Northeast Florida Regional Council
Military Installation Readiness Review

Camp Blanding Joint Training Center

Adaptation Package #2: Adaptation for Mobility Corridor State Road 16

This package includes three strategic projects that in combination improve infrastructure resilience on this mission-critical corridor. It encompasses drainage infrastructure improvement recommendations that can be led by regional and local authorities and agencies as well as private service providers.

This study was prepared under contract with the Northeast Florida Regional Council with financial support from the Office of Local Defense Community Cooperation, Department of Defense.

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:

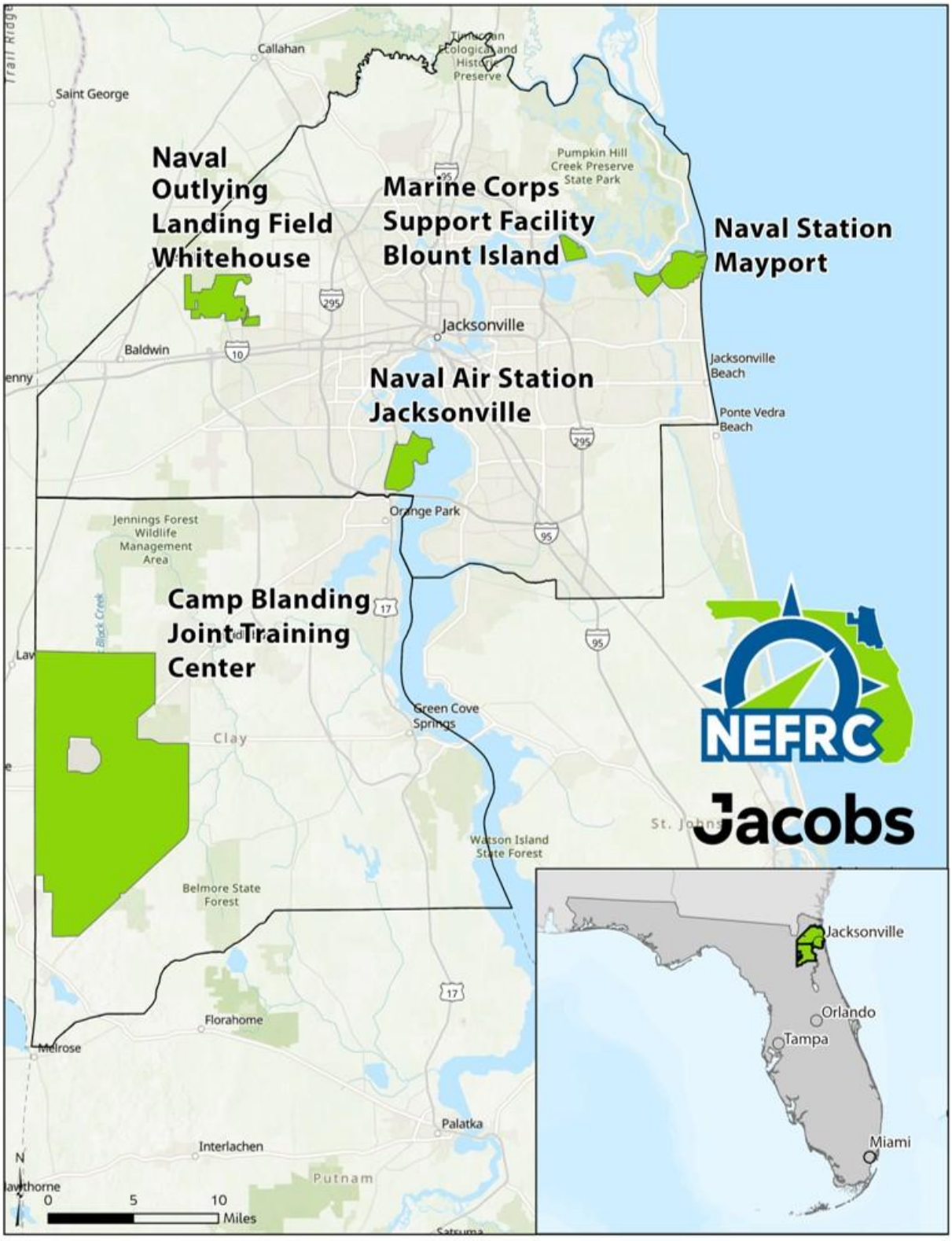
- **Shocks and Stresses** affecting the mission-critical asset
- **Project Objective**, which captures the adaptation goal for the following recommendations to support mission readiness through community resilience
- **Stakeholders and Current Efforts** highlighting successful foundational work upon 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 Context

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 (OLDCC) 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 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.

Camp Blanding JTC

Camp Blanding Joint Training Center (JTC) is in Clay County, Florida, west of the City of Starke, north of Keystone Heights, and east of the City of Green Cove Springs, along the border of Bradford and Clay counties. The rural setting provides the expansive, undeveloped land necessary to support large-scale ground maneuvers and live-fire training exercises, which was a key reason the site was selected when it was established in 1940 as one of the largest Army training centers in the United States during World War II. At its peak, Camp Blanding processed and trained hundreds of thousands of troops, briefly making it one of the largest population centers in Florida. Following the war, the installation transitioned to a Florida National Guard training site but retained its strategic importance due to its size and flexibility. Today, the cantonment area is primarily accessed via State Road 16, which runs east-west through the installation, connecting Starke to Green Cove Springs, while Keystone Heights Airport just to the south supports installation operations and training activities. The installation's location and surrounding open space remain critical to its mission, enabling dispersed, high-intensity training with minimal encroachment and preserving its historic role as a major military training hub.

Mission

Camp Blanding JTC is a Level II Garrison Training Center and the Florida National Guard's premier training site. The installation spans more than 73,000 acres, including approximately 55,000 acres dedicated to live-weapons and ground-maneuver training. Capable of supporting an Army brigade, Camp Blanding JTC provides year-round combat and civil-support training through ranges, a shoot house, convoy live-fire range, simulation center, education facilities, and maintenance resources.

Secondary mission activities at the installation support national security training and emergency response for a variety of federal and state agencies. Camp Blanding JTC supports military units and federal, state, local, and international partners across the Joint, Interagency, Intergovernmental, and Multinational spectrum. Customers include the Federal Bureau of Investigation, Department of Homeland Security, and Federal Emergency Management Agency. Due to its position as an integrated training hub, the dedicated Multijurisdictional Counterdrug Task Force campus supports law-enforcement training, while joint exercises with Caribbean nations advance international partnerships. The installation averages approximately 10,000 visitors per month.

Camp Blanding also plays a critical role in Florida's continuity and emergency-response operations. It serves as a Continuity of Government site for the Governor and Executive Branch

and as a Continuity of Operations (COOP) site for the Florida Division of Emergency Management (FDEM) and Joint Force Headquarters-Florida. The installation houses the State's backup Emergency Operations Center (EOC) and functions as a Joint Reception, Staging, and Onward Integration (JRSOI) site and Logistical Support Base, providing command, logistics, and staging support before, during, and after emergencies. It also hosts emergency-management academies for county officials.

State and federal investments support facility improvements, new ranges, and mobilization capabilities for homeland-defense and overseas missions. Florida's continued investment in the Operational Readiness Training Complex will expand battalion-scale training support and help attain and sustain the infrastructure standards associated with Level II Garrison Training Center capability.

Partnerships with Keystone Airpark, the Clay County Development Authority, and the Clay County Economic Development Corporation further strengthen infrastructure and operational readiness, reinforcing Camp Blanding JTC's position as a leading southeastern training and emergency-response hub.

Installation Interconnections

The Camp Blanding linkage overlays illustrate the installation's role as Florida's central land-domain readiness, National Guard, and civil-support platform. The maps demonstrate how Camp Blanding JTC connects to Joint Force Headquarters–Florida, the Florida Department of Military Affairs, the Florida Department of Emergency Management, major Florida Army National Guard commands, readiness centers, armories, aviation support facilities, specialized units, and other support nodes across the state. Together, the layers demonstrate that Camp Blanding JTC is not just a training area near Starke, but the geographic and operational hub of a statewide Guard readiness network that ties together command, mobilization, training, logistics, aviation, special operations, sustainment, and unit readiness across Florida, in addition to its role as a key continuity of operations and government function for the state government.

The broader strategic value of Camp Blanding JTC is underscored in its dual military and state response roles. Its Florida Army National Guard readiness and training network links the installation to major commands and armories from the Panhandle through South Florida, while its Camp-based nodes support training, mobilization, emergency response, civil support, logistics-staging, and continuity functions. While not necessarily standing linkages, National Guard and mobilization forces from around the country often leverage Camp Blanding JTC's capabilities as well.

