Saltwater Intrusion Study for Anne Arundel County, MD

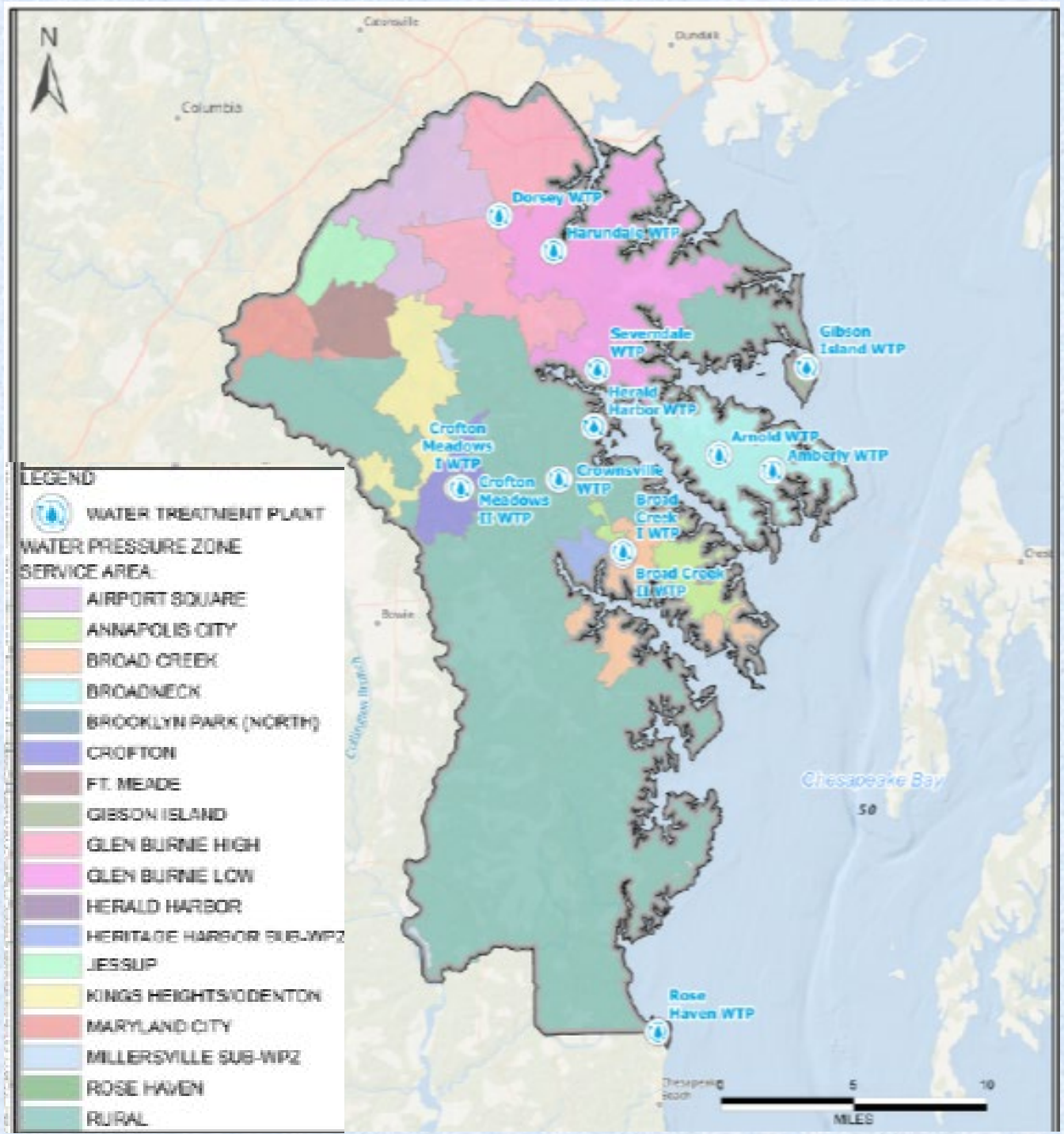
STAC Workshop
March 27, 2026

Presented by James (Jimmy) Howard, P.E.


WSSC Water
Service Area
MONTGOMERY COUNTY
PRINCE GEORGE'S COUNTY
WASHINGTON D.C.
Little Monocacy
Monocacy
Patuxent North
Upper Potomac
Seneca Creek
Muddy Branch
Rock Creek
Northwest Branch
Paint Branch
Parkway
Horsepen
Watts Branch
Cabin John
Dulles Interceptor
Northeast Branch
Rock Run
Little Falls
Sligo Creek
Lower Anacostia
Beaverdam Branch
Western Branch
Oxon Run
Patuxent Center
Broad Creek
Potomac River
Piscataway Creek
Patuxent South
Potomac River South
Mattawoman
Zekiah Swamp
Baltimore
Baltimore
Pikesville
Patapsco Valley State Park
Rosedale
Catonsville
Patuxent River State Park
Columbia
Bethesda
Washington
DC
Alexandria
Camp Springs
Clinton
Waldorf
Bowie
National Capital Parks
Chester
Chesapeake Beach
Huntingtown
Annapolis
ANNE ARUNDEL COUNTY
MARYLAND
CITY OF ANNAPOLIS
ANNAPOLIS
Maryland
Baltimore City Water Facilities
FACILITIES MANAGED BY AND SERVICE AREAS SERVED BY DC WATER
MONTGOMERY COUNTY
LOUDOUN COUNTY
FAIRFAX COUNTY
PRINCE GEORGE'S COUNTY
DC
ARLINGTON COUNTY
Anacostia River
Potomac River
Blue Plains Advanced Wastewater Treatment Plant
Blue Plains Service Area
Jurisdictional Boundaries
Potomac Interceptor
Blue Plains Advanced Wastewater Treatment Plant
AA

