



# ENVIRONMENTAL ASSESSMENT

Everglades National Park

Rehabilitation of Parkwide Water and Wastewater Systems



November 2023

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**United States Department of the Interior  
National Park Service  
Everglades National Park**

**Rehabilitation of Parkwide Water and Wastewater Systems  
Environmental Assessment**

**November 2023**

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The National Park Service (NPS) proposes to enhance visitor experience, safety, and park operations at Everglades National Park (EVER) by improving and/or replacing potable water treatment and distribution systems, and wastewater collection and treatment systems at key areas across the park. The existing systems are critically deficient, expensive to maintain, and others are only partially operable or at the end of their service life.

The NPS prepared this Environmental Assessment (EA) to evaluate two alternatives: a No Action alternative, and a Preferred alternative. This EA describes the environment that would be affected by the alternatives and assesses the environmental consequences or impacts of implementing the alternatives. The No Action alternative would maintain the existing water and wastewater systems managed by EVER. This EA examines potential impacts on vegetation, rare plants, wetlands, and soils; wildlife and species of special concern; cultural and historic resources; hydrology and water quality; floodplains; and visitor use and experience. Climate change and potential effects to the Project are also discussed.

The NPS prepared this EA in accordance with the National Environmental Policy Act (NEPA); Council on Environmental Quality (CEQ) implementing regulations [40 Code of Federal Regulations (CFR) 1500-1508]; Director's Order 12: Conservation Planning, Environmental Impact Analysis, and Decision-making; and its accompanying NEPA handbook to assess the alternatives and their impacts on the environment.

### **Public Review and Comment**

This EA is available for public review for 30 days. If you wish to comment, you are encouraged to submit your comments directly through the NPS Planning, Environment, and Public Comment (PEPC) website: <https://parkplanning.nps.gov/WaterSystems>.

You may also mail written comments to:

Everglades National Park  
Superintendent  
Rehabilitation of Parkwide Water and Wastewater Systems EA  
40001 State Road 9336, Homestead FL 33034

Before including your address, phone number, email address, or other personal identifying information in your comment, please be aware that your entire comment, including your personal identifying information, may be made publicly available. While you can request in your comment to withhold your personal identifying information from public review, the NPS cannot guarantee that it will be able to do so.

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## ACRONYMS AND ABBREVIATIONS

AOA .....	Area of Analysis
APE .....	Area of Potential Effects
BICY .....	Big Cypress National Preserve
bgs .....	below ground surface
BMP .....	Best Management Practices
BRBC .....	Biological Resource Branch Chief
CEPP .....	Central Everglades Planning Project
CEQ .....	Council on Environmental Quality
CERP .....	Comprehensive Everglades Restoration Plan
CFR .....	Code of Federal Regulations
CY .....	cubic yard(s)
EA .....	Environmental Assessment
EFH .....	Essential Fish Habitat
ESA .....	Endangered Species Act
EVER .....	Everglades National Park, or park
°F .....	degrees Fahrenheit
ft .....	feet or foot
FDEP .....	Florida Department of Environmental Protection
FEMA .....	Federal Emergency Management Agency
FIRM .....	Flood Insurance Rate Maps
FLUCCS .....	Florida Land Use and Cover Classification System
FMSF .....	Florida Master Site File
HDPE .....	high-density polyethylene
IPaC .....	Information for Planning and Consultation
LF .....	linear feet
MOA .....	Memorandum of Agreement
NAVD88 .....	North American Vertical Datum of 1988
NEPA .....	National Environmental Policy Act
NFHL .....	National Flood Hazard Layer
NHPA .....	National Historic Preservation Act
NMFS .....	National Marine Fisheries Service
NPS .....	National Park Service
NRHP .....	National Register of Historic Places
PBF .....	physical or biological features
PEPC .....	Planning, Environment, and Public Comment

PVC.....	polyvinyl chloride
RV .....	recreational vehicle
SCADA.....	Supervisory Control and Data Acquisition
SHPO .....	State Historic Preservation Office
SWPPP .....	Stormwater Pollution Prevention Plan
UMAM .....	Uniform Mitigation Assessment Method
USACE .....	U.S. Army Corps of Engineers
USC .....	United States Code
USFWS .....	U.S. Fish and Wildlife Service
WTP.....	water treatment plant
WWTP.....	wastewater treatment plant

## Chapter 1: Purpose and Need

### Introduction and Proposed Action

The National Park Service (NPS) proposes to enhance visitor experience, safety, and park operations at Everglades National Park (EVER or park) by improving and/or replacing potable water treatment and distribution systems and wastewater collection and treatment systems at key facilities managed by the park (Project). The existing systems are critically deficient, expensive to maintain, and many are only partially operable or at the end of their service life.

The NPS prepared this Environmental Assessment (EA) to evaluate two alternatives, a No Action alternative, and an Action alternative, which is the NPS Preferred alternative. This EA describes the environment that would be affected by the alternatives and assesses the environmental consequences or impacts of implementing the alternatives. The No Action alternative would maintain the existing water and wastewater systems managed by EVER. This EA examines potential impacts on vegetation, rare plants, wetlands, and soils; wildlife and species of special concern; cultural and historic resources; hydrology and water quality; floodplains; and visitor use and experience. Climate change and potential effects to the Project are also discussed.

The NPS prepared this EA in accordance with the National Environmental Policy Act (NEPA); Council on Environmental Quality (CEQ) implementing regulations [40 Code of Federal Regulations (CFR) 1500-1508]; Director's Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making* (NPS, 2011); and its accompanying NPS NEPA handbook (NPS, 2015a). The NPS is also separately and concurrently preparing an assessment of effect to comply with the requirements of Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended (54 United States Code [USC] 306108), and its implementing regulations (36 CFR 800).

### Background

EVER was formally established in 1947 to conserve the Everglade's natural landscape and prevent further degradation of its land, cultural resources, plants, and animals. It encompasses over 1.5 million acres of land and eight distinct land habitats, including the marine habitat of Florida Bay, making it one of the world's most diverse ecosystems. EVER is an essential breeding ground for over 400 species of birds and home to more than 20 rare, endangered, and threatened species.

The park connects over one million annual visitors from all over the world to this protected area, and a variety of recreational opportunities that are available to visitors throughout EVER. Popular activities include wildlife viewing, nature hikes, fishing, camping, bicycling, motor boating, and kayaking/canoeing. Five visitor centers provide visitors with interpretation, educational information, and access opportunities to various sections of the park.

Reliable, well-maintained, and professionally designed water and wastewater systems are essential to the NPS meeting its dual obligations of protecting the unique environment of the Everglades, while also enabling public access and recreation in the park.

The existing Flamingo wastewater treatment plant (WWTP) and potable water treatment plant (WTP) were completed by the NPS in 2005. The existing Pine Island WWTP was completed in 2008. Currently, all three plants are aging and show advanced deterioration resulting from exposure to the harsh local environment. In 2019, NPS completed several Project Scoping Assessments of EVER's potable water treatment and distribution systems and wastewater collection and treatment systems at key areas across the park (NPS, 2019a; NPS, 2019b; NPS, 2019c). These included an assessment of the Flamingo wastewater and potable water treatment plants, the Pine Island WTP, and EVER's water and wastewater piping distribution network. The Project Scoping Assessments were intended to provide NPS with project descriptions, justification, scope, and other information necessary to support future project approval, funding, and implementation. The assessments identified several potable water and wastewater systems in need of repair or replacement within the Main Entrance/Royal Palm Area, Flamingo Area, Shark Valley Area, and the Loop Road Area.

## Project Area

The Project includes 13 sites (i.e., project areas) located in four primary areas (Figure 1). The primary areas and sites are as follows:

### Flamingo Area

- Flamingo
- West Lake Area

### Shark Valley Area

- Shark Valley Tower Area
- Shark Valley Administration and Visitor Center

### Loop Road Area

- Tamiami Ranger Station
- Loop Road Area Education Center (within Big Cypress National Preserve [BICY] but managed by EVER)
- Trail Center Area (within BICY but managed by EVER)

### Main Entrance/Royal Palm Area

- Long Pine Key Campground
- Royal Palm Visitor Center
- Hidden Lake Education Center
- Daniel Beard Center
- Dr. Bill Robertson Center
- Ernest F. Coe Visitor Center/ Headquarters and Pine Island Residential/Maintenance Area

Refer to Appendix A for figures related to each individual site and the project area limits for each site.

## Purpose and Need for Action

### *Purpose*

The purpose of the Project is to address the physical and operational deficiencies of EVER's potable water and wastewater systems by improving system efficiency, operation, safety, and climate resiliency.

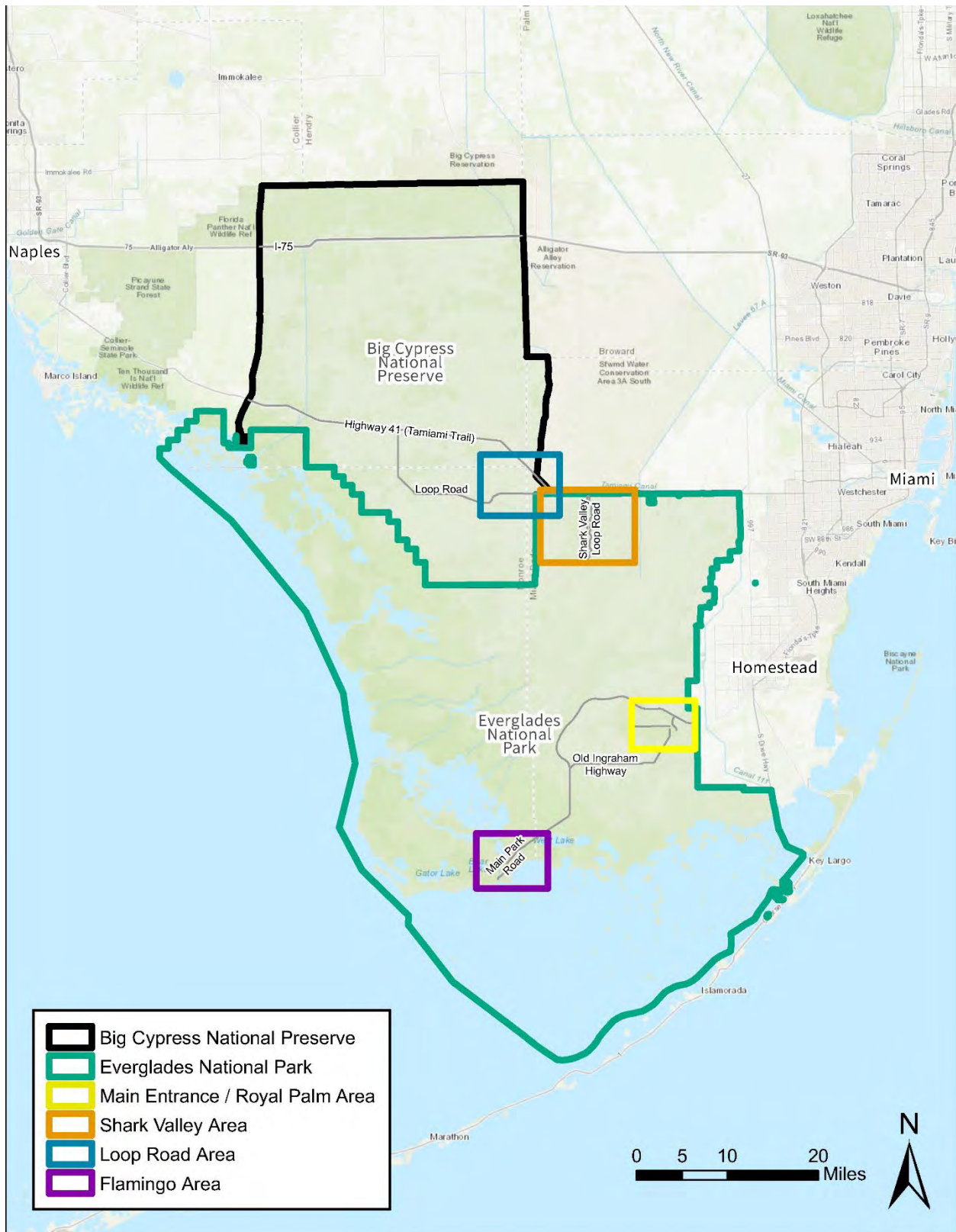


Figure 1. Project Location



## *Need*

The current potable water and wastewater infrastructure managed by EVER is outdated and in need of repair and upgrade. The existing systems are critically deficient, expensive to maintain, and many are only partially operable or at the end of their service life. The worn network of buried pipes and equipment frequently require emergency repairs due to leaks and failures, especially at buried junctions where original and newer piping hardware connect. The potable water systems have dated well equipment and distribution lines. Rising groundwater levels and wide ranges in seasonal use are causing problems with aging septic systems, absorption fields, and wastewater treatment facilities. Use of septic systems at the end of their service life risks system failure and contamination of the sensitive Everglades ecosystem. Additionally, infrastructure, particularly near the ocean, can corrode/deteriorate due to saltwater, high ultraviolet light index, and temperature of the Everglades.

## *Design Objectives*

Objectives provide a basis for comparing the effectiveness of alternatives to achieve the desired outcomes of the action (NPS, 2015a). All alternatives carried forward for detailed analysis must meet the objectives to a large degree, as well as meet the Project Purpose and Need. The NPS identified the following objectives or benefits for the Project:

- **Improved Visitor Experience:** Replacement or rehabilitation of water and wastewater infrastructure would provide more reliable availability of drinking water and improve aspects of EVER's restrooms and comfort stations. These updates would allow a more enjoyable and memorable experience at park facilities.
- **Improved Park Infrastructure:** Updated infrastructure would improve the efficiency of the systems, maintain health and safety, provide more resiliency to the effects of climate change, and maximize the lifecycle of water and wastewater systems.
- **Improved Sustainability:** Many of the current water systems managed by EVER are outdated or damaged and cannot withstand a Category 5 hurricane (157 miles per hour sustained wind speed). Replacement or rehabilitation of water and wastewater infrastructure would better protect these assets during flooding and severe weather, thus increasing lifespan.
- **Sensitivity for Natural and Cultural Resources:** Improvements to water and wastewater systems would consider practicable alternatives that are sensitive to the social, natural, and cultural resources in EVER and within BICY sites managed by EVER and that avoid or limit adverse impacts to these resources. Improvements would update existing infrastructure and preserve the historic qualities of identified buildings, as practicable.
- **Concessioners Support:** The Project would support concessioners that operate facilities in EVER and their relationship with the NPS, which would promote the long-term viability of the concession services.

## Chapter 2: Alternatives

CEQ implementing regulations for NEPA provide guidance on the consideration of alternatives in an EA. These regulations require the decision-maker (NPS) to consider the environmental effects of the Project and a range of alternatives, including No Action (40 CFR 1502.14). NPS must consider reasonable alternatives, and for alternatives eliminated from detailed study, briefly discuss the reasons for their elimination. To be reasonable, an alternative must meet the stated Project Purpose and Need and be technically and economically feasible.

The alternatives analyzed in this EA are based on the outcome of Project Scoping Assessments of the various water and wastewater systems, internal scoping, and civic engagement. NPS dismissed alternatives and actions that would not be feasible and would not meet the Project Purpose and Need.

NPS explored and objectively evaluated two alternatives for this EA:

- Alternative A (No Action)
- Alternative B (NPS Proposed Action and Preferred alternative) – Rehabilitation of Parkwide Water and Wastewater Systems

### Alternative A (No Action)

Under the No Action alternative, NPS would maintain the existing outdated potable water treatment and distribution systems and wastewater collection and treatment systems at the identified sites managed by EVER, but make no improvements. Only the landscape and grounds immediately surrounding water and wastewater infrastructure would continue to be maintained at each site. Under the No Action alternative, the water and wastewater systems would continue to degrade, become less efficient, and eventually fail, risking contamination to the sensitive Everglades ecosystem, impacting the health and safety of visitors at the park, and diminishing their overall experiences. The No Action alternative is used as a basis to compare and evaluate the other Project alternative.

### Alternative B (Preferred alternative) – Rehabilitation of Parkwide Water and Wastewater Systems

Alternative B is the Proposed Action and the NPS Preferred alternative. Alternative B would rehabilitate EVER's water and wastewater systems at 13 sites throughout the park and within BICY in accordance with the Federal Flood Risk Management Standard (Executive Order 13690), NPS climate change resiliency guidance (NPS, 2023a), and other applicable sustainability requirements. Primary elements of Alternative B include:

- Rehabilitating the reverse osmosis potable WTP in Flamingo and replacing the WWTPs in the Flamingo and Main Entrance/Royal Palm areas with new, hurricane-hardened, enclosed climate-controlled structures that are raised to accommodate storm surge.
- Replacing electrical infrastructure that supports water and wastewater systems and replacing control systems.
- Replacing potable water distribution lines and wastewater collection lines with new polyvinyl chloride (PVC) or high-density polyethylene (HDPE) piping.

- Repairing and replacing potable water well houses, sewage lift stations, septic tanks, absorption fields, manholes, water/sewer meters, pumps, and associated apparatuses needed for distribution, collection, and treatment of potable water and wastewater.
- Raising upgraded and replaced absorption fields and well houses to accommodate storm surge and groundwater rise.
- Constructing new infrastructure with appropriate materials to assist with protection from fire damage and corrosion.

At all 13 sites, staging areas would be located in disturbed or hardscaped locations during construction, with access for all construction vehicles delegated to established gravel and paved roadways. Pipe installation would be completed via trenching within a maximum 15-foot (ft)-wide disturbance corridor; however, pipe bursting (a trenchless method that pulls the new pipe through old pipe while simultaneously bursting the old pipe) would be used where determined practicable. Any proposed lighting would implement Best Management Practices (BMPs) for full cutoff, dark-sky friendly outdoor lighting. Lights would be added only where needed, shielded, directed to keep light on the intended subject, and localized. Once improvements at each site are complete, vegetation within a 10-ft buffer around the perimeter of the water and wastewater infrastructure would be regularly maintained per current NPS management procedures and would include regular mowing, edging, and the use of tree and string trimmers.

Specific elements under Alternative B at each site are outlined below. All referenced drawings, showing the Preferred alternative for each site, are provided in Appendix A (Figure 3 through Figure 15).

## ***Flamingo Area***

### **Flamingo**

The Flamingo project area consists of the existing Flamingo WWTP, Flamingo WTP, Flamingo NPS housing area, Flamingo Visitor Center and public marina, and Flamingo Campground. The WTP and water distribution lines provide potable water for the area. Wastewater collection sewer lines and force mains that convey effluent to the WWTP make up the wastewater system (Appendix A, Figure 3).

### **Water System Improvements**

- Rehabilitate the existing Flamingo desalination/reverse osmosis WTP while keeping it in production during construction, which includes expansion of the elevated building footprint by 50 percent, within a hardened structure for storm resistance, to provide dedicated rooms for chemicals and electrical; new heating, ventilation, and air conditioning system; new plumbing; and installation of a new propane back-up generator. Other improvements at the WTP include:
  - Upgrade controls system and Supervisory Control and Data Acquisition (SCADA).
  - Demolish the existing raw water wells and replace with two new, drilled potable water wells at new locations (80 ft deep).

- Construct a new, finished water pump station at the location of the existing water pumps that includes a new Category 5 hurricane-rated enclosure over the pumps (157 miles per hour sustained wind speed).
  - Demolish existing potable water storage tank, install new potable water tank at new location adjacent to WTP, and realign existing delivery access drive (0.07 acre of permanent disturbance and fill).
- Install 5,650 linear feet (LF) of fiber optic line, directly adjacent to existing roadway, from the WTP to the Flamingo WWTP.
- Implement improvements to the potable water distribution system, including replacement of 20,860 LF of water distribution/service lines on the same alignment and replacement of 6,700 LF of water distribution/service lines on new alignment adjacent to roadways and within previously disturbed areas. The water distribution/service lines would be replaced with new PVC or HDPE pipeline, and water meters and connections would be replaced. Improvements would also include:
  - Replacement of hose bibs and metering around marina
  - Installation of new fire hydrant placements
  - Addition of flushing stations at all dead-end water lines
- Staging would occur on hardened or disturbed locations, including the existing Flamingo maintenance parking area adjacent to the WTP.

### **Wastewater System Improvements**

- Replace existing WWTP within a new Category 5 hurricane-rated structure at a new location by filling in a portion of an existing, adjacent percolation pond (1.07 acres of permanent disturbance and fill). The new structure would be raised to account for storm surge and climate controlled to protect the plant equipment. The existing WWTP would be abandoned in place; however, the existing tanks would be removed. Other improvements at the new WWTP include:
  - Installation of new electrical service to building and new, backup propane generator and tank
  - Installation of new paved parking area
  - Installation of new effluent groundwater injection wells
  - Raising an existing berm at the adjacent retention pond
- Replace and provide 5,650 LF of brine concentration force main from the WTP to new WWTP, which includes replacement of 5,300 LF of force main on existing alignment and 350 LF of new brine concentration force main on new alignment within a previously disturbed area.
- Implement improvements to the wastewater collection system, including replacement of 18,540 LF of sewer lines and force mains on the same alignment and replacement of 5,230 LF of sewer lines and force mains on new alignment adjacent to roadways and within previously disturbed areas. The sewer lines and force mains would be replaced with new PVC or HDPE pipeline, and lift stations and manholes would be replaced. New SCADA equipment would be added to each remote lift station.

- Replace the fish-cleaning station 1,000-gallon solids holding tank at same location.
- Staging would occur on hardened or disturbed locations, including an existing gravel parking area adjacent to the WWTP.

### West Lake Area

Non-potable, non-dermal water is currently provided to the West Lake comfort station via a raw water pump at the lake. Wastewater collection includes an existing septic tank and absorption field (Appendix A, Figure 4).

#### **Water System Improvements**

- Reconstruct the non-potable, non-dermal water system at the same location to include new raw water pump and piping, filters, and chlorine and hydropneumatics tanks. The system would remain non-potable/non-dermal.

#### **Wastewater System Improvements**

- Replace the existing septic tank with a new 1,050-gallon septic tank at the same location and replace the 40 LF of sewer line from the comfort station with new PVC or HDPE pipeline.
- Replace the existing wastewater absorption field with a new, 14-ft by 120-ft, raised (7-ft above existing grade) absorption field at a new, undisturbed location adjacent to the parking area (0.28 acre of new, permanent disturbance and fill) and install 100 LF of new force main, within a previously disturbed area, from the new septic tank to the new absorption field. The existing absorption field would be abandoned in place.
- Staging would occur on hardened or disturbed locations, including the existing paved parking lot.

### ***Shark Valley Area***

#### Shark Valley Tower Area

Potable water is currently provided to the Shark Valley Tower comfort station via a raw water well/treatment area and water distribution pipeline. Wastewater collection includes an existing septic tank and absorption field (Appendix A, Figure 5).

#### **Water System Improvements**

- Demolish existing well house and construct new, potable water well house with a new treatment system at the same location. Raise the well house 4 ft and include armored riprap around the raised well house to protect against flooding (0.11 acre of permanent disturbance and fill). The discharge of the new well would be raised 18-inches above future grade. Other well house improvements include installation of fencing and access improvements, new solar panels on the roof of the new well house, and replacement of existing batteries.
- Replace 615 LF of existing water distribution pipeline to comfort station on same alignment adjacent to the existing tower pathway. The distribution pipeline would be replaced with PVC or HDPE.

## **Wastewater System Improvements**

- Replace existing septic tank at same location with new 3,200-gallon tank and replace 23 LF of gravity sewer line from the comfort station with new PVC or HDPE pipeline.
- Replace existing wastewater absorption field with an expanded absorption area that includes two 15-ft by 100-ft absorption fields and one 25-ft by 60-ft absorption field that are raised 6-ft above existing grade (0.41 acre of new, permanent disturbance and fill primarily within an undisturbed area). The existing absorption field would be abandoned in place.
- Staging would occur on hardened or disturbed locations, including the existing, paved pullout area.

### **Shark Valley Administration and Visitor Center**

Potable water is currently provided to the Shark Valley Administration and Visitor Center via a raw water well/treatment area and water distribution pipeline. Wastewater collection includes existing septic tanks, sewer lines, force mains, and an absorption field (Appendix A, Figure 6).

## **Water System Improvements**

- Abandon existing well in place and connect the potable water distribution system to the Miccosukee water system via 720 LF of new water line installed adjacent to existing roadway.
- Replace 1,400 LF of existing water distribution pipeline with new PVC or HDPE on same alignment adjacent to existing roadway.

## **Wastewater Improvements**

- Convert existing vault toilet comfort station to flushing toilets with new water connection and provide new sewer drain piping inside comfort station.
- Replace 2,208 LF of sewer line and force main with new PVC or HDPE pipeline on same alignment adjacent to roadway, replace existing lift stations and manholes, and provide two new 1,900-gallon septic tanks within the previously disturbed Shark Valley Administration area.
- Replace existing absorption field at the same location with two new, 16-ft by 104-ft, raised (5 ft above existing grade) absorption fields (0.26 acre of permanent disturbance and fill).
- Staging would occur on hardened or disturbed locations, including the existing paved parking lot and canal access road.

### **Main Entrance/Royal Palm Area**

#### **Long Pine Key Campground**

Potable water is currently provided to the Long Pine Key Campground via a raw water well/treatment area and water distribution pipeline. Wastewater collection includes existing septic tanks and sewer lines to several small individual absorption fields (Appendix A, Figure 7).

### **Water System Improvements**

- Demolish existing campground well house, drill one new potable water well (80 ft deep), and construct new, larger well house with water treatment at same location to avoid impacts to natural resources (0.02 acre of permanent disturbance and fill). No improvements to existing water distribution lines are proposed.
- Abandon the existing well at the camp-tender house.

### **Wastewater System Improvements**

- Replace existing individual absorption fields with one, large absorption area at a new location near the recreational vehicle (RV) sanitary dump station that includes four, 10-ft by 150-ft absorption fields raised 5 ft above existing grade (0.7 acre of new, permanent disturbance and fill). Abandon existing individual absorption fields in place.
- Abandon existing septic tanks and provide three new 2,700-gallon septic tanks and one new 3,200-gallon septic tank at new location adjacent to the new absorption field.
- Provide new lift stations at the comfort stations and camp-tender house and provide 7,290 LF of new PVC or HDPE wastewater force main and sewer service line on new alignments adjacent to roadways and within previously disturbed areas, connecting the comfort stations and camp-tender house to the new absorption field.
- Staging would occur on hardened or disturbed locations, including the existing paved parking areas.

### **Royal Palm Visitor Center**

Potable water is currently provided to the Royal Palm Visitor Center via a raw water well/treatment area and water distribution pipeline. Wastewater collection includes an existing septic tank, sewer line, and an absorption field (Appendix A, Figure 8).

### **Water System Improvements**

- Drill one new potable water well at a new location adjacent to the north side of visitor center restrooms (80 ft deep) and install 39 LF of new PVC or HDPE water line connecting the new well to a newly installed water treatment area inside existing visitor center building.
- Demolish and remove existing well house and abandon existing water line on west side of parking area in place.

### **Wastewater System Improvements**

- Replace existing absorption field with a new 25-ft by 75-ft absorption field at a new location west of the parking area at the abandoned well house location. Raise the absorption field 5 ft above existing grade (0.18 acre of new, permanent disturbance and fill).
- Replace existing septic tank at same location with new 2,200-gallon septic tank and lift pump, replace 166 LF of existing sewer service line on same alignment with PVC or HDPE pipeline, and provide 420 LF of new PVC or HDPE force main to new absorption field on new alignment adjacent to existing roadway.

- Staging would occur on hardened or disturbed locations, including the existing paved parking area.

### *Hidden Lake Education Center*

Potable water is currently provided to the Hidden Lake Education Center via a raw water well/treatment area and water distribution pipeline. Wastewater collection includes an existing septic tank, sewer line, and an absorption field (Appendix A, Figure 9).

#### **Water System Improvements**

- Replace hose bib and drinking fountain and replace potable water distribution lines with 265 LF of new PVC or HDPE pipeline on same alignment.

#### **Wastewater System Improvements**

- Replace existing wastewater septic tank at same location with a new 1,050-gallon septic tank and replace existing wastewater absorption field at same location with a new 13-ft by 54-ft absorption field raised 3.5 ft above existing grade (0.1 acre of permanent disturbance and fill).
- Staging would occur on hardened or disturbed locations, including an existing disturbed gravel area adjacent to the well house.

### *Daniel Beard Center*

Potable water is currently provided to the Daniel Beard Center via a raw water well/treatment area and water distribution pipeline. Wastewater collection includes an existing septic tank, sewer lines, force main, and an absorption field (Appendix A, Figure 10).

#### **Water System Improvements**

- Drill two new potable water wells (80 ft deep) and replace existing potable water well house with a new structure at a new location adjacent to the existing well house, which includes a new water treatment chemical room (0.06 acre of permanent disturbance and fill). Abandon the existing well house in place.
- Replace existing generator and propane tank at the new well house and install perimeter fencing.
- Provide 1,410 LF of new PVC or HDPE water distribution line on a new alignment within previously disturbed area from new well house to the Bill Robertson Center, crossing the Beard Center Road via horizontal directional drilling.

#### **Wastewater System Improvements**

- Replace existing lift stations, replace existing septic tank with new 1,050-gallon septic tank at same location, and replace 450 LF of existing wastewater force main with PVC or HDPE pipeline on the same alignment.
- Replace existing absorption field with an expanded system at the same location that includes a new 47-ft by 16-ft absorption field raised 5 ft above existing grade (0.23 acre of permanent disturbance and fill).



- Staging would occur on hardened or disturbed locations, including the existing paved area adjacent to the existing well house.

### *Dr. Bill Robertson Center*

Potable water is currently provided to the Dr. Bill Robertson Center via a raw water well/treatment area and water distribution pipeline. Wastewater collection includes an existing septic tank, sewer lines, and an absorption field (Appendix A, Figure 10).

### **Water System Improvements**

- Update potable water system by providing water from new well and new water distribution line installed at/from Daniel Beard Research Center on a new alignment adjacent to existing roadway.

### **Wastewater System Improvements**

- Replace existing septic tank with new 1,200-gallon septic tank at a new location and replace existing sewer lines from administration building and fire cache building with 470 LF of new PVC or HDPE pipeline on new alignments within previously disturbed area. Abandon existing septic tank and sewer lines in place.
- Replace existing absorption field with an expanded system at the same location that includes a new 50-ft by 17-ft absorption field raised 5 ft above existing grade (0.15 acre of disturbance). Provide 85 LF of new PVC or HDPE service line on a new alignment from new septic tank to absorption field.
- Staging would occur on hardened or disturbed locations, including the paved area north of the administration building.

### *Ernest F Coe Visitor Center/Headquarters and Residential/Maintenance Area*

Two existing wells with treatment areas and water distribution lines currently provide potable water for the Ernest F Coe Visitor Center/Headquarters and the Pine Island Residential/Maintenance area. Wastewater collection sewer lines and force mains that convey effluent to the WWTP at the Pine Island Residential/Maintenance area make up the wastewater system (Appendix A, Figures 11 and 12).

### **Water System Improvements**

- Abandon in place the potable water well, well house, and waterline to the well house at the Ernest F Coe Visitor Center/Headquarters and the potable water well, well house, and storage tank at the Pine Island Residential/Maintenance area.
- Drill two new potable water wells (80 ft deep) at a new location within a previously cleared area north of the Pine Island Residential/Maintenance area and construct a new, raised well house with water treatment that is hurricane-rated, to service both the Visitor Center/Headquarters and the Residential/Maintenance area (0.4 acre of permanent disturbance and fill). Other improvements include:
  - A four-person office in the structure that is climate-controlled
  - Installation of a 6-ft riprap bench around raised building with new security fencing

- Installation of a new paved parking area for four vehicles
  - Installation of new SCADA system and new back-up generator
- Improve potable water distribution systems at Visitor Center/Headquarters, EVER entrance gate, and Pine Island Residential/Maintenance area, including replacement of 9,135 LF of water distribution/service lines on the same alignment and replacement of 2,875 LF of water distribution/service lines on new alignment adjacent to roadways and within previously disturbed areas. The water distribution/service lines would be replaced with new PVC or HDPE pipeline, all water meters and connections would be replaced, and flushing stations would be added at all dead-end water lines.
- Provide new fire hydrant placements and upgrade existing fire well house at Visitor Center/Headquarters with new equipment and new roof built to Category 5 hurricane requirements.
- Provide an upgraded water system capable of meeting fire-fighting water demands for the Visitor Center/Headquarters and the Residential/Maintenance area (60 gallons per minute).
- Install 4,140 LF of new fiber optic line on existing alignment from new well house to new WWTP.

### **Wastewater System Improvements**

- Improve wastewater collection system at Visitor Center/Headquarters, EVER entrance gate, and the Pine Island Residential/Maintenance area by replacing lift stations and hose bibbs to lift stations, adding a new lift station at the new well house location, replacing 10,135 LF of sewer service lines and force main on the same alignment, and replacing 5,295 LF of sewer lines and force mains on new alignment adjacent to roadways and within previously disturbed areas. The sewer lines and force mains would be replaced with new PVC or HDPE pipeline.
- Replace existing WWTP within a new Category 5 hurricane-rated structure at a new, previously disturbed location just southeast of the maintenance buildings complex (0.4 acre of permanent disturbance and fill). Raise the new structure to account for flooding and provide climate control to protect the plant equipment. Abandon the existing WWTP in place. Other improvements to the new WWTP include:
  - New generator and propane tank
  - New paved parking area
  - New SCADA system
- Upgrade and expand existing percolation ponds and reconstruct existing fence around ponds (0.5 acre of permanent disturbance).
- Staging would occur on hardened or disturbed locations, including gravel and paved parking areas.

## ***Loop Road Area***

### **Tamiami Ranger Station**

Potable water is currently provided to the Tamiami Ranger Station via the Miccosukee water system. Wastewater collection includes an existing septic tank and an absorption field (Appendix A, Figure 13).

#### **Water System Improvements**

- Demolish and remove existing well house and cap well that is no longer in use (water provided by Miccosukee water system).

#### **Wastewater System Improvements**

- Replace septic system with new lift station, new 1,050-gallon septic tank, and 56 LF of PVC or HDPE force main pipeline at same location.
- Replace existing absorption field at same location with new 14-ft by 54-ft absorption field raised 3 ft above existing grade (0.09 acre of permanent disturbance and fill).
- Staging would occur on hardened or disturbed locations, including an existing gravel parking area.

### **Loop Road Area Education Center**

Potable water is currently provided to the Loop Road Education Center via a raw water well/treatment area and water distribution pipeline. Wastewater collection includes a septic tank, sewer lines, force main, and an absorption field (Appendix A, Figure 14).

#### **Water System Improvements**

- Raise discharge level of existing well head to comply with Florida Department of Environmental Protection (FDEP) design requirements, remove doghouse structure over existing well and replace with a new prefabricated doghouse at same location, and replace water treatment infrastructure.
- Replace 405 LF of potable water distribution lines on the same alignment and replace 290 LF of water distribution/service lines on new alignment within a previously disturbed area. The water distribution/service lines would be replaced with new PVC or HDPE pipeline.

#### **Wastewater System Improvements**

- Provide new 1,900-gallon septic tank and replace 360 LF of force main and sewer lines on new alignment within previously disturbed area. The sewer lines and force mains would be replaced with new PVC or HDPE pipeline.
- Replace existing absorption field at same location with a new 30-ft by 50-ft absorption field raised 4 ft above existing grade (0.19 acre of permanent disturbance and fill).
- Staging would occur on hardened or disturbed locations, including the existing disturbed parking area.

### Trail Center Area

Potable water is currently provided to the Trail Center area via a raw water well/treatment area and water distribution pipeline. Wastewater collection includes septic tanks, sewer lines, and absorption fields (Appendix A, Figure 15).

#### **Water System Improvements**

- Drill new potable water well (100 ft deep) and construct a new well house at a new location (0.07 acre of new, permanent disturbance and fill within a partially undisturbed area). Install a new back-up generator and perimeter fencing. Abandon the existing well house in place.
- Replace potable water distribution lines on same alignment with 1,825 LF of new PVC or HDPE pipeline.

#### **Wastewater System Improvements**

- Replace existing main absorption field with a new absorption field at a new, previously disturbed location and replace the absorption field at secondary house with a new absorption field at a new, partially disturbed location. The main absorption field would include two new 28-ft by 50-ft absorption fields, and the secondary absorption field would include a new 50-ft by 10-ft absorption field. Raise both fields 4 ft above existing grade (0.27 acre of permanent disturbance and fill). Abandon existing absorption fields in place.
- Replace existing main septic tank with a new 2,700-gallon tank at a new, previously disturbed location and replace the secondary house septic tank with a new 900-gallon tank at a new, previously disturbed location. Provide three new lift stations at existing septic locations, replace 830 LF of existing force main and sewer lines on same alignment, and provide 180 LF of new force main on a new alignment within a previously disturbed area. The sewer lines and force mains would be replaced with new PVC or HDPE pipeline.
- Staging would occur on hardened or disturbed locations, including a currently maintained (mowed) grass area.

### **Mitigation Measures**

The NPS places a strong emphasis on avoiding, minimizing, and mitigating potentially adverse impacts to affected resources, whether under jurisdiction of the NPS or as a result of an NPS decision. To help ensure the protection of natural and cultural resources and the quality of the visitor experience, developed mitigation measures would allow the NPS to meet its conservation mandates as required by the Organic Act (16 USC 1 *et seq.*) and as further detailed in NPS Management Policies, and the NHPA and Endangered Species Act (ESA) (16 USC 1531 *et seq.*). The NPS would also implement an appropriate level of monitoring throughout the construction process to help ensure that protective measures are being properly implemented and are achieving their intended results.

The mitigation measures applied to avoid or minimize potential impacts from implementation of Alternative B (Preferred alternative/Proposed Action) are provided in Appendix B.

## **Alternative Options Considered but Dismissed from Detailed Analysis**

During planning and conceptual design, the NPS considered various design options as part of the water and wastewater systems rehabilitation project. These options were dismissed because of potential impacts to resources or because they did not meet the Project Purpose and Need. The dismissed alternative options are described in Appendix C.

## Chapter 3: Affected Environment and Environmental Consequences

This chapter describes the affected environment, which documents the existing conditions of EVER and sites managed by EVER in BICY. These descriptions serve as a baseline for understanding the resources that could be impacted by implementation of the Project. This chapter also includes an analysis of the environmental consequences or “impacts” of the No Action alternative and the Preferred alternative for each resource.

During civic engagement in Winter 2023, the NPS, participating agencies, stakeholders, and members of the public identified specific issues and concerns related to implementing the Project. Some of the issues and concerns were considered by the NPS but were ultimately dismissed from detailed analysis because they were determined not central to the Project or were not of critical importance for the Project, the environmental impacts related to these issues are not necessary to make a choice between alternatives, or no impacts or negligible impacts are anticipated (Refer to Appendix D for resources considered but ultimately dismissed). The resources addressed in this chapter include:

- Vegetation, Rare Plants, Wetlands, and Soils
- Wildlife and Species of Special Concern
- Cultural and Historic Resources
- Hydrology and Water Quality
- Floodplains
- Visitor Use and Experience

Climate change and potential effects to the Project are also discussed.

### Analysis Methods for Establishing Impacts

The analysis of impacts follows CEQ implementing regulations (40 CFR 1500-1508), Director’s Order 12 procedures (NPS, 2011), NPS NEPA Handbook (NPS, 2015a), and NPS NEPA Handbook Supplemental Guidance: *Preparing Focused and Concise EAs* (NPS, 2015b). The impacts are assessed in the context of EVER’s purpose and significance, and any resource-specific context that may be applicable. The methods used to assess impacts vary depending on the resource being considered, but the methods are generally based on a review of pertinent literature and park studies, information provided by on-site subject matter experts and other agencies, professional judgement, and EVER staff knowledge and insight.

For each resource, the impacts are identified and characterized based on Area of Analysis (AOA), impact type (adverse or beneficial), duration, and intensity.

### *Area of Analysis for Impacts*

AOA refers to the geographic setting within which an impact may occur, such as the affected region. For the purposes of this EA, most impacts are local to the immediate project area of each site unless otherwise noted.

## *Type of Impact*

In accordance with CEQ regulations finalized in 2020 [40 CFR 1508.1 (g)], effects or impacts are defined as changes to the human environment from the Project or alternatives that are reasonably foreseeable and have a reasonably close causal relationship to the Project or alternatives, including those impacts that occur at the same time and place as the Project or alternatives and may include impacts that are later in time or farther removed in distance from the Project.

The potential impacts of the alternatives were determined based on the following defined terms:

- *Short-term (i.e., temporary) impacts:* Impacts that would occur because of the construction activities of the Action alternative. Depending on the impact topic, impacts may be intermittent (days or weeks) or continuous during construction.
- *Long-term (e.g., permanent) impacts:* Impacts that would occur after construction is complete and continue for years or decades.
- *Beneficial:* A favorable change in the condition or appearance of the resource, or a change that moves the resource toward a desired condition.
- *Adverse:* A change that declines, degrades, and/or moves the resource away from a desired condition or detracts from its appearance or condition.

Qualifying adjectives used to describe the intensity of the impact may include:

- *Negligible* – The impact to the resource or discipline is barely perceptible and not measurable and confined to a small area.
- *Minor* – The impact to the resource or discipline is perceptible and measurable and is localized.
- *Moderate* – The impact is clearly detectable and could have an appreciable effect on the resource or discipline.
- *Major* – The impact would have a substantial, highly noticeable effect on the resource or discipline on a regional scale.

The effects described in this EA for federally listed plant and wildlife species followed the effects determination described in the US Fish and Wildlife Service (USFWS) ESA Handbook for Section 7 consultation (USFWS, 1998). The three effects categories used include:

- *Likely to Adversely Affect* – The Project is likely to adversely affect a species if: 1) the species is known to occur in the AOA; and 2) Project activities would disturb area or habitat elements known to be used by the species or would directly affect an individual.
- *Not Likely to Adversely Affect* – The Project is not likely to adversely affect a species if: 1) The species may occur, but its presence has not been documented; and 2) Project activities would not result in disturbance to areas or habitat elements known to be used by the species.

- *No effect* – The Project will have no effect on a species if: 1) the species is considered unlikely to occur (e.g., range, vegetation are inappropriate); and 2) the species or its sign was not observed during surveys of the project area.

The environmental impacts methodology for cultural and historic resources is further outlined in the Cultural and Historic Resources section of this EA.

### ***Cumulative Impacts***

This EA also considers cumulative impacts, namely “the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions” (40 CFR 1508.1). Table 1 lists the past, present, or reasonably foreseeable actions considered for analysis of cumulative impacts for each resource. The actions or projects were selected because they are within the AOA or in the immediate vicinity.

