A G E N D A
JAMES CITY COUNTY BOARD OF SUPERVISORS
WORK SESSION
County Government Center Board Room
101 Mounts Bay Road, Williamsburg, VA 23185
March 22, 2016
3:00 PM

A. CALL TO ORDER

B. ROLL CALL

C. BOARD DISCUSSIONS

1. School Discussion
2. Sustainable Water Recycling

D. CLOSED SESSION

E. ADJOURNMENT

1. Adjourn until Regular Meeting at 6:30 pm

AGENDA ITEM NO. C.1.

ITEM SUMMARY

DATE: 3/22/2016

TO: The Board of Supervisors

FROM: Bryan J. Hill, County Administrator

SUBJECT: School Discussion

ATTACHMENTS:

	Description	Type
🗋	Attachment	Exhibit

REVIEWERS:

Department	Reviewer	Action	Date
Board Secretary	Fellows, Teresa	Approved	3/15/2016 - 11:35 AM

Learning in the 21st Century

Steven M. Constantino, Ed.D. | March 2016

> *If you want to do something new, you will have to stop doing something old.*
>
> *– Peter Drucker*

Understanding the terminology and language surrounding the necessity for schools to adapt a focus that centers on the requirements of 21st-century students is daunting but essential if student learning needs are to be met now and in the future.

It is important, at the onset of this discussion, to be clear as to what 21st-century education is not. Our students will always need to have a civic understanding and appreciation of history, geography, math and science. Now more than ever, these topics are essential for students to assimilate in the world and begin to understand future, unforeseen events. To sustain and improve upon the quality of life we have all come to cherish, these subjects must always have a prominent place in the education of our students.

21st-century learning does not mean that we will cast aside, with reckless abandon, core curricular principles of learning that have served us well. What it does mean is that we must change not what students learn, but how they learn it and most importantly, answer the question of why does it matter?

Students must also speak and write the English language well. We need to broaden the linguistic abilities of our students to ensure that they are multilingual in the languages of the world today, not the world of yesterday. Mastering languages also means attaining an awareness and appreciation of different cultures to bring about a better understanding of what unites mankind, not divides it.

Exposure to the arts and literature are critical. We must nurture the souls of students and enrich their lives with an understanding that the challenges of our society are timeless. Students must possess a deep understanding of the human condition and develop a desire for learning that expands long after the formal process of education ends.

If our students are to take their place as leaders, thinkers and doers in this world, ethical and moral character, integrity, and conviction to one's own beliefs are as essential as possessing the ability to listen to differing points of view. An understanding of the integral role that technology plays in our society and in just about every aspect of future fields of work is essential; however, for 21st-century students to thrive they must have a clear understanding of the appropriate use of technology and the consequences of misuse.

21st-century learning does not mean that we will cast aside, with reckless abandon, core curricular principles of learning that have served us well. What it does mean is that we must change not what students learn, but how they learn it and most importantly, answer the question of why does it matter?

How Things Have Changed

Consider for a moment, the following facts about today's students:

- Our students spend an average of about 7 hours per day using electronic media, more than they do in perhaps any other activity except sleeping *(Ridehout, Foehr, & Roberts, 2010)*.
- Students have been raised in media-rich environments. They expect information to be presented in digestible morsels, not lengthy expositions *(Nevid, 2011, p.5)*.
- Today's students are superficial processors of information. They may passively listen to the instructor's words and copy down a few choice remarks, but don't become engaged in the deeper thinking or reflection that leads to more enduring learning *(Nevid, 2011, p.6)*.

- Raised in an age of the World Wide Web, students are accustomed to nonlinear forms of thinking, such as jumping from hyperlink to hyperlink *(Nevid, 2011, p. 6)*.
- Students have higher and different standards of how material will be presented to them.

The Dilemma

Despite the high degree of autonomy and customization in their social and personal lives, students' academic lives are characterized by standardized achievement measures. Schools and curriculum, for the most part, are still focused on industrial-age content. Industrialists, commonly referred to as "The Committee of 10", developed our current school system in 1893. The Committee of 10 had a very clear vision of the role and purpose of education:

> *The purpose of education is to teach students low-level cognitive skills, train them to perform repetitive tasks quickly and error free, and eliminate all traces of creativity and innovation (Wagner and Dintersmith, 2015).*

As a result of this model, calendars continue to be based on the agrarian needs of the 1800s, and fall woefully short in preparing students to enter The Knowledge Age -- an advanced form of capitalism where knowledge and ideas are the main source of economic growth.

In a recent study of American business and industry, the following question was asked: To be prepared for the jobs of the 21st century, do you think the kinds of things a student needs to learn in school are very similar, somewhat similar, somewhat different or very different from what a student needed to learn 20 years ago? 80% of respondents agreed that learning must be somewhat or very different.

