Climate Resilience Action Strategy

CHARLES COUNTY, MARYLAND

UNIVERSITY OF MARYLAND 1856
SCHOOL OF PUBLIC POLICY
CENTER FOR GLOBAL SUSTAINABILITY

CHARLES COUNTY

CLIMATE RESILIENCE ACTION STRATEGY

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The following document provides a DRAFT Climate Resilience Action Strategy, which was developed by the University of Maryland on behalf of Charles County. Please forward all questions and/or comments to:

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INTRODUCTION

In 2019, the Center for Global Sustainability at the University of Maryland launched the Local Resilience Financing Initiative (LRFI) with the support of the Chesapeake Bay Program Office and the Maryland Department of Natural Resources (DNR). LRFI is designed to move communities towards robust economies, healthy environments, and sufficient and sustainable infrastructure systems. A key component of LRFI is its work with municipalities in Maryland and throughout the Mid-Atlantic region; specifically, LRFI is working in partnership with local leaders to develop, implement, and finance robust resilience plans, with a specific focus on linking natural resource restoration and protection to community infrastructure and economic development. The following document provides a DRAFT preliminary Climate Resilience Action Strategy for Charles County, which was one of the three initial LRFI partner communities.

SECTION 1: OVERVIEW

In terms of percent growth, Charles County is one of the fastest growing counties in Maryland. Its geographic location; proximity to natural resources, such as the Potomac River and Chesapeake Bay; availability of low-cost housing (relative to other jurisdictions in the Washington metropolitan area); and its well-established highway system make Charles County a very desirable place to live. However, the very things that make the County appealing also present challenges. Specifically, the anticipated impacts of climate change are well documented, and the implications for communities across the State of Maryland and the Chesapeake Bay region are significant. The increased infrastructure requirements that will be necessary to adapt and thrive in increasingly difficult conditions will require financial investments well beyond current levels of implementation funding. For example, the 2018 National Climate Assessment notes that coastal zone counties account for nearly half of the nation's population and economic activity, and that cumulative damage to property in those areas could reach $3.5 trillion by 2060.[1]

Although the cost of potential future damage is daunting, investing in adaptation and resilience can be highly cost effective. The National Climate Assessment estimates that adaptation and resilience measures could significantly reduce the cumulative damage to coastal property to about $800 billion instead of $3.5 trillion. In short, investment by local government is both a challenge and an opportunity, and it is with this dichotomy in mind that this project was developed and implemented. Virtually every community within the Chesapeake Bay region will find it necessary to mitigate the risks of climate change in some capacity in the near future. This is especially true for coastal communities like the three counties that participated in this project.

Maryland is often referred to as "America in Miniature" with every county and city offering its own unique and diverse culture, geographic makeup, and natural infrastructure. This cultural and natural diversity has resulted in equally diverse processes, systems, and capacities for maintaining quality of life for its citizens. Each community has its own chronic stressors and risks to be managed and addressed, including economic shocks, overwhelmed and obsolete infrastructure, environmental water shortages, and flooding. Ensuring long-term viability and resilience—financial, environmental, social, or economic—will require communities to understand both chronic and acute stressors, as well as to prepare before shocks occur. This, of course, is the basis for comprehensive resilience planning.

Local Resilience Financing Initiative. The Charles County Resilience Action Plan project was designed as part of LRFI. The structures of the new Initiative are based on decades of experience engaging local and state governments on environmental, social, and economic policies and programs. The Initiative is founded on key processes, goals, and strategies, including:

- *Moving from planning to action:* Community planning is one of the essential functions of local government, and Charles County has significant planning capacity. Well-designed

[1] https://phys.org/news/2018-12-climate-resilience-trillions-runbut-billions.html. Last accessed on 11/27/19.

plans include long-term visions and goals designed to ensure economic, social, and environmental sustainability into the future, and effective planning is essential for ensuring genuine climate resilience. However, the success of comprehensive long-term planning is founded on equally effective short-term project development planning and processes; our focus with this project is on the interaction between long-term planning and short-term implementation and action.

- *Incentivizing collaboration, coordination, and inclusiveness:* The risks and associated impacts of climate change on coastal communities will be as unique as the communities themselves. As a result, the response to those risks will require community leaders to develop equally unique and customized responses. That said, no community can successfully address these issues in a vacuum and the need to move quickly and at scale will require engaging both internal and external community leaders. Our program is founded on three experiential learning processes: collaboration, coordination, and inclusiveness:
  - Collaboration: The scale and timing of climate change impacts demand a comprehensively open implementation environment and process. To that end, the LRFI is predicated on what we refer to as an "open source" implementation and learning process. Our strategy is to identify and apply the most effective resilience processes implemented in communities across the world. Additionally, our strategy will also be to provide these same processes to the broader community as it relates to our project communities. This collaborative experiential learning process will make all communities stronger and more resilient.
  - Coordination: Directly related to collaboration is coordination. The complexity and scale of the climate resilience challenge will require a renewed effort to coordinate internally through inter-agency engagement and cooperation, as well as externally through community-to-community engagement and cooperation.
  - Inclusiveness: Climate change is comprehensive in nature, in that it will impact everyone. That said, and as is the case with most natural, social, and economic disasters and changes, the most economically vulnerable communities are those that will be disproportionately negatively impacted. Though there are myriad economic and efficiency arguments to be made for reducing the risk to these vulnerable populations, it is the ethical and normative arguments that guide this project and our processes. In other words, reducing the impacts of climate change is the right thing to do and will result in stronger and more resilient communities.
- *Accelerate financing:* Infrastructure financing and investment is perhaps the most direct indicator of a community's values and commitments towards addressing community challenges. Our focus is on accelerating finance and investment and creating the systems and processes necessary for scaling and targeting investments in resilience projects and infrastructure.
- *Achieving resilience through natural resource restoration and protection:* The scale and challenge of addressing climate impacts will require leveraging opportunities where they exist, and one of the most immediate opportunities in most coastal communities is related to natural resource restoration and protection. Natural resources and features provide

effective climate change defenses. In addition, environmental restoration efforts, specifically through stormwater management and water quality restoration and protection, create genuine opportunities for achieving project efficiencies. Our project focuses on leveraging these multi-functional efficiencies.

- *Investing in opportunity:* Finally, embedded within the challenge of climate resilience exists opportunity. Mitigating the inherent risks of coastal communities will require innovation, ingenuity, efficiency, and genuine cooperation. It will require many communities to reinvent their economies and their relationship to the natural world. However, by re-envisioning our communities to be more innovative, vibrant, and secure, we will not only be better positioned to face the potential impacts of climate change, but we will also be more resilient to a broad array of threats to our economy, public health, and quality of life. In short, climate resilience enables broader resilience. A resilient community, be it Charles County or another, has a greater capacity to thrive in an ever changing and dynamic world.

Project Description. Through the leadership and coordination of the three pilot communities, the LRFI project team established *Climate Resilience Planning and Financing Work Groups* (Work Groups) to share ideas; to identify community strengths, weaknesses, and available resources; and to craft and develop potential solutions for addressing and mitigating climate change risks. The Work Groups created the foundation for what will eventually become Climate Resilience Action Plans within each county. The Draft Action Plans will identify important assets, as well as the processes and actions that must be taken to protect those assets. In addition, the Work Groups took the first steps in creating innovative, effective, and efficient planning and financing processes and systems that will be necessary for achieving climate change resilience goals.

Project Goals. Creating the Action Plan is part of the broader effort to move Charles County towards resilience implementation. Specifically, the County's strategy is to create linkages between public financing of resilience and restoration with market-based investments by:

- Developing and implementing actionable, scalable, and innovative resilience and infrastructure planning and financing strategies;
- Incentivizing the implementation of new and innovative technologies and policies; and,
- Incentivizing efficiency, thereby ensuring that every dollar invested achieves the maximum level of restoration and resilience possible.

This approach will enable Charles County to identify the co-benefits and connections between restoration, protection, and local resilience. In short, creating robust and actionable resilience plans and implementation strategies creates opportunities to expand investments in critical infrastructure and programs.

