

Chickahominy Riverfront Park Raw Water Intake and Water Treatment Facility Public Information Meeting

July 25, 2016





**PERMITS THAT DETERMINE
AVAILABLE WATER CAPACITY**



**GROUNDWATER
WITHDRAWAL PERMIT**
ANNUAL AVG = 8.8 MGD
MAX MONTH = 11.8 MGD

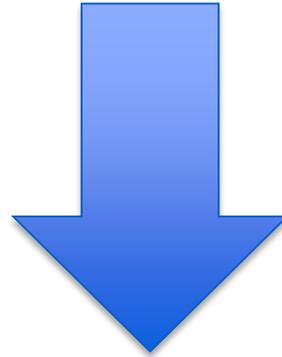


**WATERWORKS OPERATION
PERMIT**
MAX = 9.973 MGD

Why do we need a new water supply?

Eastern Virginia Groundwater Management Area

- Declining groundwater levels
- Advancing salt water intrusion
- Land subsidence



**JCSA Permitted Groundwater Withdrawal Reduction
(DEQ Proposal: 8.8 mgd reduced to 3.8-4.0 mgd)**

JCSA Water Supply

■ Existing Supply

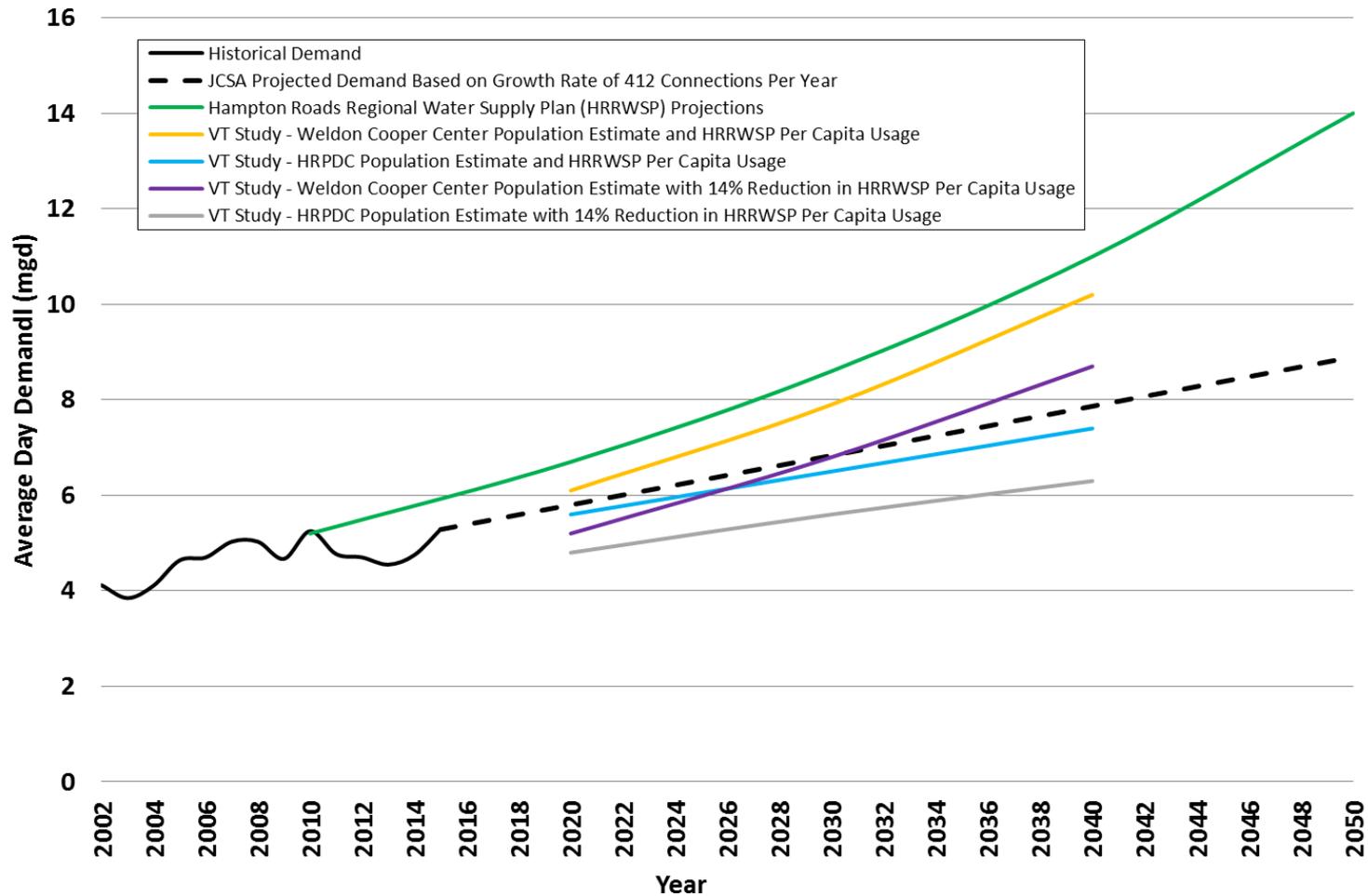
Production Facility	DEQ Annual Withdrawal (mgd)	VDH Capacity (mgd)
Five Forks WTP	5.9	5.000
7 Well Locations <ul style="list-style-type: none">• Owens-Illinois• Stonehouse• Ford's Colony• Kristiansands• The Pottery• Canterbury Hills• Ewell Hall and Olde Towne Road	2.9	4.973
TOTAL	8.8	9.973

■ Potential Future Water Supply

Newport News Waterworks (NNWW) Purchase Agreement = 2 mgd (drought condition)*

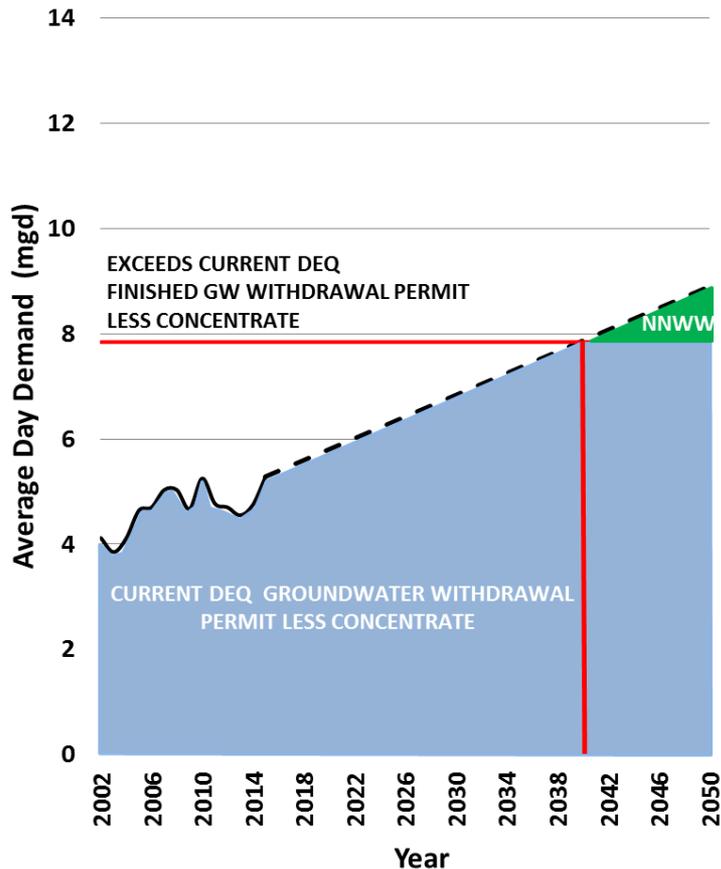
*JCSA infrastructure improvements required for delivery.

Average water demand is projected to increase.