**Table 1: Cumulative Impacts Analysis – Projects Considered**

<b>Primary Area / Project Name</b>	<b>General Description</b>	<b>Status</b>
<b>Flamingo Area</b> Rehabilitate Sewage Lift Stations – Flamingo Area	Replacement of pumps, piping and controls at 11 lift stations, demolishing and replacing one lift station, and installing new 4-inch sewer force main from Flamingo housing area to Buttonwood Canal Plug, a distance of 2,300 ft.	Past Completed in August 2021
<b>Flamingo Area</b> Upgrade Main Water Line to Flamingo Visitor Center and Concessionaire Land Assignment	Replacement of 4,600 LF of 6-inch water line from Flamingo WTP to the Flamingo visitor center, terminating at the land assignment for the concessionaire-operated restaurant and cottages.	Past Completed in September 2023
<b>Flamingo Area</b> Rehabilitate Flamingo Visitor Center/Guy Bradley Visitor Center	Rehabilitation of the Mission 66-era Flamingo Visitor Center Building Complex, including the former Flamingo Visitor Center and Flamingo Restaurant buildings connected by the second-story breezeway. Reconstruction included both interior and limited exterior alterations of the structure that resulted in hardening the facility to withstand major storm events, incorporating Leadership in Energy and Environmental Design qualities, and providing accessibility consistent with the Americans with Disabilities Act.	Past Completed in 2023
<b>Flamingo Area</b> Flamingo Lodge and Restaurant Redevelopment	Construction of the new Flamingo Lodge and Restaurant to open to the public in November 2023 at the location of the former hotel that was damaged by hurricanes. Includes 24 elevated cottage units consolidated in four buildings using modified shipping containers.	Past Completed in 2023



Primary Area / Project Name	General Description	Status
<b>Flamingo Area</b> Rehabilitate Marina Bulkheads at Flamingo	Proposed project to replace failing seawall bulkheads, boat ramps, walkways, and aging amenities at the Flamingo Marina. Includes improvements to utility services at the Whitewater Bay and Florida Bay basins. Also includes replacement of fuel pumps and boat-accessible portable sewer pumping stations near the marina store and replacement of buried piping. NPS and U.S. Army Corps of Engineers (USACE) are currently preparing an EA. The EA is anticipated to be available for public review January 2024.	Proposed
<b>Shark Valley Area</b> Old Tamiami Trail Modifications Project	Enhanced sheet flow into the Shark River Slough by removing 5.45 miles of the Old Tamiami Trail roadbed. A quarter-mile portion of the Old Tamiami Trail near the Shark Valley Entrance Road was retained.	Past Completed in 2021
<b>Shark Valley Area</b> Comprehensive Everglades Restoration Plan (CERP)	The CERP is a framework for restoring, protecting, and preserving the greater Everglades ecosystem by addressing the quantity, quality, timing, and distribution of water. The CERP is the single-largest restoration program underway in South Florida. CERP comprises several infrastructure projects intended to protect and restore water resources and ecosystems, protect communities from flooding, and provide adequate water supply.	Current In various stages of implementation
<b>Shark Valley Area</b> Central Everglades Planning Project (CEPP)	As a key project of the CERP, the CEPP is intended to improve quantity, quality, timing, and distribution of water flows. The CEPP includes projects that would allow more water to be directed south to the Northern Estuaries, central Everglades, and Florida Bay, while increasing water supply for municipal, industrial, and agricultural users. The CEPP focuses restoration on natural flows into and through the central and southern Everglades and removing barriers (e.g., canals and levees) to flow south of Lake Okeechobee. The CEPP will reduce the large pulses of regulatory flood control releases from Lake Okeechobee and retain water within EVER and protect urban and agricultural areas from flooding. Approximately 370,000 acre-ft of water will be redirected.	Current In various stages of implementation
<b>Shark Valley Area</b> Cure Plans	The NPS is developing and implementing “cure plans” at four sites within EVER along Tamiami Trail. These plans identify modifications to site elevations and select structures needed to protect them from higher water levels that will occur due to the CEPP. The facilities include three airboat concession operators (Coopertown, Gator Park, and Everglades Safari Park) and the Miccosukee Tribe of Indians of Florida Osceola Camp.	Proposed or in various stages of implementation

Primary Area / Project Name	General Description	Status
<b>Shark Valley Area</b> Tamiami Trail Modifications: Next Steps Project	The project is implemented by the CEPP for creating additional water deliveries to the park. The project is immediately north of EVER and includes reconstruction of the eastern Tamiami Trail roadway, six new bridges, and seven improved culverts to accommodate the CEPP flows and design high water to create more natural flows.	Current Construction 2015-2026
<b>Shark Valley Area</b> Shark Valley Site Plan Implementation	The purpose of the plan is to enhance visitor safety and experience and park operations. The site plan includes making roads and facilities more resilient to flood events and minimize congestion along the Entrance Road and in the parking lot. A new overflow parking lot inside the entrance gate would be constructed and the existing traffic pattern from the entrance road through the current parking area will remain. Other improvements will include raising sections of the tram road, adding shade structures and benches along the tram road, raising, and widening the entrance road to two inbound lanes and one outbound lane.	Future Implementation when funding is available
<b>Main Entrance/Royal Palm Area</b> Rehabilitate Water Distribution System at the Long Pine Key Campground and Day-Use Area	Construction entails a new HDPE domestic water distribution piping system from the existing pump house to all comfort stations, shower houses, and water fountains in the Long Pine Key Campground. The new line will be routed through previously excavated areas along the road and the existing easement path along the campground, minimizing impact to critical habitats. Sections of the existing line through pine lands will be abandoned in place and grout filled.	Past Completed in 2023
<b>Main Entrance/Royal Palm Area</b> Construct new Research Office Facility (South Florida Natural Resources Center)	NPS has begun planning the proposed construction of a South Florida Natural Resources Center building within the Pine Island area. Two sites are being considered: the Dr. Bill Robertson Jr. Center and an abandoned airstrip in Pine Island. Geotechnical studies will be conducted in Fall of 2023 to inform the selection of a preferred location.	Proposed
<b>Loop Road Area</b>	No projects identified	Not Applicable

## General Chapter Methodology

This chapter is organized by resource topic. Under each resource topic, existing conditions and trends are presented for the four primary areas. The environmental consequences section evaluates direct and indirect impacts from the implementation of each alternative. Potential cumulative impacts for each resource are summarized, which consider both the No Action alternative and the Preferred alternative.

## Climate Change

Climate change is a key consideration in current planning efforts for infrastructure and park management. The effects of changing precipitation patterns, increasing storm frequency and

intensity, rising sea levels, rising air temperatures, and other climatic changes are evident in the national park system. The NPS recognizes the importance of addressing the effects of climate change in its planning and, as such, this EA considers the effects of climate change in the analysis of impacts. One of the NPS objectives for this rehabilitation project is to design the facilities to be resilient to severe storms, temperature changes, and sea level rise.

Climate change could have a range of effects. Although difficult to conclude, scientific models suggest that changing climate could lead to higher wind speeds and more frequent storms, such as hurricanes and tropical storms; increased erosion and/or accretion across EVER's coastline; rising groundwater tables and possible saltwater intrusion; changes in precipitation and drought frequency; increases in extreme fire days; and loss of land and habitat important to wildlife.

For the Project, NPS performed a Climate Change Analytics study and completed a Natural Hazard Checklist to determine the vulnerability of EVER's water and wastewater systems and the natural hazards most likely to impact these assets (Stanley Consultants, 2023). Earlier studies, such as the *Coastal Hazards & Sea-Level Rise Asset Vulnerability Assessment for EVER* (NPS, 2022), were also completed to identify coastal hazards and climate change factors and the assets that may be at risk. Results of these studies are discussed further in this chapter under the trend analysis for each resource. The analysis describes how climate change would affect these resources in the future, when applicable.

## **Vegetation, Rare Plants, Wetlands, and Soils**

### ***Area of Analysis***

The AOA for vegetation, rare plants, wetlands, and soils includes the 13 sites that would be directly affected by improvements and where construction would occur (project area limits) as well as the directly adjacent natural habitat that could be affected by the Project.

### ***Current and Expected Future Conditions of Affected Environment***

The greater Everglades ecosystem has been largely impacted by the multitude of infrastructure projects in South Florida over the last 150 years which included a series of canals, levees, and other drainage systems that were constructed to drain the landscape for development as well as the construction of new roadways. These infrastructure projects have altered historic hydrology to the region. Historic development within the park, including farming, oil and gas exploration, military missile defense sites, as well as the park infrastructure used by park visitors and NPS staff have also resulted in a loss of native vegetation.

Currently, much of the vegetated area within the 13 project sites is regularly maintained via mechanical mowing, with some landscaping. Hardscape features, such as parking lots, roadways, pathways, sidewalks, buildings/structures, concrete patios, pavilions, docks, and picnic areas are also present. St. Augustine grass (*Stenotaphrum secundatum*) and other various forbs and grasses are common in the maintained areas (Anchor QEA, 2023a; Anchor QEA, 2023b).

The native vegetation, rare plants, wetlands, and soils differ throughout the distinct primary areas and are described below. Detailed information on the wetlands delineated within the

AOA is provided in the Wetland and Floodplain Statement of Findings in Appendix E. Additional information on existing vegetation can also be found in the Project's Biological Assessment (Anchor QEA, 2023c).

### Flamingo Area

Native vegetation surrounds both the Flamingo and West Lake areas and includes forest, shrubland, hammock, and coastal habitats characterized by green buttonwood (*Conocarpus erectus*), red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), and white mangrove (*Laguncularia racemosa*). Other common tree and scrub-shrub species observed in the AOA include Jamaica dogwood (*Piscidia piscipula*), Christmas berry (*Lycium carolinianum*), bayleaf capertree (*Cynophalla flexuosa*), soldierwood (*Colubrina elliptica*), sea grape (*Coccoloba uvifera*), pigeon plum (*Coccoloba diversifolia*), Florida soapberry (*Sapindus saponaria*), gumbo limbo (*Bursera simaruba*), and Brazilian pepper (*Schinus terebinthifolia*). Succulent salt marsh and mixed graminoid and herbaceous freshwater marsh habitats are also present. Common herbaceous species include saltwort (*Batis maritima*), perennial glasswort (*Salicornia perennis*), perennial sea-purslane (*Sesuvium portulacastrum*), silverhead (*Blutaparon vermiculare*), salt marsh fleabane (*Pluchea odorata*), sea daisy (*Borrchia frutescens*), maidencane (*Panicum hematoma*), knot grass (*Paspalum distichum*), swamp flatsedge (*Cyperus distinctus*), smooth cordgrass (*Spartina alterniflora*), and marsh bristle grass (*Setaria parviflora*) (Anchor QEA, 2023a).

Ten estuarine wetland habitats (Wetlands L through U) were identified in portions of the Flamingo project area limits that are associated with the Cape Sable watershed (Anchor QEA, 2023a). There is also one freshwater wetland habitat in the West Lake project area limits (Wetland V) associated with the Taylor Slough Coastal watershed (Anchor QEA, 2023a). These wetlands are primarily moderate quality wetlands in terms of wetland functions and values (0.70 functional wetland score); however, one wetland at the Flamingo WTP was categorized as having minimal functionality (0.04 functional wetland score) (Anchor QEA, 2023b). Three excavated waterbodies (Percolation Pond, Overflow Pond, and the deep-water habitat of the Flamingo Canal and Marina) are also within the Flamingo Area AOA (Anchor QEA, 2023a). These aquatic resources provide essential mangrove swamp, saltwater marshes, wet prairie, and shoreline habitat.

Soils within the Flamingo Area AOA include fine-grained and organic soils consisting of sandy silt, slightly sandy silt, and/or silty sand with varying proportions of organic matter. Limestone is at 10 to 12 ft below this soil layer (Terracon, 2023a). On-site soils for wetlands consist of compacted fill or hydric soils over shallow limestone (Anchor QEA, 2023a).

### Shark Valley Area

The Shark Valley Area AOA is within the Shark River Slough, which is over 170,000 acres in size and the largest natural water flow within EVER. Typical vegetation communities within the Shark River Slough consist of sawgrass prairies and graminoid dominated marl prairies, tree islands, tropical hardwood hammocks, and alligator holes, as well as scattered pockets of cypress domes and pine islands. Native vegetation surrounding the Shark Valley Area AOA includes forest and shrubland habitats characterized by bay tree species, willow (*Salix* sp.) and cocoplum (*Chrysobalanus icaco*). Other common woody vegetation in and around the Shark

Valley Area includes pond apple (*Annona glabra*), swamp bay (*Persea palustris*), Florida strangler fig (*Ficus aurea*), and cabbage palm (*Sabal palmetto*). Marsh habitats dominated by sawgrass (*Cladium jamaicense*) are also present. Other common herbaceous plants include species such as spatterdock (*Nuphar advena*), starrush whitetop (*Rhynchospora colorata*), duck potato (*Sagittaria lancifolia*), beggarticks (*Bidens alba*), nutsedge (*Cyperus* sp.), maidencane, seven-sisters (*Crinum americanum*), bent alligator-flag (*Thalia geniculata*), and giant leather fern (*Acrostichum danaeifolium*). Although the Shark Valley Area AOA generally contains high-functioning, relatively intact wetland ecosystems, some non-native invasive vegetation has been documented encroaching into the region. This non-native vegetation includes Brazilian pepper, melaleuca (*Melaleuca quinquenervia*), Australian pine (*Casuarina equisetifolia*), and Old-World climbing fern (*Lygodium microphyllum*) (Anchor QEA, 2023a).

Portions of the Shark Valley Area AOA contain freshwater wetland habitats that are associated with the Shark Valley Slough. Two wetlands (Wetland K and Wetland J) were delineated within the Shark Valley Area AOA that provide wetland scrub, wet prairie, and inland ponds and sloughs wetland habitats. These areas are dominated by pond apple, swamp bay, willow, and cocoplum in the shrubland wetlands and primarily by sawgrass in the marsh wetlands (Anchor QEA, 2023a). These wetlands are primarily moderate quality wetlands in terms of wetland functions and values (0.70 functional wetland score) (Anchor QEA, 2023b).

Soils within the Shark Valley Area AOA include organic silty fine sand. Shallow limestone is below this soil layer (Terracon, 2023b). On-site wetland soils consist of compacted fill or thin hydric soils over shallow limestone (Anchor QEA, 2023a).

#### Main Entrance/Royal Palm Area

Soils within the Main Entrance/Royal Palm Area AOA predominately include silty sand and sandy silt to a depth of up to 2 ft below existing grade. Below these strata, limestone is between 45 and 50 ft below existing grade (Terracon, 2023c). On-site soils for wetlands consist of compacted fill or hydric soils over shallow limestone (Anchor QEA, 2023a).

Native vegetation and associated wetlands within the Main Entrance/Royal Palm Area varied by site and are described separately below.

#### Long Pine Key Campground

Outside of the maintained campground, native vegetation is present and includes pine rockland-mixed and pine rockland-shrubs habitats. Common tree and scrub-shrub species include South Florida slash pine (*pinus elliottii* var *densa*), false tamarind (*Lysiloma latisiliquum*), poisonwood (*Metopium toxiferum*), wax myrtle (*Morella cerifera*), cabbage palm, saw palmetto (*Serenoa repens*), wild coffee (*Psychotria nervosa*), sumac (*Rhus* sp.), willow-bustic (*Sideroxylon salicifolium*), rough velvetseed (*Guettarda elliptica*), satinleaf tree (*Chrysophyllum oliviforme*), green buttonwood, pineland lantana (*Lantana depressa* var *depressa*), and poison ivy (*Toxicodendron radicans*). Common herbaceous species include little bluestem (*Schizachyrium rhizomatum*), giant sword fern (*Nephrolepis biserrate*), beggarticks, flat sedges (*Cyperus* spp.), and low rattlebox (*Crotalaria pumila*) (Anchor QEA, 2023c).

No wetlands or other waters were delineated within the Long Pine Key Campground project area limits (Anchor QEA, 2023a).

#### Royal Palm Visitor Center and Hidden Lake Education Center

Native vegetation is present within and around the Royal Palm Visitor Center and the Hidden Lake Education Center and includes tropical hardwood shrubland, willow shrubland, willow scrub-sawgrass marsh, and tropical hardwood hammock habitats. Common tree and scrub-shrub species include gumbo limbo, West Indian mahogany (*Swietenia mahagoni*), Florida royal palm (*Roystonea regia*), Florida strangler fig, poisonwood, cocoplum, green buttonwood, wild coffee, pond apple, West Indian milk berry (*Chiococca alba*), false tamarind, cabbage palm, saw palmetto, swamp bay, and live oak (*Quercus virginiana*). In the herbaceous layer, common species include tuberous sword fern (*Nephrolepis cordifolia*), sawgrass, primrose-willow (*Ludwigia sp.*), spatterdock, common reed (*Phragmites australis*), duck potato, bushy bluestem (*Andropogon glomeratus*), crow's foot grass (*Dactyloctenium aegyptium*), Mexican primrose-willow (*Ludwigia octovalvis*), switchgrass (*Panicum virgatum*), Canada spikesedge (*Eleocharis geniculata*), and humped bladderwort (*Utricularia gibba*) (Anchor QEA, 2023c).

Two freshwater wetlands (Wetlands F and G) were delineated within the Royal Palm Visitor Center and Hidden Lake Education Center project area limits that are associated with the Taylor Slough watershed. These wetlands provide wet prairie, wetland scrub, and inland ponds and sloughs wetland habitats. The wetland at Royal Palm Visitor Center (Wetland F) shows limited disturbance, while much of the wetland at Hidden Lake Education Center (Wetland G) is maintained (e.g., mowed). Functional scores for these wetlands were not determined (Anchor QEA, 2023b). A freshwater, deepwater habitat (Hidden Lake) is also adjacent to the Education Center (Anchor QEA, 2023a).

#### Daniel Beard and Dr. Bill Robertson Centers

At the Daniel Beard and Dr. Bill Robertson Centers native vegetation outside of the maintained areas is associated with graminoid freshwater prairie habitat. This habitat is dominated by herbaceous species including Indian pennywort (*Centella asiatica*), marsh pennywort (*Hydrocotyle umbellata*), sugarcane plume grass (*Saccharum giganteum*), bushy bluestem, muhly grass (*Muhlenbergia capillaris*), rose-of-Plymouth (*Sabatia stellaris*), beggarticks, stiff yellow flax (*Linum medium* var *texanum*), goldenrod (*Salidago sp.*), stiffhair waxweed (*Cuphea strigulosa*), blue mistflower (*Conoclinium coelestinum*), oakleaf fleabane (*Erigeron quercifolius*), small fruit primrose-willow (*Ludwigia macrocarpa*), and lawn orchid (*Zeuxine strateumatica*) (Anchor QEA, 2023c).

One freshwater wetland (Wetland W) associated with the Taylor Slough watershed was delineated at the Daniel Beard Center. The wetland provides wet prairies wetland habitat; however, it is periodically maintained (e.g., mowed) within the project area limits (Anchor QEA, 2023a). This wetland is a moderate quality wetland in terms of wetland functions and values (0.60 functional wetland score) (Anchor QEA, 2023b). No wetlands were observed at the Dr. Bill Robertson Center.

### Ernest F. Coe Visitor Center/Headquarters and Pine Island Residential/Maintenance Area

Native vegetation surrounds the maintained portions of the Visitor Center/Headquarters and the Pine Island Residential/Maintenance areas and includes pine rockland, tropical hardwood hammock and shrubland, and graminoid freshwater prairie and marsh habitats. Common tree and scrub-shrub species include South Florida slash pine, false tamarind, cabbage palm, West Indian mahogany, Florida strangler fig, poisonwood, cocoplum, green buttonwood, saw palmetto, and Florida bully (*Sideroxylon reclinatum* subsp. *autrofloridense*). Common herbaceous species include sawgrass, muhly grass (*Muhlenbergia capillaris*), bushy bluestem, duck potato, starrush whitetop, common purslane (*Portulaca oleracea*), musky bushmint (*Hyptis alata*), St. Andrew's cross (*Hypericum hypericoides*), tailed bracken fern (*Pteridium aquilinum* var. *pseudocaudatum*), saltmarsh umbrella sedge (*Fuirena breviseta*), small fruit primrose-willow, and lax hornpod (*Mitreola petiolata*) (Anchor QEA, 2023c).

Five freshwater wetlands (Wetlands A, B, C, D, and E) were delineated within the Visitor Center/Headquarters and the Pine Island Residential/Maintenance project area limits that provide wetland scrub, wet prairies, hydric pine savanna, and freshwater marsh wetland habitats (Anchor QEA, 2023a). These wetlands are associated with the Taylor Slough watershed and are primarily moderate quality wetlands in terms of wetland functions and values (0.60 functional wetland score) (Anchor QEA, 2023b).

### Loop Road Area

Native vegetation includes bayhead shrubland, bayhead forest, pond apple forest, and spatterdock habitats around the Tamiami Ranger Station; tropical hardwood hammock, pine flatwoods-mixed, and temperate hardwood hammock habitats surrounding the Loop Road Education Center; and bayhead shrubland, bayhead forest, cypress-hardwood forest, cypress forest-monotypic, hardwood swamp shrubland and forest, upland hardwood scrub-graminoid prairie, cypress scrub-sawgrass marsh, and mixed graminoid freshwater marsh habitats around the Trail Center (Anchor QEA, 2023c). Common tree and scrub-shrub species include bald cypress (*Taxodium distichum*), Florida strangler fig, cocoplum, pond apple, bay species, poisonwood, cabbage palm, false tamarind, Brazilian pepper, banana (*Musa* sp.), coconut palm (*Cocos nucifera*), saltbush (*Baccharis halimifolia*), West Indian mahogany, South Florida slash pine, live oak, wild coffee, sweetbay magnolia (*Magnolia virginiana*), and hog plum (*Ximenia americana*). Common species observed in the herbaceous layer include beggarticks, swamp fern (*Blechnum serrulatum*), frogfruit (*Phyla stoechadifolia*), common reed, crow's foot grass, creeping oxeye (*Sphagneticola trilobata*), largeleaf Mexican clover (*Richardia grandiflora*), bent alligator flag (*Thalia geniculata*), spatterdock, cattail, spikerush (*Eleocharis* sp.), water lettuce (*Pistia stratiotes*), maiden fern (*Thelypteris* sp.), bushy beardgrass (*Andropogon glomerates*), yellow bristlegrass (*Sataria parviflora*), hurricane-grass (*Fimbristylis cymosa*), crowngrass (*Paspalum* sp.), starrush whitetop, Indian pennywort, and marsh pennywort (Anchor QEA, 2023c).

Two freshwater wetlands (Wetland H and I) were delineated within the Trail Center and Tamiami Ranger Station project area limits that are within the East Collier and EVER watersheds. These wetlands provide wetland scrub, inland ponds and sloughs, cypress, and wet prairie habitats and are primarily moderate quality wetlands in terms of wetland functions and values (0.60 functional wetland score) (Anchor QEA, 2023b). One other waterbody (Trail

Center Pond) was also delineated within the Trail Center project area limits (Anchor QEA, 2023a).

Soils within the Loop Road Area AOA include fine sand with silt and trace organics to a depth of up to 1 ft below existing grade. Limestone is present beneath the soil horizon to 8 ft below existing grade (Terracon, 2023e). On-site soils for wetlands consist of compacted fill or dark hydric soils with thick root mats (Anchor QEA, 2023a).

### Rare Plants

Rare plants, for the purposes of this EA, are special status plant species listed by the USFWS as endangered, threatened, proposed, or candidate species (i.e., federally listed species) under the ESA. A preliminary USFWS species list was obtained from the Information for Planning and Consultation (IPaC) website on December 21, 2022, (USFWS, 2022). ESA-listed plant species that may occur in the AOA, along with proposed or designated critical habitat are included in Table 2. The Biological Assessment for the Project provides additional details on these plant species (Anchor QEA, 2023c).

**Table 2: ESA-Listed Plants and Critical Habitats that May Occur in the AOA**

Species	Scientific Name	USFWS Listing Status	Primary Areas (per IPaC)	Critical Habitat (per IPaC)
Blodgett's silverbush	<i>Argythamnia blodgettii</i>	Threatened	May occur at Main Entrance/Royal Palm Area	Proposed – includes Long Pine Key Campground
Florida prairie-clover	<i>Dalea carthagenensis var. floridana</i>	Endangered	May occur at Main Entrance/Royal Palm and Loop Road areas	Proposed – includes Loop Road Education Center, Trail Center area, and Long Pine Key Campground
Cape Sable thoroughwort	<i>Chromolaena frustrata</i>	Endangered	May occur at Flamingo area (along coast)	Designated – includes Flamingo area (but outside AOA)
Everglades bully	<i>Sideroxylon reclinatum</i> ssp. <i>austrofloridense</i>	Threatened	May occur at Main Entrance/Royal Palm and Loop Road areas	Proposed – includes Loop Road Education Center, Trail Center area, and Long Pine Key Campground
Florida bristle fern	<i>Trichomanes punctatum</i> ssp. <i>floridanum</i>	Endangered	May occur at Main Entrance/Royal Palm Area	Designated – includes Royal Palm Visitor Center
Florida Pineland Crabgrass	<i>Digitaria pauciflora</i>	Threatened	May occur at Main Entrance/Royal Palm and Loop Road areas	Proposed – includes Loop Road Education Center, Trail Center area, and Long Pine Key Campground
Pineland sandmat	<i>Euphorbia deltoidea</i> subsp. <i>pinetorum</i>	Threatened	May occur at Main Entrance/Royal Palm and Loop Road areas	Proposed – includes Loop Road Education Center, Trail Center area, and Long Pine Key Campground



## *Future Trends*

Future trends that could affect vegetation, wetlands, and rare plants in EVER and the AOA include climate change and the invasion or spread of nonnative plant species. Results from a 2023 Climate Change Analytics analysis indicate all areas within EVER would see an annual average increase of 1 degree Fahrenheit (<sup>0</sup>F) to 9 <sup>0</sup>F from current baseline temperatures over the next 40+ years (Stanley Consultants, 2023). All areas are projected to see an increase from baseline in annual extreme fire days, with increases ranging anywhere from 30 days in the Park Entrance/Royal Palm Area in 2030, to 160 days in the Shark Valley and Loop Road areas in 2070. All areas are projected to experience an increase in the annual number of drought months. The increase ranges from less than one more month of drought to almost eight more months of drought by 2070. Additionally, all areas are projected to see a decrease in annual precipitation (Stanley Consultants, 2023). A 2018 study on sea level rise and storm surge projection for the NPS, noted a 9.4-inch rise by 2050 (Caffrey, 2018). These changes in climate and sea levels (i.e., saltwater intrusion) and potential expansion of invasive species could result in changes to vegetation communities, types of wetlands, and the survivability of rare plants.

## *Environmental Consequences*

### *Impacts of Alternative A (No Action)*

Under the No Action alternative, existing conditions for vegetation, wetlands, rare plants, and soils would remain the same. Only ongoing routine maintenance of existing infrastructure and adjacent vegetation would continue. Use of septic systems at the end of their service life could risk system failure and some subsequent contamination of the sensitive vegetation and wetland areas adjacent to this infrastructure. These impacts may be perceptible and measurable but would be localized. With over one million acres of existing native vegetation and wetlands within the Everglades ecosystem, the No Action alternative would result in minor, short-term, and long-term adverse impacts. When considering overall trends to vegetation and wetlands in the area, these impacts would have a negligible (barely perceptible) contribution.

### *Impacts of Alternative B (Preferred)*

Under the Preferred alternative, replacing or installing new wastewater and potable water distribution pipeline and conduit at all 13 sites would involve ground disturbance through excavation, placement of fill material, and vegetation removal. While the exact means and methods have not been determined, it is assumed for this analysis that trenching would be needed to complete the work. Trenches would be 2 ft wide and 4 ft deep, with a disturbance corridor 15-ft wide to accommodate equipment and trench spoils. Trenching alignments would occur within previously disturbed and/or maintained vegetated areas and some wetlands, primarily along roadway corridors, parking areas, pathways, and through maintained lawns and campgrounds.

Short-term impacts under the Preferred alternative for the AOA include the following.

- In the Flamingo and West Lake project area limits approximately 56,980 LF of pipeline and 5,650 LF of fiber optic conduit would be installed, with the temporary disturbance area equating to 19.62 acres (fiber conduit and brine concentration force main likely in same trench).

- In the Shark Valley Tower and Shark Valley Administration and Visitor Center project area limits, approximately 4,966 LF of pipeline would be installed, with the temporary disturbance area equating to 1.71 acres.
- In the Visitor Center/Headquarters and Pine Island Residential/Maintenance project area limits, approximately 27,440 LF of pipeline and 4,140 LF of fiber optic conduit would be installed with the temporary disturbance area equating to 9.45 acres (fiber conduit and segment of water distribution pipeline likely in same trench).
- In the Royal Palm and Hidden Lake Environmental Education Center project area limits, approximately 890 LF of pipeline would be installed, with a temporary disturbance of 0.31 acre.
- In the Long Pine Key Campground project area limits, approximately 7,290 LF of wastewater service lines and force mains would be installed, with a temporary disturbance of 2.51 acres.
- In the Daniel Beard Center and Dr. Bill Robertson Center project area limits, approximately 2,415 LF of pipeline would be installed, with a temporary disturbance of 0.83 acre.
- In the Tamiami Ranger Station, Loop Road Education Center, and Trail Center project area limits, approximately 3,946 LF of pipeline would be installed, with a temporary disturbance area of 1.36 acres.

After the pipeline and conduit are installed, the trenches would be filled and disturbed areas allowed to reestablish naturally. Reseeding would occur if needed, and as required under specific permits. Of the 35.79 acres of short-term impacts to vegetation and soils, 2.09 acres would be wetland impacts. Table 3 below lists the short-term impacts from piping to identified wetlands. Overall, these short-term impacts would be negligible (barely perceptible), as vegetation would reestablish. This would not result in a downward trend for vegetation, wetlands, and soils.

Long-term, adverse impacts to vegetation, wetlands, and soils are also anticipated under the Preferred alternative resulting in a total permanent disturbance of 5.56 acres. With over one million acres of existing native vegetation and wetlands within the Everglades ecosystem, the permanent disturbance of 5.56 acres is considered minor. Once construction is complete, disturbed areas not hardscaped, would be allowed to naturally reestablish. Reseeding would occur on absorption fields and other areas if needed, and as required under specific permits. Overall, when considering the larger trends to vegetation and wetlands in the area, these permanent impacts would have a negligible (barely perceptible) contribution.

The long-term impacts vary for each site and are discussed below. Unless otherwise noted, permanent impacts would occur in previously disturbed areas.

Soils considered not suitable to support construction of one or more improvements would be supplemented with clean fill soils, as necessary. Clean fill soils would meet NPS criteria for such soils, including adherence to weed prevention strategies, and would fulfill applicable engineering requirements.

### Flamingo Area

Replacing the WWTP, expanding the WTP, and replacing the wastewater absorption field at West Lake would result in long-term adverse impacts to vegetation and wetlands. To allow wastewater treatment to continue during replacement of the WWTP, the infrastructure would be constructed at a new location at the adjacent percolation pond. A portion of the pond would be filled, and a berm at the adjacent retention pond raised, requiring approximately 10,500 cubic yards (CY) of material and riprap, with a permanent disturbance area of 1.07 acres. The expansion of the WTP and installation of a new water tank would create a permanent disturbance area of 0.07 acre. These areas are currently disturbed by maintenance activities.

The new adsorption field at West Lake would be constructed north of the access road to the West Lake area. Wetland habitats surround this area, leaving little room for development in previously disturbed areas, resulting in permanent impacts to undisturbed vegetation, primarily wetlands. Due to the high-water table and predicted storm surge in the area, construction of the adsorption field would require a larger footprint, excavation to clear vegetation, and placement of 510 CY of fill material to raise the field above the water table. The permanent disturbance area would be 0.27 acre. After construction, these areas would be maintained via mechanical mowing, with an approximate 10-ft buffer around the infrastructure.

### Shark Valley Area

Demolishing the Shark Valley Tower well house and replacing with a new, raised well house at the same location and replacing the wastewater absorption fields at both the Shark Valley Tower and Administration and Visitor Center areas would have long-term adverse impacts to vegetation and wetlands. Due to the high-water table and frequent flooding at Shark Valley Tower, construction of the new well house and the absorption field would require a larger footprint to raise both features above the water table and prevent flooding of the well house. After the old well house is demolished, approximately 350 CY of fill material and riprap would be placed to establish a pad for the new well house, creating a permanent disturbance area of 0.11 acre, some of which was previously disturbed. The new adsorption field at Shark Valley Tower would use the existing absorption field site but with a larger footprint and would be sited in an area that was previously disturbed when the Shark Valley Tower was constructed. Much of this area was left unmanaged and has returned to wetland habitat (Wetland K). Installing the new absorption field would have permanent impacts to vegetation, primarily wetlands. Excavation to clear vegetation and placement of 2,000 CY of fill material would result in a permanent disturbance of 0.42 acre, some of which was previously disturbed.

Similar to the Shark Valley Tower, the new adsorption field at the Shark Valley Administration and Visitor Center area would use the existing absorption field site with a larger footprint to raise the field above the water table to prevent potential flooding. The larger footprint would impact wetland (Wetland J) due to the field's proximity to a canal access road that needs to remain unobstructed for maintenance purposes. Work would include excavation to clear vegetation and placement of 1,130 CY of fill material. The permanent disturbance area would be 0.26 acre, some of which was previously disturbed.

After construction, the infrastructure would be maintained via mechanical mowing, with an approximate 10-ft buffer around the infrastructure.

### Main Entrance/Royal Palm Area

Long-term adverse impacts to vegetation and wetlands would result from replacing the WWTP at the Pine Island Residential/Maintenance area; replacing the wells and well houses at Long Pine Key Campground, Daniel Beard Center, and the Pine Island Residential/Maintenance area; and replacing the wastewater absorption fields at Long Pine Key Campground, Royal Palm Visitor Center, Hidden Lake Education Center, Daniel Beard Center, and Dr. Bill Robertson Center.

To allow wastewater treatment to continue during replacement of the WWTP, the infrastructure would be constructed at a new location in a disturbed area adjacent to existing maintenance buildings in the Pine Island Residential/Maintenance area. Construction of the new WWTP would require excavation to clear vegetation and placement of approximately 1,850 CY of fill material and riprap, for a total permanent disturbance of 0.4 acre. The existing, overgrown percolation pond at the Pine Island Residential/Maintenance area would be cleaned out (i.e., all vegetation removed), with a permanent disturbance of 0.5 acre.

New wells and well houses would be constructed at the Daniel Beard Center, the Pine Island Residential/Maintenance area, and the Long Pine Key Campground. Well houses at the Daniel Beard Center and the Pine Island Residential/Maintenance area would be constructed at new locations, which are currently disturbed. The Long Pine Key Campground well house would be constructed at the existing well house location, after demolishing the existing well house. Construction of the new well house at the Long Pine Key Campground would result in a permanent disturbance of 0.02 acre. Construction of the new well house at the Daniel Beard Center would result in a permanent disturbance of 0.06 acre. To account for the high-water table and potential flooding, excavation to clear vegetation and placement of 1,950 CY of fill and riprap material would occur for the new well house at the Pine Island Residential/Maintenance area. The new well house and adjacent paved parking area would result in a permanent disturbance of 0.4 acre.

New absorption fields at new locations are proposed at Long Pine Key Campground and Royal Palm Visitor Center, with the existing facilities abandoned. The existing absorption fields at Hidden Lake Education Center, Daniel Beard Center, and Dr. Bill Robertson Center would be replaced at the same location with larger absorption fields constructed over a larger footprint to raise the fields above the water table to prevent potential flooding. Excavation to clear undisturbed native vegetation and placement of 1,930 CY of fill material would occur at Long Pine Key Campground for a total permanent disturbance of 0.7 acre. Excavation to clear primarily undisturbed native vegetation and placement of 670 CY of fill material would occur at Royal Palm Visitor Center for a total permanent disturbance of 0.18 acre. Excavation in already disturbed areas would take place at Hidden Lake Education Center, Daniel Beard Center, and Dr. Bill Robertson Center, with placement of 230 CY, 630 CY, and 670 CY, respectively, resulting in permanent disturbance of 0.1 acre at Hidden Lake, 0.23 acre at the Daniel Beard Center, and 0.15 acre at the Dr. Bill Robertson Center.

After construction, the infrastructure would be maintained via mechanical mowing, with an approximate 10-ft buffer around new infrastructure (e.g., wells, WWTP).

### Loop Road Area

Demolishing and replacing the Trail Center well house at a new location, and replacing the wastewater absorption fields at Tamiami Ranger Station, Trail Center, and Loop Road Education Center would have long-term adverse impacts to vegetation and wetlands. The new well house location at Trail Center would be slightly excavated to clear some native vegetation and approximately 165 CY of fill material would be placed for a well house pad, resulting in a permanent disturbance of 0.07 acre. The two new adsorption fields at Trail Center would be constructed at new locations with larger footprints to raise the features above the water table to prevent potential flooding. At the two locations, primarily disturbed vegetation and wetland would be cleared and 770 CY and 200 CY of fill material placed resulting in a permanent disturbance of 0.27 acre for both absorption fields. The new absorption fields at Loop Road Education Center and Tamiami Ranger Station would use the existing absorption field locations with a larger footprint to raise the features above the water table to prevent potential flooding. Both locations have been previously disturbed. Excavation and placement of 150 CY of fill material at Tamiami Ranger Station and 390 CY of fill material at Loop Road Education Center would occur, resulting in permanent disturbance of 0.09 acre and 0.19 acre, respectively. After construction, the infrastructure would be maintained via mechanical mowing, with an approximate 10-ft buffer around the infrastructure.

### Wetland Mitigation

Of the 5.56 acres of permanent impact to vegetation under the Preferred alternative, roughly 0.826 acre is long-term permanent impact to identified wetlands. These permanent impacts are not just a reduction in size but can also be a permanent loss of locally important ecological functions and services provided by these wetlands.

Table 3 presents the permanent acreage impacts to identified wetlands along with their Uniform Mitigation Assessment Method (UMAM) score under post-project conditions. All of the wetlands impacted are moderate quality wetlands in terms of functions, except for Wetland N, which is categorized as having minimal functionality. While the majority of impacted wetlands would not see a decline in ecological function and services, some functional loss is anticipated in wetland areas with greater permanent impact. For instance, Wetland V shows a post-project functional score much lower than its pre-project score of 0.70 due to the larger extent of permanent impacts to undisturbed habitats within the assessment area from construction of the adsorption field.

NPS Procedural Manual 77-1 states that wetland compensation is required if adverse impacts on wetlands from a project totals 0.1 acre or more (NPS, 2016). To determine the number of mitigation bank credits or amount of regional off-site mitigation needed to offset impacts, the functional loss of each wetland impact assessment area is determined by calculating the change in overall UMAM score between pre- and post-project conditions multiplied by the acreage of permanent impact. The total number of credits required is the summation of the calculated functional loss for each impact assessment area.

**Table 3: Estimated Wetland Disturbance Areas**

Primary Area	Wetland Name	Impact Type	Effects to Wetlands	Post-Project UMAM Score	Total Area of Disturbance <sup>1</sup> (Acres)
Flamingo Area	Wetland L	Sewer and potable water pipelines	Minor, temporary effects due to trenching	0.700	0.401
Flamingo Area	Wetland M	Sewer and potable water pipelines	Minor, temporary effects due to trenching	0.700	0.212
Flamingo Area	Wetland N	Sewer pipelines	Minor, temporary effects due to trenching	0.400	0.008
Flamingo Area	Wetland S	Sewer and potable water pipelines	Minor, temporary effects due to trenching	0.700	0.864
Flamingo Area	Wetland T	Sewer and potable water pipelines	Minor, temporary effects due to trenching	0.700	0.052
Flamingo Area	Wetland U	Sewer pipelines	Minor, temporary effects due to trenching	0.700	0.084
Flamingo Area	Wetland V	Adsorption field	Moderate, permanent placement of fill	0.567	0.183
<b>Flamingo Area Total</b>					<b>1.804</b>
Shark Valley Area	Wetland J	Sewer and potable water pipelines	Minor, temporary effects due to trenching	0.633	0.213
Shark Valley Area	Wetland J	Adsorption field	Moderate, permanent placement of fill	0.633	0.157
Shark Valley Area	Wetland K	Potable water pipelines	Minor, temporary effects due to trenching	0.567	0.032
Shark Valley Area	Wetland K	Adsorption field	Moderate, permanent placement of fill	0.567	0.386
Shark Valley Area	Wetland K	Well house	Moderate, permanent placement of fill	0.567	0.080
<b>Shark Valley Area Total</b>					<b>0.868</b>
Main Entrance/Royal Palm Area	Wetland A	Sewer pipelines	Minor, temporary effects due to trenching	0.600	0.060
Main Entrance/Royal Palm Area	Wetland E	Sewer and potable water pipelines and fiber optic cable	Minor, temporary effects due to trenching	0.600	0.045
Main Entrance/Royal Palm Area	Wetland W	Sewer and potable water pipelines	Minor, temporary effects due to trenching	0.533	0.090
Main Entrance/Royal Palm Area	Wetland W	Adsorption field	Moderate, permanent placement of fill	0.533	0.009
<b>Main Entrance/Royal Palm Area Total</b>					<b>0.204</b>
Loop Road Area	Wetland H	Sewer and potable water pipelines	Minor, temporary effects due to trenching	0.533	0.031
Loop Road Area	Wetland H	Adsorption field	Moderate, permanent placement of fill	0.533	0.010
<b>Loop Road Area Total</b>					<b>0.041</b>
<b>Project Total Area of Disturbance</b>					<b>2.917</b>

<sup>1</sup>Total area includes the area of fill plus temporary surface disturbance from construction vehicles, equipment, and spoil pile storage.

It is anticipated that mitigation for wetland impacts under the Preferred alternative would be offset through compensatory mitigation within EVER based on the results of the preliminary UMAM scores for each impacted wetland. It is expected that there would be some modifications to these UMAM scores during regulatory agency review as the project progresses towards the permitting phase. The NPS is committed to mitigating wetland impacts such that a project results in no net loss of wetlands. With the implementation of compensatory mitigation to address permanent impacts to moderate quality wetlands, adverse impacts under the Preferred alternative would be negligible when considering the extent of wetland habitat across the Everglades ecosystem. These negligible impacts would also not result in a discernable adverse contribution when considering the larger trends to wetlands in the area. The Wetland and Floodplain Statement of Findings in Appendix E provides detailed information on wetland impacts, predicted post-project UMAM scores, and mitigation requirements.

### **Rare Plants**

Table 4 lists the preliminary effects determinations for all rare plants that may occur within the AOA. The Biological Assessment for the Project provides additional details on these plant species and the effect determination under the Preferred alternative (Anchor QEA, 2023c).

**Table 4: Effects Determination for Rare Plants That May Occur Within the AOA**

Species	Scientific Name	Preliminary Effects Determination Species	Preliminary Effects Determination Critical Habitat
Blodgett's silverbush	<i>Argythamnia blodgettii</i>	Not Likely to Adversely Affect	Likely to Adversely Affect
Florida prairie-clover	<i>Dalea carthagenensis</i> <i>var. floridana</i>	Not Likely to Adversely Affect	Likely to Adversely Affect
Cape Sable thoroughwort	<i>Chromolaena frustrata</i>	No Effect	No Effect
Everglades bully	<i>Sideroxylon reclinatum</i> <i>ssp. austrofloridense</i>	Likely to Adversely Affect	Likely to Adversely Affect
Florida bristle fern	<i>Trichomanes punctatum</i> ssp. <i>floridanum</i>	No Effect	Likely to Adversely Affect
Florida pineland crabgrass	<i>Digitaria pauciflora</i>	Likely to Adversely Affect	Likely to Adversely Affect
Pineland sandmat	<i>Euphorbia deltoidea</i> <i>ssp. pinetorum</i>	Likely to Adversely Affect	Likely to Adversely Affect

The Preferred alternative would have **no effect** on Cape Sable thoroughwort or Florida bristle fern, as work activities would occur in regularly maintained and/or previously disturbed areas where both species are not known to occur. Both Cape Sable thoroughwort habitat and Florida bristle fern habitat are limited to intact buttonwood hammocks and coastal hardwood hammocks.

The Preferred alternative **may affect but is not likely to adversely affect** Blodgett's silverbush and Florida prairie-clover. Both species are limited to pine rocklands, rockland hammocks,

coastal berms, and marl prairie (for Florida prairie-clover). While most work activities would occur in regularly maintained and/or previously disturbed areas, these species may be present and affected by the Preferred alternative. A pre-construction survey by NPS biological resources staff or other qualified staff for species presence would help avoid and minimize impacts.

A **likely to adversely affect** determination is anticipated under the Preferred alternative for Everglades bully, Florida pineland crabgrass, and pineland sandmat. Habitat for these three species is limited to intact pine rocklands, marl prairies, and along the ecotonal regions between these two habitat types, which are present in the AOA. While most work activities would occur in regularly maintained and/or previously disturbed areas, some natural vegetation where these species may be present would be disturbed or removed. Therefore, Everglades bully, Florida pineland crabgrass, and pineland sandmat are likely to be present and likely to be affected by the Preferred alternative. A pre-construction survey by NPS biological resources staff or other qualified staff would help avoid and minimize impacts.

The Preferred alternative would **likely adversely affect** proposed or designated critical habitat for Blodgett's silverbush, Florida prairie-clover, Everglades bully, Florida bristle fern, Florida pineland crabgrass, and pineland sandmat. This is due to direct or indirect impacts to the physical or biological features (PBF) necessary for these species' conservation where they occur. A **no effect** determination under the Preferred alternative on designated Cape Sable thoroughwort critical habitat is anticipated, as no direct or indirect impacts to PBF are planned or anticipated.

With most work occurring in previously disturbed areas, and with the implementation of mitigation measures, it is anticipated that effects to federally listed plant species can be avoided or minimized. Overall, the Preferred alternative should not result in a downward trend to these local populations.