New Economy

As the country continues to emerge from the recession, a new economy has emerged as well. The new economy, itself a buzz phrase, suggests that industries on the cutting edge of technology drive growth with the use of emerging high-tech tools, powerful computing, and an entrepreneurialism that has penetrated both the consumer and business marketplace. This economy is framed by some very simple principles: consumers demand more options in the marketplace; consumers demand more customized services and product choices; and, consumers demand quality at a fair price.

> *No industry or professional field, including K-12 education, is immune to the technical, economic, and market forces that are changing how American consumers make spending decisions on goods and services, including the education of their children (Stover, 2015).*

For today's students knowledge is no longer thought of as "stuff" that is developed (and stored) in the minds of experts but rather now thought of as a form of energy, as a system of networks and flows, something that does things or makes things happen. Knowledge is produced by groups of people with complementary expertise who collaborate for specific purposes.

Education must create a shift from industrial thinking to knowledge thinking. It must focus on learning capacity, competencies, and personalized learning environments that can be manipulated on a monthly, weekly or daily basis depending on the learning needs and interests of students.

What Is 21st-Century Learning?

The term "21st-Century Learning" is really only shorthand for what needs to be different in schools. Education must create a shift from industrial thinking to knowledge thinking. It must focus on learning capacity, competencies, and personalized learning environments that can be manipulated on a monthly, weekly or daily basis depending on the learning needs and interests of students.

21st-century learning focuses on people, relationships and collaborative skills. 21st-century learning places students in situations where they are interdependent

on peers, teachers, family members and communities to help them understand learning tasks. Because 21st-century students will have several careers in their lifetimes, success will require knowing how to learn and how to master content while producing, synthesizing, and evaluating information from a wide variety of subjects and sources.

> *21st-century learning builds upon past conceptions of "core knowledge in subject areas" and recasts them for today's world, where a global perspective and collaboration skills are critical.*

Students today expect to be able to work together. They want to explore the "why" of learning and want to creatively solve problems using the skills that the curriculum teaches them. They expect to be in a digital environment that mirrors their experiences outside of school, and they want to learn whenever and wherever they desire. 21st-century learning builds upon traditional core content knowledge; however, it also incorporates into learning information and communication skills, thinking and creative problem-solving skills, interpersonal and self-directional skills, and skills to make the best use of information and communication technologies.

But, it's more than just about the work and how the work is done. It is also about the space in which the work is done. New designs in workspaces have become a component of agility in business and are now a component in schools. The environment in which students learn and teachers teach must be creative, imaginative and agile. Teachers need and desire flexibility. They need to be able to regroup and rethink lessons on a continuous basis. The positive byproduct of formative and creative assessment is the ability to use that assessment to not only drive instruction, but to modify and redesign the environment in which learning takes place.

21st-century learning shouldn't be controversial. It is simply an effort to define modern learning using modern tools and spaces.

If a year from now we are still debating 21st-century learning, it would be a clear sign that a permanent myopia has clouded what should be 20/20 vision. In a few short years every student in our schools will be from the 21st-century and no teacher will be. The entire student body and the entire teacher force will be from different centuries.

The Williamsburg-James City County School Division understands that re-imagining learning for the 21st-century is essential to our continued success and makes its tenants core attributes of the division's strategic plan. The emerging structure of programs, flexibility and personalization in learning are all components of our plan to ensure that students are at the center of the process of learning – 21st-century learning.

AGENDA ITEM NO. C.2.

ITEM SUMMARY

DATE: 3/22/2016

TO: The Board of Supervisors

FROM: M. Douglas Powell, General Manager, JCSA

SUBJECT: Sustainable Water Recycling

Ted Henifin, General Manager of Hampton Roads Sanitation District, will be making the presentation.

ATTACHMENTS:

	Description	Type
🗋	Memorandum	Cover Memo
🗋	Presentation	Presentation

REVIEWERS:

Department	Reviewer	Action	Date
Board Secretary	Fellows, Teresa	Approved	3/7/2016 - 8:08 PM
Board Secretary	Hill, Bryan	Approved	3/15/2016 - 11:34 AM
Board Secretary	Fellows, Teresa	Approved	3/15/2016 - 11:34 AM
Publication Management	Boles, Amy	Approved	3/15/2016 - 11:42 AM
Legal Review	Kinsman, Adam	Approved	3/15/2016 - 11:46 AM
Board Secretary	Fellows, Teresa	Approved	3/15/2016 - 11:46 AM
Board Secretary	Hill, Bryan	Approved	3/15/2016 - 11:46 AM
Board Secretary	Fellows, Teresa	Approved	3/15/2016 - 11:48 AM

M E M O R A N D U M

DATE: March 22, 2016

TO: The Board of Supervisors

FROM: M. Douglas Powell, General Manager, James City Service Authority

SUBJECT: Sustainable Water Recycling

At your work session, staff will brief you on sustainable water recycling, which is an initiative of the Hampton Roads Sanitation District. The initiative is in the exploratory phase, but has several potential benefits if studies conclude it is feasible.