When viewed as a combined overlay, the maps reveal Camp Blanding JTC as a statewide readiness anchor that supports not just National Guard force generation, but more broadly, disaster-response capacity, emergency-management continuity, interagency operations, and defense support to civil authorities, making it one of Florida's most important military assets for both national defense and state resilience.

Identified Priority Assets for Camp Blanding JTC

Priorities for the installation were based on the direct assets and local services required to support the missions. This includes the lands that provide buffers between training activities and the general population, the electricity required for training activities and emergency response, the water required for firefighting, and the transportation infrastructure needed to access the installation. These assets were evaluated for exposure to shocks and stresses (Figure 2).

Primary Mission Critical asset types that support live weapons and maneuver training ranges and house the FL National Guard Training Center

- Location-Specific Positioning
  - Conservation lands
- Assets Providing Direct Support
  - Electric Production and Supply Facilities
  - Roads and Bridges
  - Railway systems
  - Communications systems
  - Fire stations
  - Police stations
  - Stormwater systems
  - Clay County EOC

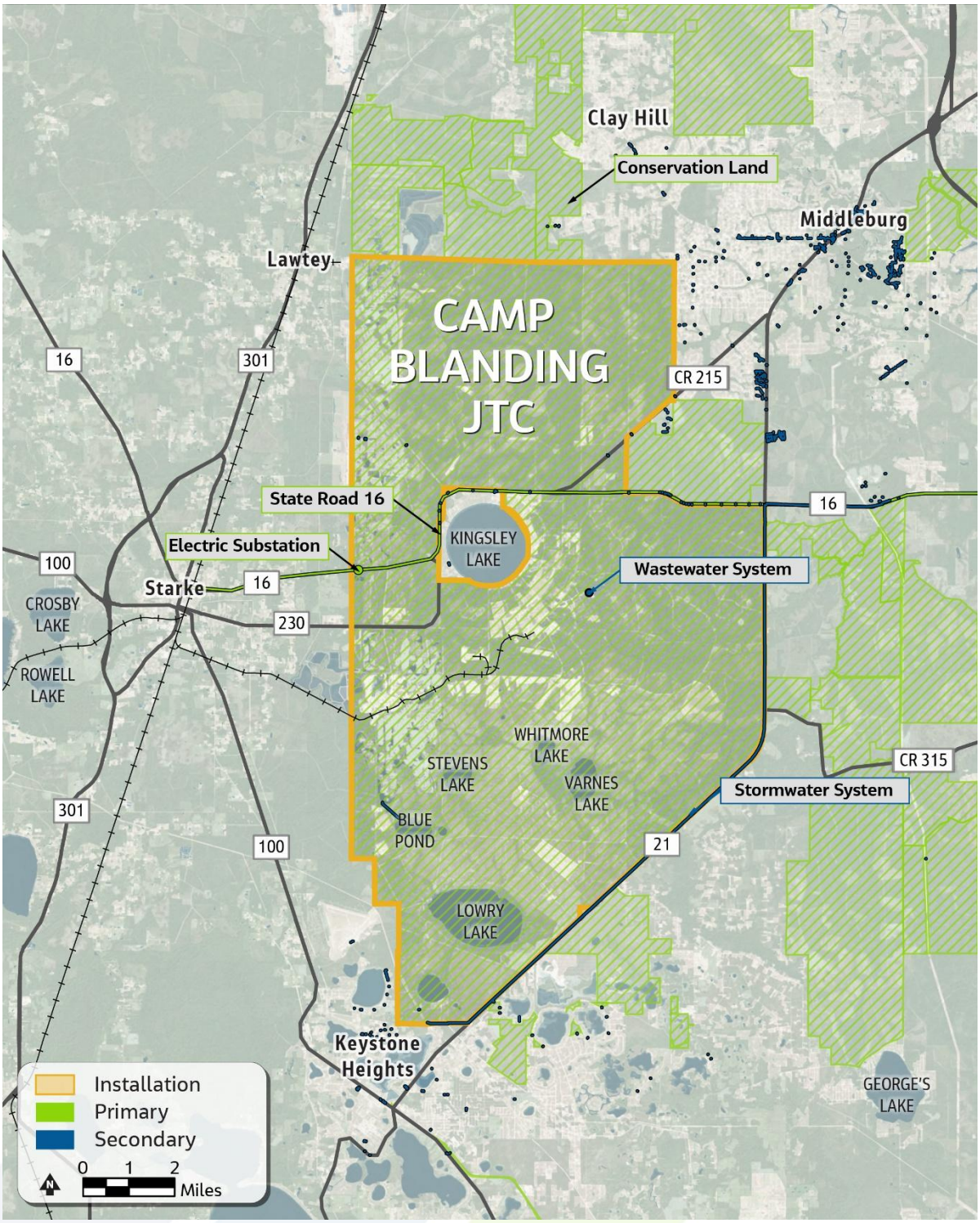
Secondary Mission Critical asset types that support various state and federal activities, including disaster response and various trainings

- Assets Providing Direct Support
  - Water systems
  - Wastewater systems

Mission Supportive asset types for the livelihood and health of installation personnel, indirect support to primary and secondary missions

- Personnel Support
  - Affordable Housing
  - Childcare Facilities
- Assets Providing Indirect Support
  - Solid and Hazardous Waste Facilities

Figure 2. Primary and Secondary Mission Critical Assets for Camp Blanding JTC



This package addresses the specific shocks and stresses of the mission-critical SR-16 mobility corridor at Camp Blanding.

Current Conditions that Affect State Road 16 at Camp Blanding and Kingsley Lake

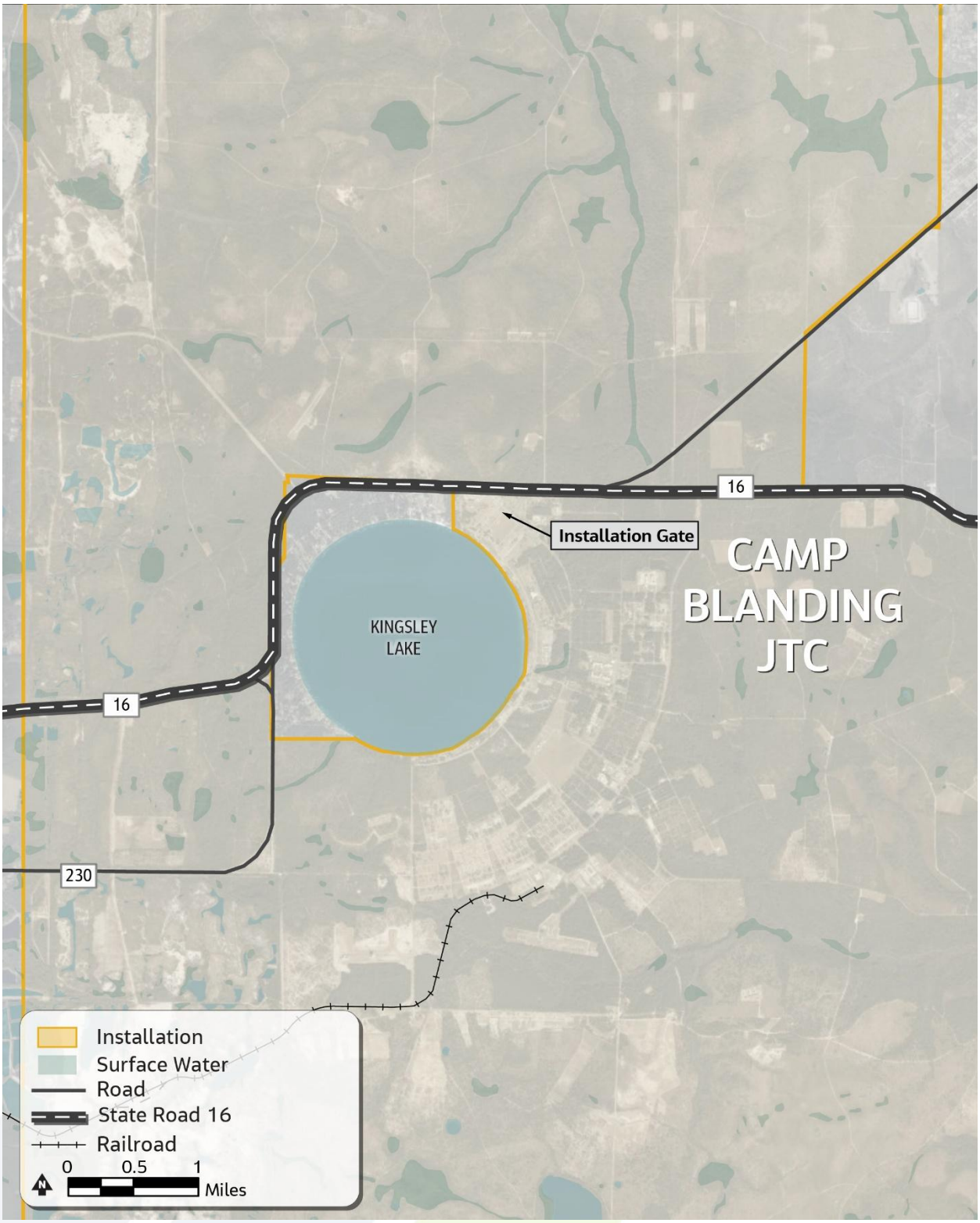
State Road 16 (SR 16) is a critical east-west corridor serving Camp Blanding JTC, the Kingsley Lake community, and surrounding areas in Clay County. It provides essential connectivity for military operations, emergency response, and local residents, linking rural areas to regional transportation networks and supporting personnel movement, training activities, and access to services (Figure 3).