This project required Work Group members to plan for the complex and multi-faceted issue of climate resilience in a way that incentivizes substantive action in the short-term. This was only made possible by building on the significant planning processes already in place in the County. This includes a Comprehensive Plan, a Hazard Mitigation Plan, and a Shoreline Assessment and Management Plan. By building on these and other similar planning documents and processes, the Work Group has been able to focus on what the existing plans do not include - an overall

strategy to coordinate actions and a unify responses to the wide-scale impacts and challenges of climate change.

Project Phases. This project is being implemented in three distinct, though at times overlapping, phases. The strategy is to build momentum and take action through each phase, ultimately leading to implementation at scale, which will be addressed in detail in Phase Three. The success of all three phases will depend heavily on County leadership and community engagement guided by a well-organized outreach approach. Phases One and Two are being implemented simultaneously through grant support from the Chesapeake Bay Program and Maryland DNR; this funding augmented County project support. The three project phases are described below:

Phase 1: Develop a Climate Resilience Action Strategy. Communities have recognized the need for establishing thoughtful and actionable resilience plans, and this is especially important in regard to the financing process. In other words, it becomes almost impossible to finance long-term resilience without an actionable plan in place.

The Work Group met regularly throughout 2019, and this draft Resilience Action Strategy is a summary of their work. When the action strategy is finalized, the Work Group will develop and implement a public outreach process to gather feedback on the results of the process. Phase 1 implementation occurs through the following 6 steps:

- *Step 1: Forming the Resilience Work Group:* The first step in the project was to convene a Climate Resilience Work Group, which was formed to provide expertise and comprehensive stakeholder representation in the action planning process.
- *Step 2: Assessing Risk and Climate Impacts:* The resilience action planning process for the County began with assessing the County's risk and anticipated future climate impacts. This was done by establishing an understanding of the potential impacts of climate change on cultural, economic, social, environmental, and physical infrastructure assets. Though there are a myriad of potential climate impacts, the Work Group focused on those risks that are assumed to have the greatest impact on human health and community economic well-being.
- *Step 3: Determining Goals and Objectives:* Once the social, environmental, and infrastructure characteristics within the community were identified, the Work Group developed resilience goals and objectives that created a framework for prioritizing short, medium, and long-term implementation solutions. The team identified resilience gaps and anticipated processes for filling those gaps, which resulted in a framework for prioritizing climate actions.
- *Step 4: Identifying key social, environmental, and economic infrastructure needs and assets:* This process focused on establishing a link between civic infrastructure and the County's environmental, social, and economic assets. In addition, the process focused on establishing a better understanding of the vulnerability of infrastructure and assets, including both the climate and non-climate stressors associated with each. The County's comprehensive plans, emergency management plan, hazard mitigation plan, community GIS

mapping, and asset management plans created a foundational level of understanding of the resilience planning and financing processes.

- *Step 5: Identifying and prioritizing action strategies:* The prioritization of actions in Step 5 represents the foundation of the resilience planning and implementation process. Specifically, this step resulted in a roadmap for moving forward with strategic infrastructure and policy development efforts.
- *Step 6: Gaining feedback, review and approval:* An important part of the planning process is to develop a strategy to engage stakeholders across the counties. This important step is being carefully developed with the assistance of outside experts to ensure that a broad reaching plan for ensuring large-scale input is achieved before the plan is considered final.

Phase 2: Develop a Climate Resilience Finance Strategy. The primary long-term objective of this project is to accelerate investment—public and private—into resilient infrastructure and environmental resources. To that end, the project team is working with County leaders to expand the key components of effective public financing systems including incentivizing revenue flow and investment into key infrastructure projects. The objective of Phase 2 is to identify and expand revenue sources and to maximize efficiency in regard to investments within multiple sectors. An important part of this process is to identify the co-benefits between environmental restoration and resilience implementation; it is the nexus between these benefits that will create the conditions necessary for investment at scale.

Phase 3: Formally launch the implementation and financing processes. The intent of this entire process is to move beyond planning and towards implementation, especially as it relates to building, protecting, and restoring critical infrastructure. In short, the goal is to position Charles County for action. It is our goal in Phase 3 to incentivize investment and implementation of the key projects that have been identified and prioritized in the Action Planning process.

Through the combination of these three phases, this project will result in refined and enhanced processes for achieving resilience goals in the County, most importantly through the implementation and financing processes. The anticipated results will include improvements and expansions in critical infrastructure; new and/or strengthened inter- and intra-community partnerships; increased awareness of systemic and acute climate change risks across the County; and, the establishment of comprehensive and holistic solutions to resilience challenges. In addition, through this project, Charles County will be better positioned to address the root causes of climate vulnerability, specifically through improved communications, better coordination, and collaboration across county agencies.

Key Issues and Lessons Learned. In the next section, we describe in detail the project outcomes for each of the three partner communities. First, however, we address some key lessons learned and issues that were common to each of the communities.

- *The risk is real:* The potential impacts to communities within the Mid-Atlantic region as a result of a warming climate are very real and well documented. For example, recent studies show that more than 10% of coastal populations (including more than 2 million households) within the Mid-Atlantic region will be directly impacted by sea level rise in the coming

decades.[2] In addition, more than 550,000 jobs are considered to be vulnerable within the study area, which included the Chesapeake Bay watershed. To be clear, a full accounting of the known risks that climate change poses to our project communities is well beyond the scope of this project. Rather, our goal was to establish a process by which community leaders can continually assess risk and associated actions.

- *There is a solid infrastructure foundation in place:* Though climate risks are very real, so too are the opportunities to adjust, adapt, and move towards resilience. Specifically, the Mid-Atlantic region has some relative advantages for addressing the climate change issue and moving towards resilience. For example, people who live and work in the region generally, as well as those in the three project counties specifically, have access to sophisticated health care systems, advanced climate control (cooling and heating), and roadway and communication networks. It is the purpose of this project not to reinvent these societal systems, but rather to use them as a foundation for maintaining resilience in the face of the impacts of climate change.
- *Resilience is about addressing uncertainty through redundancy:* One of the great strengths of this project was the comprehensive approach that each of the three partner communities took to implement the action strategy process. Specifically, each of the three Resilience Action Strategies represents the engagement and input of multiple experts and departmental agency leaders. As a result, the plans themselves represent a system of interconnected, redundant, and overlapping projects and strategies, which is essential for dealing with the very unpredictable nature of climate change impacts. In short, creating resilient communities will require a broad array of local government programs, agencies, and actions, which again was a cornerstone of this project.
- *Addressing the needs of the most vulnerable populations:* Perhaps by definition, planning for and adapting to the impacts of climate change is driven by vulnerability within the community. Vulnerability refers to the potential for harm, and in coastal communities, the potential for harm from the impacts of climate change is relatively higher than that of other, inland communities across the country. In addition, there are certain populations within the community that are more exposed to risk, and thus more vulnerable than others, and it was the concerted goal of each of the project teams to address those members of the community specifically.
- *Focus on collaboration:* In spite of the very real political, cultural, and geographic differences between the three counties, there was a genuine commitment towards collaboration and learning among each of the three project Work Groups. In many respects they approached the project as a unified team.
- *Making connections between natural resource protection and resilience:* A common characteristic among each of the three communities was the importance of natural resource protection and restoration as it relates to climate change resilience. Specifically,

[2] http://midatlanticocean.org/wp-content/uploads/2018/04/Climate-Change-Vulnerabilities-in-the-Coastal-Mid-Atlantic-Region.pdf. Last accessed on December 27, 2019.

each of the three communities is in many respects defined by its relationship to the Chesapeake Bay, and as a result water and water quality will play a significant role in each community's resilience planning, implementation, and financing processes.

SECTION 2: CHARLES COUNTY COMMUNITY ASSESSMENT

Charles County is 458 square miles (293,120 acres) in area, with approximately 300 miles of shoreline, primarily on the Potomac River.[3] The population of Charles County is approximately 161,896 and population projections anticipate that the County's population grow to 173,764 by 2024. It is one of the most racially diverse counties in the state of Maryland with 46% of residents identifying as African American and 42% of residents identifying as Caucasian. It is also one of the most affluent counties, yet there is a large wealth gap between large population segments of affluent and less than affluent citizens. Charles County is considered a bedroom community for the Washington, D.C. metropolitan region, with more than 60% of the population commuting outside of the County for work. Charles County's proximity to Washington D.C. (the County seat is less than 30 miles south of Washington) and the scarcity of affordable housing in the greater region have contributed to rapid population growth in the County, which has caused some growing pains for many years.