## ***Cumulative Impacts***

### ***Impacts of Alternative A (No Action)***

Under the No Action alternative, vegetation, wetlands, rare plants, and soils would not be removed or filled. Only ongoing routine maintenance of existing infrastructure and adjacent vegetation would continue. However, use of septic systems at the end of their service life could risk system failure and some subsequent contamination of sensitive vegetation and wetland areas. Such impacts would be limited to relatively small areas of the larger Everglades ecosystem and, collectively, would likely be a negligible (barely perceptible) contribution to cumulatively adverse impacts on vegetation, wetlands, rare plants, and soils when considered with other past, present, and reasonably foreseeable future projects and action within and in the vicinity of the AOA (refer to Table 1).

### ***Impacts of Alternative B (Preferred)***

Nearly all of the sites in the Project AOA are areas that are already routinely maintained and/or disturbed. However, the Preferred alternative would have noticeable impacts on vegetation and some wetlands at West Lake, Shark Valley Tower, Royal Palm, and Long Pine Key Campground. Other past, present, and reasonably foreseeable future projects that have or



would likely have adverse or beneficial cumulative impacts on vegetation and wetlands at and in the vicinity of the AOA are listed in Table 1. Many of these construction- and development-related projects have or would potentially result in net losses of vegetation and wetlands; however, it is likely that such losses would be mitigated to some degree by federal and state requirements. Other projects and actions, such as CERP and CEPP, would have beneficial impacts on vegetation and wetlands by restoring hydrology to the Everglades ecosystem that mimics more historic patterns. Such beneficial impacts to the larger Everglades ecosystem may be enough to offset vegetation and wetland loss from other projects. Adverse impacts on vegetation and wetlands from the Preferred alternative would be noticeable, limited to relatively small areas, with mitigation proposed to offset wetland loss. Therefore, when considering the larger Everglades ecosystem, the Preferred alternative would have negligible contribution to cumulatively adverse impacts on vegetation, wetlands, rare plants, and soils when considered with other past, present, and reasonably foreseeable future projects and actions occurring at and in the vicinity of the AOA.

## **Wildlife and Species of Special Concern**

### ***Area of Analysis***

The AOA for wildlife and species of special concern includes the 13 sites that would be directly affected by the improvements and where construction would occur (project area limits), as well as a 5,000-ft buffer around the project area limits.

### ***Current and Expected Future Conditions of Affected Environment***

Trends for native species within EVER are mixed, with certain species improving (e.g., wood stork) and others declining or threatened by climate change (e.g., Cape Sable seaside sparrow). Habitat quality and quantity has diminished especially in compromised areas of the ridge, slough, and tree island landscapes (NPS, 2017). The abundance of tree islands has decreased by approximately 70 percent over the last 50 years, and wading bird populations remain far below historic levels. Nonnative species introduction, especially the Burmese python and tegu, are associated with declines in native mammal populations. Status of crocodiles within EVER has improved in recent years (NPS, 2017).

The AOA provides terrestrial and aquatic habitat to support an array wildlife. Mammals, such as white-tailed deer, bobcat, marsh rabbit, raccoon, and opossum, are commonly found throughout the AOA. In the Flamingo, Shark Valley, Main Entrance/Royal Palm, and Loop Road areas, reptiles, and amphibians such as turtles, frogs, crocodile, and alligator can be found on the banks of the canals and in the deepwater habitats. Fish are also present in the canals and deep-water habitat. Additionally, the AOA provides foraging, roosting, and breeding habitat for resident, wading, and migratory birds.

### **Federally Listed Species**

Wildlife species of special concern include federally listed species designated as threatened, endangered, proposed, or candidate by the USFWS and the National Marine Fisheries Service (NMFS) under the ESA. The Flamingo, Shark Valley, and Main Entrance/Royal Palm areas are within EVER, which provides habitat for several federally listed species and other wildlife. The Loop Road Area is mainly within the BICY, with a small portion in the northern area of

EVER. A preliminary species list was obtained from the NMFS website on December 21, 2022 (NMFS, 2022), and a preliminary USFWS species list was obtained from the IPaC website on December 21, 2022, (USFWS, 2022). Species of special concern known to occur or that may occur within the AOA, along with proposed or designated critical habitat are listed in Table 5. The Biological Assessment for this project provides more detail on each of these species of special concern (Anchor QEA, 2023c).

**Table 5: Federally Listed Wildlife Species and Critical Habitat that May Occur in the AOA**

Species	Scientific Name	NMFS or USFWS Listing Status	Primary Areas (per IPaC)	Critical Habitat (per IPaC)
<b>Fish</b>				
Smalltooth sawfish	<i>Pristis pectinate</i>	Endangered	May occur at Flamingo Area	Designated – includes Flamingo Area and West Lake
<b>Reptiles</b>				
American crocodile	<i>Crocodylus acutus</i>	Threatened	May occur at Flamingo Area	Designated – includes Flamingo Area and West Lake
Eastern indigo snake	<i>Drymarchon corais cooperi</i>	Threatened	May occur at all Project sites	Not designated
<b>Mammals</b>				
Florida bonneted bat	<i>Eumops floridanus</i>	Endangered	May occur at all Project sites	Proposed – includes Park Headquarters/Visitor Center, Pine Island Maintenance Center, Royal Palm Visitor Center, Hidden Lake Education Center, Long Pine Key Campground, and Dr. Bill Robertson and Daniel Beard Centers
Tricolored bat	<i>Perimyotis subflavus</i>	Proposed Endangered	May occur at all Project sites	Not designated
Florida panther	<i>Puma concolor coryi</i>	Threatened (SA)	May Occur at all Project sites	Not designated
West Indian manatee	<i>Trichechus manatus</i>	Threatened	May occur at Flamingo Area	Not designated
<b>Birds</b>				
Cape Sable seaside sparrow	<i>Ammodramus maritimus mirabilis</i>	Endangered	May occur at Main Entrance/Royal Palm Area	Designated – includes Park Headquarters/Visitor Center, Pine Island Maintenance Center, Royal Palm Visitor Center, Hidden Lake Education Center
Everglades snail kite	<i>Rostrhamus sociabilis plumbeus</i>	Endangered	May occur at Shark Valley and Loop Road areas	Designated – includes Tamiami Ranger Station and Shark Valley Tower and Visitor Center

Species	Scientific Name	NMFS or USFWS Listing Status	Primary Areas (per IPaC)	Critical Habitat (per IPaC)
Wood stork	<i>Mycteria americana</i>	Threatened, proposed for downlisting	May occur at all Project sites	Not designated
<b>Invertebrates</b>				
Bartram's scrub hairstreak butterfly	<i>Strymon acis bartrami</i>	Endangered	May occur at Main Entrance/Royal Palm Area	Designated – includes Long Pine Key Campground
Florida leafwing butterfly	<i>Anaea troglodyta floridalis</i>	Endangered	May occur at Main Entrance/Royal Palm Area	Designated – includes Long Pine Key Campground

### Essential Fish Habitat

The 1996 Sustainable Fisheries Act (Public Law 104-297) amended the Magnusen Stevens Act and requires federal agencies to consult with NMFS on activities that may adversely affect essential fish habitat (EFH). EFH is defined as “those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity” (16 *United States Code* 1802[10]). The Flamingo and West Lake areas include the Gulf of Mexico EFH for spiny lobster, reef fish species, coastal migratory pelagic species, shrimp species, and red drum, as well as highly migratory species EFH, which includes bonnethead shark, bull shark, spinner shark, black nose shark, Caribbean reef shark, nurse shark, lemon shark, sailfish, sandbar shark, great hammerhead shark, tiger shark, and blacktip shark (Anchor QEA, 2023c). These areas also include South Atlantic EFH for snapper/grouper and spiny lobster, as well as highly migratory species EFH, which includes tiger shark, bull shark, spinner shark, nurse shark, lemon shark, sailfish, sandbar shark, and great hammerhead shark (Anchor QEA, 2023c).

### Other Wildlife Species

Other species are state-listed by the State of Florida Fish and Wildlife Commission under Chapter 68A-27 of the Florida Administrative Code. State-listed species that occur or may occur in the AOA are listed in Table 6.

**Table 6: State-Listed Species that Occur or May Occur in the AOA**

Species	Scientific Name	State Listing Status
<b>Birds</b>		
American oystercatcher	<i>Haematopus palliatus</i>	Threatened
Black skimmer	<i>Rynchops niger</i>	Threatened
Burrowing owl	<i>Athene cunicularia</i>	Threatened
Least tern	<i>Sternula antillarum</i>	Threatened
Little blue heron	<i>Egretta caerulea</i>	Threatened
Reddish egret	<i>Egretta rufescens</i>	Threatened
Roseate spoonbill	<i>Platalea ajaja</i>	Threatened
Sandhill crane	<i>Grus canadensis</i>	Threatened
Snowy plover	<i>Charadrius nivosus</i>	Threatened

Species	Scientific Name	State Listing Status
Tricolored heron	<i>Egretta tricolor</i>	Threatened
White-crowned pigeon	<i>Patagioenas leucocephala</i>	Threatened
<b>Mammals</b>		
Big Cypress fox squirrel	<i>Sciurus niger avicennia</i>	Threatened
Everglades mink	<i>Neovision vison evergladensis</i>	Threatened
Sherman's short-tailed shrew	<i>Blarina carolinensis shermani</i>	Threatened
Southern Fox Squirrel	<i>Sciurus niger</i>	Species of Special Concern
<b>Reptiles</b>		
Florida pine snake	<i>Pituophis melanoleucus mugitus</i>	Threatened
Rim rock crowned snake	<i>Tantilla oolitica</i>	Threatened

### Future Trends

Future trends that could affect wildlife in EVER and the AOA include climate change and the continued spread of nonnative predator species. As previously noted, temperatures in EVER over the next 40+ years are anticipated to rise, all areas are projected to see an increase in annual extreme fire days, the annual number of drought months is anticipated to increase, and a decrease in annual precipitation is expected (Stanley Consultants, 2023). A 9.4-inch sea level rise by 2050 is also anticipated (Caffrey, 2018). These changes in climate conditions and increase in saltwater intrusion will have an impact on the existing Everglades ecosystem and the habitats species rely on. Nonnative predator species, such as Burmese python, will continue to impact wildlife populations in the park, particularly mammals.

### Environmental Consequences

#### Impacts of Alternative A (No Action)

Under the No Action alternative, the existing conditions within the AOA would remain the same. Only ongoing routine maintenance of existing infrastructure and adjacent vegetation would continue. No ground disturbance in natural areas, including wetlands and other suitable habitat, would occur; however, use of septic systems at the end of their service life could risk system failure with some contamination of the sensitive vegetation and wetland areas in the AOA, as well as adjacent surface waters. These impacts may be perceptible and measurable, with primarily affects to the local wildlife species and habitats that occur near this infrastructure. Therefore, minor, long-term adverse impacts to species of special concern and other wildlife may be anticipated. When considering overall trends to wildlife and wildlife habitat, these impacts would have a negligible (barely perceptible) contribution.

#### Impacts of Alternative B (Preferred)

The Preferred alternative would include ground disturbance, through excavation for foundation and trenching, placement of fill within wetlands, and some vegetation removal. The estimated affected acreage is listed below.

- Flamingo Area – Approximately 19.62 acres of habitat would be temporarily impacted during construction, while the Preferred alternative would have long-term adverse impacts on approximately 1.41 acres of potential habitat.

- Shark Valley Area – Approximately 1.71 acres of potential habitat would be temporarily impacted during construction, while the Preferred alternative would have long-term adverse impacts on approximately 0.79 acre of potential habitat.
- Main Entrance/Royal Palm Area – Approximately 9.45 acres of potential habitat would be temporarily impacted during construction, while the Preferred alternative would have long-term adverse impacts on 2.74 acres of potential habitat.
- Loop Road Area – Approximately 1.36 acres of potential habitat would be temporarily impacted during construction, while the Preferred alternative would have long-term adverse impacts on approximately 0.62 acre of potential habitat.

Overall, 5.56 acres of long-term impact to potential wildlife habitat would occur under the Preferred alternative, with most of this permanent impact occurring in previously disturbed areas. With over one million acres of existing suitable habitat within the Everglades ecosystem, the permanent disturbance of 5.56 acres is considered minor and adverse. Once construction is complete, disturbed areas not hardscaped, would be allowed to naturally reestablish. Reseeding would occur on absorption fields and other areas if needed, and as required under specific permits. Overall, when considering the larger trends to wildlife and wildlife habitat, these permanent impacts would have a negligible (barely perceptible) contribution.

The following provides additional impact analysis on federally listed species, EFH, and other wildlife species.

#### Federally Listed Species

For federally listed species that may occur in the AOA, the Preferred alternative would result in temporary effects connected to construction-related noise and potential increased turbidity and contaminant levels in stormwater runoff, and more permanent effects from vegetation loss. The preliminary effects determinations for federally listed species that may occur in the AOA, and for designated or proposed critical habitat are listed in Table 7.

**Table 7: Effects Determination for Federally Listed Species That May Occur in the AOA**

Species	Scientific Name	Preliminary Effects Determination Species	Preliminary Effects Determination Critical Habitat
Smalltooth sawfish	<i>Pristis pectinate</i>	May be affected, not likely to be adversely affected	May be affected, not likely to be adversely affected
American crocodile	<i>Crocodylus acutus</i>	May be affected, not likely to be adversely affected	May be affected, not likely to be adversely affected
Eastern indigo snake	<i>Dymarchon corais cooperi</i>	May be affected, not likely to be adversely affected	No Effect (not designated)
Florida panther	<i>Eumops floridanus</i>	May be affected, not likely to be adversely affected	No Effect (not designated)

Species	Scientific Name	Preliminary Effects Determination Species	Preliminary Effects Determination Critical Habitat
West Indian manatee	<i>Trichechus manatus</i>	May be affected, not likely to be adversely affected	No Effect (not designated)
Cape Sable seaside sparrow	<i>Ammodramus maritimus mirabilis</i>	May be affected, not likely to be adversely affected	May be affected, not likely to be adversely affected
Everglades snail kite	<i>Rostrhamus sociabilis plumbeus</i>	May be affected, not likely to be adversely affected	May be affected, not likely to be adversely affected
Wood stork	<i>Mycteria americana</i>	May be affected, not likely to be adversely affected	No Effect (not designated)
Florida bonneted bat	<i>Eumops floridanus</i>	Likely to be adversely affected	Likely to be adversely affected (Proposed)
Tricolored bat (proposed)	<i>Perimyotis subflavus</i>	Likely to be adversely affected	No Effect (Not designated)
Bartram's scrub hairstreak butterfly	<i>Strymon acis bartrami</i>	Likely to be adversely affected	Likely to be adversely affected
Florida leafwing butterfly	<i>Anaea troglodyta floralis</i>	Likely to be adversely affected	Likely to be adversely affected

The following sections briefly describe the rationale for the effect determination for each species, and the effect determination on designated or proposed critical habitat, as applicable. Mitigation measures (Appendix B) would be implemented to reduce potential effects. Detailed information on these effect determinations and proposed mitigation are provided in the Project Biological Assessment (Anchor QEA, 2023c). Concurrence from USFWS on these effect determinations would occur during the Section 7 consultation process.

### *Smalltooth Sawfish*

Potential short-term effects on the smalltooth sawfish would include construction-related increased turbidity and potential contaminant levels in stormwater runoff from the construction areas. Therefore, the Preferred alternative **may affect, but is not likely to adversely affect** the smalltooth sawfish or its designated critical habitat.

### *American Crocodile*

Effects on the American crocodile would be short-term from construction ground-disturbing activities and increased turbidity and contamination in stormwater runoff. Noise would not have an effect on the American crocodile because elevated noise would occur only during construction and in areas with already elevated noise levels above ambient levels (Anchor QEA, 2023c). Overall, the Preferred alternative **may affect, but is not likely to adversely affect** the American crocodile or its designated critical habitat.

### *Eastern Indigo Snake*

Effects on the eastern indigo snake would be short-term from construction, ground-disturbing activities, and increased turbidity and contamination in stormwater runoff. Elevated noise would occur only during construction and in areas with already elevated noise levels above ambient levels (Anchor QEA, 2023c). Construction would occur in areas that are routinely maintained and/or previously disturbed, not in natural preferred habitat (to be confirmed by pre-construction surveys). Therefore, the project **may affect, but is not likely to adversely affect** the eastern indigo snake.

### *Florida Bonneted Bat*

Potential effects on the Florida bonneted bat would be short-term during daytime construction activities, affecting the nocturnal bat's daytime bat roosts, if present. Noise would not have an effect on the Florida bonneted bat, because construction would occur in areas that already have elevated noise levels above background (Anchor QEA, 2023c). With potential impacts on daytime roosting, the Preferred alternative is **likely to adversely affect** the Florida bonneted bat. No long-term adverse effects are anticipated on the Florida bonneted bat designated critical habitat; however, impacts to undisturbed suitable habitat would occur at Long Pine Key campground, where 0.7 acre would be impacted with the construction of the new absorption field. Therefore, critical habitat would **likely be adversely affected**.

### *Tricolored Bat*

Potential effects on the tricolored bat would be short-term during daytime construction activities, mainly affecting the nocturnal bat's daytime bat roosts, if present. Elevated noise levels during construction (short-term) may potentially affect the tricolored bat (Anchor QEA, 2023c). Due to potential short-term effects on daytime roosting, the Preferred alternative is **likely to adversely affect** the tricolored bat. No long-term adverse impacts on the tricolored bat are anticipated.

### *Florida Panther*

Effects on the Florida panther would be short-term during construction activities. Construction would occur in areas that are regularly maintained and/or previously disturbed areas, and the Florida panther would not likely be present in the construction areas. Noise would not have an effect on the Florida panther, because construction would occur in areas that already have elevated noise levels above background (Anchor QEA, 2023c). Therefore, the Preferred alternative **may affect, but is not likely to adversely affect** the Florida panther.

### *West Indian Manatee*

Potential effects on the West Indian manatee would be short-term during construction activities causing elevated turbidity and contamination levels in stormwater runoff. Noise would not have an effect on the West Indian manatee, because construction would occur in areas that already have elevated noise levels above background (Anchor QEA, 2023c). In addition, in-water work would not occur. Therefore, the Preferred alternative **may affect, but is not likely to adversely affect** the West Indian manatee.



### *Cape Sable Seaside Sparrow*

The probability of presence of the Cape Sable seaside sparrow in the AOA is expected to be low. Potential effects would be short-term during construction activities that would cause some natural vegetation to be disturbed or removed. Construction would occur in areas already routinely maintained and/or developed. Noise would not have an effect on the Cape Sable seaside sparrow, because construction would occur in areas that already have elevated noise levels above background (Anchor QEA, 2023c). Therefore, the Preferred alternative **may affect but is not likely to adversely affect** the Cape Sable seaside sparrow. Negligible long-term adverse effects on Cape Sable seaside sparrow designated critical habitat would result from the Preferred alternative. Therefore, the Preferred alternative **may affect, but is not likely to adversely affect** Cape Sable seaside sparrow designated critical habitat.

### *Everglades Snail Kite*

The probability of presence of the Everglades snail kite in the AOA is expected to be low. Potential effects would be short-term during construction-related disturbance or removal of natural vegetation used for nesting and foraging. Construction would occur in areas that are already routinely maintained and/or developed. Noise would not have an effect on the Everglades snail kite, because construction would occur in areas that already have elevated noise levels above background (Anchor QEA, 2023c). Therefore, the Preferred alternative **may affect but is not likely to adversely affect** the Everglades snail kite. Negligible long-term adverse effects to designated critical habitat would result from the Preferred alternative. Therefore, the Preferred alternative **may affect but is not likely to adversely affect** Everglades snail kite designated critical habitat.

### *Wood Stork*

Potential effects on the wood stork would be short-term during construction-related disturbance or removal of natural vegetation used for nesting and foraging. Construction would occur in areas that are already routinely maintained and/or developed. Noise would not have an effect on the wood stork, because construction would occur in areas that already have elevated noise levels above background (Anchor QEA, 2023c). Therefore, the Preferred alternative **may affect but is not likely to adversely affect** the wood stork.

### *Bartram's Scrub Hairstreak Butterfly*

The probability of presence of the Bartram's scrub hairstreak butterfly in the AOA is expected to be low. Noise would not have an effect on Bartram's scrub hairstreak butterfly, because construction would occur in areas that already have elevated noise levels above background (Anchor QEA, 2023c). Potential effects on the Bartram's scrub hairstreak butterfly would be short-term as a result of construction. Construction would occur in areas that are already routinely maintained and/or developed where the Bartram's scrub hairstreak butterfly's host plant (pineland croton) is absent; however, some habitat would be impacted (0.7 acre), with some natural vegetation used for foraging and reproduction being disturbed or removed. Therefore, the Preferred alternative **is likely to adversely affect** Bartram's scrub hairstreak butterfly. Minor, long-term impacts to undisturbed suitable habitat may occur. Therefore, Bartram's scrub hairstreak butterfly critical habitat would **likely be adversely affected** (Anchor QEA, 2023c).



### *Florida Leafwing Butterfly*

The probability of presence of the Florida leafwing butterfly in the AOA is expected to be low. Noise would not have an effect on Florida leafwing butterfly, because construction would occur in areas that already have elevated noise levels above background (Anchor QEA, 2023c). Construction would occur in areas that are already routinely maintained and/or developed where the Florida leafwing butterfly's host plant (pineland croton) is absent. However, some habitat (0.7 acre) would be impacted, with some natural vegetation used for foraging and reproduction being disturbed or removed. Therefore, the project **is likely to adversely affect** the Florida leafwing butterfly. Minor, short-term impacts to undisturbed suitable habitat may occur; therefore, Florida leafwing butterfly critical habitat would **likely be adversely affected** (Anchor QEA, 2023c).

### Essential Fish Habitat

The Preferred alternative has the potential to result in accidental discharge of chemical contaminants, construction and demolition debris, and/or sediment loads to surface waters adjacent to the AOA during construction. Improvements that include ground-disturbing activities may also result in erosion of sediment that could potentially be introduced to adjacent waterways and increase turbidity. These impacts would be short-term. No long-term or permanent effects to EFH are planned or anticipated as a result of the Preferred alternative. Therefore, the Preferred alternative would **not adversely affect** EFH (Anchor QEA, 2023c).

### Other Wildlife Species

Other wildlife species and their habitat would be similarly affected as the federally listed species described above, with generally short-term impacts from noise and ground disturbing activities during construction. The habitats primarily include regularly maintained and previously disturbed area, some wetland habitat, and native upland habitat. The permanent loss of some smaller individual species that may be occupying their burrows at the time of construction or are less mobile and unable to escape the disturbance, may be anticipated. These losses should not result in a downward trend to local populations. Construction activities may also affect individuals through noise, vibration, human activity, and construction equipment. These impacts would be short-term and cease once construction is complete.

## *Cumulative Impacts*

### Impacts of Alternative A (No Action)

Under the No Action alternative, vegetation and suitable wildlife habitat would not be disturbed, removed, or filled. Only ongoing routine maintenance of existing infrastructure and adjacent vegetation would continue. However, use of septic systems at the end of their service life could risk system failure and some contamination of the sensitive vegetation and wetland areas in the AOA, as well as adjacent surface waters. Such impacts would be limited to relatively small areas of the larger Everglades ecosystem and, collectively, would likely be a negligible contribution to cumulatively adverse impacts on wildlife and species of concern when considered with other past, present, and reasonably foreseeable future projects and action within and in the vicinity of the AOA (Refer to Table 1).

### ***Impacts of Alternative B (Preferred)***

Past, present, and reasonably foreseeable future projects that have or would likely have adverse or beneficial cumulative impacts on wildlife and wildlife habitat at and in the vicinity of the AOA are listed in Table 1. Many of these construction- and development-related projects have or would potentially result in net losses of wildlife habitat or some habitat degradation; however, it is likely that such impacts would be mitigated to some degree by federal and state requirements. Other projects and actions, such as CERP and CEPP, have focused on and will continue to focus on restoration efforts to the larger Everglades ecosystem through large-scale hydrologic alternations that mimic more historic patterns. Such beneficial impacts to the larger Everglades ecosystem may be enough to offset some of the habitat loss and degradation from other projects.

Nearly all of the sites in the Project AOA are already routinely maintained and/or disturbed. However, the Preferred alternative would have noticeable, long-term adverse impacts on wildlife habitat primarily at West Lake, Shark Valley Tower, Royal Palm, and Long Pine Key Campground by contributing to the historic practice of development and removal of potential habitat for species, particularly Bartram's shrub hairstreak butterfly, Florida leafwing butterfly, and Florida bonneted bat. These impacts would be limited to relatively small areas, with mitigation proposed to offset habitat loss and potential effects to wildlife species. Therefore, when considering the larger Everglades ecosystem, the Preferred alternative would have a minor contribution to cumulatively adverse impacts on wildlife and species of concern when considered with other past, present, and reasonably foreseeable future projects and actions occurring at and in the vicinity of the AOA.

## **Cultural and Historic Resources**

### ***Area of Analysis***

The AOA for cultural and historic resources includes the 13 sites directly affected by the improvements and where construction would occur (project area limits), as well as a 550-ft buffer around the project area limits. Under Section 106 of the NHPA, this analysis area is referred to as the Area of Potential Effects (APE) for cultural and historic resources and is established by the NPS and Section 106 consulting parties. The APE includes "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR 800.16[d]) (SEARCH, 2023a).

### ***Current and Expected Future Conditions of Affected Environment***

EVER contains a wealth of archeological and historical resources spanning human history from the initial settlement by Indigenous peoples to more recent use of the park's resources in the twentieth century (NPS, 2017). EVER was authorized by Congress in 1934 and officially dedicated in 1947. The establishment of EVER as a national park was driven by the destruction caused from years of drainage in South Florida. Drainage activities between the 1880s and 1940s lowered water levels across the Everglades by 3 to 9 ft, which led to various environmental concerns and excessively dry land. Numerous locks, dikes, pumps, and canals were features of the early twentieth-century drainage efforts in South Florida (SEARCH, 2023a).

In the 1960s, plans for large construction projects, including proposals for the world's largest jetport within the heart of the Greater Everglades of South Florida, were unveiled. The development threat spurred efforts to protect the region, resulting in the establishment of Big Cypress National Preserve in 1974. Big Cypress was the nation's first national preserve (SEARCH, 2023a).

In 1965, the NPS introduced Mission 66, a program aimed at expanding visitor services and modernizing park facilities. EVER was chosen as one of the pilot parks for the Mission 66 initiative. Today, several Mission 66 projects still stand within EVER (NPS, 2021).

A review of files on past cultural resource surveys and data obtained from the NPS Cultural Resources Information System, Florida Master Site File (FMSF), and documents provided by EVER was conducted to identify previously recorded resources within the area APEs (SEARCH, 2023a). A Phase IB intensive archaeological investigation was also conducted from September to October 2023 within the 13 project area limits. The following provides an overview of previously recorded resources identified during this data review and the results of the 2023 field investigation. Resources include historic resources and archaeological sites (any material remains of human life or activities that are at least 100 years of age, and that are of archaeological interest). Additional information on these resources is provided in Appendix F.

### Flamingo Area

The records review identified two archaeological sites within the Flamingo Area APE. One of these resources (Flamingo Settler Houses) is eligible for listing on the National Register of Historic Places (NRHP). The review of previously recorded resources also identified four historic resource groups within the Flamingo APE. According to FMSF, these resource groups are eligible for NRHP listing and include the Old Ingraham Highway and Canal System, the Buttonwood Canal, Old Ingraham Highway, and associated buildings/properties of the Flamingo Mission 66 Developed Area. Fifteen architectural history resources were also identified within the Flamingo APE. Fourteen of these architectural history resources are eligible for NRHP listing, and one has insufficient information to determine eligibility (SEARCH, 2023a). No additional historic resources or archaeological sites were identified and recorded during the 2023 field investigation (SEARCH, 2023b).

### Shark Valley Area

No archaeological sites were identified within the Shark Valley Area APE during the records review. Five historic resources are found within the APE. According to FMSF, these include two NRHP eligible resources (Shark Valley Lookout Tower and Shark Valley Comfort Station) and the unevaluated Shark Valley Developed Area Historic District. No additional historic resources or archaeological sites were identified and recorded during the 2023 field investigation (SEARCH, 2023b).

### Main Entrance/Royal Palm Area

The records review identified two archaeological sites within the APE (SEARCH, 2023a). During the 2023 field investigation, both archaeological sites within the APE were revisited. Site 8DA00026/EVER 155 was determined to be significant for its potential to yield information important in prehistory and was determined eligible for listing on the NRHP. The

second site (Site 8DA00027) was previously reported as destroyed and was not relocated (SEARCH, 2023b).

Seven historic resources are found within the APE and include one NRHP-listed resource group (Nike Missile Site HM-69) and four historic resource groups eligible for NRHP listing (Long Pine Key Campground Historic District, Old Ingraham Highway and Canal System, Old Ingraham Highway, and Pine Island Administrative Housing Area Historic District). These resource groups extend beyond the APE (SEARCH, 2023a). No additional historic resources were identified and recorded during the 2023 field investigation (SEARCH, 2023b).

### Loop Road Area

The records review identified no archaeological sites within the APE. Six historic resources are found in the APE. Five of these resources are eligible for NRHP listing and include Tamiami Canal/Old Tamiami Canal, Tamiami Trail, L-67 Canal Extension/Road/Old Tamiami Trail, S-14 Culvert, and the Florida Department of Transportation Bridge 870030 (SEARCH, 2023a). During the 2023 field investigation, one archaeological occurrence (AO-01) was newly identified at the Loop Road Education Center. AO-01 was determined not eligible for NRHP-listing (SEARCH, 2023b).

### Future Trends

From a trend perspective, natural and environmental forces pose a threat to EVER's cultural resources. There are many areas of significant cultural resources that are in low-lying areas that could be impacted by overland flooding, shoreline erosion, and storm surge. Sea level rise, hurricanes, and future shifts in weather patterns may also impact the park's ability to preserve some of these cultural and historic resources.

### Environmental Consequences

NHPA Section 106 review includes a process by which the effects to cultural and historic resources listed or eligible for listing within the NRHP may be determined by levels. Specifically, three kinds of effects are possible:

- *No Historic Properties Affected:* This determination usually means that there are no cultural or historic resources within the APE. It may also mean there would be no direct or indirect effects to any cultural or historic resources identified in the APE.
- *No Adverse Effect:* This determination means that there would be an effect on the cultural or historic resource, but the direct or indirect effect does not meet the criteria of "Adverse."
- *Adverse Effect:* This determination means the effect on the cultural or historic resource may, according to 36 CFR 800.5(a)(1), "alter, directly or indirectly, any of the characteristics that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association..." Adverse effects include: demolition, alteration, removal of a property from its original setting, change in use, neglect or abandonment, and introduction of visual, atmospheric or audible elements.

### Impacts of Alternative A (No Action)

Under the No Action alternative, existing conditions within the APE would remain the same. Only ongoing routine maintenance of existing infrastructure and adjacent vegetation would continue. Therefore, no direct or indirect impacts to any cultural or historic resources would occur.

### Impacts of Alternative B (Preferred)

#### Archaeological Sites

The Preferred alternative would either avoid known, documented archeological sites or would not impact the aspects of integrity for eligible sites. Therefore, the Preferred alternative would have **no adverse effect** to known archaeological sites.

Although no impacts to the archaeological sites are expected, upgrading and replacing the potable water distribution system and wastewater collection system would involve various equipment and certain ground-disturbing activities, such as excavations for pipelines and foundations. Such activities have the potential to uncover undocumented archeological resources. Therefore, EVER would ensure that an archaeological monitor meeting the Secretary of the Interior's Professional Qualification Standards is present for all initial ground-disturbing activities at designated areas.

#### Historic Resources

Under the Preferred alternative, three historic structures would be demolished to make way for the proposed potable water and wastewater improvements. These include the Royal Palm transformer building/well house (non-contributing to the resource group), the Tamiami Ranger Station well house (non-contributing to the resource group), and the Shark Valley Tower utility area/well house (contributing to the resource group). Therefore, the Preferred alternative is anticipated to have an **adverse effect** on historic resources. Demolition and reuse of the Shark Valley Tower utility area/well house footprint "in kind" is proposed under the Preferred alternative, and effects would be less impactful to the overall cultural landscape.

Additionally, several structures, including the existing Flamingo WWTP; the WWTP, well house, and storage tank at the Pine Island Residential/Maintenance project area limits; the well house at the Ernest F. Coe Visitor Center/Headquarters; the well house at the Daniel Beard Center; the well house at the Shark Valley Administration and Visitor Center; and the well house at Trail Center would be abandoned in place and may be demolished at a later date under a separate project. NRHP eligibility of these abandoned structures would be determined as part of the NHPA Section 106 consultation process.

Indirect effects to cultural or historic resources caused by environmental forces have the potential to be adverse through neglect or abandonment. Abandoning any eligible structures in place would mean they are subject to degradation by neglect, which would constitute a cumulative **adverse effect**.

As part of the Section 106 consultation process, a memorandum of agreement (MOA) would be developed through consultation with Florida State Historic Preservation Office (SHPO) and

Tribal Partners to best mitigate the proposed demolition and the effects of neglected or abandoned eligible historic resources.

### ***Cumulative Impacts***

#### ***Impacts of Alternative A (No Action)***

The No Action alternative would have no direct impacts to cultural and historic resources. Therefore, this alternative would have no potential to contribute to cumulative impacts when considered with past, present, and reasonably foreseeable future projects and actions occurring at and in the vicinity of the AOA.

#### ***Impacts of Alternative B (Preferred)***

Past, present, and reasonably foreseeable future projects that have or would likely have cumulative impacts on cultural and historic resources at and in the vicinity of the APE are listed in Table 1. Many of these construction- and development-related projects have or could potentially result in the disturbance of undocumented archaeological sites and modifications/adverse impacts to historic resources (i.e., buildings and structures).

The Preferred alternative would not adversely impact known archaeological sites within the Project APE; however, potential disturbance of undocumented sites could occur. The Preferred alternative would also demolish or abandon historic structures potentially eligible for listing on the NRHP. When the potential impacts of the Preferred alternative are combined with the impacts of other past, present, and reasonably foreseeable future actions, an overall adverse cumulative impact would result. For many of these projects, adverse impacts would be addressed through consultation with the Florida SHPO and Tribal Partners to identify, minimize, or mitigate impacts to cultural and historic resources.

## **Hydrology and Water Quality**

### ***Area of Analysis***

The AOA for hydrology and water quality includes the 13 sites directly affected by the improvements and where construction would occur (project area limits), and the adjacent natural habitat that may receive runoff from the project area limits.

### ***Current and Expected Future Conditions of Affected Environment***

Past and current activities within the greater Everglades ecosystem, including drainage and engineering works, have greatly altered the timing, quantity, and distribution of water into EVER. The total volume of water delivered to the park has historically been less than half of what is desirable given historical patterns and the needs of habitats within the park. EVER is also more drought-prone than the rest of the greater ecosystem, which has resulted in deficient water quantity, particularly during dry periods (NPS, 2017). Saltwater intrusion is a concern, with expansion into areas such as the southern Taylor Slough causing coastal wetland “white zones” with low plant abundance and productivity. Higher nutrient levels from point source discharge into the park, including through the South Florida Water Management District S-12 water control structures, has also degraded water quality (NPS, 2017).

Waters throughout EVER are currently designated as Outstanding Florida Waters (designated in 1978). These waters provide the predominate water recharge for the Biscayne Aquifer, which serves as a drinking water source for most of South Florida, including the Miccosukee Reserve Area. As such, no degradation of surface water quality is permitted to these waters.

Stormwater generated at the park primarily percolates into the ground through permeable surfaces or sheet flows from paved or otherwise impermeable areas into conveyances, such as vegetated swales or canals, or into adjacent wetlands.

### Flamingo Area

The Flamingo Area AOA is within the Cape Sable and Taylor Slough Coastal watersheds (Anchor QEA, 2023b). Important surface waters within the Flamingo area AOA include the Flamingo Canal and Marina, Florida Bay, and West Lake. Geotechnical survey of the Flamingo Area AOA identified groundwater at a depth of 3.1 to 4.5 ft below the ground surface (bgs) (Terracon, 2023a).

### Shark Valley Area

The Shark Valley AOA is within the Everglades National Park/Shark River Slough watershed (Anchor QEA, 2023b). Important surface waters within the Shark Valley AOA include the Shark River Slough and Tamiami Canal. Geotechnical survey of the Shark Valley AOA identified groundwater at a depth of 1.6 ft bgs at the Shark Valley Tower to 3.3 ft bgs at the Visitor Center (Terracon, 2023b). Currently, the Entrance Road, the Administration Complex, and the southern end of Tram Road at the Shark Valley Tower are in low-elevation areas and experience periodic flooding.

### Main Entrance/Royal Palm Area

The Taylor Slough watershed is the primary watershed for the Main Entrance/Royal Palm AOA (Anchor QEA, 2023b). Important surface waters within the Main Entrance/Royal Palm AOA include the Taylor Slough, Hidden Lake, Long Pine Key Lake, two small freshwater ponds at the Visitor Center/Headquarters and Pine Island Residential/Maintenance area, and Anhinga Pond at Royal Palm. Geotechnical survey of the Main Entrance/Royal Palm AOA identified groundwater at a depth of 1.8 to 4.2 ft bgs (Terracon, 2023c; Terracon, 2023d).

### Loop Road Area

The East Collier watershed and the greater Everglades National Park watershed are the primary watersheds in the Loop Road AOA (Anchor QEA, 2023b). Important surface waters within the Loop Road AOA include the freshwater pond at Trail Center and Tamiami Canal and its various sub canals. Geotechnical survey of the Loop Road AOA identified groundwater at a depth of 1.8 to 2.1 ft bgs (Terracon, 2023e).

### Future Trends

Future trends that could affect hydrology and water quality in EVER and the AOA include climate change, operating and maintaining facilities within EVER, continued development surrounding EVER, and implementation of CERP. As previously noted, temperatures in EVER over the next 40+ years are anticipated to rise, all areas are projected to see an increase in

annual extreme fire days, the annual number of drought months is anticipated to increase, and a decrease in annual precipitation is expected (Stanley Consultants, 2023). A 9.4-inch sea level rise by 2050 is also anticipated (Caffrey, 2018); however, sea-level rise is already evident in estuarine and freshwater wetland gauges (NPS, 2017). Continued development around EVER and a predicted increase in the number of drought months will dictate regional water management decisions, potentially augmenting drought conditions in EVER (NPS, 2017). Additional development adjacent to EVER and an increase of extreme fire days may add to current water quality issues through urban and agricultural runoff and increased sediment in burn areas. The restoration efforts through the CERP could alleviate some of these trends with the predicted addition of approximately 370,000 acre-ft of water redistributed south to the Everglades. Overall, these changes will have an impact on existing EVER hydrology and water quality.

## ***Environmental Consequences***

### ***Impacts of Alternative A (No Action)***

Under the No Action alternative, no improvements would be implemented, groundwater use would remain at an approximate current level, impervious surfaces would remain the same, and no considerable long-term change in the current hydrology would be anticipated. However, there likely would be an adverse impact on water quality resulting from failing water and wastewater systems.

Wastewater from Flamingo Area facilities and from the Visitor Center/Headquarters and Pine Island Residential/Maintenance area is collected through a combination of gravity sanitary sewers and sewage lift stations and conveyed to WWTPs. For all other sites within the Shark Valley, Main Entrance/Royal Palm, and Loop Road areas, wastewater is collected via septic tanks and wastewater absorption fields. Many of these wastewater collection systems are deteriorating or at capacity and at the end of their service life. Under the No Action alternative, the worn network of buried pipes and equipment used to convey wastewater would continue to require emergency repairs to address leaks and failures, and the use of septic systems at the end of their service life risks system failure and potential contamination to adjacent groundwater, surface water, and the sensitive ecosystem. These impacts may be perceptible and measurable but would be localized. With the vast amount of surface water and high groundwater found throughout the Everglades ecosystem, the No Action alternative would result in minor, short-term, and long-term adverse impacts. When considering overall trends to hydrology and water quality in the area, these impacts would have a negligible (barely perceptible) contribution.

### ***Impacts of Alternative B (Preferred)***

During construction, there may be short-term adverse impacts on water quality that could be a direct result of ground disturbance activities, as well as potential oil/fuel leaks from equipment. These activities may temporarily contribute to turbid stormwater runoff and an increase in contaminants in adjacent surface waters, groundwater, or wetlands. To avoid and reduce such impacts an Erosion and Sediment Control Plan and Stormwater Pollution Prevention Plan (SWPPP) would be developed and implemented under the Preferred alternative to comply with current FDEP National Pollutant Discharge Elimination System requirements, and Construction General Permit coverage would be obtained. The SWPPP would be developed to



address all stormwater management BMPs. Additionally, appropriate measures would be employed to prevent or control spills of fuels, lubricants, or other contaminants from entering waterways or wetlands.

Following construction, continued use of groundwater at approximate current levels is expected. This is not anticipated to adversely impact hydrology at each of the sites. Additionally, the Preferred alternative would upgrade and replace the deteriorating wastewater systems, alleviating flood concerns and reducing potential long-term contamination of localized surface and groundwater resources. Construction of a new WWTP and expansion of the WTP in the Flamingo Area would include addition of impervious and hardscape surfaces (1.0 acre and 0.07 acre, respectively). New impervious and hardscape surfaces would also be added with the new WWTP and new well houses at several sites in the Main Entrance/Royal Palm Area (0.88 acres); the new, raised well house in the same location at the Shark Valley Tower (less than 0.1 acre); and with the newly located well house at Trail Center in the Loop Road Area (0.07 acre). This overall increase in impervious surface (2.12 acres) is negligible, as this runoff contribution would be spread across the Everglades at various sites and would not alter current hydrology in the larger Everglades ecosystem. With groundwater use continued at approximate current levels and provided upgrades to the deteriorating system, the Preferred alternative is expected to have long-term, beneficial impacts on hydrology and water quality. Additionally, this alternative may help mitigation possible future trends to hydrology and water quality in the area, by identifying and reducing the potential for water quality impacts and by developing more efficient water and wastewater systems to address predicted changes to groundwater and hydrology.

## ***Cumulative Impacts***

### ***Impacts of Alternative A (No Action)***

The No Action alternative would have no long-term impacts on existing hydrology. However, this alternative would increase a risk to water quality, as septic systems at the end of their service life are not replaced and could potentially fail. This would have incremental, but barely perceptible long-term impacts on water quality in the AOA, as these potential failures would be localized and spread across the Everglades. None of the other past, present, or reasonably foreseeable future projects addressed in Table 1 of this EA would result in long-term sedimentation and erosion of exposed soils, as land disturbed during construction activities would be developed or otherwise revegetated or restored to a pre-project condition following the completion of land-disturbing activities. Therefore, when considered with these projects, the No Action Alternative would not contribute to cumulative adverse impacts on water quality at or in the vicinity of the AOA.

### ***Impacts of Alternative B (Preferred)***

The Preferred alternative is not anticipated to adversely impact existing hydrology, but includes the addition of impervious and hardscape surfaces, which would create a negligible increase in stormwater runoff. This alternative would also upgrade and replace wastewater systems, preventing failing systems from contaminating surface and groundwater resources. Past, present, and reasonably foreseeable future projects that have or would likely have adverse or beneficial cumulative impacts on hydrology and water quality at and in the vicinity of the AOA are listed in Table 1. Negligible long-term adverse impacts to water quantity are

anticipated for those projects that have or propose facility developments that involve an increase in water use, as continued use of groundwater at approximate current levels is expected. Many of these construction- and development-related projects have or would potentially increase impervious surfaces and stormwater runoff, negatively contributing to water quality. However, none of these projects would result in long-term sedimentation and erosion of exposed soils, because land disturbed during construction activities would be developed or otherwise revegetated or restored to a pre-project condition following the completion of land-disturbing activities. Considering that the Preferred alternative is spread across the Everglades at various sites and would upgrade systems to reduce potential failures, this alternative would have a negligible contribution to cumulatively adverse impacts on hydrology and water quality considered with other past, present, and reasonably foreseeable future projects and actions occurring at and in the vicinity of the AOA.

