RESILIENCE AUTHORITY

Annapolis and Anne Arundel County

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The Cost of Climate Change

- The global cost of climate change damage is estimated to be between $1.7 trillion and $3.1 trillion per year by 2050.
- New York City's Financial District and Seaport Climate Resilience Project: $7 B.
- United States Naval Academy's Farragut Field Sea Wall Resilience Project: $37.5M.
- Annapolis City Dock Park Resiliency Project project construction costs: $72.1M.

About Us

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Who We Are

[Future Proofing Anne Arundel]

Recognizing that local governments bear the **burden of building, maintaining, and upgrading infrastructure to withstand the effects of climate change and protect the environment**, the Maryland General Assembly passed SB457 (Chapter 236) in 2020 to enable local jurisdictions to form Resilience Authorities. These nonprofit, independent bodies can help cities and counties identify, obtain, and allocate financing for large scale infrastructure projects.

The Resilience Authority of Annapolis and Anne Arundel County (Resilience Authority) was created in 2021 to:

- **oversee, coordinate, and implement** projects that enhance environmental and community resilience.
- **manage resources, secure funding, and drive initiatives** that mitigate risks associated with climate change, natural disasters, and other vulnerabilities
- **ensure projects are strategically aligned** with broader community goals and that they have the necessary oversight to be effectively executed.

Key Milestones

A Resilience Authority enables a local jurisdiction to flexibly organize funding structures and manage large-scale infrastructure projects specifically aimed at addressing the effects of climate change, including sea-level rise, flooding, increased precipitation, erosion, drought, and heatwaves.

2020

Passed on May 8, 2020, Maryland's Senate Bill 457 (Chapter 236) authorizes local governments to establish and fund a Resilience Authority under local law, outlines the requirements to do so, and specifies the powers local governments may grant to an Authority.

2021

On June 8, 2021, the Anne Arundel County Council passed legislation to create the nation's first multi-jurisdictional Resilience Authority to finance and support the construction of resilience infrastructure.

2022

On September 28, 2022, Anne Arundel County Executive Steuart Pittman and City of Annapolis Mayor Gavin Buckley announced the first appointments to the Board of Directors for the Resilience Authority.

2023

On September 15, 2023, the Resilience Authority exceeded $20 million in federal, state, local, and private funding to protect Anne Arundel County's shorelines, communities, and residents from climate threats taking some of the burden off of local taxpayers.

2024

On October 24, 2024, celebrated the completion of the Resilience Authority's first project—the restored coastal floodplain at Jabez III. This project marks a significant milestone in protecting our communities from flooding while enhancing natural resilience.

Leadership and Staff

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The Board of Directors serves as the governing body for the authority which will work with residents to set priorities, and the City and County to develop a project portfolio. The Board's diverse background of experience and knowledge will help the Authority secure funding opportunities and implement meaningful projects to prepare the County for sea level rise, increased flooding, heat waves and other extreme weather events.

Executive Committee

Véronique Bugnion Board Chair	**Nathan Betnun** Vice Chair	**Teresa Sutherland** Treasurer	**Emily Clifton** Secretary

City of Annapolis

Nathan Betnun	**Mariah Davis**	**Jared Littman**

Anne Arundel County

Jamie Benoit	**Véronique Bugnion**	**Emily Clifton**	**David Jarrell**
Stacy Schaefer	**Mike Sewell**	**Stacy Schaefer**	

Leadership and Staff

The Resilience Authority Staff is guided by science and works closely with the Board of Directors to create innovative, on-the-ground solutions to combat the effects of climate change in a cost-effective, fiscally responsible way.

Matthew Fleming | Resilience Authority Director
Matt was appointed as the Resilience Authority Director by County Executive Steuart Pittman in December 2022. He has more than 25 years of experience in the areas of coastal restoration, natural resource management, and program administration.

Kristina Perry Alexander | Director of Operations
Kristina serves as Director of Operations for the Resilience Authority. She is a lawyer and former appellate attorney, administrative law judge, general counsel, compliance executive, and senior government lawyer.