Charles County has an abundance and diversity of natural resources (including rivers and streams, marshland, forests, and shoreline) that support a wide variety of plant and wildlife communities. Forestlands represent the dominant land cover in the County, comprising approximately 56% of the land area. Charles County is also home to Mallows Bay National Marine Sanctuary, which is the first federally designated national marine sanctuary in 20 years. More than 98,000 acres (33% of the total land area) have been preserved in the County to date, which contributes to the rural character and quality of life. The County also has numerous outdoor recreational assets such as the Indian Head Rail Trail, the Popes Creek Rail Trail (under construction), 17 County parks, four state Parks (Mallows Bay, Smallwood, Chapel Point and Chapman), State forests, and a number of Management Areas. The County holds approximately 9,520 acres in Maryland Agriculture Land Preservation Foundation (MALPF) easements; 4,474 acres of Rural Legacy easements; and 6,155 acres through the Transfer of Development Rights (TDR's) and Purchase of Development Rights (PDR's) programs.

Charles County has 382 farms located on 46,000 acres. The County is home to three farmers markets and offers strong technical support for the agriculture community through the Charles County Soil Conservation District, the Southern Maryland Resource Conservation and Development Office, the University of Maryland Cooperative Extension Office, and the Natural Resource Conservation Service. Agriculture in the County was historically focused on intense row crops such as tobacco, but in response to State programs and market pressures that disincentivized tobacco production, activities have shifted more towards specialty crops and livestock. Agriculture in the County has recently trended towards cultivating locally grown food and using smaller parcels of land for specialized crops such as organic vegetables.

Charles County has a rich history that includes Piscataway Indian culture, tobacco growing heritage, colonial architecture, Victorian railroad towns, and post-World War II Amish communities. There are more than 2,000 properties listed on the Maryland Inventory of Historic Properties. Of these, approximately twenty (20) are preserved through Maryland

[3] Charles County Government: https://www.charlescountymd.gov/sites/default/files/pgm/rim/swp_chap2_3-18.pdf

Historical Trust Preservation Easements. The County is also home to the Thomas Stone National Historic Site, the Religious Freedom National Scenic Byway, the Star-Spangled Banner Byway, and the Booth Escape Byway.

SECTION 3: PHASE 1 PROJECT IMPLEMENTATION

As described above, Phase 1 of this project focused on convening to identify the key assets, threats, and actions that are required to move the County towards long-term resilience. This phase included six key steps: 1) Forming the resilience Work Group; 2) Assessing risk and climate impacts; 3) Determining goals and objectives; 4) Identifying key social, environmental, and economic infrastructure needs and assets; 5) Identifying and prioritizing action strategies; and, 6) Gaining feedback, review and approval. Each of the six steps is described below.

Step 1: Establish the Charles County Resilience Work Group

Beth Groth	Planning and Growth Management	Planner III (CHAIR)
Suzan Lowry	Health Department	Health Officer (MD, FAAP)
Sam Walter	Public Works/Utilities	Engineer III
Stephanie Lowery	Public Works/Facilities	Environmental Compliance Officer
Alicia Afroilan	Planning and Growth Management	Engineer IV
Michelle Lilly	Emergency Services	Director
Don Litten	Planning and Growth Management	Building Code Official
Alex Waltz	Planning and Growth Management	Planner II
Steve Andritz	Board of Education	Director of Planning and Construction
Buddy Bowling	Natural Resources Conservation Service Maryland	Outreach Coordinator

Step 2: Assess Risk and Climate Impacts.

Direct climate hazards**.** Climate hazards are agents of disaster related to developed areas and to the environment. The Work Group focused its attention on the hazards of most concern over the next decade, including the following: coastal flooding, extreme weather events, sea level rise, and extreme temperatures (particularly as it relates to heat). Primary hazards are associated with water and flooding and include:

- *Catastrophic/major storm events:* In recent years, several natural hazards have become more frequent and impactful within the County. This includes an increase in major thunderstorms with quick and heavy rains that also bring high winds to the area. As the severity of these storms increases, so too will the impacts to the County's residents and businesses caused by excessive stormwater. In 2002, Charles County experienced an F4 tornado that caused widespread damage.
- *Temperature:* Again, as described in Section 1, long-term projections suggest that average annual temperatures will increase in the County.

Indirect Climate Hazards of Concern. In addition to the direct climate hazards associated with extreme weather and natural resource events, the County will also need to address a variety of non-direct climate hazards and risks, including:

- *Inadequate and Aging Infrastructure:* Like many other counties in Maryland, Charles County has some aging infrastructure that needs to be addressed. This includes certain stormwater management facilities, roads, water and sewer facilities, as well as many public buildings, including certain schools that require renovation.
- *Aquifer Capacity:* The County's drinking water system relies, to a large extent, on groundwater and aquifers; thus, the long-term capacity of the system is limited.
- *Development Issues:* As one of the fastest growing counties in Maryland, land development in Charles County will be a challenge—good and bad—into the future. New development, especially "greenfield development," leads to air quality concerns, increased CO_2 emissions, increased impervious surface, deforestation/habitat fragmentation, and increased water and sewer service demands.
- *Communication:* There is a lack of broadband as well as a lack of cellular service in some of the rural areas of the County.
- *Public Health:* Public health impacts from climate change may include exposure to extreme hot and cold, vector-borne illnesses, and injuries due to catastrophic weather events.
- *Agriculture:* Agriculture uses approximately 70% of water worldwide today. Ensuring there is enough water for agriculture is an ongoing concern, as is pesticide and herbicide overuse and pest resistance.

Step 3: Set Goals and Objectives. The County set certain goals for prioritizing climate resilience actions. The following goals were determined to be the guiding factors for the plan:

- Enhance the ability to recover from hazards by preserving natural resources, improving infrastructure's ability to sustain functionality, diversifying the County's employer mix, and concentrating residential and business growth in the Development District;
- Ensure equitable input from, and outcomes for, a rapidly growing and increasingly diverse population (race, income, age, etc.); and
- Maintain and improve access to key destinations, facilities, and services for people of all ages, abilities, and transportation modes.

Step 4: Identify key social, environmental, and economic infrastructure assets and potential threats to those assets. Charles County has certain resources that are considered assets to the community's economic, environmental, and social well-being. Targeted investments can accentuate specific strengths, particularly as they relate to climate resilience. The Work Group identified several important assets for the County that could be impacted by climate change and specific hazards. Certain locations within the County as well as certain populations could be affected to a greater degree than others. The Work Group identified the following community assets, as well as potential threats to the viability of those assets:

- *Existing Plans to Address Hazards:* One of the County's most significant resilience assets is its capacity to develop essential planning resources. The County has completed many plans and reports to assess current conditions and needs, including the Climate Resilience Action Strategy. These plans include:
  - 2016 Charles County Comprehensive Plan
  - 2018 Hazard Mitigation Plan Update
  - Shoreline Assessment and Management Plan
  - Ecosystem Services Report
  - Planning Commission Annual Reports
  - Annual Municipal Separate Storm Sewer System (MS4) Permit Report
  - Comprehensive Solid Waste Management Plan
  - Alternative Water Study
  - Charles County Budget Book for FY20
- *Key Institutions, Facilities, and Infrastructure:*
  - Government Buildings (County Government Building and other critical operations facilities, as well as cooling centers): Extreme weather and flooding can impact critical operation facilities that are expected to withstand any type of weather. There is a need to identify each building facility individually and include the incorporated towns of La Plata and Indian Head as applicable.
  - Critical Non-Governmental Utility Infrastructure (SMECO HQ, etc.): During extreme weather, critical infrastructure must remain operational without a disruption in service.
  - Critical Government Utilities: It is important to ensure that County utilities infrastructure & facilities withstand any type of extreme weather events.
  - Roads and Associated Stormwater Management Facilities: MD Route 210, for example, is a bottleneck even on normal days. If Route 210 shuts down for a weather event, it will shift traffic to US Route 301, which may be prone to significant flooding causing a public safety issue.
  - Transportation: Without a County Transportation Master Plan, it is difficult to prioritize investments that may reduce the impacts of climate change on commuters, especially when traffic problems are expected to become worse with any increase in population and with continued political apathy at the State level for financing high-capacity transit.
  - Stormwater (not associated with roads): With more frequent flooding comes more frequent wear on existing infrastructure, and thus a greater need for more frequent repairs, upgrades, and maintenance.
  - Water and Sewer (wastewater, water supply, and reclaimed water): All of the County's wastewater treatment plants are in low lying areas which is a major concern given anticipated sea level rise, flooding, and extreme weather.
  - Agricultural Infrastructure: Small scale agricultural operations may not be properly insured for extreme weather and precipitation events, making them financially vulnerable.

