

Infrastructure Committee Meeting AGENDA

May 2, 2017 – 1:30 pm
Conference Room A/B/C, Second Floor

Committee Members: Chairman Meg Bohmke, Jack Cavalier and Paul Milde

Agenda Item	
1.	Transportation <ul style="list-style-type: none">a. Update on the I-95/Courthouse Road Widening Projectb. Route 1 & Telegraph Road Intersection LAP authorizationc. Mt. View/Stefaniga update discussion on funding optionsd. Courthouse Road/Route 1 Intersection Project Update
2.	Utilities Issues <ul style="list-style-type: none">a. Discuss Consent Orderb. CIP project updatec. Disposition of property left vacant by removal of Berea Water Tank
3.	Discuss Results of RFP for a Well Water Study
4.	VDOT Negotiations Related to Courthouse Road Widening
	Next IC meeting is scheduled for June 6, 2017

INFRA0502017agenda





Exit 140 Diverging Diamond Interchange *and* Route 630 (Courthouse Road) Widening Stafford County

May 2, 2017

Sean Nelson, P.E., VDOT Fredericksburg Residency Administrator

Randy McKinney, P.E., VDOT Area Construction Engineer

Project Fast Facts

Cost:

\$149.4 million (interchange)

\$35.9 million (widening)

Design-Build Contractor:

Shirley Contracting Company, LLC

Dewberry Consultants, LLC

Work zone:

Route 1 to

Ramoth Church Road



**Project start:
June 2017**

**Project
completion:
July 2020**

Project Leadership

Randy McKinney, P.E., VDOT Area Construction Engineer

Steve Kuntz, P.E., Associate Vice President, Dewberry Consultants, LLC

Chuck Smith, Vice President, Shirley Contracting Company, LLC



Project Background

- Growing traffic demand in Courthouse Road corridor
- Need to modernize interchange
- Opportunity to accomplish county widening project using revenue-sharing funds and interchange work simultaneously
- Diverging Diamond Interchange concept reduced right-of-way footprint and stayed within project budget
- Design-build project accelerates schedule

Traffic Counts in 2017

I-95 at Exit 140:

134,000 vehicles a day

Courthouse Road from Rt. 1 to I-95:

17,000 vehicles a day

Rt. 1 traffic:

14,000 vehicles a day

Courthouse Road from I-95 to Shelton Shop Road:

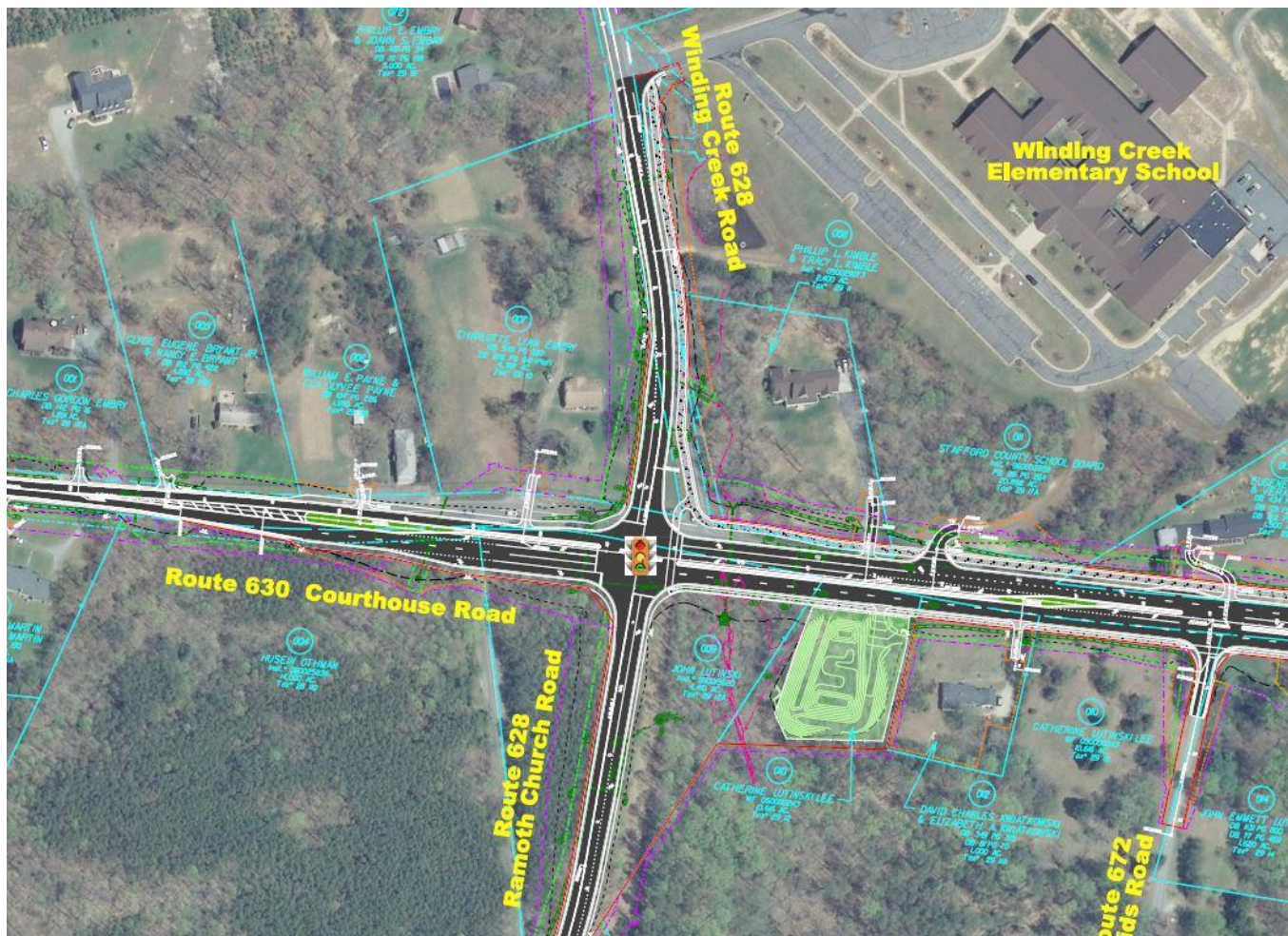
10,000 vehicles a day



Project Highlights

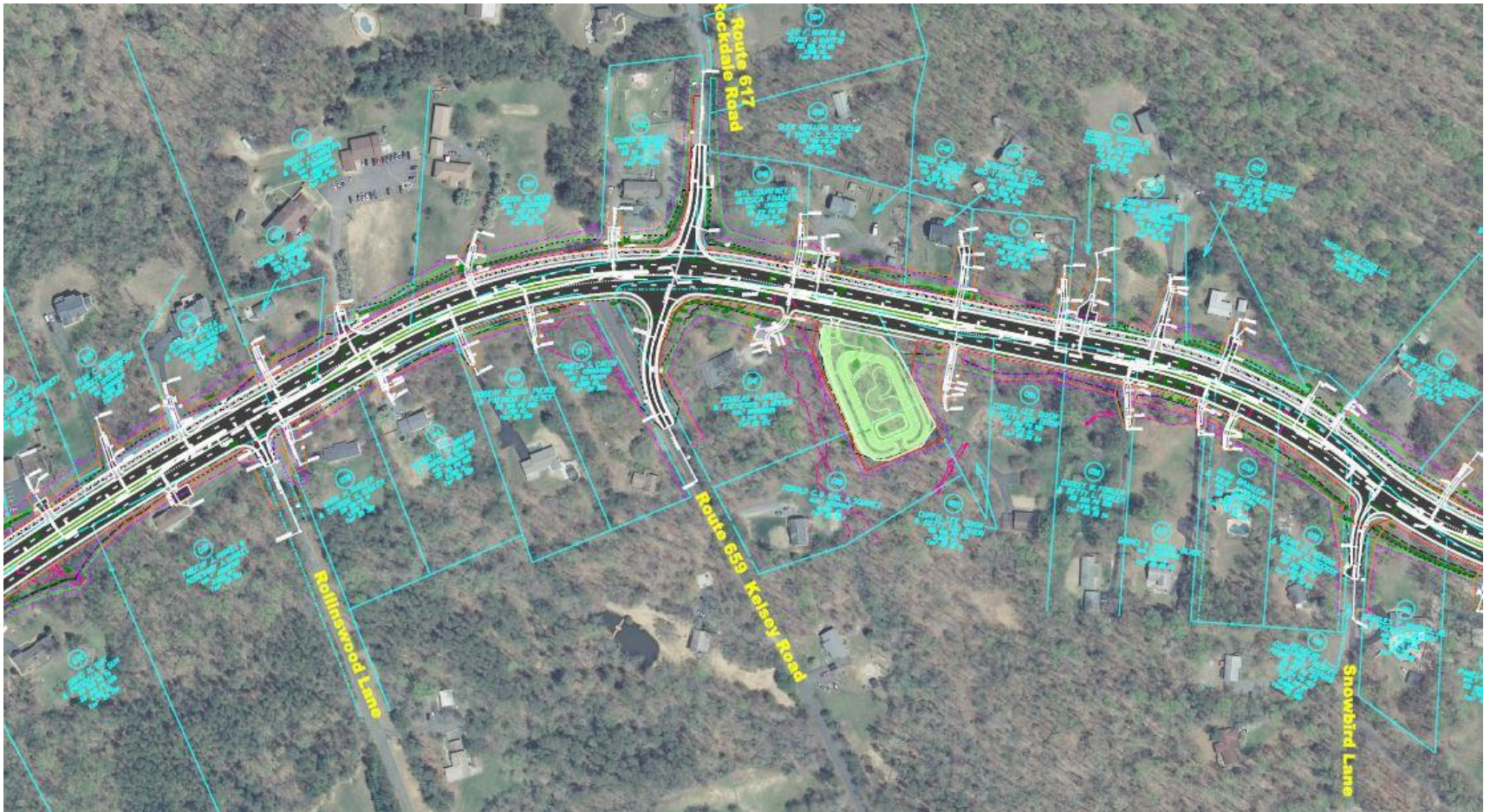
- **Interstate 95 at Exit 140 (Courthouse Road)**
 - Diverging Diamond Interchange design
 - Moves Courthouse Road and Route 1 intersection south to Hospital Center Boulevard
 - Wider Courthouse Road with more vehicle capacity
 - Commuter lot moves east of I-95
- **Courthouse Road Widening**
 - Widens road to 4 lanes from Cedar Lane to Ramoth Church Road and Winding Creek Road
 - New traffic signals at:
 - Ramoth Church and Winding Creek roads
 - Colonial Forge High School and Liberty Knolls entrance