Gabe Cohee | Director of Programs
Gabe serves as Director of Programs for the Resilience Authority. He formerly worked at the Department of Natural Resources providing technical and financial resources to communities and governments to address non-point pollution through nature-based and natural solutions.

Benjamin Lewis | Resilience Associate
Ben serves as a Resilience Associate through Governor Moore's Maryland Corps/Service Year Option. Ben is a second-year member of the Department of Service and Civic Innovation's flagship program, having completed a placement with the Maryland Archives as part of the first cohort of Maryland Corps/Service Year Option.

Resilience Authority Advisory Committee

Established in Article 3, Title 8A-103 of the County Code and Title 2, Chapter 2.58.040 of the Annapolis Code of Ordinances - to serve as non-voting advisors to the Resilience Authority. In addition, the Advisory Committee provides a forum for practitioner exchange, to share knowledge and provide opportunities or coordination around the complex issues involved in resilience planning and implementation. Advisory and Partnering Agencies include:

The County Director of Public Works,
The County Director of Emergency Management,
The County Planning and Zoning Officer
The County Senior Environmental Policy Officer
The County Budget Officer
The County Director of Recreation and Parks

The Deputy City Manager for Resilience and Sustainability
The City Director of Public Works
The City Director of the Office of Emergency Management
The City Director of Planning and Zoning
The City Director of Parks and Recreation

Community Planning Liaison Officer NSA Annapolis/PWD Annapolis/USNA

How We Work

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The Resilience Authority is uniquely empowered to levy fees, issue bonds, and invest in critical infrastructure projects that mitigate climate risks. Unlike traditional government departments with broader mandates, the Resilience Authority's singular focus on resilience enables targeted and specialized approaches to addressing these challenges.

One of its most significant powers is the ability to issue bonds, allowing the Authority to raise substantial capital upfront for immediate investment in resilience projects. This funding can be further amplified by leveraging other sources, such as federal grants and private investments, to maximize impact.

By concentrating resources specifically on resilience initiatives, the Resilience Authority ensures these projects receive the focused funding, strategic execution, and attention they require—avoiding the dilution of priorities that often occurs when resilience efforts are bundled with other infrastructure or development programs.

Sources of Revenue

Grants

Grants are one of the most attractive sources of local revenue, as they do not strain local budgets. A key role of the Resilience Authority will be to ensure that Annapolis and Anne Arundel County are highly competitive in securing these federal funds to advance critical resilience initiatives.

Tax Transfer

Resilience Authorities are prohibited from directly assessing or collecting taxes. As such, any tax revenues supporting the Resilience Authority's projects or operations must come through transfers from the two jurisdictions.

Project and Non-Tax-Based Fees

By implementing user-based funding mechanisms, the Resilience Authority can generate sustainable revenue while ensuring equitable contributions from stakeholders who benefit from resilience investments.

Asset-Based Revenues

The Authority can also explore innovative revenue generation by leveraging public assets, including real estate, through approaches like *Community Wealth Funds (CWF)*. This strategy involves consolidating public commercial assets under professional management to maximize their value for the community.

Our Impact

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Our Objectives

Resilience, as defined by our organization, is more than the ability to withstand stresses—it embodies the capacity to thrive under a range of climate-influenced conditions.

Together, we are building a resilient future—one that balances environmental stewardship, social equity, and economic vitality for generations to come. **Achieving this vision requires action across three interconnected priorities...**

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1.

Reducing Greenhouse Gas Emissions

We are dedicated to mitigating the region's contribution to climate change by supporting projects that lower emissions, enhance energy efficiency, and promote renewable energy solutions.

2.

Planning for Climate Adaptation

Anticipating and preparing for inevitable changes—such as rising sea levels, increased storm intensity, and shifting weather patterns—ensures that communities, infrastructure, and ecosystems remain robust in the face of adversity.

3.

Fostering Social Cohesion and Inclusion

Strengthening the social fabric of our communities is integral to resilience. By fostering inclusivity and ensuring that the benefits of climate action reach all residents equitably, we build a foundation for collective strength and shared prosperity.

By the Numbers

$38 Million
Mobilized for climate resilient infrastructure projects since inception.