- Energy Infrastructure (i.e. NRG Morgantown Power Plant): Extreme weather, flooding, and sea level rise can impact critical infrastructure located on the shoreline.
- School Building: Extreme weather and localized flooding can make it difficult for aging infrastructure, including some County schools, to be used as shelters during an emergency. Understanding which schools need to be more resilient is an important starting point.
- Naval Bases: With such a large footprint in the County, as well as being a major employer, collaboration and cooperation with Naval Bases with respect to climate resilience is important.
- Fiber Optic: Communications is critical during extreme weather events and not all lines within the County are buried, making this a vulnerability.
- Septic Systems: Sea level rise and flooding put septic systems at risk.
- IT Infrastructure: In an extreme weather event, it is important to sustain Information Technology (IT), communications, and Internet operations.
- Dams (flood control): In the event of significant flooding, the Jameson Dam would be considered a significant hazard with the likely potential for loss of life. Wheatley and Trinity Dams would also be considered a significant hazard in terms of infrastructure and road loss.
- Radio and Cell Towers: Many County towers have fiber runs and are redundant due to microwave systems. It is necessary to maintain operational status of existing towers to ensure they can withstand high wind events and have redundant power and communications systems on board. The cell towers in the County have aging infrastructure and rural areas can have limited service.
- Landfills and Recycling Centers*:* Heavy rains and leachate can impact landfills.

- *Social and Cultural Assets, Concerns and Challenges.*
  - Healthcare: There is only one hospital within the County, which can lead to longer wait times for treatment. Also, as is the case in many communities, high-quality mental health providers can reach capacity during times of crises. These issues would only be exacerbated during a climate crisis. Rural areas in the County, such as Nanjemoy, are considered “healthcare deserts”.
  - Education System: Although the County has a number of education buildings (e.g. St. Charles High School, Billingsley Elementary, Dr. Mudd Elementary) designed to meet LEED or equivalent rating systems, increasing temperatures, extreme rainfall events, and snowfall with high intensity will eventually impact the system at large.
  - Vulnerable Populations: The County has a relatively significant homeless population (approx. 300-400) that will become more vulnerable to extreme weather conditions with climate change.
  - Historic and Cultural Resources: Historic and cultural resources are especially vulnerable to flooding, erosion, landslides and wildfires. Places like Port Tobacco, Benedict, and Cobb Island are important to the culture of the County and need to be considered within the framework of a resilience plan.

- *Environmental and Natural Features, Assets, Concerns and Challenges:*
  - Stormwater facilities (not associated with roads)
  - Natural & Water Resources (i.e. Potomac River, Mallows Bay, forests, marsh, shoreline): Extreme temperatures and weather will impact wildlife, habitat and the local economy.
  - Forests
  - Shoreline Communities: Cobb Island, Swan Point, and Benedict are areas that are extremely vulnerable to sea level rise, land subsidence, and extreme weather events.
  - Green Spaces (trails, parks, waterfront, fairgrounds): The public parks and open space areas are vulnerable to flooding and extreme weather.

Step 5: Develop and prioritize action strategies. In Step 5, the "action" part of the process began to materialize as the Work Group began to devise action strategies. The Work Group used the social, environmental, and infrastructure characteristics identified in Step 4 to identify steps necessary for protecting and leveraging those assets in the interest of long-term sustainability and resilience. The Work Group prioritized implementation activities based on short, medium, and long-term risk and needs. The result was a prioritized list of action steps that serve as the basis for the County's Climate Resilience Action Strategy.

The purpose of this step was not to replace the planning process, but rather to provide the bridge between planning and implementation/financing. In the next phase of this project, these prioritized actions will serve as the launching point for investment and implementation, which will require a clear assessment of the County's capacity to implement each project as well as an assessment of the financing and investment requirements. The action steps, which were tracked in spreadsheet form during Work Group meetings, are summarized below:

HIGH PRIORITY

- **Government Buildings (County Government Building and other critical operations facilities, as well as cooling centers)**
  - Goal: Fortify government facilities to withstand extreme weather events.
  - Strategy: Coordinate investments to adapt infrastructure to future climate conditions.
  - Performance measure: The number of facilities that have been mitigated to withstand extreme weather events and flooding.
  - Performance target: Provide mitigation for one facility per fiscal year.
  - Possible actions include the following:

1. *Fortify facilities to withstand extreme weather events and flooding.*

    a) Establish an annual review and update of the existing Critical Facilities List and, based on internal policies, prioritize updating the most vulnerable facilities that require additional resources. This List should include places that can be used as shelters (e.g. schools, libraries) and it should not be allowed to remain static and/or to only be updated when new buildings are added. The facilities on this

List should have HVAC and appropriate lighting. The List currently resides with Emergency Services and the Town of La Plata.

2. *Bury power lines from source to the facility.*

    a) Locate important facilities from the Critical Facilities List (see 1(a) above) and review which buildings have above-ground power lines. Measures should be taken to bury the power lines of facilities that are considered a high priority, targeting one project each year, if possible, until all utilities of critical facilities are buried underground.

3. *Add generator power to cooling/warming centers to ensure power is maintained during power outages.*

    a) When building new critical facilities, add generators at time of construction. Avoid planning to add generators in the future after construction is complete, as is commonly the current practice. Critical spaces that will be used for shelters should have generators for HVAC and lighting.
    b) When updating existing facilities, always add a generator. Places such as the Capital Club House in Waldorf, gyms, and ice-skating rinks that may be used as emergency shelters should be properly equipped.
    c) Review schools that should have mobile generators in place and confirm that existing generators have the capacity to go beyond the small generators that are in place to serve as shelter. By prioritizing the purchase of at least three new mobile generators, the County can rotate the generators between the schools that will need them in case of power outages or extreme weather. Schools will need electrical rewiring for switching to accommodate mobile generators, and costs should include those related to rewiring.

3. *Add automated outdoor lightning warning systems with sirens at ballfields.*

    a) Seek out possible grant funding from Maryland state agencies (such as Maryland Emergency Management Administration and the Maryland Department of Natural Resources) for sirens at ballfields. Develop a priority list of outdoor facilities and plan for at least one field to update every year. Consideration should be given to widely used ballfields, such as Laurel Springs Regional Park, White Plain Regional Park, Bryantown Sports Complex, and Robert D. Stethem Sports Complex.

- **Critical Non-Governmental Utility Infrastructure**
    - Goal: Fortify critical non-governmental facilities to withstand extreme weather events.
    - Strategy: Assist the Southern Maryland Electric Cooperative (SMECO) with grant applications and recommend investments to adapt infrastructure to future climate conditions.
    - Performance measure: The number of facilities & infrastructure that have been mitigated to withstand extreme weather events and flooding.