AA County Water

- 100% Groundwater sourced
- 38 Million gallons of water produced daily
- 9 Water Treatment Plants (several self-contained wells that may be brought back online in the future)
- 52 production wells
- 137K Water accounts. Approximately half of the 600K population is served by public water, the rest are private wells.
- 0 Permit violations



Anne Arundel County Aquifers

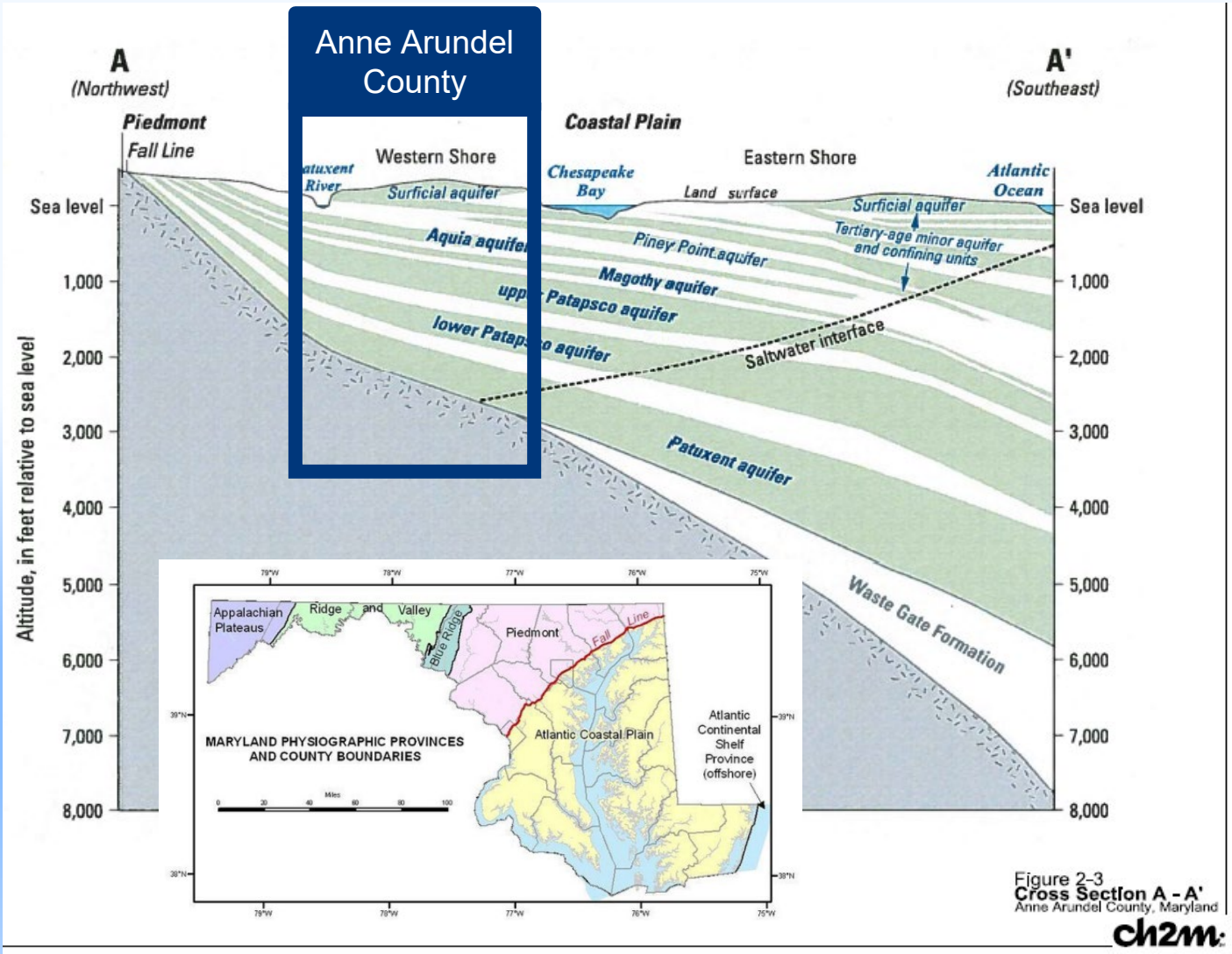


Figure 2-3
Cross Section A - A'
Anne Arundel County, Maryland

ch2m:

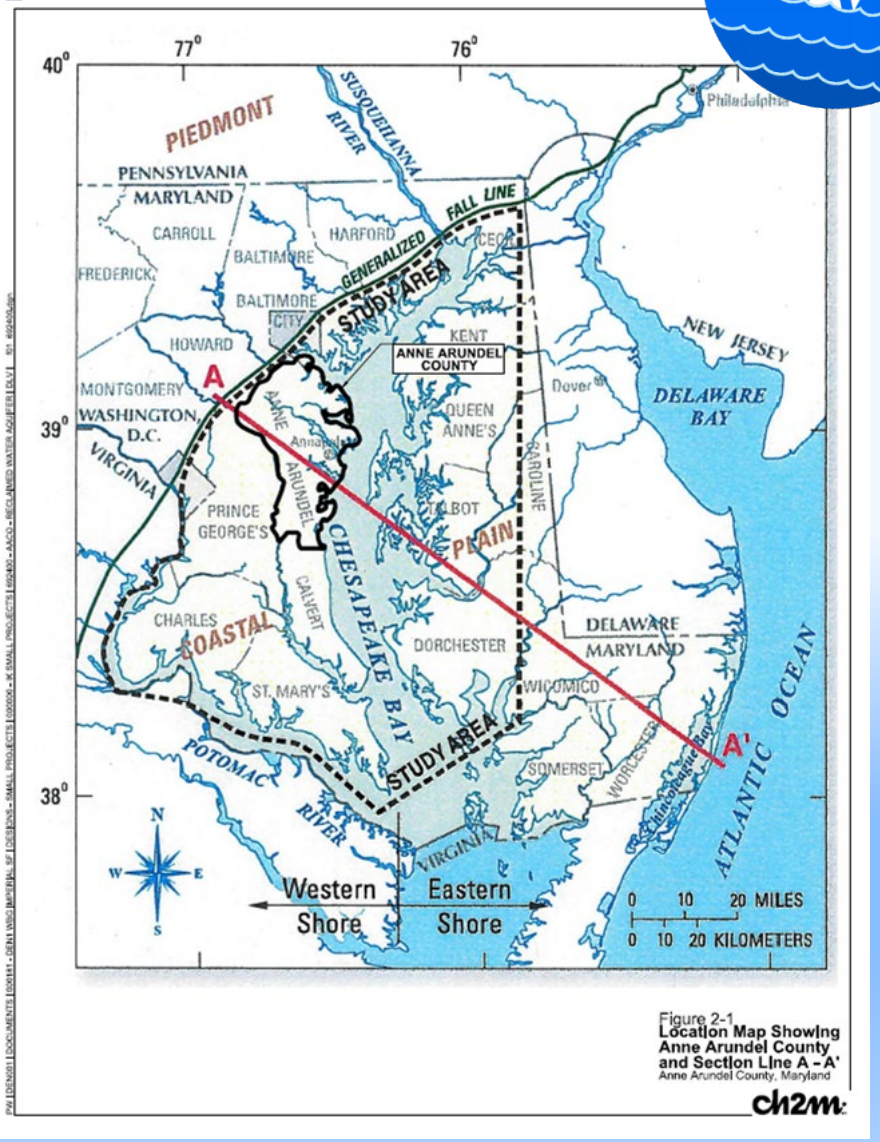
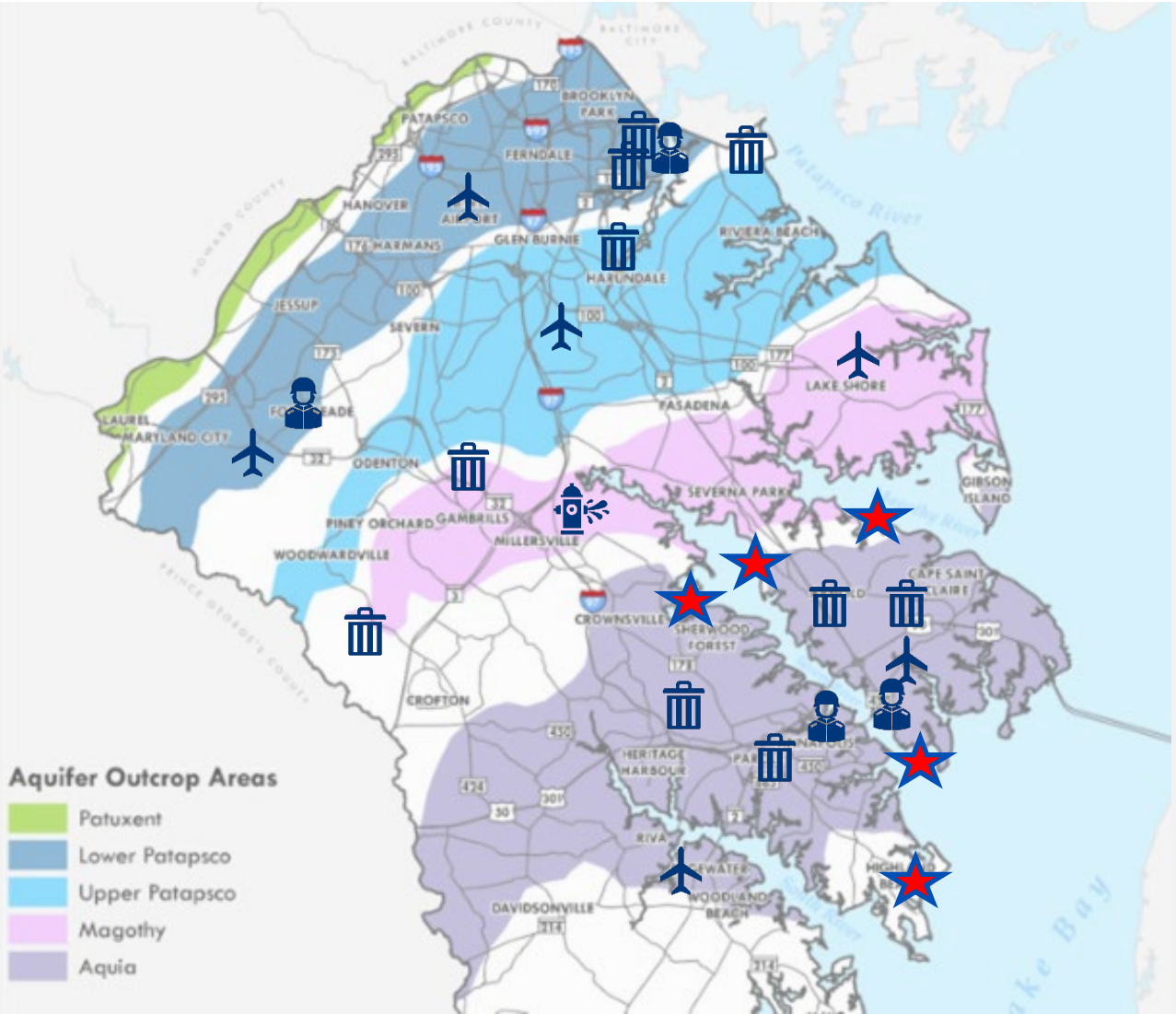


Figure 2-1
Location Map Showing Anne Arundel County and Section Line A - A'
Anne Arundel County, Maryland

ch2m:

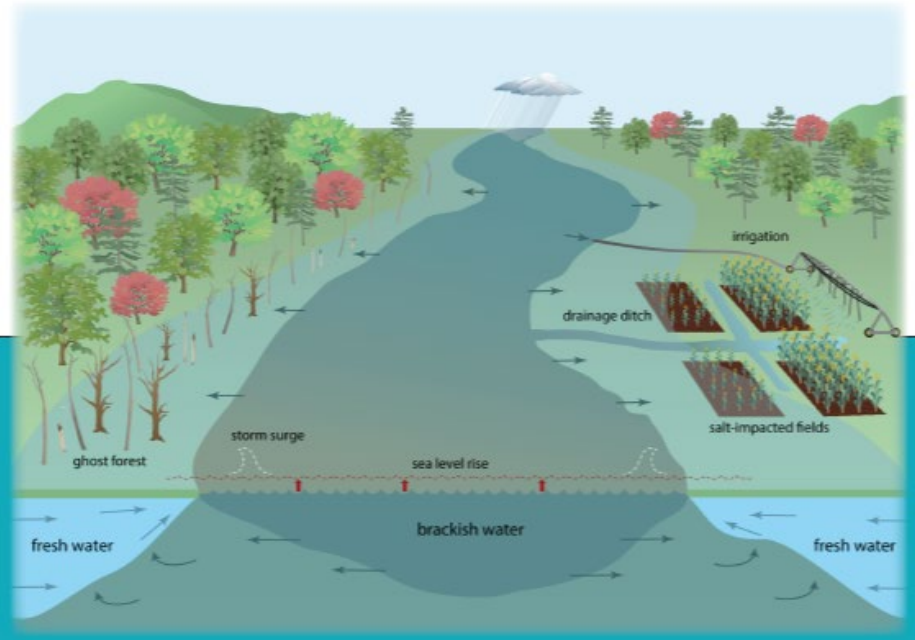
County Aquifer Recharge Areas



- Airport
- Landfill
- Military
- Fire Training Academy
- Saltwater Intrusion into private wells

State Publications

Maryland's Plan to Adapt to Saltwater Intrusion and Salinization



Prepared by the Maryland Department of Planning
December 2024

Department of Natural Resources
Resource Assessment Service
MARYLAND GEOLOGICAL SURVEY
Emery T. Cleaves, Director

REPORT OF INVESTIGATIONS NO. 62

GEOHYDROLOGIC FRAMEWORK, GROUND-WATER QUALITY AND FLOW, AND BRACKISH-WATER INTRUSION IN EAST-CENTRAL ANNE ARUNDEL COUNTY, MARYLAND

by
William B. Fleck
U.S. Geological Survey
and
David C. Andreasen
Maryland Geological Survey

With a section on
SIMULATION OF BRACKISH-WATER INTRUSION IN THE AQUIA AQUIFER IN THE ANNAPOLIS AREA USING A SOLUTE-TRANSPORT MODEL
by
Barry S. Smith
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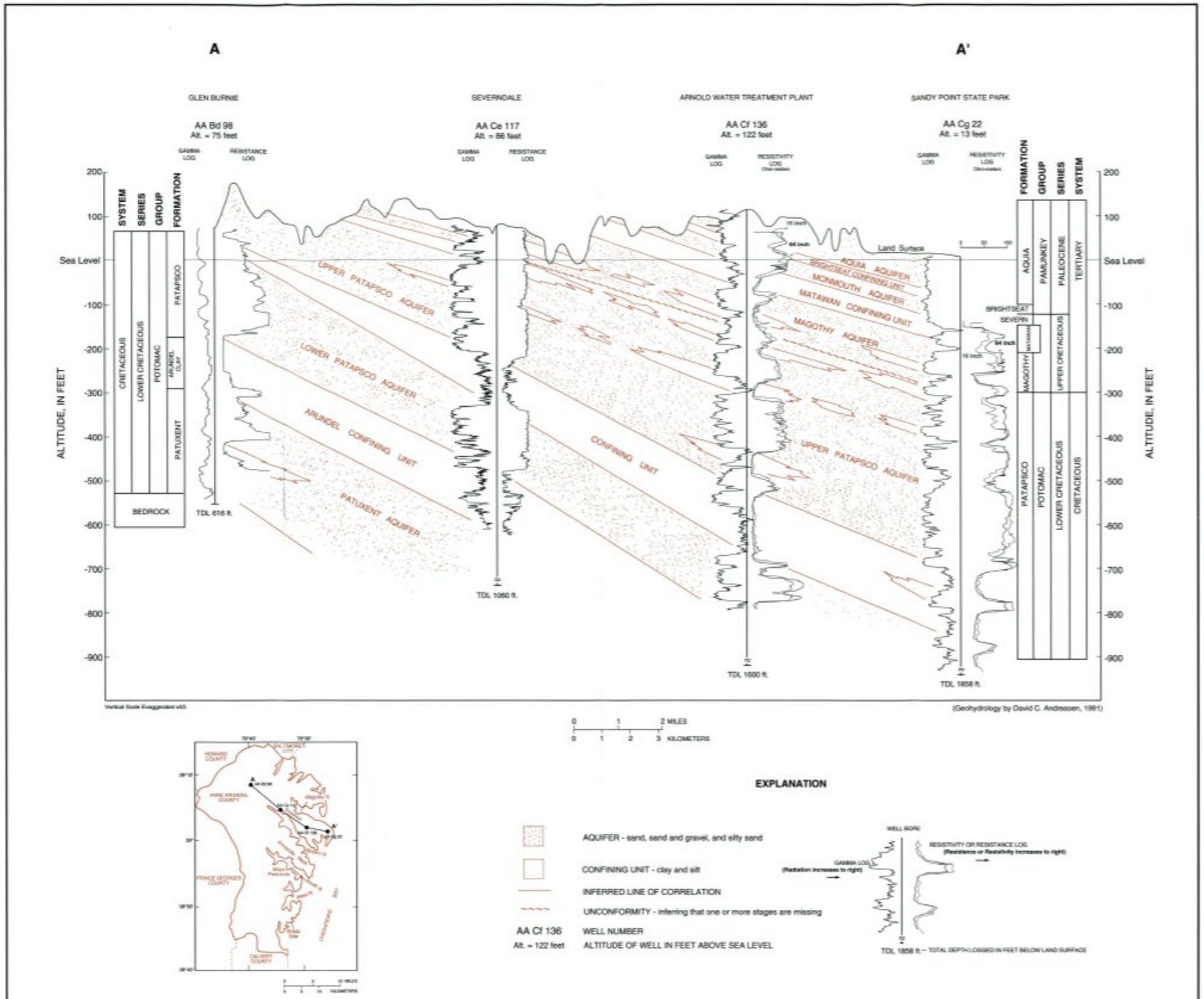