4580% ROI
Annual operating costs leveraged to secure infrastructure project funding in FY2024

$7.02 Million
Total investment in climate infrastructure projects since inception.

$48.26 Million
Savings in avoided losses and damages due to investments in resilience.

$2.63 Million
Mobilized to advance clean energy projects since inception.

1372 Tons
Carbon emissions reduced since inception.

$1.75 Million
Capital committed to projects in underserved communities to date.

6 Completed
Climate infrastructure projects completed since inception.

18 Active
Climate infrastructure projects currently underway.

36 Communities
Assisted with a climate infrastructure project since inception

45 Jobs
Created or supported through completed projects.

5 Acres
Natural infrastructure restored, enhanced or protected since inception

Our Projects

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Where We Work

The Resilience Authority's mission is rooted in proactive partnerships and decisive action to safeguard the City of Annapolis and Anne Arundel County against climate-related challenges. While not a planning agency, the Resilience Authority works closely with City and County planning departments, public works, and emergency management agencies to identify the most vulnerable infrastructure assets and develop actionable strategies to address them. Central to this effort is the establishment of an initial project portfolio, focused on moving projects swiftly to "shovel-ready" status. These on-the-ground initiatives are critical to demonstrating the Resilience Authority's value and achieving tangible results for communities across the region. By prioritizing equity in project implementation, we ensure that our work benefits all citizens while addressing the urgent challenges of climate resilience. As the Resilience Authority continues to grow, we remain committed to adapting our approach based on evolving local conditions, community needs, and climate priorities. Our dynamic project pipeline reflects this commitment, ensuring that we consistently deliver measurable progress toward a more resilient and sustainable future.

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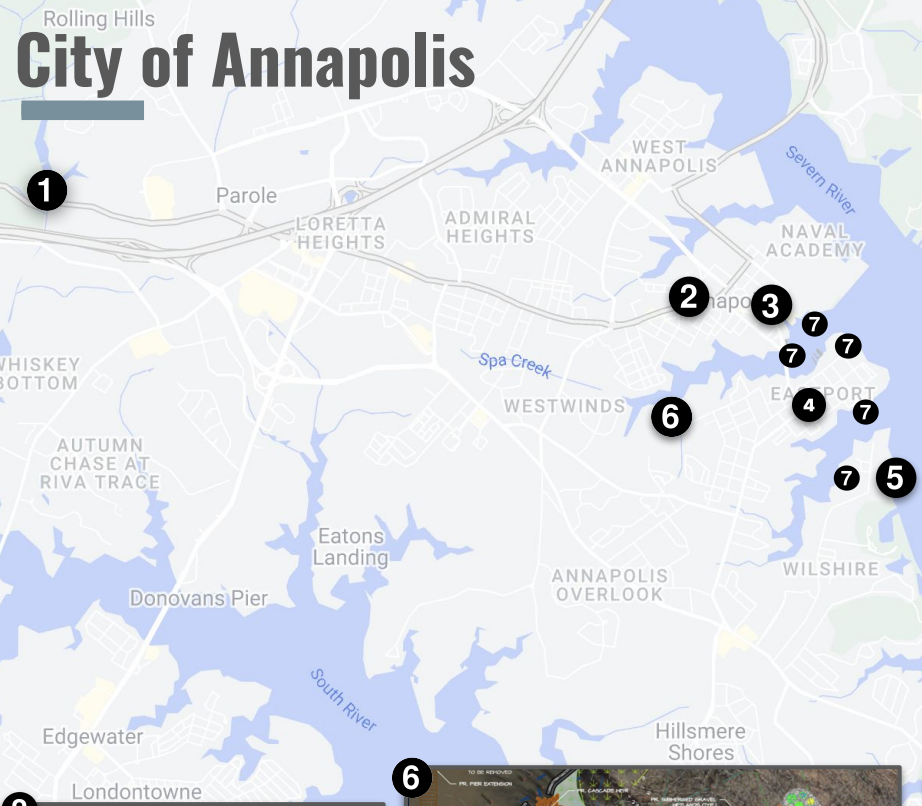
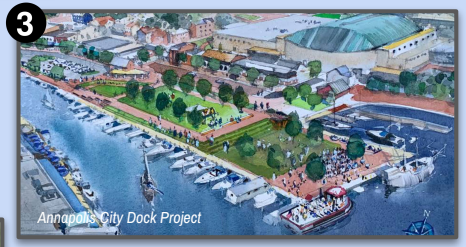
Nature and Resources
From coastal wetlands and shorelines that buffer storm surges to reforested areas that sequester carbon, these initiatives reduce disaster risks while providing co-benefits such as improved air and water quality, recreational opportunities, and biodiversity conservation.