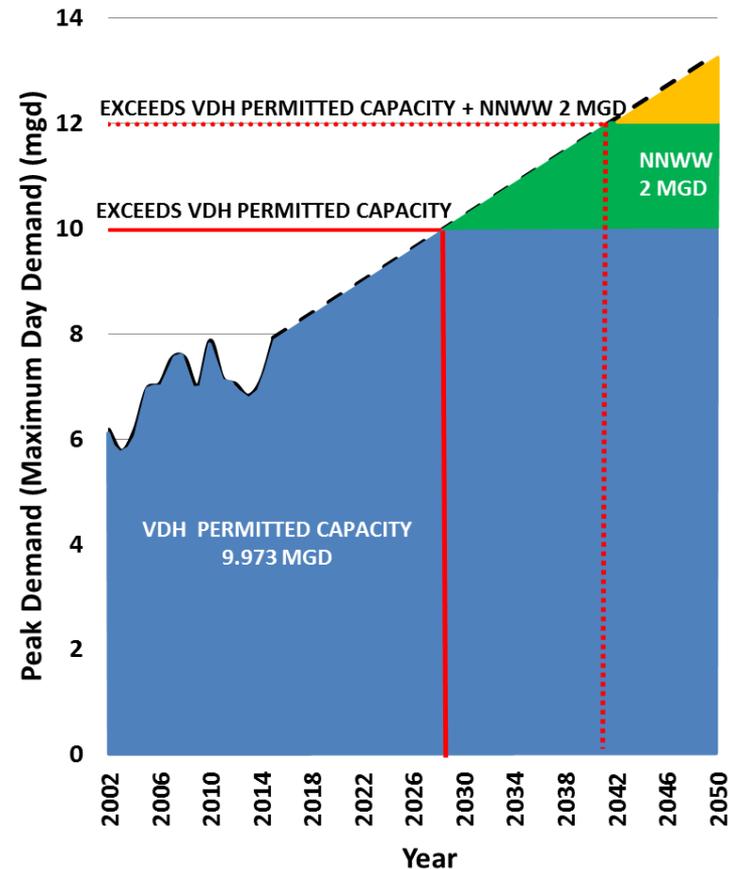


Future demand will exceed existing permitted capacity.

Average Day Demand

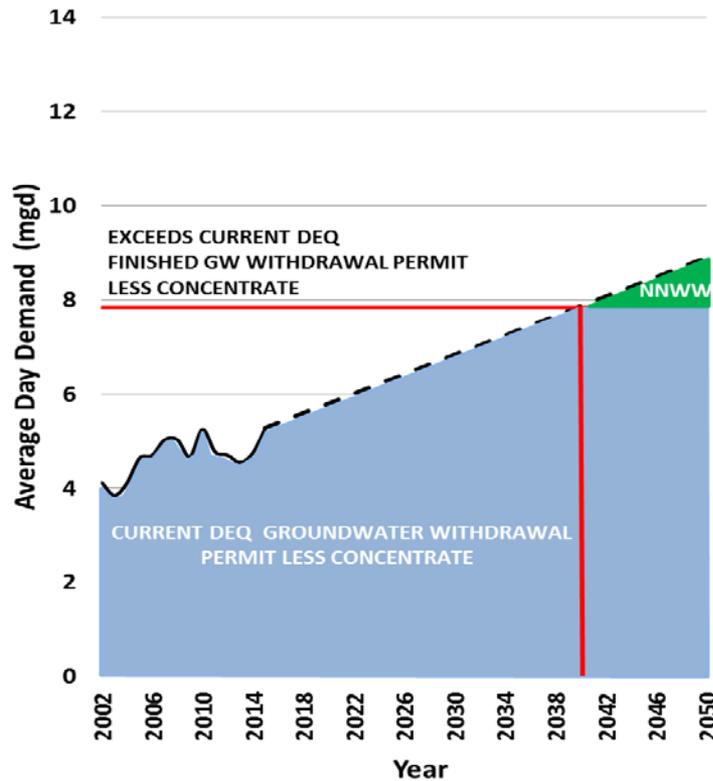


Maximum Day Demand

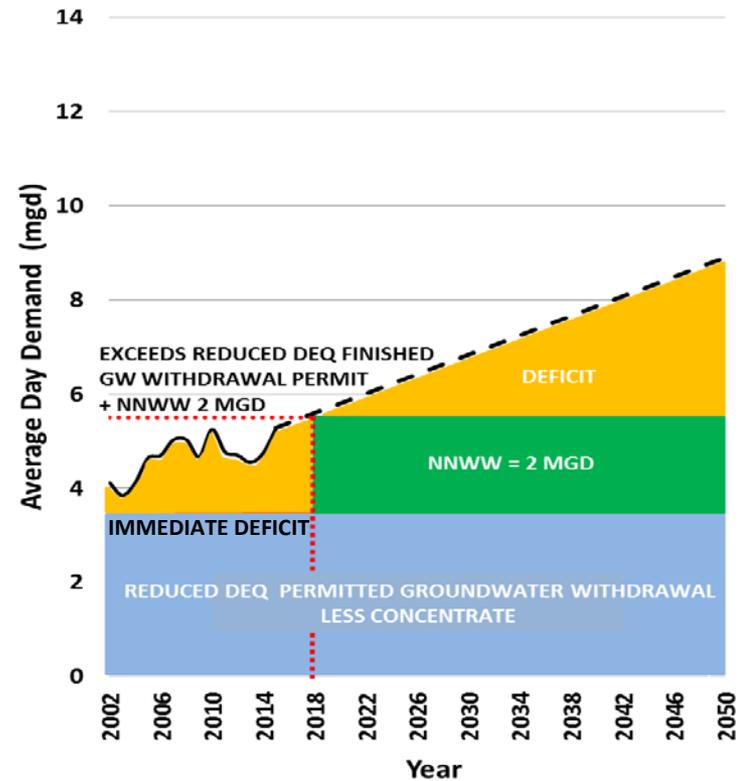


Reduction in DEQ permitted groundwater withdrawal to 4.0 mgd will result in immediate deficit.

Current DEQ Groundwater Withdrawal

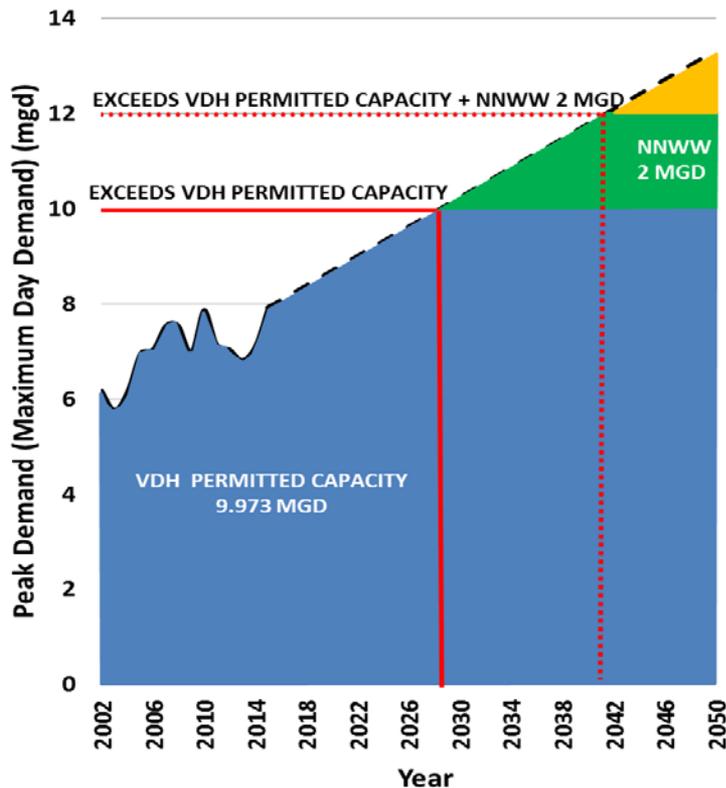


Reduced DEQ Groundwater Withdrawal

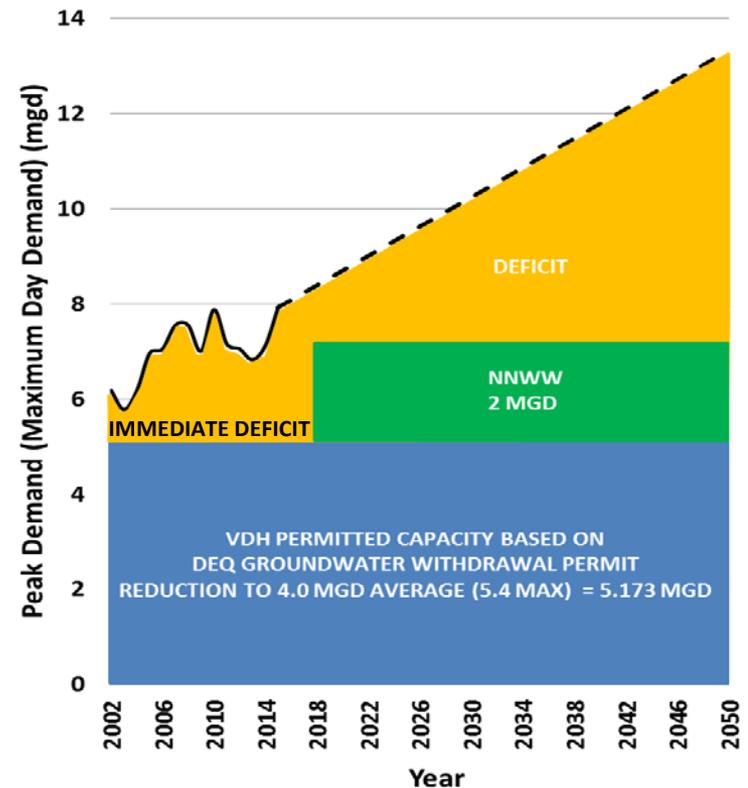


Reduction in DEQ permitted groundwater withdrawal to 4.0 mgd impacts VDH permitted maximum capacity