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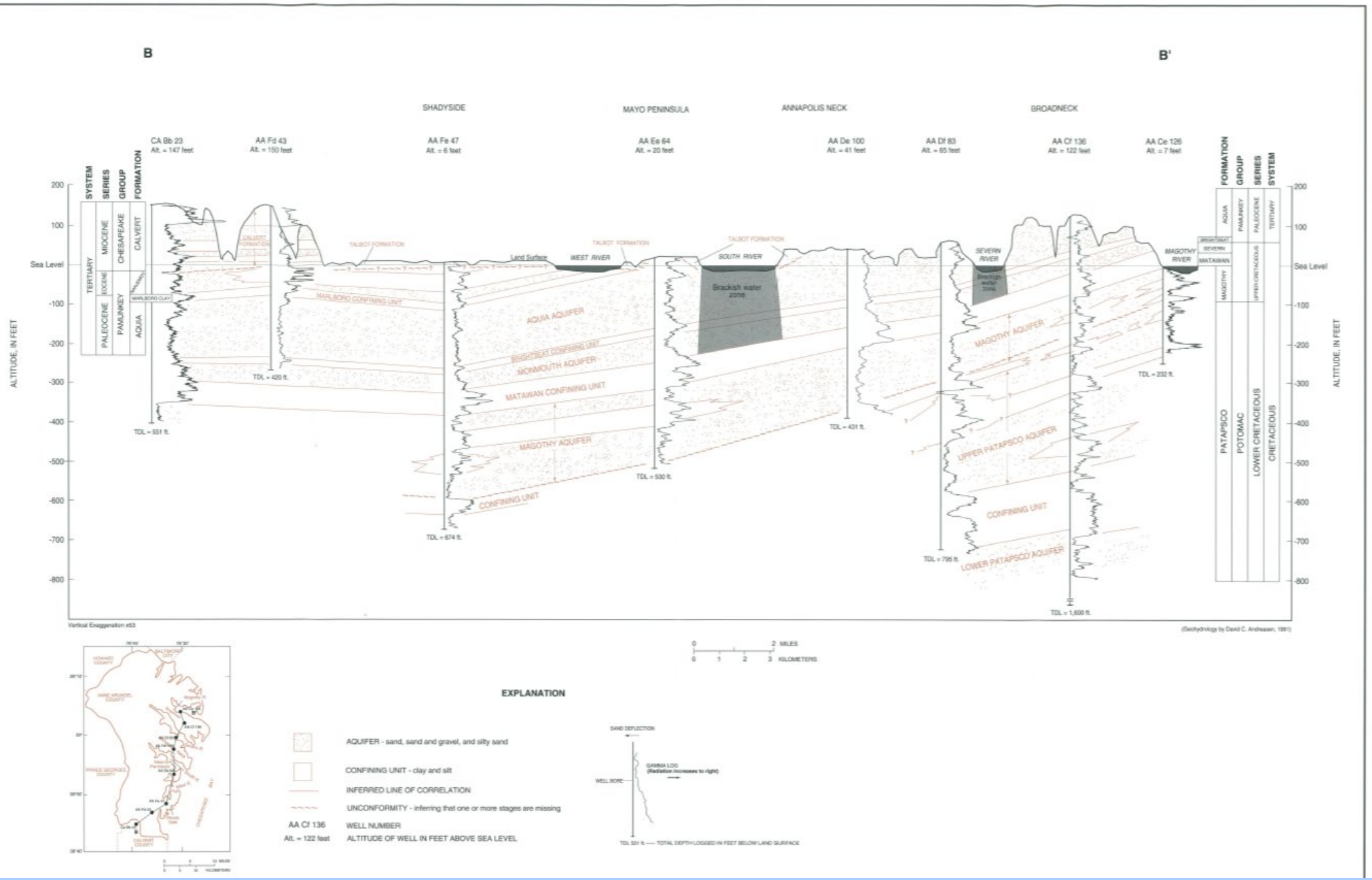