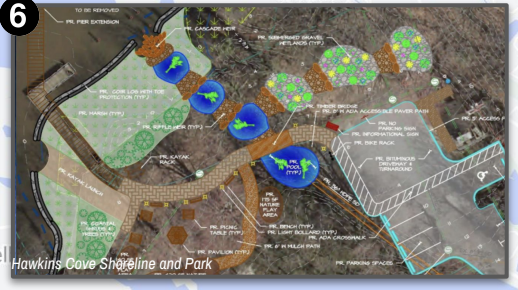
Community and Infrastructure
Protecting critical infrastructure is vital to the region's ability to withstand climate impacts such as flooding, heatwaves, and severe storms. The Resilience Authority invests in projects that enhance the resilience of public and private assets, ensuring they remain robust and adaptable in the face of environmental challenges.

Energy Transitions
The Resilience Authority collaborates with City and County agencies to promote energy systems that are both reliable and resilient. These efforts not only reduce greenhouse gas emissions but also ensure energy accessibility across the region.

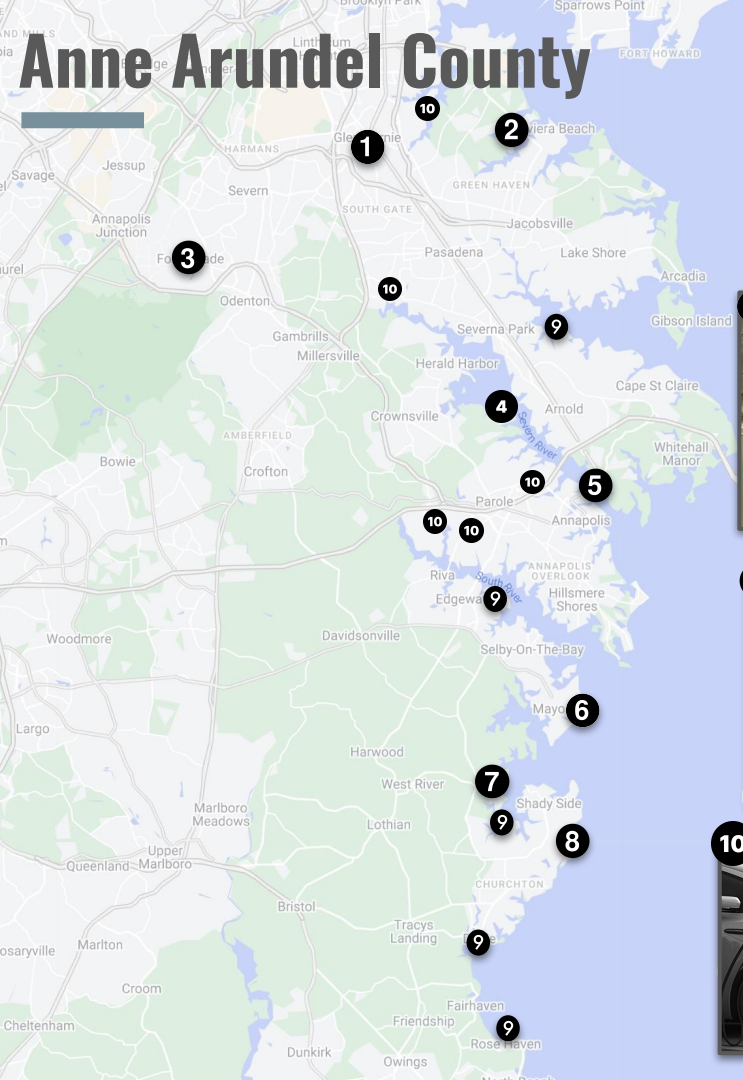
City of Annapolis

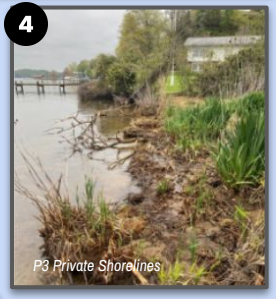






Anne Arundel County





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Annapolis Maritime Resilience Initiative