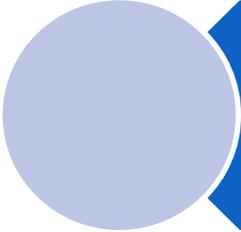
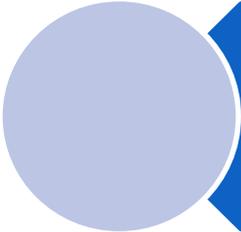
Current DEQ Groundwater Withdrawal



Reduced DEQ Groundwater Withdrawal



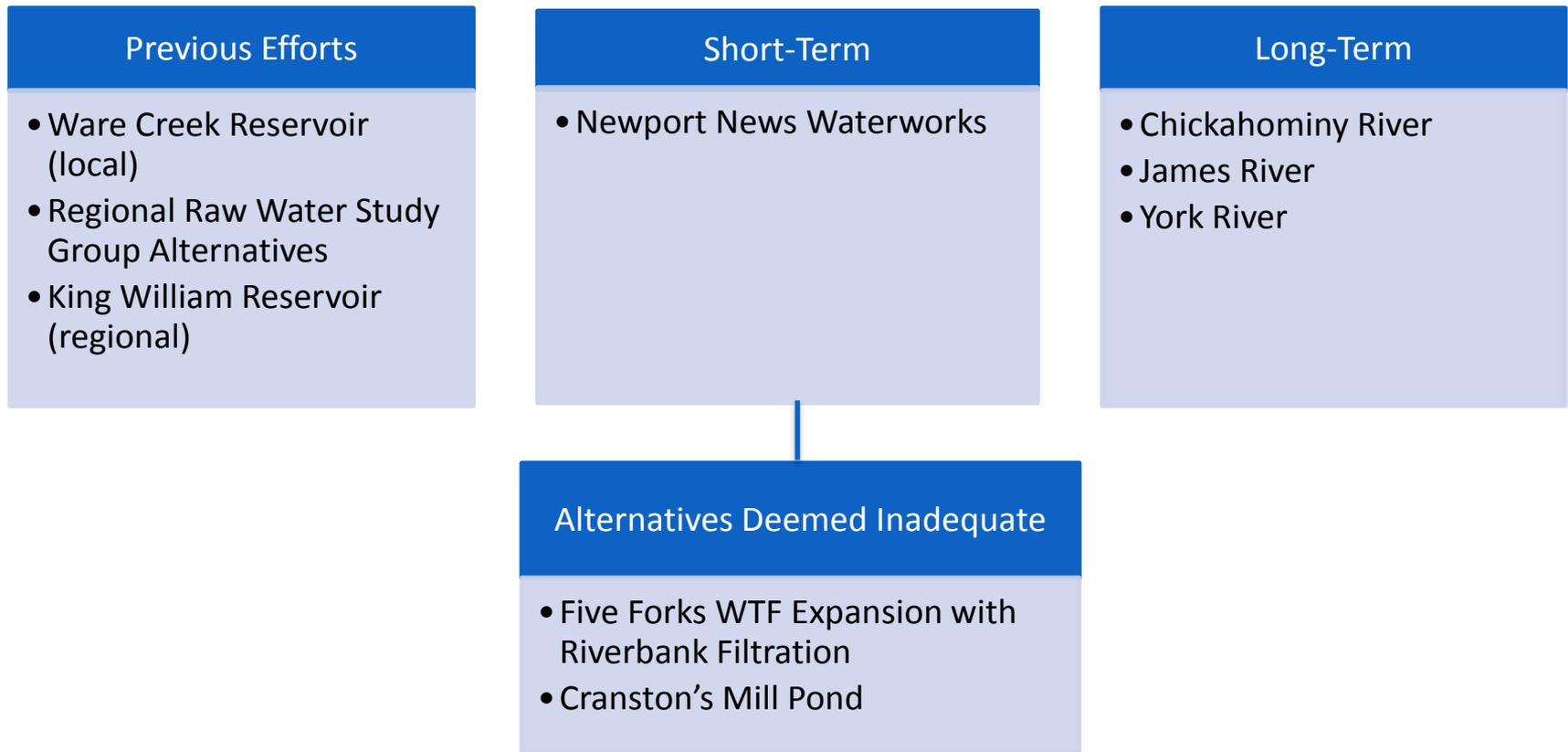
Water Supply Alternatives

-  No Action
-  Water Conservation Only
-  Alternative Water Supply with Water Conservation

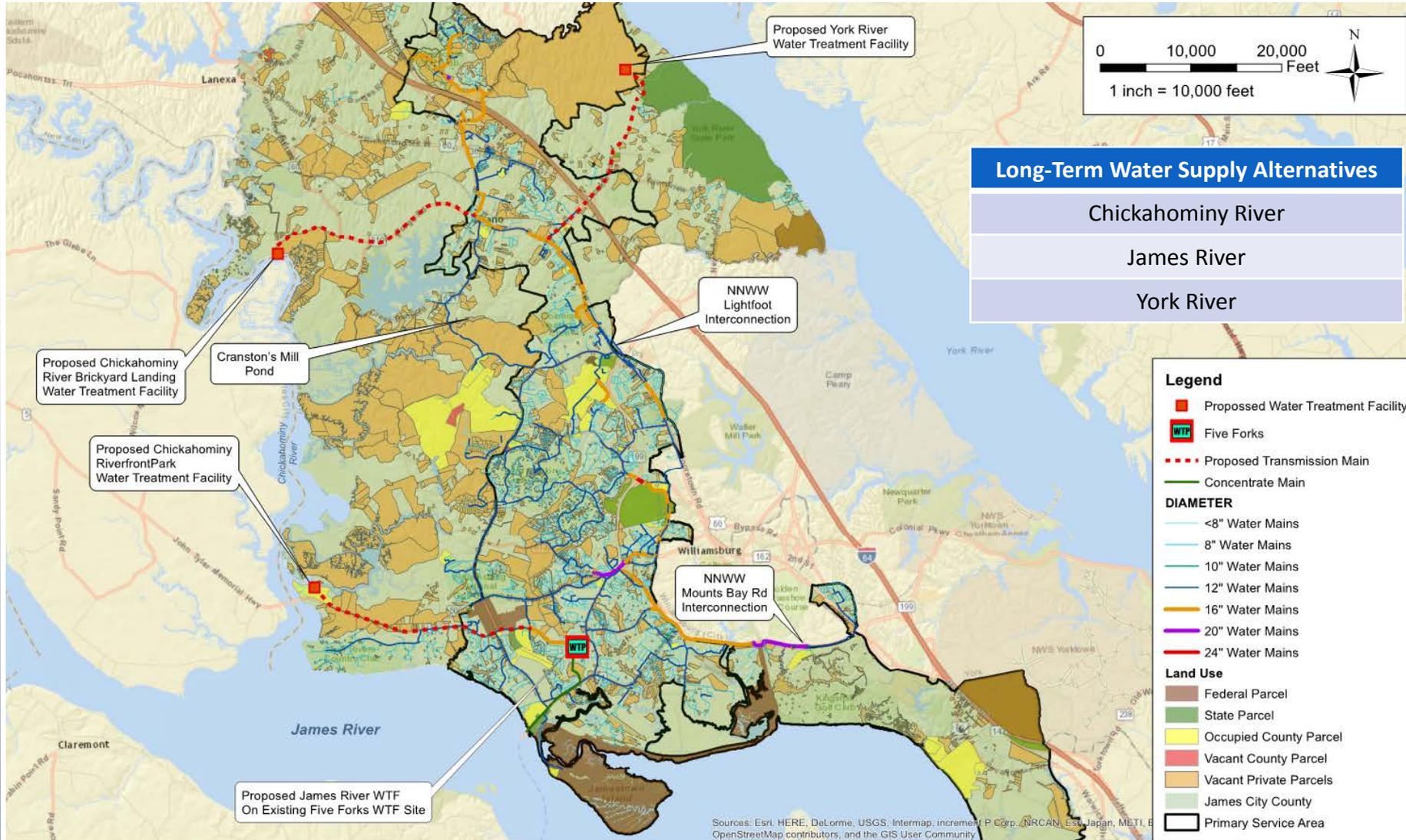
Water Conservation Measures – Already in Effect

- Water conservation and drought management program
- Install low water use fixtures – Building Code
- Irrigation management – Outdoor Water Use Ordinance
- Rebate programs
 - Rain Sensor
 - Rain Barrel
 - Rebate programs for Water Smart landscapes, cisterns, “on-demand” hot water re-circulators, and high-efficiency toilet, washing machine, and dishwasher replacements
- Tiered water rate structure
- Public education – Let’s Be Water Smart Program