Courthouse Road Widening: Ramoth Church Road and Winding Creek Road

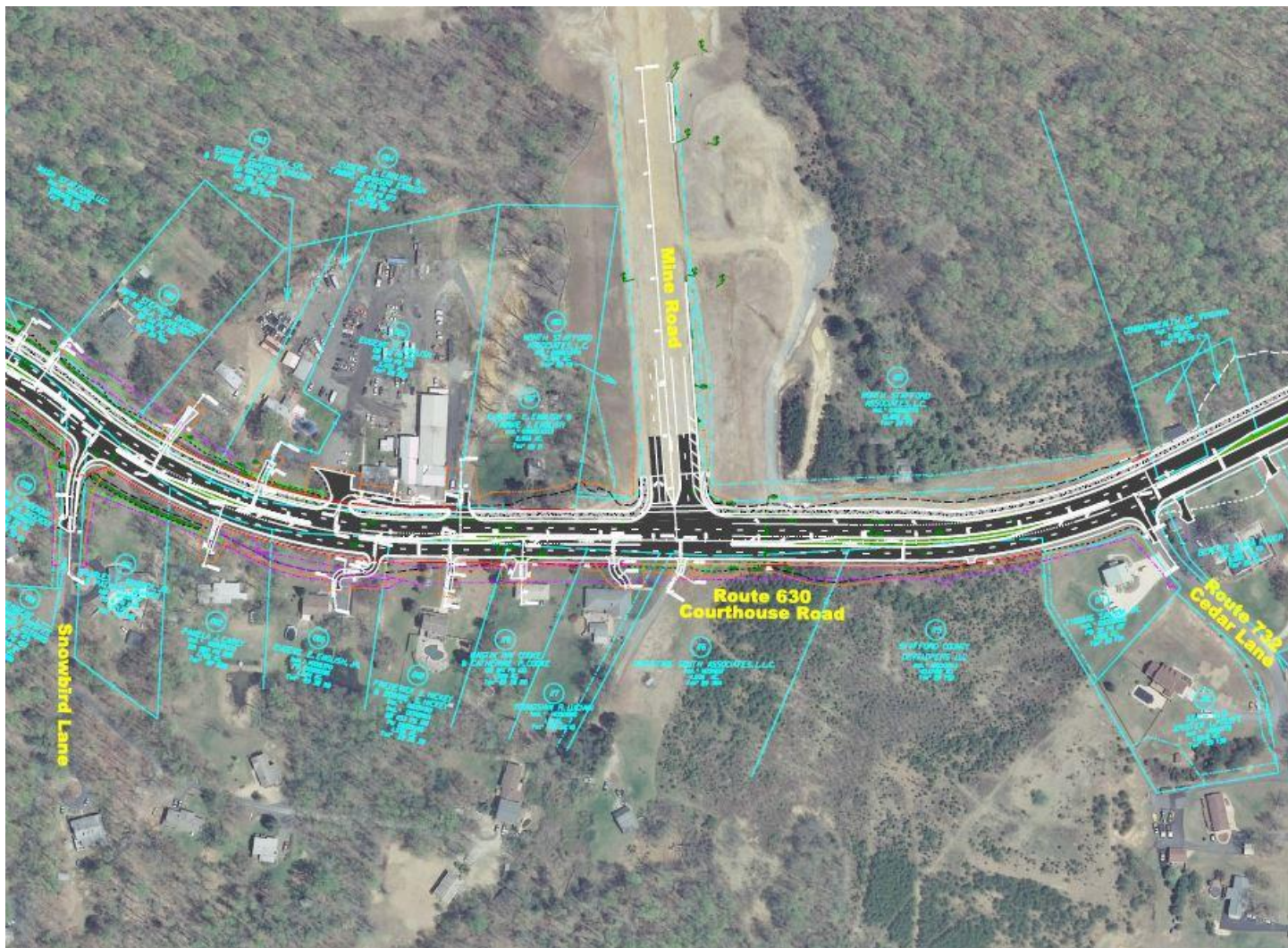




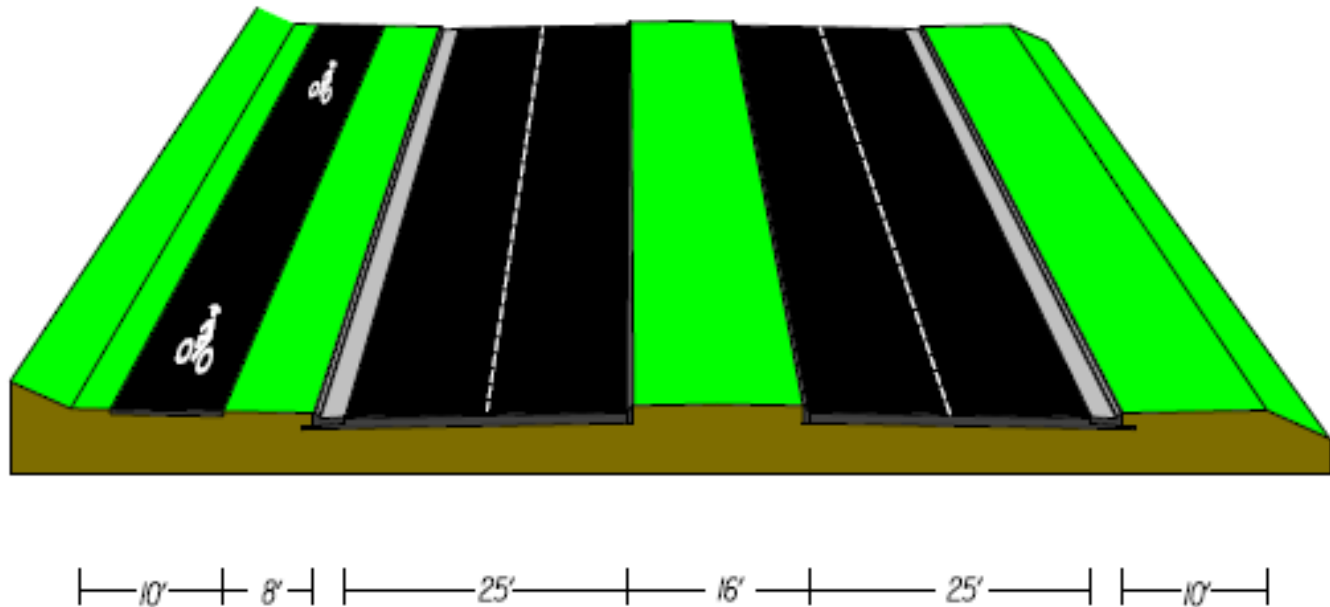
Rockdale Road and Kelsey Road



Mine Road, Embrey Mill Entrance



Typical Section: Courthouse Road after Widening



- Median may be grass or concrete
- 5 foot sidewalk to be built south of Courthouse Road near Colonial Forge High School