A PowerPoint presentation is attached.

MDP/ab
WaterRec-mem

Attachment

HRSD

Cleaning wastewater every day for a better Bay.

Sustainable Water Recycling

An integrated solution to the water issues challenging Hampton Roads and the Commonwealth of Virginia

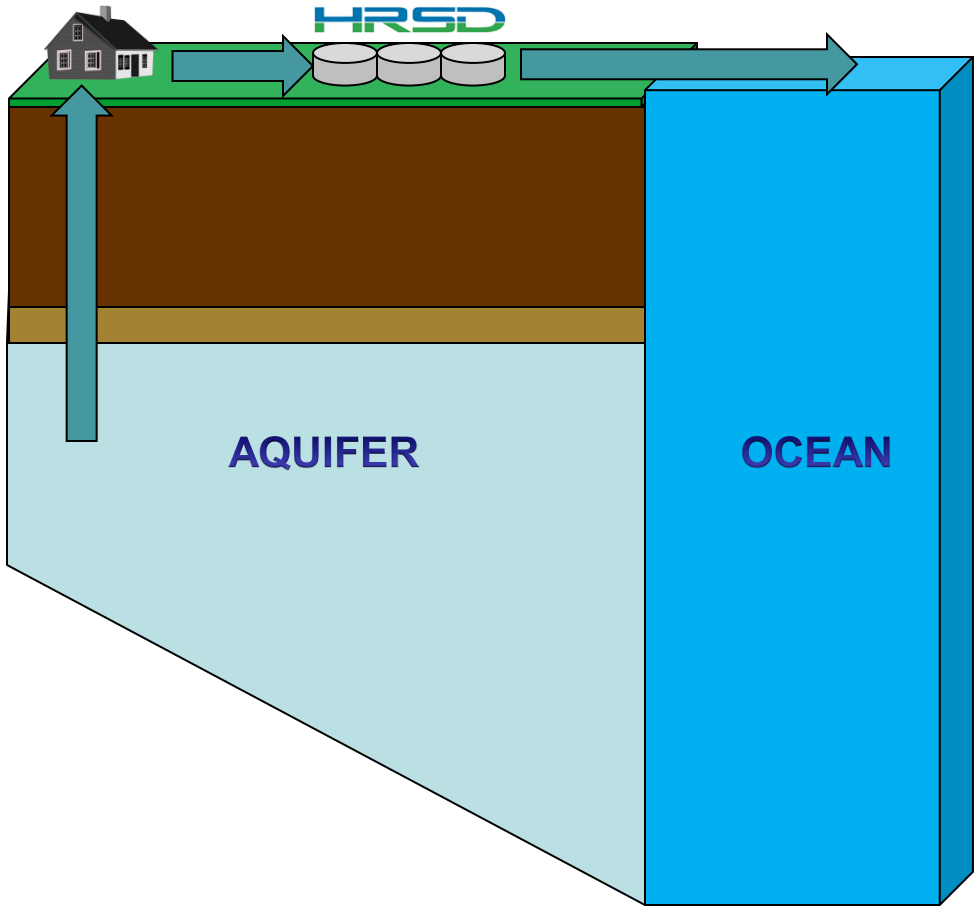
Water Issues Challenging Virginia and Hampton Roads

- Depletion of groundwater resources
  - Including protection from saltwater contamination
- Restoration of the Chesapeake Bay
  - Harmful Algal Blooms
  - Localized bacteria impairments
  - Urban stormwater retrofits (cost and complexity)
- Adaptation to sea level rise
  - Recurrent flooding
- Wet weather sewer overflows
  - Compliance with Federal enforcement action

Current state of groundwater in Eastern VA

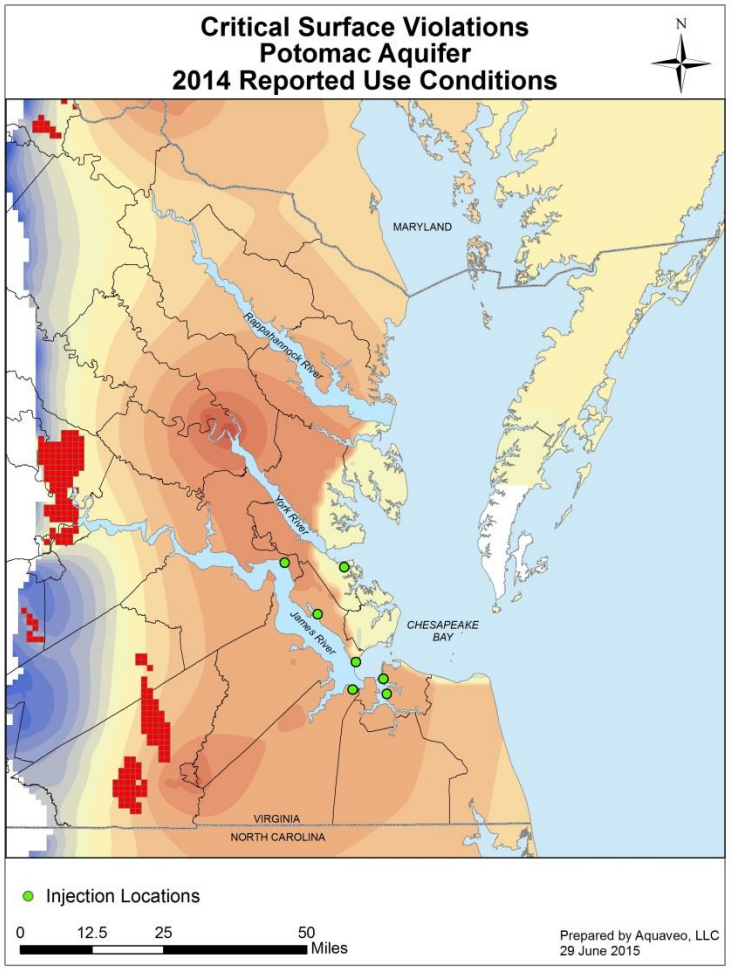
Currently mining but not replenishing the aquifer

- Natural aquifer recharge is not keeping up with withdrawals
- Water is cleaned and discharged to local waterways, ultimately to the ocean with no downstream use
- Aggravating other problems including land subsidence and salt water intrusion



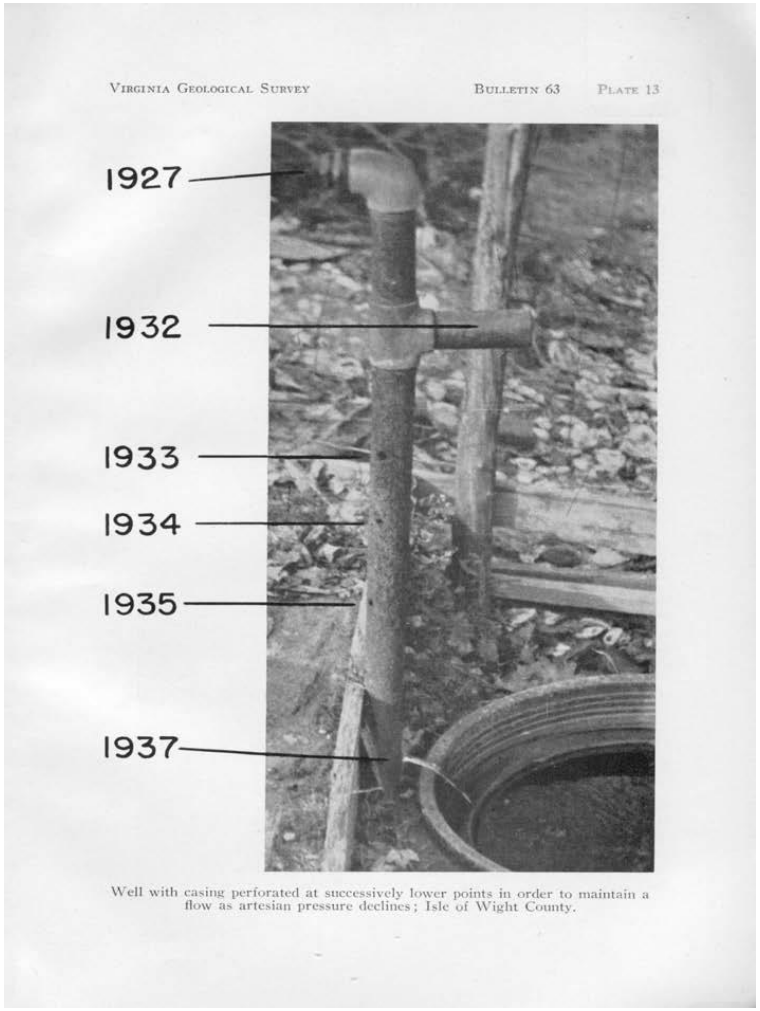
Unsustainable Aquifer Withdrawals

- Over-allocated permitted withdrawal
  - Water levels falling several feet/yr
  - Some water levels below the aquifer tops in western Coastal Plain
- Total permitted withdrawals are **unsustainable**
  - Areas below regulatory criteria
  - Areas experience aquifer dewatering



Groundwater depletion has been rapid

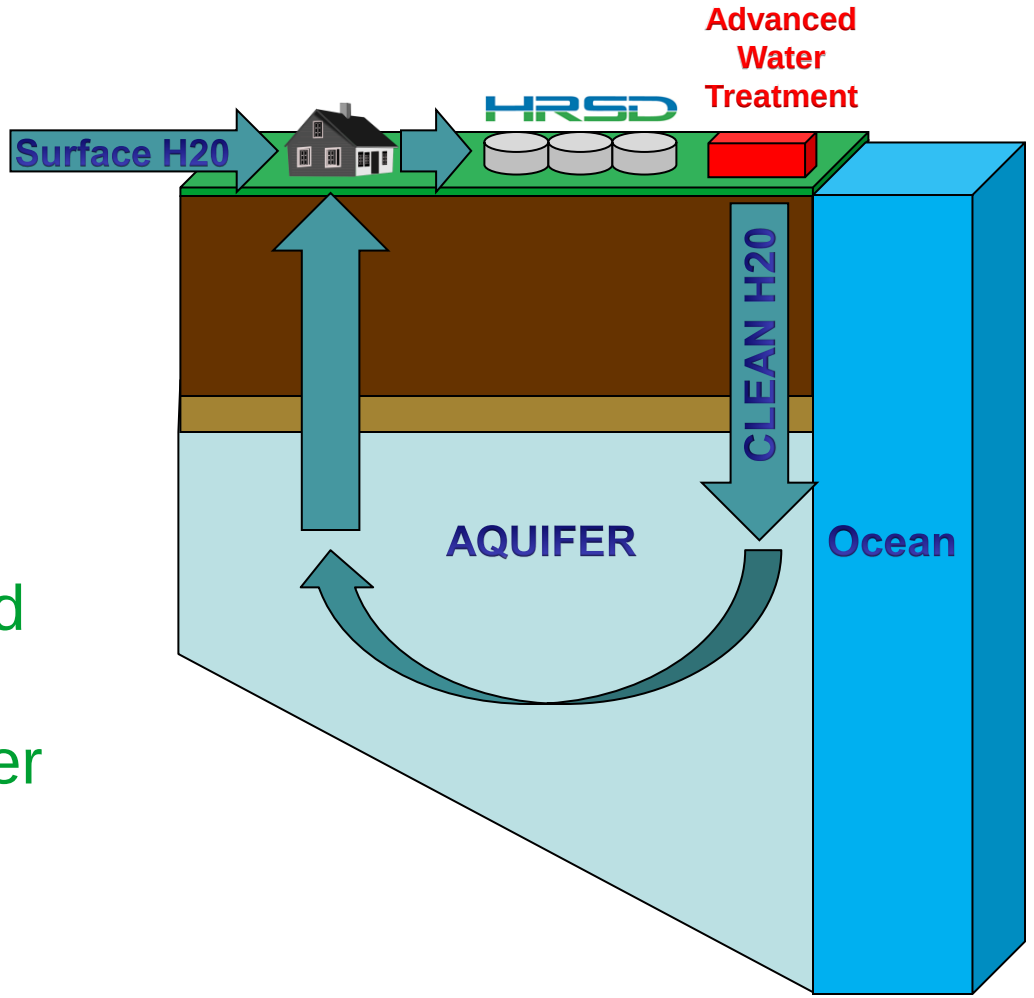
A, Overflow from artesian well in Isle of Wight County is wasted.



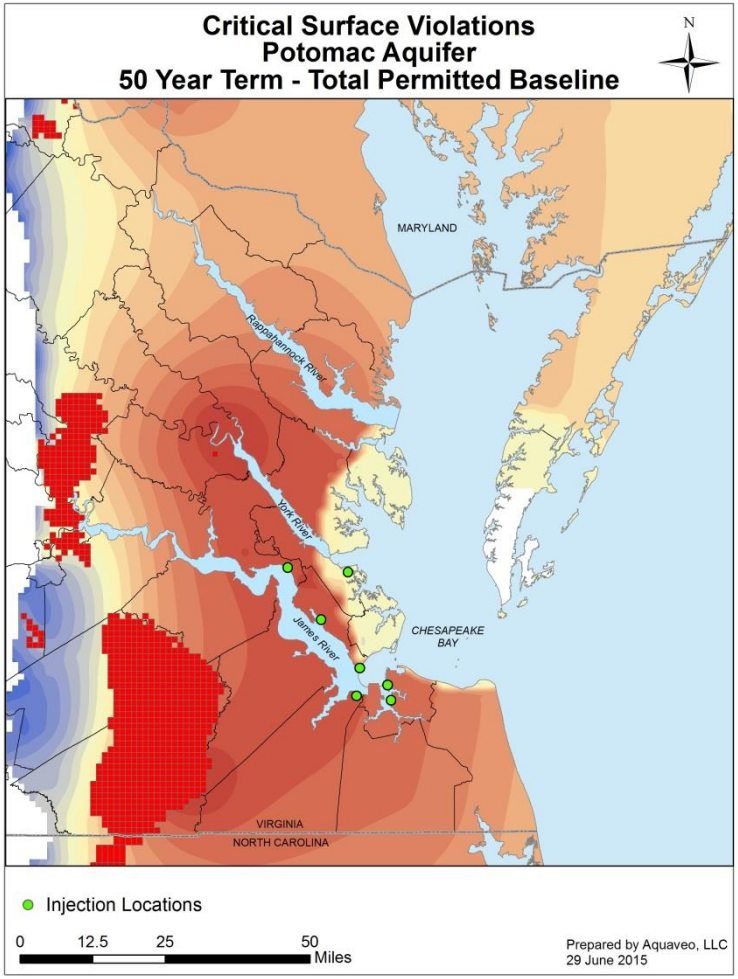
- Artesian wells in early 1900s – groundwater wells required valves not pumps!
- In about 100 years have gone from water levels at 31 feet above sea level to 200± feet below.

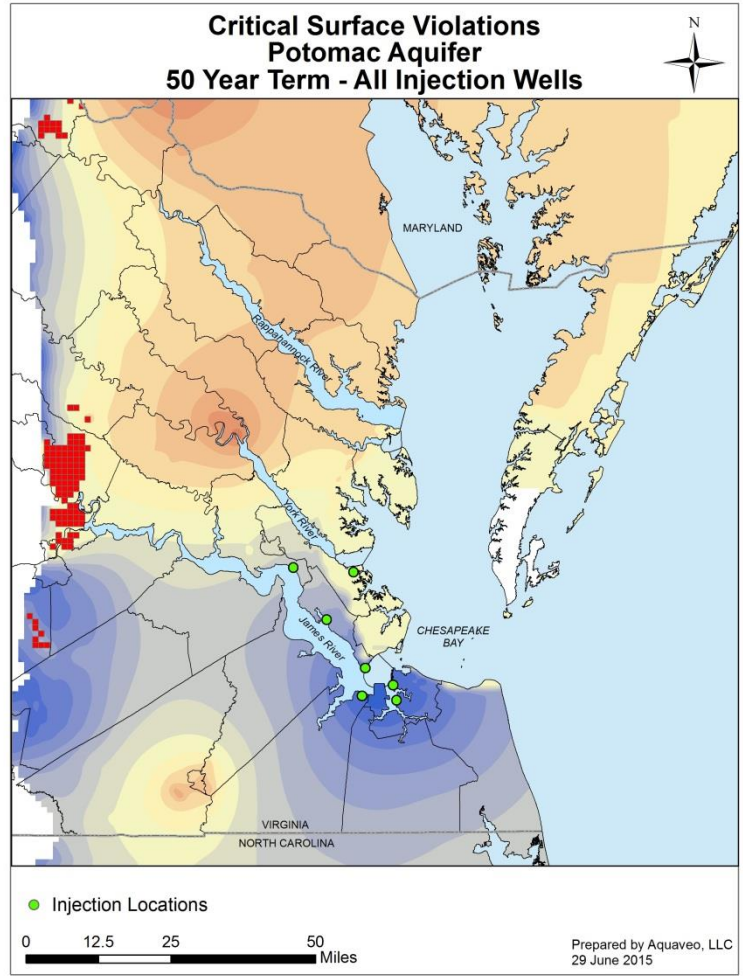
Proposed cycle of sustainable water recycling

- HRSD's concept - replenish the aquifer with clean water to:
  - Reduce nutrient discharges to the Bay
  - Provide a sustainable supply of groundwater
  - Reduce the rate of land subsidence
  - Protect the groundwater from saltwater contamination

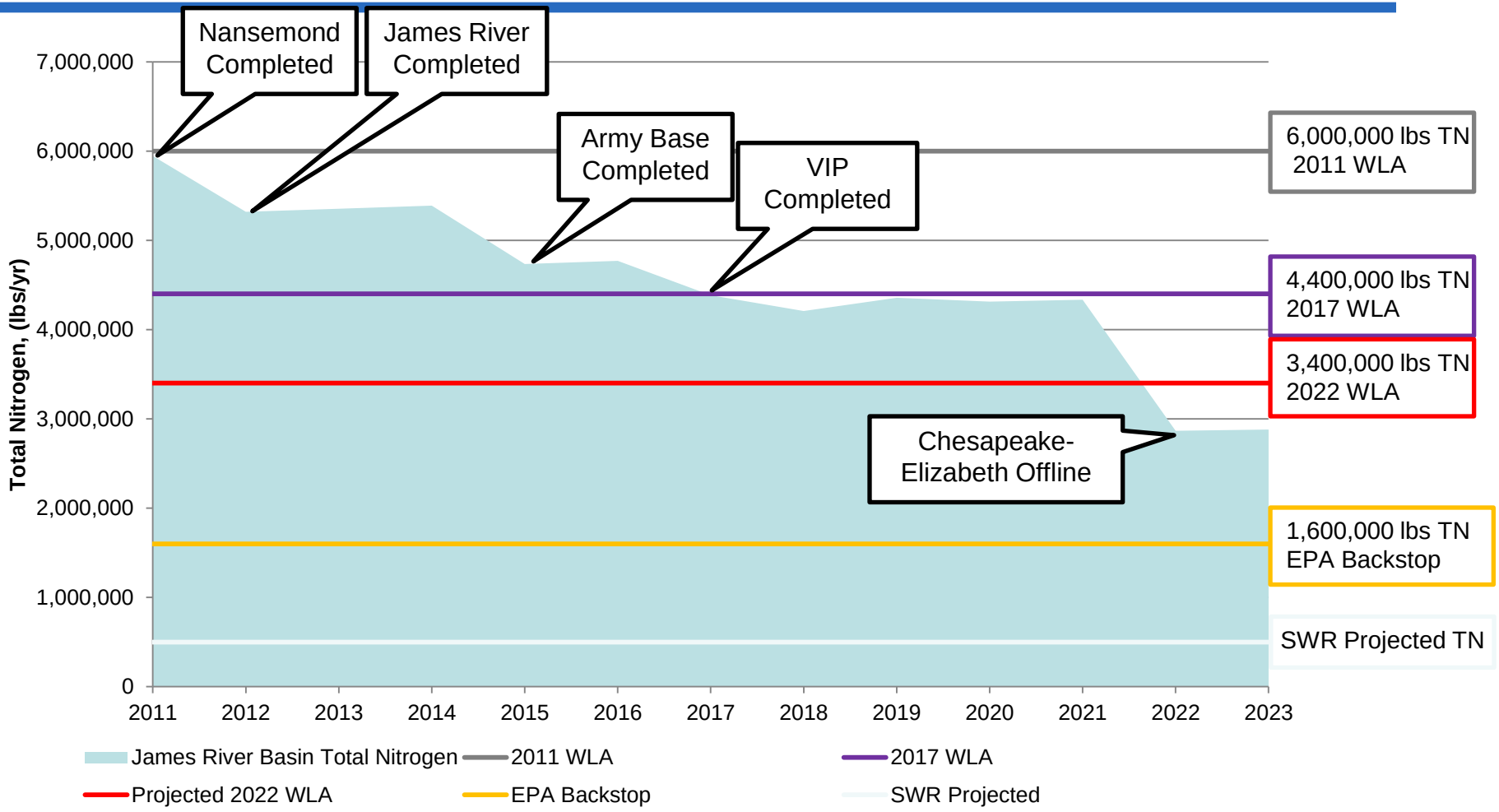


Potomac Aquifer water levels before and after injection





Impact on nutrient reductions



James River Basin – TN Similar results with TP and TSS and in other river basins.

WLA – Nutrient Waste Load Allocation in lbs/yr

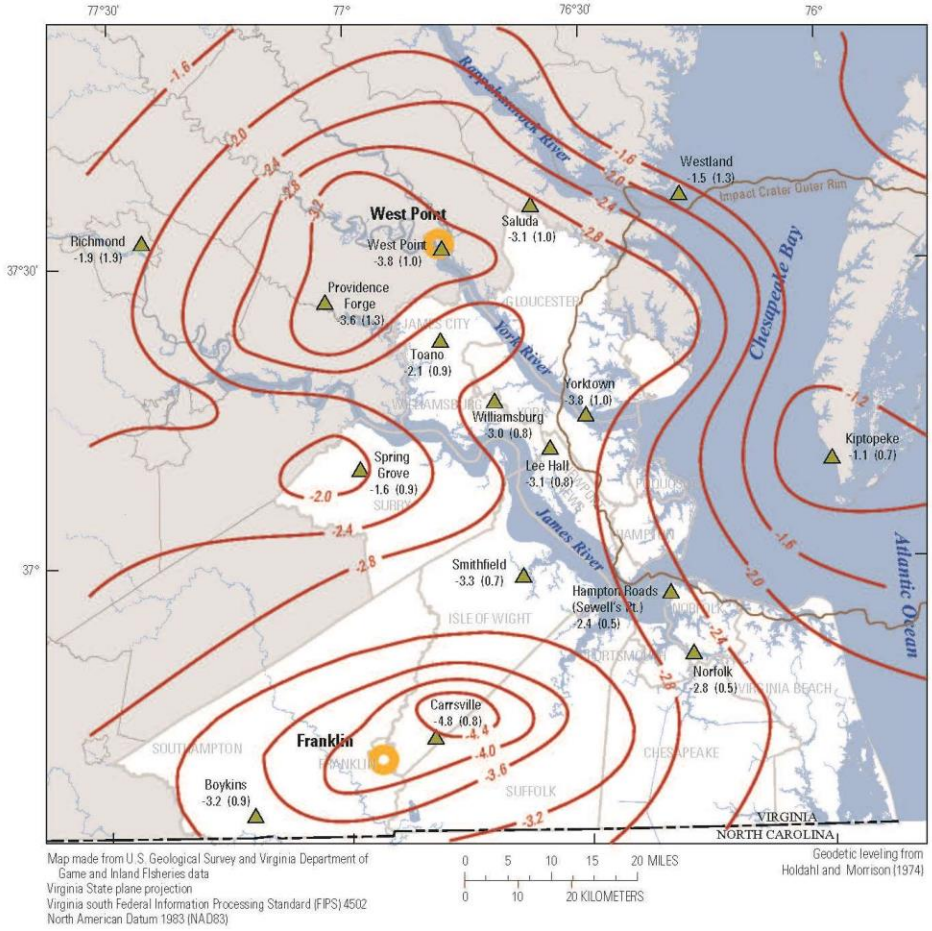
Potential to offset stormwater reductions

	HRSD Bay TMDL Allocations	HRSD Post SWRI Loads (2030)	Available for other needs	Stormwater Reduction Needs*
Nitrogen				
James	3,400,000	500,000	2,900,000	63,039
York	275,927	25,000	250,927	19,114
Phosphorus				
James	300,009	50,000	250,009	13,088
York	18,395	2,000	16,395	3,887
Sediment				
James	14,000,000	700,000	13,300,000	5,269,142
York	1,400,000	98,000	1,302,000	1,413,762

* DEQ Regulated Stormwater w/o federal lands

Land subsidence – *we are sinking*

- According to USGS
  - Up to 50% of sea-level rise may be due to land subsidence
  - **Up to 50% of land subsidence may be due to aquifer compaction**
- Potential solutions
  - Reduced withdrawal
  - Aquifer recharge



HAMPTON ROADS IS THE #2 LARGEST POPULATION CENTER AT RISK

HRSD

Proven technologies

- Advanced treatment used throughout world, many locations in USA and even in Virginia to produce water that exceeds drinking water standards
  - Upper Occoquan Service Authority/Fairfax Water
  - Loudoun Water
- Aquifer replenishment also done in many places including Virginia
  - City of Chesapeake Aquifer Storage and Recovery system – over 2.8 billion gallons pumped to date

Cost Summary

- Total project in the $1 billion range (120 mgd)
  - For 6 or 7 plants (not CE or Atlantic)
  - York needs additional study to locate injection site
- Annual operating costs $21 - $43 M
- Operating costs could be recovered with reasonable permitted withdrawal fee
  - Provides incentive for permits without significant reserves for potential future needs – right sized
  - Encourages conservation

Conclusion – Summary of Benefits

- Significantly reduced discharge into the Chesapeake Bay (only during wet weather)
  - Creates source of nutrient allocation to support **other needs**
  - Increases available oyster grounds
- Regulatory stability for treatment processes
- Sustainable source for groundwater replenishment
  - Supports water needs (today and future) throughout Eastern Virginia without piping to specific locations (wireless solution)
- Potential reduction in the rate of land subsidence
- Protection of groundwater from saltwater contamination

HRSD

Next steps

- Engage stakeholders
- Model and quantify
  - Impact on saltwater intrusion
  - Impact on land subsidence
  - Safe yield
  - Spatial analysis and travel time to existing withdrawals
- Additional geochemistry evaluation
- Additional water treatment technology analysis and evaluation – pilot-scale
- Develop demonstration-scale project – advanced treatment & aquifer injection (1-4 mgd)

Timeline

- Complete next phase of study with consultant by end of 2016
- Room scale pilot projects – operating in May 2016
- 2017
  - Public outreach
  - Endorsement from DEQ/VDH to move forward
  - Groundwater Committee recommends recharge project
  - EPA agrees to integrated plan to meet Consent Decree requirements
  - Phase 3 WIP includes this project to achieve TMDL goals
- 2018
  - Demonstration pilot (2 year study)
- 2020
  - EPA/DEQ/VDH formally approves Certificate to Construct for SWR
- 2020 to 2030
  - Construction through phased implementation
- 2030 Fully operational
  - 120 MGD of clean water put into the aquifer

Questions?

Future generations will inherit clean waterways and ***be able to keep them clean****.*

thenifin@hrsd.com

http://www.hrsd.com/SWR.shtml

AGENDA ITEM NO. E.1.

ITEM SUMMARY

DATE: 3/22/2016

TO: The Board of Supervisors

FROM: Teresa J. Fellows, Administrative Coordinator

SUBJECT: Adjourn until Regular Meeting at 6:30 pm

REVIEWERS:

Department	Reviewer	Action	Date
Board Secretary	Fellows, Teresa	Approved	3/14/2016 - 10:48 AM