## Floodplains

### *Area of Analysis*

The AOA for floodplains includes the 13 sites that would be directly affected by improvements and where construction would occur (project area limits) and the area adjacent to the project area limits that could be affected by altered flood elevations.

### *Current and Expected Future Conditions of Affected Environment*

The AOA is in an area where historically, freshwater flowed from the Kissimmee River in central Florida to Florida Bay. Beginning in the 1800s, the greater Everglades ecosystem began to be developed for agricultural, residential, and commercial use, driving the desire to drain or fill wetlands and build canals, roads, and buildings, which displaced native habitat and disrupted historical water flows (NPS, 2023d). In 1948 Congress authorized the Central and Southern Florida Flood Control Project comprising water management infrastructure that drained half of the original Everglades. By the 1960s there was continued effort to control the natural ecosystem, but there was a shift in the development focus toward conservation with the establishment of Biscayne National Park (1968) and Big Cypress National Preserve (1974). Beginning in the 1990s, a different viewpoint evolved regarding the flood control system and effects on the Everglades, with creation of the South Florida Ecosystem Restoration Task Force (NPS, 2023d). In the 2000s, the CERP was developed as a large restoration program for the South Florida ecosystem and to restore more natural hydrologic flow in the region. Several projects are completed or underway under CERP including Tamiami Trail Modifications with flood mitigation plan and conveyance and seepage control features (NPS, 2023d).

The Federal Emergency Management Agency (FEMA) National Flood Hazard Layer (NFHL) dataset represents the current effective flood hazard data for the United States. It is a compilation of effective Flood Insurance Rate Map (FIRM) databases and Letters of Map Revisions. In compliance with Executive Order 11988 on Floodplain Management and with the Federal Flood Risk Management Standard (Executive Order 13690), a NFHL review was completed to determine whether the project areas are in a regulatory floodplain. Current FEMA flood zones in the AOA include:

- Zone A = Areas with a 1 percent annual chance of flooding. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.
- Zone AE = Areas with a 1 percent annual chance of flooding. The base floodplain where base flood elevations are provided.
- Zone D = Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted.
- Zone VE = Coastal high hazard areas with a 1 percent or greater chance of flooding and an additional hazard associated with storm waves. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.

FEMA flood zones and base elevations for each project area are described below. Refer to the Wetland and Floodplain Statement of Findings in Appendix E for additional information.

### Flamingo Area

According to the NFHL Viewer, the Flamingo WWTP area is in the 100-year flood zone (Zone AE) with a base flood elevation of 9 ft North American Vertical Datum of 1988 (NAVD88). The northern portion of the Flamingo WTP area is in the 100-year flood zone (Zone AE) with base flood elevations ranging from 9 to 10 ft NAVD88. The southern portion of the WTP area and Flamingo Residential area are in the coastal high-hazard 100-year flood zone (Zone VE) with base flood elevations ranging from 11 to 16 ft NAVD88. At the Flamingo Marina and Flamingo Campground area, the northern portion of the site is in the 100-year flood zone (Zone AE) with a base flood elevation of 10 ft NAVD88. The southern portions of the site are in the coastal high-hazard 100-year flood zone (Zone VE) with base flood elevations ranging from 11 to 16 ft NAVD88.

West Lake is in an area where flooding is possible but has undetermined flood hazards (Zone D) (FEMA, 2023). Currently, the West Lake comfort station uses an existing 2,000-gallon septic system and absorption field at-grade. Site elevation is nominally 3 ft NAVD88, with predicted FEMA storm surge/flood elevation of 6 ft NAVD88 (Stanley Consultants, 2023).

### Shark Valley Area

According to the FEMA NFHL Viewer, the entire Shark Valley Tower project area limits and most of the Shark Valley Administration and Visitor Center project area limits are in an area where flooding is possible but has undetermined flood hazards (Zone D). The northernmost portion of the Shark Valley Administration and Visitor Center project area limits is in the 100-year flood zone (Zone A) with no base elevations determined (FEMA, 2023).

Currently, the Entrance Road, the Administration Complex and the southern end of Tram Road at the Shark Valley Tower are in low elevation areas and experience periodic flooding. The Shark Valley Tower comfort station wastewater currently flows by gravity to a septic tank to a raised bed absorption field adjacent to the comfort station. Site elevation is nominally 6 ft NAVD88 with a FEMA storm surge/flood elevation prediction of 7.6 ft NAVD88 for this site. The existing absorption field at the Shark Valley Administration and Visitor Center sits at an

elevation of 10.4 ft NAVD88, with FEMA storm surge/flood elevation prediction of 9.4 ft NAVD88 for this location (Stanley Consultants, 2023).

### Main Entrance/Royal Palm Area

According to the NFHL Viewer, all project areas within the Main Entrance/Royal Palm AOA are in areas where flooding is possible but have undetermined flood hazards (Zone D) (FEMA, 2023).

Currently, the Visitor Center/Headquarters and Pine Island Residential/Maintenance area ranges in elevation from 4 to 5 ft NAVD88. Long Pine Key Campground site elevation is 10 ft NAVD88. The site elevation at Royal Palm Visitor Center is 5 ft NAVD88. At Hidden Lake Education Center, elevation is nominally 7 ft NAVD88. Site elevations of the Daniel Beard Center and the Dr. Bill Robertson Center are nominally 8 ft NAVD88. The FEMA storm surge/flood elevation predicted for all of these sites is 6 ft NAVD88 (Stanley Consultants, 2023).

### Loop Road Area

Tamiami Ranger Station, Loop Road Education Center, and Trail Center are in the 100-year flood zone (Zone AE) with a base flood elevation of 7 ft NAVD88 (FEMA, 2023).

Currently, Trail Center elevation is nominally 14 ft NAVD88, with a predicted FEMA storm surge/flood elevation of 7 ft NAVD88. Tamiami Ranger Station elevation is 14 ft NAVD88. No FEMA storm surge/flood elevation predictions for this site are available. The site elevation at Loop Road Education Center is 13 ft NAVD88, with the storm surge/flood elevation predicted for the site from FEMA at 7 ft NAVD88 (Stanley Consultants, 2023).

### Future Trends

With the implementation of the CERP, currently scheduled for completion no earlier than 2028, restoration would be expected to increase freshwater delivery to EVER, which elevates concerns of additional flooding in low-lying visitor areas and at other park infrastructure (e.g., Shark Valley Area). The CEPP, which is part of the CERP, focuses on the central portion of the Everglades ecosystem, and captures freshwater lost to the sea and re-directs water flow south to the central Everglades, EVER, and Florida Bay. Modeling completed for the CEPP predicted conditions that would bring approximately 370,000 acre-ft south to the Everglades, and result in restoration delivering additional freshwater primarily to Northeast Shark River Slough (U.S. Army Corps of Engineers, 2019). The storage, conveyance, and distribution projects outlined in the CEPP are meant to replicate historic pulses and distribution of water following historic flow paths. At this time, results of the CEPP project are expected to reduce flooding potential in EVER (U.S. Army Corps of Engineers, 2019).

In addition to increased overland and groundwater flow that would result from CERP projects across EVER, future changes in sea level and storm surge are also a concern. A 2018 study on sea level rise and storm surge projections for the NPS, noted a 9.4-inch rise by 2050 along the coastal areas of EVER (Caffrey, 2018). A Coastal Hazard and Sea-Level Rise Asset Vulnerability Assessment for EVER modeled sea-level rise to the year 2050. The assessment concludes most of the assets (e.g., building, roads, marinas) at EVER (95 percent) are highly or

moderately susceptible to flooding from sea level rise and storm surge. The most susceptible areas include the Flamingo Area – ranger station, marina, and along the waterfront. Assets at Main Entrance/Royal Palm, Shark Valley, and Loop Road are moderately susceptible to sea-level rise. The assessment did not include potential impacts from increased hydrologic flows that would result from the CERP projects (Peek, 2022).

## ***Environmental Consequences***

### ***Impacts of Alternative A (No Action)***

Under the No Action alternative, the existing conditions within the AOA would not change. Only ongoing routine maintenance of features or structures would continue. Therefore, no impacts to designated floodplains and areas with predicted storm surge/flooding would occur. However, the No Action alternative would not provide any improvements to EVER's water and wastewater systems and infrastructure, which would leave these assets susceptible to flooding from sea level rise, storm surge events, and flow changes resulting from CERP projects.

### ***Impacts of Alternative B (Preferred)***

The NPS Climate Change and Natural Hazards assessment for the Project identified design considerations that could be implemented to respond to current and future hazards influenced by a changing climate (Stanley Consultants, 2023). The Preferred alternative would improve/raise water and wastewater infrastructure to accommodate CERP projects and to withstand sea level rise, storm surge, and greater flood events within these hazard zones, greatly decreasing the likelihood of property and facility damage due to flood-related occurrences, enhancing the resiliency of these assets.

To provide these improvements, the Preferred alternative would encroach into existing designated floodplains and into areas where storm surge/flooding is predicted, with both temporary, and permanent adverse impacts to floodplain functions and values anticipated. Total footprint of permanent fill within floodplains would be 5.56 acres, with an additional 35.79 acres of temporary ground disturbance. This permanent fill and temporary disturbance would be limited to predominantly disturbed areas, with several of the improvements constructed on the same footprint of demolished structures. With the vast majority of the Everglades ecosystem within a regulatory floodplain or areas with predicted storm surge/flooding, and with proposed improvements spread out across the park at various sites, the permanent disturbance of 5.56 acres and proposed temporary disturbance is considered minor. Upon completion of the Preferred alternative, floodplains would continue to operate as they do in current condition. Over the long term, the Preferred alternative would provide more efficient and resilient water and wastewater systems that can address current and future flooding trends and provide improved water quality from replacing these wastewater collection and treatment systems, which would benefit the 100-year floodplain.

Specifics for each project area are described below. Additional information floodplains and floodplain impacts are provided in the Wetland and Floodplain Statement of Findings in Appendix E.

### Flamingo Area

The improvements at the Flamingo WWTP, WTP, and the marina and campground are all within the 100-year floodplain with base flood elevations that range from 9 to 16 ft NAVD88. Improvements at West Lake are outside of the designated 100-year floodplain; however, predicted FEMA storm surge/flood elevation at West Lake is 6 ft NAVD88 (Stanley Consultants, 2023). The 100-year floodplain would be impacted by temporary ground disturbance required to install the new pipelines and fiber optic cables and by the permanent placement of fill and riprap to construct the new WWTP, which would be raised above base flood elevations (5 ft above existing grade to a proposed site elevation of 13 ft NAVD88). The WTP addition would be constructed on stilts, similar to the existing building, at an elevation of 13 ft NAVD88. To accommodate potential storm surge at West Lake, the new absorption field would be raised 7 feet above existing grade.

### Shark Valley Area

The absorption field at the Shark Valley Administration and Visitor Center is within the 100-year floodplain. The floodplain would be affected because of temporary ground disturbance required to install new pipelines and the permanent placement of fill to construct the new, raised absorption field (5 ft above existing grade). Improvements at the Shark Valley Tower and the remainder of the Shark Valley Administration and Visitor Center project area limits are outside of the 100-year floodplain. However, the new Shark Valley Tower well house would be raised 4 ft above existing grade to a finished floor elevation of 10.6 ft NAVD88. The new absorption field would also be raised 6 ft above existing grade to protect against flooding.

### Main Entrance/Royal Palm

No existing designated floodplains have been delineated within the Main Entrance/Royal Palm AOA; however, the FEMA storm surge/flood elevation predicted for this area is 6 ft NAVD88 (Stanley Consultants, 2023). The Preferred alternative would include placement of fill to construct the new WWTP, new well houses, and new absorption fields, which would raise the new infrastructure above predicted flood elevations (5 ft above existing grade for all absorption fields and a finished floor elevation of 7 ft NAVD88 for the new WWTP and Pine Island Residential/Maintenance well house).

### Loop Road Area

The improvements at Tamiami Ranger Station, Trail Center, and Loop Road Education Center are within the 100-year floodplain with base flood elevations of 7 ft NAVD88. The floodplain would be impacted because of the temporary ground disturbance required to bury new pipelines and the permanent placement of fill and riprap to construct a new well house and new absorption fields. The new absorption fields would be raised 3 -to 4-ft above base flood elevations.

## ***Cumulative Impacts***

### *Impacts of Alternative A (No Action)*

The No Action alternative would have no impact to floodplains. Therefore, it would have no potential to contribute to cumulative impacts when considered with past, present, and reasonably foreseeable future projects and action occurring at and in the vicinity of the AOA.

### ***Impacts of Alternative B (Preferred)***

Past, present, and reasonably foreseeable future projects that have or would likely have adverse or beneficial cumulative impacts on floodplains at and in the vicinity of the AOA are listed in Table 1. Many of these construction- and development-related projects have or would potentially result in encroachments into floodplains and into areas where storm surge/flooding is predicted, and impacts to floodplain functions and values. Other projects and actions, such as CERP and CEPP, have focused on and will continue to focus on restoration efforts to the larger Everglades ecosystem through large-scale hydrologic alternations to provide floodplain reconnection, greatly improving floodplain functions and values. Such beneficial impacts to the larger Everglades ecosystem may be enough to offset some of the floodplain impacts from other projects. The Preferred alternative would encroach into existing floodplains, with both minor, temporary, and permanent adverse impacts to floodplain functions and values anticipated. Considering that the Preferred alternative is spread across the Everglades at various sites, that floodplains would continue to operate as they do in current condition, and that water quality would potentially improve within 100-year floodplains, this alternative would have a negligible contribution to cumulatively adverse impacts on floodplains when considered with other past, present, and reasonably foreseeable future projects and actions occurring at and in the vicinity of the AOA.

## **Visitor Use and Experience**

### ***Area of Analysis***

The AOA for visitor use and experience encompasses the 13 sites that would be directly affected by the improvements and where construction would occur (project area limits).

### ***Current and Expected Future Conditions of Affected Environment***

Enjoyment of park resources and values by the public is a fundamental purpose of the national park system, and NPS is committed to providing appropriate, high-quality opportunities for visitors to experience at national parks. Over the last decade, the NPS has invested in the renovation and replacement of visitor facilities and infrastructure throughout EVER to enhance visitor use and experience. EVER regularly welcomes approximately one million visitors annually (NPS, 2017). Visitation to EVER is highly seasonal. Peak visitation in the park occurs within the winter months, from December to April, with a low visitation season from June to September due primarily to heat, mosquitoes, and tropical storm/hurricane season in the fall (NPS, 2015c). Visitor use and associated recreational activities such as biking, hiking, camping, and enjoying the park's landscapes are anticipated to continue and increase.

### ***Flamingo Area***

The Flamingo Area AOA is at the southernmost tip of the Florida peninsula and provides beautiful campgrounds, the Flamingo Lodge, and an abundance of recreational activities. The area provides phenomenal near- and distant views of the largest subtropical wilderness in the nation, the large blue expanse of Florida Bay and its hundreds of islands, and West Lake.

Activities at Flamingo Area include boat tours, kayaking, canoeing, fishing, biking, boating, camping, bird watching, stargazing, and hiking (Guest Services, Inc., 2023). The Flamingo

Canal is also part of the Wilderness Waterway, connecting boaters to Coot Bay and Whitewater Bay.

Guest Services, Inc. is the primary concessioner that operates out of the Flamingo Area and runs the campground, boat rentals, and Flamingo lodge, gift shop, and food and beverage (Guest Services, Inc., 2023).

### *Shark Valley Area*

Shark Valley is one of the most visited areas in EVER and provides near- and distant views of the sawgrass marsh of the Everglades from various viewpoints. Recreational activities in the AOA include hiking, fishing, wildlife viewing, and biking. Bird watching is also a popular recreational activity in the winter because of bird migrations. Walking trails are located throughout the Shark Valley Area stemming off the 15-mile Tram Road. The Tram Road extends into the sawgrass marsh and offers one of the best opportunities for viewing the natural environment in EVER. The Shark Valley AOA is available to the public after-hours, which makes the area a popular destination for biking. Shark Valley Tower is at the half-way point off Tram Road, which gives open-air views of the River of Grass and Shark Valley Slough.

Shark Valley Tram Tours, Inc. is the primary concessioner that operates out of the Shark Valley Area and runs a guided tram along Tram Road, as well as bicycle rentals (Shark Valley Tram Tours, 2023).

### *Main Entrance/Royal Palm Area*

The Main Entrance/Royal Palm AOA is the primary entrance area to EVER, on the eastern side of the park. The AOA provides beautiful campgrounds, an abundance of recreational activities, and phenomenal views of the unique pine rockland, sawgrass marsh, and tropical hardwood hammock habitats. Activities in the Main Entrance/Royal Palm AOA include fishing, biking, camping, wildlife and bird viewing, stargazing, canoeing, kayaking, ranger-guided programs, the historic Nike Missile Site HM-69, and hiking on the many trails, including the Anhinga Trail boardwalk. The Hidden Lake Environmental Education Center provides educational and camping opportunities for students.

Guest Services, Inc. is the primary concessioner that operates in the AOA and runs the Long Pine Key Campground (Guest Services, Inc., 2023).

### *Loop Road Area*

The Loop Road Area is just outside the western boundary of EVER within Big Cypress National Preserve. Views from the road are mainly hardwood hammock and pine flatwoods and the cypress swamp. Although Loop Road Area facilities are not within the park, they are under management by EVER. The AOA is primarily used by NPS staff; however, Loop Road Education Center provides educational and camping opportunities for students. Visitor use of the AOA is not typical except for the Education Center, with peak student visitation occurring during the school year from December to April (NPS, 2023c).



## ***Environmental Consequences***

### ***Impacts of Alternative A (No Action)***

Under the No Action alternative, no improvements would occur. The outdated water and wastewater infrastructure would continue to require emergency repairs, with some infrastructure becoming more susceptible to flooding and the effects of climate change. This would result in inefficiencies and may restrict amenities, such as visitor centers and campgrounds, from meeting current and future water and wastewater demands. These results may have an appreciable affect to and become a common part of the visitor experience. Therefore, the No Action alternative would have moderate, long-term adverse impacts on visitor use and experience.

### ***Impacts of Alternative B (Preferred)***

The Preferred alternative would provide necessary updates to water and wastewater infrastructure, including replacement of potable water distribution lines and wastewater collection systems, replacement of the WWTPs at Flamingo area and Pine Island Residential/Maintenance area, improvements to the Flamingo WTP, connection of the potable water system at Shark Valley Visitor Center to the Miccosukee water system, conversion of the vault toilets at Shark Valley Visitor Center to flushing toilets, and improvements or replacements of existing wells. These upgrades would improve the resiliency and reliability of these systems, enhancing the overall visitor experience at EVER.

Improvements at some locations would result in obvious changes for visitors. Improvements at West Lake would require necessary removal of shrubs and trees for construction of the new wastewater absorption field. Trees and shrubs would not be allowed to reestablish on the absorption field, creating a permanent change in appearance for visitors. Construction of the new well house and absorption field at Shark Valley Tower would be noticeable because shrubs and trees would need to be removed to construct the new wastewater absorption field and the new well house would require a larger footprint and riprap to accommodate the raised infrastructure. Improvements at Long Pine Key Campground and Royal Palm would be noticeable as shrubs and trees would also be removed to construct the new wastewater absorption fields creating a permanent change in appearance for visitors. Improvements at Loop Road Education Center would require a large area of grassy vegetation to be temporarily removed during the replacement of the wastewater absorption field. This would be obvious until grass re-establishes.

During project construction at sites that are frequented by the public, moderate short-term, adverse impacts on visitor use and experience are anticipated. The presence and operation of construction equipment would result in construction-related noise that would be clearly detectable and could potentially have an appreciable, short-term disruption to visitor experience. Construction may also temporarily disrupt access to certain recreational opportunities, such as trails, campsites, comfort stations, and parking areas. Work adjacent to roadways going into and around the project areas may require lane closures or reduced traffic speeds, temporarily impacting travel times and increasing traffic congestion. To mitigate these impacts, the majority of construction would occur during the low visitation period and shoulder seasons. Full area closures would be on a case-by-case basis and as short as possible

to complete the work activity. The public would be notified in advance, should areas require several months of closure.

Overall, the Preferred alternative would result in long-term, beneficial impacts on visitor use and experience through enhanced, more reliable water and wastewater systems that would provide for the health and safety of visitors and a more enjoyable and memorable experience at park facilities.

### ***Cumulative Impacts***

#### ***Impacts of Alternative A (No Action)***

Many of the construction- and development-related projects identified in Table 1 have been or would be built to benefit visitors through improved facilities and more reliable infrastructure. Under the No Action alternative, no improvements would occur, resulting in inefficiencies to the potable water and wastewater systems that may become a common part of the visitor experience. These inefficiencies may affect the purpose of other past, present, and future projects to provide a positive visitor use experience. Therefore, the Preferred alternative would have a noticeable adverse impact when combined with the impacts of other projects.

#### ***Impacts of Alternative B (Preferred)***

Past, present, and reasonably foreseeable future projects that have or would likely have cumulative impacts on visitor use and experience at and in the vicinity of the AOA are listed in Table 1. Many of these construction- and development-related projects have or would be built to benefit visitors through improved facilities and more reliable infrastructure. The Preferred alternative would have an overall beneficial impact on visitor use and experience by providing more efficient and reliable water and wastewater facilities throughout the park. When considering the projects for cumulative impact and the Preferred alternative, cumulative effects would be long-term and beneficial for visitor use and experience.

## Chapter 4: Consultation and Coordination

The NPS places a high priority on public involvement in the NEPA process and on giving the public an opportunity to comment on the Project. Consultation and coordination with federal, state, and local agencies, as well as American Indian tribes, were conducted to identify issues and concerns related to natural and cultural resources within EVER and sites managed by EVER in BICY. This chapter describes the public involvement and agency and tribal consultation used during the preparation of this EA.

### Public Involvement

#### *Civic Engagement*

Civic engagement was conducted in February and March 2023, to provide the public an opportunity to learn about the Project and provide their input. The NPS Planning, Environment, and Public Comment (PEPC) website; Story Map; press release and email blasts; and agency letters all went active or were distributed on February 13 and 14, 2023. Social media posts were published on February 13 and 27 and March 5, 6, and 19, 2023. The NPS also held two Public Meetings: one in-person (March 7, 2023) and one virtual (March 8, 2023). A news article describing the Project and inviting public input was published in the South Dade News Leader on March 10, 2023. The public was invited to electronically submit comments on the Project through the PEPC website, or by mailing written comments.

During the civic engagement comment period, correspondence was received on topics ranging from project improvement questions, park operations questions, park resources questions, and design suggestions. Comments were reviewed, and some resulted in changes incorporated into the EA.

#### *Environmental Assessment Review*

This EA will be available for a 30-day public comment period. The public comment period will be announced by press release, posts on the PEPC website, social media, and by electronic mail sent from the EVER mailing list. Agencies and tribes also will be notified by letter. The public is encouraged to post comments online at <https://parkplanning.nps.gov/WaterSystems> or mail comments to Planning and Compliance Office, Everglades National Park Headquarters, 40001 State Road 9336, Homestead, Florida 33034. After the close of the public comment period, all public comments will be reviewed and analyzed prior to the release of a NPS decision document.

### Agency and Tribal Consultation

NPS initiated consultation with relevant agencies and tribes during the preparation of this EA. Consultation efforts, as described in the following section, began during civic engagement, and continued through the preparation of this EA. All agencies will be provided a copy of this EA for review and comment, as required.

### ***Endangered Species Act Section 7 Consultation***

Section 7 of the ESA requires federal agencies to ensure that the actions they authorize, fund, or conduct do not jeopardize the continued existence of listed species or destroy or adversely affect critical habitat. The NPS conducted early coordination with the USFWS and NMFS on the Project in February 2023. A Biological Assessment was prepared, and the NPS initiated formal Section 7 consultation with USFWS and NMFS on September 8, 2023. The NPS will complete the Section 7 consultation process prior to finalizing the NPS decision document for this project.

### ***Section 106 of the National Historic Preservation Act Consultation***

Section 106 of the NHPA requires federal agencies to consider the effects on historic properties of projects they carry out, assist, fund, permit, license, or approve throughout the country. This requires coordination and consultation with the Florida SHPO and Tribal Partners. A Cultural Resources Report and Assessment of Effect Documentation were prepared, and NPS will complete the Section 106 consultation process prior to preparing a NPS decision document for this project. This may include development of an MOA to best mitigate the proposed demolition and the effects of neglected or abandoned historic resources.

### ***Tribal Consultation***

Consultations with the Miccosukee Tribe of Indians of Florida, the Seminole Tribe of Florida, and the Seminole Nation of Oklahoma are ongoing. The NPS conducted early coordination with the Tribes in February 2023. Tribal consultation will be complete prior to preparing an NPS decision document for this project.

### ***Clean Water Act***

In accordance with Sections 404 and 401 of the Clean Water Act (33 USC 1344 and 33 USC 1341, respectively), the NPS is seeking authorization from the USACE for regulated activities proposed within jurisdictional wetlands and other waters of the U.S. located within the project areas. Coordination regarding these authorizations is ongoing at the time of this EA. As part of the permit review processes, potential impacts to jurisdictional wetlands and other waters of the U.S. would be avoided or minimized to the maximum extent practicable. As described in Chapter 3, the NPS would coordinate with USACE to determine appropriate compensatory mitigation for any unavoidable adverse impacts to water resources.

## **Chapter 5: Preparers and Planning Team**

### **National Park Service, Everglades National Park**

Brien Culhane, NEPA Specialist  
Daniel Noon, Chief of Planning and Environmental Compliance  
Jaci Wells, Cultural Resources Lead  
Morgan Wooderson, Archaeologist  
Tylan Dean, Biological Sciences Branch Chief  
Maria Vasquez, Biologist  
Pablo Ruiz, Biologist  
Britta Muiznieks, Biologist  
Adrienne Valdes, Civil Engineer

### **National Park Service, Denver Services Center**

Kaetlyn Jackson, Natural Resources Specialist  
Greg Cody, Cultural Resources Specialist

### **DOWL, LLC**

Emily Peterson, NEPA/Environmental Lead  
Emily Paris, Environmental Specialist  
Donna Robinson, Senior Environmental Specialist  
Cara Wright, Technical Editor  
Lisa Olmstead, Public Involvement  
Catherine Hammond, Public Involvement  
Cameron Sapp, Environmental Specialist  
Tim Jameson, GIS Specialist  
Amy Ramirez, Architectural Historian/Cultural Specialist

### **Anchor QEA**

Greg Summers, Biologist Specialist  
Julie Fox, Wetlands Specialist

### **SEARCH**

Tim Parson, Cultural Resources Lead  
Ryan Collins, Archaeologist

## **Stanley Consultants**

Jerome Schoffler, Senior Project Manager

Patrick Haney, Technical Lead

Brett Feichtinger, Civil Engineer

Brian Duffy, Client Service Manager

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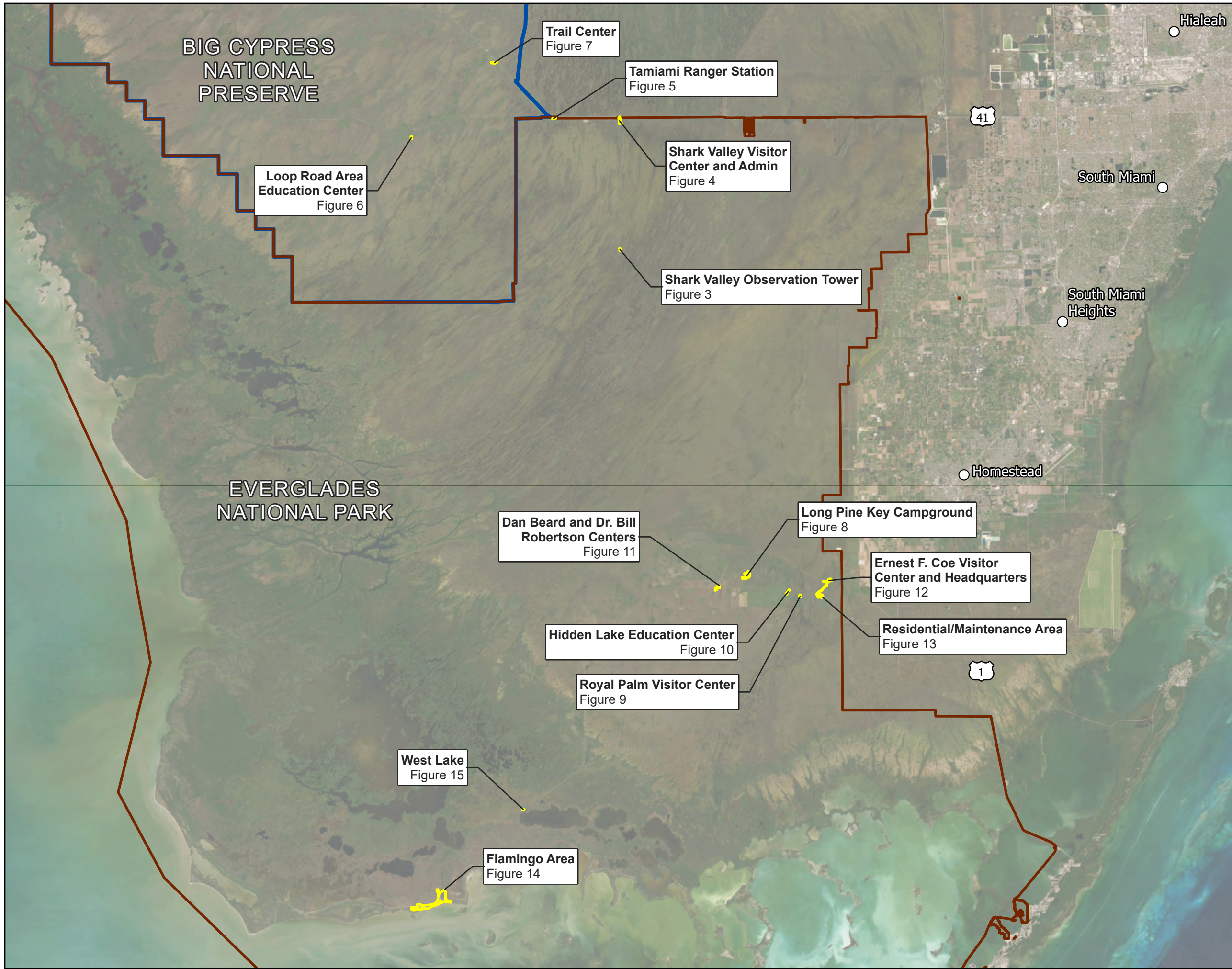
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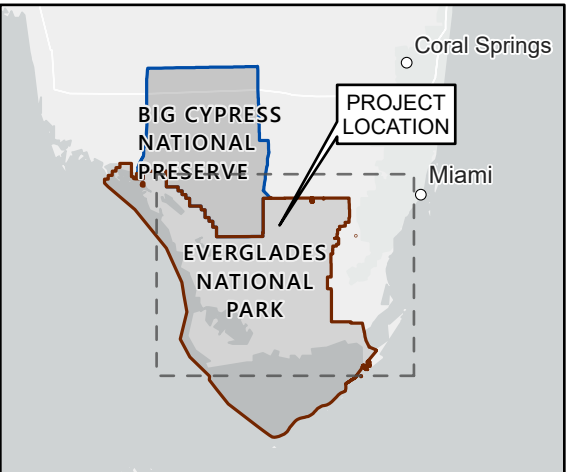
# APPENDIX A: FIGURES

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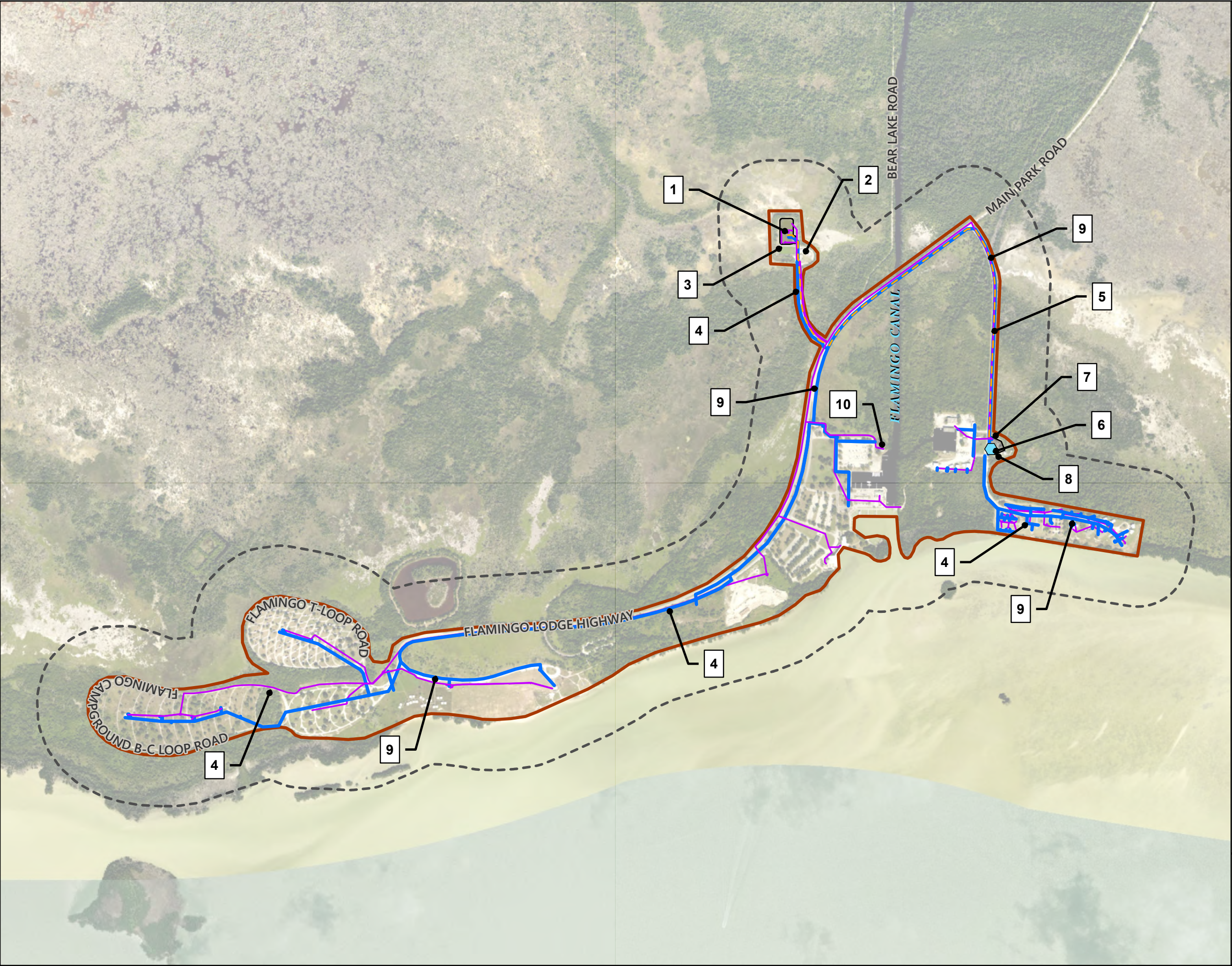


 Project Limits



Site Location	
Rehabilitation of Parkwide Water and Wastewater Systems	
 National Park Service	Date: October 26, 2023
Figure 2	





Project Limits

Area of Potential Effect (APE)

Proposed Well

Sewer (Replace/ Proposed)

Water (Replace/ Proposed)

Fiber Optic

Disturbance Areas

1. Fill in existing percolation pond and replace existing wastewater treatment plant at this new location. New facility to be completely enclosed, raised to account for storm surge, and include paved access.

2. Abandon existing wastewater treatment plant.

3. Raise berm on existing wastewater treatment pond.

4. Replace wastewater collection system (sewer lines and force main system).

5. Install new communications line for wastewater treatment plant operation.

6. Drill two new wells.

7. Rehabilitate the reverse osmosis potable water treatment plant to include expansion of building and harding against storms.

8. Install new water tank.

9. Replace or install new potable water distribution system.

10. Replace fish cleaning station 1000-gallon solids holding tanks.

PROJECT LOCATION

BIG CYPRESS NATIONAL PRESERVE

EVERGLADES NATIONAL PARK

Coral Springs

Miami

0

500

1,000

2,000

Feet

N

Flamingo Area

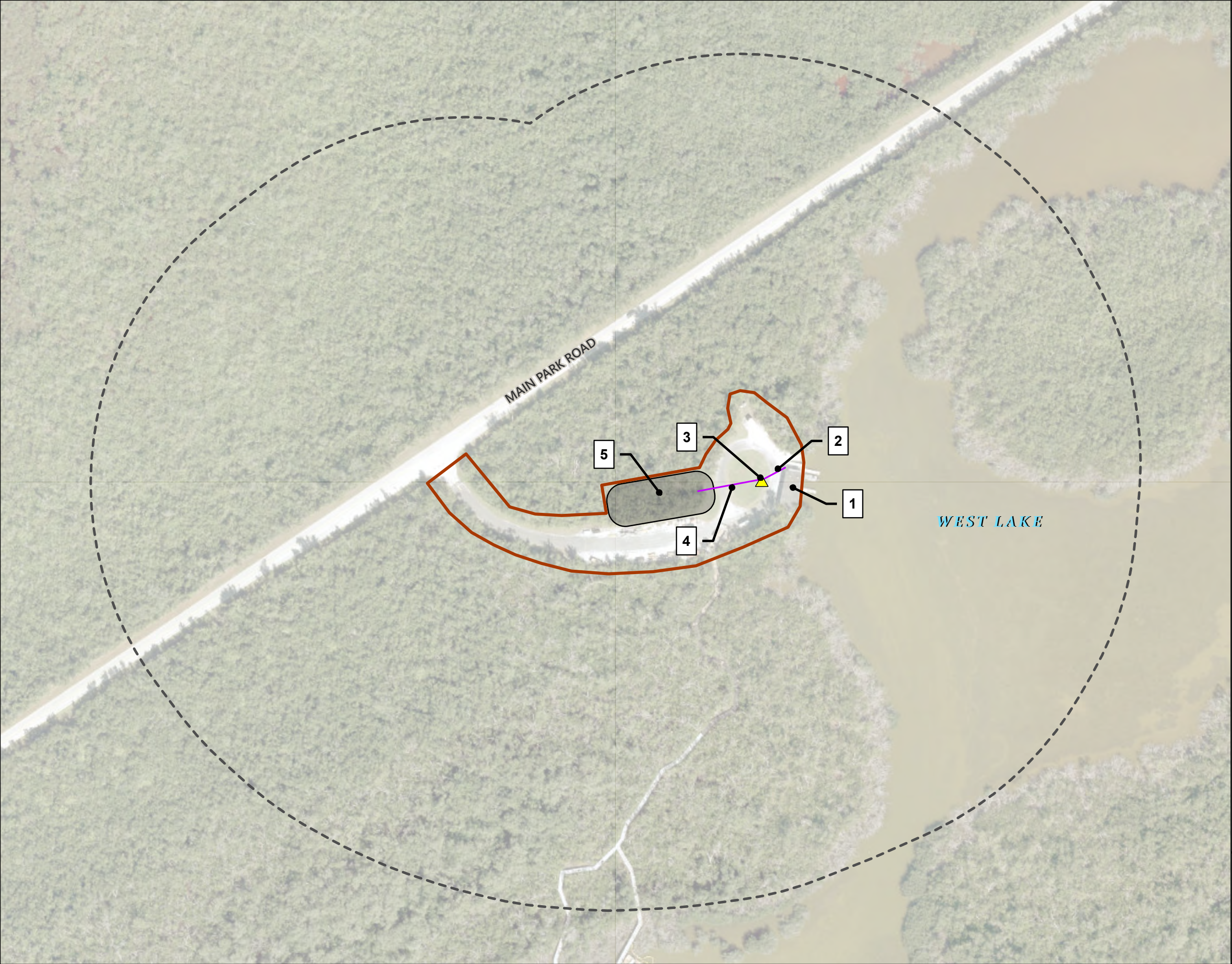
Rehabilitation of Parkwide Water and Wastewater Systems

National Park Service

Date: October 26, 2023

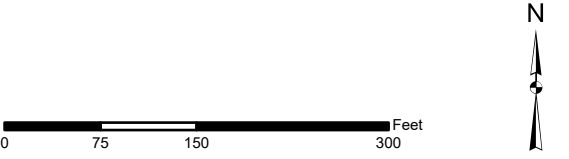
Figure 3





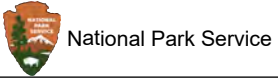
- Project Limits
- Area of Potential Effect (APE)
- Septic Tank
- Sewer (Replace/ Proposed)
- Disturbance Areas

1. Reconstruct non-potable / non-dermal water system with new raw water piping, pump, and filters.
2. Replace gravity sewer line.
3. Replace septic tank.
4. Install new wastewater force main from new septic tank to new absorption field.
5. Install new, raised absorption field.