Exit 140

Diverging Diamond Interchange

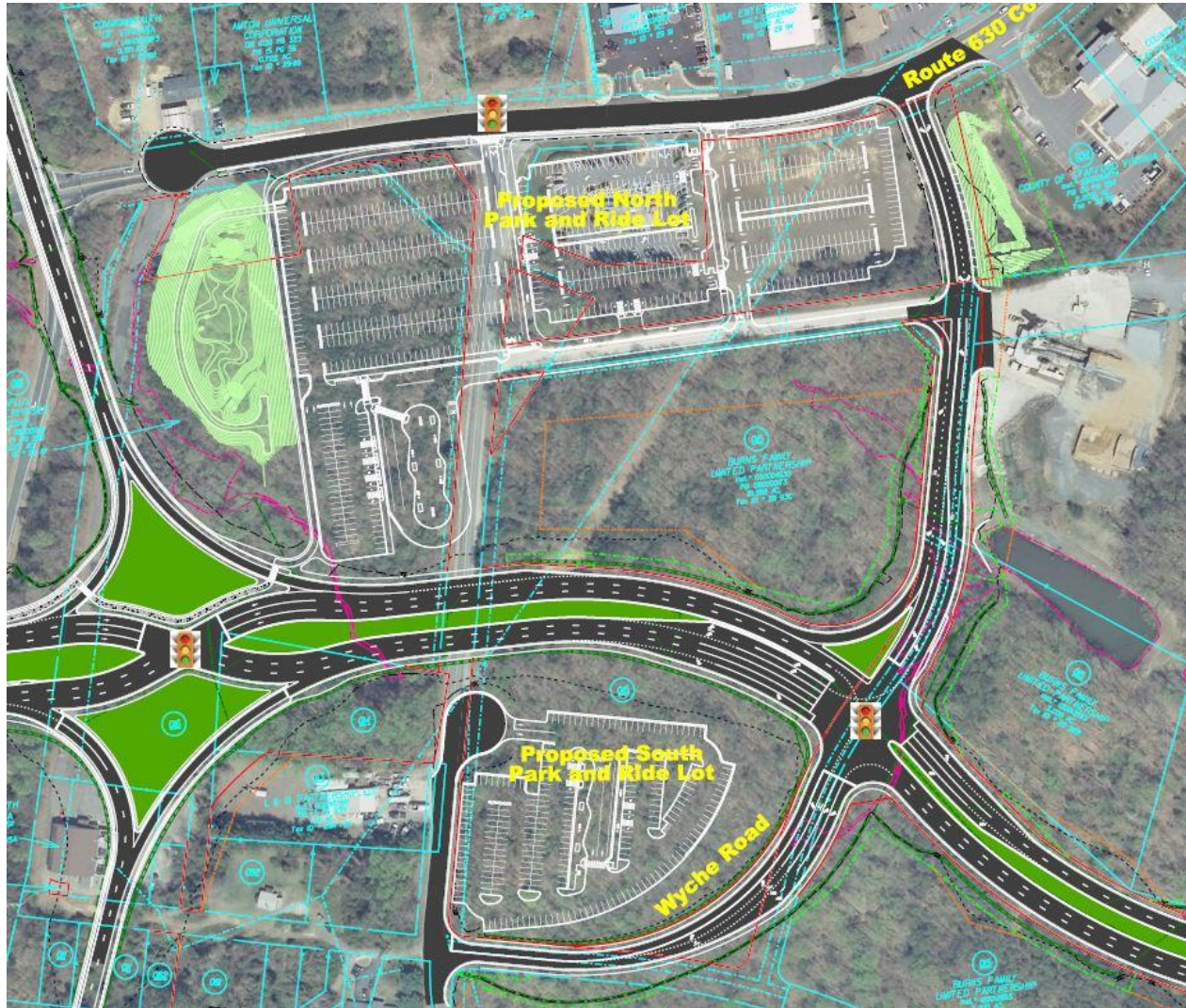


Park & Ride Lot

- No change for commuters until summer 2018
- Current lot with 545 spaces remains open through summer 2018
- At least 545 spaces will open in new lot location east of I-95
- Minor traffic shifts in lot as construction completes



Park & Ride Lots



Overall Project Schedule

Milestone	Date
“Pardon Our Dust” Public Meeting	May 17, 2017
Courthouse Road widening begins	June 2017
Temporary traffic signal, pedestrian crossing activated at Colonial Forge H.S.	August 2017
Interchange and Park & Ride lot construction begins	Fall 2017 – Early 2018
All work complete	July 31, 2020

Project Communications

- ***“No Surprises”*** philosophy
- **Communications plan includes:**
 - **Community meetings at every stage**
 - **Message boards**
 - **Paid advertising**
 - **Print, radio and theater at key project milestones**
 - **Email newsletters**
 - **Social media**
 - **One-on-one customer service**



Project Communications

Key audiences

- Emergency responders
- Stafford County Public Schools
- Residents
- Businesses
- Student drivers and driver's education teachers
- Schools in the corridor – Colonial Forge High School, Rodney Thompson Middle School and Winding Creek Elementary
- Government Center and Public Safety Center employees
- I-95 travelers and county visitors

VDOT Communications Team

Kelly Hannon

VDOT Communications Manager

(540) 374-3344 office

(540) 656-0321 cell

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Darragh Frye

VDOT Communications Coordinator

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Tina Bundy

VDOT Communications Coordinator

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Tina.Bundy@VDOT.Virginia.Gov



Questions?



BOARD OF SUPERVISORS

Agenda Item

Meeting Date:	May 2, 2017
Title:	Authorize the County Administrator to Budget and Appropriate Funds for Intersection Improvements in the Vicinity of Route 1 And Telegraph Road, and Request the Virginia Department of Transportation for Authority to Locally Administer this Project
Department:	County Administration
Staff Contact:	Keith Dayton, Project Manager
Board Committee/ Other BACC:	Infrastructure Committee
Staff Recommendation:	Approval
Fiscal Impact:	None at this time
Time Sensitivity:	N/A

ATTACHMENTS:

1.	Background Report	3.	Intersection Improvement Concepts
2.	Proposed Resolution R17-126		

<input checked="" type="checkbox"/>	Consent Agenda	<input type="checkbox"/>	Other Business	<input type="checkbox"/>	Unfinished Business
<input type="checkbox"/>	Discussion	<input type="checkbox"/>	Presentation	<input type="checkbox"/>	Work Session
<input type="checkbox"/>	New Business	<input type="checkbox"/>	Public Hearing	<input type="checkbox"/>	Add-On

REVIEW:

<input checked="" type="checkbox"/>	County Administrator	
<input checked="" type="checkbox"/>	County Attorney <i>(legal review only)</i>	
<input checked="" type="checkbox"/>	Finance and Budget	

DISTRICT:	Griffis-Widewater
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BACKGROUND REPORT

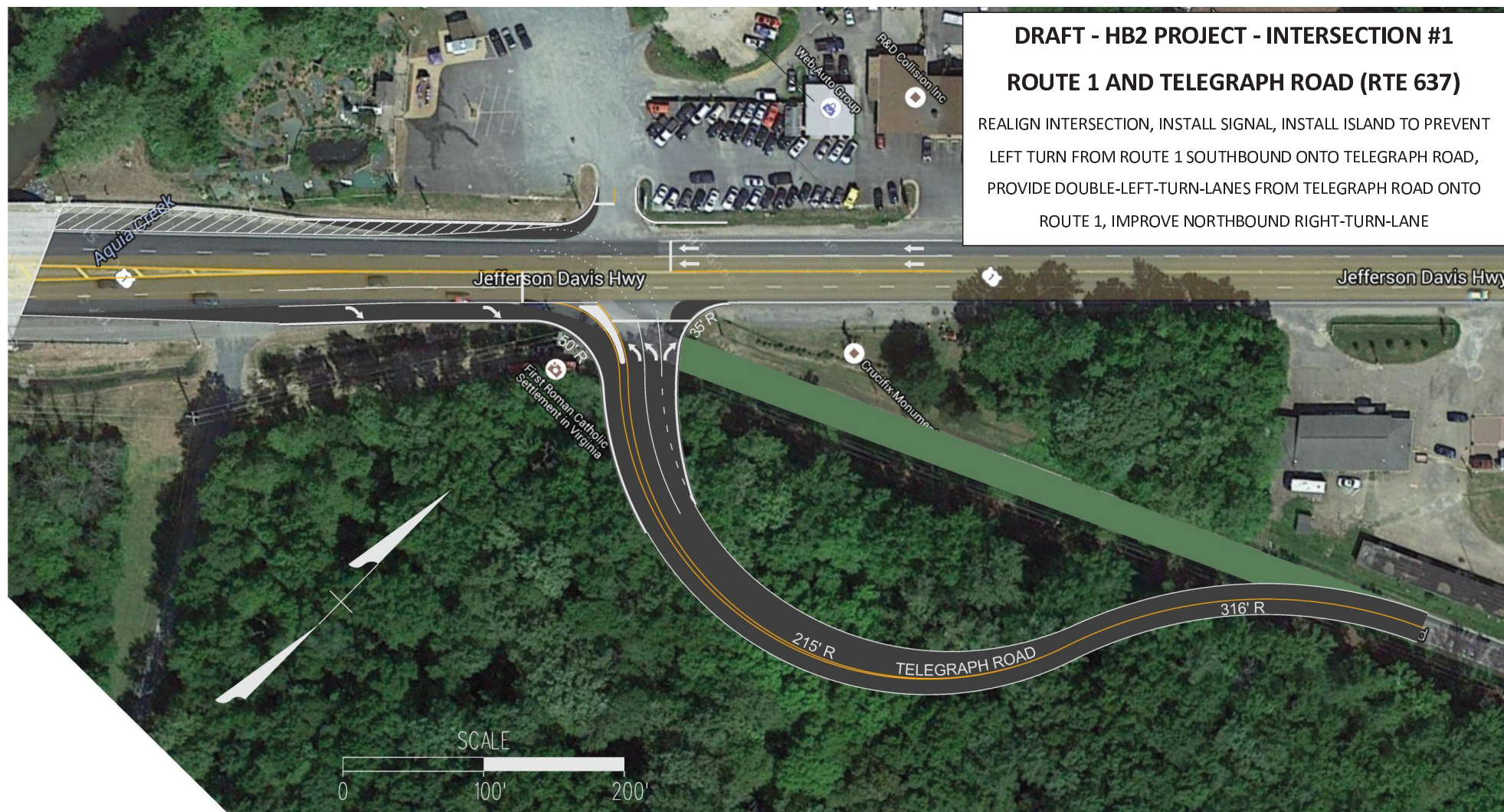
The Board authorized staff to submit a project for House Bill 2 (SmartScale) funds to complete safety improvements to Route 1 in the area near Telegraph Road and Woodstock Lane (Project). The Project was approved for District grant funds, with the initial \$1,874,000 in state funding available in FY2017.

The County committed to providing \$1,275,000 of the estimated total cost of \$8,880,000 from remaining Widewater Area Transportation Impact Fees. The improvements funded by the successful SmartScale application, shown conceptually on pages 1 and 2 of Attachment 3, would benefit the entire Widewater community by providing a signalized intersection in an area heavily used by residents when exiting the Widewater area. Board action is necessary to budget and appropriate these funds for the Project.

Staff, in conjunction with the Virginia Department of Transportation (VDOT), is studying various alternatives in this area that may offer equivalent improvements in a more cost effective manner. One approach, shown on page 3 of Attachment 3, would construct a new signalized intersection for the Project. A local developer has committed to donating much of the necessary right-of-way, if this option is selected. Once an operational analysis of this option is complete, an approach would be selected and design of the selected approach would commence.

To administer the Project, the Board must request that VDOT allow the County to administer the Project under its Locally Administered Projects program.