Alternative Water Supply Considerations with Water Conservation



Water Supply Alternatives



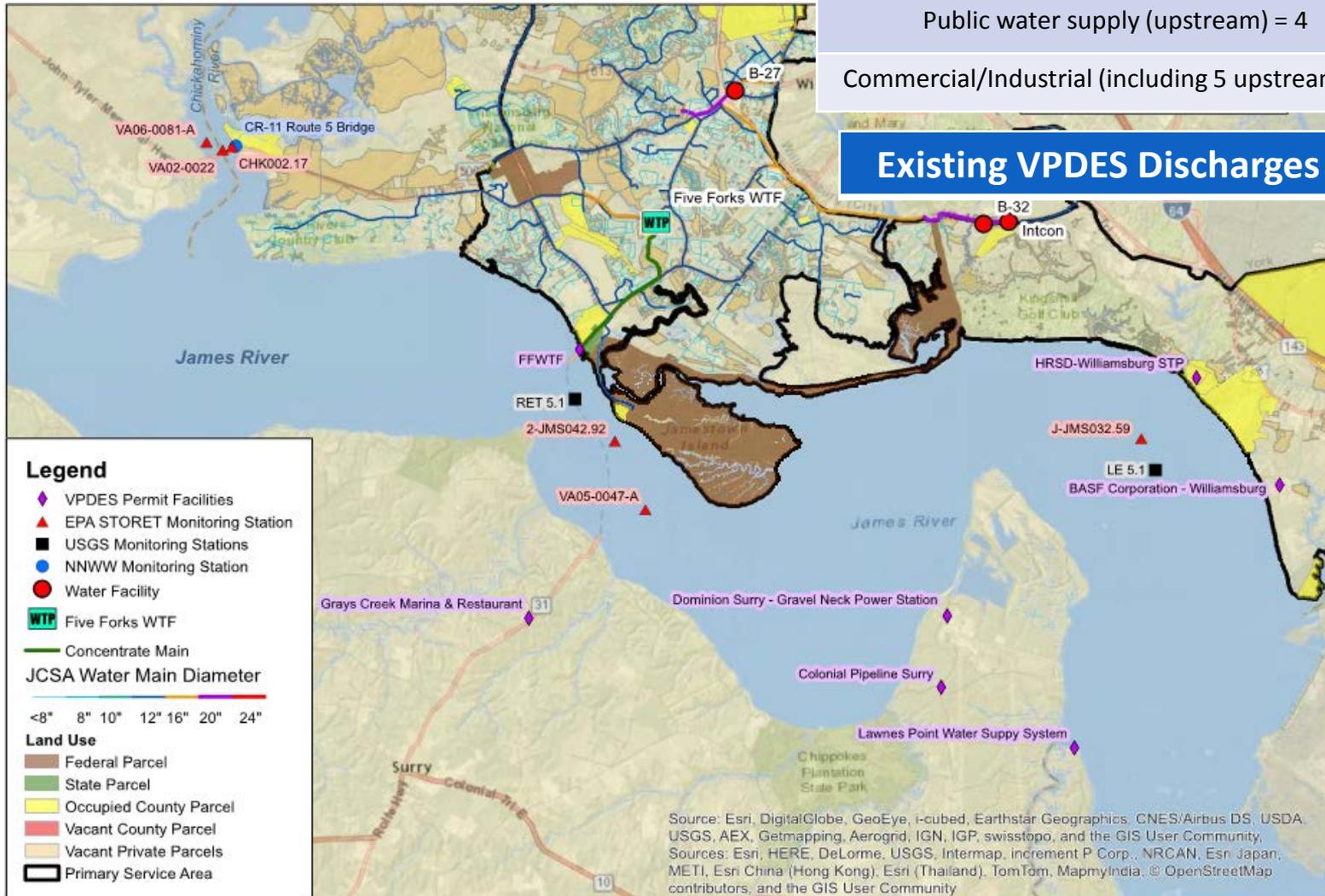
James River

Existing Withdrawals

Public water supply (upstream) = 4

Commercial/Industrial (including 5 upstream) = 6

Existing VPDES Discharges = 7



York River

Existing Withdrawal

(approx. 21 miles downstream of proposed intake)

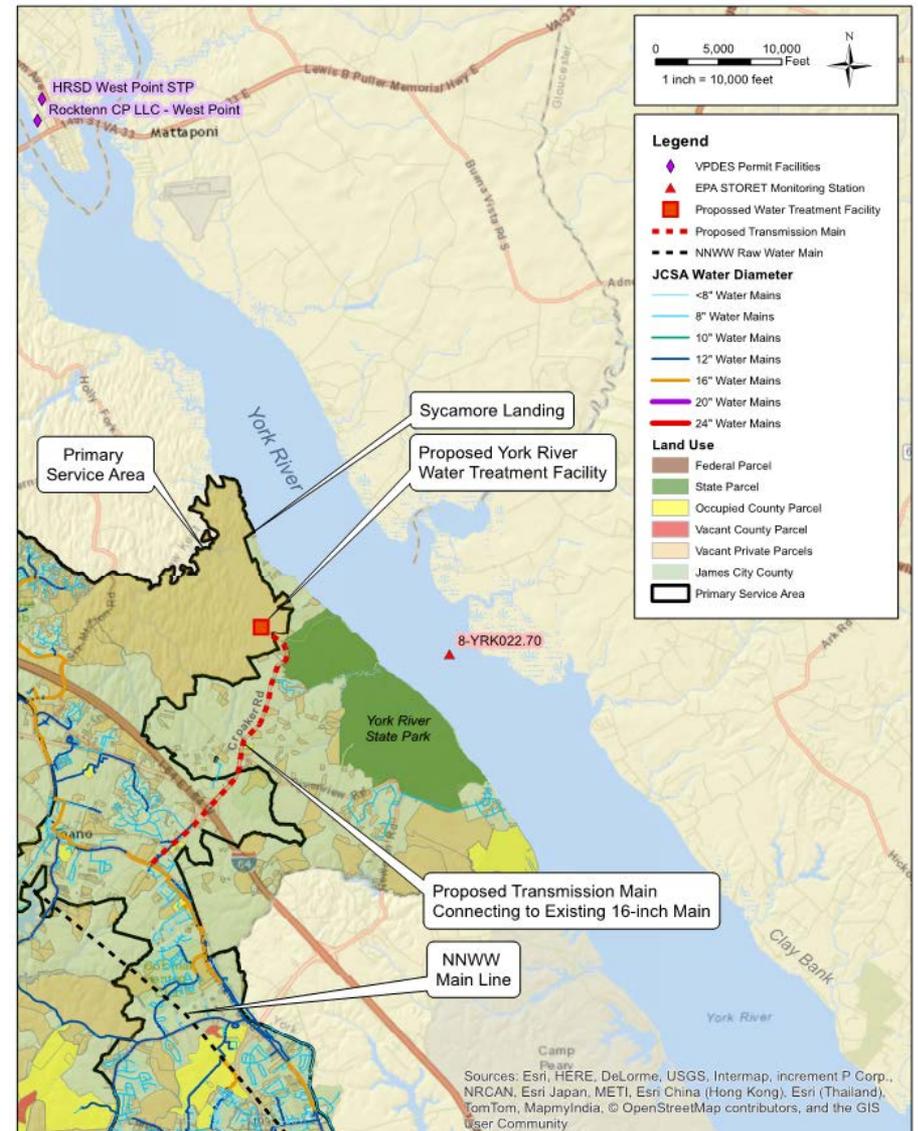
Yorktown Fossil Power Plant
(cooling water)

Existing VPDES Discharges

(approx. 10 miles upstream of proposed intake)