The primary stressors affecting SR 16 are environmental rather than traffic-related stressors. Extreme heat accelerates pavement degradation, contributing to softening and rutting, while heavy rainfall creates hazardous driving conditions through localized flooding, erosion, and reduced visibility. Flooding is further exacerbated by stormwater infrastructure that is at or beyond its service life, limiting drainage capacity during high-intensity rainfall events and increasing the risk of standing water, roadway overtopping, and washouts.

These challenges are intensified by surrounding low-lying terrain and natural drainage patterns near Kingsley Lake, making certain segments more prone to water accumulation during severe weather (Figure 3). As a result, roadway reliability can be compromised during storms, directly affecting time-sensitive military operations and emergency access to Camp Blanding.

Given its limited redundancy, disruptions along SR 16 have heightened impacts on both mission readiness and community connectivity. Strengthening resilience through stormwater system upgrades, improved drainage capacity, and heat-resistant materials can reduce vulnerability, enhance reliability, and ensure consistent access for military and civilian users.

Figure 3. SR 16 Location Map



MIRR 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. 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 (Figures 4 and 5) into coordinated action (NEFRC 2025).

Figure 4. Regional Resilience Action Plan

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.

RRAP Goals and Objectives

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

Create a Durable and Adaptive Built Environment
- Minimize magnitude and cost of damage to infrastructure
- Improve development practices and policies
- Decrease utility service disruptions and recovery time
- Improve transportation and mobility

Develop a Thriving Regional Economy
- Improve education and employment opportunities
- Increase housing stability
- Enhance tourism and historic preservation
- Increase smart growth and development

Ensure a Vibrant Quality of Life
- Improve public health and wellness
- Enhance supply of food, energy, and other critical resources
- Increase public participation and engagement
- Minimize disparity

Promote a Healthy Natural Environment
- Reduce heat stress
- Increase biodiversity and ecological services
- Maximize quality of soil, air, and water
- Minimize erosion, flooding, and storm impacts

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 following acknowledgments indicate how it is connected to the Regional Economy, Natural Environment, and Quality of Life to ensure that project development created balance by positively benefiting each to the extent achievable.

Figure 6. Connection of This Asset to the Community

Recommendations

Documenting Shocks and Stresses with a Vulnerability Assessment

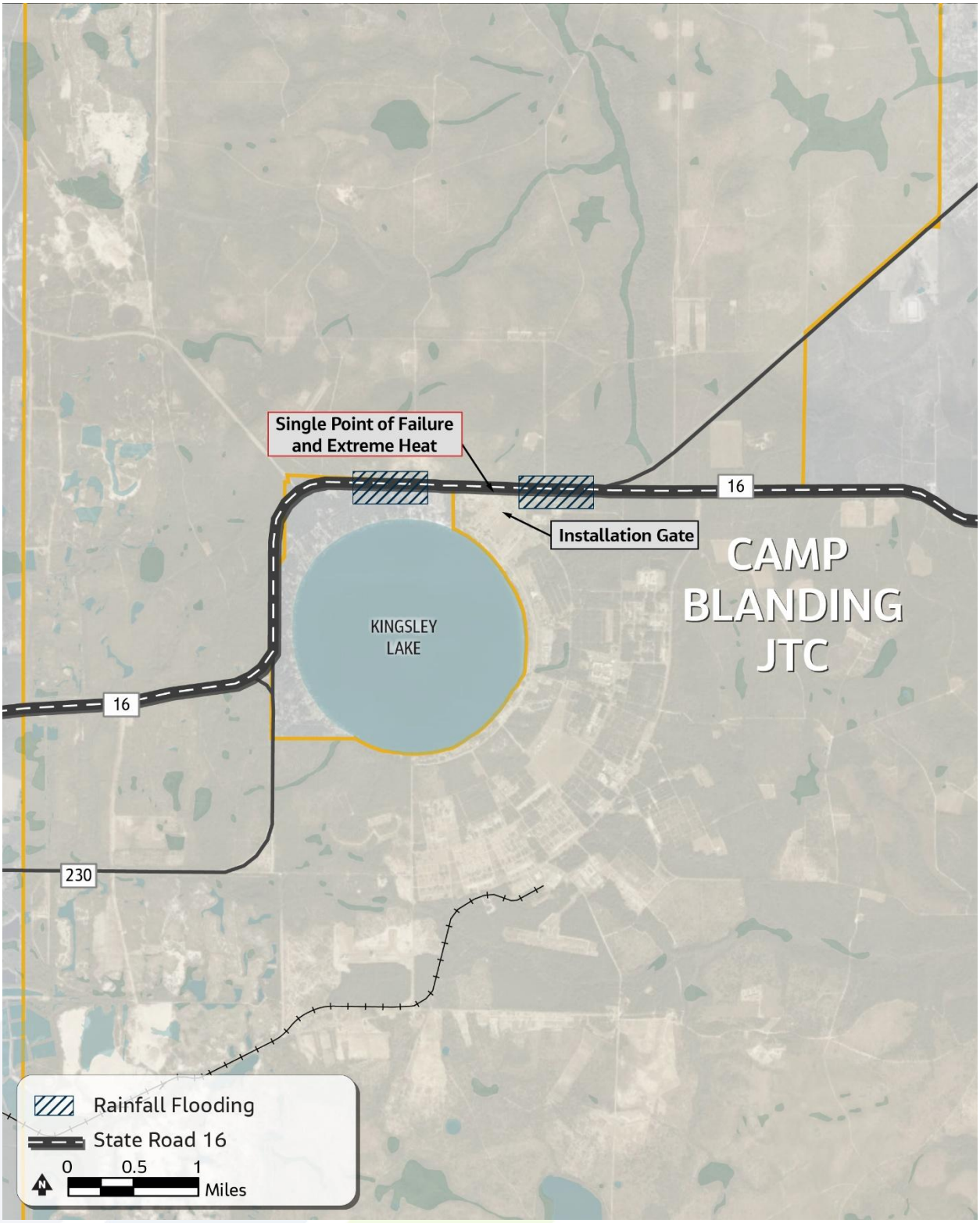
Shocks and stresses to the mission-critical assets supporting Camp Blanding JTC include wildfire, rainfall-induced flooding that overwhelms stormwater infrastructure, extreme heat impacts to transportation assets and personnel executing outdoor training, lack of redundancy, aging infrastructure, and regulatory pressures on utility infrastructure. Notably, the predominant threat to the installation's mission is encroachment from incompatible land uses.

1. Remaining unprotected priority parcels, fragmented ownership, and gaps in buffer continuity leave portions of the installation boundary exposed to incompatible development and wildfire-management constraints.
2. On the installation, wildfire is a well-managed risk. Installation personnel, in collaboration with the Florida Forest Service, regularly conduct prescribed burns as a means of fuels management. However, wildfire hazards off the installation are managed by a variety of entities (state, local, or private). Wildfire risk is greater on private property that is not well managed. This can result in fire hazards entering other properties and, eventually, the installation, threatening operations.
3. **Stormwater flooding is a risk on the installation (which has stormwater infrastructure past the end of its service life) and on SR-16, impacting installation access.**
4. **Extreme heat threatens regional railways and roadways, potentially causing buckling and impacting the movement of personnel and equipment.**
5. The installation's electrical supply lacks redundancy, and wildfires threaten nearby electrical substations.
6. The installation's wastewater system lacks redundancy and faces regulatory pressures from existing State legislation, which requires that the installation adjust its wastewater disposal methods by 2032.

This project package addresses localized flooding, improved mobility, and installation access on SR-16 (items 3 and 4). Figure 7 highlights these issues.

Project Need: Reduce Navigation Issues and Mitigate Future Flood Risk

Figure 7. Risk to Mission Map



Vulnerabilities Creating Risks to Mission for this Asset

SR 16 runs east-west through federal property located north of the Camp Blanding JTC campus. The roadway is owned and maintained by the Florida Department of Transportation (FDOT) and serves as a key regional connector between the City of Starke and the First Coast Expressway.

This roadway is considered a mission-critical asset because it provides the primary access route to the installation. Both the main and secondary gates are accessed exclusively from the SR 16 corridor, highlighting its importance for operational continuity. In addition to its role in supporting installation access, SR 16 also functions as the principal arterial serving the Kingsley Lake area, supporting both local mobility and regional connectivity.

Table 1. SR-16 Asset Overview

Asset Name	Owner	Location	Mission Criticality	Relevant Shocks & Stresses	Level of Urgency
SR 16	FDOT	Between County Road 225 and eastern edge of installation boundary	Primary	Rainfall Flooding, Single Access Road, Extreme Heat	Mid-term

Stakeholders and Current Efforts

A coordinated group of federal, state, regional, and local stakeholders is required for planning and implementing improvements along SR 16. These partnerships are essential given the roadway's dual role as a mission-critical access route to Camp Blanding JTC and a key regional transportation corridor connecting surrounding communities. Collaboration among these entities ensures that infrastructure investments support operational readiness, improve safety, and enhance long-term resilience and connectivity. Key stakeholders include the following:

- Camp Blanding JTC
- FDOT
- North Florida Transportation Planning Organization
- Kingsley Lake
- Clay County

There are no ongoing projects immediately outside or within the installation boundary that relate to SR 16.

Review of Strategic Partnerships and Policies

Camp Blanding, Clay County, FDOT, and regional entities such as the North Florida Transportation Planning Organization (TPO) maintain ongoing coordination to address vulnerabilities along SR 16. These partnerships emphasize shared responsibility for infrastructure resilience, continuous communication, and integration of military priorities into civilian planning efforts. However, while the TPO serves as a key regional forum convening FDOT, Clay County, and other stakeholders, Camp Blanding does not have direct representation within the TPO structure. Although the Navy holds an ex officio position, this does not fully substitute for installation-specific engagement, creating some uncertainty as to how effectively Camp Blanding's transportation needs are consistently elevated and reflected in regional priorities.

Along the SR 16 corridor, coordination between Camp Blanding leadership and local and regional planners does occur through project-level engagement and interagency communication. This collaboration helps inform transportation decisions related to military training schedules, heavy equipment movements, and surge conditions associated with mobilization and emergency response. Additionally, the corridor's critical role during disaster response, when Camp Blanding functions as a regional staging and support hub, reinforces the need for reliable access and highlights the importance of strengthened coordination mechanisms over time.

Flood Mitigation and Resilience Initiatives

Flooding remains a primary concern affecting SR 16, with increasing impacts to roadway reliability, safety, and base access. These risks are projected to intensify with future rainfall conditions, further stressing a corridor that already functions as a single access road for all installation gates. Compounding this issue, Camp Blanding personnel commute from a broad geographic area, including Jacksonville, Gainesville, and St. Augustine, meaning transportation disruptions can have outsized operational impacts.

In response, partner agencies are advancing several efforts aligned with MIRR resilience priorities:

- **Drainage and Stormwater Improvements** with Clay County in coordination with the Suwannee River Water Management District (SRWMD) and FDOT, are advancing stormwater enhancements, culvert upgrades, and stormwater system improvements along flood-prone segments of SR 16 to reduce roadway inundation.
- **Resilient Infrastructure Planning:** Improvements are increasingly incorporating resilience considerations, including roadway elevation, embankment stabilization, and design standards that account for future precipitation and flooding conditions.
- **Data-Driven Risk Assessment:** Regional partners utilize flood modeling, hazard mapping, and historical data to better understand vulnerabilities and prioritize the most critical segments for investment.
- **Emergency Access and Continuity Planning:** Recognizing SR 16 as a key evacuation and response route, agencies are coordinating on contingency planning to maintain access during flood events or disruptions.

Transportation Improvements to Support Access

In addition to flood mitigation, ongoing initiatives aim to improve overall mobility and reduce congestion along SR 16:

- **Operational Enhancements:** Signalization improvements, intersection upgrades, and safety projects are being evaluated to improve traffic flow and reduce delays, particularly during peak travel and adverse weather conditions.
- **Freight and Military Mobility Considerations:** Planning efforts account for the movement of heavy military vehicles and equipment, prioritizing roadway design features that support these demands.
- **Redundancy and Network Connectivity:** While efforts are underway to assess alternative routes, SR 16 remains a primary access corridor. The continued lack of fully viable secondary routes reinforces the need for both physical improvements and enhanced coordination to address single-point-of-failure conditions.

Policy Alignment and Partnership Opportunities

MIRR-informed policies emphasize the importance of compatible land use and protection of critical infrastructure corridors, and local planning efforts continue to support these objectives through drainage management, right-of-way preservation, and access management strategies. However, the findings suggest that policy and partnership structures could be strengthened to more effectively address long-term resilience needs.

Given that the TPO already includes Clay County representation and FDOT participation, enhancing Camp Blanding's ability to elevate its priorities within this existing framework may be more efficient than establishing entirely new coordination structures. This could include increased coordination with county representatives or more formalized engagement mechanisms with the TPO. Alternatively, targeted agreements with FDOT and Clay County could help advance specific roadway improvements and resilience strategies along SR 16.

Sustained Mutual Support and Future Direction

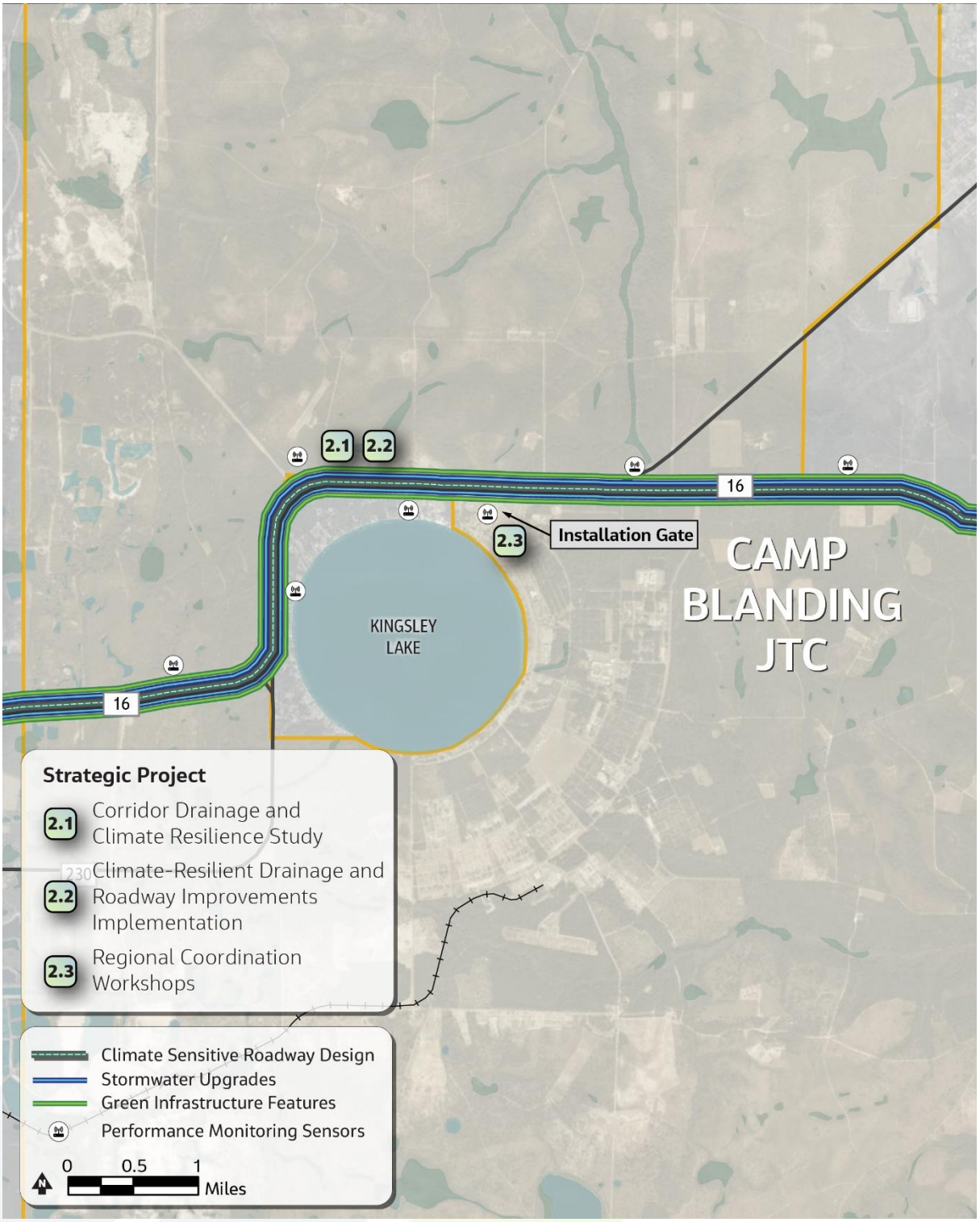
Continued efforts along SR 16 should focus on strengthening both physical infrastructure and institutional coordination to address growing risks. Key priorities include:

- Enhancing Camp Blanding's engagement in regional transportation planning processes
- Accelerating flood mitigation investments along vulnerable corridor segments
- Improving coordination with FDOT, Clay County, and regional partners to address single-point-of-failure risks
- Exploring opportunities for formal agreements to address roadway and rail resilience
- Integrating monitoring technologies and data-sharing practices to improve situational awareness

Through strengthened partnerships, more formalized coordination mechanisms, and targeted infrastructure investments, SR 16 can be better positioned to serve as a **reliable, resilient, and mission-supportive corridor** for Camp Blanding while continuing to meet the broader transportation needs of the region.

Adaptable Built Infrastructure Projects

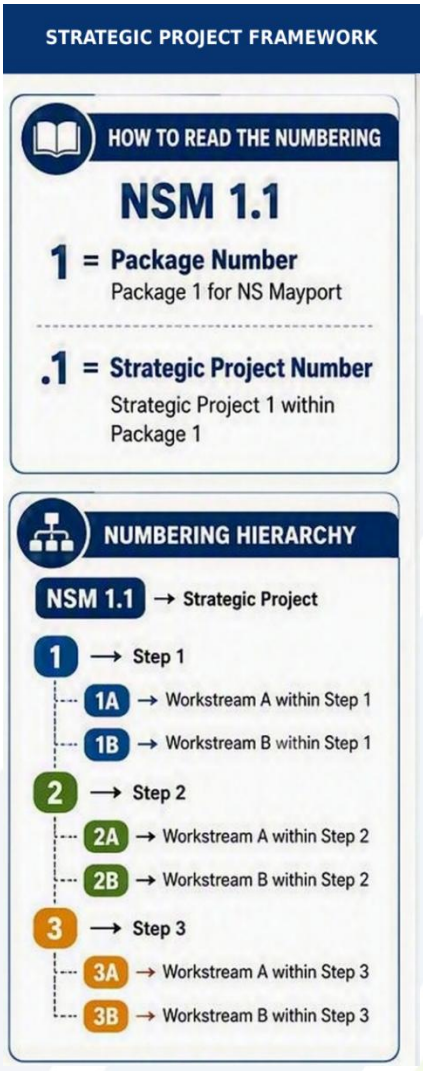
Figure 8. Adaptation Strategies Map



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 CB 2.1. Corridor Drainage and Climate Resilience Study

This project establishes a comprehensive roadway drainage and climate resilience study for SR 16 at Camp Blanding, extending along the corridor from upstream hydraulic connections through downstream collection systems and final outfalls. Led by FDOT, the study can evaluate existing drainage infrastructure and roadway assets under current and projected storm and temperature conditions. The first priority is preserving reliable military and emergency access by identifying and addressing vulnerabilities associated with flooding, culvert failure, washout, incidents, and roadway obstructions. A secondary priority is improving long-term pavement durability under extreme heat and heavy loading.

Increasing rainfall intensity, localized flooding, and prolonged extreme heat exposure present growing risks to corridor functionality, pavement integrity, and emergency access. This project can guide the prioritization of improvements to enhance roadway resilience, reduce flood risk, and mitigate thermal degradation of infrastructure. The effort can integrate predictive modeling, remote sensing, and climate-informed design practices to ensure that the final study deliverable provides actionable, forward-looking recommendations.

Current Stakeholder Projects

- Drainage and Stormwater Improvements
- Resilient Infrastructure Planning
- Emergency Access and Continuity Planning

Potential Project Leads and Partners

- Florida Department of Transportation (FDOT)
- North Florida Transportation Planning Organization (NFTPO)
- Camp Blanding Joint Training Center (JTC)
- Clay County
- St. Johns River Water Management District (SJRWMD)
- Local municipalities and drainage authorities

Estimated Cost

$200,000

Step 1: Corridor Drainage and Climate Resilience Study (Short-term)

1A. Data Compilation, Inventory, and Existing Conditions Assessment

- FDOT can compile and review existing drainage inventories, pavement condition data, temperature exposure records, and as-built documentation along SR 16. Where gaps are identified, FDOT can supplement with light detection and ranging (LiDAR) mapping, drone surveys, and aerial imagery to capture both drainage conditions and heat-related vulnerabilities such as pavement distress and surface deformation. This assessment can also identify locations where heat and stormwater issues overlap, such as low-lying, heat-retaining surfaces with poor drainage. Additionally, FDOT can identify suitable locations for green

infrastructure features such as bioswales, vegetated conveyance systems, and infiltration areas that can both manage runoff and reduce surface temperatures.

1B. Hydrologic, Hydraulic, and Thermal System Characterization

- FDOT can integrate hydrologic and hydraulic data sets with climate and pavement temperature data to better understand how extreme heat affects stormwater behavior. This includes evaluating how elevated temperatures can reduce soil moisture retention, increase runoff rates during storm events, and contribute to faster deterioration of drainage and roadway materials. Predictive analytics can be used to jointly assess rainfall intensity and temperature exposure, creating a combined understanding of how these stressors interact to influence drainage capacity, subgrade stability, and long-term infrastructure performance.

1C. Deficiency Identification and Integrated Performance Evaluation

- FDOT can identify drainage deficiencies, such as undersized culverts and restricted outfalls, while also evaluating areas where heat-induced pavement degradation contributes to drainage inefficiencies, such as rutting that alters flow paths or cracking that compromises structural integrity. This combined analysis can highlight locations where flooding risk is exacerbated by thermal damage, allowing for a more holistic identification of system vulnerabilities.

1D. Predictive Modeling and Climate-informed Analysis

- FDOT can apply integrated modeling approaches that simulate both stormwater performance and thermal stress under current and future climate scenarios. These models can evaluate how increased rainfall intensity and prolonged heat exposure together impact runoff, infiltration, drainage capacity, and pavement performance. Predictive analytics can identify areas where infrastructure is most vulnerable to combined stressors, enabling solutions that address both flooding and heat resilience simultaneously.

1E. Flood Risk Mapping and Prioritization

- FDOT can develop integrated risk maps that illustrate not only flood extent and duration but also areas of high thermal stress and material degradation. These combined risk layers can highlight critical segments where overlapping hazards create compounded risk to roadway performance, supporting prioritization of improvements that deliver the greatest resilience benefit.

1F. Development of Adaptation Strategies and Final Study Deliverable

- FDOT can identify and evaluate adaptation strategies that address both stormwater and heat impacts in a coordinated manner. These can include traditional drainage improvements, such as culvert upgrades and storage enhancements, paired with climate-resilient pavement materials, reflective or permeable surfaces, and enhanced subgrade stabilization.
- The study can also identify opportunities for green infrastructure solutions such as bioswales, vegetated systems, and infiltration areas that simultaneously reduce runoff and lower surface temperatures. Smart technologies such as embedded sensors and monitoring systems can be evaluated to track both hydraulic and thermal performance over time. Findings can be compiled into a comprehensive final study that prioritizes integrated, climate-adaptive solutions designed to improve both drainage performance and heat resilience.

Strategic Project CB 2.2. SR 16 Climate-resilient Drainage and Roadway Improvements Implementation

This project advances implementation of the SR 16 Corridor Drainage and Climate Resilience Study by delivering prioritized infrastructure upgrades. Led by FDOT, this effort can translate study findings into built improvements that address both flooding and extreme heat impacts, improving corridor durability, reliability, and long-term performance.

Because SR 16 serves a military installation with frequent heavy vehicular use, including large trucks and tactical vehicles, this corridor can also serve as a strategic pilot location for innovative roadway materials and construction approaches. The project can provide an opportunity to test and validate high-performance, climate-resilient materials that can withstand combined stressors from heavy loads, extreme heat, and moisture variability, generating insights that can inform broader FDOT applications statewide.

The project can prioritize integrated solutions that address the interconnected effects of stormwater and heat stress. Rather than treating these as separate issues, implementation can focus on strategies that simultaneously improve drainage performance, reduce runoff, mitigate surface temperatures, and extend pavement life. This approach ensures that infrastructure investments deliver multiple resilience benefits and remain effective under future climate conditions.

Current Stakeholder Projects

- Drainage and Stormwater Improvements
- Resilient Infrastructure Planning

Potential Project Leads and Partners

- Florida Department of Transportation (FDOT)
- North Florida Transportation Planning Organization (NFTPO)
- Camp Blanding Joint Training Center (JTC)
- Clay County
- St. Johns River Water Management District (SJRWMD)
- Local municipalities and drainage authorities

Estimated Cost:

Cost to be determined by owner

Step 1: Integrated Climate-resilient Infrastructure Implementation (Short- to Mid-term)

1A. Final Design of Integrated Solutions

- FDOT can advance study recommendations into final engineering designs that integrate drainage improvements with heat-resilient roadway solutions. Designs can combine increased hydraulic capacity with materials and configurations that perform under high temperatures and heavy loading conditions, such as polymer-modified asphalt, high-performance concrete, reflective or permeable pavements, and reinforced subgrade systems.

- This corridor can also serve as a testing ground for innovative roadway materials and methods designed to withstand both extreme heat and the heavy vehicular demands associated with Camp Blanding operations. The rural location combined with extreme heat conditions and presence of heavy machinery movement provide a unique opportunity for this testing. Predictive modeling can be used to confirm that designs effectively address both stormwater and heat stress conditions.

1B. Permitting, Coordination, and Climate-sensitive Design Integration

- FDOT can coordinate permitting and approvals while integrating design elements that provide dual benefits for stormwater and heat mitigation. This can include incorporating vegetation, green infrastructure, and surface treatments that reduce runoff while also lowering surface temperatures and mitigating heat-island effects. Selected pilot materials and technologies can be coordinated with partners to ensure compliance while supporting innovation in resilient roadway design.

1C. Construction and Upgrade of Integrated Systems

- FDOT can implement prioritized upgrades that combine drainage improvements with climate-resilient roadway reconstruction. This can include culvert replacements, enhanced conveyance systems, and roadway rebuilding using advanced materials engineered for durability under heavy traffic, extreme heat, and variable moisture conditions. Construction activities can incorporate pilot deployments of innovative materials and methods, allowing performance to be evaluated under real-world operational stresses.

1D. Deployment of Green Infrastructure and Heat-mitigation Features

- FDOT can integrate green infrastructure solutions such as bioswales, vegetated conveyance systems, and infiltration areas that manage stormwater while also reducing surface temperatures and improving corridor microclimate. These features can complement structural improvements by providing additional resilience benefits that address both runoff and heat exposure.

1E. Smart Construction Technologies and Performance Monitoring

- FDOT can use smart construction technologies and embedded monitoring systems to enhance implementation quality and long-term performance. Sensors can be deployed to track pavement temperature, structural performance, and drainage functionality over time. These tools can be particularly valuable for evaluating the effectiveness of pilot materials and innovative construction techniques under combined loading, thermal, and hydrologic stress conditions.

1F. Phased Implementation and Resilience Optimization

- FDOT can phase implementation based on priority, funding, and risk, focusing first on segments where combined flooding, heat, and heavy vehicle impacts create the highest vulnerability. The phased approach can also allow lessons learned from pilot materials and technologies to inform subsequent construction phases, ensuring continuous improvement and optimized long-term performance.

Strategic Project CB 2.3. Improve Navigation with Wayfinding

This small-scale, short-term project will improve access resilience at Camp Blanding JTC by enhancing wayfinding signage and updating navigation and communication protocols for existing alternative access gates. The effort will focus on ensuring that military personnel, authorized visitors, emergency responders, contractors, and partner agencies can more easily identify and utilize available access points during routine operations, emergency situations, and transportation disruptions.

Camp Blanding's primary access routes may be affected by flooding, severe weather, traffic incidents, or other disruptions. While alternative access gates already exist, their effectiveness can be improved through clearer roadway signage, updated navigation information, and coordinated communication procedures. This project will provide a practical, low-cost approach to strengthening operational flexibility and maintaining reliable installation access without requiring the construction of new infrastructure.

Potential Project Leads and Partners

- NFTPO
- Camp Blanding JTC
- FDOT
- Kingsley Lake stakeholders and community representatives
- Clay County
- Regional planning and emergency management agencies

Estimated Cost

$30,000

Step 1: Wayfinding Signage and Access Protocol Enhancements (Short-term)

1A. Assessment of Existing Signage and Access Procedures

- Review existing signage, navigation resources, and communication procedures associated with alternative access gates. Identify gaps in visibility, wayfinding, routing information, and stakeholder awareness that could hinder access during emergencies or disruptions.

1B. Implementation of Wayfinding Improvements

- Install or update roadway and directional signage leading to authorized alternative access gates, as appropriate.
- Improve gate identification, routing information, and traveler guidance to support efficient navigation by authorized users and emergency responders.
- Coordinate with FDOT and local stakeholders to ensure consistency with regional transportation signage and routing practices.

1C. Update Navigation and Communication Protocols

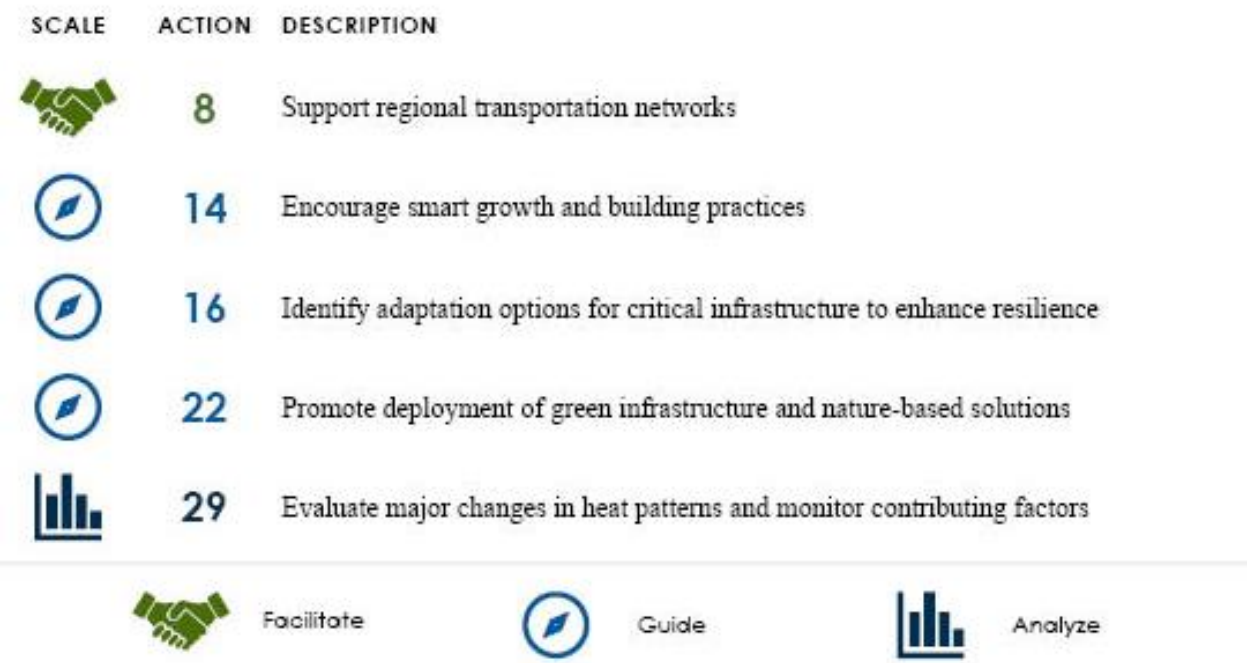
- Develop or refine procedures for communicating alternative access routes during road closures, emergency events, training exercises, or other disruptions.
- Update mapping resources, navigation guidance, and stakeholder contact procedures to improve awareness and coordination. Review and revise communication protocols among Camp Blanding, Clay County, FDOT, emergency management officials, and Kingsley Lake stakeholders regarding access status and gate utilization as needed.

Key Outcome

- A low-cost, near-term enhancement to Camp Blanding's access resilience that improves awareness and use of existing alternative access gates through better signage, navigation resources, and coordinated communication procedures.