Staff recommends approval of Resolution R17-126, which authorizes the County Administrator to budget and appropriate \$1,107,953 in remaining Widewater Transportation Impact Fee funds, and to request that VDOT allow the County to locally administer the Project.





DRAFT - HB2 PROJECT - INTERSECTION #2

ROUTE 1 AND WOODSTOCK LANE (RTE 639)

REALIGN INTERSECTION, INSTALL SOUTHBOUND LEFT-TURN-LANE
INSTALL MEDIAN (SLOTTED-LEFT) TO PREVENT LEFTS-OUT FROM
CONNECTING ROADWAYS, IMPROVE NORTHBOUND RIGHT-TURN-LANE,
GUINNS LANE CONNECTION/ENTRANCE (RI/RO) TO BE DETERMINED

NOTE: FUTURE SIGNAL OPTIONAL

SILVER

C O M P A N I E S

1201 Central Park Blvd.
Fredericksburg, Virginia 22401
540 786 1405 • FAX 540 786 1406

RIGHT-IN
RIGHT-OUT
INTERSECTION

PROPOSED
TRAFFIC SIGNAL

DIRECTIONAL
LEFT TURN LANE

ROUTE 1 (45 MPH)

PARCEL 21-160
6.14 AC

ON-SITE
R/W DEDICATION
0.76 AC

WOODSTOCK LANE (30 MPH)

TELEGRAPH ROAD (35 MPH)

PHASE 3
TELEGRAPH ROAD
DEVELOPMENT
STAFFORD COUNTY, VA
01-21-16



**Fairbanks &
Franklin**

CIVIL ENGINEERING ♦ LAND PLANNING
1005 Mahone Street ♦ Fredericksburg, VA 22401 ♦ (540) 899-3700

0 100 200
SCALE IN FEET

PROPOSED

BOARD OF SUPERVISORS
COUNTY OF STAFFORD
STAFFORD, VIRGINIA

RESOLUTION

At a regular meeting of the Stafford County Board of Supervisors (the Board) held in the Board Chambers, George L. Gordon, Jr., Government Center, Stafford, Virginia, on the 2nd day of May, 2017:

MEMBERS:

Paul V. Milde, III, Chairman
Meg Bohmke, Vice Chairman
Jack R. Cavalier
Wendy E. Maurer
Laura A. Sellers
Gary F. Snellings
Robert "Bob" Thomas, Jr.

VOTE:

On motion of , seconded by , which carried by a vote of , the following was adopted:

A RESOLUTION AUTHORIZING THE COUNTY ADMINISTRATOR TO BUDGET AND APPROPRIATE FUNDS FOR SAFETY IMPROVEMENTS ON ROUTE 1 IN THE VICINITY OF TELEGRAPH ROAD AND WOODSTOCK LANE, AND TO REQUEST VIRGINIA DEPARTMENT OF TRANSPORTATION TO GIVE AUTHORITY TO THE COUNTY TO LOCALLY ADMINISTER THIS PROJECT

WHEREAS, the Board authorized staff to submit an application for state funding to complete safety improvements on Route 1 in the vicinity of Telegraph Road and Woodstock Lane (Project); and

WHEREAS, the Board committed up to \$1,275,000 in local funding towards this Project, using the remaining funds (\$1,107,953) provided from Widewater Area Transportation Impact Fees; and

WHEREAS, the Board desires that the Project be locally administered;

NOW, THEREFORE, BE IT RESOLVED by the Stafford County Board of Supervisors on this the 2nd day of May, 2017, that the County Administrator be and he hereby is authorized to budget and appropriate One Million One Hundred Seven Thousand, Nine Hundred Fifty-three Dollars (\$1,107,953) from Widewater Transportation Impact Fee Fund to the Transportation Fund for the design and

construction of safety improvements on Route 1 in the vicinity of Telegraph Road and Woodstock Lane (Project); and

BE IT FURTHER RESOLVED that the Virginia Department of Transportation is requested to allow Stafford County to administer the Project as a locally administered project; and

BE IT STILL FURTHER RESOLVED the County Administrator is authorized to transmit this Resolution to the appropriate VDOT officials to effectuate this request, and to sign all documents that he deems necessary to effectuate this Resolution.

TCF:KD

Stefaniga and Mountain View Road Intersection
Infrastructure Committee
May 2, 2017

Background

- The intersection has poor sight distance and poor vertical alignment
- Morning wait times average about 6.5 minutes to turn from Stefaniga onto Mountain View
- VDOT studied the intersection and provided recommendations to help the situation

Possible Remedies

- Clear Vegetation At The Intersection
 - VDOT has committed to this maintenance item
 - Minimal cost
- Install All-way Stop Controls
 - VDOT does not recommend this option
 - Minimal cost
- Modify The Grade Of Stefaniga To Flatten Out The Approach
 - VDOT recommends this interim solution
 - Cost: \$600,000
- Construct a New Intersection to Align with Lightfoot Drive
 - VDOT recommends a roundabout for the intersection
 - Cost: \$3.4 million (without roundabout)
 - Would require at least one total take of property

Funding Options

- Smart Scale Program
 - This project could be added to the FY2020 round of smart scale applications
 - It may not score well as many of the primary scoring priorities do not fit this location
- SSYP Program (for short term grading option)
 - This project could be added to next years proposed SSYP
 - Currently allocations have been proposed for the six year period; however, the Board has the option to realign some projects such as unpaved roads
 - The earliest any funding would be available would be FY20 and FY21 to fully fund this improvement (Previous funding assigned to Courthouse Road and Poplar Road)
- General Fund (for either project option)
 - The Board could allocate monies from the general fund
 - There may be enough money from PRO after this fiscal year for the short term grading option.

Route 1 and Courthouse Road Intersection Improvement Project

The Route 1 and Courthouse Road Intersection Improvement Project will improve the flow of traffic along Route 1 by widening Route 1 to provide dedicated left-turn lanes at the intersection with Courthouse Road (Rt. 630) and the intersection with Bells Hill Road (Rt. 631) and Hope Road (Rt. 687).

Description of Work

- In addition to dedicated left turn lanes on Route 1, eastbound Courthouse Road (near the Courthouse) will be widened to provide dedicated left, thru, and right-turn lanes.
- Existing lanes on westbound Courthouse Road (across from the Courthouse) will be re-striped to provide dedicated left, thru, and right-turn lanes.
- A 4-ft wide concrete median will run down the center of Route 1 to separate northbound and southbound traffic and limit turning movements to the Courthouse Road and Bells Hill/Hope Road intersection.
- An 8-ft wide sidewalk will be installed along to roadway along with crosswalks and dedicated pedestrian signals to facilitate pedestrian movements at the intersections.
- A Public Hearing was held in June 2016 in which approximately 24 citizens attended.
- On track to begin the Right-of-Way Acquisition process this summer, in advance of the current project schedule.
- Due to recent property purchases by a developer, the acquisition and relocation of existing business has been reduced. Currently anticipate the total acquisition of 2 parcels (7-Eleven & Law Office of Robert Hyman) and relocation of businesses on approximately 3 parcels (Aquia Medical Center, Portion of Troy Farms LLC, & JPI Fountain Park).

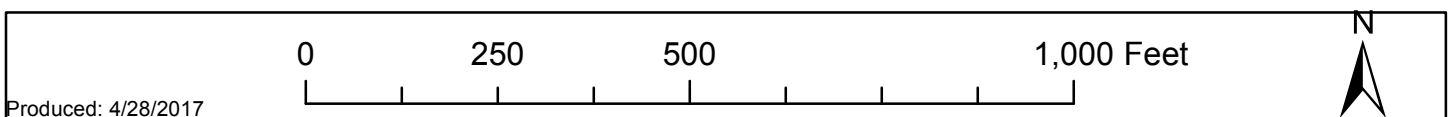
Schedule

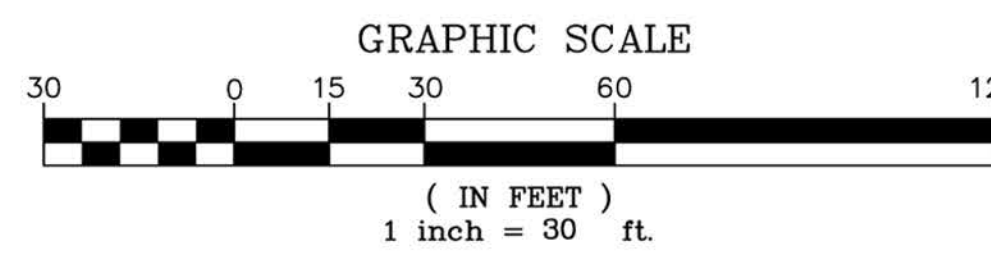
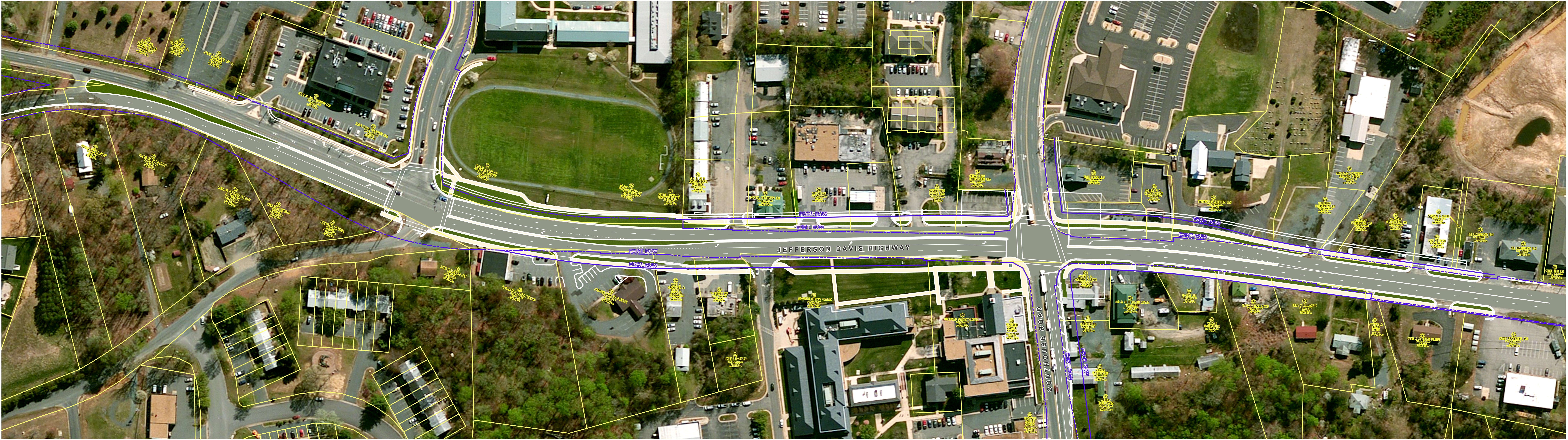
- Right-of-Way Acquisition – Beginning next month expected to be complete Mid-summer 2018
- Utility relocation - to begin in Fall 2018 thru Fall 2019.
- Advertise for Construction - Winter 2019
- Construction beginning – Spring 2020 thru Summer 2022 (majority of roadwork at night to minimize disruptions to traffic).