**West Lake - Flamingo Area**

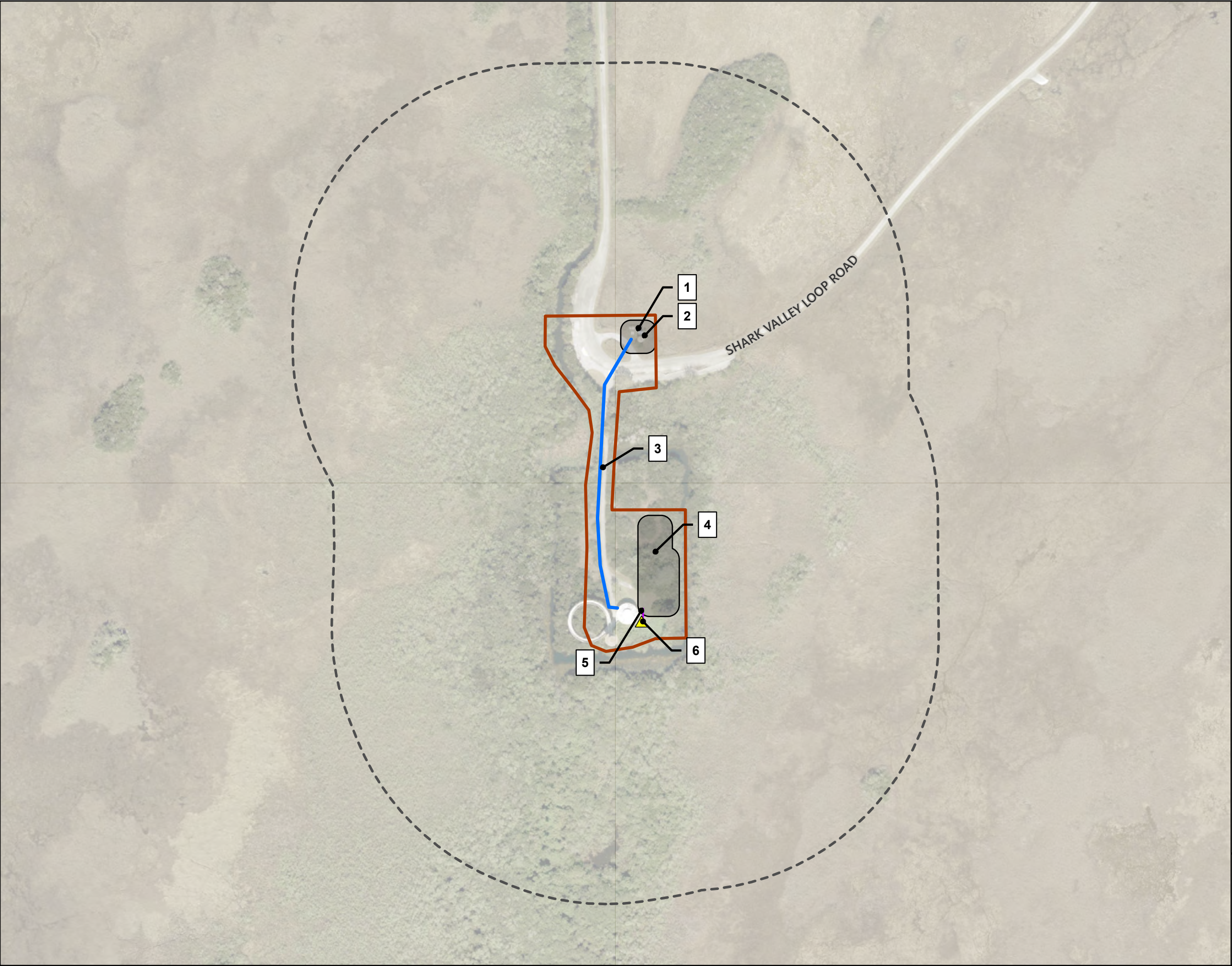
Rehabilitation of Parkwide  
Water and Wastewater Systems



Date: October 26, 2023

Figure 4



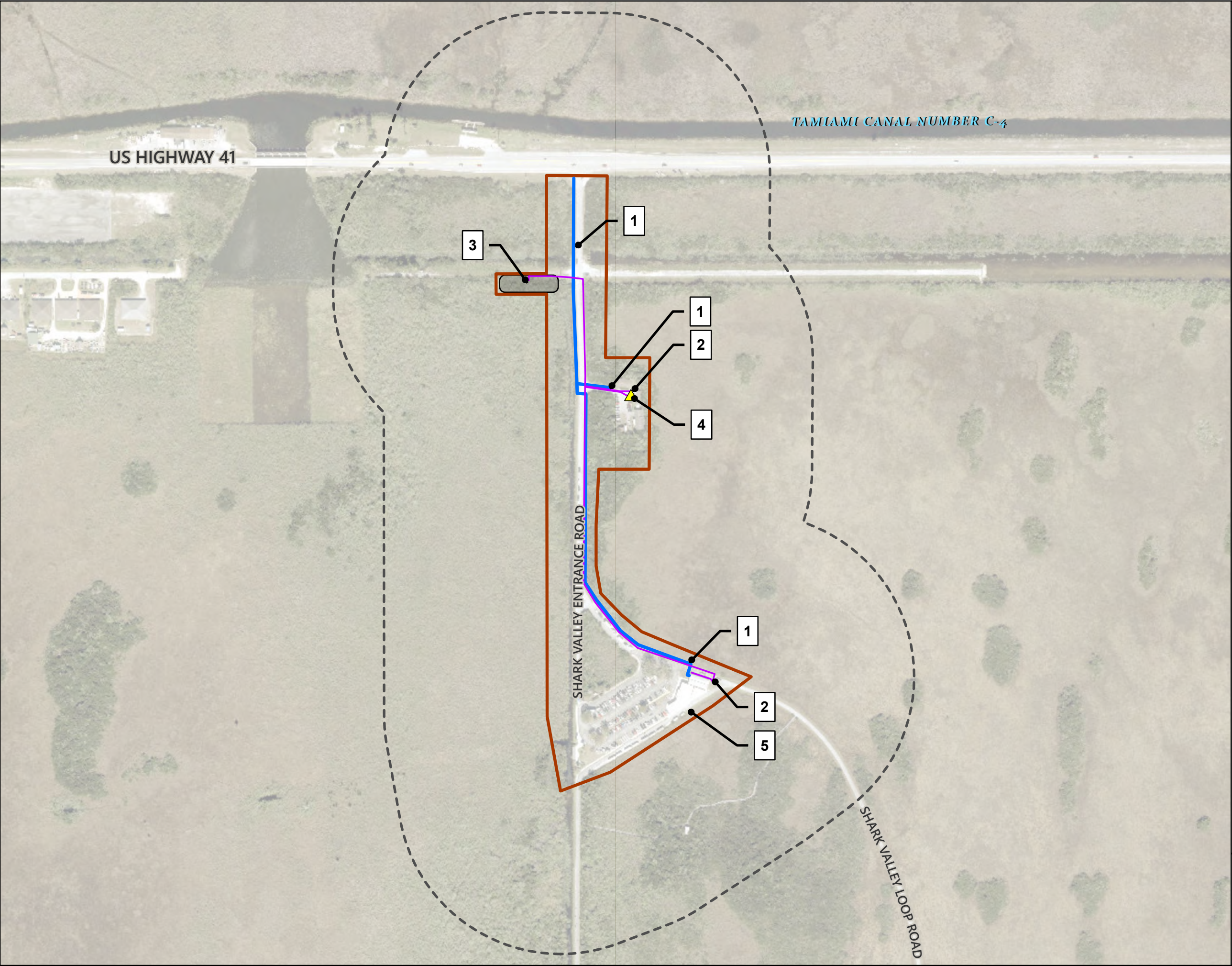


- Project Limits
- Area of Potential Effect (APE)
- Septic Tank
- Sewer (Replace/ Proposed)
- Water (Replace/ Proposed)
- Disturbance Areas

1. Demolish existing well house, treatment building, yard equipment, fencing as required, and all other associated buildings.
2. Construct new, raised well house with armored riprap slope, reconnect well, and reconstruct fencing.
3. Reconstruct water line and abandon existing water line in place.
4. Provide new, raised wastewater absorption fields.
5. Replace wastewater force main from septic tank to absorption fields.
6. Replace existing septic tank.

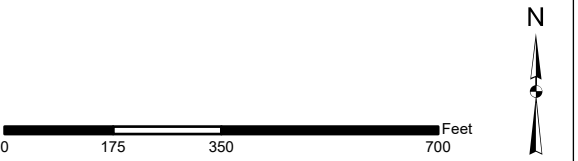
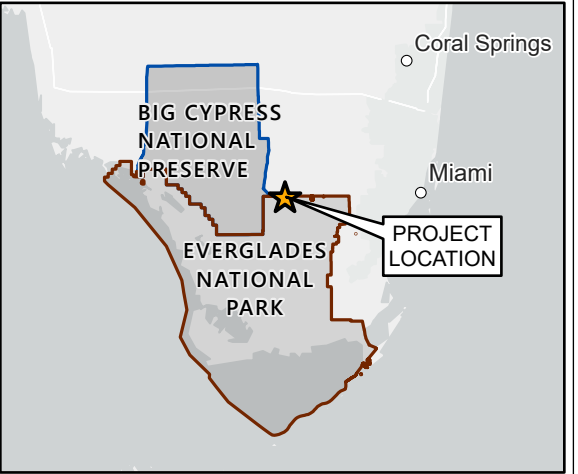






- Project Limits
- Area of Potential Effect (APE)
- Septic Tank
- Sewer (Replace/ Proposed)
- Water (Replace/ Proposed)
- Disturbance Areas

1. Replace existing waterlines and extend waterline to connect to Tribal water main.
2. Replace wastewater collection system (force mains, lift stations, and sewer lines).
3. Provide new, raised wastewater absorption field.
4. Provide two septic tanks.
5. Provide new flushing toilets inside comfort station.

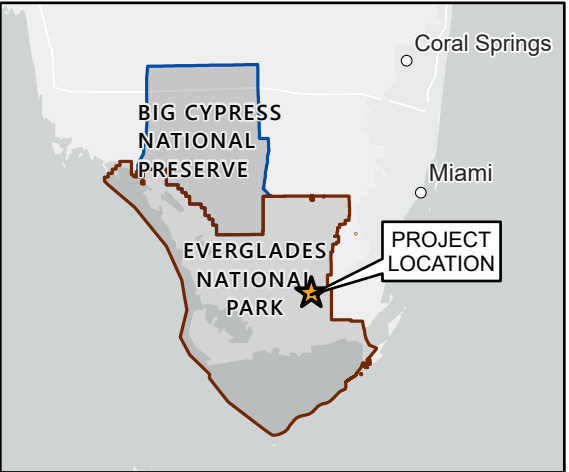






- Project Limits
- Area of Potential Effect (APE)
- Proposed Well
- Septic Tank
- Sewer (Replace/ Proposed)
- Disturbance Areas

- 1. Drill new potable water well.
- 2. Demolish existing well house and construct new well house with water treatment equipment.
- 3. Provide new lift stations and abandon existing absorption fields.
- 4. Provide four new septic tanks.
- 5. Provide new, raised absorption field.
- 6. Provide new wastewater force mains.



**Long Pine Key Campground  
Main Entrance / Royal Palm Area**

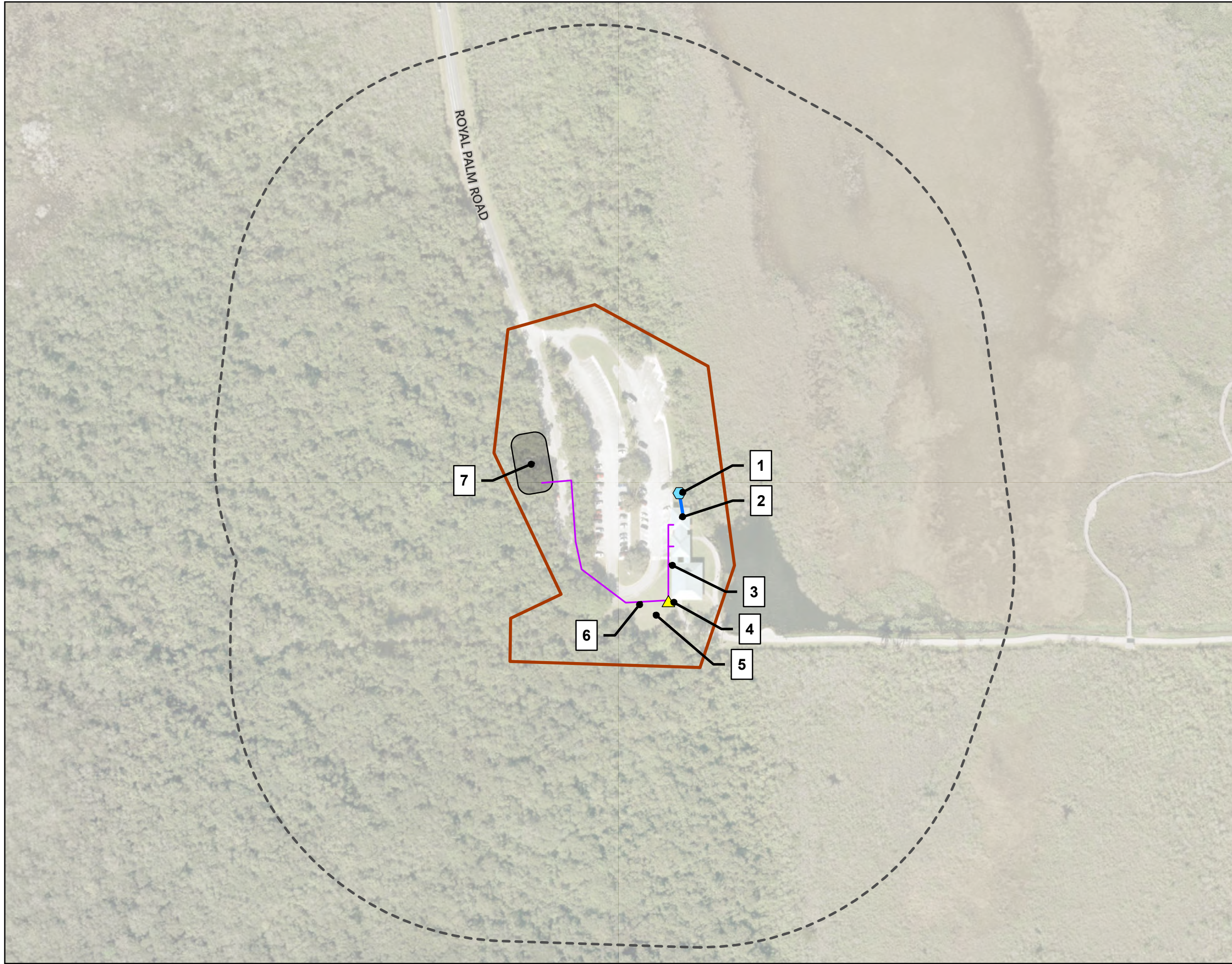
Rehabilitation of Parkwide  
Water and Wastewater Systems

 National Park Service

Date: October 26, 2023

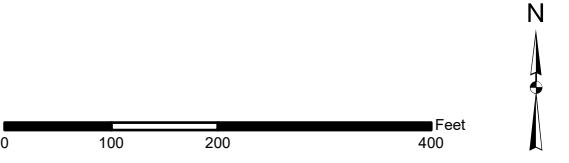
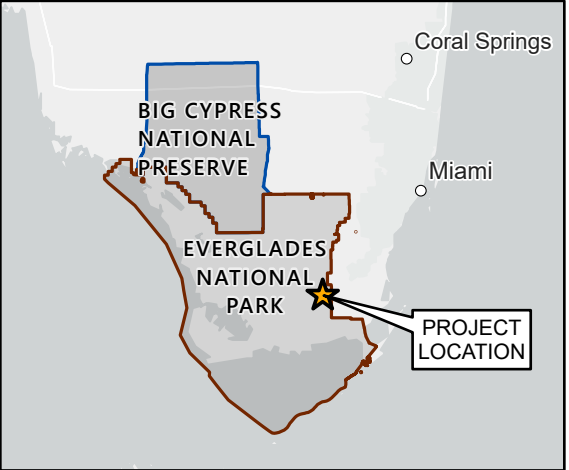
Figure 7





- Project Limits
- Area of Potential Effect (APE)
- Proposed Well
- Septic Tank
- Sewer (Replace/ Proposed)
- Water (Replace/ Proposed)
- Disturbance Areas

1. Drill new potable water well and install new water line.
2. Install well water treatment inside existing comfort station / visitor center.
3. Replace existing wastewater sewer line.
4. Replace existing septic tank.
5. Abandoned existing absorption field.
6. Install new wastewater force main to new absorption field.
7. Demolish existing well house and provide new, raised wastewater absorption field.

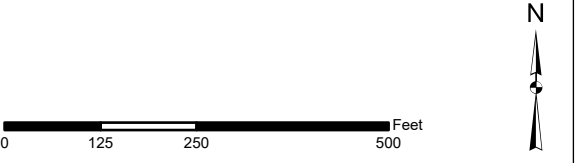
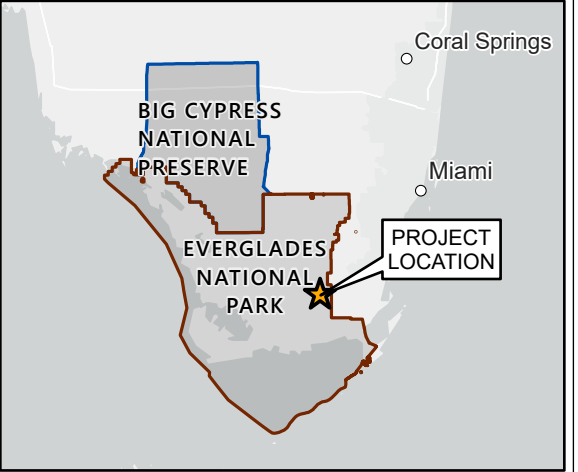






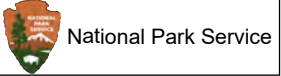
- Project Limits
- Area of Potential Effect (APE)
- Septic Tank
- Water (Replace/ Proposed)
- Disturbance Areas

1. Replace septic tank.
2. Provide new, raised wastewater absorption field.
3. Replace potable water distribution system (water line).



**Hidden Lake Environmental Education Center  
Main Entrance / Royal Palm Area**

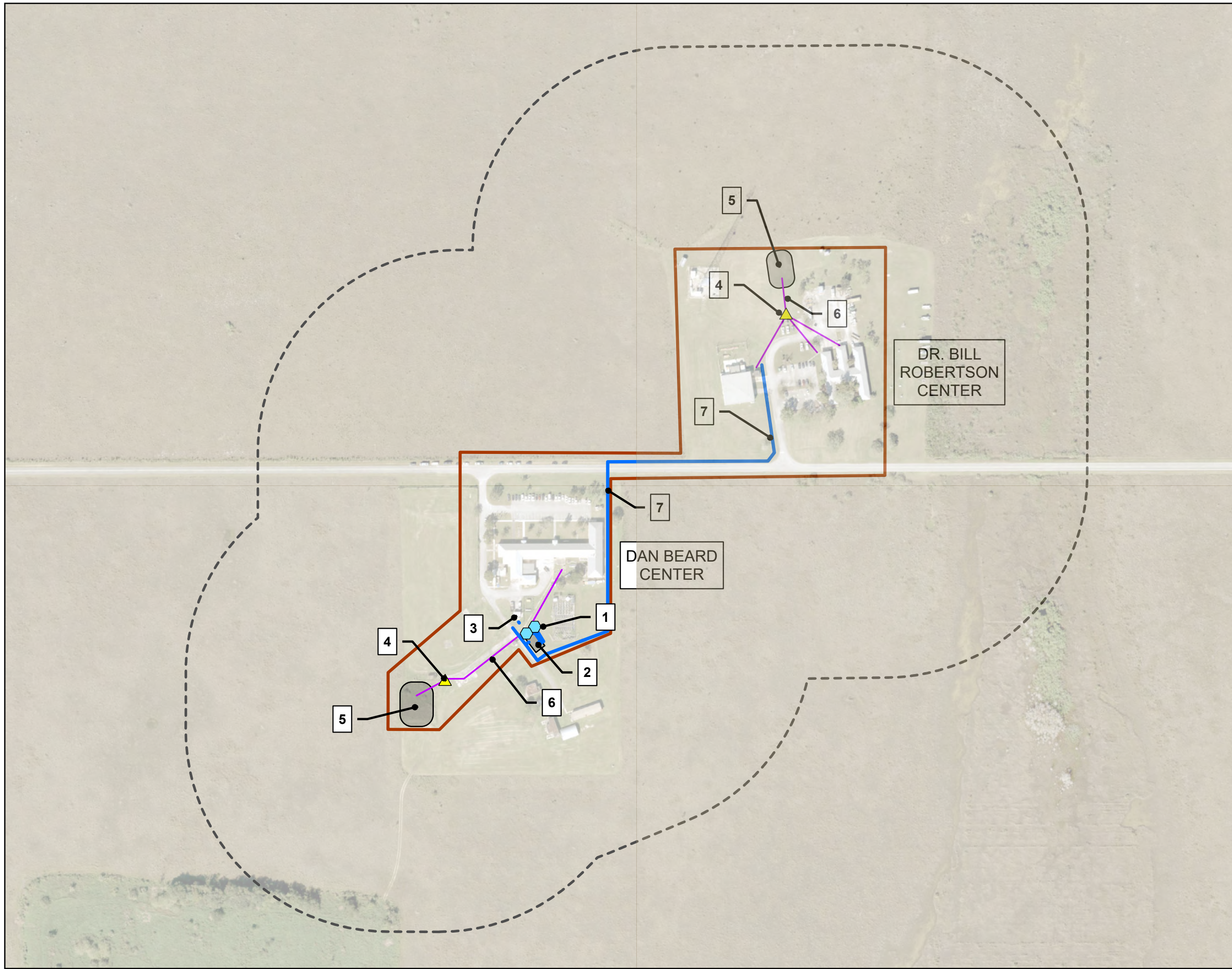
Rehabilitation of Parkwide  
Water and Wastewater Systems



Date: October 26, 2023

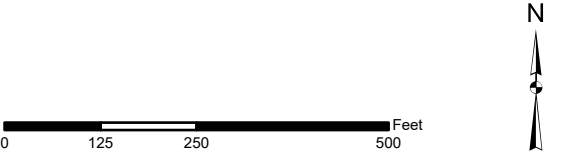
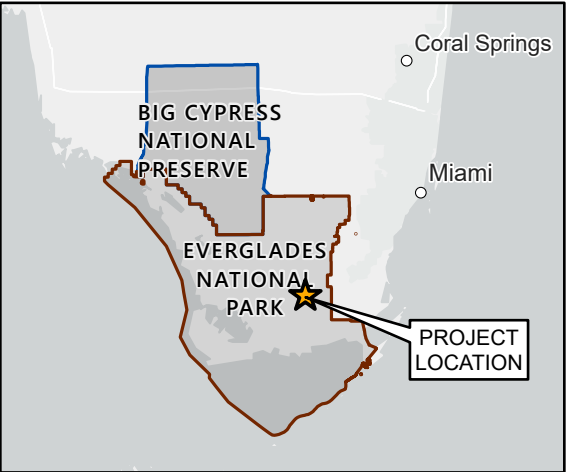
Figure 9





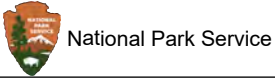
- Project Limits
- Area of Potential Effect (APE)
- Proposed Well
- Septic Tank
- Sewer (Replace/ Proposed)
- Water (Replace/ Proposed)
- Disturbance Areas

1. Drill two new potable water wells.
2. Construct new, raised potable water well house.
3. Abandon existing well house.
4. Replace existing septic tanks and lift stations.
5. Provide new, raised wastewater absorption fields.
6. Replace wastewater collection system (gravity sewers and sewer lines).
7. Replace potable water distribution system, which includes new pipe to Dr. Bill Robertson Center.



**Daniel Beard and Dr. Bill Robertson Centers  
Main Entrance / Royal Palm Area**

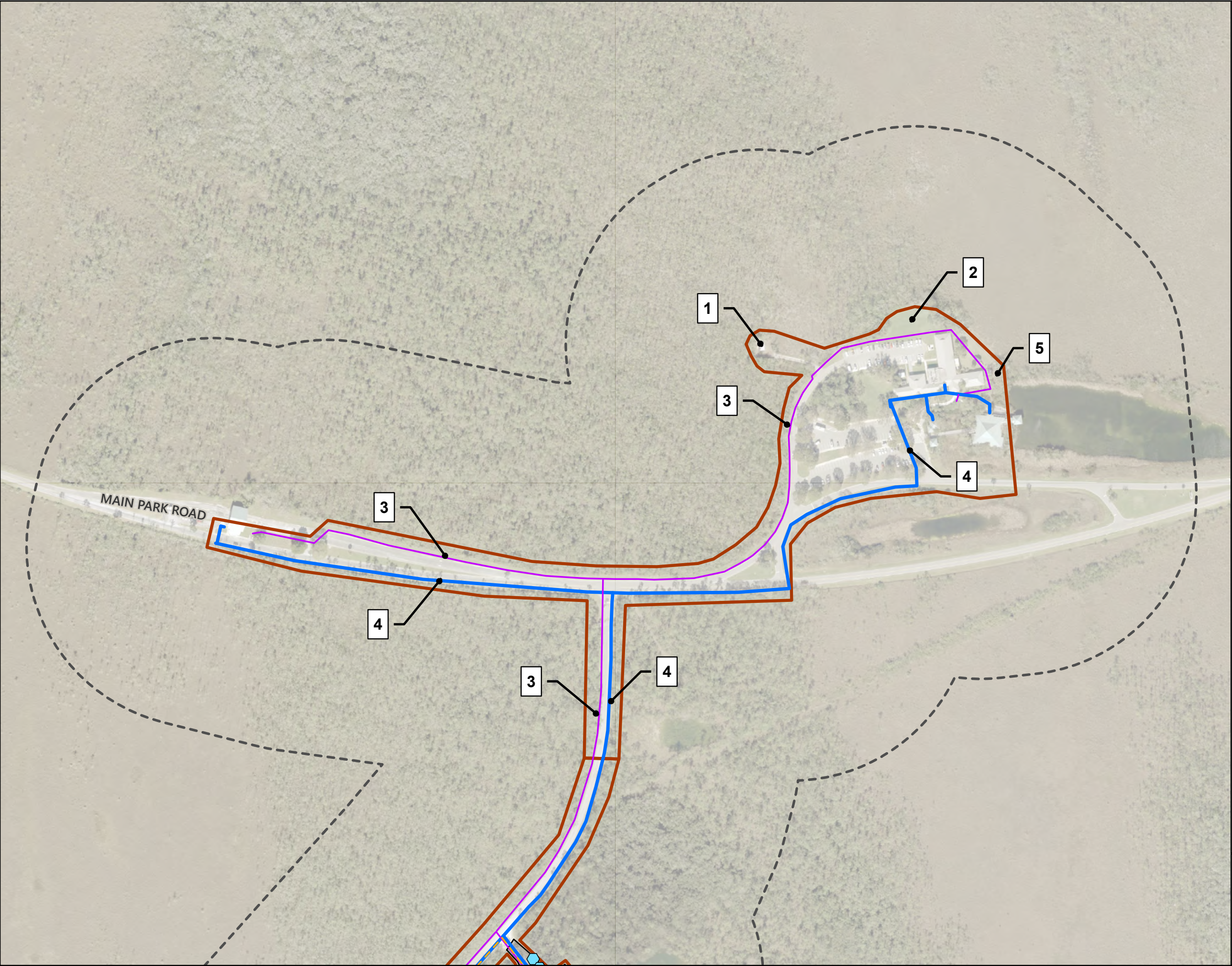
Rehabilitation of Parkwide  
Water and Wastewater Systems



Date: October 26, 2023

Figure 10





Project Limits

Area of Potential Effect (APE)

Proposed Well

Sewer (Replace/ Proposed)

Water (Replace/ Proposed)

Fiber Optic

Disturbance Areas

1. Abandon existing well house and waterline to well house.

2. Abandon existing wastewater absorption field.

3. Replace wastewater collection system (force mains, lift stations, and sewer lines).

4. Replace potable water distribution system with new connection to new wells found north of the Residential/ Maintenance Area.

5. Upgrade fire well house to include upgraded equipment and a new roof to meet category 5 hurricane rating.

BIG CYPRESS NATIONAL PRESERVE

EVERGLADES NATIONAL PARK

PROJECT LOCATION

Coral Springs

Miami

0

162.5

325

650

Feet

N

Ernest F. Coe Visitor Center & Headquarters

Main Entrance / Royal Palm Area

Rehabilitation of Parkwide Water and Wastewater Systems

National Park Service

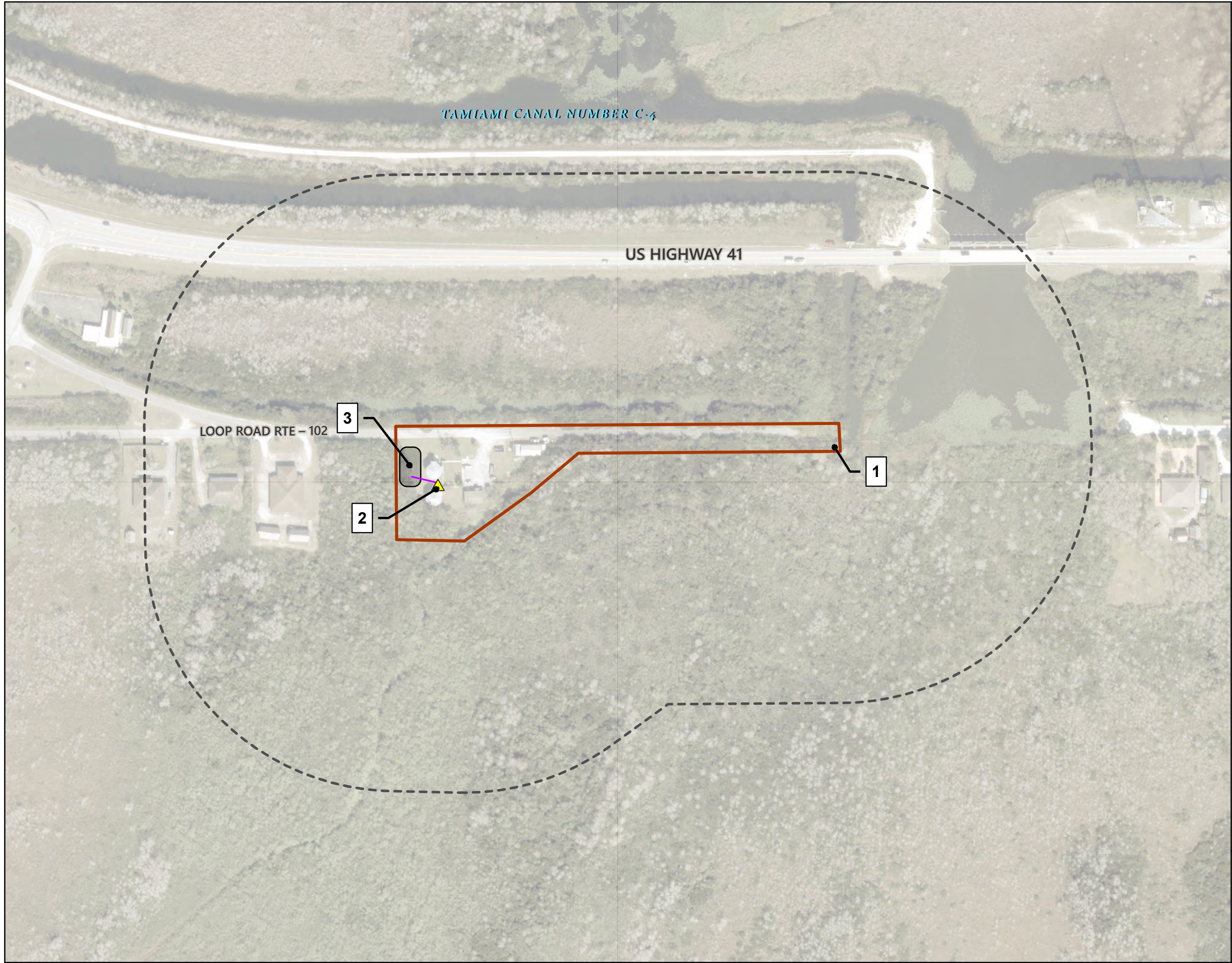
Date: October 26, 2023

Figure 11



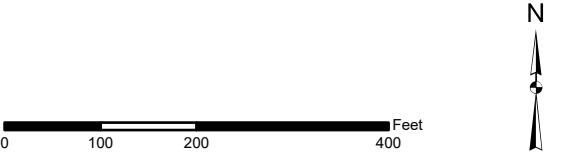
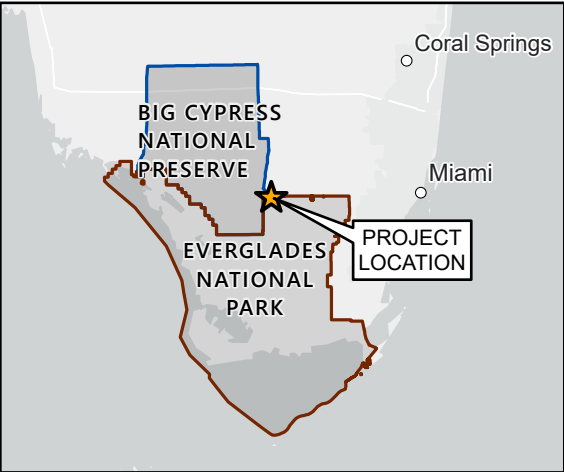






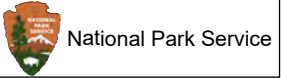
- Project Limits
- Area of Potential Effect (APE)
- Septic Tank
- Sewer (Replace/ Proposed)
- Disturbance Areas

1. Abandon existing well house and cap well
2. Replace existing septic tank and connector line.
3. Provide new, raised wastewater absorption field.



**Tamiami Ranger Station - Loop Road Area**

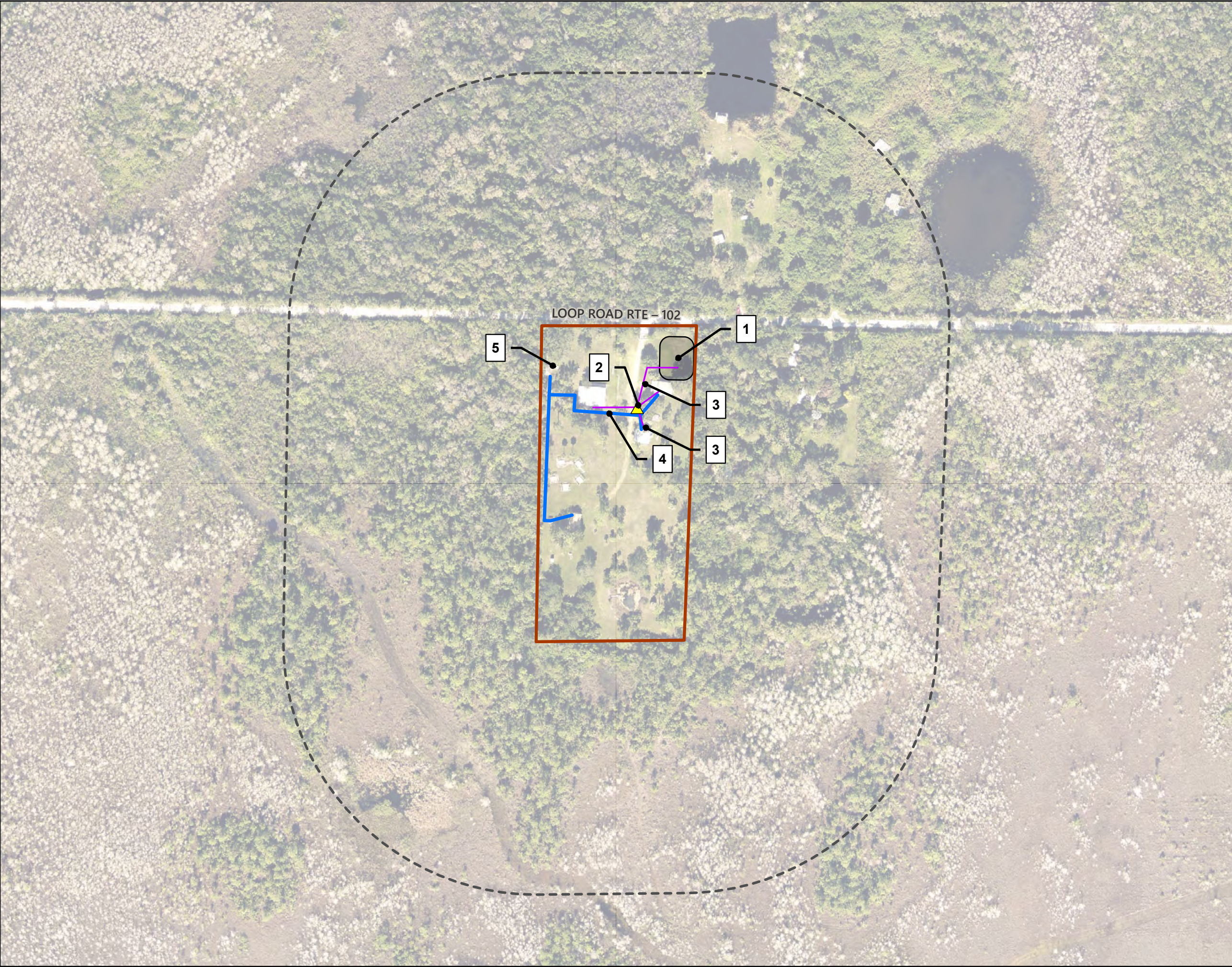
Rehabilitation of Parkwide  
Water and Wastewater Systems



Date: October 26, 2023

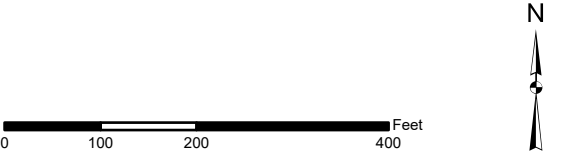
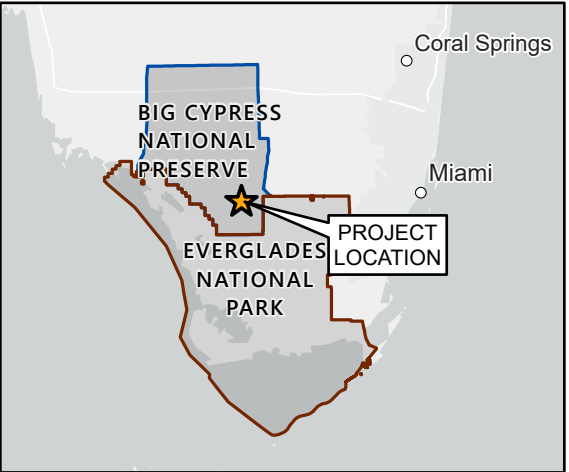
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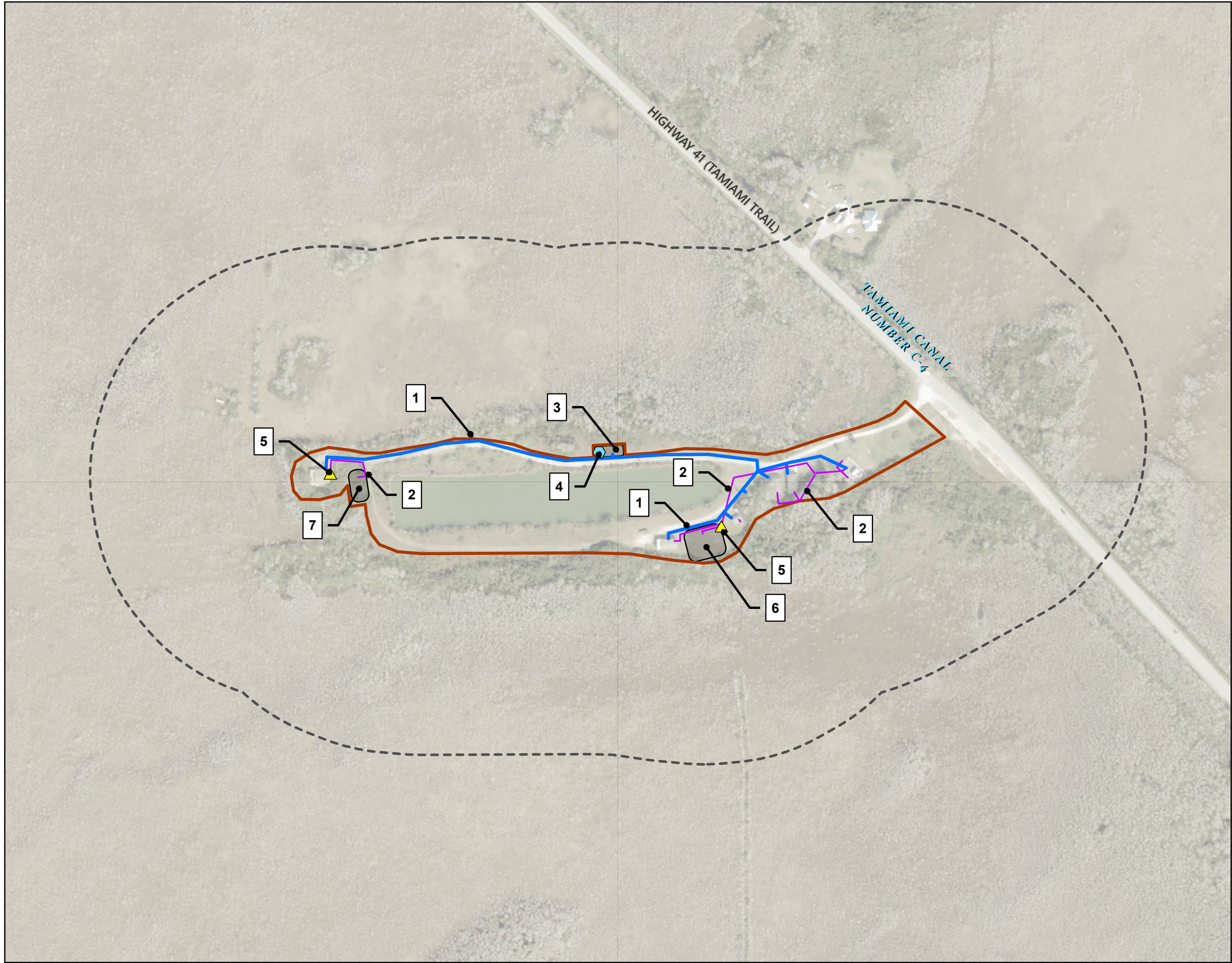


- Project Limits
- Area of Potential Effect (APE)
- Septic Tank
- Sewer (Replace/ Proposed)
- Water (Replace/ Proposed)
- Disturbance Areas

- 1. Construct new, raised absorption field
- 2. Replace existing septic tank.
- 3. Replace wastewater distribution lines and lift stations
- 4. Replace potable water distribution lines.
- 5. Remove existing doghouse structure over well and construct new pump building.

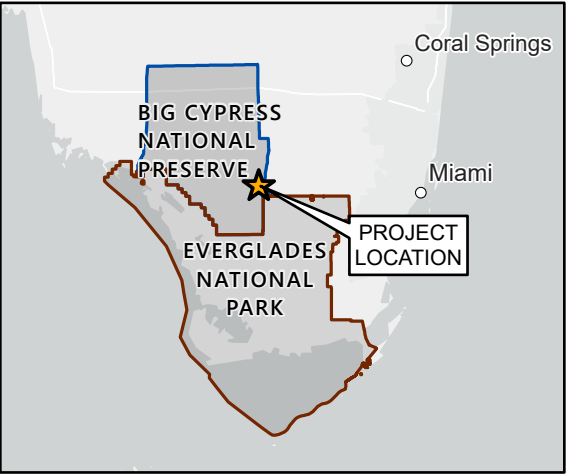






- Project Limits
- Area of Potential Effect (APE)
- Proposed Well
- Septic Tank
- Sewer (Replace/ Proposed)
- Water (Replace/ Proposed)
- Disturbance Areas

- 1. Replace potable water distribution system.
- 2. Replace wastewater collection system (sewer lines, force mains, and left stations).
- 3. Construct a new well house.
- 4. Drill new well.
- 5. Abandon existing septic tanks and replace with new septic tanks.
- 6. Provide new, raised wastewater absorption field.
- 7. Replace absorption field with new, raised absorption field at new location.





## APPENDIX B: MITIGATION MEASURES

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## Mitigation Measures

The National Park Service (NPS) places a strong emphasis on avoiding, minimizing, and mitigating potentially adverse impacts. The following mitigation measures will be applied to avoid or minimize potential impacts from implementation of Alternative B (Preferred alternative / Proposed Action).

### *Vegetation and Wetlands*

Listed plant species-specific mitigation measures are outlined in the Biological Assessment (BA) completed for the Project. The jobsite supervisor and work crews must follow all mitigation measures identified in the BA. General mitigation measures for vegetation and wetlands include the following.

- All jobsites will be surveyed prior to the start of work by Everglades (EVER) Biological Resources staff or other qualified staff to determine there are no federally listed plant species present. If federally listed plant species are found within the jobsite, additional consultation with U.S. Fish and Wildlife Service (USFWS) will be required.
- All equipment staging will occur on developed, non-wetland areas.
- Where appropriate, fencing, flagging, or biological monitoring will be used to minimize disturbance to environmentally sensitive areas and listed species habitat.
- Where wetlands occur near construction activities, construction limits will be clearly demarcated, such as with fencing, to minimize the potential for wetland fill outside of the intended project area.
- To reduce potential for introduction of non-native organisms, all equipment used for the Project entering EVER will be kept clean and free from visible debris (e.g., mud, debris, plant materials).
- If necessary, and in coordination with the EVER Botanist, any fill, mulch, reseeding, and sod material brought into the park must be free of non-native, invasive plants and animals, and noxious weeds.

### *Wildlife*

Listed species-specific mitigation measures are outlined in the BA completed for the Project. The jobsite supervisor and work crews must follow all mitigation measures identified in the BA submitted to USFWS. General mitigation measures for wildlife include the following.

- All jobsites will be surveyed prior to the start of work by EVER Biological Resources staff or other qualified staff to determine there are no federally listed species present.
- Construction work windows will be required depending on whether a listed species has the potential to occur in the project area limits as identified by EVER Biological Resources staff.
- The EVER Biological Resource Branch Chief (BRBC) or delegate will inform the jobsite supervisor and work crews of the description and potential presence of federally designated threatened and endangered species within the jobsite during an environmental awareness training.

- The jobsite supervisor must report all listed species sightings within the jobsite to the EVER BRBC (or delegate) in a timely manner.
- If any federally listed species is observed within the jobsite, the jobsite supervisor will stop all work at the jobsite and work may only resume once the animal leaves on its own and is no longer present within the jobsite. Upon consultation, EVER BRBC (or delegate) may authorize work to continue if a buffer distance can be used to avoid impacts to animals and nests.
- The jobsite supervisor must report any injured or dead animals encountered at the jobsite to the EVER BRBC (or delegate).
- No living, injured, or dead listed species will be harmed, handled, or removed from the jobsite.
- No trees or branches with cavities will be disturbed or removed without a prior inspection by EVER Biological Resources staff or other qualified staff.
- All jobsites will be kept clean and clear of debris, to the extent possible, throughout the duration of the work to protect the surrounding environment and wildlife.
- Once work is completed, all jobsites will be inspected to ensure no debris or equipment is left behind that might injure or entrap wildlife or degrade the environmental conditions of the area and designated critical habitat.
- All work shall only be conducted during daylight hours to minimize disturbance to wildlife.
- Compliance with the Migratory Bird Treaty Act of 1918 is mandatory. Jobsite work will be timed to avoid migratory bird nesting periods and/or vegetation visually inspected for nests by EVER Biological Resources staff or other qualified staff before it is treated or removed.