Alignment and Support of the Regional Resilience Action Plan

Figure 10. Alignment with the RRAP



This project advances RRAP Actions 8, 14, 16, 22, and 29 by addressing a corridor that serves as the sole access route to Camp Blanding JTC, with both the main and secondary gates accessed exclusively from SR 16. Strategic Projects CB 3.1 and CB 2.2 evaluate and then implement drainage capacity improvements, culvert upgrades, roadway elevation, and embankment stabilization along flood-prone segments near Kingsley Lake. These measures implement Action 8 (Support Regional Transportation Networks), specifically Subaction 8.1 on ensuring safe and sufficient evacuation routes, which directs the Collaborative to work with local governments to ensure roads along evacuation routes are properly maintained and improved to reflect growing populations, and Subaction 8.2 on improvements to regionally significant transportation assets designed for future conditions rather than today's needs. Camp Blanding's function as a regional staging and support hub during disaster response, combined with the commuting patterns of personnel traveling from Jacksonville, Gainesville, and St. Augustine, means that disruptions to this single-point-of-failure corridor propagate well beyond the installation. Strategic Project CB 2.3, the NEFRC-facilitated regional workshop series exploring a secondary access point, applies Subaction 8.1 at the network scale by evaluating redundancy alternatives before a disruption forces the question.

The project's drainage and green infrastructure components advance the RRAP's Healthy Natural Environment goal. Culvert upsizing, expanded conveyance, and storage enhancements implement Subaction 14.6 on encouraging advances in stormwater management to reduce flooding and improve water quality, which specifically notes that traditional gray infrastructure

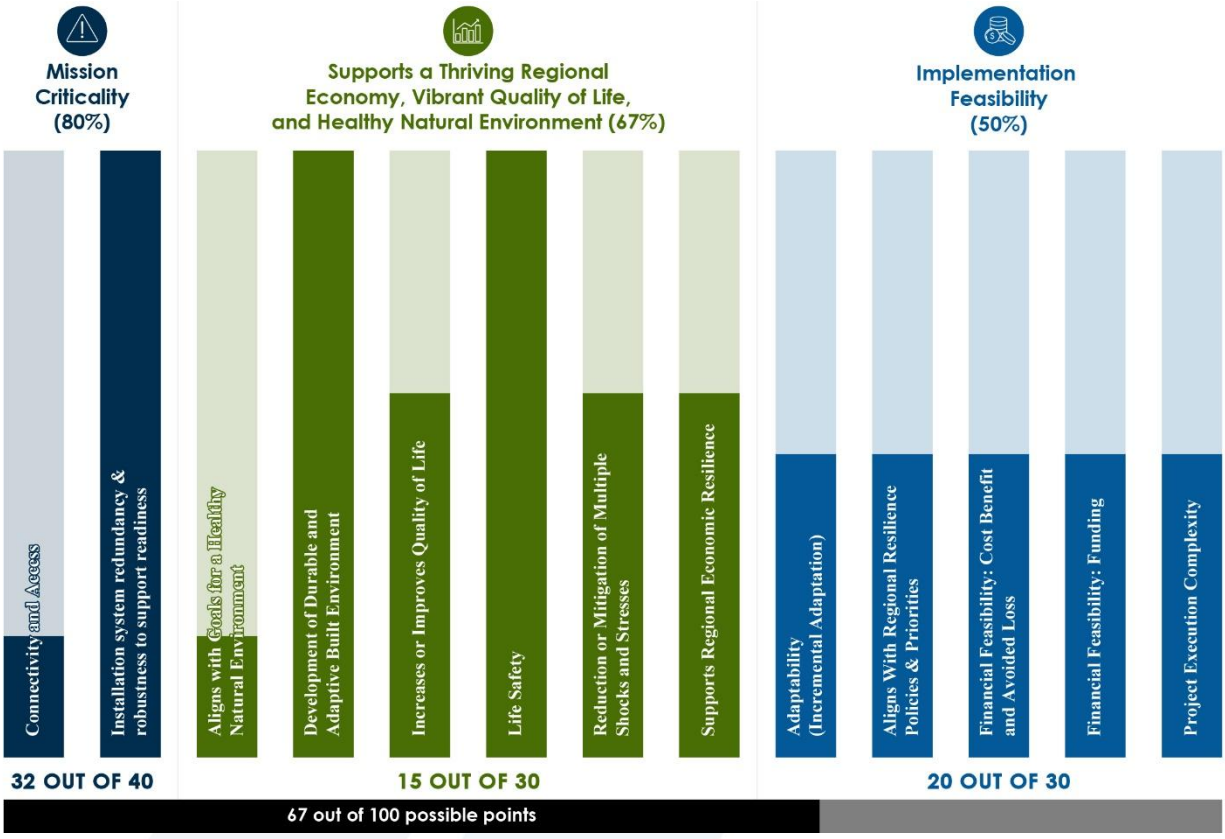
approaches may prove inadequate as extreme precipitation events become more frequent and promotes green stormwater infrastructure as the preferred approach for new development and retrofit projects. Deployment of bioswales, vegetated conveyance systems, and infiltration areas implements Action 22 (Promote Deployment of Green Infrastructure and Nature-Based Solutions), including Subaction 22.2 on compiling and applying regional design guidelines and best practices and Subaction 22.4 on supporting the creation of green streets, which the RRAP describes as incorporating tree wells, curb extensions, bioswales, and cool or permeable pavements within public rights-of-way. Reducing untreated stormwater discharge into the sensitive systems near Kingsley Lake and the Black Creek headwaters supports Subaction 1.1 on promoting practices that improve water quality to protect groundwater and surface waters.

This package carries the portfolio's most substantive treatment of extreme heat and is the natural point of alignment with Action 29 (Evaluate Major Changes in Heat Patterns and Monitor Contributing Factors). The evaluation of pavement softening and rutting, thermal degradation of drainage and roadway materials, reduced soil moisture retention and increased runoff under prolonged heat and the deployment of reflective and permeable pavements implement Subaction 29.3 on tracking impervious surface cover, which the RRAP notes contributes unevenly to ambient temperature depending on surface type. The integrated hydrologic-thermal modeling proposed under CB 3.1 assessing how rainfall intensity and temperature exposure interact to influence drainage capacity, subgrade stability, and pavement performance generates precisely the kind of downscaled data the Collaborative commits to compiling under Subactions 29.1 and 29.3. The proposal to use SR 16 as a pilot corridor for climate-resilient materials under heavy tactical vehicle loading, with embedded sensors tracking thermal and hydraulic performance, offers a replicable model of the type the Collaborative shares under Subaction 14.5 on educating the public sector and development community about resilient building practices. Roadway hardening and elevation implement Subaction 16.1 on protecting critical assets, and flood sensors with dynamic traveler information support Subaction 23.1 on compiling and distributing locally relevant hazard information.

Metrics Score

The Camp Blanding SR-16 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 comparative importance for the MIRR, with Mission Criticality being the highest (Figure 11). 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 11. Metrics Scorecard Results



Cost-Benefit Analysis

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

$\frac{B}{C}$ = 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).

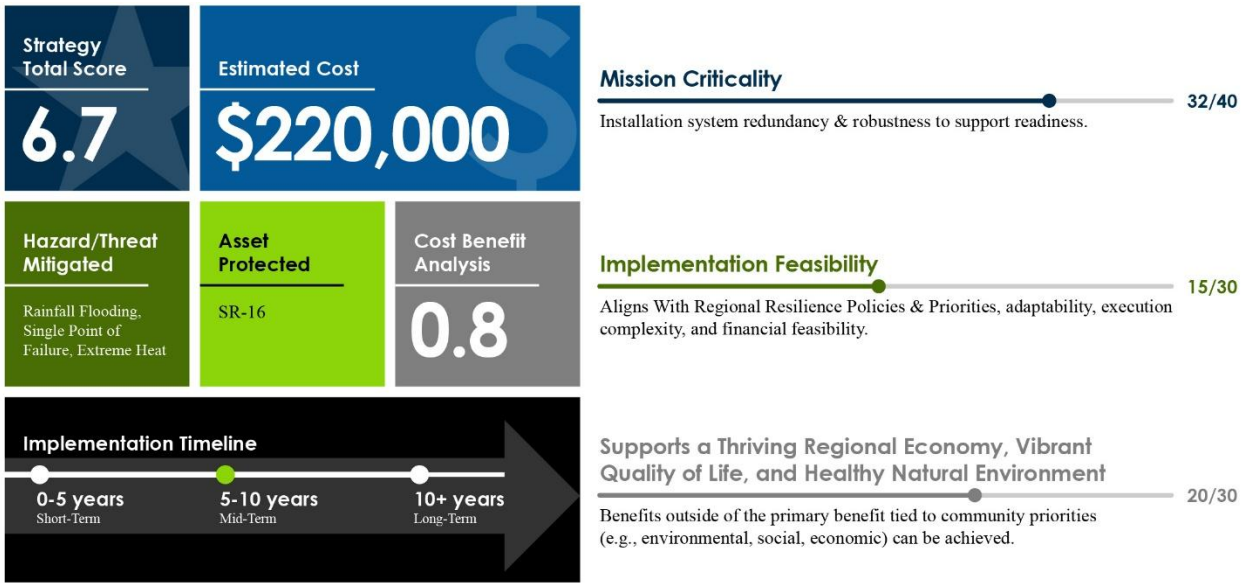
Adaptation project costs were costed to include project construction and design costs, where feasible. Project benefits were costed to include direct (construction or repair costs) and indirect (social, economic, and environmental) costs whenever feasible.

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 12. 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.

Align Military Access Routes with the FDOT Work Program and TPO Priorities (Near-term)

Since most of the roadway projects sit on FDOT-owned facilities, the highest-leverage near-term action is not a new grant but placement in the pipelines that already fund state roads. Steps include:

- Working with FDOT and the North Florida TPO to align MIRR roadway projects with the FDOT Work Program and the TPO's long-range plan and priority lists, so that resilience upgrades fit into existing corridor and access investments rather than competing as standalone initiatives.
- Using MIRR vulnerability data to inform project scoping, site selection, and the case for prioritization within those programs.
- Embedding resilience and critical-access criteria (flood exposure, installation access, redundancy) into local and regional transportation planning frameworks.

Leverage Defense-Specific Transportation Funding (Near-term)

The installation-access purpose of these routes makes them eligible for funding that general roadway projects cannot reach. The FHWA Defense Access Road (DAR) program provides a mechanism for the Department of Defense to fund public highway improvements necessitated by defense activities, which is a direct fit for access routes such as Mayport Road and the Blount Island corridors. Near-term steps include engaging the installations and DoD early to document the defense necessity that DAR requires and identifying which access-route projects are strongest candidates. The Defense Community Infrastructure Program (DCIP), discussed under Resilient Utilities, can also fund qualifying off-base transportation projects that support an installation.

Bundle Roadway and Freight-Rail Projects for Federal Discretionary Funding (Near-term)

Federal discretionary programs increasingly favor bundled, regionally coordinated applications, and the region can begin organizing project scopes now even where construction is years out. Near-term steps include:

- Developing a bundled project list focused on installation access routes, freight corridors, and flood-prone transportation nodes.
- Positioning candidate projects for US DOT's BUILD/RAISE and INFRA programs (the latter awarded through the Multimodal Project Discretionary Grant NOFO), which fund road elevation, bridges, freight rail, and multimodal work.
- Coordinating across FDOT, the TPO, CSX, and JAXPORT to align scopes, permitting, and timelines so joint applications and cost-share agreements are ready when rounds open.

Notes: The current federal surface transportation authorization (IIJA) expires September 30, 2026, and future BUILD/RAISE and INFRA rounds depend on reauthorization.

Explore Value Capture and Partnerships in Freight and Growth Corridors (Near-term)

Corridors serving the port and freight network are likely to see rising land values and continued private investment, which creates room for value capture and private participation over a longer horizon. In the near term, the region can conduct a scan of where tax increment financing, mobility fees, or special assessments may be viable, and begin early conversations with private beneficiaries such as JAXPORT tenants, logistics firms, and CSX about co-investment in shared freight-corridor resilience. Full deployment of these tools requires multi-year planning and, in some cases, legislative action, so this is scoping-and-feasibility work now that informs the longer-term strategies.

Transportation & Mobility Longer-term Implementation

As noted earlier, transportation and mobility projects should be carried forward through integration into agency and asset owner investment processes. The key implementation challenge is that mission-related transportation vulnerabilities do not automatically align with established investment priorities. They consequently need to be framed and pursued in ways aligning with those regional priorities.

For roadway and access projects, this may translate into identifying the specific consequences of disruption to mission readiness and positioning projects for the next decision point where they may be advanced. For projects that are already connected to FDOT and the TPO, these should be positioned with the documentation needed for project prioritization and funding consideration.

Freight, port, rail, and aviation needs require similar translation, but through different delivery systems. Port and freight-related priorities may, for example, be framed around topics of regional importance such as shoreline exposure or operational resilience, where those issues intersect with JAXPORT infrastructure planning. Rail-related priorities require early coordination and planning with CSX, with public investment opportunities framed around public benefits while accounting for CSX ownership, operations, and long-term capital planning.

Over time, the strongest adaptation project candidates will be those with a clearly documented readiness consequence, an identified owner or sponsor, established plans, and sufficient scoping to compete for design, capital, or discretionary transportation funding.

Funding Opportunities

Table 2. Transportation Funding Options

Agency/Org	Program	Description	Available Funding	General Eligibility	Example Eligible Projects	Timeline
US DOT	Better Utilizing Investments to Leverage Development (BUILD) Grant Program (formerly RAISE)	Provides discretionary funding for transportation projects that promote safety, environmental sustainability, quality of life, and economic competitiveness.	~$1.5 billion available for FY2026. (transportation.gov/BUILD grants)	State and local governments, MPOs, transit agencies, port authorities	Complete streets, road elevation, bridges, rail planning, multimodal mobility hubs	FY2026 NOFO published Dec 15, 2025; applications due Feb 24, 2026 (letters of support through Mar 13, 2026). Note: IIJA authorization expires Sept 30, 2026 — future rounds depend on reauthorization. (transportation.gov)
US DOT	INFRA Grant Program	Funds large-scale infrastructure projects that improve the movement of freight and people across the country.	~$1.6 billion/year	States, MPOs, local governments, tribal governments	Highway modernization, road widening, interchanges, freight rail	Awarded through the combined Multimodal Project Discretionary Grant (MPDG) NOFO (INFRA/Mega/Rural); FY2026 round active. IIJA expires Sept 30, 2026. (transportation.gov/grants/mpdg-program)
US DOT	Safe Streets and Roads for All (SS4A) Grant Program	Supports regional, local, and tribal initiatives to prevent roadway deaths and serious injuries through comprehensive safety planning and implementation.	~$993.5 million for FY2026 (~$687.8M Implementation, ~$305.7M Planning & Demonstration). (transportation.gov/grants/SS4A)	Local, regional, tribal governments	Road safety audits, protected bike lanes, speed management systems, crosswalk improvements	FY2026 NOFO closed May 26, 2026. Likely the final SS4A round — IIJA expires Sept 30, 2026. (transportation.gov; visionzeronetwork.org)
FDOT	Transportation Alternatives (TA) Set-Aside Program	Provides funding for smaller-scale transportation projects such as pedestrian and bicycle facilities, recreational trails, and safe routes to school programs.	Approximately $5.1 million annually.	Local governments, regional transportation authorities, transit agencies, natural resource or public land agencies, school districts, and tribal governments.	Construction of on-road and off-road trail facilities for pedestrians, bicyclists, and other non-motorized forms of transportation.	Annual competitive application process; specific deadlines vary by FDOT district.
FDOT	Transportation Regional Incentive Program (TRIP)	Encourages regional planning by providing state funds to improve regionally significant transportation facilities in regional transportation areas.	State funds cover up to 50% of the non-federal share of project costs.	Projects must be identified in the capital improvements element of a local government comprehensive plan and be consistent with the MPO's Long-Range Transportation Plan.	Improvements to regionally significant roadways, public transportation facilities, and intermodal facilities.	Application cycles and deadlines are managed by FDOT districts
FTA	Urbanized Area Formula Grants	Provides formula funding to support public transportation in urbanized areas (pop. > 50,000), including capital, planning, and limited operating expenses.	Over $6.5 billion annually (nationally). Federal funding not to exceed 80% of total project costs.	Public transit agencies, states, and designated recipients in urbanized areas.	Bus and rail capital investments, mobility hubs, transit planning, fare collection systems.	Funding apportioned based on legislative formulas; funds are apportioned annually.
FTA	Pilot Program for Transit-Oriented Development (TOD) Planning	Supports planning efforts near transit corridors to foster compact, mixed-use development and maximize transit access.	~$29 million in FY26	Transit project sponsors with eligible capital projects	Planning for mobility hubs, affordable housing near transit, station area design.	Annual discretionary grant; FY26 NOFO issued on 5/11/26. Applications are due by 7/10/2026.

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