Cost

- Total Estimated Cost of the Project is \$13.8 million dollars.
- If additional funds are needed for sidewalks, the County could submit a Transportation Alternative Program Grant application to supplement road project funding.

Route 1 and Courthouse Road Potential Total Takes and Relocations



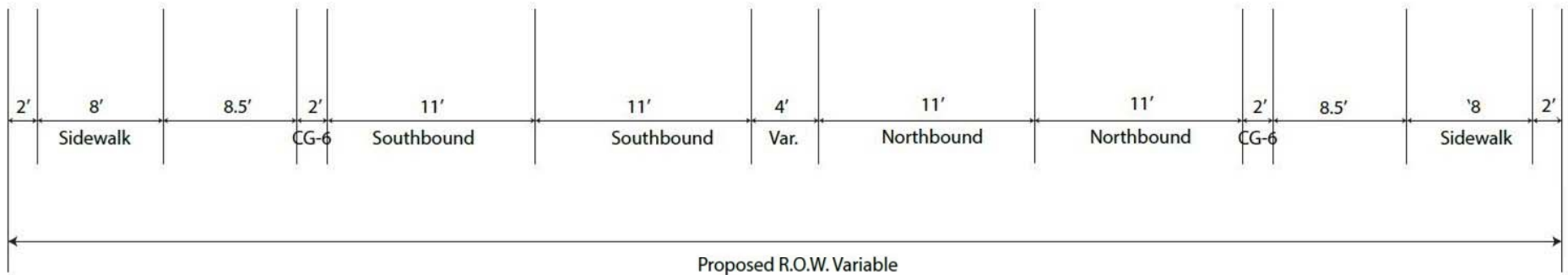
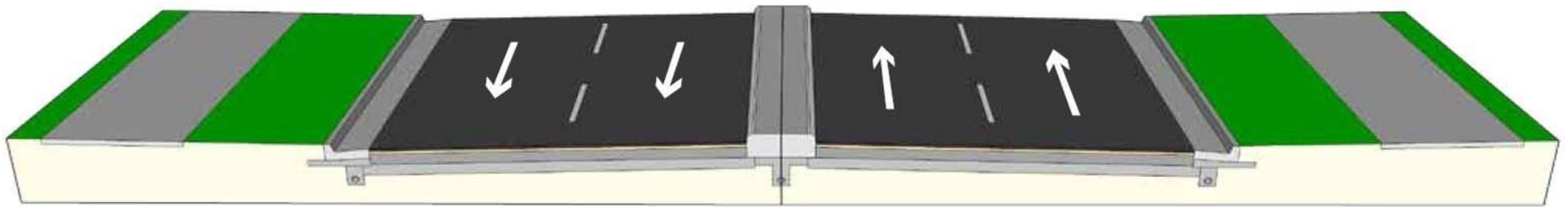


COURTHOUSE AREA ROAD IMPROVEMENTS

STAFFORD, VIRGINIA

AERIAL EXHIBIT

AUGUST 3, 2015



Current Situation

- The Department of Utilities received a proposed Consent Order (CO) from DEQ on February 21, 2017.
- The CO process is used by DEQ to achieve compliance with Notices of Violations (NOV).
- The NOVs cited are for overflows at the Claiborne Pump Station in July and September of 2016 and the Austin Run Sewer Shed due to excessive rainfall and the spill caused by the break in the Falls Run Force Main
- The proposed CO requests a civil penalty of \$39,520.00 and for the County to Submit a schedule for improvements to the Claiborne Run Force Main.

Proposed End State

- Staff has addressed the failures of the Falls Run Force Main and continues to work with DEQ to finalize the requirements of the CO.
- In lieu of paying the fine to DEQ the majority of the funds can be donated to a Secondary Environmental Project (SEP) in Stafford County. Staff proposes to donate the funds to either Tri-County Soil and Water or to Crows Nest.
- Staff has requested a 30% reduction of the penalty, making the new amount \$27,664. Of this amount \$24,897.60 would be provided to the SEP, and \$2,766.40 to the civil penalty.
- The improvements to the Claiborne Run Parallel Force Main will increase the capacity of the station and are already included in the 2018 CIP.

Request for the CEDC Committee/Board of Supervisors

- Request the Committee recommend approval of the CO with the described SEP
- Approval of the Final CO will require Board Approval.

Benefits to the County

- Assistance to either Tri-County and/or Crows Nest
- Minimal impact to Capital Improvement Plan

Utilities Capital Projects Update

PROJECT	Courthouse Area Elevated Water Tank
Description	Construction of a 1 million gallon elevated water tank on Potomac Church Road near Stafford Hospital Center. This replaces the existing .25MG tank and allows for growth in the Courthouse Area
Project Budget	\$3.8M
Completion Status	Completion date is June 2018
Recent Activity	Clearing is complete. Foundation construction to begin May 1, 2017.



Mass grading and foundation preparation

Utilities Capital Projects Update

PROJECT	Airport Business Sewer Extension
Description	Construct 4,000 feet of sewer line to connect the Centerport area to the existing system. This will allow development of the Centerport area.
Project Budget	\$1.03 M
Completion Status	September 2017
Recent Activity	Clearing is complete, pipework to begin week of April 24, 2017.



Cleared Alignment

Utilities Capital Projects Update

PROJECT	Route 1 North Sewer Line
Description	Approximately 4,400 feet of 18-inch gravity sewer along and parallel to Route 1 will replace deteriorated gravity sewer This will provide additional wastewater capacity for the northern part of the county.
Project Budget	\$4.15M
Completion Status	September 2017
Recent Activity	Night work has begun and a bypass pumping system is in place. Both microtunnel bores are complete.



Tunnel Boring Machine

Utilities Capital Projects Update

PROJECT	Falls Run Interceptor (1-95 Crossing)
Description	Approximately 700 linear feet of 36-inch HDPE gravity sewer pipe and associated manholes through a 48" steel casing.
Project Budget	\$1.5M
Completion Status	August 2017
Recent Activity	Contractor has completed approximately 100' of the 680' bore.



Tunnel Boring Machine slurry collection

Utilities Capital Projects Update

PROJECT	Claiborne Run Parallel Force Main
Description	Construction of approximately 36,000 linear feet of 24" force main from the Claiborne Run Pump Station to the Little Falls Run Wastewater Treatment Facility.
Project Budget	\$6.2M
Completion Status	Projected Completion Date - June 2019
Recent Activity	Preliminary Engineering has begun.
PROJECT	Courthouse Road Waterline Upgrade
Description	Replacement of an 8" water line with a 12" water line from US 1 to the project limits of the new Rte. 630 Interchange Project. VDOT Contractor to complete portions within Rte. 630 Interchange. Project provides hydraulic capacity, along with Courthouse Water Storage Tank, for new Animal Shelter.
Project Budget	\$200,000
Completion Status	Advertise for construction February 2017
Recent Activity	Expect plan approval first half of February.
PROJECT	Route 630 Interchange Betterments (VDOT)
Description	Replacement of an 8" water line with a 12" waterline within the project limits of the new Rte. 630 Interchange Project.
Project Budget	\$100,000
Completion Status	By end of 2017
Recent Activity	Negotiating with VDOT contractor regarding costs and schedule.