(AMRI)

National Coastal Resilience Fund Grant

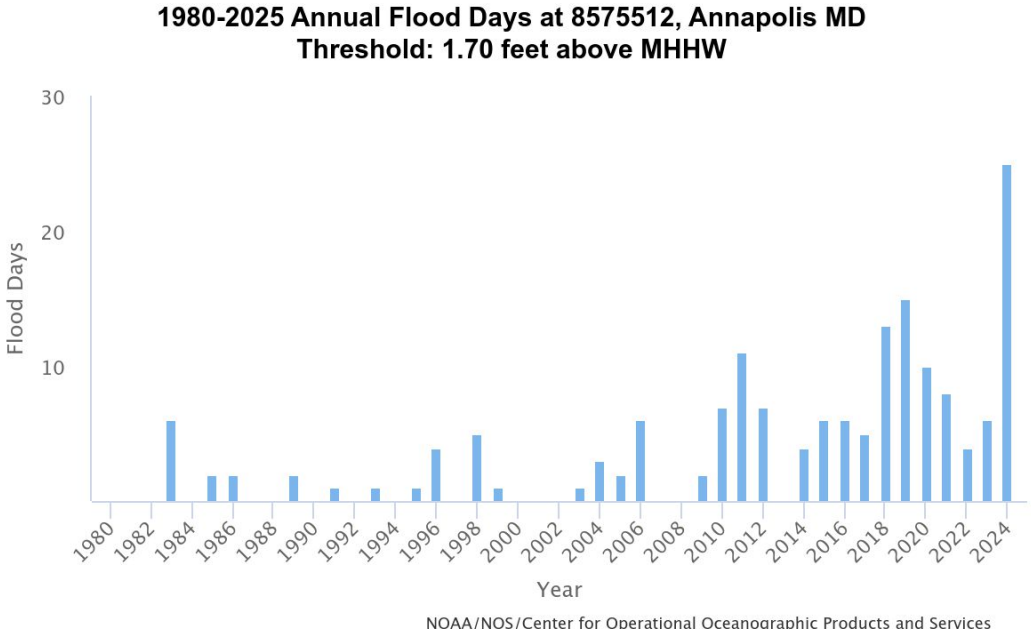
Context

Annapolis is increasingly experiencing flooding from high tides, sea level rise, erosion, extreme weather, and issues with stormwater management.

Roughly half of the flood events take place in the fall (57%), followed by spring (21%), winter (14%), then summer (9%).

Waters and Events on the Rise

Flooding in Annapolis on Jan. 9. Photo submitted to MyCoast, Maryland Department of Natural Resources.



GREEN INFRASTRUCTURE (GI)

Nature-based Solutions (NbS)/Nature-based Climate Solutions

Natural Infrastructure (NI) | **Low Impact Development (LID)**

NATURAL ASSETS:*
- Wetlands
- Forests
- Parks
- Meadows
- Lawns and gardens
- Soil

ENHANCED ASSETS:*
- Rain gardens
- Green roofs and walls
- Bioswales
- Urban trees
- Naturalized stormwater ponds

ENGINEERED ASSETS:*
- Permeable pavement
- Rain barrels
- Cisterns
- Perforated pipes
- Infiltration trenches

GREY INFRASTRUCTURE:*
- Bridges
- Roads
- Parking lots
- Culverts
- Pipes

What is AMRI?

- Nature-based resilience pilot
- Targeting Spa Creek and Back Creek watersheds in and around Eastport
- Community-scale projects prioritized across region
- Based on diverse community engagement
- Planned and executed with a priority on equity

Proposed 2025 Timeline

- January - March: Public engagement regarding community vulnerability
- April - May: Assess opportunities for risk reduction
- June - July: Site selection and continued public engagement
- August: Development design, funding strategies and schedules
- September - December: Master plan and continued public engagement

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Project Highlights

Restoring Coastal Floodplain at Jabez Branch

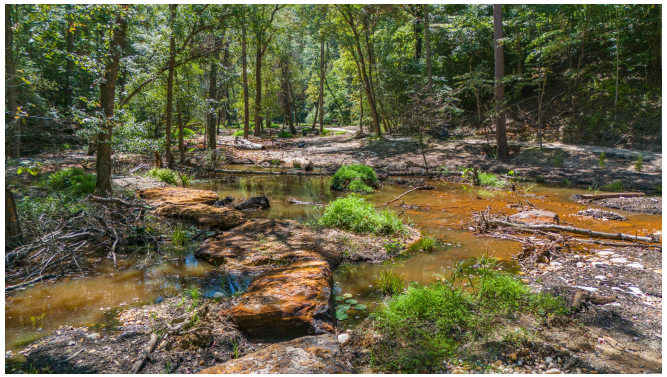
Status | Complete
Location | Anne Arundel County
Funding | $9.897M
District | 6

Challenge

The Severn River is heavily impacted by sediment and nutrients from its tributary system. Jabez Branch III was highly incised and a source of much of the negative non-point source pollution entering the Severn River. The erosion of this Use III tributary was accelerated by the development of Route 97 and Route 3 which directed large amounts of stormwater into the stream system.

Solution

Focused on the Severn River Natural Resource Management Area, a large-scale coastal restoration project designed to reduce the erosive velocity of stormwater by reconnecting to historic floodplains, restoring lost adjacent wetlands, re-engaging cold water seeps, and creating diverse habitat was implemented.



Partners

- State of Maryland
- Department of Natural Resources
- National Fish & Wildlife Foundation
- Anne Arundel County
- Severn RiverKeeper
- Underwood and Associates

Results

- 2,268 lf of floodplain restored
- 7.7 acres of wetland restored
- 1,878 trees planted
- 89.05 impervious acre credits

Project Highlights

Shoreline and Nature Park at Carrs Beach

Status | Planning & Design
Location | Annapolis
Funding | $1.605M
District | Ward 7

Challenge

Carr's Beach was an extremely popular Chesapeake Bay resort and concert venue for the African American community during the racial segregation years of the 1900s. The original footprint of the beach and park has been greatly reduced due to land acquisition and development. The remaining beach and 5 acre park is threatened by erosion and the impacts of climate change.

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Solution

A master plan for the park with deep community engagement will be developed along with design and implementation of a dynamic living shoreline for 460 linear feet of beach that remains public. The passive park and beach will offer more accessible use, better management of stormwater and erosion threats, and a return to a resilient, swimmable, and safe community beach.

Partners

- City of Annapolis
- McAdams
- SCAPE
- Blacks of the Chesapeake
- Underwood and Associates
- Synergy Solutions

Results

- Master Plan for Nature Park
- Restored 460lf of shoreline
- Upland habitat restoration
- Rehabilitated beach
- Water access

Project Highlights

Advancing Fleet Electrification Goals

Status | Design
Location | Anne Arundel County
Funding| $8.128M
District | Regional

Challenge

The County is taking the bold step to convert its fleet of over 1,600 conventional vehicles to fully-electric models by 2037. This is a large undertaking that requires an assessment of infrastructure, maintenance, and personnel needed to successfully meet the goal.

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Solution

The Resilience Authority, on behalf of Anne Arundel County, forged an innovative partnership with Ameresco, a leading cleantech integrator and renewable energy asset developer, owner, and operator. Together, we are evaluating and developing EV charging infrastructure across County-owned facilities.

