

Naval Station Mayport

Adaptation Package #1: Improving Electric Utility System Resilience

This package includes four strategic projects that in combination improve utility resilience for Naval Station (NS) Mayport and the surrounding community. It encompasses substation hardening, system upgrade, site improvement, and partnership recommendations that can be led by regional and local authorities and agencies as well as private and public service providers.



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The content herein reflects the views of the Northeast Florida Regional Council and does not necessarily reflect the views of the Office of Local Defense Community Cooperation or the Department of Defense.

How to Read this Document

Project Summary Packages provide details on recommendations, background, and context to facilitate and accelerate implementation. The summaries are presented by mission-critical priority assets in the study area. The recommendations may include physical projects, new partnerships, and modernized policies identified over the course of the project. Presented in three sections, **Background and Context, Recommendations, and Implementation Tools**, each summary package can be used to brief decision makers and to complete funding requests and/or grant applications.

The first section, **Background and Context**, situates the reader to the Military Installation Readiness Review (MIRR) project, the study area location, and the military installations. It includes the following subsections:

- **Mission of the Installation of the Package**, which reminds the reader of the installations' purpose and importance of readiness
- **Mission-Critical Priority Assets** for the installation as identified through stakeholder engagement and vulnerability assessment
- **Current Conditions** of the mission-critical asset of the package, which illustrate the issues in local context
- **MIRR Adaptation Strategy Framework**, which is aligned to the region's vision for a Resilient First Coast and is the foundation of this body of work

The second section, **Recommendations**, dives into the issues challenging the region and study area and presents recommendations in the form of investments through projects, policy modernization, and/or by forging new partnerships among diverse stakeholder groups. This section is informed by the vulnerability assessment findings, stakeholder insight on ongoing projects and priorities, and best practices research. Information on the following topics is included in this section:

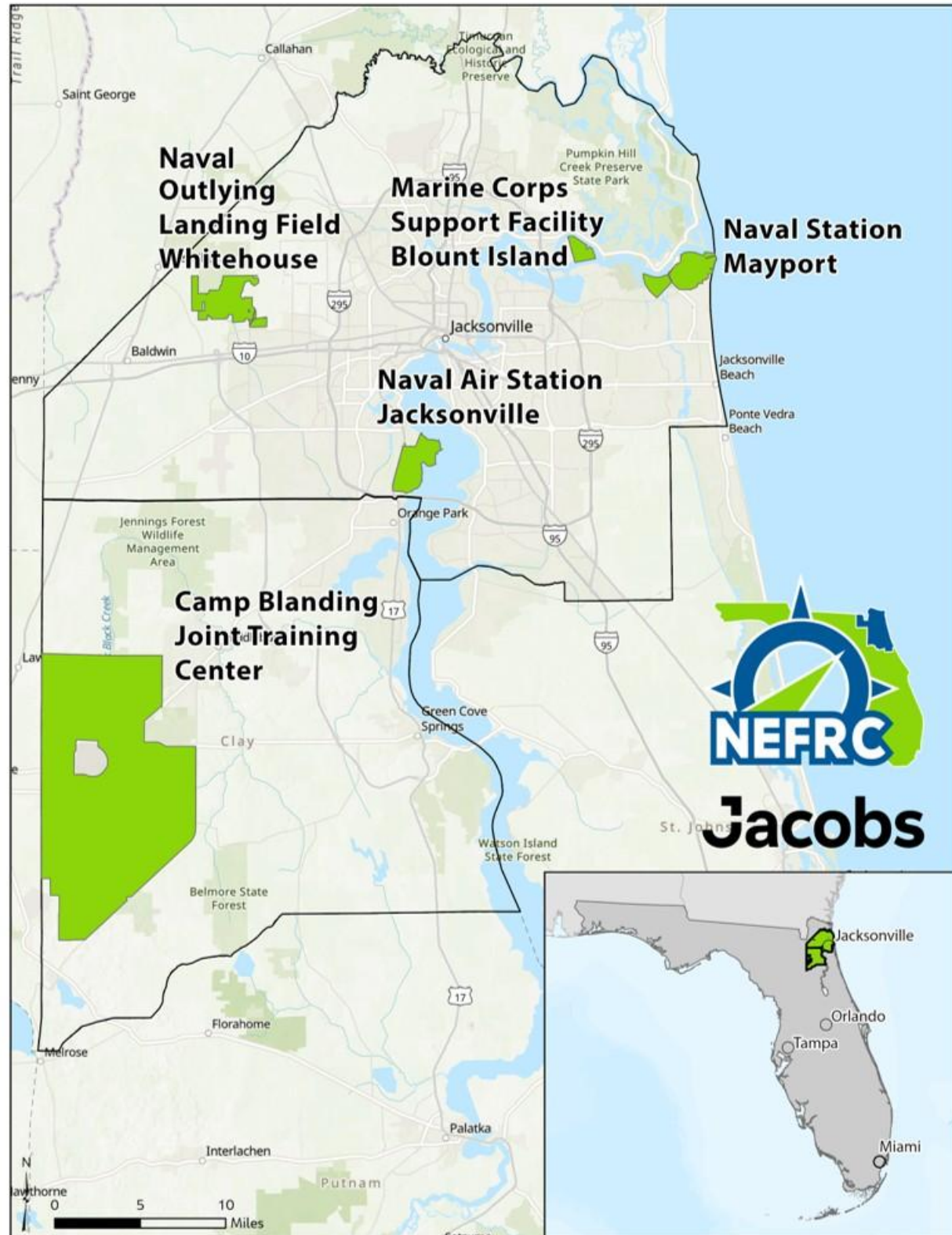
- **Shocks and Stresses** affecting the mission-critical asset
- **Project Objective**, which captures the adaptation goal for the following recommendations to support mission readiness through community resilience
- **Stakeholders and Current Efforts** highlighting successful foundational work upon which to build
- **Recommended Strategic Projects, Policies, and Partnerships**, including the owners and partners, vulnerability being addressed, co-benefits, foundational existing projects (as applicable), and timeline to comment implementation
- The **Metrics and Cost-Benefit Analysis** section, which illustrates how the recommendations were evaluated to determine appropriateness, viability, and achievement of project goals; this tool is available as new projects are identified by implementation partners

The final section, **Implementation Tools**, is provided as a resource to move from planning to action:

- **Financial Strategy Toolkit with Funding Opportunities**, which presents a matrix of opportunities and tools to finance and fund recommendations. Some recent grant opportunities are highlighted; however, given the changing conditions of federal sources and requirements, these should be viewed as initial suggestions for further review and applicability at the appropriate time.
- **References** are presented for user convenience.

Background and Content

Figure 1. Northeast Florida MIRR Study Area Map



In 2024, the Northeast Florida Regional Council (NEFRC) obtained a MIRR grant from the Department of Defense's Office of Local Defense Community Cooperation to identify and analyze the assets, hazards, and corresponding vulnerabilities and risks that affect the military installations in Duval and Clay counties. This study includes Camp Blanding Joint Training Center, Marine Corps Support Facility Blount Island, Naval Station (NS) Mayport, and Naval Air Station Jacksonville (Figure 1). The goal is to increase the resilience and readiness of these installations from the impacts of extreme weather events, infrastructure challenges, and other vulnerabilities, thereby promoting mission assurance. The adaptation projects are structured into comprehensive Summary Packages, with each focused on a specific mission-critical asset or system.

NS Mayport

NS Mayport is located on the eastern edge of Duval County at the mouth of the St. Johns River. The installation is north of Atlantic Beach, south of the St. Johns River, and east of the Village of Mayport. Because of its location, NS Mayport is unique in its operational composition, combining a busy seaport with an air facility. It can accommodate 34 ships while also operating an 8,000-foot-long runway suitable for any aircraft in the DoD inventory. The base also houses helicopter training sites and uses the surrounding marshlands as essential training environments. Another benefit to NS Mayport's location is the small tidal fluctuations that enable loading and unloading of ships throughout the year. Because of its location at the confluence of the St. Johns River and Atlantic Ocean, the installation is able to serve as a central hub of naval activity, with easy access to Central America, South America, and the Caribbean.

Mission

NS Mayport spans 3,409 acres and serves as a major surface and air warfare-focused installation. Its mission is to provide "The Finest Service to the Finest Fleet." NS Mayport supports the homeporting, readiness, and sustainment of Atlantic Fleet surface forces while also hosting the headquarters and operational activities of U.S. Naval Forces Southern Command/U.S. Fourth Fleet, which employs maritime forces in cooperative security operations to maintain access, enhance interoperability, build enduring partnerships, strengthen regional security, and promote peace, stability, and prosperity throughout the Caribbean and Central and South America. The Fourth Fleet's Area of Responsibility includes 31 countries, 16 dependencies, and areas of special sovereignty, a combined area equaling approximately one-sixth of the world's landmass.