Utilities Capital Projects Update

PROJECT	Centreport Sewer Extension Project
Description	Construct 2,000 feet of sewer line to connect the Centreport area to the existing system. This will allow development of the Centreport area.
Project Budget	\$1.03M
Completion Status	November 2017
Recent Activity	Notice to Proceed is February 20, 2017.
PROJECT	Claiborne Run Sewer Interceptor Replacement Project
Description	Replace 2,500 feet of the existing Claiborne Run gravity sewer interceptor with a 42" line to accommodate future flows and replace a current line that is at the end of its useful life.
Project Budget	\$2.8M
Completion Status	December 2017
Recent Activity	Project has been advertised with an opening date of February 22, 2017. This opening date was extended due to design changes.
PROJECT	Falls Run Force Main Replacement and Upgrade
Description	Replace 16" Ductile Iron Force Main with 30" PVC Force Main from Falls Run Pump Station in Falmouth Bottom to Claiborne Run Sewer Interceptor at the CVS on Butler Road
Project Budget	\$3.2M
Completion Status	Plan Approval in FY18 with Construction in FY19
Recent Activity	Design of alignment is underway

Utilities Capital Projects Update

Comprehensive Water Overview – Current and FY18

Currently in Design or Construction

Smith Lake Water Treatment Plant Filters

Abel Lake Dam Spillway Improvements

Courthouse Elevated Water Storage Tank

Berea Water Tank Demolition (Complete)

342 Pressure Zone Transmission Pipeline Phase 1

342 Pressure Zone Transmission Pipeline Phase 2 (Complete)

Celebrate Virginia Elevated Water Storage Tank (Complete)

Short Extension Projects

Projects to begin next fiscal year (FY18)

Smith Lake Distribution Pump Station Upgrade

Moncure Booster Pump Station Replacement

Short Extension Projects

Utilities Capital Projects Update

Comprehensive Sewer Overview – Current and FY18

Currently in Design or Construction

- Austin Run Pump Station Rplmt (Complete)
- Falls Run Force Main Repair (Complete)
- Little Falls Run Wastewater Treatment Facility Centrifuge Replacement
- Sweetbriar Force Main Replacement
- Ebenezer Pump Station Replacement
- Oaks at Stafford Pump Station Pump Station Replacement
- Route 1 North Sewer Interceptor - Lower
- Falls Run Force Main Replacement
- Old Concorde to Wayside 18" Sewer Interceptor
- Wayside to Austin Run Pump Station 18" Sewer Interceptor
- Lower Accokeek Pump Station
- Lower Accokeek 18" Gravity
- Lower Accokeek Force Main
- Lower Accokeek 8" Gravity Sewer Trunk SE

Currently in Design or Construction

- Lower Accokeek 8" Extension for Staff Hospital PS
- Lower Accokeek Rowser 10" Gravity Sewer
- Lower Accokeek Wyche Road 12" Gravity Sewer
- Route 1 North Sewer Interceptor - Hidden Valley (Central)
- Aquia Wastewater Treatment Facility Centrifuge Replacement

Projects to begin FY18

- Claiborne Run Pump Station Replacement
- Falls Run Interceptor Phase 2
- Hilldrup Pump Station Replacement
- Hilldrup Force Main Replacement
- Aquia Creek PS Expansion
- Several Small Sewer Extension Projects

Current Situation

- The Department of Utilities recently removed the water tank at the Berea Tank Site (TM 44-104N)
- The site is approximately 0.2296 Acres in size
- The site is land-locked and is surrounded on all sides by the Dominion Virginia Power Facilities
- Dominion Virginia Power has approached the County about what our intention is with the property
- Utilities has no further use for the property

Proposed End State

- Staff recommends negotiating a sale of the property with Dominion Virginia Power if possible

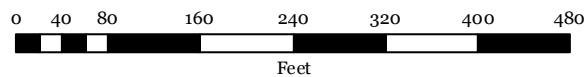
Request for the CEDC Committee/Board of Supervisors

- Code allows for the sale of property through a solo negotiation or through a public auction
- Staff would like to negotiate with Dominion for the sale of this property due to the access issues
- Committee concurrence to proceed with negotiations
- Final sale of the property will require Board Action

Benefits to the County

- Disposal of unneeded property
- Additional revenue for the Utilities Fund

Berea Tank Site



Date: 4/18/2017

Author:



Board of Supervisors

Paul V. Milde, III, Chairman
Meg Bohmke, Vice Chairman
Jack R. Cavalier
Wendy E. Maurer
Laura A. Sellers
Gary F. Snellings
Robert "Bob" Thomas, Jr.

Thomas C. Foley,
County Administrator

Memorandum To: Thomas C. Foley
County Administrator

From: Keith Dayton
Project Manager

Date: April 27, 2017

Subject: **Groundwater Study Request for Proposals**

Staff provided a briefing on current issues related to residential groundwater wells within the Piedmont area of the County west of Interstate 95 at the October 4th and November 1st meeting of the Infrastructure Committee (IC). The IC was advised of recent concerns from residents experiencing inadequate well production and poor well water quality. Information was provided on our previous efforts to investigate groundwater resources, the highly variable nature of the Piedmont aquifer, and the current state of Piedmont aquifer use in the County. The October 4, 2016 memorandum provided for the IC meeting is attached.

Board members attending the November 1st meeting directed staff to solicit proposals from consultants to complete a study of groundwater resources within the Piedmont area of the County. Staff then completed a request for proposals to provide a study of the scope of services attached to this memorandum, and issued the solicitation in February.

We received eight responses to this solicitation. Following review of each proposal by the proposal review committee, three firms with significant experience completing groundwater studies were invited to interview with the committee. The committee conducted interviews with three short-listed firms, and these conversations provided further insight into the problems associated with groundwater use in the Piedmont aquifer and the nature of other studies completed by localities with similar concerns.

After our review of the proposals, followed by the interviews, the committee believes we have an opportunity to complete a report which provides useful information on a broad range of issues related to groundwater use in the County. Key areas which could be addressed by this study include the following:

- Update the sustainable yield for the Piedmont aquifer based on modern analytical methods using precipitation records, aquifer recharge rate, geology and topography
- Assess the current state of our groundwater resources
- Identify localized areas of concern based on geology, topography and population density

- Identify limitations of our groundwater resources for future development
- Describe planning tools in use by other localities to manage groundwater resources
- Create graphics for use by our planning staff, residents, developers, and home builders to identify areas of particular concern relative to groundwater availability
- Update our well database to include wells completed after the 2004 study

After reviewing the cost estimates provided by the three short-listed consultants, the review committee believes this study can be completed for \$75,000. These funds are not included in the current budget, or the FY2018 budget. It may be possible to fund the study with FY2016 carry over funds, should the Board desire to proceed with the study at this time.

KCD:kd

Attachments (as noted)

Groundwater Request for Proposals Scope of Services

Provide professional services for the evaluation of the groundwater resources within the Piedmont Geologic Province including, but not limited to, the following:

1. Review previous studies of Piedmont groundwater resources in Stafford County, or other localities with similar characteristics as appropriate.
2. Provide an overview of the Piedmont Geologic Province in Stafford County, along with a description of the characteristics related to its use as a groundwater supply source.
3. Develop an estimate for the minimum and maximum sustainable water supply capacity for the Piedmont aquifer in Stafford County.
 - a. Describe the process and assumptions necessary to derive this value, along with a level of confidence in the accuracy of the estimate.
 - b. Describe the effects of shallow versus deep wells, and potential for variations of well yield in different areas in the County.
4. Quantify the current use of the Piedmont aquifer for residential and agricultural purposes. Include other demands on the Piedmont aquifer (if applicable).
5. Examine the possibility of using monitoring wells to provide an assessment on the status of the aquifer over time.
6. Discuss methods to improve the success rate for domestic wells using this aquifer.
7. Provide examples of regulatory and land use measures used by other localities in Virginia to assure the availability of domestic well water supplies for existing and new residents.
 - a. Identify the state authorization in place or required for implementation of each identified measure.
 - b. Explain the resources (staffing, funding, etc.) necessary for implementation
 - c. Provide input on the effect/success of these measures.
 - d. Rank these measures for adoption by Stafford County.
8. Provide a report of the results of this study electronically and in fifteen bound copies. The report shall include an Executive Summary.





MEMORANDUM

Department of Planning and Zoning

To: Infrastructure Committee

From: Jeffrey A. Harvey
Director of Planning and Zoning

Date: October 4, 2016

SUBJECT: ***Groundwater Issues***

Background:

Recently the Board has heard concerns from residents in the Mount Olive Road area about the availability of groundwater resources for their private wells. Residents are concerned about well recharge rates and potential impacts of a new subdivision being constructed in the area. Some residents have requested the Board to consider numerous changes to our subdivision ordinance relative to the cluster provisions, timing of well completion, and updating a groundwater study. The Board directed staff to examine this matter and report back to the Infrastructure Committee.

The County has completed three previous studies related to groundwater, as follows: Comprehensive Water Supply Study (1991); Ground Water Supply Study (1994); and most recently, the Groundwater Management Plan (2004). In addition, there are private, more localized investigations of County groundwater resources, although these efforts predate the 2004 County-wide study. Details on the most recent effort follow.

Groundwater Management Plan:

The Groundwater Management Plan (Plan) was adopted as an element of the Comprehensive Plan in 2004. During the years 2001 through 2003, Virginia experienced a sustained drought. In 2004, the Board decided that a groundwater management plan for the county was to be completed. Draper Aden Associates (DAA) was engaged as our consultant for this effort. The objective was to evaluate the characteristics of our groundwater resource, quantify the current and projected use of this resource, and recommend management strategies to protect both quality and quantity of groundwater resource. The DAA used Virginia Department of Health logs from single family wells as its primary data source. Additionally, the DAA incorporated information from USGS studies (R. B. Mixon et. al., 1989) and the County groundwater studies of 1991 and 1994 referenced above, among other resources.

In terms of groundwater quantity for the County, the plan estimates the capacity to be between 31 and 43 million gallons per day (mgd) County-wide. That includes both the Piedmont and Coastal Plain aquifers. While there is no definitive estimate for sustainable groundwater yield for the Piedmont aquifer in Stafford, a very rough estimate included in the Plan indicate that 6 mgd may be a reasonable estimate for this area. Using an estimate of 5,652 homes using wells in the Piedmont area of Stafford, and applying the 220 gallons per dwelling per day calculated for residential water customers within the public utility service area, we estimate approximately 1.24 mgd is presently using this resource.

A projection was also made for peak groundwater usage in 2012 based on a projected county population of 167,300. The peak usage ranged from 4.43 to 7.45 million gallons per day for both agricultural and residential usage. The current population is estimated to be approximately 142,000 which is significantly less than the projected population for the year 2012.