Pulp mill owned by Rocktenn CD LLC –
West Point

HRSD West Point sewage treatment
plant



Chickahominy River

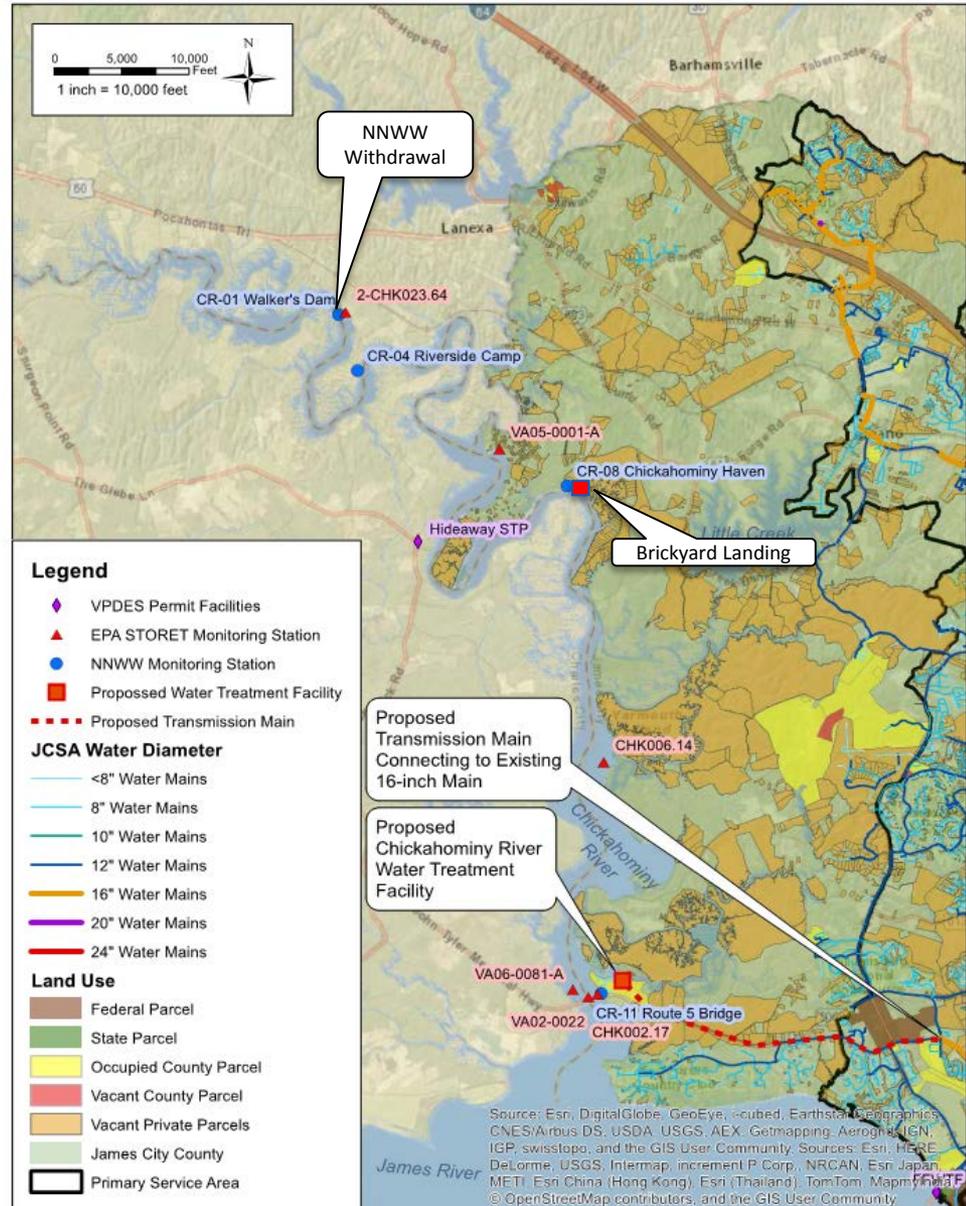
Existing Withdrawal

Newport News Waterworks (NNWW)

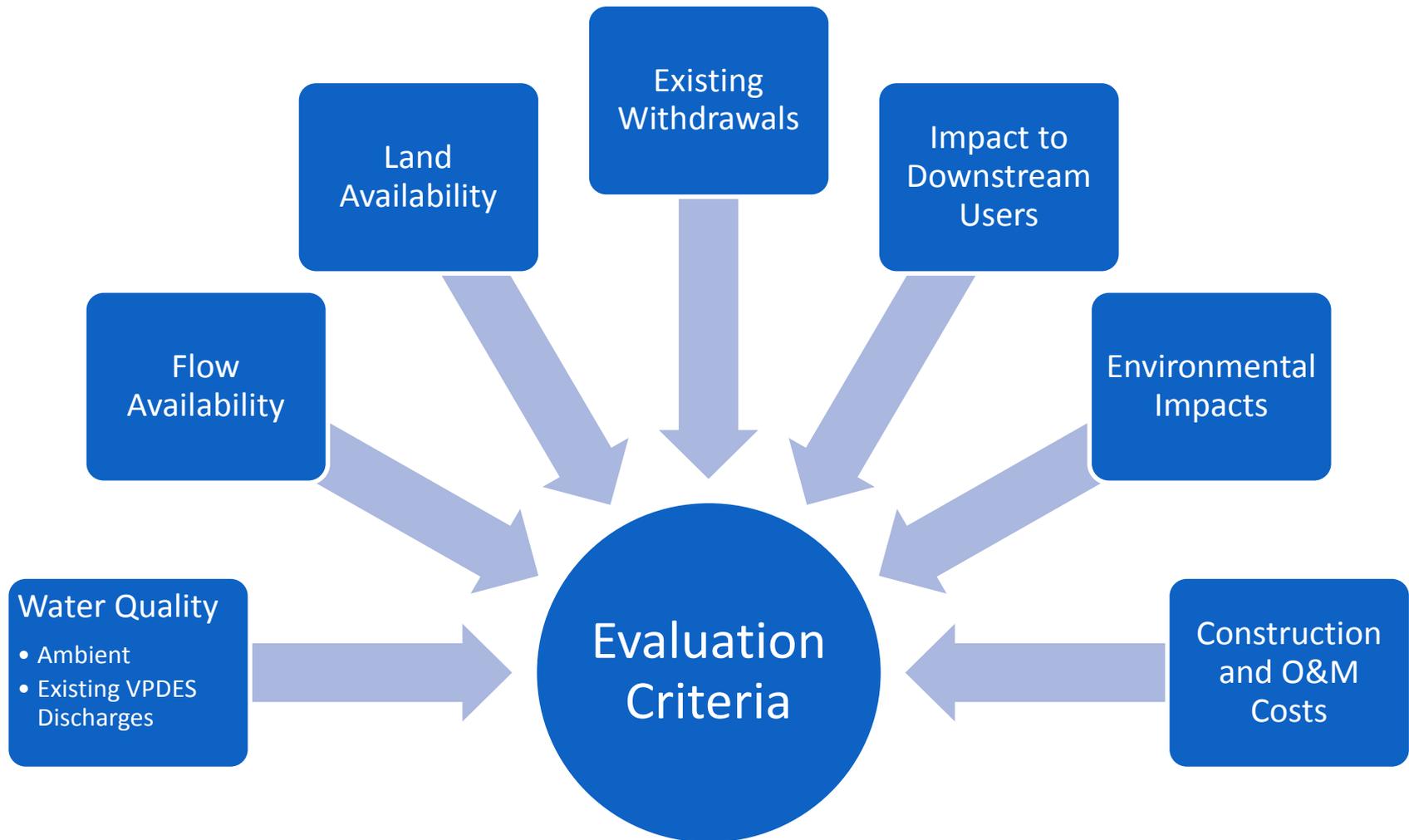
- Above Walker's Dam
- Drainage area = 301 sq mi
- Average river flow = 180 mgd
- MIF = 10 cfs (6.5 mgd)

Existing VPDES Discharge

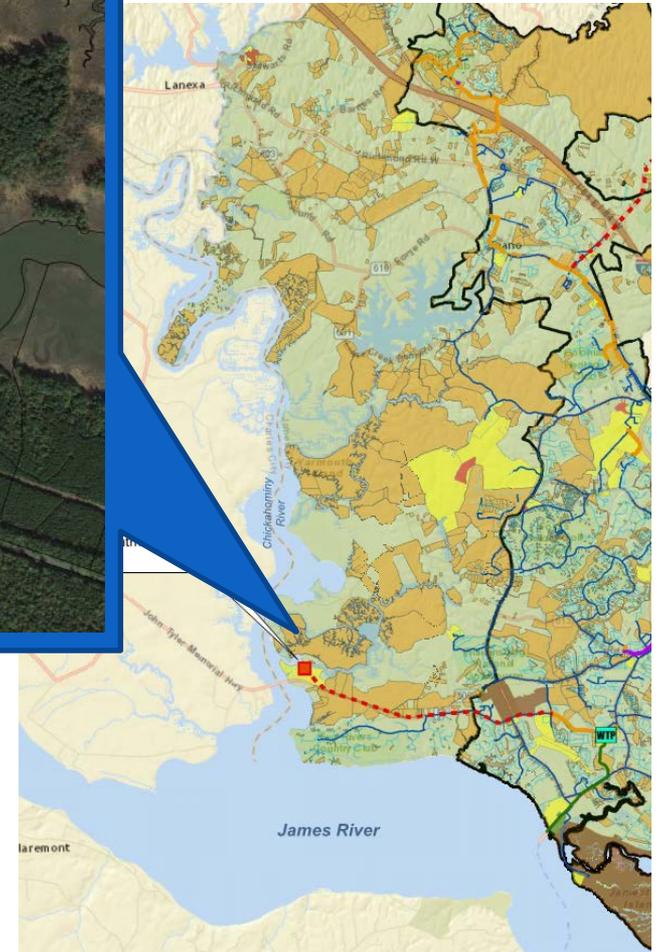
Hideaway Sewage Treatment Plant (Mount Airy)