In addition to providing a home for the Fourth Fleet, NS Mayport also supports aviation basing for rotary-wing and unmanned aircraft. The installation is home to the Helicopter Maritime Strike Wing, U.S. Atlantic Fleet (CHSMWL), multiple Helicopter Maritime Strike Squadrons, and the launch, recovery and maintenance location for Unmanned Patrol Squadron (VUP) 19, which uses MQ-4C Triton aircraft for intelligence, surveillance, and reconnaissance purposes. Overall, NS Mayport plays a critical role for fleet readiness and sustainment in the southern hemisphere.

NS Mayport also has multiple secondary missions. It enables carrier and amphibious operations, enables joint/coalition operations and exercises, supports humanitarian and disaster response, and supports major tenant commands. The installation provides operational, logistical, and quality of life support to 82 tenant commands. NS Mayport serves as a critical hub for regional and international defense operations. As of March 2024, NS Mayport is home to 8,076 active-duty

and reserve full-time support personnel, along with 21,500 family members. The workforce also includes 826 civilian employees, 523 non-appropriated fund employees, 1,504 contract employees, and 19 Selected Reserve members.

Installation Interconnections

The Naval Station Mayport linkage overlays, as shown in the NEFL MIRR webpage, illustrate the installation's role as one of Florida's most important surface-fleet, rotary-wing, sustainment, and maritime operations hubs. The maps show how Mayport connects locally to NAS Jacksonville, Blount Island, the St. Johns River defense logistics network, while also linking nationally to Norfolk-based Navy fleet, surface-force, aviation, training, maintenance, and logistics commands. Together, the layers demonstrate that Mayport is not simply a ship homeport, but a combined operating platform that supports surface combatants, helicopter maritime strike forces, long-range maritime reconnaissance, Fourth Fleet operations, ship and aircraft sustainment, port operations, munitions, fuels, training, and operational support.

The broader strategic value of Naval Station Mayport is most strategically significant in its international and theater linkages. Its surface-force and HSM networks connect Mayport to Norfolk, Rota, Guantánamo Bay, and deployed U.S. Navy ships; its Fourth Fleet role links directly to SOUTHCOM, JIATF-South, CSL Comalapa, and maritime security cooperation across the Caribbean, Central America, and South America. Its sustainment and training layers connect broadly across the Navy systems commands and shore enterprise to include: NAVSEA, NAVAIR, FRCSE, AUTEC, Bahrain, Dahlgren, Pensacola, Orlando, NAVSUP, DLA, and Navy expeditionary support commands. When viewed as a combined overlay, NS Mayport is revealed as a critical Atlantic and SOUTHCOM-facing naval node that links Northeast Florida to fleet readiness, regional maritime security, deployed surface operations, and international partnership missions.

Identification of Priority Assets for NS Mayport

Figure 2. Primary and Secondary Mission Critical Assets for NS Mayport



Priorities for the installation were based on the direct assets and local services required to support the missions. This includes the shorelines that protect the installation and its systems, the roadways required to access the base, the electrical systems that support all activities, the fueling facilities that support the fleet, and the natural systems that protect the installation from erosion and flooding. These assets were evaluated for exposure to shocks and stresses (Figure 2).

Primary Mission Critical asset types for ship homeporting and support, 4th Fleet Headquarters support, aviation basing and support, managing fuel depots, homeland defense, major ship repairs

- **Location-Specific Positioning**
 - St. John's River
 - Wetlands and Marshes
 - Shorelines
 - Fuel Depot
- **Assets Providing Direct Support**
 - Electric Production and Supply Facilities
 - Roads and Bridges
 - Communications Facilities (e.g., cell towers, fiberoptic lines)
 - Water utility supply facilities
 - Wastewater conveyance and treatment facilities
 - Safe Harbor Facilities (JAXPORT)
 - Offsite dry dock facilities (BAE)

Secondary Mission Critical asset types that offer the regional fueling depot

- **Assets Providing Direct Support**
 - Emergency Response Facilities
 - Shorelines (Atlantic Coast shorelines)
 - Fire Stations
 - Mission Supportive for the livelihood and health of installation personnel, indirect support to primary and secondary missions.
- **Personnel Support**
 - Affordable Housing
 - Childcare Facilities
 - Emergency Response Facilities (Hospitals)
- **Assets Providing Indirect Support**
 - Solid and Hazardous Waste Facilities

This package addresses the specific shocks and stresses of the mission critical electrical assets for NS Mayport.

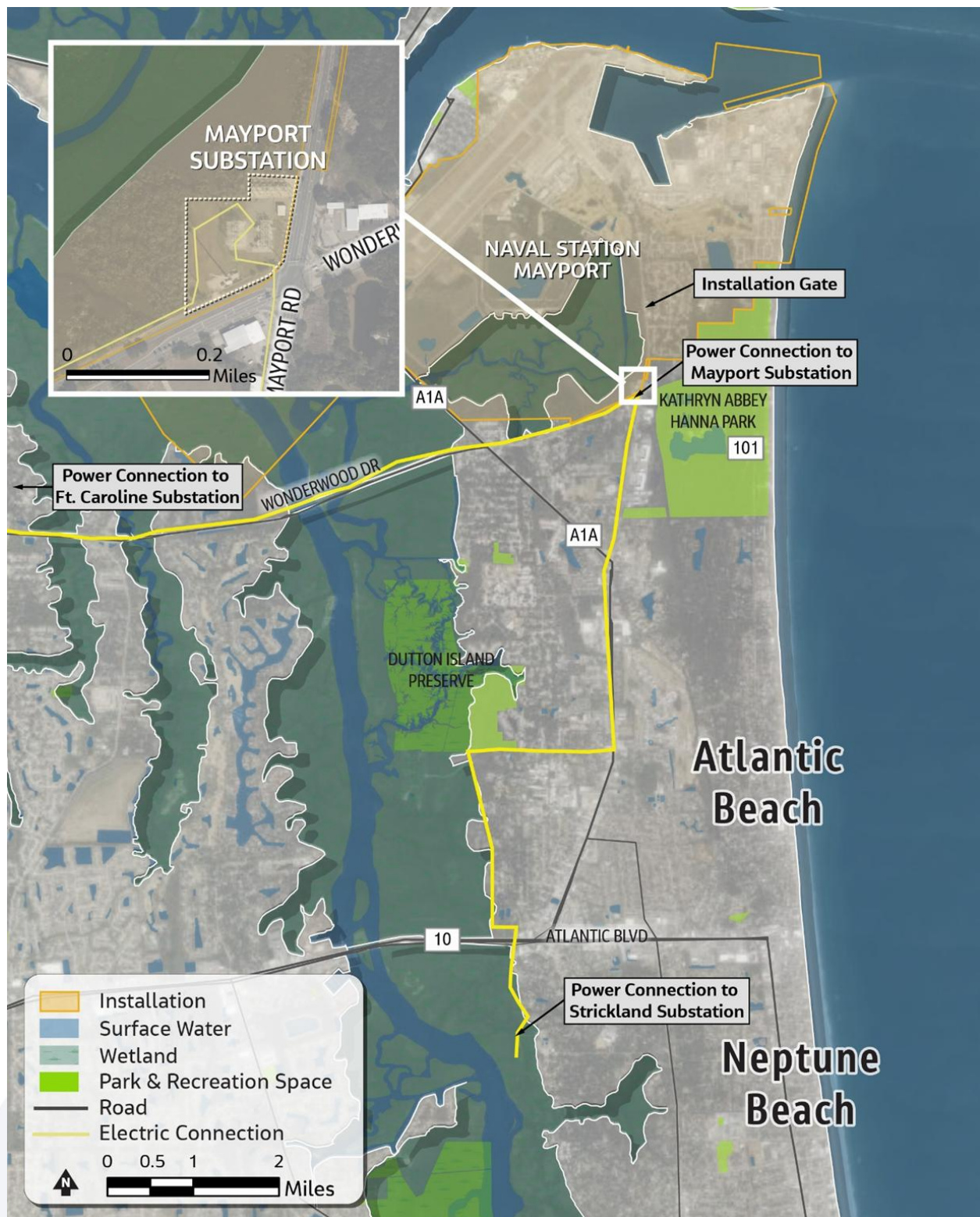
Current Conditions That Affect the Electric System

Historically, the electric system serving NS Mayport developed as part of the JEA regional grid, with power supplied from centralized fossil-fuel-based generation (coal, oil, and natural gas) and distributed through a network designed to support a high-tempo naval installation with waterfront, industrial, and residential loads. Infrastructure was constructed over multiple decades to support fleet operations, resulting in a layered system with a mix of legacy and upgraded components. Much of the distribution system remained above ground, exposing it to hurricane-force winds, saltwater corrosion, and storm surge impacts. While the broader grid incorporated redundancy, the installation's internal distribution relied on a limited number of substations and feeders, creating vulnerabilities to localized failures, particularly in low-lying waterfront areas critical to mission operations.

Today, the system is more advanced, with stronger regional redundancy, modern grid controls, storm-hardened poles, selective undergrounding, and a cleaner generation mix that includes natural gas and some solar (Figure 3). On-installation upgrades such as selective undergrounding, improved protective devices, and strengthened poles have increased resilience. However, the installation's coastal location and operational complexity continue to present challenges. Critical electrical assets remain exposed to storm surge, flooding, and corrosive marine conditions, while the concentration of high-demand mission loads—such as ship berthing, maintenance, and support facilities—places significant stress on the system. Though redundancy has improved, key substations and feeder pathways still represent potential points of failure during severe weather events.

In the future, these pressures are expected to intensify, compounding threats to aging infrastructure and low-lying assets. As a result, resilience efforts such as substation hardening, distributed energy resources (microgrids, storage), and heat- and flood-adapted design will be essential to maintain reliable operations under future climate conditions.

Figure 3. Electric Infrastructure Location Map



MIRR Adaptation Strategy Framework

The NEFRC envisions a resilient, prosperous, and inclusive region where communities work collaboratively across jurisdictional boundaries to strengthen economic vitality, safeguard natural and built systems, and enhance quality of life for current and future generations (Figure 4). In 2022, the Council launched **Resilient First Coast** to collaboratively address climate-related challenges across its seven member counties—Baker, Clay, Duval, Flagler, Nassau, Putnam, and St. Johns. This regional effort received strong support to develop a plan focused on addressing climate impacts and related threats to the region. Guided by this vision, the Regional Resilience Action Plan (RRAP) was published in 2025, providing a unifying framework that translates shared regional goals into coordinated action (NEFRC 2025).

The RRAP establishes a durable foundation for implementing this vision—enabling member governments and partners to prioritize investments, leverage funding opportunities, and advance solutions that build long-term resilience to environmental, economic, and social challenges across Northeast Florida. As such, the MIRR adaptation projects are built upon this framework to ensure alignment and promote successful implementation of the recommended strategies (Figure 5).

RRAP Goals and Objectives

Figure 4. Regional Resilience Action Plan Vision (NEFRC 2025)



Figure 5. Regional Structure for Resilience as Framework for the MIRR



Connecting this Built Environment Asset to the Regional Economy, Natural Environment, and a Vibrant Quality of Life

This framework provides the structure for how assets were organized and evaluated. This resilience project is centered on assets in the Built Environment pillar, so the acknowledgments below indicate how it is connected to the Regional Economy, Natural Environment, and Quality of Life.

Figure 6. Connection of This Asset to the Community





Recommendations



Documenting Shocks and Stresses with a Vulnerability Assessment

Shocks and stresses to the mission critical assets supporting NS Mayport include rainfall-induced flooding, coastal flooding from SLR and storm surge, shoreline loss from erosion, and school closures (Figure 7).

1. Flooding has been documented as occurring throughout the installation because of storm surge and SLR. It also threatens to permanently inundate other regional mission-critical systems, such as regional fuel depots, in the foreseeable future.
2. Rainfall-induced flood events are also projected to affect supporting access roads, such as Wonderwood Drive.
3. **Storm surge can inundate multiple regional facilities, such as electric substations. It can also cause significant shoreline erosion.**
4. Shoreline erosion has occurred on the installation's own shores (such as north of the fuel farm) and affects supporting infrastructure, such as A1A. This erosion is exacerbated by major storm events.
5. The pending closure of the Anchor Academy would be a major shock, requiring students to find a new school and posing physical, emotional, and financial challenges to military families, potentially impacting readiness.

This project package addresses flood hazards and redundancy for improved electrical system resilience for the installation (item 3).

Project Objective: Reduce Flood Risks and Improve Infrastructure Capacity for Future Demand

Figure 7. Risk to Mission Map



Vulnerabilities Creating Risk to Mission for this Asset

The Mayport Electrical Substation, owned and operated by JEA, is located along the western boundary of the installation at the intersection of Mayport Road and Wonderwood Drive (Figure 7). It is adjacent to the saltwater marshes along Sherman Creek, which are managed by the Florida Department of Environmental Protection (FDEP). The substation's key vulnerability is a lack of redundancy. In the past, a wildlife-related incident caused a power outage that affected runway lighting and approximately half of the installation. As the endpoint of the transmission line, the substation primarily serves the installation and is critical for its operation (Table 1). Additionally, the substation is forecasted to be exposed to storm surge and some rainfall-induced flooding, based on the projections used in the vulnerability assessment.

Table 1. NS Mayport Substation Asset Overview

Asset Name	Owner	Location	Mission Criticality	Relevant Shocks & Stresses	Level of Urgency
Mayport Substation	JEA	Southern boundary of NS Mayport installation	Primary	Lack of Redundancy, Rainfall flooding, storm surge	Immediate

Stakeholders and Current Efforts

NS Mayport, in coordination with JEA, the City of Jacksonville, is advancing resilience efforts to reduce the impacts of hurricane storm surge, rainfall flooding, and wildlife intrusion on the Mayport Electrical Substation and the broader electrical system.

Key characteristics of the electricity substation and its redundancy include:

- Redundant power supply: Supplied by Fort Caroline and Strickland Road substations
- Backup power: Diesel generator with up to 5 days of fuel storage
- Onsite generation: Limited solar capacity, insufficient for major demand
- Monitoring and maintenance: It is part of JEA's centralized monitoring system and is maintained under its standard inspection protocols

Beyond its primary function, the substation also presents opportunities to strengthen broader energy resilience. These include:

- Reducing grid demand during outages
- Supporting the surrounding community by exporting excess onsite-generated power
- Enhancing overall grid stability in the local area

There are currently no known active capital improvement projects at the Mayport substation or the adjacent electrical facility, aside from ongoing activities such as monitoring, inspection, and asset management. However, the substation is included in several long-term planning initiatives. It is part of JEA's Systemwide Electrical Resilience Plan, which targets flood hardening and replacement of vulnerable electrical assets as well as upgrades to system-wide design standards (JEA 2025). The substation is also included in the City of Jacksonville's 2023 Resilient

Jacksonville Plan, which emphasizes scaling up nature-based solutions, preserving existing wetlands, and coordinating with JEA to protect critical electrical infrastructure.

Table 2 gives details on projects and efforts that are currently ongoing or have been identified as a need within the region as it relates to mitigating vulnerabilities for the Electrical System supporting NS Mayport.

Table 2. Current Projects and Efforts Related to NS Mayport's Electrical System

Existing Project	Entity	Location	Purpose	Timeline
Substation Hardening Study	JEA	Southern boundary of NS Mayport installation	Electrical system resilience	Study completed study; remains at the concept level
Wetlands preservation Study	City of Jacksonville	Wetlands along Sherman Creek	Manage flooding, minimize storm surge damage, filter pollutants, replenish groundwater, and support wildlife habitats	Study completed; remains at the concept level
Duval Countywide Map of Oysters: Land Conservation for Existing Salt Marsh	City of Jacksonville	Wetland along Sherman Creek	Marsh Migration Corridor Conservation	Remains at the program level

Review of Strategic Partnerships and Policy Review

Naval Station Mayport's partnerships related to its electrical system are currently centered on a formal Intergovernmental Support Agreement (IGSA) with JEA, which governs utility operations and maintenance. This agreement provides a stable framework for routine service delivery and supports continuity of operations through priority power restoration status following outages. However, it does not explicitly address system resilience or redundancy, and no formal mutual support or alternative service arrangements have been identified to mitigate single points of failure affecting the installation.

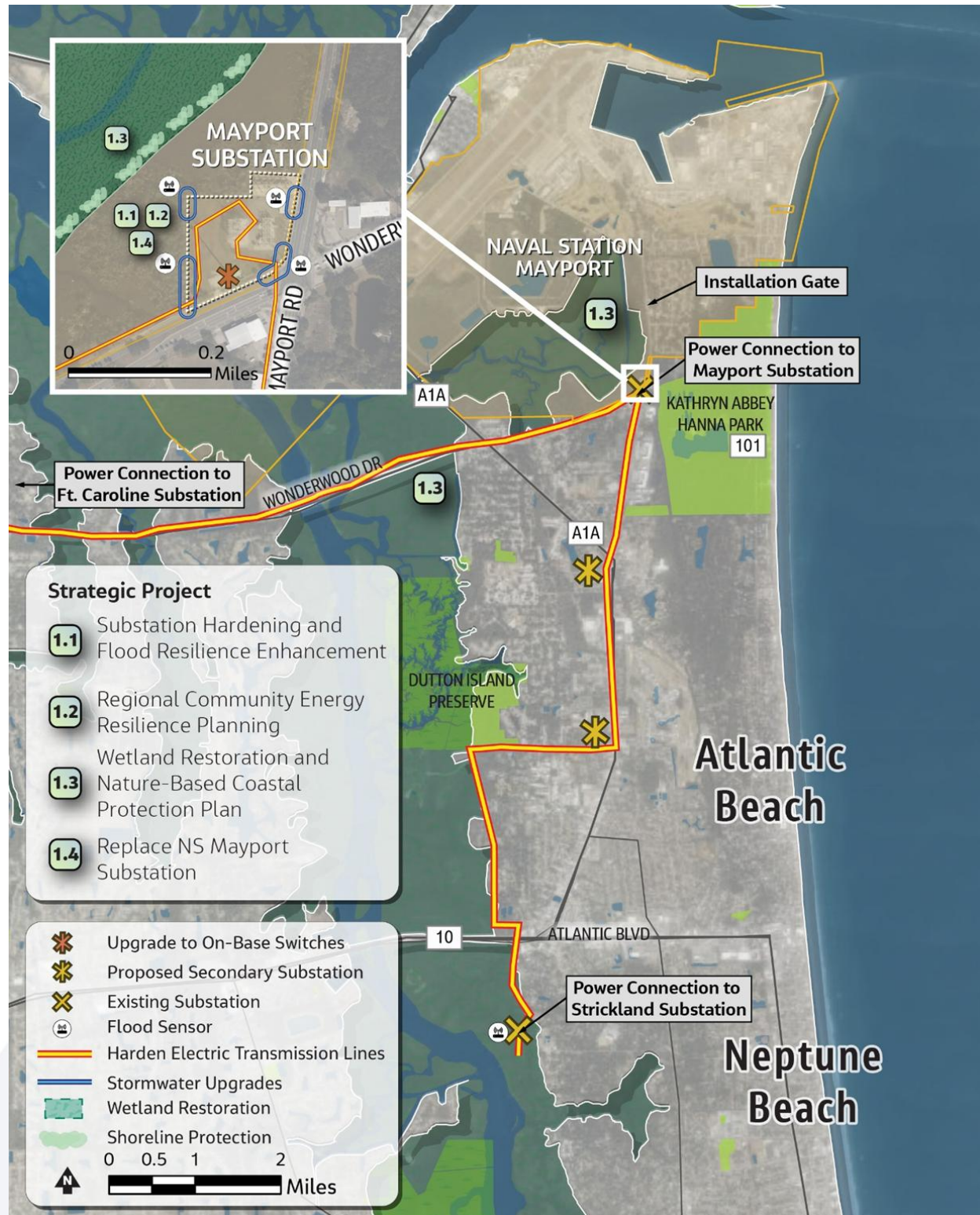
As a result, while the existing relationship with JEA is operationally effective for day-to-day needs, it is not structured to directly mitigate vulnerabilities stemming from storm surge, rainfall flooding, or other hazards identified in the installation's vulnerability assessments. JEA is advancing resilience initiatives across its broader service area, but these efforts appear to focus primarily on restoration and continuity rather than the development of redundant supply pathways or hardened infrastructure tailored to NS Mayport's specific risks. The absence of a dedicated redundancy framework leaves critical infrastructure exposed, particularly where substations or feeder lines may be susceptible to flooding impacts.

Looking ahead, the need for enhanced coordination is expected to grow as flood risk intensifies. The appropriate path forward may depend on the nature of the solution: discrete capital projects—such as substation hardening, elevation, or the addition of redundant feeds—may be addressed through project-specific agreements, while broader system changes could require a more formal, resilience-oriented partnership framework.

Expanding the existing IGSA to incorporate planning and coordination around resilience and redundancy would be an efficient first step, leveraging an established institutional relationship while setting the stage for future investments. Even if capital improvements ultimately require separate agreements, an enhanced IGSA could serve as a bridge by formally acknowledging resilience needs, aligning planning efforts, and establishing roles and responsibilities between NS Mayport and JEA.

Adaptable Built Infrastructure Projects

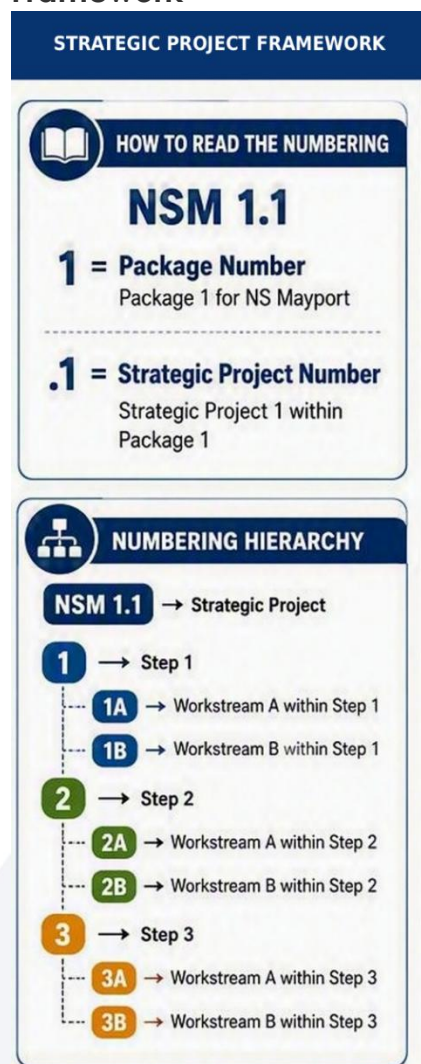
Figure 8. Adaptation Strategies Map



Strategies included in the adaptation plan have been organized by short, mid, and long-term timeframes for implementation. The strategy numbers in the maps correspond to the details provided in their respective sections, which outline a comprehensive approach to strengthening energy resilience and support long-term mission continuity. These strategies focus on enhancing existing system performance, reducing vulnerabilities, and advancing modern, flexible infrastructure solutions that can adapt to future demands and environmental conditions. Order-of-magnitude cost estimates will be provided in 2026 dollars to the extent possible, with up to 50% contingency unless otherwise noted.

Potential Project Leads and Partners are mentioned by organization in the following narratives. The intent is to identify the correct stakeholders that have agency, authority, and interest in the work that is being proposed. Being listed as a lead or partner provides the opportunity to collaborate, advise, and be involved in the adaptation efforts, but does not mandate participation. Funding and financing of projects are not indicated as the responsibility of the project lead or partners, and the monetary tools for obtaining such are in the Implementation section of this package.

Figure 9. Strategic Project Framework



The strategic projects are organized by installation, package, project, step, and actions. The 2-3 letter code indicates the installation. The first number indicates which package this project is in. The second number indicates the project number in the package.

Within each project, the timeline of activities is indicated through the steps (Step 1, Short-term, etc.), and the order of activities is narrated in the sub-steps (1A, 1B, etc.). Through this organization, each strategic project illustrates its project number, timeline, and actions in the narrative.

Strategic Project NSM 1.1. Substation Hardening and Flood Resilience Enhancement

This project strengthens the resilience of the Mayport, Fort Caroline, and Strickland Road substations and the 9.8-mile-long transmission line against storm surge, extreme rainfall, tidal flooding, and high-wind events. The effort focuses on hardening critical electrical infrastructure, improving flood management systems, and enhancing fault detection and recovery capabilities. JEA serves as the lead for tracking and implementing flood and wind hardening of critical equipment at both locations, with a specific emphasis on prioritizing upgrades to aging infrastructure.

Potential Project Leads and Partners

- NS Mayport Public Works Department (PWD)
- Naval Facilities Engineering Systems Command (NAVFAC) Southeast (Contracting Authority)
- JEA
- Defense Logistics Agency (DLA Energy – Supporting Role)
- Base Operations and Supporting Utility Contractors

Current Stakeholder Projects

- JEA Electrical System Resilience Plan (Improvements Planned)

Estimated Cost

\$82,500,000

Step 1: Critical Infrastructure Hardening (Short-term)

1A. Prioritize Improvements to Critical Substation and Transmission Infrastructure

- JEA can prioritize and implement elevation and floodproofing measures for infrastructure at the Mayport, Fort Caroline, and Strickland Road substations and the transmission line, per the project description in the *Electrical System Resilience Plan*. Improvements can include raising equipment above projected flood elevations and installing waterproof enclosures and perimeter flood barriers to reduce storm surge and saltwater intrusion. JEA can prioritize replacement and reinforcement of aging infrastructure as part of its hardening program, reducing risk of failure during extreme weather events while improving overall system reliability.

1B. Protect Control and Communication Systems

- JEA can reinforce redundant communication pathways across NS Mayport substations and the broader JEA grid interface, ensuring persistent monitoring and control capability during disruptions. NAVFAC and NS Mayport PWD should consider hardening and/or relocating SCADA systems, protection relays, and control panels within installation substation control facilities to maintain operational continuity during flood events.

Step 2: Smart Flood Management and Active Drainage Systems (Mid-term)

2A. Enhance Stormwater and Flood Management

- NAVFAC can upgrade drainage infrastructure within the NS Mayport substations footprint and adjacent low-lying areas, including regrading, expanded conveyance capacity, and improved drainage pathways to reduce standing water and mitigate compound flooding from storm surge, rainfall, and tidal influences. NAVFAC should install backflow prevention systems at NS Mayport waterfront outfalls, preventing reverse flow during surge events and reducing inundation risk to critical electrical infrastructure.

2B. Smart Drainage and Active Flood Control

- NAVFAC can deploy automated pump systems and water-level sensors within the substation yard to actively remove floodwater during storm events. JEA can integrate intelligent drainage controls and monitoring capabilities into broader utility system visibility platforms, enabling real-time awareness and coordinated response. NS Mayport PWD should operate and maintain these systems to ensure continuous readiness and performance during high-risk conditions.

Step 3: Fault Detection, Recovery, and Predictive Resilience (Long-term)

3.A Strengthen Recovery and Emergency Power Capability (Fault Detection)

- JEA can deploy advanced fault detection, automated switching, and system segmentation technologies across the NS Mayport Substation and its grid interface, enabling rapid identification, isolation, and restoration of outages following storm events. NAVFAC and NS Mayport PWD should coordinate restoration priorities and pre-stage spare components, particularly for aging or high-risk assets identified through JEA tracking efforts. JEA and NAVFAC should align recovery protocols across substations to accelerate service restoration.

3.B AI-Driven Predictive Analytics

- JEA can implement artificial intelligence (AI)-driven predictive analytics platforms across substations, using real-time sensor data, historical flood patterns, and asset condition data to forecast equipment failure risks and inform proactive maintenance and upgrade decisions. NAVFAC should integrate centralized dashboards for shared situational awareness, incorporating weather forecasts, tidal conditions, drainage performance, and system health data. All stakeholders should leverage these tools to support pre-storm planning, operational adjustments, and coordinated emergency response.

Strategic Project NSM 1.2. Regional Community Energy Resilience Planning

This project establishes a coordinated community energy resilience planning framework for NS Mayport and the surrounding six communities (approximately 25 square miles [mi²]) sharing the same grid segment. The goal is to improve overall grid stability, reduce outage competition, and enhance continuity of service by aligning community-level energy needs with utility system operations and long-term resilience strategies.

NS Mayport operates within a broader, interconnected energy environment where residential, commercial, and military users rely on shared distribution infrastructure. During major events or peak demand periods, competing loads across these communities can increase stress on the system, reducing reliability and slowing restoration. Through partnership with JEA, NS Mayport, and local community stakeholders, this project advances a unified planning approach that identifies critical loads, improves redundancy, and integrates community energy priorities into grid management strategies.

Potential Project Leads and Partners

- JEA
- NS Mayport Public Works Department (PWD)
- City of Jacksonville (Resilience Office /Planning Department)
- City of Jacksonville Emergency Management
- Adjacent Municipalities
- DLA Energy
- Northeast Florida Regional Council (NEFRC)

Current Stakeholder Projects

- JEA Electrical System Resilience Plan (Improvements Planned)
- City of Jacksonville Resilient Jacksonville (Improvements Planned)

Estimated Cost

Cost to be determined by owner

Step 1: Community Energy Resilience Planning and Load Coordination (Short-term)

1A. Critical Load Identification and Prioritization

- Project partners can collaborate to overlay critical, essential, and non-essential loads across both installation and community systems, including mission-critical military operations, emergency services, transportation infrastructure, and key community assets to develop a shared prioritization framework. This framework supports future load management strategies and ensures that essential services are maintained during high-demand or disruption scenarios.

1B. Develop Community Energy Resilience Plan

- JEA, NS Mayport PWD, and community stakeholders can develop a comprehensive Community Energy Resilience Plan for the six-community service area (approximately 25 mi²), consolidating findings from load prioritization, vulnerability assessments, and existing resilience studies. The plan establishes clear goals, identifies priority projects, defines roles and responsibilities, and outlines phased implementation strategies to improve grid stability, coordinate load management and restoration priorities during regional energy disruptions, and enhance regional energy resilience. NS Mayport should provide JEA, through approved controlled channels, the aggregate service requirements, restoration priorities, and interface information necessary to support installation energy resilience without disclosing detailed mission-critical load attribution.

1C. Monitoring Strategy and System Visibility Planning

- JEA can plan and design integrated monitoring platforms to provide real-time visibility into electrical system performance across NS Mayport and surrounding communities. This includes defining requirements for shared dashboards, data flows, and system interfaces that will enable utility operators and stakeholders to track load conditions, identify system stress points, and coordinate demand balancing in later implementation phases.

Step 2: Coordination and Plan Implementation (Mid-term)

2A. Load Management and Demand Balancing

- JEA can implement load management strategies from the Community Energy Resilience Plan across the shared grid segment, using data from resilience studies to better balance demand between NS Mayport and surrounding communities. These efforts coordinate load management and restoration priorities during regional energy disruptions..

2B. Coordinated Integration with Utility Control Systems

- JEA deploys and integrates NS Mayport and community demand data into its central monitoring and control systems, enabling more precise system-wide load management and operational decision-making. This integration supports proactive balancing of supply and demand and improves grid stability under both normal and stressed conditions.

Step 3: Long-Term Community Resilience and Adaptive Planning (Long-term)

3A. Resilience Strategy Integration and Continuous Improvement

- JEA, NS Mayport PWD, and community stakeholders update resilience plans regularly based on system performance data, growth projections, and emerging threats such as SLR and increased storm intensity. Lessons learned from events and exercises inform iterative improvements to planning assumptions and system design.

3B. Regional Coordination and Stakeholder Engagement

- JEA and NS Mayport facilitate ongoing coordination across municipal, utility, and installation stakeholders to align long-term infrastructure investments and resilience priorities. This collaborative approach ensures that community growth, infrastructure upgrades, and mission requirements are planned in a complementary manner.

Strategic Project NSM 1.3. Wetland Restoration and Nature-Based Coastal Protection Plan

This project establishes a wetland restoration and coastal resilience planning framework for the approximately 55-mi² wetland system located west of the Mayport Substation, led by FDEP and partners. The goal is to evaluate current wetland conditions and develop a phased restoration strategy that reduces storm surge impacts, attenuates wave energy, and lowers flood exposure to critical electrical infrastructure.

The project emphasizes a nature-based and hybrid protection approach, combining wetland restoration with engineered features to create layered defense systems. Efforts will coordinate with and build on existing research, pilot projects, and programmatic guidance developed by the U.S. Army Corps of Engineers (USACE) Engineering With Nature (EWN) initiative and National Oceanic and Atmospheric Administration (NOAA) coastal resilience programs in the Jacksonville and Lower St. Johns River region, ensuring alignment with proven methodologies, funding pathways, and regional restoration priorities.

Potential Project Leads and Partners

- JEA
- NS Mayport Public Works Department (PWD)
- City of Jacksonville (Resilience Office/Planning Dept.)
- City of Jacksonville Emergency Management
- U.S. Army Corps of Engineers (USACE) Engineer Research and Development Center, EWN Program
- National Oceanic and Atmospheric Administration (NOAA)
- Florida Department of Environmental Protection (FDEP)
- Naval Facilities Engineering Systems Command (NAVFAC)
- Academic research programs

Current Stakeholder Projects

- JEA Electrical System Resilience Plan (Improvements Planned)
- City of Jacksonville Resilient Jacksonville (Improvements Planned)
- Oyster Integrated Mapping and Monitoring Program

Estimated Cost

\$19,000,000

Step 1: Wetland Assessment and Restoration Planning (Short-term)

1A. Collate Existing Wetland Research and Conditions Data

- Partners can collate, review, and synthesize existing research, datasets, and prior studies on the 55-mi² wetland system west of the Mayport substation, including vegetation health, hydrology, elevation, and documented areas of degradation or erosion. This effort leverages available federal, state, and regional resources—such as USACE EWN, NOAA, and FDEP datasets—to establish a baseline understanding of wetland conditions and identify data gaps. The synthesized findings inform subsequent analysis of how wetland conditions influence

storm surge attenuation and flood risk to the substation and surrounding infrastructure. Local academic research programs provide partnership opportunities for this research and bring effective documentation approaches for compiling and analyzing results.

1B. Develop Wetland Restoration Unified Vision

- FDEP and partners can develop a unified regional vision for wetland restoration across the Mayport electrical substation influence area, aligning environmental, infrastructure protection, and community resilience goals. This vision establishes clear performance targets such as surge attenuation levels, flood reduction thresholds, and habitat outcomes, and identifies priority corridors for intervention. The unified vision ensures stakeholder alignment and serves as a decision framework for selecting and advancing fundable restoration projects.

1C. Predictive Modeling and Scenario Simulation

- FDEP and technical partners can develop predictive models to simulate storm surge pathways, flood extents, and shoreline dynamics affecting the Mayport electrical substation and adjacent wetlands. These models produce spatially explicit outputs such as priority protection zones, surge reduction benefits, and design elevations that directly inform project siting, sizing, and engineering requirements. Modeling results support cost-benefit analysis, strengthen grant competitiveness, and enable packaging of projects for implementation funding.

1D. Develop Wetland Restoration Plan

- FDEP and partners can develop a comprehensive Wetland Restoration Plan that translates outputs from Steps 1A–1C into a prioritized, implementation-ready project portfolio. The plan identifies specific restoration projects such as marsh enhancement areas, sediment placement zones, living shorelines, and hybrid protection features; defines conceptual designs; establishes phasing and sequencing; and aligns each project with potential funding sources and delivery pathways. This step formalizes a clear pipeline from planning to execution, enabling immediate advancement of high-priority projects into Step 2 implementation, permitting, and construction.

Step 2: Restoration, Implementation and Hybrid Protection Integration (Mid-term)

2A. Implement Priority Nature-Based Restoration Projects

- FDEP and partners can advance and implement priority wetland restoration projects identified in the Wetland Restoration Plan (Step 1D), focusing on high-impact areas west of the Mayport electric substation. These projects include marsh enhancement, sediment placement, hydrologic reconnection, and vegetation restoration in zones prioritized through data synthesis and modeling. Implementation follows the phased sequencing and design concepts established in Step 1, enabling projects to move directly into permitting, funding execution, and construction. These actions increase wetland capacity to attenuate storm surge, dissipate wave energy, and reduce inland flood propagation before reaching critical infrastructure.

2B. Deliver Hybrid Shoreline and Flood Protection Projects

- FDEP, in coordination with NAVFAC and JEA, can design and construct hybrid protection features identified in the Step 1D project portfolio, integrating nature-based systems with engineered elements such as berms, reinforced shorelines, and targeted elevation improvements near the substation interface. These projects are implemented as part of the same prioritized capital pipeline, using modeling outputs from Step 1C to refine engineering specifications and performance targets. This ensures that hybrid solutions are deployed in locations with the highest risk reduction benefit and are fully aligned with substation resilience investments.

2C. Advance Funding, Permitting, and Program Delivery

- FDEP and partners can advance funding and delivery mechanisms for the prioritized project portfolio developed in Step 1D by aligning projects with federal, state, and regional funding sources including USACE, NOAA, and resilience grant programs. Projects are packaged into implementation-ready phases with defined scopes, cost estimates, and benefit metrics, enabling accelerated permitting, grant applications, and capital delivery. This coordinated approach ensures a continuous pipeline from planning into construction, reducing delays and enabling scalable expansion of restoration efforts over time.

Step 3: Monitoring, Adaptive Management, and Long-Term System Performance (Long-term)

3A. Integrated Monitoring of Implemented Restoration Projects

- FDEP, in coordination with USACE EWN and NOAA, monitor performance of the wetland restoration and hybrid protection projects implemented in Step 2, using real-time environmental, hydrologic, and surge data. Monitoring systems track key performance metrics including water levels, sediment movement, vegetation health, shoreline stability, and storm surge attenuation effectiveness. Data collection aligns with USACE EWN monitoring frameworks and NOAA observation networks, ensuring consistency with regional and national datasets and enabling cross-program comparison.

3B. Adaptive Management and Performance-Based Optimization

- FDEP, USACE, NOAA, and regional partners evaluate and adapt restoration strategies based on monitoring results from Step 3A and performance targets established in Steps 1B and 1C. This includes refining designs, reinforcing underperforming areas, and advancing additional restoration phases identified in the Step 1D project portfolio. Adaptive management decisions are guided by USACE EWN principles and NOAA resilience methodologies, ensuring that implemented projects continue to meet storm surge reduction and ecosystem performance objectives over time.

Strategic Project NSM 1.4. Replace NS Mayport Substation

This project evaluates and advances the replacement of the existing NS Mayport-serving substation with a new off-base substation in a more suitable and resilient location to enhance power reliability, capacity, and long-term resilience. The project focuses on establishing a hardened, strategically sited utility supply pathway that reduces risk from flooding, storm surge, and other hazards while minimizing potential for service disruption.

Current Stakeholder Projects

- JEA Electrical System Resilience Plan (Improvements Planned)

Potential Project Leads and Partners

- JEA
- Naval Facilities Engineering Systems Command (NAVFAC)
- NS Mayport Public Works Department (PWD)

Estimated Cost

\$45,000,000

Step 1: Feasibility, System Design, and Operational Integration Planning (Mid-term)

1A. Evaluate Secondary Substation Feasibility, Capacity, and System Design

- Assess the feasibility of replacing the existing substation serving NS Mayport with a newly constructed facility at an alternative, lower-risk location, including evaluation of siting options outside high-risk flood zones, interconnection points, and required transmission and distribution upgrades. Analyze opportunities to increase upstream system capacity to support both current and projected demand associated with installation growth, ensuring reliable operation under future load conditions. Develop design concepts for an independent feeder configuration that provides redundant power supply capability, with physically separated routing along distinct corridors to reduce the likelihood of simultaneous disruption. Incorporate resilient design considerations, including storm hardening, flood protection, and elevation, and evaluate integration with existing and planned installation resilience systems such as microgrid capabilities, energy storage, and load prioritization frameworks.

1B. Implement Switching Infrastructure, Automation, and Monitoring Systems

- Evaluate and implement upgrades to on-base switching infrastructure at NS Mayport to support rapid and automated transfer between the existing substation and the new electrical substation, minimizing outage duration and improving operational flexibility during transition and steady-state operations. Integrate smart grid technologies and real-time monitoring systems to enable automated fault detection, diagnostics, and coordinated response between utility and installation operations. Support these capabilities with data-driven tools, including predictive analytics for load forecasting and infrastructure optimization, to enhance system performance, improve reliability, and inform ongoing operational and planning decisions.

Step 2: Execution (Long-term)

2A. Construct Replacement Substation and Commission Transition

- Advance the design, permitting, and construction of the new off-base replacement substation in the selected resilient location, along with associated feeder infrastructure. Coordinate phased transition of electrical load from the existing substation to the new facility, ensuring continuity of service throughout implementation. Commission the system to operate as the primary supply source serving NS Mayport, with improved resilience, capacity, and reliability compared to the legacy asset.

2B. Optimize System Performance and Resilience Over Time

- Use real-time monitoring, operational data, and predictive analytics to continuously evaluate system performance, support proactive maintenance, and refine coordination between substations. Identify opportunities for incremental upgrades and system enhancements that further improve reliability, resilience, and alignment with installation growth and mission requirements.

Alignment and Support of the Regional Resilience Action Plan

Figure 9. Alignment with the RRAP

SCALE	ACTION	DESCRIPTION
	3	Maintain healthy air quality and reduce greenhouse emissions
	5	Promote the conservation and restoration of ecologically significant natural ecosystems
	6	Support resilient utilities
	13	Facilitate partnerships to advance resilience work
	16	Identify adaptation options for critical infrastructure to enhance resilience
	17	Support shoreline stabilization of natural and modified shorelines
	22	Promote deployment of green infrastructure and nature-based solutions
	27	Create an inventory of projects utilizing nature-based solutions
	32	Inventory critical and significant assets



Facilitate



Guide



Analyze

This project advances RRAP Actions 5, 6, 13, 16, and 17 by addressing a substation that sits at the end of the transmission line, adjacent to the saltwater marshes of Sherman Creek, and serves as the effective single point of supply for the installation. Strategic Project NSM 1.3 implements elevation and floodproofing of equipment at the Mayport, Fort Caroline, and Strickland Road substations and the 9.8-mile transmission line, together with waterproof enclosures, perimeter flood barriers, hardened SCADA and protection relay systems, and prioritized replacement of aging infrastructure. These measures implement Action 16 (Identify Adaptation Options for Critical Infrastructure to Enhance Resilience), specifically, Subaction 16.1 on elevating critical equipment, implementing flood barriers and waterproofing, and applying cost-benefit and life-cycle analysis to identify durable protective measures. Strategic Project NSM 1.4 goes further, evaluating replacement of the existing substation with a new facility sited outside high-risk flood zones, implementing Subaction 16.2, under which the Collaborative identifies programs that have successfully relocated critical infrastructure, summarizes lessons learned, and provides guidance to local governments on which regionally significant assets should be relocated versus adapted in place. This is the clearest application of Subaction 16.2 in the MIRR portfolio.

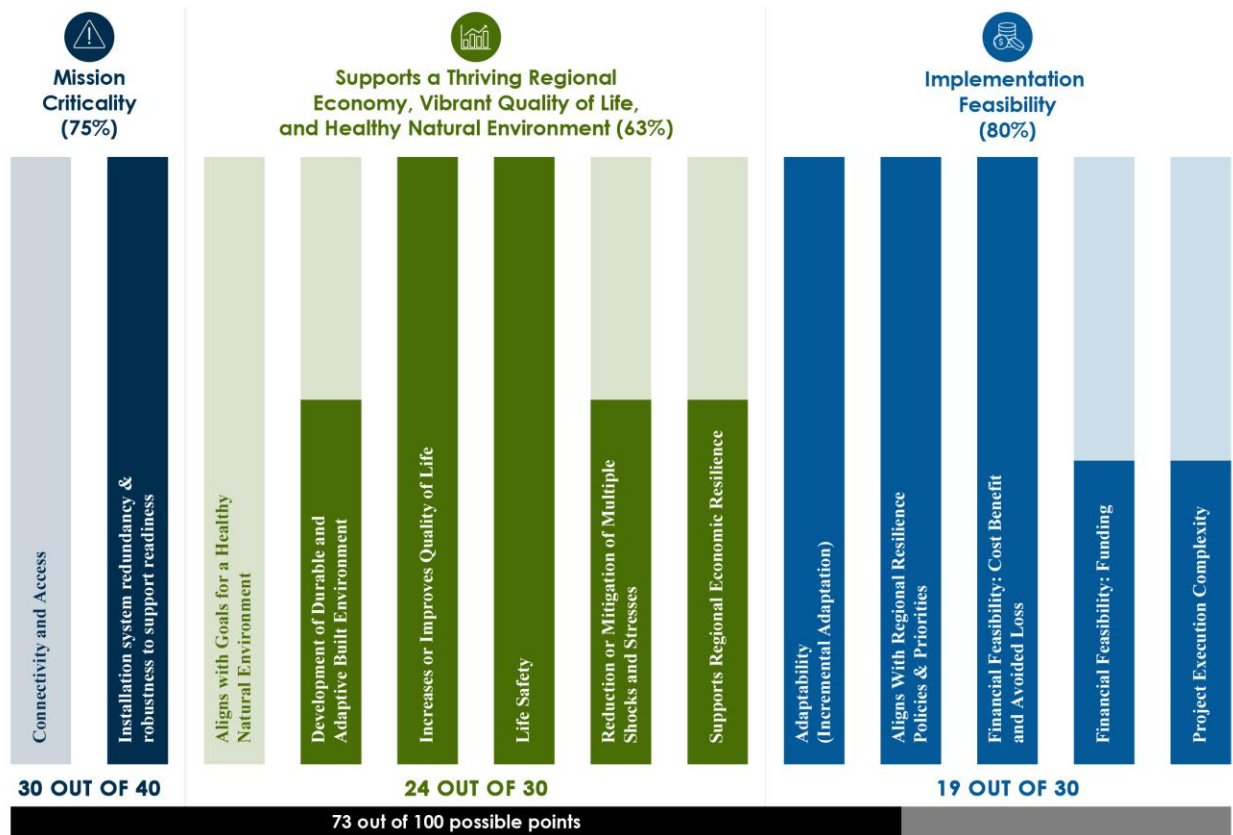
Strategic Project NSM 1.3 delivers the RRAP's Healthy Natural Environment goal alongside infrastructure protection. Restoration planning across the wetland system west of the substation, including marsh enhancement, sediment placement, hydrologic reconnection, and vegetation restoration, implements Subaction 5.1 on supporting efforts to conserve and restore estuarine and freshwater wetlands, which the RRAP grounds in the finding that 1 acre of wetlands can store 1.5 million gallons of floodwater and that coastal wetlands provide substantial erosion and surge protection. The project's coordination with the Duval Countywide Map of Oysters and marsh migration corridor conservation work advances Subaction 5.4, under which the Collaborative commits to continue working with the South Atlantic Salt Marsh Initiative to identify coastal areas critical for the landward migration of salt marshes and to work with local governments to preserve and protect them. Hybrid protection features combining nature-based systems with berms, reinforced shorelines, and targeted elevation near the substation interface implement Subaction 17.2 on encouraging living shorelines and nature-based solutions where site conditions support them and Subaction 22.2 on compiling and applying regional design guidelines. Coordination with the USACE Engineering With Nature program and NOAA coastal resilience programs and the monitoring of surge attenuation and shoreline stability under Step 3 generate exactly the project-level data the Collaborative compiles under Action 27 (Create an Inventory of Projects Utilizing Nature Based Solutions), including location, technique, permit numbers, and performance metrics.

Strategic Project NSM 1.2 establishes a Community Energy Resilience Plan across the six-community, roughly 25-square-mile grid segment shared by the installation and the Girvin, North Beach, Fort Caroline Shores, East Arlington, and Mayport Village communities. Critical load identification, demand balancing, and integrated monitoring implement Action 6 (Support Resilient Utilities), specifically, Subaction 6.2 on facilitating collaboration between utility providers and local governments regarding service provision during disturbances (the subaction that cites JEA's grid localization and outage monitoring practices as a regional model) and Subaction 6.3 on capacity improvements to accommodate continued growth. Onsite generation and the potential to export excess power to the surrounding community advance Subaction 6.1 on diversification of the energy grid and decentralized systems that keep essential services powered during grid-wide failure. The recommendation to expand the existing Intergovernmental Support Agreement with JEA beyond operations and maintenance to encompass resilience and redundancy implements Subaction 13.1 on advancing public-private partnerships to leverage expertise and funding and Subaction 13.3 on intergovernmental partnerships with state and federal agencies, including the military, to increase regional readiness (the subaction under which the RRAP explicitly recognizes the Council's MIRR process). Reduced reliance on extended diesel generator runtime and JEA's diversifying clean energy portfolio support Subaction 3.2 on promoting activities that reduce greenhouse gas emissions, and documentation of the substation and its dependencies contributes to the inventory of regionally significant assets maintained under Subaction 32.2.

Metrics Score

The NS Mayport Electric System Resilience Project was evaluated against a robust series of metrics to determine the appropriateness, viability, and achievement of goals. The metric categories are given a percentage weight to indicate the comparative importance of the MIRR, with Mission Criticality being the highest. High and mid-range scores across all metric categories indicate that implementing the strategies and policy recommendations within this project will promote mission assurance for the installation (Figure 10).

Figure 10. Metrics Scorecard Results



Cost-Benefit Analysis

Benefit-cost analysis (BCA) determines the cost-effectiveness of adaptation projects. This effectiveness is calculated using the equation

$$\frac{B}{C} = \text{Value}$$

Where B is the benefit, or avoided costs, of the project and C is the cost to implement the project. A benefit-cost value greater than 1 indicates that a project is cost-effective (i.e., the benefits of the project outweigh the costs incurred in implementing it), whereas a BC value less than 1 indicates the project may not be cost effective (i.e., the costs exceed the benefits).

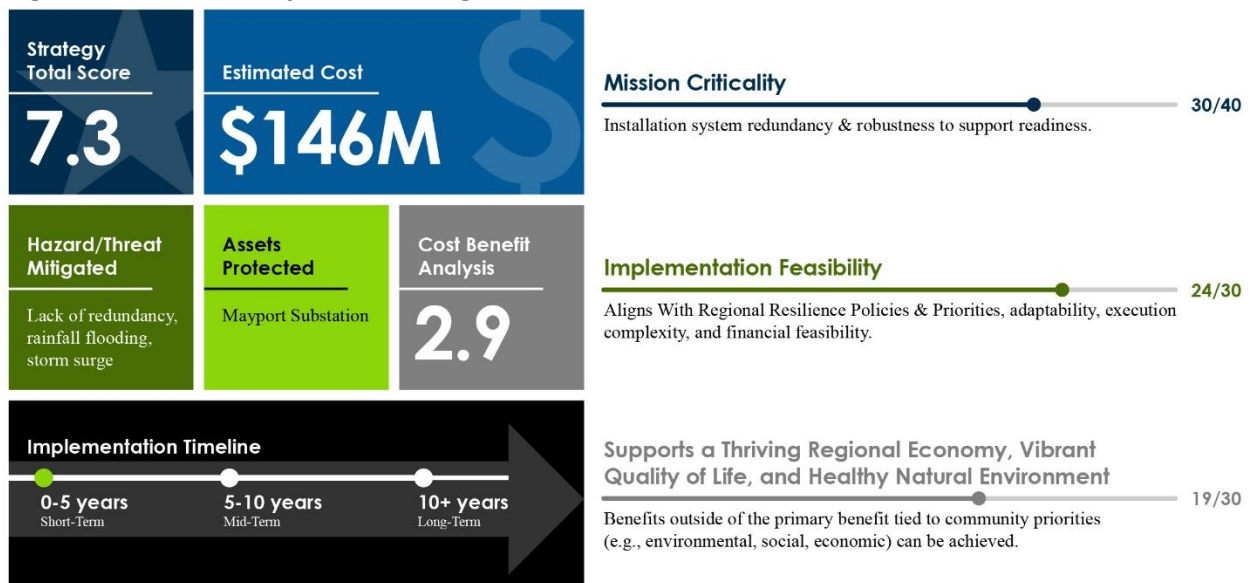
Adaptation project costs were costed to include project construction and design costs, where feasible. Project benefits were costed to include direct (construction or repair costs) and indirect (social, economic, and environmental) costs whenever feasible.

Data sources for benefit values include the Federal Emergency Management Agency, the National Institute of Standards and Technology, the National Interagency Fire Center, and others.

In many cases, associated financial savings data (such as improved installation operations, improved quality of life for installation personnel, or asset-specific O&M costs) was unknown; in these cases, the benefit is described. Hence, BCA values may not reflect the total possible benefit of the proposed adaptation project.

Total Project Package Snapshot

Figure 11. Total Project Package Snapshot





Implementation Tools



Financial Strategy Toolkit

More information on financial strategy building can be found in Technical Memo 10: Implementation Strategy and Investment Pathways.

Many of the tools required to fund, finance, and coordinate resilience implementation are already available under current Florida law or institutional precedent. The challenge, then, is aligning, adapting, and scaling existing tools to support coordinated regional resilience investment strategies. Thus, this section provides an initial inventory of funding, financing, and institutional tools that can be used to support the implementation of the MIRR project portfolio and the broader resilience system envisioned above.

Coordinate with JEA and Clay Electric on Regional Resilience Priorities

The region's utilities own most of the off-base grid, so coordinated planning and advocacy are the primary near-term levers. The proposed off-base substation near Camp Blanding is the clearest dual-benefit example, serving both the installation and the surrounding community. This effort can serve as a model for how utility investment and installation resilience can align. Near-term steps include:

- Convening the installations, JEA, and Clay Electric to identify shared priorities such as substation hardening and relocation, feeder redundancy, and outage-response improvements.
- Aligning installation and community resilience planning with the utilities' investment cycles and rate cases so regional needs are reflected in grid modernization plans.
- Advancing the off-base Camp Blanding substation as a co-investment that delivers mission and community benefit together.

Access Grid Resilience and Modernization Funding

Federal grid programs are structured to reach utilities like JEA and Clay Electric, either by formula through the state or through competitive rounds. Near-term steps include:

- Coordinating with the state energy office and the Florida Department of Emergency Management on the DOE Grid Resilience State and Tribal Formula Grants (IIJA §40101(d)), which pass through to electric utilities, including municipal utilities such as JEA and cooperatives such as Clay Electric, for hardening, undergrounding, and other resilience measures.
- Positioning larger transmission and reconductoring needs for DOE's competitive grid program (SPARK, formerly GRIP), which funds grid hardening, microgrids, and storage.

Note: The DOE competitive grid program's current round is likely the final one under IIJA, with concept papers and applications due in Spring of 2026, and formula grant allocations run through FY2026. Funding past FY2026 will depend on future congressional allocations.

Use the Defense Community Infrastructure Program (DCIP) for Dual-Benefit Utility Projects

The Defense Community Infrastructure Program (DCIP), administered by the DoD Office of Local Defense Community Cooperation, is a competitive grant program for community infrastructure that supports a nearby installation, and it can fund off-base water, wastewater, electric, and other utility projects. It is open to state and local governments and to member-owned utilities, which makes it a strong fit for dual-benefit projects such as the off-base Camp Blanding substation and community-serving upgrades tied to the installations. REPI can also support installation-resilience elements where energy and encroachment protection overlap. Near-term work is to identify which utility projects meet DCIP's installation-support criteria and prepare competitive applications around reliability and mission continuity.

Incorporate Energy Resilience into Public Facility and Infrastructure Upgrades

Many public facilities that provide lifeline services, including emergency operations centers and water treatment plants, lack sufficient backup power or redundancy. A cost-effective way to add resilience to existing facilities is during already planned upgrades. Near-term actions can include screening critical facilities for backup power, solar-plus-storage, or microgrid opportunities, aligning capital improvement planning with resilience co-benefits such as operational continuity and reduced recovery time, and prioritizing facilities that serve high-risk populations or mission-critical functions. Early-stage grant funding can pilot these systems before they are financed at scale through longer-term tools.

Resilient Utilities Longer-term Implementation

Utility resilience priorities should be matched to the funding or capital process most likely to deliver them. For utility-owned assets, this means determining whether the project belongs in the utility's capital program or needs another funding path based on the risk addressed, the function served, and the project's likely scope, cost, timing, and operation.

Installation-side and federally linked assets require separate considerations. Fuel infrastructure, on-base utility systems, and other projects tied directly to continuity of operations inside the fenceline should be distinguished from community utility investments, even where the systems are connected. These projects may require federal action, utility coordination, service-agreement changes, local cost-share, or a defense-community funding strategy.

The strongest candidates will be projects that connect mission assurance with community continuity and can be translated into a clear path to delivery.

Funding Opportunities

Table 3. Energy and Utility Resilience Funding Options

Agency/Org	Program	Description	Available Funding	General Eligibility	Example Eligible Projects	Timeline
US DOE	Speed to Power through Accelerated Reconductoring and other Key Advanced Transmission Technology Upgrades (SPARK) (formerly known as GRIP)	Supports efforts to modernize the electric grid, including reconductoring with advanced conductors, Advanced Transmission Technologies (ATTs) that can increase the usable capacity of existing assets in real time, and large-scale, cross-regional transmission upgrades and coordinated planning.	\$10.5 billion total (IIJA, FY2022-26); >\$6B awarded across Rounds 1-2. Round 3 = 'SPARK' (Speed to Power / advanced transmission), up to \$1.9B.	State and local governments, tribes and territories, utilities (including publicly owned and cooperative), grid operators, and partnerships among these entities.	Undergrounding of power lines, microgrids and energy storage for resilience, weatherization and automation of grid components, smart grid sensors and cybersecurity systems	Round 3 (SPARK) concept papers due April 2, 2026; full applications due May 20, 2026. Likely the final IIJA round — authorization expires FY2026.
US DOE	Grid Resilience State and Tribal Formula Grants (IIJA §40101(d))	Non-competitive formula grants to states and tribes to prevent outages and enhance the resilience of the electric grid against wildfires, extreme weather, and natural disasters. States sub-grant funds to electric utilities and other eligible entities.	Up to \$459M/year nationally (FY2022-26), allocated by formula (population, land area, hazard exposure, prior mitigation spending). Florida receives an annual allocation administered by the state energy office. (energy.gov/gdo; netl.doe.gov)	States and tribes (pass-through to electric utilities — investor-owned, cooperative, and municipal — and other eligible entities).	Grid hardening, undergrounding, vegetation management, weatherization, monitoring/control equipment, microgrids, and other resilience measures.	Annual state allocations FY2022-26.

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