The Plan noted that Stafford County has three distinct geologic zones: Piedmont, Fall (or Coastal Plain Aquifer recharge Zone) and the Coastal Plain system. The Piedmont is generally to the west of I-95, whereas Coastal Zone is to the east of I-95. The recharge zone runs along the fall line and spreads as far as 2,000 feet west and 1 mile east of Fall line as identified in the Figure 8 of the study (attached). In general, the groundwater systems are unique and distinct for the three geological zones.

The Piedmont system is dependent upon fractured bedrock for groundwater recharge and well. Groundwater in the Piedmont area tends to be plentiful where wells intersect the fracture zones (Attachment 2). However, wells that are developed outside of the fracture zones are likely to experience low-yields, especially during dry and excessively dry periods. Shallower bored wells are vulnerable to deep well pumping in the region. Water quality can be highly variable over small geographic areas.

The Coastal Plain system features alternating layers of sands, gravels and clays. Deep wells usually provide generous flows and are less susceptible to variance during periods of droughts. However, deep wells may be affected by other deep wells nearby that draw from the same aquifer. Shallow wells are susceptible to interruptions during times of drought because the surface aquifer is the primary source of recharge for shallow wells. In areas adjacent to estuaries of the Potomac River there may be elevated levels of sodium due to influence of salt water, although that risk is considered minimal. In specific regions, there may be naturally occurring level of iron and fluoride. Saltwater, iron and fluoride concentrations may require treatment before water is potable for human consumption.

The Coastal Plain Aquifer Recharge Zone (Fall Zone) is an area where the Coastal Plain aquifers slope upward to intersect the surface. Shallow wells in the Fall Zone have characteristics similar to those of the Coastal Plain while deep wells have characteristics similar to those in the Piedmont. The Fall Zone is where the majority of recharge for the Coastal Plain takes place. It is also more vulnerable to degradation by surface contamination.

Recent Development:

Since the Groundwater Management Plan was completed in 2004, the County has experienced substantial growth. The County estimates that the overall number of housing units has increased from 38,427 in 2004 to 50,424 in 2015. The majority of those 12,000 homes were built within the County's Urban Services Area (USA) where use the public water supply is required. During that time period, 1,463 lots were authorized to be created outside of the USA (522 Coastal Plain and 941 Piedmont). Of those, staff estimates that 824 were constructed (303 Coastal Plain and 521 Piedmont). The total estimated number of houses on wells in the Piedmont area is 5,652.

Geology in the Mount Olive Road Area:

The Mount Olive Road area of the County is located within the Piedmont geological area, and residential wells utilize the Piedmont aquifer. While bored wells approximately 60' deep were common before 1990, currently deep wells are usually drilled to obtain water from fractures in the underlying bedrock rather than bored wells in the shallow soil layer. Fractures are not uniform. Access to water will vary based on the size and depth of the fractures. The Groundwater Management Plan includes maps that show the general location of faults within the Piedmont. It may be presumed that wells that tap into fractures along those faults may have relatively high yields. Some areas may have very low well yields. In 1988 the Culpeper Stone Company had proposed to develop a rock quarry along Long Branch Creek and Poplar Road. The application made reference to little impacts of groundwater intrusion in the proposed quarry site. The quarry application was ultimately denied by the Board in 1990 due to traffic impacts and citizen concerns. The proposed quarry site was in the location of the current Long Branch neighborhood. The proposed location of the Culpeper Stone Quarry was similarly situated to the current location of the Vulcan Quarry on Garrisonville Road. Both locations were on plateaus with steep hillside areas sloping down towards the south bank of a major creek. This description is characteristic of properties located on the north side of Mount Olive Road and south of Long Branch Creek.

Due to the geology of the aquifer in the Mount Olive Road area, there is a wide variability of yields from wells in close proximity. For example, one residence has reported 5 wells with no yield or very low yield on a single 4.5 acre parcel,

while across the street there are two wells tested at 10 gallons per minute (gpm) each. A well just north of the problem parcel has tested a well at 60 gpm. This degree of variability demonstrates the difficulty in predicting well yields in the Piedmont aquifer.

Authority to Regulate Groundwater Withdrawals:

Currently Stafford County does not have the state enabling authority to require wells be drilled and quantity tested for water volume in advance of a building permit being issued. As noted above, VDH regulates residential groundwater use, and therefore the issuance of construction permits for wells. Prior to the County issuing an occupancy permit, VDH must verify that wells meet minimum requirements for water quantity and quality. The standard for minimum quantity is that all wells must be able to pump at least 3 gallons of water per minute. For wells that do not meet that standard, there must be at least 150 gallons of water storage for every bedroom in the house. This water storage requirement is often met within the well casing. VDH officials were advised of one location in the County (along Mount Olive Road) where storage tanks with a total of 240 gallons of capacity were used to meet the minimum storage requirement.

In the case of low-flow wells such as those noted in the Mount Olive Road area, those wells also will have a slow recharge rate. Once the water storage is depleted, the slow recharge rate means that several hours may transpire before the water level is built back up in the well to accommodate substantial water usage. For houses with low-flow wells, use of water storage tanks may help to alleviate some of the timing problems between water usage and recharge of well water.

Conversations with VDH indicate there are localized problems with adequate well yields in the areas near Mount Olive Road and Poplar Road. Beyond these two localized areas, no other areas in the County were reported to have problems meeting minimum standards for well yields using deep well construction. Shallower bored wells are more frequently reported with problems, particularly during extended dry periods.

Recommendations:

The Groundwater Management Plan had the following recommendations for code amendments:

- i. Require conditional use permits for all proposed land uses within the Fall Zone to require adequate groundwater recharge methods and minimize surface contamination due to industrial accidents.
- ii. Require conditional use permits for new wells to be drilled within a prescribed radius of 1,000 feet from existing and proposed community water supply wells
- iii. Performance of hydrogeological testing and modeling of proposed groundwater withdrawals equal to or greater than 300,000 gallons per month. This would include residential subdivisions with more than 25 lots.

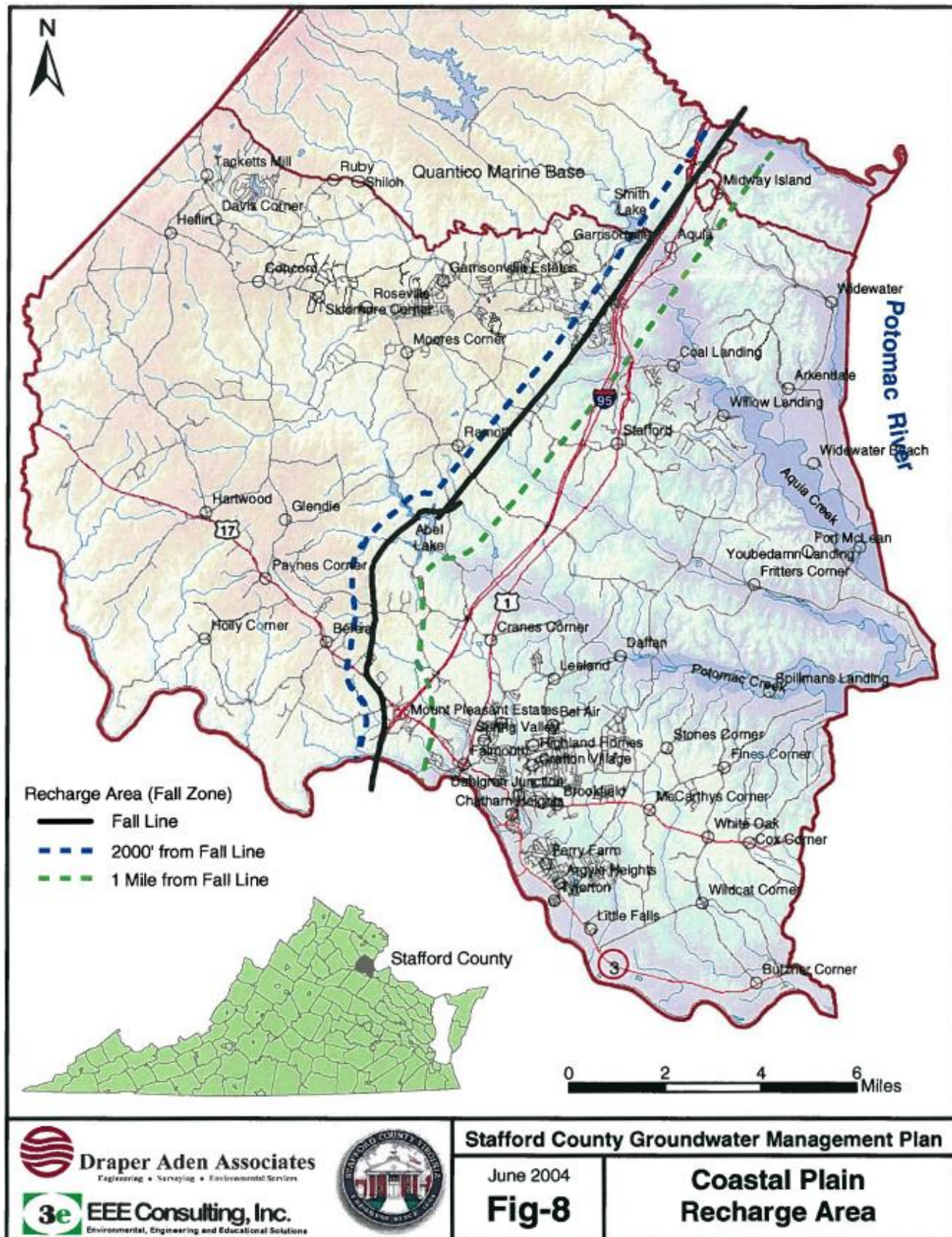
Whereas the County has no current plans to use groundwater for public water supply purposes, and there are no private community wells currently in use or planned, and no proposals for new single point groundwater withdrawals in excess of 300,000 gallons per month, these recommendations have not been directly implemented. County and state stormwater management regulations were adopted to require groundwater infiltration measures.