- Performance target: Provide mitigation for one facility per fiscal year.
- Possible actions include the following:
  1. *Coordinate with SMECO to harden power lines (bury lines) against high wind events.*
  2. *Approach SMECO regarding resiliency discussions for future and existing development.*
  3. *Help SMECO in prioritizing existing infrastructure based on high hazard areas.*
  4. *Identify funding sources for mitigation actions regarding power supply resiliency.*

- **Critical Government Utilities**
  - Goal: Fortify utility infrastructure and facilities to withstand extreme weather events.
  - Strategy: Coordinate investments to adapt infrastructure to future climate conditions.
  - Performance measure*:* The number of facilities that have been mitigated to withstand extreme weather events and flooding.
  - Performance target: Provide mitigation for one facility per fiscal year.
  - Possible actions in the following:
    1. *Add berms or flood walls to utility infrastructure within flood areas.*
    2. *Evaluate all sites for vulnerabilities and prioritize mitigation measures.*
    3. *Elevate facility infrastructure in flood areas.*
    4. *Construct sewer flow storage structures to contain excess flow during high rainfall events.*

- **Roads and Associated Stormwater Management Facilities (1)**
  - Goal: Mitigate roads for current and future flood predictions.
  - Strategy: Coordinate investments to mitigation roads for future climate conditions.
  - Performance measure: The number of roads that have been protected against future flooding events.
  - Performance target: Provide mitigation for one flooded road location per fiscal year.
  - Possible actions include the following:
    1. *Target coordination with the Maryland State Highways Administration to work collaboratively on a plan to harden roads to withstand flood events using the Urban & Nuisance Flooding Plan as the guide to prioritizing actions.*
    2. *Prioritize drainage (stormwater management) projects through a planned analysis of Countywide projects & prioritization.*
    3. *Add flood gauges, for safety, to areas prone to flooding.*
    4. *Post-pandemic, review remote teleworking policies.*

a) Update and adjust plans with more details to promote a smoother process and more opportunities to permanently telework for many County staff. This will help to alleviate traffic congestion.

- **Roads and Associated Stormwater Management Facilities (2)**
  - Goal: Maintain operation of County-owned roadways that are susceptible to sea level rise or flooding (nuisance or otherwise).
  - Strategy: Fortify vulnerable roadways against flooding and sea level rise by raising the roadbed; improving drainage/stormwater management in the public right-of-way; and improving drainage/stormwater management in flood-prone areas.
  - Performance measure: A certain percentage of flood and sea level rise prone roads hardened and mitigated; a certain number of gallons of stormwater managed by new projects.
  - Performance target: Set target of 10% of flood and sea level rise prone roads fortified by 2030; 50% by 2040; 100% by 2050; and 50% of all stormwater managed on-site by 2030, 100% by 2050.
  - Possible actions include the following:
    1. *Identify sea level rise and flood prone roads.*
    2. *Develop priority list for road mitigation.*
    3. *Develop priority list for stormwater management improvements. This list should be available soon from work underway with the Maryland Environmental Service.*
    4. *Construct improvements beginning with the highest priority.*

- **Transportation**
  - Goal: Ensure that people of all ages and abilities have multi-modal access to key destinations, including commuter locations.
  - Strategy: Expand walking and bicycling infrastructure and accommodations throughout the County by first identifying key destinations and then by prioritizing investment in projects that expand multi-modal access to identified key destinations.
  - Performance Measure: Amount of sidewalk, bike trails, separated lanes constructed; number of curb ramps improved; number of crosswalks installed; number of VanGO stops that are ADA-accessible.
  - Performance Target: Finance at least one bike/pedestrian infrastructure project each fiscal year.
  - Possible Actions include the following:
    1. *Finalize a Countywide transportation master plan, which is currently underway. A consultant will be needed to work on the graphics for the report.*

2. *Complete existing conditions analysis: identify key destinations, assess and document bike/pedestrian facilities.*

3. *Continue to work closely with SMECO to identify Electric Vehicle (EV) infrastructure placements sites for charging stations around the County.*

    a) There is a list of more than 20 different possible locations of public properties where EV stations can be located. Beyond what SMECO will fund, there could be other opportunities with the state (Maryland Energy Administration) and the federal government (Department of Energy) for additional grants that may fund the full priority list over the next five years. The priority list should be updated annually.

4. *Complete feasibility study that is currently underway that looks at expanding bike and pedestrian trail.*

    a) This current study includes the 13 miles of Indian Head trail and the St. Mary's rail trail. The study should be completed in 2021 and then funding this work should be prioritized to promote more multi-model transportation options.

5. *Continue working with the Government Alliance on Race and Equity (GARE) to explore ways to improve public transportation (VanGO).*

    a) A recent survey completed by GARE shows recommendations for improving VanGo to accommodate ridership. The survey results should be coordinated with the 2019 Charles County VanGO Transit Development Plan Final Report to prioritize costs and specify actions over the next five years.

6. *Research pavement mixes/other engineering topics that could improve resilience of transportation assets.*

- **Stormwater (not associated with roads)**
  - Goal: Improve SWM features (repair, maintain, and upgrade as needed).
  - Strategy: Improve SWM structure resiliency by prioritizing structures in flood prone areas and taking appropriate action to include: upgrades, retrofits, and repairs.
  - Performance measure: Percent of SWM structures improved.
  - Performance target: 10% of prioritized SWM structures improved by 2030, 25% by 2040, 50% by 2050.
  - Possible actions include the following:

    1. *Identify stormwater structures that require retrofit (per 2010 regulations) and develop a priority list.*

    2. *Research known areas of flooding and add to priority list for retrofit/upgrade/repair.*

    3. *Develop a public outreach plan to educate Home Owner Associations (HOAs) and stormwater structures owners about maintenance and repair procedures.*

4. *Determine which stormwater feature projects could utilize watershed funding and benefit County's MS4 goals.*
5. *Develop priority list for stormwater structure upgrades/retrofit/repairs.*

- **Water and Sewer (wastewater, water supply, and reclaimed water)**
  - Goal: Ensure adequate public water supply and harden existing wastewater facilities against climate change.
  - Strategy: Coordinate investments to adapt infrastructure to future climate conditions. Investigate expansion of water reuse and evaluate options to increase water supply to meet future demands.
  - Performance measure: The number of facilities that have been mitigated to withstand extreme weather events and flooding. Expand water supply to meet projected demand.
  - Performance target: Provide mitigation for one facility per fiscal year. Have a percentage of water demand to water supply (meeting 30-year projection).
  - Possible actions include the following:
    1. *Identify options to upgrade existing water and sewer facilities to mitigate impact of floods.*
    2. *Construct sewer flow storage structures to contain excess flow during high rainfall events.*
    3. *Revise a Memorandum of Understanding with WSSC to obtain an increase in alternative potable water source.*
    4. *Evaluate all sites for vulnerabilities and prioritize mitigation measures.*

- **Public Health**
  - Goal: Integrate Maryland Responds: Medical Reserve Corps (MRC) into the resilience plan; draft a local and/or a regional plan. Connect and brief the volunteers residing in Charles County about anticipated health care needs resultant of increasing heat and rainfall.
  - Strategy: Bring current medical volunteers in as stakeholders; increase number of volunteers by reaching out to medical professionals in the County; consider awareness campaign.
  - Performance measure: Increase number of medical volunteers educated in delivery of emergency services particular to needs of Charles County, with volunteers evenly distributed according to population density and zip code.
  - Performance target: Attain a large-scale number of volunteers that adequately meets the need during an emergency situation.

- Possible actions include the following:

  1. *Ensure that County residents have adequate access to medical services and facilities during emergency events.*
  2. *Contact the current list of local volunteers to ensure up-to-date information. Increase volunteers by zip code and geographic representation for logistical efficacy.*
  3. *As a follow-up to the pandemic, re-examine healthcare response, weaknesses, and areas for improvements. This would enhance climate resilience goals.*
  4. *Formulate additional ways to improve communication with County residents regarding healthcare information while assuming that not everyone will be reachable, and then plan accordingly.*
  5. *Ensure plan is to conduct prevention outreach and education before any new crisis occurs. This can be done by following possible action #3 (above).*

- **Natural & Water Resources**
  - Goal: Protect and conserve environmentally sensitive areas (stream valleys, wetlands, forestlands, agricultural lands, etc.).
  - Strategy: Consider different options to accomplish conservation of environmentally sensitive areas (regulations, purchase of conservation easements, grant programs, etc.).
  - Performance measure: The number of acres preserved through various preservation programs.
  - Performance Target: Preserve 1,000 or more acres per year.
  - Possible actions include the following:

    1. *Recommend regulations that protect natural resources (e.g. prohibit mass clear-cutting for development projects).*
    2. *Work to restore Tier II streams and other environmentally sensitive areas.*
    3. *Restrict recreational access in areas that show signs of excessive wear on natural resources in order to allow for revegetation or soil stabilization.*
    4. *Install berms or dikes to divert surface water to any lowland areas affected by precipitation.*
    5. *Restore or promote a diversity of tree and plant species to increase stream shading; provide a source of woody debris; stabilize the soil; and provide habitat and connectivity for wildlife in order to maintain or restore riparian areas.*
    6. *Use impact models and monitoring data to anticipate the arrival of pests and pathogens and provide management actions in order to reduce the impact of biological stressors.*
    7. *Increase monitoring for known or potential invasive species to ensure early detection and eradicate existing populations or seed sources of invasive plants through*

physical or even chemical treatments as needed to prevent the introduction and establishment of invasive species.