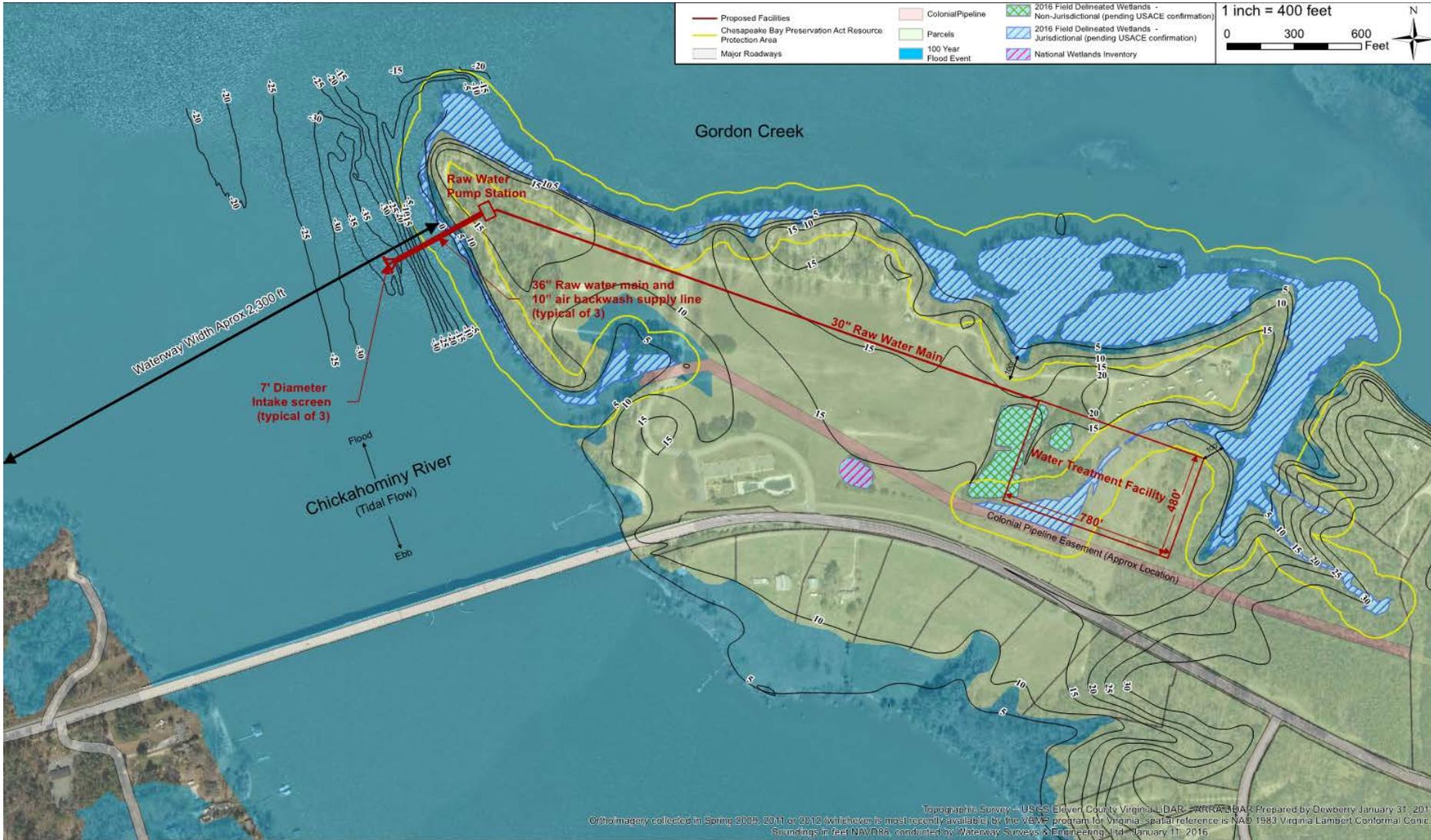
How was site selected?



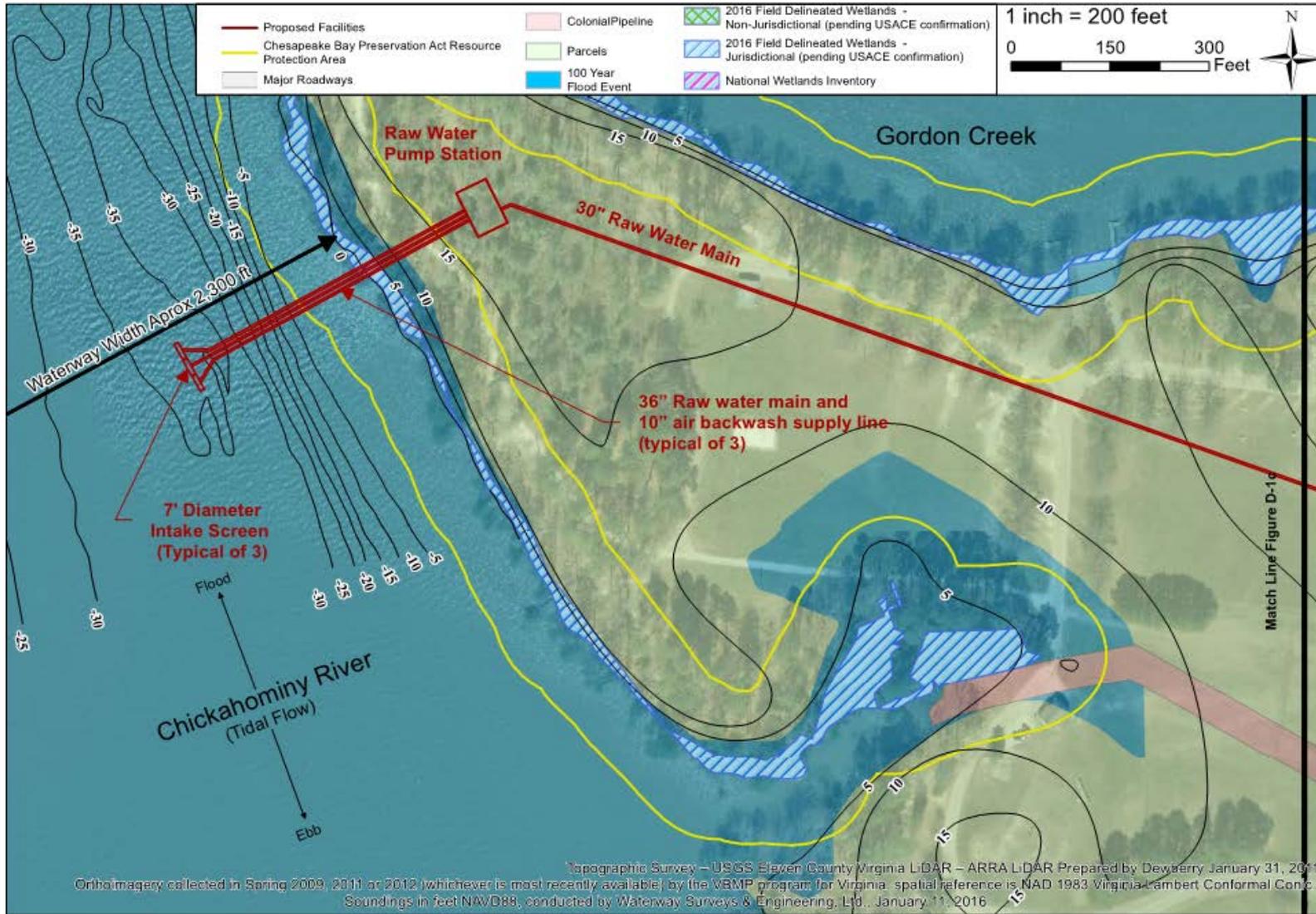
Chickahominy Riverfront Park



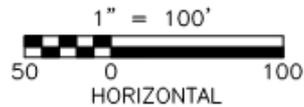
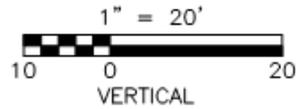
Conceptual Site Plan