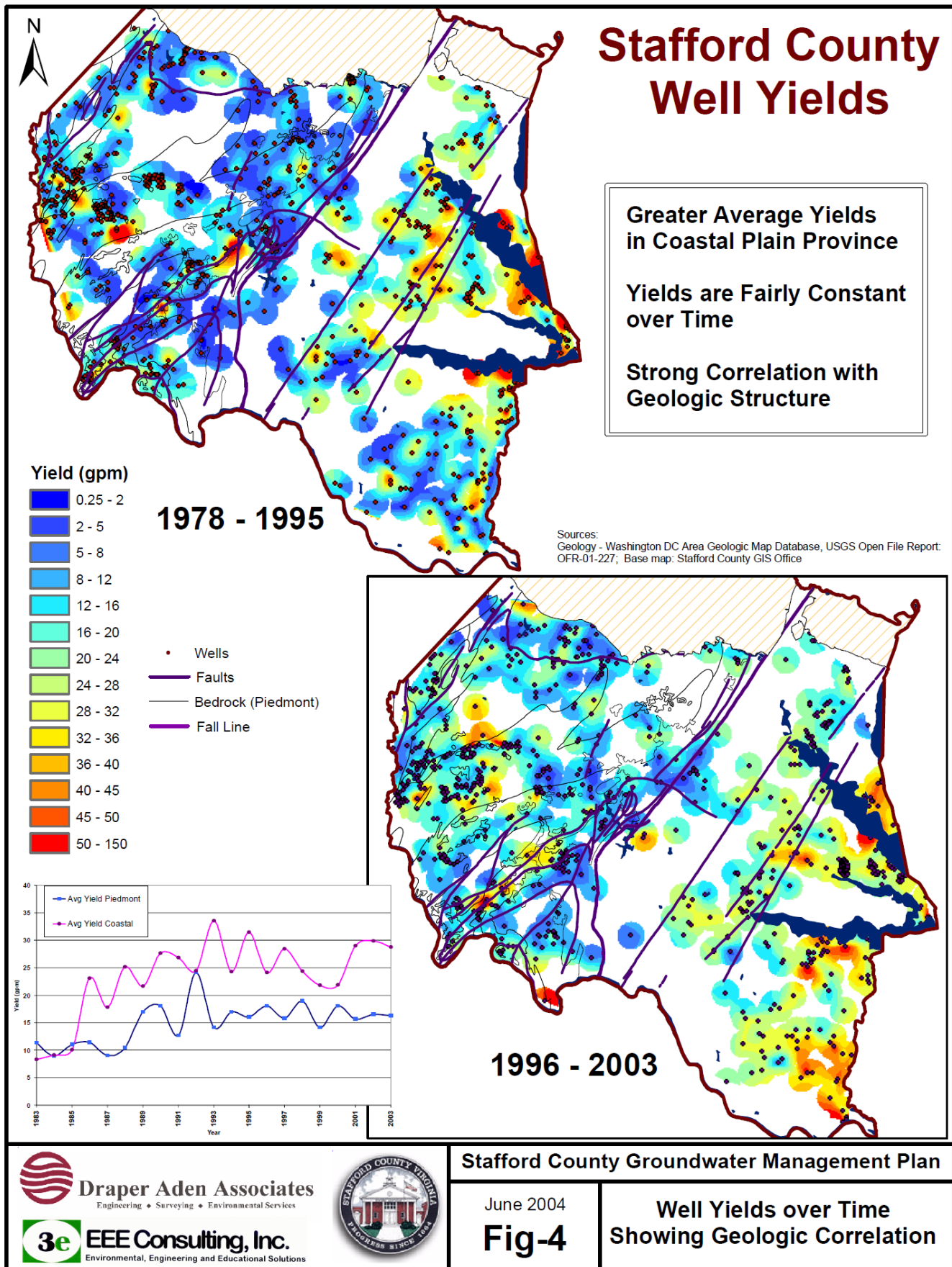
Recommendations for individual home owners with low-yield wells can include:

- use of water saving fixtures in the house
- use of rain barrels or cisterns to capture rainwater for outside watering
- Use of water storage tanks to help alleviate timing of well water recharge relative to water usage

JAH:

Attachments (3)

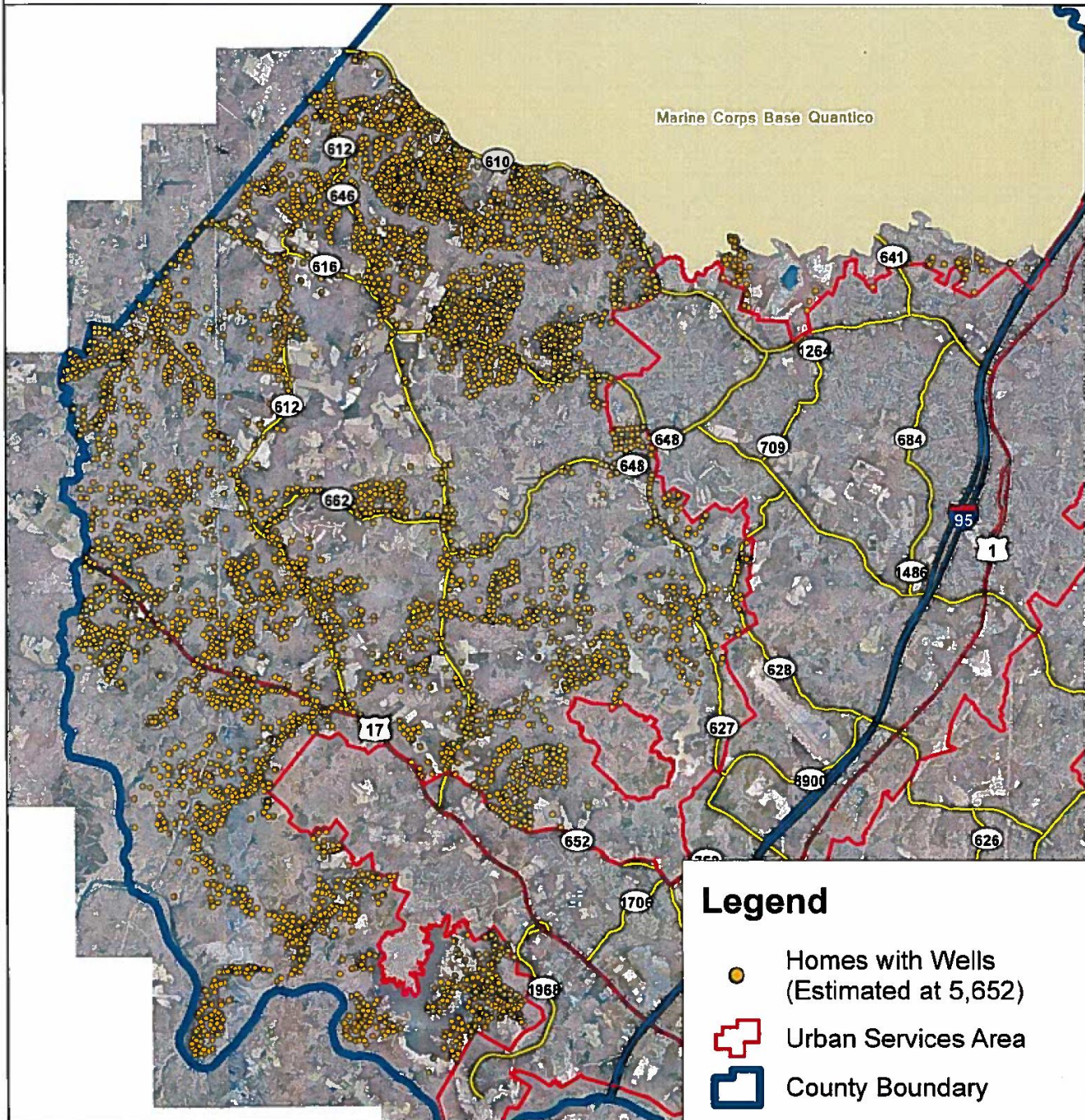






Homes with Wells in Piedmont Geologic Area

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



Coordinate System: NAD 1983 HARN StatePlane Virginia North FIPS 4501 Feet
Produced: 9/27/2016
MXD Path: \\srv16\gisdata\users\gis\Brad\Planning\WellsPiedmont\WellsPiedmont.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.

0 1 2 4 Miles

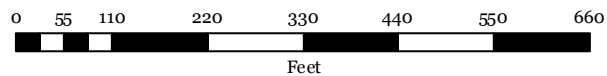


VDOT Negotiations Related to Courthouse Road Widening Project

May 2, 2017

- During the course of the Courthouse Road widening project VDOT encountered negotiation problems with parcel 29-44F.
- The initial design impacted the well for the parcel; therefore, VDOT offered to pay for a new well.
- The owners felt it would be difficult to find adequate water with a new well, so they declined the offer.
- VDOT then re-designed the road and left the well untouched; however, a utility power line ran above the well and the owner was concerned they would not be able to replace the well if it went bad due to the proximity of the power line.
- The power company agreed to shut down the line if needed to replace the well pump; however, the owner still declined.
- VDOT then agreed to run a 4" line 900' along Courthouse Road at a cost of \$66,000 to provide the owner with water and maintain the payment of \$10,358 for the well, that they could use for hook-up fees and a plumber.
- The owner still declined the offer.
- VDOT has gone through the quick take condemnation process and is proceeding with the project.
- The owner has now approached the County for relief from the Availability fee and connection fees for the water connection, which total \$8,400.
- Staff has informed the owner that Utilities fees cannot be waived.
- Supervisor Sellers has asked that we bring this matter to the Infrastructure Committee to determine if there is a desire to have the fees paid by the County for this important road project.

Parcel 29-44



Date: 4/28/2017

Author:

