 1.24 mgd
- Does not seem to be an immediate supply problem
- But, there are localized areas of low water supply



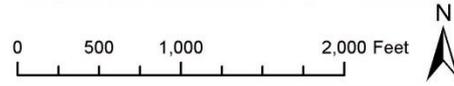


Mt. Olive Road Area Well Data

Produced by the Stafford County GIS Office
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Coordinate System: NAD 1983 HARN StatePlane Virginia North FIPS 4501 Feet
Produced: 9/27/2016
MXD Path: \\srv16\gisdata\users\gis\Brad\Planning\Wells\Piedmont\MtOliveRd.mxd
Data layers are compiled from various sources and are not to be construed or used as a "legal description." Data layers are believed to be accurate, but accuracy is not guaranteed.



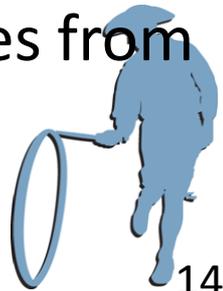
Monitoring Wells

- Groundwater in the Piedmont aquifer is transmitted through fractures, which are highly variable
- Horizontal movement is limited, with vertical fractures being the predominant flow pattern
- A test well may not show influence on a well 50' away, but influence a well 500' from it
- Shallow (bored) wells may exhibit characteristics of monitoring wells in the immediate vicinity of high withdrawal deep wells
- Monitoring wells are common in Coastal Plain aquifers to assess the “cone of influence” from large withdrawal wells



Saltwater Intrusion

- Saltwater intrusion is a concern for Coastal Plain aquifers in the Tidewater area of Virginia due to the porosity of the aquifer
- Monitoring wells are used to assess the extent of the intrusion, and withdrawals rates are often adjusted to counter this
- Wells in the Piedmont often have dissolved salts (iron or magnesium, calcium, sodium) which originates from chemical reaction as the water migrates from upper to lower elevations
- The chemical reaction is not affected by withdrawal rates from the aquifer



Regulatory Responsibilities

- Well permitting for individual residential wells in Virginia is the responsibility of the Virginia Department of Health (VDH)
- Larger withdrawals fall under the purview of VaDEQ
- Stafford will not issue a building permit until we have a record from VDH that a well permit has been applied for
- Stafford will not issue an occupancy permit until a well has been drilled, tested for quantity and quality, and approved by VDH
- VDH private well requirements (12VAC5-630) Adopted 2012
 - Chemical constituents within limits or treatment system installed
 - Free of bacteriological contamination
 - Well output < 3 gpm; produce and store 150 gallons per bedroom per day and deliver 5 gpm of sustained flow per connection
 - Well output \geq 3 gpm; no additional storage required
- Stafford has not been granted the authority by the state to require well quantity tests prior to issuing a building permit



Groundwater Study Update

- The Board could initiate a new groundwater study, although no funding is budgeted
- The previous studies were County-wide and don't provide sufficient information to address localized low yield conditions
- Staff could obtain a proposal for a new study, although we haven't seen a wide spread problem with groundwater well production in the County
- The 2004 study was done for \$126k, but was a county-wide study



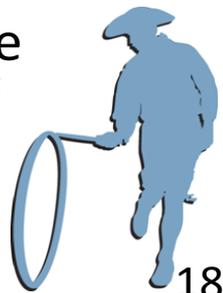
Cluster Development

- Cluster development is mandated for Stafford County by state code
- County cluster provisions allow for placing houses on a minimum lot size of 1.5 acres with 50% of the tract area being in open space; half of the 3 acre minimum lot size allowed in the agricultural (A-1) district for conventional subdivisions
- Total lot yield is calculated using the 3 acre minimum lot size, with no bonus density for cluster development
- There is no increase in total lot count due to clustering
- Cluster development results in fewer roads, more pervious area, and theoretically better infiltration of groundwater



Water Extensions

- Board Resolution R04-217 adopted the Water and Sewer Line Extension Policy
- Policy allows the extension of public water and sewer to areas such as Mr. Olive Road
- This would be classified as a Large Scale Project, serving existing, occupied properties and estimated cost more than \$500,000
- This area is outside the service area about 4 miles from the nearest public water supply
- Extension of services would require a Comprehensive Plan Amendment to the Urban Services Area
- Requires a review by the Planning Commission for Comprehensive Land Use Compliance
- Large Scale Projects must comply with guidelines for adequate water quality and are expected to have the support of 50% of the households within the project area



Extension Policy Process

- Large Scale Project Application Process:
 - Nominations for projects are due by December 31st each year
 - February/March - Preliminary Technical Review and Cost Estimate are prepared by staff and reviewed by the Utilities Commission; Utilities Commission recommends Large Scale Projects for further evaluation
 - April-August - Department of Utilities conducts survey of the property owners in the area to determine the level of interest. Planning Commission conducts Comprehensive Land Use Plan Compliance Review
 - September/October - Utilities Commission considers Large Scale Projects which were nominated, conducts a Public Hearing and makes a recommendation to the Board by November 30th
 - All Large Scale Projects are submitted to the Board for review and approval prior to initiation, design and construction. This includes approval of the expansion of the utility service area
 - The maximum annual expenditure for Large Scale Projects shall not exceed \$2.5M



Questions?



Area Road Projects Update

- Rt. 17 Reconstruction and Widening
 - Substantially complete
 - All travel lanes and turn lanes are now open between McLane Drive and Stafford Lakes Parkway
 - Three through lanes in each direction between Interstate 95 and Stafford Lakes Parkway
 - Final contract fixed completion date of December 2016
- I-95 HOT Lanes Southern Terminus
 - Project awarded to Branch Highways under a design build contract
 - Clearing and grubbing activities are being conducted
 - Southbound ramp to be completed late 2017/early 2018
 - Northbound ramp to be completed summer 2018



Area Road Projects Update

- **Courthouse Road/Exit 140 Interchange on I-95**
 - New design concept for interchange; diverging diamond (DDI)
 - Design-build project; Procurement underway for Engineer/Contractor
 - VDOT to issue Notice of Intent to Award in September 2016
 - Commonwealth Transportation Board (CTB) approval in October 2016
 - Right-of-way acquisition and utility relocation well underway
- **Courthouse Road Widening Project**
 - Project to be included with the interchange project; west from Cedar Lane to Winding Creek Road
 - Widen to 4 lanes; Project completion summer 2020
 - Utility relocations underway for all phases of Courthouse Road widening



Area Road Projects Update

- Enon Road Widening Project
 - Improve intersection at Route 1/Enon Road and widen Enon Road from Route 1 to I-95
 - Improve entrance onto Stafford Indians Lane from Enon Road by lengthening the dedicated left turn lane and adding a right turn lane
 - Engineering Phase started but project postponed due to lack of funding (decline in revenue from the fuels tax)
 - County seeking full funding through a Smart Scale application to the State