- **Protected Lands (watershed and land conservation)**
  - Goal: Protect and conserve environmentally sensitive areas (stream valleys, wetlands, forests, agricultural lands, etc.).
  - Strategy: Consider different options to accomplish conservation of environmentally sensitive areas (regulations, purchase of conservation easements, grant programs, etc.).
  - Performance measure: The number of acres preserved through various preservation programs.
  - Performance target: Preserve 1,000 or more acres per year.
  - Possible actions include the following:

    1. *Actively promote land conservation programs (MALPF, Rural Legacy, TDR/PDR) to residents. These are popular programs and can remain strong and well supported through organized promotional information.*
    2. *Consider and adopt new or expand existing regulations to protect natural resources (buffers/setbacks in areas vulnerable to more than 3 feet of sea level rise, impervious coverage standard, etc.);*
    3. *Work to restore Tier II streams, and other environmentally sensitive areas.*

- **Forests**
  - Goal: Protect and conserve large tracts of contiguous forestland and forest interior dwelling bird habitat (FIDS).
  - Strategy: Consider different options to accomplish conservation of environmentally sensitive areas and tracts of forest 50 acres or larger in area. Priority areas have been identified by DNR Forest Service to target land conservation practices and there are existing maps that identifies areas with high stewardship potential. The most heavily wooded areas of Charles County include Nanjemoy, Zekiah Swamp, Mattawoman Creek and Cobb Island Neck. An outreach program to promote the ecological and financial benefits of maintaining forestland in Charles County would help conserve forestland.
  - Performance measure: The number of acres enrolled in the various conservation programs to maintain large blocks of forest cover. Monitor approved Forest Harvest Operation permits to ensure BMPs are being implemented and timber harvest permit costs are not deterring active forest management in order to promote healthy forests.
  - Performance target: Preserve 1,000 or more acres per year.
  - Possible actions include the following:

    1. *Recommend regulations that protect natural resources (prohibit mass clear-cutting for development projects, etc.).*

2. *Actively promote land conservation programs (MALPF, Rural Legacy, Forest Conservation Management Act (FCMA), Tree Farm, Transferable Development Rights(TDR/Purchase of Development Rights (PDR) to residents.*
3. *Plant trees for carbon sequestration, especially in urban areas.*

- **Urban Tree Canopy**
  - Goal: Expand tree canopy in urban areas to reduce heat island and increase carbon sequestration.
  - Strategy: Identify urban districts with tree planting opportunity and need for heat island mitigation. Develop partners and funding sources to plant and care for more trees. Incorporate trees into asset management systems for municipalities, a basis for accounting that could be tapped for carbon sequestration.
  - Performance measure: Acre-equivalents of trees planted in development districts and summer surface temperature peaks.
  - Performance target: 20 acre-equivalents of trees planted annually; net reduction in summer surface temperature peaks.
  - Possible actions include the following:
    1. *Develop carbon accounting for urban tree planting tracked through the Chesapeake Bay Best Management Practice (BMP) reporting and local asset management accounting.*
    2. *Combine water quality and carbon sequestration benefits to expand funding for additional urban tree planting.*
    3. *Target tree planting to areas with opportunity to address heat-island increases.*

MEDIUM PRIORITY

- **Healthy Forests that Support A Local Rural Economy**
  - Goal: Improve management for healthy forests that support a local rural economy and regenerating native forests.
  - Strategy: Support invasive species awareness and control in forests, and use a resource-based economy for a diversity of forest products to make good forest management affordable and accessible to forest owners.
  - Performance measure: Presence of regeneration in forest stands (% plots with native tree regeneration).
  - Performance target: 100 native or desirable trees/acre free to grow.
  - Possible actions include the following:
    1. *Work to establish a Southern Maryland Partnership for Regional Invasive Species Management (SM-PRISM).*

a) The goal of the PRISM is to bring together and leverage all of the regional resources that have a shared interest in the awareness, education, and eradication of invasive species in Southern Maryland. This partnership would include Charles County and other Southern Maryland counties, Tri-County Council, Southern Maryland Agricultural Development commission, land trusts, other community nonprofits, DNR Forest Service, the University of Maryland Extension Service, and others. The Lower Eastern Shore PRISM can be used as a reference for setting this up.

2. *Support local forest-based economic development for a range of forest products, allowing affordable harvest of low-grade trees contributing to overcrowding and slower growth rates.*

- **Shoreline Property: Cobb Island, Benedict, Swan Point, Port Tobacco**
  - Goal: Restore and maintain shoreline to reduce the impacts of climate change.
  - Strategy: Identify options to accomplish shoreline restoration goals. This includes funding and financing (CIP budget, RFP for full delivery, etc.).
  - Performance measure: The number of feet/miles of restored shoreline.
  - Performance Target: Restore 1,000-2,000 feet of shoreline per year.
  - Possible actions include the following:
    1. *Cross-reference a priority project list (shoreline study) with areas most vulnerable to sea level rise to further prioritize shoreline areas for restoration.*
    2. *Investigate opportunities to purchase/conserve land along the shoreline to reduce development pressure in flood-prone areas.*
    3. *Investigate shoreline management techniques and best management practices.*
    4. *Establish an outreach program targeted to shoreline communities.*

- **NRG Morgantown Powerplant**
  - Goal: Fortify critical infrastructure to withstand extreme weather, flooding, and sea level rise.
  - Strategy: Recommend investments or offer incentives to adapt infrastructure to future climate conditions.
  - Performance measure: Improved stormwater management inspections, resiliency during extreme events, and no disruption to operations.
  - Performance target: Improved inspection reports and less interruption to operations.
  - Possible actions include the following:
    1. *Determine if company has structures or funding in place*.
    2. *Inform company of impending impacts.*
    3. *Evaluate any interruptions to operations that relate to climate change impacts.*

4. *Evaluate current stormwater management measures/practices.*
5. *Recommend mitigation measures to ensure the power plant is more resilient to extreme weather, flooding, and sea level rise.*

- **School Buildings**
  - Goal: Improve properties and buildings to shed water and withstand storms and flooding created by extreme weather.
  - Strategy: Assess the facilities to determine what improvements are needed and provide a comprehensive design approach for correction.
  - Performance measure: Reduce flooding that impacts building closure and property damages.
  - Performance Target: Eliminate school closures due to flooding.
  - Possible actions include the following:
    1. *Request funding for a study and design of stormwater management and flooding corrections.*
    2. *Conduct a comprehensive analysis of all school buildings and grounds to determine where and how adjustments are needed.*
    3. *Request Capital Improvement Plan funding for construction of stormwater and flooding corrective measures.*
    4. *Design and permitting of corrective measures.*

- **Naval Bases**
  - Goal: Fortify critical infrastructure to withstand extreme weather, flooding, and sea level rise.
  - Strategy: Recommend investments to adapt infrastructure to future climate conditions including facilities & roads.
  - Performance measure: Specific assets at the naval bases that are identified as needing protection against climate related events.
  - Performance target: Investments in the protection of critical assets important to the naval bases to ensure continued operation.
  - Possible actions include the following:
    1. *Develop and recommend mitigation measures through climate resilience planning in cooperation with the Department of Defense, Indian Head, and Charles County to ensure the base infrastructure is more resilient to extreme weather, flooding, & sea level rise.*
    2. *Coordinate with staff from the surrounding naval bases to ensure they are represented in the Mitigation and Nuisance & Urban Flooding Plans.*

- **Fiber Optic – 911; SCADA systems (WS Alarm System)**
  - Goal: Fortify critical infrastructure to withstand extreme weather. Improve system reliability and redundancy.
  - Strategy: Evaluate systems for vulnerabilities and implement recommended improvements.
  - Performance measure: Resilience during extreme events and no disruption to operations.
  - Performance target: Less interruption to operations during extreme weather events.
  - Possible actions include the following:
    1. *Expand the fiber optic network to ensure there is a loop throughout the County.*
    2. *Evaluate SCADA communications for vulnerabilities to extreme weather and implement improvements in a prioritized manner.*