Conceptual Site Plan – Raw Water Intake

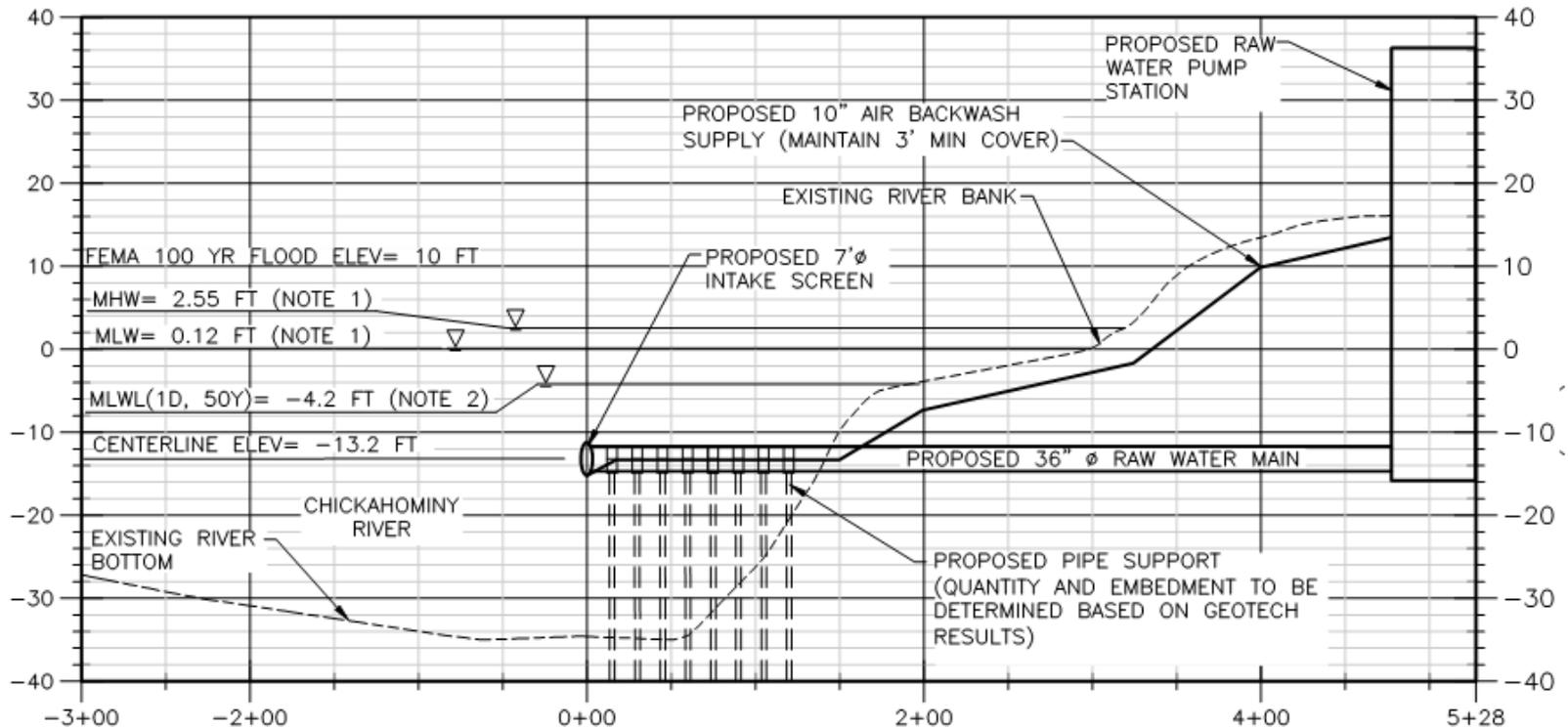


Raw Water Intake Profile



NOTES:

1. MHW AND MLW LEVEL BASED ON NOAA SEWELL'S POINT MONITORING DATA.
2. MINIMUM LOW WATER LEVEL BASED ON 1 DAY, 50-YR RECURRENCE, NOAA SEWELL'S POINT MONITORING DATA.



Ways to Mitigate Impacts

Aesthetic Quality (Scenic River)

- Submerged intake and pipe

Aquatic Life/ Anadromous Fish/ Atlantic Sturgeon

- Impingement/entrapment prevention (1.0 mm screen mesh; 0.25 fps flow-through velocity)
- Instream work time of year restriction
- Modeling to determine impact of withdrawal and concentrate discharge on salinity gradient

Archaeological Resources

- Locating treatment facility on east side to avoid impact to archaeological resources primarily on west side
- Coordination with DHR and potential field surveys

Botanical Significance

- Locating intake away from cypress-gum swamp forests and bottomland hardwood forests on south shore of Gordon Creek and submerged aquatic vegetation (SAV) beds

Ways to Mitigate Impacts

Navigation

- Intake and pipe located closer to shore than midstream
- Intake velocities low compared to normal flow – no noticeable effect on navigation due to river flow changes
- Work with Coast Guard on type of hazard warning requirements

Parks and Recreation

- Locate treatment facility on east side of property to try to preserve recreational use (boat launch access and open field)

Existing Discharge Assimilation

- Tidally influenced, low-velocity, low-volume withdrawal not anticipated to appreciably affect river's ability to assimilate discharges from upstream sources

Beneficial Impacts

Groundwater

- Reduces withdrawal from Eastern Virginia Groundwater Management Area, allowing for aquifer recharge
- Replenishing aquifer improves baseflow for perennial streams in Chickahominy River watershed

Water Supply

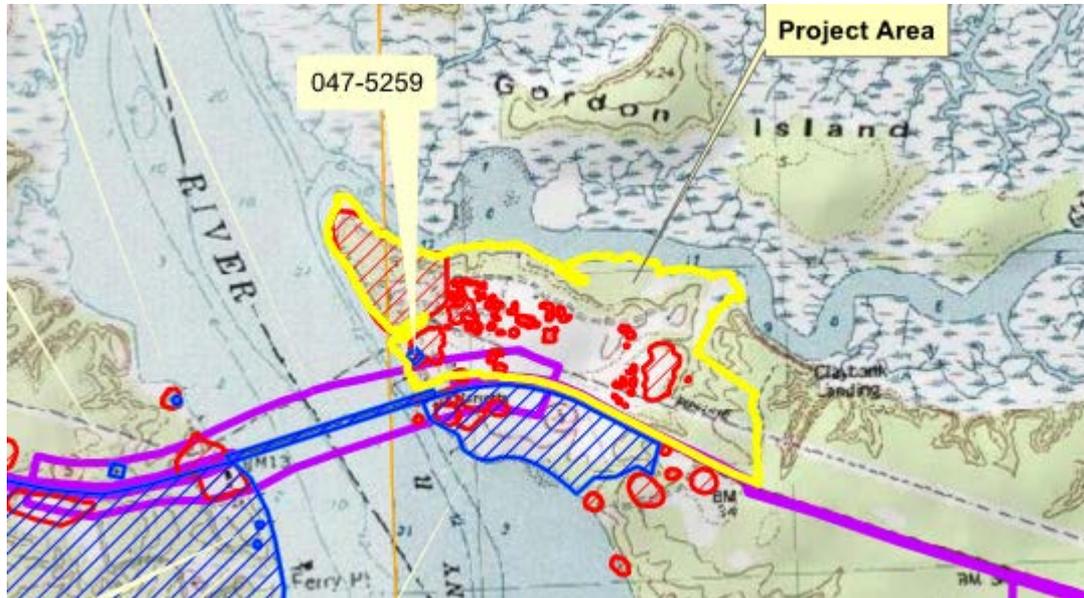
- Public water supply to meet long-term projected demands of James City County residents

References

- <http://www.jamescitycountyva.gov/611/James-City-Service-Authority>
- Burton & Associates. 2015. *James City Service Authority Water & Sewer Rate Study Final Report.*
- CDM Smith. 2015. *Water Supply Study Final Draft Report.*
- CDM Smith. 2016. *Chickahominy River Brickyard Landing Raw Water Supply Feasibility Study.*
- Hampton Roads Planning District Commission. 2011. *Hampton Roads Regional Water Supply Plan.*
- Norfolk District Army Corps of Engineers. 1997. *Final Environmental Impact Statement (EIS), Main Report - Volume I, Regional Raw Water Study Group Lower Virginia Peninsula Regional Raw Water Supply Plan.*
- Stephenson, K. and Abt Associates. 2014. *An Investigation of the Economic Impacts of Coastal Plain Aquifer Depletion and Actions That May Be Needed to Maintain Long-Term Availability and Productivity.*