Partners

- Anne Arundel County
- US Department of Energy
- MD Department of Transportation
- Federal Highways Administration
- Ameresco, Inc

Results

- Reduced climate impacts
- Model of innovation
- Reduced O&M costs
- Fleet Analysis
- Design Engineering
- Installation

Project Highlights

Community Resilience for Columbia Beach

Status | Design
Location | Anne Arundel County
Budget | $1,751,597
District | 7

Challenge

Founded in 1940 as a summer retreat for African Americans, today Columbia Beach is a racially and socioeconomically diverse community. It is one of several communities on the Shady Side peninsula currently dealing with increased flooding. The drainage infrastructure as a whole is disjointed and fails to provide continuity among different areas of the community.

Solution

A comprehensive, sustainable, and environmentally resilient upgrade of the stormwater conveyance system that provides a mitigation model suitable for similar communities. Efficient mechanisms to remove stormwater from roads and community property, transfer stormwater and runoff to new or existing holding/infiltration devices, and improve water quality before discharge into the Chesapeake Bay.

Partners

- Columbia Beach Citizens Improvement Association
- National Fish & Wildlife Foundation
- Arundel Rivers Federation
- BayLand Consultants & Designers

Results

- Decreased flooding
- Nature-based infrastructure
- Model green stormwater system

Project Highlights

Resilience & Energy Codes for Annapolis

Status | Contracting
Location | Annapolis
Budget | $1,700,000
District | Regional

Challenge

The three jurisdictions leading this project, Annapolis, MD | Montpelier, VT and Santa Barbara, CA suffer from extreme climate risk: flooding from sea-level rise in downtown Annapolis has grown exponentially, with costly consequences as recently as January 10, 2024. Building codes mandate minimum resilience standards but only apply to new construction or major retrofits.

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Solution

This three year project seeks to address policy shortcomings by designing and implementing a Building Performance Standard program for smaller buildings, emphasizing jurisdictions with significant climate risk and achieve equal or greater energy savings as compared to the latest model code.

Partners

- U.S. Department of Energy
- City of Annapolis
- City of Montpelier
- City of Santa Barbara
- ClearlyEnergy, Inc.
- NE Energy Efficiency Partnerships
- The Building Performance Institute
- NORESCO
- Ceres, Inc.

Project Highlights

Improved Flood Prediction Capabilities

Status | Installation
Location | Regional
Budget | In-kind (UMD)
District | Regional

Challenge

Sea level rise, nuisance flooding, and storm surge is a growing threat to community infrastructure. Existing NOAA tide gauges provide some local data; however, there is a need for hyper-local information to help protect coastal communities from the impacts of flooding by providing better resolution in the data and understanding across our region on flood frequency and impact.

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Solution

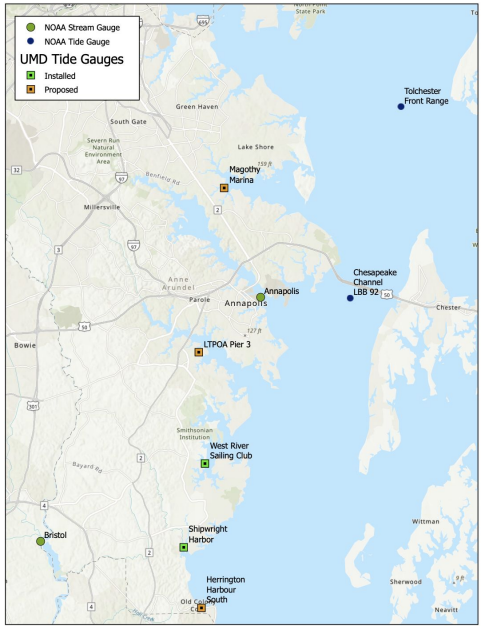
This project will help bolster coastal resilience and serve as an enhanced flood risk alert system for local communities, counties, and the region. The sensors are placed in strategic areas to give public works and EMS more accurate actionable information for individual events and to inform decision-makers regarding ongoing nuisance flooding, sea-level rise, and short-term to long-term zoning and planning.

Partners

- City of Annapolis
- Anne Arundel County
- University of Maryland
- Hohonu
- NOAA

Results

- Real-time, hyper-local data streams on water levels
- Development of decision support tools critical for emergency response and resilience planning



Thank You

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