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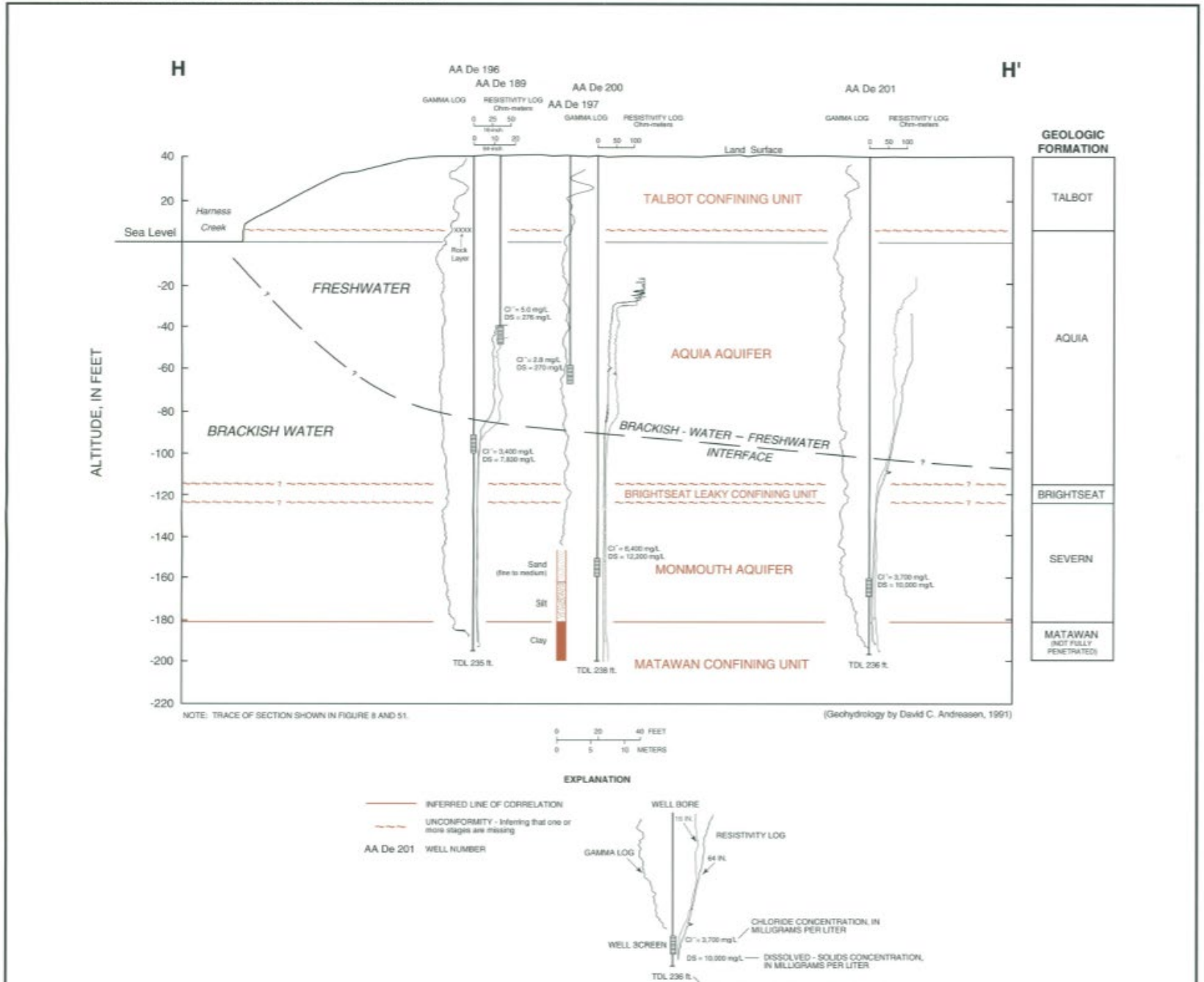
Plate 5. – **Cross section of Quiet Waters Park showing geologic formations, geohydrologic units, location of wells, geophysical logs, and the interface of brackish water and freshwater in the Aquia and Monmouth aquifers, Anne Arundel County, Maryland.**



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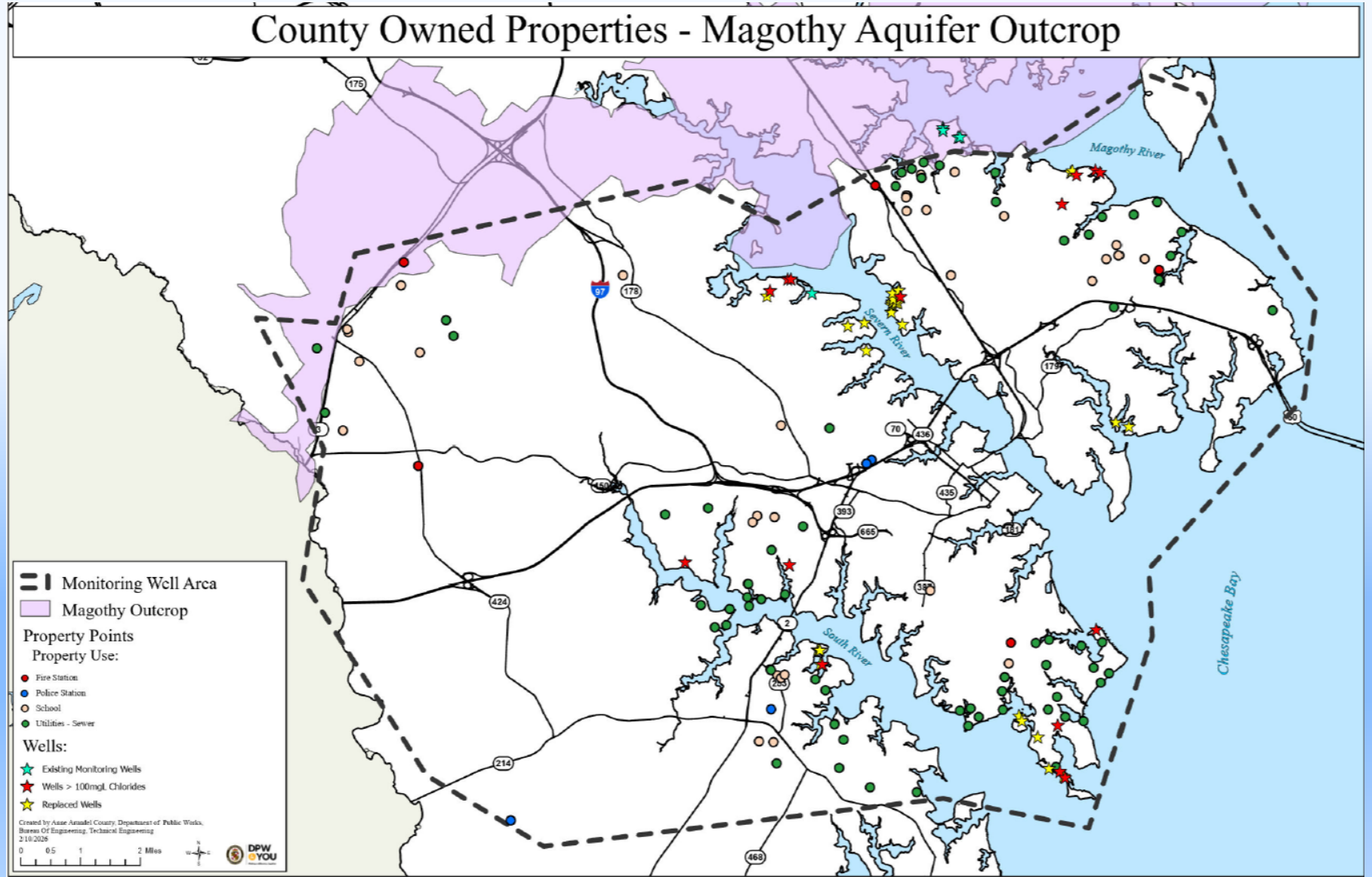
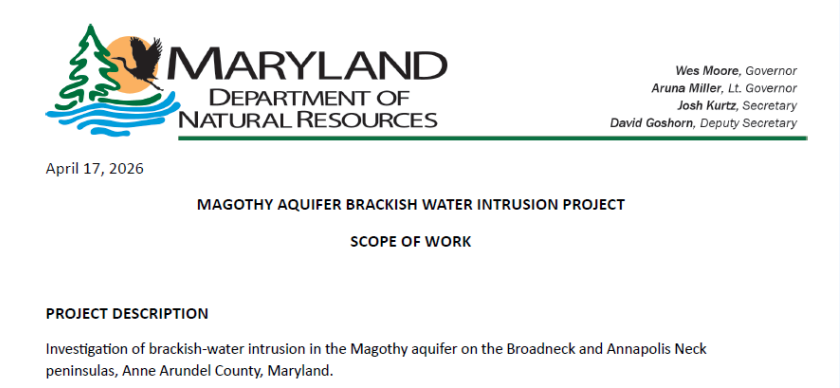
Saltwater Intrusion into the Magothy Aquifer study area