### ***Cultural Resources***

- In accordance with 36 CFR Part 800 and the 2008 NPS Programmatic Agreement Section VI, if changes are made to the proposed activities or previously unidentified cultural resources are discovered during project implementation, all work in that area must stop, and the Superintendent, Park Archaeologist, and Chief of Cultural Resources must be immediately notified.
- If items protected by the Native American Graves Protection and Repatriation Act are discovered during project implementation, all activities must cease in the area of discovery, and immediate notice made to the Superintendent, Park Archaeologist, and Chief of Cultural Resources. The Superintendent or Chief of Cultural Resources will notify the appropriate federally recognized Indian Tribes/Organizations and State Historic Preservation Office.
- An archaeological monitor will be required during all ground-disturbing activities within Historic Districts or areas of cultural concern.

## ***Hydrology and Water Quality***

- An Erosion and Sediment Control plan and Stormwater Pollution Prevention Plan (SWPPP) will be developed to comply with the Florida Department of Environmental Protection (FDEP) National Pollutant Discharge Elimination System (NPDES) requirements and a FDEP NPDES Construction General Permit will be obtained. The SWPPP will be developed to address all stormwater management Best Management Practices (BMP).
- Pre-and post-construction erosion control BMPs for drainage, erosion, and sediment control will be implemented to prevent or reduce runoff from entering the water column.
- Erosion and sediment control BMPs will be inspected and maintained on a regular basis and after each measurable rainfall to ensure they are functioning properly.
- Equipment must be free of any fluid leaks (fuel, oil, hydraulic fluid, etc.) upon arrival to the work site and will be inspected at the beginning of each shift for leaks. Leaking equipment will be removed off site for necessary repairs before the commencement of work.
- Appropriate measures will be employed to prevent or control spills of fuels, lubricants, or other contaminants from entering waterways or wetlands. Actions will be consistent with state water quality standards and Clean Water Act, Section 401 certification requirements.
- All BMPs required by regulatory permits will be implemented and adhered to.

## ***Visitor Use and Experience***

- Visitors will be informed of construction activities by posting information at the park website, social media, and visitor centers.
- Construction activities during peak visitor-use periods will be limited or avoided to the extent possible.
- Temporary short-term full closures will be for the minimal time required to complete the work activity. To the extent possible, partial and/or limited closures of visitor access will be implemented.
- Prior to commencing work at the Loop Road and Hidden Lake Environmental Education Centers, the Project Leader will coordinate with the Director of Education to avoid or minimize potential effects on environmental education programs.
- Prior to commencing work in the Flamingo, Long Pine Key, and Shark Valley Areas, the Project Leader will notify concessioners in coordination with the EVER Commercial Services Program to avoid and minimize potential conflicts with visitor use and experience during the Project.

### ***Human Health and Safety***

- Spill containment kits and fire extinguishers will be available on site at all times.
- NPS construction contract standards during construction will be followed, including implementation of an accident prevention program, installation of warning signs at the construction sites and along the nearby parking lots, and installation and maintenance of construction fences around the construction sites to prevent non-contractors and the public from entering the construction areas.

### ***Climate Change***

- Vehicle and equipment idling times when parked will be limited to reduce greenhouse gas emissions.



# **APPENDIX C: ALTERNATIVES CONSIDERED BUT DISMISSED**

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## Alternatives / Options Considered but Dismissed

Tables C-1 through C-4 present the alternatives and options that were considered but dismissed from further study for each area and site.

**Table C-1: Alternatives and Options Dismissed from Further Study in Flamingo Area**

Project Area	System	Dismissed from Further Study
Flamingo Area	Water System	<ul style="list-style-type: none"> <li>Limited replacement of existing water piping</li> </ul>
Flamingo Area	Wastewater System	<ul style="list-style-type: none"> <li>Remove old wastewater discharge pond northwest of the loop campground</li> <li>Limited replacement of existing sewer piping</li> <li>Construct a new wastewater treatment plant sited at the adjacent retention pond verses the percolation pond</li> <li>Construct a completely exposed wastewater treatment plant with mechanical, electrical, and chemical equipment located under canopies and exterior tankage</li> </ul>
West Lake Area	Water System	<ul style="list-style-type: none"> <li>Drill new wells and install treatment option (no desalinization)</li> <li>Construct a new surface water treatment building</li> <li>Include additional treatment (non-purified water, Dermal)</li> </ul>
West Lake Area	Wastewater System	<ul style="list-style-type: none"> <li>Replace the existing absorption field at its current location</li> </ul>

**Table C-2: Alternatives and Options Dismissed from Further Study in Shark Valley Area**

Project Area	System	Dismissed from Further Study
Shark Valley Tower Area	Water System	<ul style="list-style-type: none"> <li>Retain the existing water line from well to observation tower</li> <li>Replace the wellhouse and treatment building at a new location</li> </ul>
Shark Valley Tower Area	Wastewater System	<ul style="list-style-type: none"> <li>Replace the wastewater absorption field at a new location south the tram drop off</li> </ul>
Shark Valley Administration and Visitor Center	Water System	<ul style="list-style-type: none"> <li>Continue well water and treatment as the potable water source and construct a new well and pumphouse</li> </ul>
Shark Valley Administration and Visitor Center	Wastewater System	<ul style="list-style-type: none"> <li>Upgrade well size to include flushing toilet demands in addition to existing demands</li> <li>Evaluate the raised bed absorption field, located on north edge of the administration complex area, to serve the visitor center and new administration center</li> </ul>

**Table C-3: Alternatives and Options Dismissed from Further Study in Main Entrance/Royal Palm Area**

<b>Project Area</b>	<b>System</b>	<b>Dismissed from Further Study</b>
Long Pine Key Campground	Water System	<ul style="list-style-type: none"> <li>• Drill two new wells instead of one</li> <li>• Consider reusing the existing well house for treatment</li> </ul>
Long Pine Key Campground	Wastewater System	<ul style="list-style-type: none"> <li>• Provide a single septic tank, lift station, and raised absorption field for each collocated comfort station and bathhouse</li> </ul>
Royal Palm Visitor Center	Water System	<ul style="list-style-type: none"> <li>• Consider drilling two new potable water wells instead of one</li> <li>• Design a new well house on the west side of the area adjacent to the existing well house and remove the existing well house</li> <li>• Replace the potable water distribution system</li> </ul>
Royal Palm Visitor Center	Wastewater System	<ul style="list-style-type: none"> <li>• Upgrade the wastewater absorption fields south of the parking lot</li> <li>• Move the wastewater absorption fields to south median</li> <li>• Move the wastewater absorption fields to north median</li> </ul>
Hidden Lake Education Center	Water System	<ul style="list-style-type: none"> <li>• Update the potable water well head to meet Florida code requirements and replace the pump</li> <li>• Update the potable water well house and evaluate for chemical storage and ventilation</li> </ul>
Hidden Lake Education Center	Wastewater System	No additional alternatives were considered at this site
Daniel Beard Center	Water System	No additional alternatives were considered at this site
Daniel Beard Center	Wastewater System	<ul style="list-style-type: none"> <li>• Upgrade the raised bed absorption field instead of replacement</li> </ul>
Dr. Bill Robertson Center	Water System	No additional alternatives were considered at this site
Dr. Bill Robertson Center	Wastewater System	<ul style="list-style-type: none"> <li>• Upgrade of the raised bed absorption field instead of replacement</li> </ul>
Ernest F. Coe Visitor Center and Headquarters	Water System	<ul style="list-style-type: none"> <li>• Implement larger water distribution lines for fire water storage</li> </ul>
Ernest F. Coe Visitor Center and Headquarters	Wastewater System	No additional alternatives were considered at this site
Pine Island Residential/Maintenance Area	Water System	No additional alternatives were considered at this site
Pine Island Residential/Maintenance Area	Wastewater System	<ul style="list-style-type: none"> <li>• Implement injection wells</li> <li>• Replace the wastewater treatment plant adjacent to existing in the recycle center area</li> <li>• Construct a prefabricated structure for the new wastewater treatment plant</li> </ul>

**Table C-4: Alternatives and Options Dismissed from Further Study in Loop Road Area**

<b>Project Area</b>	<b>System</b>	<b>Dismissed from Further Study</b>
Tamiami Ranger Station	Water System	No additional alternatives were considered at this site
Tamiami Ranger Station	Wastewater System	No additional alternatives were considered at this site
Loop Road Area Education Center	Water System	<ul style="list-style-type: none"><li>• Keep filters and hydropneumatics tank with the well in the new pump building</li></ul>
Loop Road Area Education Center	Wastewater System	No additional alternatives were considered at this site
Trail Center Area	Water System	<ul style="list-style-type: none"><li>• Install a new well and construct a new well house at the same location</li></ul>
Trail Center Area	Wastewater System	No additional alternatives were considered at this site

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# **APPENDIX D: ISSUES DISMISSED FROM DETAILED ANALYSIS**

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## Resource Topics and Issues Considered but not Retained for Detailed Analysis

National Environmental Policy Act (NEPA) and Council on Environmental Quality regulations direct federal agencies to prepare NEPA documents that are, “concise, clear, and to the point.” The National Park Service (NPS) considered several issues and resource topics during the development of this Environmental Assessment (EA) but ultimately dismissed them from detailed analysis for the following reasons:

- Potential environmental impacts associated with the issue are not central to the proposal or of critical importance.
- Detailed analysis of environmental impacts related to the issue is not necessary to make a choice between alternatives.
- The environmental impacts associated with the issue are not contentious among the public or other agencies.
- Impacts to the resource are not anticipated or are expected to be negligible (i.e., the impact to the resource is barely perceptible and not measurable and confined to a small area).

Details on the dismissals for these issues and resource topics are described below.

### Air Quality and Greenhouse Gas Emissions

Everglades National Park (EVER) is located within a designated attainment area<sup>1</sup> under the Clean Air Act. Improving and/or replacing potable water treatment and distribution systems and wastewater collection and treatment systems at key facilities managed by the park (Project) would have negligible effects on air quality as compared to regional emissions. There would be short term, localized impacts, increasing greenhouse gas emissions during the construction period from the use of construction equipment. However, these impacts would be negligible as compared to greenhouse gas emissions from vehicular traffic for all of EVER, and only occur while construction equipment is in use. The NPS would avoid or limit impacts through mitigation measures and Best Management Practices (BMP) used during construction. An example of a mitigative measure or BMP is limiting construction vehicle and equipment idling times when equipment is parked, to reduce emissions. Another example is dust abatement mitigation measures for reducing dust from trucks hauling fill material. These measures include reducing fill haul distance or truck speed; reducing truck loaded fill haul volume to less than the allowable maximum; wetting the top of the fill loads on trucks; placing a tarp or a cover over fill loads; or reducing the daily allowed equipment operation times.

The new wastewater treatment plants (WWTP) would be fully enclosed and could generate additional heat inside the facilities. Proper heating, ventilation, and air conditioning equipment would be sized to operate at temperatures at least 75 °F (cooling) and 70 °F (heating) in office spaces and 85 °F (cooling) and 50 °F (heating) for non-office spaces. The operation of heating, ventilation, and air conditioning equipment at these facilities would

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<sup>1</sup> An attainment area is a geographic area where the air quality meets or is cleaner than the national standard.

contribute to greenhouse gas emissions. However, with advances in sustainable facility design; construction materials and techniques; and heating, ventilation, and cooling technology, it is anticipated that emissions would be meaningfully decreased compared to the continuous operation and maintenance of the current systems and facilities. Additionally, because greenhouse gases from the Project mix readily into the global pool of greenhouse gases, it is currently not possible to discern the effects of this project from the effects of all other sources worldwide, nor is it expected that attempting to do so would provide a practical or meaningful analysis of project effects. Potential regional and local variability in climate change effects add to the uncertainty regarding the actual intensity of this project's effects on global climate change. Further, emissions associated with this project are extremely small in the context of global atmospheric carbon dioxide making it impossible to measure the incremental cumulative impact on global climate from emissions associated with the Project.

## Environmental Justice

Presidential Executive Order 12898 requires all federal agencies to identify and address the disproportionately high and/or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. According to the U.S. Environmental Protection Agency, environmental justice is the,

“...fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs, and policies (USEPA, 2020).”

The NPS actively solicited public participation as part of the planning process and gave equal consideration to all input from persons regardless of age, race, income status, or other socioeconomic or demographic factors). There are two minority populations (Native Americans and Hispanics) in the vicinity of the Project; however, environmental justice was dismissed from additional analysis in this EA for the following reasons:

- The impacts associated with implementation of the Project would not disproportionately affect any minority or low-income population or community.
- Implementation of the Project would not result in any identified effects that would be specific to any minority or low-income community. Restrictions on travel or access to any area of EVER that would result from the Project would be equally applied to all visitors, regardless of race or socioeconomic standing.
- The Project would not result in destruction or disruption of community cohesion and economic vitality, displacement of public and private facilities and services, increased traffic congestion, and/or exclusion or separation of minority or low-income populations from the broader community.
- The environmental impacts associated with this topic are not central to the Project and are not necessary to make a reasoned choice between alternatives.

## **Ethnographic Resources**

Ethnographic resources include landscapes, objects, plants and animals, or sites and structures that are important to a people's sense of purpose or way of life. Although ethnographic resources exist in EVER, none have been identified in the 13 project area limits at this time and was dismissed from additional analysis in this EA; however, tribal input on the Project is pending.

## **Geology**

The improvements may include the excavation of soft material for the water and wastewater systems rehabilitation. However, no impacts to geologic features are anticipated. Where possible, fill material would be obtained on-site during any required excavation. If the Project requires a specific type and/or quality of fill, it may be obtained outside of project area limits from a permitted local or regional source. No commercial fill material sources have been selected at this time. The loss of native soils, potential for increased sediment during construction, and compaction of existing soils are discussed under the Vegetation, Rare Plants, Wetlands, and Soils resource section of the EA; therefore, Geology was dismissed from additional analysis in this EA.

## **Indian Trust Resources**

Indian Trust Resources are legal obligations of the U.S. government to protect tribal lands, assets, resources, and/or treaty rights as granted under treaty or another legal instrument. No trust treaties exist in EVER. The consideration of Indian Trust Resources (as specified in Director's Order 12, Secretary's Order 3175, and other policies/regulations) do not apply to the Project; therefore, this topic was dismissed from additional analysis in this EA.

## **Prime and Unique Farmlands**

There are no agricultural lands within the 13 project area limits; therefore, this topic was dismissed from additional analysis in this EA.

## **Socioeconomics**

The Project would not discernably affect socioeconomics. In the long-term, the Project would better accommodate existing and future visitation levels by addressing water and wastewater deficiencies in EVER. Therefore, visitor-related economic impacts from spending at nearby tourism-related businesses and attractions (Miccosukee Indian Village) and at the Flamingo Marina and EVER campgrounds would remain the same. Economic impacts related to the implementation of the Project would be one-time capital costs and would be short-term to the local and regional economy. Additionally, staffing (NPS and concessioners) would remain the same, resulting in no change in the current economic impact. Short-term impacts during construction activities may reduce the number of visitors and associated spending at the various project sites. However, NPS would avoid or limit construction activities during peak visitor-use periods to the extent possible to mitigate these short-term impacts. Therefore, this topic was dismissed from additional analysis in this EA.

## **Soundscapes/Noise**

Construction activities would have short term, temporary impacts on noise. Any impacts on wildlife and visitors to EVER from construction noise are discussed under “Wildlife and Species of Special Concern” and “Visitor Use and Experience.” Therefore, this topic was dismissed from additional analysis in this EA.

## **Wilderness**

The Project is outside of wilderness boundaries as designated under the National Wilderness Preservation System. No impacts to wilderness are anticipated because of the Project, and this topic was dismissed from additional analysis in this EA.

# **APPENDIX E: WETLAND AND FLOODPLAIN STATEMENT OF FINDINGS**

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EVER 290451 – Rehabilitation of Parkwide Water and  
Wastewater Systems Project

Everglades National Park—Florida

National Park Service  
U.S. Department of the Interior



November 2023

Rehabilitation of Parkwide Water and Wastewater Systems Project



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# Wetland and Floodplain Statement of Findings

Prepared for the National Park Service



DRAFT

November 2023

Rehabilitation of Parkwide Water and Wastewater Systems Project

# Wetland and Floodplain Statement of Findings

**Prepared for**

National Park Service

Everglades National Park – Florida

**Prepared by**

Anchor QEA, LLC

6720 South Macadam Avenue, Suite 300

Portland, Oregon 97219



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## ABBREVIATIONS

Big Cypress.....	Big Cypress National Preserve
BMP.....	best management practice
CEPP.....	Central Everglades Planning Project
CERP .....	Comprehensive Everglades Restoration Plan
Cowardin system .....	Classification of Wetlands and Deepwater Habitats of the United States
CMECS .....	Coastal and Marine Ecological Classification Standard
DO .....	Director's Order
E1UBLx.....	estuarine, subtidal, unconsolidated bottom, subtidal, excavated
E2EM1P.....	estuarine, intertidal, emergent, persistent, irregularly flooded
E2SS3P .....	estuarine, intertidal, scrub-shrub, broad-leaved evergreen, irregularly flooded
E2USHx.....	estuarine, intertidal, unconsolidated shore, permanently flooded, excavated
E2USKx.....	estuarine, intertidal, unconsolidated shore, artificially flooded, excavated
EA.....	Environmental Assessment
E. coli.....	Escherichia coli
EO .....	Executive Order
EVER.....	Everglades National Park
F.A.C.....	Florida Administrative Code
FEMA .....	Federal Emergency Management Agency
FFRMS .....	Federal Flood Risk Management Standard
FGDC .....	Federal Geographic Data Committee
FDOT.....	Florida Department of Transportation
FL.....	functional loss
FLUCCS .....	Florida Land Use, Cover and Forms Classification System
HDPE.....	high-density polyethylene
HQ .....	National Park Headquarters
Loop Road.....	County Road 94
MBR .....	membrane bioreactor
NAVD88 .....	North American Vertical Datum of 1988
NFHL.....	National Flood Hazard Layer
NPS .....	National Park Service
PABH .....	Permanently flooded
PEM1B.....	palustrine emergent, persistent, saturated
PEM1Cx .....	palustrine emergent, persistent, seasonally flooded, excavated

PEM1/PSS3B .....	palustrine emergent, persistent, palustrine scrub-shrub, broad-leaved evergreen, saturated
PEM1/PSS3C .....	palustrine emergent, persistent, palustrine scrub-shrub, broad-leaved evergreen, seasonally flooded
PFO2/PSS3/PEM1C .....	palustrine forested, needle-leaved deciduous, palustrine scrub-shrub, broad-leaved evergreen, palustrine emergent, persistent, seasonally flooded
PFO3C .....	palustrine forested, broad-leaved evergreen, seasonally flooded
project.....	Rehabilitation of Parkwide Water and Wastewater Systems Project
PSS3F.....	palustrine scrub-shrub, broad-leaved evergreen, semipermanently flooded
PSS3/PEM1F .....	palustrine scrub-shrub, broad-leaved evergreen, palustrine emergent, persistent, semipermanently flooded
PSS3/PEM1/PFO3C .....	palustrine scrub-shrub, broad-leaved evergreen, palustrine emergent, persistent, palustrine forested, broad-leaved evergreen, seasonally flooded
PUBH .....	palustrine unconsolidated bottom, permanently flooded
PUBHx .....	palustrine unconsolidated bottom, permanently flooded, excavated
PUB/PABH .....	palustrine unconsolidated bottom, palustrine aquatic bed, permanently flooded
ROW .....	right of way
RV .....	recreational vehicle
SOF.....	Statement of Findings
SR.....	State Road
UMAM.....	Uniform Mitigation Assessment Method
UV .....	ultraviolet
Visitor Center .....	Earnest F. Coe Visitor Center
WCS .....	Wetlands Classification Standard

# 1 Introduction

The purpose of this Statement of Findings (SOF) document is to comply with National Park Service (NPS) wetland and floodplain protection procedures for the proposed Rehabilitation of Parkwide Water and Wastewater Systems Project (project) in the Everglades National Park (EVER) and Big Cypress National Preserve (Big Cypress) located in Miami-Dade County and Monroe County, Florida (NPS 2023). The purpose of the project is to address the physical and operational deficiencies of the potable water and wastewater systems managed by EVER by improving the efficiency, operation, and safety of the system, and updating it for climate resiliency. The proposed project consists of the replacement of aging potable water distribution and wastewater collection systems in the Pine Island District, the Loop Road District (including several systems managed by EVER within Big Cypress), the Shark Valley District, and the Flamingo District (NPS 2023).

Executive Order (EO) 11990 "Protection of Wetlands" requires the NPS and other federal agencies to evaluate the likely impacts of federal actions in wetlands. Per NPS Director's Order (DO) #77-1: Wetland Protection and NPS Procedural Manual 77-1 (NPS 2016) provide NPS policies and procedures to comply with EO 11990.

EO 11988 *Floodplain Management* and EO 13690 *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input* require the NPS and other federal agencies to evaluate the impacts of federal actions within floodplains. Per NPS DO #77-2: Floodplain Management and NPS Procedural Manual 77-2 (NPS 2002), provide NPS policies and procedures to comply with EOs. EO 11988 was issued "to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative." EO 13690 was issued to establish a Federal Flood Risk Management Standard (FFRMS) for federally funded projects to improve the nation's resilience to floods and to ensure new federal infrastructure will last as long as intended. Guidance for the FFRMS is described in EO 13690 and the associated implementation guidelines. In addition, it is NPS policy, as described in Section 4.6.4 of the NPS Management Policies 2006, to manage floodplains for the preservation of floodplain values, to minimize potentially hazardous conditions associated with flooding, and to comply with the NPS Organic Act and all other federal laws and EOs relating to management of floodplains. This SOF is prepared in accordance with the guidelines found in NPS DO #77-2 (Floodplain Management) and to comply with EO 11988 and EO 13690.

The Wetland and Floodplain SOF will be published and made available for public review with the Environmental Assessment (EA) (NPS 2023) being prepared for this project.



## 2 Project Description (Preferred Alternative)

The NPS proposes to replace the potable water distribution and wastewater collection systems in the Flamingo District; the Pine Island District; the Shark Valley District; and the Loop Road District including the Tamiami Ranger Station, Loop Road Environmental Education Center, and the Trail Center Housing Area (NPS 2023). This work includes rehabilitating the reverse-osmosis potable water treatment plant in the Flamingo District; replacing the wastewater treatment plants in the Flamingo and Pine Island districts in new hurricane-hardened climate-controlled structures; replacing electrical infrastructure that supports water/wastewater systems from meter to utility (secondary systems); replacing control systems including control system equipment and programming to enable remote monitoring of all utility sites; replacing potable water distribution lines and wastewater collection lines with new high-density polyethylene (HDPE) piping; and repairing and replacing potable water well houses, sewage lift stations, septic tanks, wet wells, maintenance holes, water/sewer meters, pumps and associated apparatuses needed for the distribution, collection, and treatment of potable water and wastewater.

### 2.1 Purpose and Need

The purpose of the proposed action is to address the physical and operational deficiencies of the potable water and wastewater systems managed by EVER by improving the system's efficiency, operation, safety, and climate resiliency. The current potable water and wastewater infrastructure is outdated and in need of repair and upgrade. The existing systems are critically deficient, expensive to maintain, and many are only partially operable or at the end of their service life. The worn network of buried pipes and equipment frequently require emergency repairs due to leaks and failures, especially at buried junctions where original and newer piping hardware connect. The potable water systems' well equipment and distribution lines are dated, and *Escherichia coli* (*E. coli*) contamination has been recorded. Rising groundwater levels and wide ranges in seasonal use are causing problems with aging septic systems, leach fields, and wastewater treatment facilities. Use of septic systems at the end of their service life risk system failure and contamination of the sensitive Everglades ecosystem. Additionally, infrastructure, particularly near the ocean, can corrode/deteriorate due to saltwater, high ultraviolet (UV) index, and temperature of the Everglades.

### 2.2 Other Alternatives Considered

Under Alternative A (No Action Alternative), the NPS would maintain the existing conditions of the water and wastewater systems managed by EVER. No improvements would be made except for existing routine maintenance of any feature or structure within EVER. The No Action Alternative is used as a basis to compare and evaluate potential impacts from the other project alternatives.

### 3 Description of Wetlands

The project site includes specific work areas in the Pine Island District, the Loop Road District, the Shark Valley District, and the Flamingo District as described in Section 2. Wetlands were field delineated in these work areas by Anchor QEA wetland biologists on January 16, 17, 18, and 19, 2023, along with initial wetland reconnaissance investigations conducted on October 17, 18, and 19, 2022. Anchor QEA biologists delineated 23 wetlands (Wetlands A through W) totaling 3,623,393 square feet (83.18 acres) within the study area (Figures 1a through 1r in Attachment A). The wetlands and other waters were classified according to the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin system; Cowardin et al. 1979), the Federal Geographic Data Committee (FGDC) Wetlands Classification Standard (WCS; FGDC 2013), the Coastal and Marine Ecological Classification Standard (CMECS; FGDC 2012), and the Florida Land Use and Cover Classification System (FLUCCS system; FDOT 1999). The individual characteristics of each of these areas are summarized in Table 1 and in the following subsections. Additional details can be found in the Wetland Preliminary Jurisdictional Determination Report (Anchor QEA 2023).

**Table 1**  
**Potential Jurisdictional Wetlands and Other Waters Delineated Within the Study Area**

District	Wetland/ Other Water	Cowardin/WCS/CMECS Classification System	FLUCCS Classification System	On-Site Area Square Feet	On-Site Area Acres
<b>Pine Island District</b> Park Headquarters and Visitor Center	Wetland A	PSS3/PEM1/PFO3C	Wetland Scrub, Wet Prairies, and Hydric Pine Savanna	44,058	1.01
<b>Pine Island District</b> Park Headquarters and Visitor Center	Wetland B	PEM1Cx	Freshwater Marshes	25,212	0.58
<b>Pine Island District</b> Pine Island Maintenance Center and Residential Area	Wetland C	PEM1/PSS3C	Freshwater Marshes and Wetland Scrub	309	0.01
<b>Pine Island District</b> Pine Island Maintenance Center and Residential Area	Wetland D	PEM1/PSS3C	Freshwater Marshes and Wetland Scrub	2,164	0.05
<b>Pine Island District</b> Pine Island Maintenance Center and Residential Area	Wetland E	PEM1/PSS3C	Freshwater Marshes and Hydric Pine Savanna	89,980	2.07
<b>Pine Island District</b> Royal Palm Visitor Center	Wetland F	PEM1/PSS3C and PUBHx	Wet Prairie, Wetland Scrub, and Inland Ponds and Sloughs	27,824	0.64
<b>Pine Island District</b> Hidden Lake Environmental Education Center	Wetland G	PEM1/PSS3B	Wet Prairies and Wetland Scrub	242	0.01
<b>Pine Island District</b> Hidden Lake Environmental Education Center	Hidden Lake	PUBHx	Lakes	27,582	0.63
<b>Pine Island District</b> Daniel Beard Center	Wetland W	PEM1B	Wet Prairies	76,534	1.76
<b>Loop Road District</b> Trail Center Housing Area	Wetland H	PFO2/PSS3/PEM1C	Cypress, Wetland Scrub, and Wet Prairie	16,585	0.38

District	Wetland/ Other Water	Cowardin/WCS/CMECS Classification System	FLUCCS Classification System	On-Site Area Square Feet	On-Site Area Acres
<b>Loop Road District</b> Trail Center Housing Area	Trail Center Pond	PUBHx	Lakes	122,574	2.81
<b>Loop Road District</b> Tamiame Ranger Station	Wetland I	PSS3F and PABH	Wetland Scrub and Inland Ponds and Sloughs	33,710	0.77
<b>Shark Valley District</b> Shark Valley Administrative Area and Visitor Center	Wetland J	PSS3/PEM1F and PUB/PABH	Wetland Scrub, Wet Prairie, and Inland Ponds and Sloughs	348,000	7.99
<b>Shark Valley District</b> Shark Valley Observation Tower	Wetland K	PSS3/PEM1F and PUBH	Wetland Scrub, Wet Prairie, and Inland Ponds and Sloughs	66,230	1.52
<b>Flamingo District</b> Flamingo Wastewater Treatment Plant	Wetland L	E2SS3P, E2EM1P, and E2USHx	Mangrove Swamp, Saltwater Marshes, and Slough Waters	314,629	7.22
<b>Flamingo District</b> Flamingo Wastewater Treatment Plant	Percolation Pond	E2USKx	Sewage Treatment Pond	31,741	0.73
<b>Flamingo District</b> Flamingo Wastewater Treatment Plant	Overflow Pond	E2USKx	Sewage Treatment Pond	16,014	0.37
<b>Flamingo District</b> Flamingo Water Treatment Plant, and Residential Area	Wetland M	E2SS3P and E2EM1P	Mangrove Swamp and Saltwater Marshes	534,000	12.26
<b>Flamingo District</b> Flamingo Water Treatment Plant, and Residential Area	Wetland N	PEM1B	Wet Prairies	15,202	0.35
<b>Flamingo District</b> Flamingo Water Treatment Plant, and Residential Area	Wetland O	E2EM1P and E2SS3P	Saltwater Marshes and Mangrove Swamp	92,438	2.12
<b>Flamingo District</b> Flamingo Water Treatment Plant, and Residential Area	Flamingo Canal and Marina	E1UBLx	Streams and Waterways and Marinas	408,836	9.39

District	Wetland/ Other Water	Cowardin/WCS/CMECS Classification System	FLUCCS Classification System	On-Site Area Square Feet	On-Site Area Acres
<b>Flamingo District</b> Flamingo Visitor Center and Campground	Wetland P	E2SS3P and E2EM1P	Mangrove Swamps, Shorelines	61,687	1.42
<b>Flamingo District</b> Flamingo Visitor Center and Campground	Wetland Q	E2EM1P	Saltwater Marshes	24,192	0.56
<b>Flamingo District</b> Flamingo Visitor Center and Campground	Wetland R	E2SS3P	Mangrove Swamps and Shorelines	107,352	2.46
<b>Flamingo District</b> Flamingo Visitor Center and Campground	Wetland S	E2SS3P and E2EM1P	Saltwater Marshes and Shorelines	1,272,645	29.22
<b>Flamingo District</b> Flamingo Visitor Center and Campground	Wetland T	E2SS3P and E2EM1P	Saltwater Marshes and Shorelines	57,481	1.32
<b>Flamingo District</b> Flamingo Visitor Center and Campground	Wetland U	E2SS3P and E2EM1P	Mangrove Swamps and Saltwater Marshes	399,070	9.16
<b>Flamingo District</b> West Lake Area	Wetland V	E2SS3P	Mangrove Swamps	13,849	0.32
<b>Total On-Site Wetland Area</b>				3,623,393	83.18
<b>Total On-Site Other Waters Area</b>				606,747	13.94

### 3.1 Pine Island District

The Pine Island District consists of proposed work areas at the National Park Headquarters (HQ) and Visitor Center, Pine Island Maintenance Center and Residential Area, Royal Palm Visitor Center, Hidden Lake Environmental Education Center, Bill Robertson Center, Dan Beard Center, and the Long Pine Key Campground (NPS 2023).

#### 3.1.1 Park Headquarters and Visitor Center

The HQ and Visitor Center project site is located on the north side of State Route 9336 (SR 9336) near the entrance to the east side of EVER (NPS 2023). Habitats in the maintained portions are characterized by buildings, paved parking, concrete walkways, wooden boardwalks, and landscaped/mowed open spaces. The mowed areas are associated with road rights-of-way (ROWS), parking lot meridians, and soft turf areas (e.g., grass lawns).

Wetlands delineated within the HQ and Visitor Center project site include two freshwater wetlands (Wetlands A and B) that are within the Taylor Slough watershed and continue off site (Figure 1a in Attachment A). Wetland A consists primarily of Graminoid Freshwater Prairie wetland habitat with areas of Pine Rockland-Shrubs habitat (Ruiz et al. 2021). On-site dominant vegetation in the tree (canopy) and shrub/sapling (subcanopy) layers included green buttonwood (*Conocarpus erectus*), poisonwood (*Metopium toxiferum*), Florida bully (*Sideroxylon reclinatum subsp. austrofloridense*), and Florida strangler fig (*Ficus aurea*). In the herbaceous layer, sawgrass (*Cladium jamaicense*), muhly grass (*Muhlenbergia capillaris*), broadleaf arrowhead (*Sagittaria latifolia*), starrush whitetop (*Rhynchospora colorata*), musky bushmint (*Hyptis alata*), St. Andrew's cross (*Hypericum hypericoides*), saltmarsh umbrella sedge (*Fuirena breviseta*), smallfruit primrose-willow (*Ludwigia microcarpa*), and lax hornpod (*Mitreola petiolata*) were common. The on-site portion of Wetland A is classified as a palustrine scrub-shrub, broad-leaved evergreen, palustrine emergent, persistent, palustrine forested, broad-leaved evergreen wetland with a seasonally flooded water regime (PSS3/PEM1/PFO3C) under the Cowardin system and the FGDC WCS. Under the FLUCCS system, the on-site portion of Wetland A is classified as Wetland Scrub (FLUCCS code 631), Wet Prairies (FLUCCS code 643), and Hydric Pine Savanna (FLUCCS code 626) wetland habitats.

Wetland B consists of an excavated pond dominated by cattail (*Typha* sp.) and sawgrass. The on-site portion of Wetland B is classified as a palustrine emergent, persistent, seasonally flooded, excavated (PEM1Cx) wetland under the Cowardin system and the FGDC WCS. Under the FLUCCS system, the on-site portion of Wetland B is classified as Freshwater Marshes (FLUCCS code 641) wetland habitat.



### 3.1.2 Pine Island Maintenance Center and Residential Area

The Pine Island Maintenance Center and Residential Area project site is located down a spur road near the entrance to the east side of EVER on the south side of SR 9336 (NPS 2023). On the eastern side of the spur road south of SR 9336, a previously disturbed laydown area is located near an unnamed lake feature. The laydown area is within the project site, but the lake is outside the boundaries. Habitats in the maintained portions of the Pine Island Maintenance Center and Residential Area are characterized by maintenance facilities, paved parking areas, a looped road with administrative residences and driveways, and landscaped/mowed open spaces. The mowed areas are associated with road ROWs, parking lot meridians, and soft turf areas (e.g., grass lawns).

Wetlands delineated within the Pine Island Maintenance Center and Residential Area project site and along the spur road north of the project site include three freshwater wetlands (Wetlands C, D, and E) that are within the Taylor Slough watershed (Figures 1b through 1d in Attachment A). Wetlands D and E continue off site. Wetland C is a small herbaceous and scrub-shrub wetland adjacent to Tropical Hardwood Hammock and Pine Rockland-Shrubs habitats (Ruiz et al. 2021). Dominant vegetation included broadleaf arrowhead, cattail (*Typha* sp.), and knotweed (*Polygonum* sp.) in the herbaceous layer and coastal plain willow (OBL) in the subcanopy layer. The on-site portion of Wetland C is classified as a palustrine emergent, persistent, palustrine scrub-shrub, broad-leaved evergreen, seasonally flooded (PEM1/PSS3C) wetland under the Cowardin system and the FGDC WCS. Under the FLUCCS system, Wetland C is classified as Freshwater Marshes (FLUCCS code 641) and Wetland Scrub (FLUCCS code 631) wetland habitats.

Wetland D consists of Short Sawgrass Marsh-Dense Pine habitat that is adjacent to Pine Rockland-Graminoids and Pine Rockland-Shrubs habitats (Ruiz et al. 2021). On-site dominant vegetation included starrush whitetop, pennywort (*Hydrocotyle* sp.), spikerush (*Eleocharis* sp.), sawgrass, and muhly grass in the herbaceous layer and coastal plain willow in the subcanopy. The on-site portion of Wetland D is classified as a PEM1/PSS3C wetland under the Cowardin system and the FGDC WCS. Under the FLUCCS system, Wetland D is classified as Freshwater Marshes (FLUCCS code 641) and Wetland Scrub (FLUCCS code 631) wetland habitats.

Wetland E consists predominantly of Graminoid Freshwater Prairie habitat with Pine Rockland-Graminoids and Pine Rockland-Mixed habitats (Ruiz et al. 2021). On-site dominant vegetation included swamp-lily, sawgrass, broadleaf arrowhead, muhly grass, cattail (*Typha* sp.), and goldenrod (*Solidago* sp.) in the herbaceous layer and green buttonwood, poisonwood, and cabbage palm (*Sabal palmetto*) in the subcanopy. The on-site portion of Wetland E is classified as a PEM1/PSS3C wetland under the Cowardin system and the FGDC WCS. Under the FLUCCS system, Wetland E is classified as Freshwater Marshes (FLUCCS code 641) and Hydric Pine Savanna (FLUCCS code 626) wetland habitats.

### 3.1.3 *Royal Palm Visitor Center*

The Royal Palm Visitor Center project site is located at the end of Royal Palm Road off SR 9336 approximately 1.7 miles west of the EVER entrance gate (NPS 2023). Habitats in the maintained portions consist of the Visitor Center, a well house, an abandoned well house, an abandoned utility building, paved parking and sidewalks, maintained grass lawns, and two trailheads (Gumbo Limbo Trail and Anhinga Trail). The Anhinga Pond is also present.

Wetlands delineated within the Royal Palm Visitor Center project site include one freshwater wetland (Wetland F) associated with the Anhinga Pond that are within the Taylor Slough watershed and continue off site (Figure 1e in Attachment A). Wetland F consists of Willow Scrub-Sawgrass Marsh, Willow Shrubland, Short Sawgrass Marsh-Dense, and Mixed Graminoid Freshwater Marsh habitats with areas of open water (Ruiz et al. 2021). It consists of Willow Scrub-Sawgrass Marsh, Willow Shrubland, Short Sawgrass Marsh-Dense, and Mixed Graminoid Freshwater Marsh habitats with areas of open water (Ruiz et al. 2021). On-site dominant vegetation included willow in the subcanopy and spatterdock (*Nuphar advena* spp. *advena*), sawgrass, southern shield fern (*Thelypteris kunthii*), water-primrose (*Ludwigia* sp.), and common reed (*Phragmites australis*) in the herbaceous layer. The on-site portion of Wetland F is classified as a PEM1/PSS3C wetland and as a palustrine unconsolidated bottom, permanently flooded, excavated (PUBHx) under the Cowardin system and the FGDC WCS. Under the FLUCCS system, Wetland F is classified as Wet Prairie (FLUCCS code 643), Wetland Scrub (FLUCCS code 631), and Inland Ponds and Sloughs (FLUCCS code 616) wetland habitats.

### 3.1.4 *Hidden Lake Environmental Education Center*

The Hidden Lake Environmental Education Center project site is located west of Royal Palm Road and south of Research Road on the north side of Hidden Lake (NPS 2023). Habitats in the maintained portions of the education center consist of a well house, two sheds, a dock, picnic shelter, comfort station with composting toilets, and tent platforms. Hidden Lake is also located in and adjacent to the education center.

Wetlands delineated within the Hidden Lake Environmental Education Center project site include one freshwater wetland (Wetland G) and a small portion of a freshwater, deepwater habitat (Hidden Lake) that are within the Taylor Slough watershed (Figures 1f and 1g in Attachment A). Wetland G is primarily an herbaceous wetland that is periodically maintained (e.g., mowed, pruned) and surrounded by Tropical Hardwood Hammock and Tropical Hardwood Shrubland habitats (Ruiz et al. 2021). Dominant vegetation included Indian pennywort, marsh pennywort, frogfruit, sedge, and other various unidentified forbs and grasses in the maintained (e.g., mowed) portions of the herbaceous layer and a minor component of willow in the subcanopy layer. Wetland G is classified as a PEM1/PSS3 wetland with a saturated (B) water regime under the Cowardin system and the FGDC

WCS. Under the FLUCCS system, Wetland G is classified as Wet Prairies (FLUCCS code 643) and Wetland Scrub (FLUCCS code 631) wetland habitats.

Hidden Lake is surrounded by Tropical Hardwood Hammock and Tropical Hardwood Shrubland habitats (Ruiz et al. 2021). Dominant woody vegetation surrounding Hidden Lake included Florida strangler fig, live oak (*Quercus virginiana*), false tamarind (*Lysiloma latisiliquum*), green buttonwood, cocoplum (*Chrysobalanus icaco*), cabbage palm (*Sabal palmetto*), wild coffee (*Psychotria nervosa*), Southern wax myrtle (*Morella cerifera*), poisonwood, and groundsel tree (*Baccharis halimifolia*). In the herbaceous layer, cattails and sawgrass were common. Hidden Lake is classified as a PUBHx wetland under the Cowardin system and the FGDC WCS. Under the FLUCCS system, Hidden Lake is classified as Lakes (FLUCCS code 524) habitat.

### 3.1.5 Long Pine Key Campground

The Long Pine Key Campground project site is located approximately 4 miles west of the EVER entrance gate and accessed via a spur road off SR 9336 (NPS 2023). Habitats in the maintained portions of the Long Pine Key Campground consist of a public campground, camp tender's cabin, concession trailer, comfort stations and bathhouses, water house, and recreational vehicle (RV) dump station, with a two-loop access road.

No wetlands were observed within the Long Pine Key Campground project site (Figure 1h in Attachment A).

### 3.1.6 Bill Robertson and Daniel Beard Centers

The Bill Robertson and Daniel Beard Centers project site is located along Research Road and west of the Hidden Lake Environmental Education Center (NPS 2023). Habitats in the maintained portions of the project site consist of buildings, numerous outbuildings, parking areas, and maintained landscaping and mowed areas.

Wetlands delineated within the Daniel Beard Center include one freshwater wetland (Wetland W) that is within the Taylor Slough watershed (Figure 1i in Attachment A). Wetland W is an herbaceous wetland that is periodically maintained (e.g., mowed) and surrounded by Graminoid Freshwater Prairie habitat (Ruiz et al. 2021). On-site dominant vegetation included St. Augustine grass (*Stenotaphrum secundatum*), Indian pennywort (*Centella asiatica*), and marsh pennywort (*Hydrocotyle umbellata*). Smooth false buttonweed (*Spermacoce glabra*) and lawn orchid (*Zeuxine strateumatica*) were also present. The on-site portion of Wetland W is classified as a palustrine emergent, persistent, saturated (PEM1B) wetland under the Cowardin system and the FGDC WCS. Under the FLUCCS system, Wetland W is classified as Wet Prairies (FLUCCS code 643) wetland habitat.

No wetlands were observed at the Bill Robertson Center.

## 3.2 Loop Road District

The Loop Road District consists of proposed work areas at the Trail Center Housing Area, Loop Road Education Center, and Tamiami Ranger Station (NPS 2023).

### 3.2.1 Trail Center Housing Area

The Trail Center Housing Area project site is located off U.S. Highway 41 (Tamiami Trail East) approximately 26 miles west of State Road 997 (SR 997) in Big Cypress (NPS 2023). Habitats in the maintained portions of the project site consist of four dwellings (residences) and four outbuildings (e.g., laundry room, well house/treatment building) loosely grouped around a large unnamed pond, along with mowed areas and a variety of native and invasive plants.

Wetlands delineated within the Trail Center Housing Area project site include one freshwater wetland (Wetland H) that is within the East Collier watershed and continues off site (Figure 1j in Attachment A). The on-site area of Wetland H consists of Cypress Forest-Monotypic habitat adjacent to Bayhead Forest, Cypress Scrub-Sawgrass Marsh, Cypress-Hardwood Forest, Graminoid Freshwater Prairie, Hardwood Swamp Forest, Hardwood Swamp Shrubland, and Spikerush Marsh habitats (Ruiz et al. 2019). On-site dominant vegetation in the canopy and subcanopy layers included bald cypress (*Taxodium distichum*), cocoplum, swamp bay (*Persea palustris*), and pond apple (*Annona glabra*). In the herbaceous layer, sparse maiden fern (*Thelypteris* sp.) and swamp fern (*Blechnum serrulatum*) were dominant with bare ground dominating under the canopy and subcanopy.