Questions/Comments

Archaeological Resources

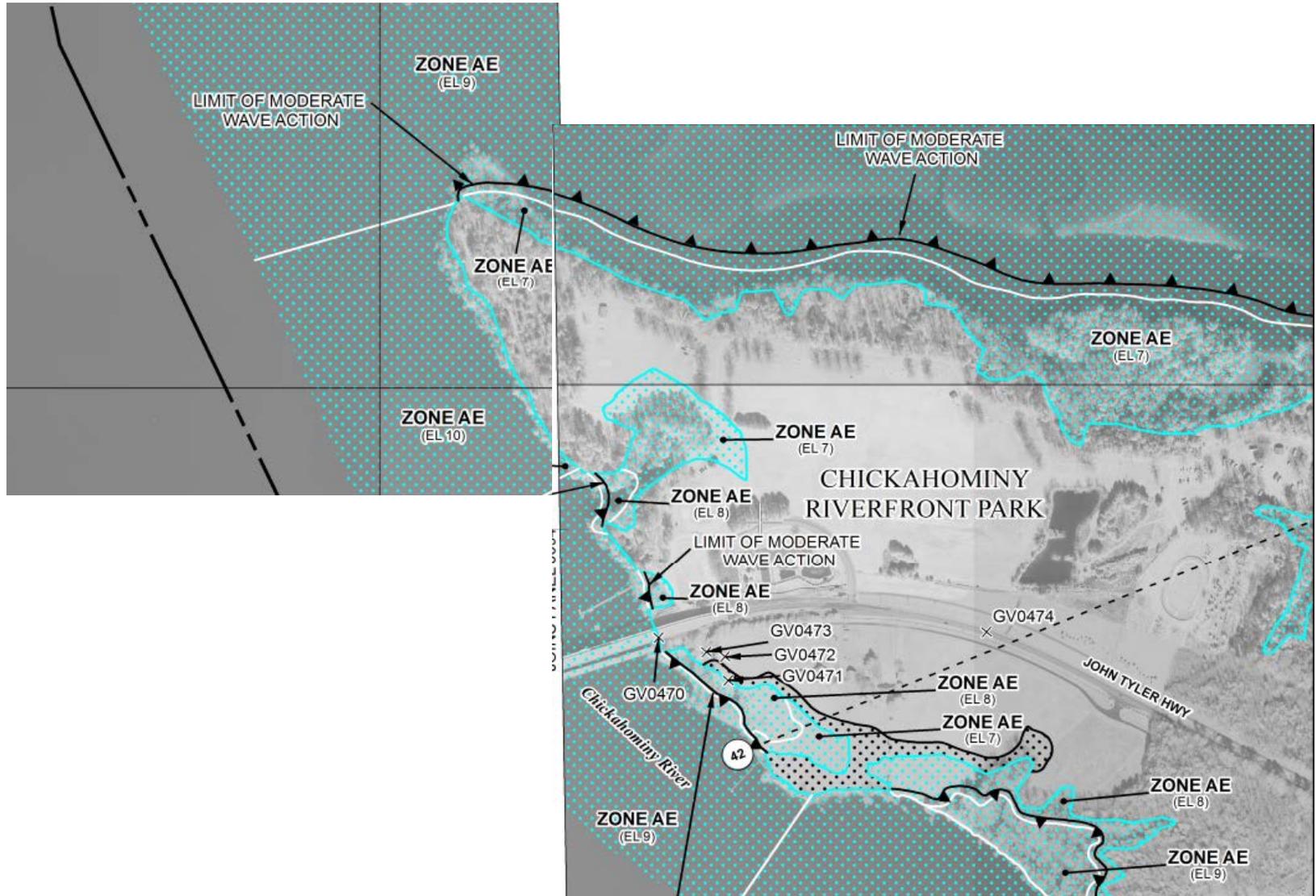


James City Service Authority
Chickahominy Riverfront Raw Water Supply
1350 John Tyler Memorial Hwy
Williamsburg, VA 23185
February 03, 2016
L. Leake

Legend

-  Selected AH Resources
-  1 Mile Search Radius
-  Area_of_Potential_Effects_20160120
-  Architecture Resources
-  Archaeological Resources
-  Phase I CRM Survey Areas

FEMA 100-Yr Flood Elevation



Submerged Aquatic Vegetation Beds (SAVs)

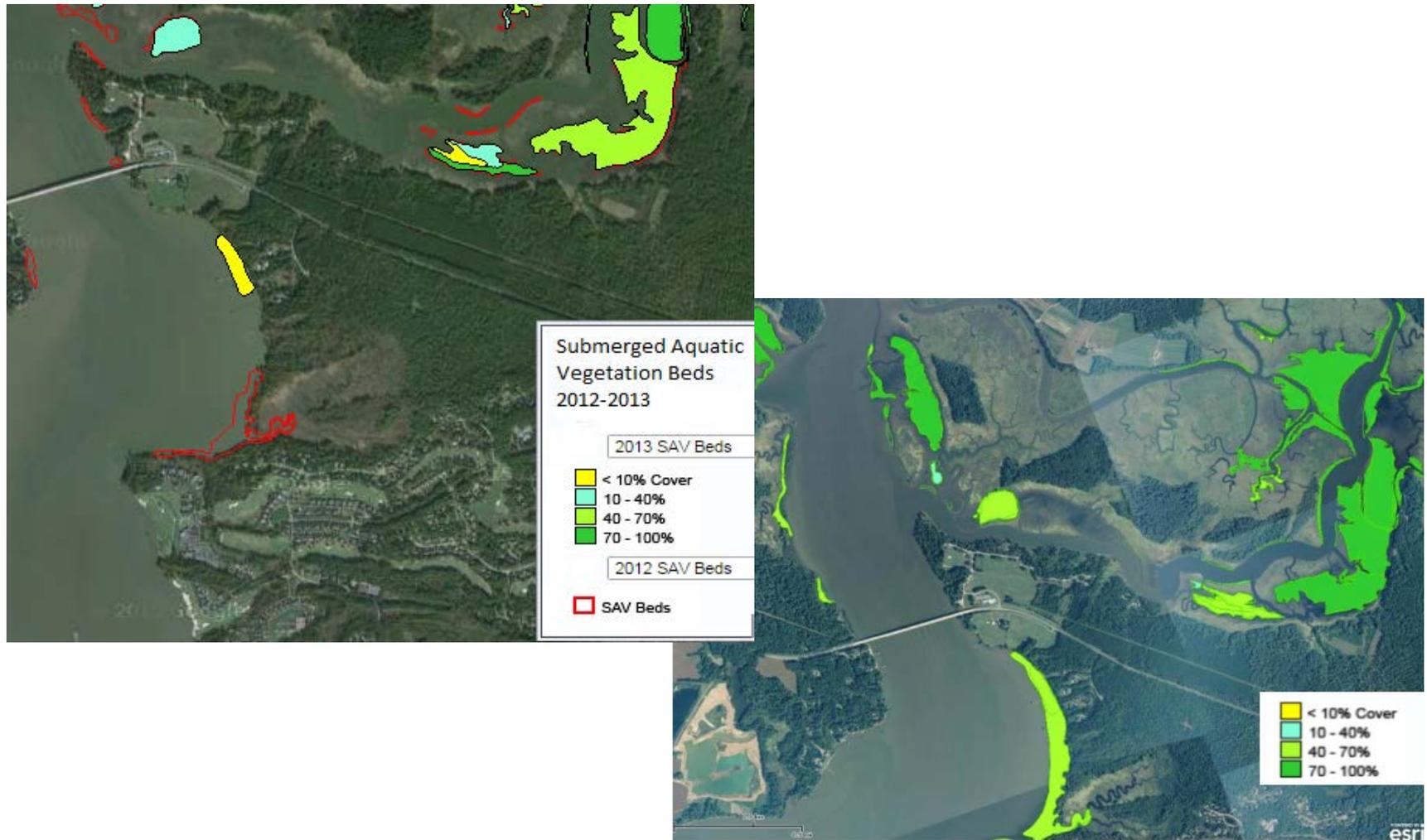


Figure 1. Submerged aquatic vegetation beds 2013-2015 (Virginia Institute of Marine Science)

Raw Water Quality

	TDS, Average (mg/L)	TDS, Max (mg/L)
Chickahominy River at Brickyard Landing	1,100	7,000
Chickahominy Riverfront Park	1,700	8,800
James River	5,600	12,500
York River	10,000	16,820

Cost Estimates

	4 mgd	8 mgd	12 mgd
Chickahominy Riverfront Park ¹	\$106M	\$128M	\$149M
Chickahominy River at Brickyard Landing ¹	\$106M	\$127M	\$148M
James River ²	\$99M	\$122M	\$144M
York River ¹	\$113M	\$138M	\$162M

Notes:

1. Need to refine cost for concentrate discharge main after location is identified.
2. Need to refine cost for RW transmission, concentrate discharge main, and finished water main after site is identified.

NNWW Cost

MB = Mounts Bay Road
Interconnection

LT = Lightfoot Connection

Scenario A: MB=2 mgd

Infrastructure = \$6M

Scenario B: MB = 2mgd, LT = 2 mgd

2nd Payment w/debt service	\$60M
Infrastructure Improvements	15M
Disinfection Improvements	<u>2M</u>
Total	\$77M

Scenario C: LT = 4 mgd

2nd Payment w/debt service	\$60M
Infrastructure Improvements	17M
Disinfection Improvements	<u>2M</u>
Total	\$79M