- **Education System**
  - Goal: Allow schools to be more resilient so the buildings can withstand greater ranges of temperatures and changes in climate.
  - Strategy: Design new buildings and renovations of existing buildings with increased insulation, utilize geo-thermal systems, solar panels, green roofs, and efficient HVAC systems that can quickly adapt to the changing climate and help to buffer the school buildings.
  - Performance Measure: Reduction of energy usage on a square foot basis from the last new facility or the prior building before renovation.
  - Performance Target: Reduction in energy usage and costs associated with new and renovated buildings.
  - Possible actions include the following:
    1. *Request additional local Capital Improvement Plan funding for study and design of features, as well as for construction associated with features.*
    2. *Educate students, staff, parents and the public on the features of the new buildings.*
    3. *Measure the efficiency of the features to determine if they are effective.*

- **Vulnerable Populations (homeless, low-income, elderly, etc.)**
  - Goal: Secure a designated facility or facilities to provide consistent services to vulnerable populations in multiple locations within the County.
  - Strategy: Identify fixed facility locations that would be easily accessible to those in need that would provide shelter during a major storm or extreme temperatures.
  - Performance measure: Have access to year-round permanent space available for all those in need.

- Performance Target: Significant yearly reductions in people in need of shelter during a climate related event.
- Possible actions include the following:

1. *Consult with Lifestyles, Inc. to provide information regarding vulnerable populations in Charles County.*
2. *Better define the scope of vulnerable populations for Charles County based upon existing definitions.*
3. *Consider all new County facility Capital Projects to have secondary uses as emergency shelters and/or warming/cooling centers.*
4. *Incorporate design features and emergency power and utilities into new facilities where feasible.*
5. *Work closely to tie this action to existing warming and cooling centers.*

LOW PRIORITY

- **Septic Systems**
  - Goal: Provide information to system owners on potential vulnerabilities and possible state funding.
  - Strategy: Identify system owners in the County that are potentially impacted by sea level rise and flooding.
  - Performance measure: Percent of vulnerable systems identified.
  - Performance target: Vulnerable systems identified and system owners notified/provided information.
  - Possible actions include the following:

1. *Identify system owners in the County and the ones impacted by sea level rise and flooding and provide information;*
2. *Establish a septic fund program similar to the Anne Arundel County grant program that is locally administered using the Bay Restoration Fund (BRF).*

- **Energy Infrastructure (renewables, gas plant, coal plant)**
  - Goal: Sustain energy delivery through severe weather events and other climate impacts while decreasing GHG emissions from energy production, maintaining service reliability, and decreasing risks from aging or failing infrastructure.
  - Strategy: Fortify and bury underground appropriate transmission lines where feasible; increase renewable energy mix; provide 100% of energy for County facilities from renewable sources by 2030.
  - Performance measure: Feet/miles of transmission lines hardened/undergrounded; percentage of energy in the County coming from renewable sources; percentage of energy for County facilities coming from renewable sources.

- Performance target: 100% of feasible transmission lines are hardened and undergrounded by 2050; 100% renewable energy mix by 2030; 100% energy for County facilities from renewable sources by 2030.
- Possible actions include the following:
  1. *Identify transmission lines that could be susceptible to extreme weather.*
  2. *Distribute list to energy providers (SMECO, SMO).*
  3. *Propose energy mix goal of 100% renewable by 2030 to Commissioners for approval/adoption.*
  4. *Disseminate County facility renewable energy strategy; progress on energy mix goals for County facilities by constructing Pisgah solar array, etc.*
  5. *Construct Pisgah Landfill solar array.*

- **IT Infrastructure (GIS, Project Management, Cyber security, etc.)**
  - Goal: Sustain IT/communications/Internet operations through extreme weather events.
  - Strategy: Fortify and bury appropriate transmission lines where feasible and improve cyber security of automated and critical systems while continuing to create backups of critical data.
  - Performance measure: Percent of lines hardened/undergrounded; percent of County staff that have completed Security Mentor training; frequency of backups of County servers
  - Performance target: 100% of feasible transmission lines hardened/undergrounded by 2050; 100% of County staff completed Security Mentor training by end of 2020; County servers backed up weekly.
  - Possible actions include the following:
    1. *Identify transmission lines that could be susceptible to extreme weather, distribute list to Internet Service Providers and other communications utilities.*
    2. *Harden and underground identified lines where feasible; Coordinate with IT to determine percent of County staff that have completed all Security Mentor trainings.*

- **Dams (Flood Control)**
  - Goal: Ensure dams are compliant and are deemed resilient against impending climate changes by FY2026.
  - Strategy: Procure necessary funding each year and plan for necessary projects accordingly.
  - Performance measure: Inspection reports and recommendations from regulatory agencies.
  - Performance target: Passing inspections and reduce findings list.

- Possible actions include the following:
  1. *Prioritize necessary projects based on inspections and expert recommendations.*
  2. *Perform studies to determine resilience of dams.*
  3. *Make any necessary repairs and continue maintenance.*

- **Radio and Cell Towers**
  - Goal: Maintain operational status of towers by ensuring they can withstand high wind events and have redundant power and communications systems on board.
  - Strategy: Enforce ANSI/TIA 222 latest revision for new tower builds and require a structural analysis and retrofit to latest revision upon tower modification requests.
  - Performance measure: The number of towers that have been built or retrofitted to ANSI/TIA 222 latest revision standard.
  - Performance target: No issued variances, all towers built and retrofitted will have a structural analysis that meets the standard.
  - Possible actions include the following:
    1. *Any tower builds or modifications must be held to the ANSI/TIA 222 latest revision.*
    2. *Run fiber to all towers that do not currently have fiber runs to provide for redundant communications.*
    3. *Where applicable, provide for multiple microwave links for redundancy.*
    4. *Harden shelters to be above and beyond the standards to include elevated backup utilities and hardened exterior shelter walls.*

- **Waldorf Landfill, Pisgah Landfill, and Four Recycling Distribution Centers**
  - Goal: Ensure the landfill's stormwater management and leachate infrastructure can withstand impending climate change impacts.
  - Strategy: Determine if stormwater management and leachate infrastructure are sufficiently resilient and improve upon best management/operations practices. Explore emerging technology.
  - Performance measure: Inspection reports, resiliency evaluations, evaluate common interruptions with operations.
  - Performance target: Lower methane emissions and water pollution, positive inspection findings, resiliency during storms, no interruptions to operations.
  - Possible actions include the following:
    a) Explore any room for improvement within the current leachate collection plan.
    b) Develop Stormwater Management Plan and train staff.

c) Explore emerging technologies and if an active gas collection system or waste-to-energy system is feasible.

- **Historic and Cultural Resources**
  - Goal: Safeguard historic and cultural resources for climate resiliency, especially those in vulnerable areas (flood, erosion, landslide and wildfire).
  - Strategy: Consider options to protect historic and cultural resources to accomplish protection from floods, erosion, etc.
  - Performance measure: To be determined.
  - Performance target: To be determined.
  - Possible actions include the following:
    1. *Create an archaeological context for Charles County and survey high priority sites in high hazard areas.*
    2. *Prioritize efforts to protect the Mount Vernon Viewshed, which encompasses portions of Bryans Road, Marshall Hall and Piscataway Park.*
       a) The Mount Vernon Viewshed has been identified as an area of concern and future land development, loss of tree cover, and erosion could potentially have adverse impacts on this historic landscape.
    3. *Consider stormwater management, soil stabilization, erosion control methods, water flow control, and drainage programs for historic properties.*
    4. *Encourage more historic preservation easements in the county to protect the historic character of properties.*
    5. *Continue to update the county cemetery inventory and analyze for those vulnerable to hazard events. Identify any additional information about cemeteries throughout Charles County and obtain necessary information for safeguarding;*
    6. *Evaluate sites and determine eligibility to be included on the Recommended National Register Eligible Resources (RNRE).*
    7. *Establish demolition delay process for post-incidents and expedited permitting for stabilization measures, minor repairs, etc.*
    8. *Develop outreach programs targeted to historic property owners.*

- **Green Spaces (trails, parks, waterfront, fairgrounds)**
  - Goal: Safeguard public parks and open spaces for climate resiliency while creating more opportunities for public access.
  - Strategy: Consider multi-functional infrastructure investments to accomplish flood risk protection and public access opportunities.
  - Performance measure: Feet/miles/acres of improved trails, parkland, etc.