A freshwater, deepwater habitat (Trail Center Pond) is also located in the project site. Vegetation surrounding the pond included swamp bay, Southern wax myrtle, cocoplum, cabbage palm, groundsel tree, bushy beardgrass, and other forbs and grasses. The Trail Center Pond is classified as a PUBHx wetland under the Cowardin system and the FGDC WCS. Under the FLUCCS system, the pond is classified as a Lakes (FLUCCS code 524) habitat.

### 3.2.2 Loop Road Education Center

The Loop Road Education Center project site is located off County Road 94 (Loop Road) approximately 30 miles west of SR 997 in Big Cypress (NPS 2023). Habitats in the maintained portions of the project site consist of the Education Center office building, well house/tool shed, rope shed, two "doghouses" (canopies), a residence, comfort stations, pavilion and tent platforms, along with maintained open areas and native vegetation.

No wetlands were observed within the Loop Road Education Center project site (Figure 1k in Attachment A).



### 3.2.3 *Tamiami Ranger Station*

The Tamiami Ranger Station project site is located off County Road 94 (Loop Road) approximately 22 miles west of SR 997 along the Old Tamiami Trail road in EVER (NPS 2023). Habitats in the maintained portions of the project site consist of several buildings (two residences and the ranger station) and associated parking area, construction building, and an abandoned well house set east of and away from the ranger station on the Old Tamiami Trail.

Wetlands delineated within the Tamiami Ranger Station project site include one freshwater wetland (Wetland I) that is within the Everglades National Park watershed and continues off site (Figure 1l in Attachment A). Wetland I consists of Bayhead Forest, Bayhead Shrubland, Pond Apple Forest, and spatterdock habitats (Ruiz et al. 2021). On-site dominant vegetation in the canopy and subcanopy layers included bald cypress, pond apple, and cocoplum, along with scattered Florida strangler fig, poisonwood, groundsel tree, and cabbage palm. In the herbaceous layer, common reed (OBL), beggarticks (*Bidens alba*), cattail, swamp fern, and water lettuce (*Pistia stratiotes*) were common.

## 3.3 **Shark Valley District**

The Shark Valley District project site consists of proposed work areas at the Shark Valley Administrative Area and Visitor Center and the Shark Valley Observation Tower (NPS 2023).

### 3.3.1 *Shark Valley Administrative Area and Visitor Center*

The Shark Valley Administrative Area and Visitor Center project site are located south of U.S. Highway 41 along Shark Valley Loop Road (NPS 2023). Habitats in the maintained portions of the project site consist of a parking area and six single-story buildings surrounded by narrow strips of maintained grass, the Visitor Center building, a large public parking area, two comfort stations, and associated landscaped and mowed areas.

Wetlands delineated within the Shark Valley Administrative Area and Visitor Center project site include one freshwater wetland (Wetland J) that is within the Everglades National Park watershed and continues off site (Figure 1m in Attachment A). Wetland J consists of Bayhead Shrubland, Bayhead Swamp Scrub-Sawgrass Marsh, Cocoplum Shrubland, Sawgrass-Beakrush Marsh, Short Sawgrass Marsh-Dense, Tall Sawgrass Marsh-Dense, and Willow Shrubland habitats (Ruiz et al. 2021). On-site dominant vegetation in the subcanopy layer included pond apple, willow, and cocoplum. In the herbaceous layer, bent alligator-flag (*Thalia geniculata*), spatterdock, cattails, giant leather fern (*Acrostichum danaeifolium*), sawgrass, and starrush whitetop were common. Wetland J is classified as a PSS3/PEM1F wetland and as a palustrine unconsolidated bottom, palustrine aquatic bed, permanently flooded (PUB/PABH) wetland under the Cowardin system and the FGDC WCS. Under the FLUCCS system, Wetland J is classified as Wetland Scrub (FLUCCS code 631), Wet Prairie (FLUCCS code 643), and Inland Ponds and Sloughs (FLUCCS code 616) wetland habitats.

### 3.3.2 *Shark Valley Observation Tower*

The Shark Valley Observation Tower is located south of U.S. Highway 41 at the southern end of a 15-mile-long loop road (Shark Valley Loop Road) (NPS 2023). Habitats in the maintained portions of the project site consist of a generator building, pumphouse, parking area, concrete boardwalk, concrete access ramp and tower, and comfort station.

Wetlands delineated within the Shark Valley Observation Tower project site include one freshwater wetland (Wetland K) that is within the Everglades National Park watershed and continues off site (Figure 1n in Attachment A). Wetland K consists of Bayhead Forest and Bayhead Shrubland habitats (Ruiz et al. 2021). On-site dominant vegetation in the subcanopy layer included swamp bay, pond apple, willow, and cocoplum. In the herbaceous layer, sedges (*Carex* spp.), broadleaf arrowhead, sawgrass, Everglades water-willow (*Justicia angusta*), gulf coast spikerush (*Eleocharis cellulosa*), water cowbane (*Oxypolis filiformis*), giant leather fern, beggarticks, cattails, waterhyssop (*Bacopa monnieri*), southern cutgrass (*Leersia hexandra*), starrush whitetop, smooth false buttonweed, and marsh pennywort were common. Wetland K is classified as a PSS3/PEM1F wetland and as a PUBH wetland under the Cowardin system and the FGDC WCS. Under the FLUCCS system, Wetland K is classified as Wetland Scrub (FLUCCS code 631), Wet Prairie (FLUCCS code 643), and Inland Ponds and Sloughs (FLUCCS code 616) wetland habitats.

## 3.4 Flamingo District

The Flamingo District project site consists of proposed work areas at the Flamingo Wastewater Treatment Plant, Flamingo Water Treatment Plant, Flamingo Visitor Center and public marina, Flamingo Campground, and West Lake Area (NPS 2023).

### 3.4.1 *Flamingo Wastewater Treatment Plant*

The Flamingo Wastewater Treatment Plant and access road project site are located northwest of State Road 9336 (SR 9336), west of Bear Lake Road, and approximately 0.5 mile northeast of the Flamingo Visitor Center (NPS 2023). Habitats in the maintained portions of the project site are characterized by an operations building, equalization tank, package membrane bioreactor (MBR) treatment system and tank, disinfection system, MBR equipment building, chemical storage shed, percolation pond and wet weather flow lagoon (overflow pond).

Wetlands delineated within the Flamingo Wastewater Treatment Plant project site include one estuarine wetland (Wetland L) that is within the Cape Sable watershed and continues off site (Figures 1o and 1p in Attachment A). Wetland L predominantly consists of Black Mangrove Forest, Black Mangrove-Buttonwood Forest, Buttonwood Forest, Buttonwood-Red Mangrove Forest, Buttonwood-Red Mangrove Shrubland, Succulent Salt Marsh, and Mixed Graminoid Freshwater Marsh habitats (Ruiz et al. 2021). On-site dominant vegetation in the canopy and subcanopy layers

included black mangrove (*Avicennia germinans*), white mangrove (*Laguncularia racemosa*), green buttonwood, and christmas berry (*Lycium carolinianum*). In the herbaceous layer, saltwort (*Batis maritima*), perennial glasswort (*Salicornia perennis*), cattails, yellow joyweed (*Alternanthera flavescens*), and slippery burr (*Corchorus siliquosus*) were common. Wetland L is classified as an estuarine, intertidal, scrub-shrub, broad-leaved evergreen, irregularly flooded (E2SS3P) wetland, an estuarine, intertidal, emergent, persistent, irregularly flooded (E2EM1P), and as an estuarine, intertidal, unconsolidated shore, permanently flooded, excavated (E2USHx) wetland under the Cowardin system and the FGDC WCS. Under the FLUCCS system, Wetland L is classified as Mangrove Swamp (FLUCCS code 612), Saltwater Marshes (FLUCCS code 642), and Slough Waters (FLUCCS code 560) wetland habitats.

Two wastewater treatment ponds consisting of a percolation pond and overflow pond are also on the project site and are within the Cape Sable watershed (Figure 15 in Attachment A). Per Section 62-340.700, Florida Administrative Code (F.A.C.), approved wastewater treatment areas are exempt from regulation and are not delineated as jurisdictional wetlands or surface waters.

### 3.4.2 *Flamingo Water Treatment Plant and Residential Area*

The Flamingo Water Treatment Plant and Residential Area project site is on a well-developed site that is located south of SR 9336 and approximately 0.25 mile northeast of the Flamingo Visitor Center (NPS 2023). Habitats in the maintained portions of the project site are characterized by a water distribution system, park employee housing and camping area, the Flamingo Wastewater Treatment Plant and associated support systems and buildings grouped around a small marina.

Wetlands delineated within the Flamingo Water Treatment Plant and Residential Area project site include three estuarine wetlands (Wetlands M, N, and O) that are within the Cape Sable and Taylor Slough Coastal watersheds (Figures 1o and 1p in Attachment A). Wetlands M and O continue off site and predominantly consist of Black Mangrove Forest, Black Mangrove-Buttonwood Forest, Black Mangrove-Buttonwood Scrub-Succulent Marsh, Black Mangrove-Red Mangrove Forest, Buttonwood-Red Mangrove Forest, Buttonwood Forest, Mixed Mangrove Forest-Mixed, Red Mangrove Forest, and Succulent Salt Marsh habitats (Ruiz et al. 2021). On-site dominant vegetation in the canopy and subcanopy layers in Wetland M and O included black mangrove and green buttonwood. Wetland O also contained St. Augustine grass in the maintained (e.g., mowed) portions. Wetland M is classified as an E2SS3P/E2EM1P wetland under the Cowardin system and the FGDC WCS. Under the FLUCCS system, Wetland M is classified as Mangrove Swamp (FLUCCS code 612) and Saltwater Marshes (FLUCCS code 642) wetland habitats. Wetland O is classified as a E2EM1P/E2SS3P wetland under the Cowardin system and the FGDC WCS. Under the FLUCCS system, Wetland O is classified as Saltwater Marshes (FLUCCS code 642) and Mangrove Swamp (FLUCCS code 612) wetland habitats.

Wetland N consists of an isolated herbaceous wet prairie habitat surrounded by maintained and hardscaped (e.g., pavement) areas associated with the Flamingo Water Treatment Plant and marina. On-site dominant vegetation in the herbaceous layer included knot grass (*Paspalum distichum*), swamp flatsedge (*Cyperus distinctus*), maidencane (*Panicum hematoma*), smooth cordgrass (*Spartina alterniflora*), marsh bristle grass (*Setaria parviflora*), and other unidentified grasses and forbs. Wetland N is classified as a PEM1B wetland under the Cowardin system and the FGDC WCS. Under the FLUCCS system, Wetland N is classified as Wet Prairies (FLUCCS code 643) wetland habitat.

The Flamingo Canal and Marina are excavated estuarine deepwater habitats that are also present in the project site. The Flamingo Canal and Marina are classified as an estuarine, subtidal, unconsolidated bottom, subtidal, excavated (E1UBLx) wetland under the Cowardin system and the FGDC WCS. Under the FLUCCS system, the Flamingo Canal and Marina are classified as Streams and Waterways (FLUCCS code 510) and as Marinas (FLUCCS code 1841) habitats, respectively.

### 3.4.3 *Flamingo Visitor Center Area and Flamingo Campground*

The Flamingo Visitor Center Area and Flamingo Campground project site is located west of the Flamingo Water Treatment Plant and south of SR 9336 (NPS 2023). Habitats in the maintained portions of the project site are characterized by a marina store, hotel, maintenance buildings, lift stations, parking lots, comfort stations, maintained grass areas and other landscaping, and a network of gravel, paved, and unpaved trails.

Wetlands delineated within the Flamingo Visitor Center Area and Flamingo Campground project site include six estuarine wetland (Wetlands P, Q, R, S, T, and U) that are within the Cape Sable watershed (Figures 1p and 1q in Attachment A). Wetlands P, Q, R, S, and U continue off site. Wetlands P and R predominantly consist of Black Mangrove Forest, Black Mangrove-Buttonwood Forest, Black Mangrove-Red Mangrove Forest, Buttonwood Forest, and Buttonwood Shrubland habitats (Ruiz et al. 2021). On-site dominant vegetation in the canopy and subcanopy layers of Wetlands P and R included black mangrove, red mangrove, white mangrove, and green buttonwood, with saltwort in the herbaceous layer. Wetland P is classified as a E2SS3P/E2EM1P wetland under the Cowardin system and the CMECS. Under the FLUCCS system, Wetland P is classified as Mangrove Swamps (FLUCCS code 612) and Shorelines (FLUCCS code 652) wetland habitats. Wetland R is classified as a E2SS3P wetland under the Cowardin system and the CMECS. Under the FLUCCS system, Wetland R is classified as Mangrove Swamps (FLUCCS code 612) and Shorelines (FLUCCS code 652) wetland habitats.

Wetland Q consists of Succulent Salt Marsh habitat (Ruiz et al. 2021). Dominant vegetation included saltwort) and sea daisy (*Borrchia frutescens*), with scattered mangrove saplings. Wetland Q is classified as a E2EM1P wetland under the Cowardin system and the CMECS. Under the FLUCCS system, Wetland Q is classified as a Saltwater Marshes (FLUCCS code 642) wetland habitat.



Wetland S predominantly consists of Succulent Salt Marsh habitat, with minor areas of Buttonwood Shrubland, Black Mangrove-Buttonwood Shrubland, and Black Mangrove-Buttonwood Woodland-Succulent Marsh habitats (Ruiz et al. 2021). Wetland T is a mix of Black Mangrove-Buttonwood Woodland-Herbaceous Marsh and Herbaceous Freshwater Marsh habitats (Ruiz et al. 2021). In the herbaceous components of Wetlands S and T, saltwort was common, and green buttonwood dominated the subcanopy. In the Flamingo Eco-Tent Campgrounds and Amphitheater portion of Wetland S, St. Augustine grass dominated along with other unidentified grasses and forbs. Wetlands S and T are classified as E2SS3P/E2EM1P wetlands under the Cowardin system and the FGDC WCS. Under the FLUCCS system, Wetlands S and T are classified as Saltwater Marshes (FLUCCS code 642) and Shorelines (FLUCCS code 652) wetland habitats. The portions of the wetlands dominated by green buttonwood are associated with the greater coastal hardwood community composed of red and/or black mangrove (Mangrove Swamps [FLUCCS code 612]).

Wetland U consists of Black Mangrove-Buttonwood Shrubland, Black Mangrove-Red Mangrove Shrubland, Black Mangrove Forest, Black Mangrove Scrub-Succulent Marsh, Black Mangrove Woodland-Succulent Marsh, Buttonwood Forest and Shrubland, Coastal Hardwood Scrub, and Succulent Salt Marsh habitats (Ruiz et al. 2021). On-site dominant vegetation in the canopy and subcanopy layers included black mangrove, red mangrove, white mangrove, and green buttonwood. In the herbaceous layer, saltwort was present with bare ground dominating in some areas under the canopy and subcanopy. Wetland U is classified as a E2SS3P/E2EM1P wetland under the Cowardin system and the FGDC WCS. Under the FLUCCS system, Wetland U is classified as Mangrove Swamps (FLUCCS code 612) and Saltwater Marshes (FLUCCS code 642) wetland habitats.

### 3.4.4 *West Lake Area*

The West Lake Area project site is located south of SR 9336 on the shore of West Lake and is approximately 6.25 miles northeast of the Flamingo Water Treatment Plant (NPS 2023). Habitats in the maintained portions of the project site consist of closed loop access road, parking, comfort station, well house, dock, and maintained grassy areas.

Wetlands delineated within the West Lake project site include one freshwater wetland (Wetland V) that is within the Taylor Slough Coastal watershed (Figure 1r in Attachment A). Wetland V consists of Buttonwood-Red Mangrove Forest, Black Mangrove-Buttonwood Forest, and Black Mangrove-Red Mangrove Forest habitats (Ruiz et al. 2021). On-site dominant vegetation in the canopy and subcanopy layers included black mangrove, red mangrove, white mangrove, and green buttonwood. In the herbaceous layer, giant leather fern was present with bare ground dominating in some areas under the subcanopy. Wetland V is classified as a E2SS3P wetland under the Cowardin system and the FGDC WCS. Under the FLUCCS system, Wetland V is classified as Mangrove Swamps (FLUCCS code 612) wetland habitat.

## 4 Wetland Functions and Values Assessment

In association with the wetland delineation, a Uniform Mitigation Assessment Method (UMAM) functional assessment was completed in accordance with Chapter 62-345 F.A.C., UMAM. The FDEP's UMAM provides a standardized procedure for assessing the ecological functions provided by wetlands and other surface waters, the amount that those functions are reduced by the proposed action, and the amount of mitigation necessary to offset that loss. Functions and values assessments were performed for all wetlands that would be impacted by the proposed project (Wetlands A, E, W, H, J, K, L, M, N, S, T, U, and V). These assessments document the functions and values currently being provided by the wetlands in the study area and the anticipated functions and values losses that could result from the project. The latter is used to help identify appropriate compensatory mitigation. (Copies of the UMAM assessment data forms provided upon request).

The assessment was based on the conditions present on the site at the time of the wetland delineation site visits. It was completed using information collected through direct field observations, desktop evaluations, and from the wetland delineation reports prepared by Anchor QEA.

### 4.1 Methodology

The functions and values assessments were conducted using the methods presented in the UMAM, which is fully described in Ch. 62-345, F.A.C., adopted in February of 2004. The UMAM includes completion of Part I—Qualitative Description (Section 62-345.400, F.A.C.), and Part II—Quantification of Assessment Area (impact or mitigation) (Sections 62-345.500 and .600, F.A.C.). Standard guidance from Ch. 62-345, F.A.C. was followed for scoring each wetland assessment area. Although Ch. 62-345, F.A.C. does not specify standard field protocol, data collection for the purpose of this study followed the same method as that employed for the Wetland Rapid Assessment Procedure (WRAP) (Miller and Gunsalus 1999). It should be noted that wetlands were assessed for the portion of the wetland in the study area. Many wetlands extend far beyond the study area. The study area extends beyond the potential impact area, so this area provides a realistic assessment of the wetland being impacted. During the site visits, notes were taken on general site conditions including identification of flora, observed wildlife (e.g., visual sightings, calls), evidence of wildlife (e.g., tracks, nests, etc.), and occurrence of listed species. On the UMAM forms, "Current" indicates the functional value of the assessment area based upon existing conditions per the three indicators of wetland function (Location and Landscape Support, Water Environment, and Community Structure). Each of the three scoring categories (Location and Landscape Support, Water Environment, and Community Structure) were assigned whole numbers between 0 and 10, representing the current ecological value of the wetland assessment area. These numbers were summed, and the result was divided by 30 to attain the total UMAM score, ranging from 0.00 to 1.00 (Table 2).

## 4.2 Functional Assessment Results

UMAM functional wetland scoring is based upon what is considered “suitable” for the type of wetland assessed. The four general categories of scores based on the level of function include optimal (10), moderate (7), minimal (4), and not present (0). UMAM scores were determined for each potentially affected wetland area (Wetlands A, E, W, H, J, K, L, M, N, S, T, U, and V) and summarized in Table 2. UMAM functional wetland scores ranged from a maximum score of 0.700 to a minimum score of 0.400. Wetlands assigned UMAM scores less than 0.50 are typically highly disturbed and have limited wetland functions. Wetlands assigned UMAM scores greater than 0.79 are typically high quality wetlands with pristine wetland functions. Most of the wetlands assessed fall within moderate quality range (i.e., between 0.50 and 0.79) for functions, except for one assessment area (Wetland N), which is categorized as having minimal functionality.

### 4.2.1 *Location and Landscape Support*

As shown in Table 2, under current conditions, most assessment areas received a moderate score (0.700) for the Location and Landscape Support function. Factors that contribute to this function include the presence of adjacent available habitats outside the assessment areas that are in sufficient quantity and variety to provide optimal support for most anticipated wildlife, minimal invasive or exotic cover in proximity to the assessment areas, and land uses outside the assessment areas and adjacent developed areas have minimal adverse impacts on fish and wildlife. Factors limiting this function include the presence of barriers (e.g., roads, buildings) that partially impede wildlife movement and the limited ability of the assessment areas to provide downstream hydrological benefits from discharges should the quality or quantity of those discharges become altered. Wetland N received a lower score (0.400) for this function due to its isolated location in the landscape that limits its ecological value due to the assessment area being surrounded by roads, parking areas, and buildings. These structures limit wildlife movement into and out of the assessment area.

### 4.2.2 *Water Environment*

For the Water Environment function, most wetland assessment areas received a moderate score (0.700) for supporting water quantity and quality (Table 2). The hydrologic conditions of the assessment areas that contribute to this function include having water levels and flows that are only slightly lower than appropriate, and soil oxidation and water quality degradation are limited and not expected to cause more than minimal ecological effects. Factors limiting this function include the presence of the regulated system of canals in the Everglades that affects the frequency, depth, and duration in inundation or saturation in the assessment areas. Wetland N received a lower score (0.400) for this function due to the assessment area exhibiting water levels and flows that are

lower than what is suitable to support fish and wildlife, reduced soil moisture, and vegetation showing signs of hydrologic stress.

### 4.2.3 *Community Structure*

As shown in Table 2, many assessment areas received a moderate score (0.700) for the Community Structure function. Factors that contribute to this function in the assessment areas include the presence of appropriate and healthy plant species in the canopy, shrub, or ground stratum; minimal invasive or exotic plant species; and presence of coarse woody debris, snags, and cavities. Factors that reduce this function include the presence of water control features in the landscape and limited topographic features in the assessment areas such as refugia ponds, creek channels, flats, or hummocks. Wetlands A, E, H, W, and N received a lower score (0.400) for the Community function. Additional factors that limit the ability of these wetlands to perform this function include a lack of appropriate and desirable plant species in the canopy, shrub, or ground stratum, regular maintenance (e.g., mowing) in the assessment areas, and a lack of woody debris.



**Table 2**  
**Pre-Project Wetland Assessment Area UMAM Scores**

Study Area	Wetland Assessment Area	Cowardin Classification	UMAM Scores Location and Landscape Support Score	UMAM Scores Water Environment Score	UMAM Scores Community Structure Score	Total UMAM Score
Park HQ and Visitor Center	Wetland A	PSS3/PEM1/PFO3C	7	7	4	0.600
Pine Island Maintenance Center	Wetland E	PEM1/PSS3C	7	7	4	0.600
Daniel Beard Center	Wetland W	PEM1B	7	7	4	0.600
Trail Center Housing Area	Wetland H	PFO2/PSS3/PEM1C	7	7	4	0.600
Shark Valley Administrative Area and Visitor Center	Wetland J	PSS3/PEM1F and PUB/PABH	7	7	7	0.700
Shark Valley Observation Tower	Wetland K	PSS3/PEM1F and PUBH	7	7	7	0.700
Flamingo Wastewater Treatment Plant	Wetland L	E2SS3P, E2EM1P, and E2USHx	7	7	7	0.700
Flamingo Water Treatment Plant	Wetland M	E2SS3P and E2EM1P	7	7	7	0.700
Flamingo Water Treatment Plant	Wetland N	PEM1B	4	4	4	0.400
Flamingo Visitor Center and Campground	Wetlands S and T	E2SS3P and E2EM1P	7	7	7	0.700
Flamingo Visitor Center and Campground	Wetland U	E2SS3P and E2EM1P	7	7	7	0.700
West Lake Area	Wetland V	E2SS3P	7	7	7	0.700

## 5 Description of Floodplain

In compliance with EOs 11988 and 13690, it was determined whether the proposed actions are located in a regulatory floodplain. Flood maps provided by the Federal Emergency Management Agency (FEMA) were reviewed for each of the project sites (Figures 2a through 2l in Attachment B), which include specific work areas in the Pine Island District, the Loop Road District, the Shark Valley District, and the Flamingo District (NPS 2023). The FEMA-mapped 100-year floodplain is defined as an area inundated by a 1-percent annual chance of flooding and for which base flood elevations have been determined. Zone AE is within the High Risk Areas (Special Flood Hazard Area) category of flood zones. Zone D indicates that there is a risk of flooding, the level of risk is undetermined (e.g., undetermined base flood elevations), and there are no minimum building requirements by FEMA. However, for project sites mapped as Zone D or Zone A with undetermined base flood elevations, FEMA-predicted storm surge/flood elevations are provided in Table 3 and described in the following sections.

### 5.1 Determination of Regulatory Flood and Applicability of Federal Flood Risk Management Standard

To implement the NPS floodplain policy, proposed actions are classified as fitting into one of three classes according to NPS Director's Order #77-2 and Procedural Manual #77-2. The proposed action defines the applicable regulatory floodplain. The evaluation of the proposed actions may be grouped into the following three categories:

- Class I actions include the location or construction of administrative, residential, warehouse, and maintenance buildings, non-excepted parking lots or other constructed features, which by their nature entice or require individuals to occupy the site, are prone to flood damage, or result in impacts to natural floodplain values. Actions in this class are subject to the floodplain policies and procedures if they lie within the 100-year regulatory floodplain (the Base Floodplain).
- Class II actions include "critical actions" defined as those activities for which even a slight chance of flooding would be too great. Examples of critical actions include schools, hospitals, fuel storage facilities, irreplaceable records, museums, and storage of archeological artifacts. Actions in this class are subject to the floodplain policies and procedures if they lie within the 500-year regulatory floodplain.
- Class III actions include all Class I or Class II actions that are located in high hazard areas (V Zones), including coastal high hazard areas and areas subject to flash flooding. Actions in this class are subject to the floodplain policies and procedures if they lie within the Extreme Flood regulatory floodplain. In high hazard areas, picnic facilities, scenic overlooks, foot trails, and associated daytime parking facilities may be placed within the 100-year floodplain, but

these facilities must contain signs informing visitors of flood risk and suggested actions in the event of flooding.

The proposed project includes both Class I and Class III actions (Table 3).

**Table 3**  
**FEMA Designated Flood Zone by Project Site**

District and Project Site	Flood Zone <sup>1</sup>	Base Flood Elevation (feet NAVD88)	Floodplain Classification	Predicted Storm Surge Flood Elevations (feet NAVD88)
<b>Pine Island District</b> Park Headquarters and Visitor Center	Zone D	N.D.	Class I	6
<b>Pine Island District</b> Pine Island Maintenance Center and Residential Area	Zone D	N.D.	Class I	6
<b>Pine Island District</b> Royal Palm Visitor Center	Zone D	N.D.	Class I	6
<b>Pine Island District</b> Hidden Lake Environmental Education Center	Zone D	N.D.	Class I	6
<b>Pine Island District</b> Long Pine Key Campground	Zone D	N.D.	Class I	6
<b>Pine Island District</b> Daniel Beard Center	Zone D	N.D.	Class I	6
<b>Loop Road District</b> Trail Center Housing Area	Zone AE	7	Class I	N.D.
<b>Loop Road District</b> Loop Road Education Center	Zone AE	7	Class I	N.D.
<b>Loop Road District</b> Tamiami Ranger Station	Zone AE	7	Class I	N.D.
<b>Shark Valley District</b> Shark Valley Administrative Area and Visitor Center (northern portion)	Zone A	undetermined	Class I	9.4
<b>Shark Valley District</b> Shark Valley Administrative Area and Visitor Center (southern portion)	Zone D	N.D.	Class I	9.4
<b>Shark Valley District</b> Shark Valley Observation Tower	Zone D	N.D.	Class I	7.6
<b>Flamingo District</b> Flamingo Wastewater Treatment Plant	Zone AE	9	Class I	N.D.
<b>Flamingo District</b> Flamingo Water Treatment Plant, and Residential Area (northern and central portions)	Zone AE	9 to 10	Class I	N.D.
<b>Flamingo District</b> Flamingo Water Treatment Plant, and Residential Area (southern portion)	Zone VE	11 to 16	Class III	N.D.



District and Project Site	Flood Zone <sup>1</sup>	Base Flood Elevation (feet NAVD88)	Floodplain Classification	Predicted Storm Surge Flood Elevations (feet NAVD88)
<b>Flamingo District</b> Flamingo Visitor Center and Campground (northern portion)	Zone AE	10	Class I	N.D.
<b>Flamingo District</b> Flamingo Visitor Center and Campground (southern portion)	Zone VE	11 to 16	Class III	N.D.
<b>Flamingo District</b> West Lake Area	Zone D	N.D.	Class I	6

Notes:

N.D. – No data

1. Although no flood hazard analysis has been conducted for project sites mapped by FEMA as Zone D flood zones, many of these sites flood routinely every year (e.g., Shark Valley Observation Tower) due to water levels rising from the Central Everglades Planning Project (CEPP), a component of the Comprehensive Everglades Restoration Plan (CERP).

A = Areas with a 1% annual chance of flooding. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.

AE = Areas with a 1% annual chance of flooding. The base floodplain where base flood elevations are provided.

D = Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted (see note #1 above).

VE = Coastal high hazard areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.

As Table 3 indicates, the proposed action includes both Class I and Class III actions per NPS Director's Order #77-2 and Procedural Manual #77-2 (NPS 2007). Project activities within the floodplain are also governed by EO 13690, which established the FFRMS. The FFRMS mandates that federal agencies choose one of three methods to establish higher vertical flood elevations beyond the guidelines in EO 11988. The three methods available are Climate Informed Science Approach, Freeboard Value Approach, and the 500-year floodplain (FEMA 2022). Per FEMA's implementing guidelines for EO 11988 and 13690, agencies may use a Freeboard Value Approach in establishing FFRMS flood elevations in areas where the 100-year base flood elevation levels are known. Where the FEMA-based 100-year base flood elevation levels are not known, elevations were determined per Florida Building Code Section R322.2.1-Elevation Requirements, which states buildings in flood hazard areas shall have the lowest floors elevated to or above the base flood elevation plus 1 foot. For these areas, the base elevation was determined using the crown elevation of the paved road nearest to the proposed buildings plus adding 4 inches to the selected base elevation (Stanley Consultants 2023).

## 5.2 Description of Site-Specific Flood Risk

The proposed project is located in areas that are susceptible to flooding caused by tropical storms, hurricanes, and sea level rise (Figures 2a through 2l in Attachment B). The NPS proposes to replace the potable water distribution and wastewater collection systems that already exist in the floodplain. Many of these existing systems will be replaced within the existing system footprints or previously disturbed areas. The following sections provide a description of site-specific flood risk as a result of the proposed project, as well as the classifications (Section 5.1) of the proposed actions.

### 5.2.1 *Pine Island District*

All proposed actions in the Pine Island District will fall under a Class I action of DO 77-2. Where the proposed actions are within a FEMA-mapped 100-year floodplain or predicted FEMA storm surge/flood area and due to requirements under Class I actions, project modifications would ensure that elevations associated with the proposed actions are above the 100-year flood elevation or the predicted FEMA storm surge/flood elevation.

#### 5.2.1.1 **Park Headquarters and Visitor Center**

FEMA flood maps show that the HQ and Visitor Center project site is located in an area where flooding is possible but has undetermined flood hazards (Zone D) (Figure 2a in Attachment B). Currently, the site ranges in elevation from 4 to 5 feet NAVD88. The predicted FEMA storm surge/flood elevation for this site is 6 feet NAVD88 (Stanley Consultants 2023). Work proposed in these areas includes replacing potable water distribution systems (between Pine Island and HQ/Visitor Center), replacing equipment within the HQ fire well house, and replacing the Visitor Center and administrative sanitary lift stations. All proposed work would occur below ground or at existing elevations.

#### 5.2.1.2 **Pine Island Maintenance Center and Residential Area**

FEMA flood maps show that the Pine Island Maintenance Center and Residential Area project site is located in an area where flooding is possible but has undetermined flood hazards (Zone D) (Figure 2a in Attachment B). Currently, the site ranges in elevation from 4 to 5 feet NAVD88. The predicted FEMA storm surge/flood elevation for this site is 6 feet NVAD88 (Stanley Consultants 2023). Work proposed in these areas includes replacing wastewater treatment plant and wastewater collection system, replacing electrical service and generator at the housing/maintenance well house, and constructing a new well house and two new wells. Two new wells will be constructed at a minimum depth of 80 feet adjacent to the new well house. The location of the new well house will be at the construction staging area between the Visitor Center and the Pine Island Maintenance Center and Residential Area. In addition, all wastewater piping will be replaced from the lift station south of the HQ to the Pine Island Maintenance Center. All proposed buildings will have the lowest floors elevated to 7 feet NAVD88.

### **5.2.1.3 Royal Palm Visitor Center**

FEMA flood maps show that the Royal Palm Visitor Center project site is located in an area where flooding is possible but has undetermined flood hazards (Zone D) (Figure 2b in Attachment B). Currently, site elevation is 5 feet NAVD88. The predicted FEMA storm surge/flood elevation for this site is 6 feet NAVD88 (Stanley Consultants 2023). Work proposed in these areas includes drilling two new potable water wells, removing abandoned well houses and utility infrastructure on the west side of the area, replacing potable water well house, replacing the potable water distribution system, and replacing existing two 2000-gallon septic tanks with new septic tank(s) and lift pumps. All proposed work would occur below ground or at existing elevations.

### **5.2.1.4 Hidden Lake Environmental Education Center**

FEMA flood maps show that the Hidden Lake Environmental Education Center project site is located in an area where flooding is possible but has undetermined flood hazards (Zone D) (Figure 2c in Attachment B). Currently, site elevation is approximately 7 feet NAVD88. The predicted FEMA storm surge/flood elevation for this site is 6 feet NAVD88 (Stanley Consultants 2023). Work proposed in these areas includes updating the potable water well head to meet Florida code requirements and replacing the pump, updating the potable water well house, replacing the potable water distribution system, replacing the 1,000-gallon wastewater septic system, and raising the drain field. All new utility equipment shall be installed within the existing well room. All proposed work would occur below ground or at existing elevations.

### **5.2.1.5 Long Pine Key Campground**

FEMA flood maps show that the Long Pine Key Campground project site is located in an area where flooding is possible but has undetermined flood hazards (Zone D) (Figure 2d in Attachment B). Currently, site elevation is 10 feet NAVD88. The predicted FEMA storm surge/flood elevation for this site is 6 feet NAVD88 (Stanley Consultants 2023). Work proposed in these areas includes installing a potential new well house located on the existing spur road adjacent to the existing well house, drilling two new potable water wells, and replacing 11 of 12 wastewater septic systems. All proposed buildings will have the lowest floors elevated to 7 feet NAVD88.

### **5.2.1.6 Bill Robertson and Daniel Beard Centers**

FEMA flood maps show that the Bill Robertson Center and Daniel Beard Center project site is located in an area where flooding is possible but has undetermined flood hazards (Zone D) (Figure 2e in Attachment B). Currently, site elevation is approximately 8 feet NAVD88. The predicted FEMA storm surge/flood elevation for this site is 6 feet NAVD88 (Stanley Consultants 2023). Work proposed in these areas includes drilling two new potable water wells within a new well house to a minimum depth of 80 feet, replacing a propane tank, replacing potable water well houses with one combined system located at the Daniel Beard Center with a pipeline to the Bill Robertson Center, replacing one

1,000-gallon septic system at the Bill Robertson Center and lift station to drain fields, adding wastewater service to Fire Cache Building, and replacing one 2,000-gallon septic system. No new structures are planned for the Bill Robertson Center. All proposed buildings will have the lowest floors elevated to 7 feet NAVD88.

### **5.2.2 Loop Road District**

All proposed actions in the Loop Road District will fall under a Class I action of DO 77-2. Where the proposed actions are within a FEMA-mapped 100-year floodplain or predicted FEMA storm surge/flood area (further described in the following sections) and due to requirements under Class I actions, project modifications would ensure that elevations associated with the proposed actions are above the 100-year flood elevation or the predicted FEMA storm surge/flood elevation.

#### **5.2.2.1 Trail Center Housing Area**

FEMA flood maps show that the Trail Center Housing Area project site is located in the 100-year flood zone (Zone AE) with a base flood elevation of 7 feet North American Vertical Datum of 1988 (NAVD88) (Figure 2f in Attachment B). Currently, site elevation is approximately 14 feet NAVD88 (average of 10 feet NAVD88) and the predicted FEMA storm surge/flood elevation is 7 feet NAVD88 (Stanley Consultants 2023). Work proposed in these areas includes replacing the potable water treatment and distribution systems, replacing septic systems with a combined system, and constructing a raised bed absorption field associated with the new septic system. As part of this work, the existing well house will be demolished, and the new facility will be constructed just to the south of the existing well. The proposed work areas are primarily in uplands surrounded by wetlands, with some work occurring in wetlands. Most of the proposed work consists of temporary ground disturbance for pipeline installation in areas that would be returned to pre-construction elevations. Construction of the westernmost new adsorption field would result in final elevations 4 feet above pre-construction elevations in an approximately 50-foot by 10-foot area. Construction of the easternmost new adsorption field would result in final elevations 4 feet above pre-construction elevations in an approximately 50-foot by 28-foot area. Construction of the new well house would result in final elevations 0.5 feet above pre-construction elevations in an approximately 17-foot by 47-foot area.

#### **5.2.2.2 Loop Road Education Center**

FEMA flood maps show that the Loop Road Education Center project site is located in the 100-year flood zone (Zone AE) with a base flood elevation of 7 feet NAVD88 (Figure 2g in Attachment B). Currently, site elevation is approximately 13 feet NAVD88 and the predicted FEMA storm surge/flood elevation is 7 feet NAVD88 (Stanley Consultants 2023). Work proposed in these areas includes removing the doghouses over the existing well and existing lift station; constructing a new pump building around the existing well to contain the well, filters, and hydropneumatic tank; and replacing

the septic system including two lift stations, all water distribution piping, septic tank, and elevated drain field. Most of the proposed work consists of temporary ground disturbance for pipeline installation in areas that would be returned to pre-construction elevations. Construction of the new adsorption field would result in final elevations 4 feet above pre-construction elevations in an approximately 30-foot by 50-foot area.

### **5.2.2.3 Tamiami Ranger Station**

FEMA flood maps show that the Tamiami Ranger Station project site is located in the 100-year flood zone (Zone AE) with a base flood elevation of 7 feet NAVD88 (Figure 2h in Attachment B). Currently, site elevation is approximately 14 feet NAVD88. No predicted FEMA storm surge/flood elevations are available for this site. Work proposed in these areas includes removing the existing abandoned well house and capping the well, replacing the septic system including lift station and all piping, and elevating the drain field. Most of the proposed work consists of temporary ground disturbance for pipeline installation in an area that would be returned to pre-construction elevations. Construction of the new adsorption field would result in final elevations 5 feet above pre-construction elevations in an approximately 47-foot by 16-foot area.

## **5.2.3 Shark Valley District**

The Shark Valley project area floods routinely every year due to water levels in the area rising from the CEPP, which is a component of the CERP; therefore, all proposed actions in the Shark Valley District will fall under a Class I action of DO 77-2. Where the proposed actions are within a FEMA-mapped 100-year floodplain or predicted FEMA storm surge/flood area and due to requirements under Class I actions, project modifications would ensure that elevations associated with the proposed actions are above the 100-year flood elevation or the predicted FEMA storm surge/flood elevation.

### **5.2.3.1 Shark Valley Administrative Area and Visitor Center**

FEMA flood maps show that most of the Shark Valley Administrative Area and Visitor Center project site is located in an area where flooding is possible but has undetermined flood hazards (Zone D) (Figure 2i in Attachment B). The northernmost portion of the project site is located in the 100-year flood zone (Zone A). Currently, the Entrance Road and the Administration Complex are in low elevation areas and experience periodic flooding. The existing absorption field at the Shark Valley Administration and Visitor Center sits at an elevation of nominally 10.4 feet NAVD88, and the predicted FEMA storm surge/flood elevation is 9.4 feet NVAD88 for this location (Stanley Consultants 2023). Work proposed in these areas includes replacing the potable water distribution system, removing the hydropneumatic tank, providing new flushing toilets with new water piping and sewer drain piping inside the comfort station, adding sewer line from new flushing toilets to collection system piping, replacing Visitor Center wastewater collection system, including the holding/septic



tank and lift station and raised bed absorption field adjacent to the existing bed. Most of the proposed work consists of temporary ground disturbance for pipeline installation in areas that would be returned to pre-construction elevations. Construction of the new adsorption field would result in final elevations 5 feet above pre-construction elevations in an approximately 16-foot by 104-foot area.

### **5.2.3.2 Shark Valley Observation Tower**

FEMA flood maps show that the Shark Valley Observation Tower project site is located in an area where flooding is possible but has undetermined flood hazards (Zone D) (Figure 2j in Attachment B). Currently, the southern end of Tram Road at the Observation Tower is in a low elevation area and experiences periodic flooding. The Shark Valley Observation Tower comfort station wastewater currently flows by gravity to a septic tank to a raised bed absorption field adjacent to the comfort station. Site elevation is approximately 6 feet NAVD88, and the predicted FEMA storm surge/flood elevation is 6.11 feet NAVD88 for this site (Stanley Consultants 2023). Work proposed in these areas includes constructing a new potable water well house, replacing the pipeline to the comfort station, replacing the septic system at the tower, and raising and expanding the septic field to a higher elevation adjacent to comfort station. In addition, the NPS has plans to raise the tram road elevation by 3 to 4 feet, on a separate project, to avoid floodplain levels. The minimum finished floor of the new structures was selected to be 10.6 feet NAVD88.

### **5.2.4 Flamingo District**

Proposed actions in the Flamingo District fall under either Class I or Class III actions of DO 77-2. Where the proposed actions are within a FEMA-mapped 100-year floodplain or predicted FEMA storm surge/flood area and due to requirements under Class I and Class III actions, project modifications would ensure that elevations associated with the proposed actions are above the 100-year flood elevation or the predicted FEMA storm surge/flood elevation.

#### **5.2.4.1 Flamingo Wastewater Treatment Plant**

FEMA flood maps show that the Flamingo Wastewater Treatment Plant project site is located in the 100-year flood zone (Zone AE) with a base flood elevation of 9 feet NAVD88 (Figure 2k in Attachment B). The wastewater treatment site ranges in elevation from 1.5 to 9.5 feet (average of 3 feet) with the high point located where the MBR equipment building is located (Stanley Consultants 2023). Work proposed in these areas involves replacing the wastewater treatment plant including raising the plant facilities (except the overflow lagoon) to account for storm surge (elevation to be determined by the NPS), construction of a new hurricane-rated, climate-controlled structure to protect the plant equipment, relocating or building a new administration/control, and replacing existing water and sewer lines. Most of the proposed work consists of temporary ground disturbance for pipeline installation in areas that would be returned to pre-construction elevations.

Construction of the replacement wastewater treatment plant is within the footprint of the existing percolation pond which is surrounded by an elevated berm and would require the permanent placement of fill and riprap. Proposed new site elevation is 13 feet NAVD88 to provide additional protection from wave run up.

#### **5.2.4.2 Flamingo Water Treatment Plant and Residential Area**

FEMA flood maps show that the northern and central portions of the Flamingo Water Treatment Plant and Residential Area project site are located in the 100-year flood zone (Zone AE) with base flood elevations ranging from 9 to 10 feet NAVD88 (Figure 2k in Attachment B). The southern portion of the project site is also located in the 100-year flood zone (Zone VE) with base flood elevations ranging from 11 to 16 feet NAVD88. The existing water treatment plant building is currently on stilts to sit above the storm surge elevation. Work proposed in these areas involves rehabilitating the reverse-osmosis potable water treatment plant including replacing the potable water storage tank and the hydropneumatics tanks, drilling two new wells, and replacing the potable water distribution system. At Residential Area, all sewer piping within the concession housing area would be replaced and reconnected to the existing lift stations. Construction of the water treatment plant addition is within a previously disturbed paved area. Proposed new site elevation is 13 feet NAVD88 to provide additional protection from wave run up.

#### **5.2.4.3 Flamingo Visitor Center Area and Flamingo Campground**

FEMA flood maps show that the northern portion of the Flamingo Visitor Center Area and Flamingo Campground project site is located in the 100-year flood zone (Zone AE) with a base flood elevation of 10 feet NAVD88 (Figure 2k in Attachment B). The southern portions of the project site are also located in the 100-year flood zone (Zone VE) with base flood elevations ranging from 11 to 16 feet NAVD88. All of the proposed work consists of temporary ground disturbance for pipeline installation in areas that would be returned to pre-construction elevations.