MGS Magothy Brackish Water Intrusion Project



MARYLAND DEPARTMENT OF NATURAL RESOURCES

Wes Moore, Governor
Aruna Miller, Lt. Governor
Josh Kurtz, Secretary
David Goshorn, Deputy Secretary

April 17, 2026

MAGOTHY AQUIFER BRACKISH WATER INTRUSION PROJECT

SCOPE OF WORK

PROJECT DESCRIPTION

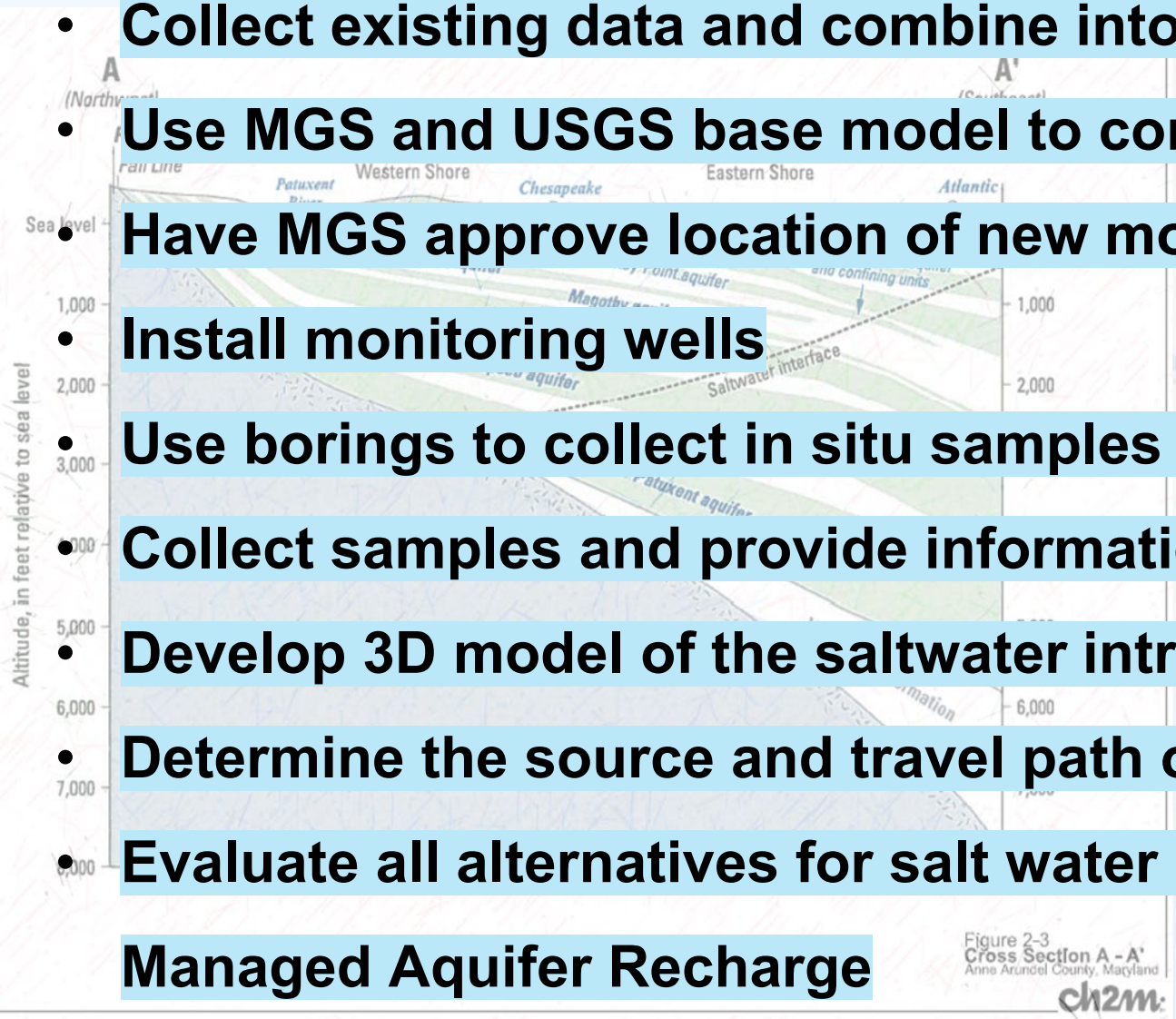
Investigation of brackish-water intrusion in the Magothy aquifer on the Broadneck and Annapolis Neck peninsulas, Anne Arundel County, Maryland.

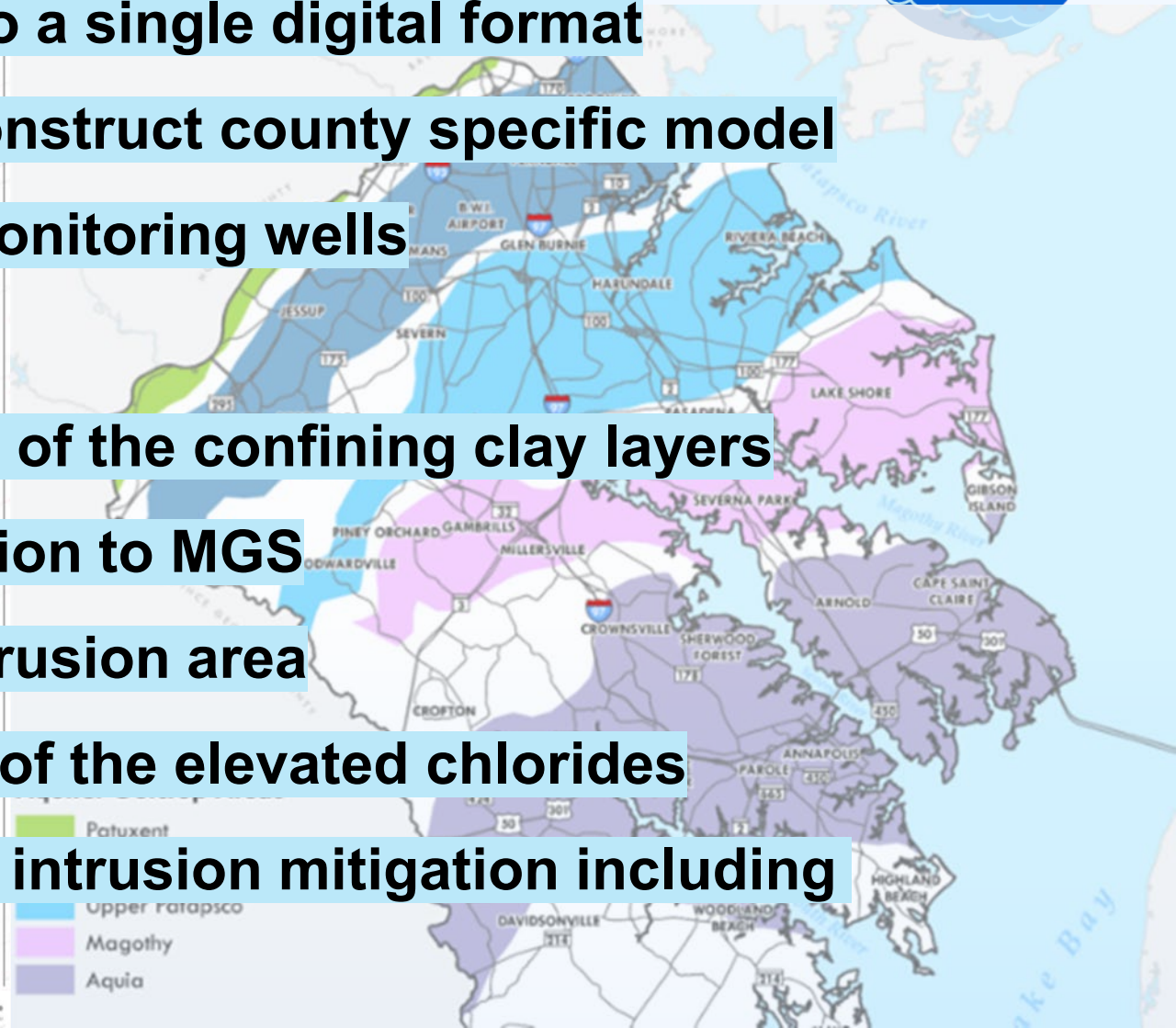
Objectives: The chief objectives of the project are:

1. Determine the geographic extent and vertical distribution of elevated chlorides in groundwater from the Magothy Aquifer in the study area to the extent possible.
2. Investigate the geochemical signature of high-chloride groundwater to help determine the source (i.e. brackish bay water vs. septic or water treatment system effluent).
3. Establish a monitoring well network to collect samples, measure water levels, and monitor water quality changes using induction logging in future years.
4. Refine the hydrogeologic framework of the study area using data from test drilling and coring, geophysical logging, hydraulic testing, and compilation of existing hydrogeologic datasets.

Next Steps

- Collect existing data and combine into a single digital format
- Use MGS and USGS base model to construct county specific model
- Have MGS approve location of new monitoring wells
- Install monitoring wells
- Use borings to collect in situ samples of the confining clay layers
- Collect samples and provide information to MGS
- Develop 3D model of the saltwater intrusion area
- Determine the source and travel path of the elevated chlorides
- Evaluate all alternatives for salt water intrusion mitigation including Managed Aquifer Recharge





Our wAAter.

THE ANNE ARUNDEL CLEAN WATER PROGRAM

Thank you!