- Performance target: To be determined.
- Possible actions include the following:

  1. *Evaluate trails, parks for vulnerability to sea level rise and other climate impacts and make infrastructure improvements as necessary.*

- **Shoreline Communities**
  - Goal: Restore and maintain shoreline to reduce the impacts of climate change.
  - Strategy: Consider different options to accomplish shoreline restoration (CIP budget, RFP for full delivery, etc.).
  - Performance measure: The number of feet/miles of restored shoreline.
  - Performance target: Restore 1,000-2,000 feet of shoreline per year.
  - Possible actions include the following:

    1. *Cross-reference priority project list (shoreline study) with areas most vulnerable to sea level rise to further prioritize shoreline areas for restoration.*
    2. *Investigate opportunities to purchase/conserve land along the shoreline to reduce development pressure in flood-prone areas.*
    3. *Investigate shoreline management techniques and best management practices; establish an outreach program targeted to shoreline communities.*

Step 6) Gaining Feedback, Review and Approval: Proposed Outreach and Engagement Strategy

Purpose. This document will serve as the outreach and engagement strategy for Charles County's Climate Resilience Plan. This strategy will ensure that all sectors of the County will have an opportunity to engage in, be informed of, and participate in the climate resilience actions proposed by the County. The strategy was developed by the Charles County Climate Resilience Work Group to guide the process and get buy-in and feedback to the draft Climate Resilience Plan.

Goal. The goal of this strategy is to raise community awareness, gain feedback, and ensure transparency in regard to Charles County's Climate Resilience Plan.

Messaging. County leaders should ensure that the Resilience Plan and this outreach strategy effectively reflect community goals and expectations. The implementation of this strategy should include as many stakeholders as possible.

Key Stakeholders. The Climate Resilience Work Group identified key stakeholder groups who should be actively involved in the implementation of the resilience plan. Stakeholders groups will have varying degrees of engagement, including: being directly involved with the planning process; consulting on the development of the resilience plan; or providing plan review or approval. Below is a list of key stakeholders and their identified roles in the planning process.

- *Local Government and Community:* Engagement should include news media, social media, newsletters, websites, surveys, public meetings, work groups, and advisory committees. It is

important to coordinate with these groups throughout the planning and implementation process, as the goal is to educate the entire community about climate resilience. Specific attention should be given to engaging the most vulnerable members of the community, including those that may have the least access to necessary resources. Vulnerability may stem from geographic location; limited resources; truncated social, family, or financial networks; medical fragility; or literacy. The County should develop specific methods for engaging vulnerable groups. In addition, community engagement should focus specifically on the following towns:

- The Town of La Plata: Collaborate on plan and throughout general review processes. Information needed includes wastewater and water treatment annexations; economic development; public landings and other impacted facilities from flooding/nuisance flooding; and stormwater management.
- The Town of Indian Head: Collaborate on plan and throughout general review processes. Information needed includes wastewater and water treatment plan annexations; economic development; public amenities; public landings and other impacted facilities; and stormwater management.

- *County, State, and Federal Agencies*
  - Charles County Department of Transportation (roads and public transit): County transportation leaders should be part of the core planning team.
  - Charles County Public Schools: Consult on outreach and education.
  - Charles County Board of Education – County Superintendent for Schools: County education leaders should provide input and consultation throughout the plan development process. This should include working collaboratively with the Work Group to develop fact sheets, flyers, contests, or classroom materials.
  - Maryland Department of Transportation (MDOT) and State Highway Administration (SHA): Consult on future development plans. Provide consultation on draft plan. Engage the Maryland Resiliency partnership and the Adaptation Resiliency Work Group, both of which meet regularly.
  - Maryland Transportation Authority (MDTA): Review and approve final plan and consult on issues related to toll facilities and the 301 Bridge.
  - Maryland Emergency Management Administration (MEMA): Review and approve final plan. Consult in regard to grant opportunities.
  - Maryland Department of the Environment (MDE): Review and approve final plan. Consult on dam safety, flood mapping, grants, water and sewer regulations, including private water and sewer, and stormwater management.
  - Maryland Department of Agriculture (MDA): Review and approve final plan.
  - Maryland Department of Natural Resources (DNR): Review final plan and consult on grant funds, waterway permits, state parks, possible technical assistance, and shoreline change mapping opportunities.

- Maryland Department of Health (MDH): Review and approve final plan and consult on infectious disease, and foodborne diseases.
- Soil Conservation 24 (MASCD): Consult, review and approve plan.
- Economic Development Department: Consult and collaborate on the plan. Ask for guidance in reaching out to the business community. This should be done as soon as possible.
- Maryland Environmental Service (MES): Consult, review and approve plan.
- Federal Highway Administration (FHWA): Consult on future development plans and about possible technical assistance.
- Federal Emergency Management Administration (FEMA): Consult about grant opportunities for actions in the plan.

- *Business Related Institutions and Interests:*
  - Chamber of Commerce: Collaborate as part of the planning team and review plan. The purpose is to educate about climate resilience, seek input and concurrence with the plan, discuss potential implications, solicit key concerns, and create a decision support tool.
  - Real Estate Developers: Inform about the plan. Work through the Charles County Building Code Official to connect with the developers.
  - PANDA Brandywine, CPV, Morgantown: Inform and review plan.

- *Private Utilities*: Utilities should be included as part of the collaborative planning team, and should include engagement related to plan development, review, and launch. Specific outreach should include:
  - SMECO Electric Power Community Liaison: Involve through collaboration and consultation about the plan. Seek plans for service restoration to critical facilities, vulnerable populations, and plans for future resiliency.
  - University of Maryland – Charles Regional Medical Center: Involve through collaboration and ask to review plan. Seek information about infrastructure needs after hazard event and look at dependencies on infrastructure.
  - Community Operated Well and Septic System: Involve and inform about the plan.
  - Maryland Airport: Inform about the plan.
  - Comcast/Verizon: Involve, collaborate, and review the plan. Look at plans for service restoration to critical facilities, vulnerable populations, and plans for future resiliency.
- *Volunteer Organizations:*
  - American Red Cross: Consult and review plan. Provide information related to emergency response plans, capacity, etc.
  - Lifestyles, Inc: Consult/inform about the plan.

- Food Banks: Consult/inform about the plan.
- Homeless Service Providers: Inform about the plan.
- Meals on Wheels: Consult/inform about the plan.
- Faith Organizations: Consult/inform about the plan.
- Volunteer Fire Departments: Consult/inform about the plan.
- Future Farmers of America (State and County): Collaborate on the plan. Seek any relevant information to enhance the plan.
- 4H: Collaborate on the plan. Seek any relevant information to enhance the plan.
- University of Maryland Charles County Extension Service: Collaborate on the plan. Seek any relevant information to enhance the plan.
- Maryland Farm Bureau (County Farm Bureau): Collaborate on the plan. Seek any relevant information to enhance the plan.
- Rural County: Consult/inform about the plan.

- *Community Organizations*
  - Port Tobacco River Conservancy. Collaborate on the plan.
  - Homeowners Associations: Consult/inform about the plan.
  - Community Advocacy Groups: Consult/inform about the plan.
  - Environmental Groups: Consult/inform about the plan.

- *Others*
  - Village of Port Tobacco: Collaborate on the plan.

CONCLUSION

The Resilience Action Strategy developed through this project will provide Charles County with a solid foundation for moving towards project implementation at scale. Existing County resources and expertise are perhaps the community's greatest asset, and that expertise is evident throughout the project and is reflected in this report. Like other communities in Maryland and across the Mid-Atlantic, Charles County is at a critical juncture in assuring the long-term vibrancy of its economic, social, and environmental infrastructure assets. This Action Strategy will be an important process in moving from planning to implementation, and finally, to resilience.