#### **5.2.4.4 West Lake Area**

FEMA flood maps show that the West Lake Area project site is located in an area where flooding is possible but has undetermined flood hazards (Zone D) (Figure 2l in Attachment B). However, site elevation is approximately 3 feet NAVD88, and the predicted FEMA storm surge/flood elevation is 6 feet NAVD88 (Stanley Consultants 2023). Work proposed in these areas includes installation of a new potable water system, removing the existing well house, replacing the 2000-gallon septic system and piping, and raising a new absorption field. The bottom of the absorption field is set at elevation 11 feet NAVD88.

## 6 Anticipated Project Impacts to Wetlands and Floodplain

### 6.1 Wetlands

A summary of anticipated temporary and permanent wetland area impacts for the proposed project is provided in Table 4 and shown on Figures 3a through 3t in Attachment C. A detailed summary of removal area and volume impacts is provided in Table 5, and a detailed summary of fill area and volume impacts is provided in Table 6. Tables 4, 5, and 6 also show where the proposed project will impact undisturbed vegetated areas versus previously disturbed areas (e.g., existing pipeline alignments, previously graded or impacted areas, maintained/mowed areas). In total, the proposed project includes 127,101 square feet (2.918 acres) of both temporary and permanent wetland impacts.

The proposed project includes 91,112 square feet (2.092 acres) of temporary wetland impacts from the excavation of materials from and subsequent placement of materials into wetlands on the project site mainly from the installation of new underground pipelines. Of this area, 2,123 square feet (0.049 acre) of temporary wetland impacts would occur in undisturbed vegetated areas (Tables 4, 5, and 6). The volume of the total temporary wetland impact work includes the excavation of 5,814 cubic yards of material from wetlands and subsequent placement of 5,814 cubic yards of fill material into wetlands. Fill material would consist of pipelines or fiber optic cables, bedding, embankment, and backfill to pre-construction elevations. Some of the placed backfill material would consist of the native material excavated from the wetland. Excavated material would include old pipelines that are proposed to be removed and replaced.

The proposed project includes 35,989 square feet (0.826 acre) of permanent wetland impacts from the excavation of materials from and placement of materials into wetlands on the project site. Of this area, 30,664 square feet (0.704 acre) of permanent wetland impacts would occur in undisturbed vegetated areas (Tables 4, 5, and 6). The project includes the total permanent excavation of 682 cubic yards of material from wetlands and placement of 3,774 cubic yards of fill material into wetlands. Fill material will consist of structural fill to construct adsorption fields and well houses.

Impacts were determined using the following assumptions:

- The area of pipeline and fiber optic cable construction disturbance area includes a 7.5-foot offset on either side of the pipeline or cable to account for ground surface disturbance from temporary equipment and spoil pile storage and construction vehicle use.
- Total volume removed for pipeline and cable installation would be limited to a 2-foot-wide, 4-foot-deep trench that is the length of the pipe or cable in the wetland.
- All proposed pipeline construction areas will be trenched and backfilled to pre-construction elevations.
- The backfill within the wetland would be designed to avoid long-term impacts to wetland hydrology, and the area would be revegetated following construction.

A summary of the proposed work in wetlands is further described in the following sections.

Table 4  
Proposed Project Impacts to Wetlands Delineated Within the Study Area

Study Area	Wetland	Temporary Impacts Previously Disturbed Areas Acres	Temporary Impacts Previously Disturbed Areas Square Feet	Temporary Impacts Undisturbed Areas Acres	Temporary Impacts Undisturbed Areas Square Feet	Permanent Impacts Previously Disturbed Areas Acres	Permanent Impacts Previously Disturbed Areas Square Feet	Permanent Impacts Undisturbed Areas Acres	Permanent Impacts Undisturbed Areas Square Feet	Total Impacts to Undisturbed Areas Acres	Total Impacts to Undisturbed Areas Square Feet	Total Impacts Acres	Total Impacts Square Feet
Park HQ and Visitor Center	Wetland A	0.060	2,596	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.060	2,596
Pine Island Maintenance Center	Wetland E	0.020	889	0.025	1,074	N.D.	N.D.	N.D.	N.D.	0.025	1,074	0.045	1,963
Daniel Beard Center	Wetland W	0.090	3,931	N.D.	N.D.	0.009	409	N.D.	N.D.	N.D.	N.D.	0.099	3,800
Trail Center Housing Area	Wetland H	0.031	1,359	N.D.	N.D.	0.010	455	N.D.	N.D.	N.D.	N.D.	0.041	1,814
Shark Valley Administrative Area and Visitor Center	Wetland J	0.213	9,290	N.D.	N.D.	N.D.	N.D.	0.157	6,829	0.157	6,829	0.370	16,119
Shark Valley Observation Tower	Wetland K	0.008	330	0.024	1,049	0.103	4,461	0.364	15,859	0.388	16,908	0.499	21,699
Flamingo Wastewater Treatment Plant	Wetland L	0.401	17,463	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.401	17,463
Flamingo Water Treatment Plant, and Residential Area	Wetland M	0.212	9,216	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.212	9,216
Flamingo Water Treatment Plant, and Residential Area	Wetland N	0.008	352	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.008	352
Flamingo Visitor Center and Campground	Wetland S	0.864	37,648	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.864	37,648
Flamingo Visitor Center and Campground	Wetland T	0.052	2,265	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.052	2,265
Flamingo Visitor Center and Campground	Wetland U	0.084	3,650	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.084	3,650
West Lake Area	Wetland V	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.183	7,976	0.183	7,976	0.183	7,976
Total Impacts		2.043	88,989	0.049	2,123	0.122	5,325	0.704	30,664	0.753	32,787	2.918	127,101

Notes:  
N.D. – No data



Table 5  
Estimated Wetland Disturbance Areas and Removal Volumes Summary

District and Project Site	Wetland	Impact Type	Material	Duration of Impact	Disturbance Dimensions Total Impact Area in Previously Disturbed Areas <sup>1,2</sup> Acres	Disturbance Dimensions Total Impact Area in Previously Disturbed Areas <sup>1,2</sup> Square Feet	Disturbance Dimensions Total Impact Area in Undisturbed Areas <sup>1,3</sup> Acres	Disturbance Dimensions Total Impact Area in Undisturbed Areas <sup>1,3</sup> Square Feet	Disturbance Dimensions Total Removal Volume <sup>4</sup> (Cubic Yards)
<b>Pine Island District</b> Park HQ and Visitor Center	Wetland A	Sanitary sewer pipelines	Mix of limestone fill and native soil	Temporary	0.060	2,596	N.D.	N.D.	158
<b>Pine Island District</b> Pine Island Maintenance Center	Wetland E	Sanitary sewer and potable water pipelines and Fiber optic cable	Mix of limestone fill and native soil	Temporary	0.020	889	0.025	1,074	286
<b>Pine Island District</b> Daniel Beard Center	Wetland W	Sanitary sewer and potable water pipelines	Mix of limestone fill and native soil	Temporary	0.090	3,931	N.D.	N.D.	120
<b>Pine Island District</b> Daniel Beard Center	Wetland W	Adsorption field	Mix of limestone fill and native soil	Permanent	0.009	409	N.D.	N.D.	15
<b>Loop Road District</b> Trail Center Housing Area	Wetland H	Sanitary sewer and potable water pipelines	Mix of limestone fill and native soil	Temporary	0.031	1,359	N.D.	N.D.	47
<b>Loop Road District</b> Trail Center Housing Area	Wetland H	Adsorption field	Mix of limestone fill and native soil	Permanent	0.010	455	N.D.	N.D.	17
<b>Shark Valley District</b> Shark Valley Administrative Area and Visitor Center	Wetland J	Sanitary sewer and potable water pipelines	Mix of limestone fill and native soil	Temporary	9,290	0.213	N.D.	N.D.	863
<b>Shark Valley District</b> Shark Valley Administrative Area and Visitor Center	Wetland J	Adsorption field	Mix of limestone fill and native soil	Permanent	N.D.	N.D.	0.157	6,829	130
<b>Shark Valley District</b> Shark Valley Observation Tower	Wetland K	Potable water pipelines	Mix of limestone fill and native soil	Temporary	0.008	330	0.024	1,049	127
<b>Shark Valley District</b> Shark Valley Observation Tower	Wetland K	Adsorption field	Mix of limestone fill and native soil	Permanent	0.022	957	0.364	15,859	300
<b>Shark Valley District</b> Shark Valley Observation Tower	Wetland K	Well house	Mix of limestone fill and native soil	Permanent	0.081	3,504	N.D.	N.D.	70
<b>Flamingo District</b> Flamingo Wastewater Treatment Plant	Wetland L	Sanitary sewer and potable water pipelines	Mix of limestone fill and native soil	Temporary	0.401	17,463	N.D.	N.D.	504
<b>Flamingo District</b> Flamingo Water Treatment Plant, and Residential Area	Wetland M	Sanitary sewer and potable water pipelines and Fiber optic cable	Mix of limestone fill and native soil	Temporary	0.212	9,216	N.D.	N.D.	1,638
<b>Flamingo District</b> Flamingo Water Treatment Plant, and Residential Area	Wetland N	Sanitary sewer pipelines	Mix of limestone fill and native soil	Temporary	0.008	352	N.D.	N.D.	22

District and Project Site	Wetland	Impact Type	Material	Duration of Impact	Disturbance Dimensions Total Impact Area in Previously Disturbed Areas <sup>1,2</sup> Acres	Disturbance Dimensions Total Impact Area in Previously Disturbed Areas <sup>1,2</sup> Square Feet	Disturbance Dimensions Total Impact Area in Undisturbed Areas <sup>1,3</sup> Acres	Disturbance Dimensions Total Impact Area in Undisturbed Areas <sup>1,3</sup> Square Feet	Disturbance Dimensions Total Removal Volume <sup>4</sup> (Cubic Yards)
<b>Flamingo District</b> Flamingo Visitor Center and Campground	Wetland S	Sanitary sewer and potable water pipelines	Mix of limestone fill and native soil	Temporary	0.864	37,648	N.D.	N.D.	1,866
<b>Flamingo District</b> Flamingo Visitor Center and Campground	Wetland T	Sanitary sewer and potable water pipelines	Mix of limestone fill and native soil	Temporary	0.052	2,265	N.D.	N.D.	152
<b>Flamingo District</b> Flamingo Visitor Center and Campground	Wetland U	Sanitary sewer pipelines	Mix of limestone fill and native soil	Temporary	0.084	3,650	N.D.	N.D.	31
<b>Flamingo District</b> West Lake Area	Wetland V	Adsorption field	Mix of limestone fill and native soil	Permanent	N.D.	N.D.	0.183	7,976	150
TOTAL TEMPORARY DISTURBANCE AREA AND REMOVAL VOLUME					2.043	88,989	0.049	2,123	5,814
TOTAL PERMANENT DISTURBANCE AREA AND REMOVAL VOLUME					0.122	5,325	0.704	30,664	682
TOTAL DISTURBANCE AREA AND REMOVAL VOLUME					2.165	94,314	0.753	32,787	6,496

Notes:  
N.D. – No data  
1. The area of pipeline and fiber optic cable construction disturbance area includes a 7.5-foot offset on either side of the pipeline or cable to account for ground surface disturbance from temporary equipment and spoil pile storage and construction vehicle use.  
2. Area of impact is within previously disturbed areas (e.g., existing pipeline alignments, maintained/mowed areas).  
3. Area of impact is within undisturbed vegetated areas.  
4. Total volume removed for pipeline and cable installation would be limited to a 2-foot-wide, 4-foot-deep trench that is the length of the pipe or cable in the wetland.

Table 6  
Estimated Wetland Disturbance Areas and Fill Volumes Summary

District and Project Site	Wetland	Impact Type	Material	Duration of Impact	Disturbance Dimensions Total Impact Area in Previously Disturbed Areas <sup>1,2</sup> Acres	Disturbance Dimensions Total Impact Area in Previously Disturbed Areas <sup>1,2</sup> Square Feet	Disturbance Dimensions Total Impact Area in Undisturbed Areas <sup>1,3</sup> Acres	Disturbance Dimensions Total Impact Area in Undisturbed Areas <sup>1,3</sup> Square Feet	Disturbance Dimensions Total Fill Volume <sup>4</sup> (Cubic Yards)
<b>Pine Island District</b> Park HQ and Visitor Center	Wetland A	Sanitary sewer pipelines	Mix of limestone fill and native soil	Temporary	0.060	2,596	N.D.	N.D.	158
<b>Pine Island District</b> Pine Island Maintenance Center	Wetland E	Sanitary sewer and potable water pipelines and Fiber optic cable	Mix of limestone fill and native soil	Temporary	0.020	889	0.025	1,074	286
<b>Pine Island District</b> Daniel Beard Center	Wetland W	Sanitary sewer and potable water pipelines	Mix of limestone fill and native soil	Temporary	0.090	3,931	N.D.	N.D.	120
<b>Pine Island District</b> Daniel Beard Center	Wetland W	Adsorption field	Mix of limestone fill and native soil	Permanent	0.009	409	N.D.	N.D.	15
<b>Loop Road District</b> Trail Center Housing Area	Wetland H	Sanitary sewer and potable water pipelines	Mix of limestone fill and native soil	Temporary	0.031	1,359	N.D.	N.D.	47
<b>Loop Road District</b> Trail Center Housing Area	Wetland H	Adsorption field	Mix of limestone fill and native soil	Permanent	0.010	455	N.D.	N.D.	59
<b>Shark Valley District</b> Shark Valley Administrative Area and Visitor Center	Wetland J	Sanitary sewer and potable water pipelines	Mix of limestone fill and native soil	Temporary	9,290	0.213	N.D.	N.D.	863
<b>Shark Valley District</b> Shark Valley Administrative Area and Visitor Center	Wetland J	Adsorption field	Mix of limestone fill and native soil	Permanent	N.D.	N.D.	0.157	6,829	920
<b>Shark Valley District</b> Shark Valley Observation Tower	Wetland K	Potable water pipelines	Mix of limestone fill and native soil	Temporary	0.008	330	0.024	1,049	127
<b>Shark Valley District</b> Shark Valley Observation Tower	Wetland K	Adsorption field	Mix of limestone fill and native soil	Permanent	0.022	957	0.364	15,859	2,100
<b>Shark Valley District</b> Shark Valley Observation Tower	Wetland K	Well house	Mix of limestone fill and native soil	Permanent	0.081	3,504	N.D.	N.D.	280
<b>Flamingo District</b> Flamingo Wastewater Treatment Plant	Wetland L	Sanitary sewer and potable water pipelines	Mix of limestone fill and native soil	Temporary	0.401	17,463	N.D.	N.D.	504
<b>Flamingo District</b> Flamingo Water Treatment Plant, and Residential Area <b>Flamingo District</b> Flamingo Water Treatment Plant, and Residential Area	Wetland M	Sanitary sewer and potable water pipelines and Fiber optic cable	Mix of limestone fill and native soil	Temporary	0.212	9,216	N.D.	N.D.	1,638
	Wetland N	Sanitary sewer pipelines	Mix of limestone fill and native soil	Temporary	0.008	352	N.D.	N.D.	22
<b>Flamingo District</b> Flamingo Visitor Center and Campground	Wetland S	Sanitary sewer and potable water pipelines	Mix of limestone fill and native soil	Temporary	0.864	37,648	N.D.	N.D.	1,866
<b>Flamingo District</b> Flamingo Visitor Center and Campground	Wetland T	Sanitary sewer and potable water pipelines	Mix of limestone fill and native soil	Temporary	0.052	2,265	N.D.	N.D.	152

District and Project Site	Wetland	Impact Type	Material	Duration of Impact	Disturbance Dimensions Total Impact Area in Previously Disturbed Areas <sup>1,2</sup> Acres	Disturbance Dimensions Total Impact Area in Previously Disturbed Areas <sup>1,2</sup> Square Feet	Disturbance Dimensions Total Impact Area in Undisturbed Areas <sup>1,3</sup> Acres	Disturbance Dimensions Total Impact Area in Undisturbed Areas <sup>1,3</sup> Square Feet	Disturbance Dimensions Total Fill Volume <sup>4</sup> (Cubic Yards)
<b>Flamingo District</b> Flamingo Visitor Center and Campground	Wetland U	Sanitary sewer pipelines	Mix of limestone fill and native soil	Temporary	0.084	3,650	N.D.	N.D.	31
<b>Flamingo District</b> West Lake Area	Wetland V	Adsorption field	Mix of limestone fill and native soil	Permanent	N.D.	N.D.	0.183	7,976	400
TOTAL TEMPORARY DISTURBANCE AREA AND FILL VOLUME					2.043	88,989	0.049	2,123	5,814
TOTAL PERMANENT DISTURBANCE AREA AND FILL VOLUME					0.122	5,325	0.704	30,664	3,494
TOTAL DISTURBANCE AREA AND FILL VOLUME					2.165	94,314	0.753	32,787	9,588

Notes:  
N.D. – No data  
1. The area of pipeline and fiber optic cable construction disturbance area includes a 7.5-foot offset on either side of the pipeline or cable to account for ground surface disturbance from temporary equipment and spoil pile storage and construction vehicle use.  
2. Area of impact is within previously disturbed areas (e.g., existing pipeline alignments, maintained/mowed areas).  
3. Area of impact is within undisturbed vegetated areas.  
4. Total volume placed for pipeline and cable installation would be limited to a 2-foot-wide, 4-foot-deep trench that is the length of the pipe or cable in the wetland.

### **6.1.1 Pine Island District**

#### **6.1.1.1 Park Headquarters and Visitor Center**

Temporary wetland impacts from the proposed work at the HQ and Visitor Center project site would be from the installation of new sanitary sewer pipelines (Figures 3a and 3b in Attachment C). This work would require short-term excavation of material from and placement of material into Wetland A, returning the final grade to pre-construction conditions. The backfill within the wetland would be native material and would allow water to flow through and infiltrate the same as current conditions to avoid long-term impacts to wetland hydrology, and the area would be revegetated following construction. The new pipelines would be installed within previously disturbed areas (e.g., mowed grassy areas where existing pipelines occur) to avoid and minimize impacts to undisturbed habitats. The need to temporarily impact small portions of Wetland A is due to its proximity with the ROW and maintained areas where the new pipelines are proposed to be installed. No impacts are proposed to Wetland B.

#### **6.1.1.2 Pine Island Maintenance Center and Residential Area**

Temporary wetland impacts from the proposed work at the Pine Island Maintenance Center and Residential Area project site would be from the installation of new sanitary sewer and potable water pipelines and fiber optic cables (Figures 3c and 3d in Attachment C). This work would require short-term excavation of material from and placement of material into Wetland E, returning the final grade to pre-construction conditions. The backfill within the wetland would be native material and would allow water to flow through and infiltrate the same as current conditions to avoid long-term impacts to wetland hydrology, and the area would be revegetated following construction. The new pipelines and fiber optic cables would be installed within previously disturbed areas (e.g., mowed grassy areas) to avoid and minimize impacts to undisturbed habitats. The need to temporarily impact small portions of Wetland E is due to its proximity with the ROW and maintained areas where the new pipelines and fiber optic cable are proposed to be installed. No impacts are proposed to Wetlands C and D.

#### **6.1.1.3 Royal Palm Visitor Center**

No impacts are proposed to Wetland F on the Royal Palm Visitor Center project site.

#### **6.1.1.4 Hidden Lake Environmental Education Center**

No impacts are proposed to Wetland G or Hidden Lake on the Hidden Lake Environmental Education Center project site.

#### **6.1.1.5 Long Pine Key Campground**

No wetlands or other waters were delineated on the Long Pine Key Campground project site, so no impacts are proposed.



#### **6.1.1.6 Bill Robertson and Daniel Beard Centers**

Temporary wetland impacts from the proposed work at the Daniel Beard Center project site would be from the installation of new sanitary sewer and potable water pipelines (Figure 3e in Attachment C). This work would require short-term excavation of material from and placement of material into Wetland W, returning the final grade to pre-construction conditions. The backfill within the wetland would be native material and would allow water to flow through and infiltrate the same as current conditions to avoid long-term impacts to wetland hydrology, and the area would be revegetated following construction. Proposed line installation would occur within previously disturbed portions of the Bill Robertson Center and Daniel Beard Center project site and the ROW associated with Research Road. The need to temporarily impact portions of Wetland W is due to its proximity with the ROW along Research Road and along the eastern boundary of the project site where the new pipelines are proposed to be installed.

Permanent wetland impacts would be from construction of an adsorption field (Figure 3f in Attachment C). This work would require the permanent placement of material into Wetland W to raise the adsorption field to design elevations. The need to permanently impact portions of Wetland W is due to its proximity with an area where the new adsorption field would be constructed in the southwest corner of the project site. Both temporary and permanent impacts are within previously disturbed areas (e.g., maintained/mowed grassy areas) to avoid and minimize impacts to undisturbed habitats.

### **6.1.2 Loop Road District**

#### **6.1.2.1 Trail Center Housing Area**

Temporary wetland impacts from the proposed work at the Trail Center Housing Area project site would be from the installation of new sanitary sewer and potable water pipelines (Figure 3g in Attachment C). This work would require short-term excavation of material from and placement of material into Wetland H, returning the final grade to pre-construction conditions. The backfill within the wetland would be native material and would allow water to flow through and infiltrate the same as current conditions to avoid long-term impacts to wetland hydrology, and the area would be revegetated following construction. Proposed line installation would occur along the Trail Center access road and adjacent to existing buildings. The need to temporarily impact portions of Wetland H is due to its proximity with previously disturbed areas (e.g., maintained areas) where the new pipelines are proposed to be installed.

Permanent wetland impacts would be from construction of an adsorption field (Figure 7 in Attachment C). This work would require the permanent placement of material into Wetland H to raise the adsorption field to design elevations. The need to permanently impact portions of Wetland H is due to its proximity with an area where the new adsorption field would be constructed.

Both temporary and permanent impacts are within previously disturbed areas (e.g., maintained/mowed grassy areas) to avoid and minimize impacts to undisturbed habitats.

#### **6.1.2.2 Loop Road Education Center**

No wetlands or other waters were delineated on the Loop Road Education Center project site, so no impacts are proposed.

#### **6.1.2.3 Tamiami Ranger Station**

No impacts are proposed to Wetland I on the Tamiami Ranger Station project site.

### **6.1.3 Shark Valley District**

#### **6.1.3.1 Shark Valley Administrative Area and Visitor Center**

Temporary wetland impacts from the proposed work at the Shark Valley Administrative Area and Visitor Center project site would be from the installation of new sanitary sewer and potable water pipelines (Figures 3h through 3l in Attachment C). This work would require short-term excavation of material from and placement of material into Wetland J, returning the final grade to pre-construction conditions. The backfill within the wetland would be native material and would allow water to flow through and infiltrate the same as current conditions to avoid long-term impacts to wetland hydrology, and the area would be revegetated following construction. Proposed line installation would occur within the ROW associated with access roads and parking areas at the project site. The need to temporarily impact portions of Wetland J is due to its proximity with the ROW where the new pipelines are proposed to be installed. Temporary impacts are within previously disturbed areas to avoid and minimize impacts to undisturbed habitats.

Permanent wetland impacts would be from construction of an adsorption field (Figure 3i in Attachment C). This work would require the permanent placement of material into Wetland J to raise the adsorption field to design elevations. The adsorption field would be constructed in the northwest portion of the project site in and adjacent to the ROW associated with an access road. The need to permanently impact portions of Wetland J is due to its proximity with the ROW where portions of the new adsorption field would be constructed. In this area, the ROW is narrow and mostly coincident with the access road that needs to remain unobstructed for maintenance purposes; therefore, the adsorption field needs to be sited partially within undisturbed wetland habitat associated with Wetland J. The remaining permanent impacts associated with construction of the adsorption field are within previously disturbed areas (e.g., ROW) to avoid and minimize impacts to undisturbed habitats.

#### **6.1.3.2 Shark Valley Observation Tower**

Temporary wetland impacts from the proposed work at the Shark Valley Observation Tower project site would be from the installation of new potable water pipelines (Figures 3m and 3n in

Attachment C). This work would require short-term excavation of material from and placement of material into Wetland K, returning the final grade to pre-construction conditions. The backfill within the wetland would be native material and would allow water to flow through and infiltrate the same as current conditions to avoid long-term impacts to wetland hydrology, and the area would be revegetated following construction. Proposed line installation would occur within the ROW associated with access roads and parking areas and along the concrete boardwalk that leads to the comfort station associated with the Observation Tower. The need to temporarily impact portions of Wetland K is due to its proximity with the ROW and concrete boardwalk where the new pipeline is proposed to be installed. Temporary impacts are mainly within previously disturbed areas to avoid and minimize impacts to undisturbed habitats.

Permanent wetland impacts would be from construction of an adsorption field and well house (Figures 3n and 3m in Attachment C). This work would require the permanent placement of material into Wetland K to raise the adsorption field to design elevations and to replace the existing well house. The proposed adsorption field would be constructed to the northeast of the existing comfort station and Observation Tower and the well house would be constructed in the same general location as the existing well house adjacent to the Observation Tower parking area. The need to permanently impact portions of Wetland K is due to its proximity with the existing comfort station where the new adsorption field would be constructed and its proximity with the existing well house footprint where the new well house would be constructed. Due to the high water table in the area, the proposed adsorption field is required to be constructed over a larger footprint to offset the need to further raise the field above the water table. It is sited in an area that was previously disturbed when the Shark Valley Observation Tower was constructed in the late 1950s and early 1960s. Much of this area has returned to wetland habitat that is associated with Wetland K.

#### **6.1.4 Flamingo District**

##### **6.1.4.1 Flamingo Wastewater Treatment Plant**

Temporary wetland impacts from the proposed work at the project site would be from the installation of new sanitary sewer and potable water pipelines (Figure 3o in Attachment C). This work would require short-term excavation of material from and placement of material into Wetland L, returning the final grade to pre-construction conditions. The backfill within the wetland would be native material and would allow water to flow through and infiltrate the same as current conditions to avoid long-term impacts to wetland hydrology, and the area would be revegetated following construction. The new pipelines would be installed within previously disturbed areas to avoid and minimize impacts to undisturbed habitats. The need to temporarily impact portions of Wetland L is due to its proximity with the ROW and mowed grassy areas where the new pipelines are proposed to be installed.

#### **6.1.4.2 Flamingo Water Treatment Plant and Residential Area**

Temporary wetland impacts from the proposed work at the Flamingo Water Treatment Plant and Residential Area project site would be from the installation of new sanitary sewer and potable water pipelines and fiber optic cables (Figures 3p through 3r in Attachment C). This work would require short-term excavation of material from and placement of material into Wetlands M and N, returning the final grades to pre-construction conditions. The backfill within wetlands would be native material and would allow water to flow through and infiltrate the same as current conditions to avoid long-term impacts to wetland hydrology and the areas would be revegetated following construction. Proposed line installation would occur within maintained grassy areas and the ROW associated with access roads and parking areas in the project site. The need to temporarily impact portions of Wetlands M and N is due to their proximity with the ROW and mowed grassy areas where the new pipelines and fiber optic cables are proposed to be installed. Temporary impacts are within previously disturbed areas to avoid and minimize impacts to undisturbed habitats.

#### **6.1.4.3 Flamingo Visitor Center Area and Flamingo Campground**

Temporary wetland impacts from the proposed work at the Flamingo Visitor Center Area and Flamingo Campground project site would be from the installation of new sanitary sewer and potable water pipelines (Figure 3s in Attachment C). This work would require short-term excavation of material from and placement of material into Wetlands S, T, and U, returning the final grades to pre-construction conditions. The backfill within wetlands would be native material and would allow water to flow through and infiltrate the same as current conditions to avoid long-term impacts to wetland hydrology, and areas would be revegetated following construction. Proposed line installation would occur within maintained grassy areas and the ROW associated with access roads and parking and camping areas in the project site. The need to temporarily impact portions of Wetlands S, T, and U is due to their proximity with the ROW and mowed grassy areas where the new pipelines are proposed to be installed. Temporary impacts are within previously disturbed areas to avoid and minimize impacts to undisturbed habitats.

#### **6.1.4.4 West Lake Area**

Permanent wetland impacts from the proposed work at the West Lake Area project site would be from construction of an adsorption field (Figure 3t in Attachment C). This work would require the permanent placement of material into Wetland V to raise the adsorption field to design elevations. The adsorption field would be constructed to the north of the access road and parking areas associated with the West Lake Area. Wetland habitats surround the West Lake Area, leaving little room for development in previously disturbed areas. The need to permanently impact portions of Wetland V is due to its proximity with the access road and parking areas where the new adsorption field would be constructed.

## 6.2 Floodplain

Impacts to the FEMA-mapped 100-year floodplain and the predicted FEMA storm surge/flood areas would include excavation of material from and placement of material into the floodplain and flood-prone areas to facilitate construction of the proposed project. Temporary impacts include ground disturbance to install new pipelines and fiber optic cables. Permanent impacts include excavation and fill placement to construct well houses and adsorption fields. A summary of the proposed work in the FEMA-mapped 100-year floodplain and the predicted FEMA storm surge/flood elevations is further described in the following sections.

### 6.2.1 *Pine Island District*

#### 6.2.1.1 **Park Headquarters and Visitor Center**

The proposed work is outside of the FEMA-mapped 100-year floodplain; however, it is located within the predicted FEMA storm surge/flood elevation of 6 feet NAVD88 (Stanley Consultants 2023). While no structures are proposed above existing grade, there would be temporary ground disturbance to install the new pipelines within the predicted FEMA storm surge/flood areas.

#### 6.2.1.2 **Pine Island Maintenance Center and Residential Area**

The proposed work is outside of the FEMA-mapped 100-year floodplain; however, it is located within the predicted FEMA storm surge/flood elevation of 6 feet NAVD88 (Stanley Consultants 2023).

Impacts to the predicted FEMA storm surge/flood areas would include placement of fill to construct the new wastewater treatment plant and new well house, which would raise the new infrastructure above the predicted flood elevation of 6 feet as required under Class I actions. There would also be temporary ground disturbance to install the new pipelines within the predicted FEMA storm surge/flood areas.

#### 6.2.1.3 **Royal Palm Visitor Center**

The proposed work is outside of the FEMA-mapped 100-year floodplain; however, it is within the predicted FEMA storm surge/flood elevation of 6 feet NAVD88 (Stanley Consultants 2023). Impacts to the predicted FEMA storm surge/flood areas would include placement of fill to construct the new well house and adsorption field, which would raise the new infrastructure above the predicted flood elevation by 5 feet as required under Class I actions. There would also be temporary ground disturbance to install the new pipelines within the predicted FEMA storm surge/flood areas.

#### 6.2.1.4 **Hidden Lake Environmental Education Center**

The proposed work is outside of the FEMA-mapped 100-year floodplain and the predicted FEMA storm surge/flood elevation of 6 feet NAVD88 (Stanley Consultants 2023), so no floodplain impacts are proposed.



#### **6.2.1.5 Long Pine Key Campground**

The proposed work is outside of the FEMA-mapped 100-year floodplain and the predicted FEMA storm surge/flood elevation of 6 feet NAVD88 (Stanley Consultants 2023), so no floodplain impacts are proposed.

#### **6.2.1.6 Bill Robertson and Daniel Beard Centers**

The proposed work is outside of the FEMA-mapped 100-year floodplain and the predicted FEMA storm surge/flood elevation of 6 feet NAVD88 (Stanley Consultants 2023), so no floodplain impacts are proposed.

### **6.2.2 Loop Road District**

#### **6.2.2.1 Trail Center Housing Area**

The proposed work at the Trail Center Housing Area project site is in the FEMA-mapped 100-year floodplain with a base flood elevation of 7 feet NAVD88. The floodplain would be impacted because of the temporary ground disturbance required to install the new pipelines and the permanent placement of fill and riprap to construct a new well house and new absorption fields. The new well house and absorption fields would be raised 3- to 4-feet above base flood elevations as required under Class I actions. The need to impact the floodplain is due to the temporary ground disturbance to install the new pipelines and permanent placement of fill material to construct the new adsorption fields. Both temporary and permanent impacts to floodplain functions and values associated with project construction will be adverse but minor and localized. Over the long term, improved water quality would benefit the 100-year floodplain with the proposed project from installation of the new wastewater treatment system.

#### **6.2.2.2 Loop Road Education Center**

The proposed work is in the FEMA-mapped 100-year floodplain with a base flood elevation of 7 feet NAVD88. The floodplain would be impacted because of the temporary ground disturbance required to install the new pipelines and the permanent placement of fill and riprap to construct a new absorption field. The new absorption fields would be raised 3 to 4 feet above base flood elevations as required under Class I actions. The need to impact the floodplain is due to the temporary ground disturbance to install the new pipelines and permanent placement of fill material to construct the new adsorption field. Both temporary and permanent impacts to floodplain functions and values associated with project construction will be adverse but minor and localized. Over the long term, improved water quality would benefit the 100-year floodplain with the proposed project from installation of the new wastewater treatment system.

### **6.2.2.3 Tamiami Ranger Station**

The proposed work is in the FEMA-mapped 100-year floodplain with a base flood elevation of 7 feet NAVD88. The floodplain would be impacted because of the temporary ground disturbance required to install the new pipelines and the permanent placement of fill and riprap to construct a new absorption field. The new absorption fields would be raised 3 to 4 feet above base flood elevations as required under Class I actions. The need to impact the floodplain is due to the temporary ground disturbance to install the new pipelines and permanent placement of fill material to construct the new adsorption field. Both temporary and permanent impacts to floodplain functions and values associated with project construction will be adverse but minor and localized. Over the long term, improved water quality would benefit the 100-year floodplain with the proposed project from installation of the new wastewater treatment system.

### **6.2.3 Shark Valley District**

#### **6.2.3.1 Shark Valley Administrative Area and Visitor Center**

Currently, the Shark Valley Administrative Area and Visitor Center project site is very flat with a mean elevation of around 12 feet NAVD88. The proposed work in the northernmost portion of the project site is located in the FEMA-mapped 100-year floodplain. The floodplain would be affected because of temporary ground disturbance required to install new pipelines and the permanent placement of fill to construct the new raised absorption field (5 feet above grade) as required under Class I actions. The need to impact the floodplain is due to the temporary ground disturbance to install the new pipelines and permanent placement of fill material to construct the new adsorption field. Both temporary and permanent impacts to floodplain functions and values associated with project construction will be adverse but minor and localized. Over the long term, improved water quality would benefit the 100-year floodplain with the proposed project from installation of the new wastewater treatment system. The remaining proposed work is outside of the currently FEMA-mapped 100-year floodplain; however, it is within the predicted FEMA storm surge/flood elevation of 9.4 feet NAVD88 (Stanley Consultants 2023). Furthermore, these portions of the project site may soon be within a FEMA-mapped 100-year floodplain with the CEPP and CERP actions.

#### **6.2.3.2 Shark Valley Observation Tower**

The proposed work is outside of the currently FEMA-mapped 100-year floodplain; however, the proposed work is located within the predicted FEMA storm surge/flood elevation of 6.11 feet NAVD88 (Stanley Consultants 2023). Furthermore, these portions of the project site may soon be within a FEMA-mapped 100-year floodplain with the CEPP and CERP actions. The floodplain would be affected because of temporary ground disturbance required to install new pipelines and the permanent placement of fill to construct the new the Shark Valley Observation Tower well house

(4 feet above grade) and the new raised absorption field (6 feet above grade) to protect against flooding as required under Class I actions.

## **6.2.4 *Flamingo District***

### **6.2.4.1 Flamingo Wastewater Treatment Plant**

The proposed work at the Flamingo Wastewater Treatment Plant project site is in the FEMA-mapped 100-year floodplain with a base flood elevation of 9 feet NAVD88. The need to impact the floodplain is due to the temporary ground disturbance to install the new pipelines and the permanent placement of fill and riprap to construct the new wastewater treatment plant, which would be raised above base flood elevations by 4 feet as required under Class I actions. Proposed new site elevation is 13 feet NAVD88 to provide additional protection from wave run up. Temporary impacts to floodplain functions and values associated with project construction will be adverse but minor and localized. Over the long term, improved water quality would benefit the 100-year floodplain with the proposed project from installation of the new wastewater treatment system.

### **6.2.4.2 Flamingo Water Treatment Plant and Residential Area**

The proposed work in the central and northern portion of the at the Flamingo Water Treatment Plant and Residential Area project site is located in the FEMA-mapped 100-year floodplain with base flood elevations ranging from 9 to 10 feet NAVD88. The proposed work in the southern portion of the project site is also located in the FEMA-mapped 100-year floodplain with base flood elevations ranging from 11 to 16 feet NAVD88. The need to impact the floodplain is due to the temporary ground disturbance to install the new pipelines and fiber optic cables. Temporary impacts to floodplain functions and values associated with project construction will be adverse but minor and localized. Over the long term, improved water quality would benefit the 100-year floodplain with the proposed project from installation of the new wastewater treatment system.

### **6.2.4.3 Flamingo Visitor Center Area and Flamingo Campground**

The proposed work in the northern portion of the Flamingo Visitor Center Area and Flamingo Campground project site is located in the FEMA-mapped 100-year floodplain with a base flood elevation of 10 feet NAVD88. The proposed work in the southern portions of the project site is also located in the FEMA-mapped 100-year floodplain with base flood elevations ranging from 11 to 16 feet NAVD88. The need to impact the floodplain is due to the temporary ground disturbance to install the new pipelines. Temporary impacts to floodplain functions and values associated with project construction will be adverse but minor and localized. Over the long term, improved water quality would benefit the 100-year floodplain with the proposed project from installation of the new wastewater treatment system.

#### **6.2.4.4 West Lake Area**

The proposed work is outside of the FEMA-mapped 100-year floodplain; however, it is within the predicted FEMA storm surge/flood elevation of 6 feet NAVD88 (Stanley Consultants 2023). The floodplain would be impacted because of the temporary ground disturbance required to install the new pipelines and the permanent placement of fill and riprap to construct a new absorption field. The new absorption field would be raised 7 feet above the predicted FEMA storm surge/flood elevation as required under Class I actions.

## 7 Justification for the Use of Wetlands and Floodplain

The main purpose of the project is to replace the aging potable water distribution and wastewater collection systems in the Pine Island District, the Loop Road District, the Shark Valley District, and the Flamingo District. The existing potable water distribution and wastewater collection systems were built in the 1950s and 1960s, and many of these systems have reached the end of their service life, are increasingly expensive to maintain, and need repair and upgrade. Construction of the proposed project will require excavation of material from and placement of fill material into portions of wetlands that are predominantly located in previously disturbed areas (e.g., ROW, mowed grassy areas). Construction of the proposed project will also require excavation of material from and placement of fill material into flood-prone areas.

### 7.1 Wetland Impacts

Under the proposed action, 127,101 square feet (2.918 acres) of wetland would be filled or disturbed, and normal wetland functions would be permanently (35,989 square feet [0.826 acre]) or temporarily (91,112 square feet [2.092 acres]) lost as a result of the proposed construction activities. This includes 30,664 square feet (0.704 acre) of permanent wetland impacts and 2,123 square feet (0.049 acre) of temporary wetland impacts in undisturbed vegetated areas.

### 7.2 Floodplain Impacts

The majority of the proposed action is located entirely within the regulatory floodplain or the predicted FEMA storm surge/flood elevations, and there is no alternative for replacing the aging potable water distribution and wastewater collection systems within the park areas. However, the intent of the project is to reduce flood risk by elevating structures above the current ground surface. Proposed and rehabilitated structures within the floodplain would be raised above the 100-year flood elevation or the predicted FEMA storm surge/flood elevation. While these structures would be elevated above the floodplain, this would also mean the floodplain would be reduced in size, although this reduction would be minimal.

#### 7.2.1 *Potential Risk to Human Health and Safety*

The proposed action would be beneficial to human health and safety because the project would provide clean potable water to park visitors and constructed structures would be elevated to heights greater than the 100-year flood elevation as determined by the NPS as part of the project. This would ensure that all proposed structures within the project site would be at a lower risk of flooding compared to the current conditions.



### *7.2.2 Potential Risk to Property*

Upon completion of the proposed action, all constructed features within the project site would be above NPS recommended elevations and outside of the FEMA-mapped 100-year floodplain and the predicted FEMA storm surge/flood elevation. In turn, this would decrease the likelihood of property and facility damage due to flood-related occurrences. Risk to properties and facilities would be significantly greater if the proposed action were not performed due to rising water levels in EVER from climate-predicted changes to sea level rise and storm surge heights.

### *7.2.3 Potential Risk to Floodplain Functions and Values*

The proposed action would not significantly impact floodplain functions and values. Construction activities would be limited to predominantly disturbed areas. Furthermore, as part of the project, many structures within EVER would be demolished and rebuilt within the same footprint as currently exists. When considering the greater floodplain area outside the project site, the effects of the Project would be overall minimal. Upon completion of the proposed action, the floodplain would continue to operate as it does in its current condition.

## 8 Proposed Mitigation

To determine the amount of mitigation needed, a UMAM assessment was completed for post construction conditions. That assessment is summarized in the following text followed by how it was used to determine required mitigation.

### 8.1 Post-Project Conditions

Under post-project conditions (Table 7), the functional scores for most assessment areas would not substantially change because of the temporary nature of construction impacts or the limited extent (less than 3% of the assessment area) of permanent impacts to small portions of Wetlands W, H, and J. For Wetlands K and V, the post-project functional scores are lower due to the larger extent of permanent impacts to undisturbed habitats within the assessment areas from construction of the adsorption fields. Factors that affect the Water Environment function score includes the placement of fill material in wetland resulting in loss of water storage and the reduced ability of the wetland to improve water quality. Factors that limit the Community Structure function include the removal of native woody vegetation and the replacement of that vegetation within maintained ground cover.

To determine the potential number of mitigation bank credits or amount of regional off-site mitigation needed to offset impacts, when the bank or regional off-site mitigation area is assessed in accordance with Section 62-345.600, F.A.C., the functional loss of each impact assessment area is determined by calculating the change in overall score between pre- and post-project conditions multiplied by the acreage of permanent impact (Table 8). The total number of credits potentially required is the summation of the calculated functional loss for each impact assessment area. The UMAM requires 0.3 mitigation credit per acre impacted for low quality; 0.5 mitigation credit per acre impacted for moderate quality; and 0.7 mitigation credit per acre impacted for high quality wetlands. It is expected that there will be some modifications to these UMAM scores during regulatory agency review as the project progresses toward the permitting phase. Based on the preliminary UMAM scores, all permanently impacted wetlands are functioning moderately (UMAM scores 0.6 to 0.7); that is, wetland condition is less than optimal, but sufficient to maintain most wetland functions.

**Table 7**  
**Post-Project Wetland Assessment Area UMAM Scores**

<b>Study Area</b>	<b>Wetland Assessment Area</b>	<b>Cowardin Classification</b>	<b>Location and Landscape Support UMAM Score</b>	<b>Water Environment UMAM Score</b>	<b>Community Structure UMAM Score</b>	<b>Total UMAM Score</b>
Park HQ and Visitor Center	Wetland A	PSS3/PEM1/PFO3C	7	7	4	0.600
Pine Island Maintenance Center	Wetland E	PEM1/PSS3C	7	7	4	0.600
Daniel Beard Center	Wetland W	PEM1B	7	6	3	0.533
Trail Center Housing Area	Wetland H	PFO2/PSS3/PEM1C	7	6	3	0.533
Shark Valley Administrative Area and Visitor Center	Wetland J	PSS3/PEM1F and PUB/PABH	7	6	6	0.633
Shark Valley Observation Tower	Wetland K	PSS3/PEM1F and PUBH	7	5	5	0.567
Flamingo Wastewater Treatment Plant	Wetland L	E2SS3P, E2EM1P, and E2USHx	7	7	7	0.700
Flamingo Water Treatment Plant	Wetland M	E2SS3P and E2EM1P	7	7	7	0.700
Flamingo Water Treatment Plant	Wetland N	PEM1B	4	4	4	0.400
Flamingo Visitor Center and Campground	Wetlands S and T	E2SS3P and E2EM1P	7	7	7	0.700
Flamingo Visitor Center and Campground	Wetland U	E2SS3P and E2EM1P	7	7	7	0.700
West Lake Area	Wetland V	E2SS3P	7	5	5	0.567

**Table 8**  
**Wetland Impact Summary and UMAM Total Scores**

Study Area	Wetland Assessment Area	Cowardin Classification	Pre-Project Total UMAM Score	Post-Project Total UMAM Score	Degree of Ecological Change <sup>1</sup>	Total Permanent Impact Acreage	Total Functional Loss
Park HQ and Visitor Center	Wetland A	PSS3/PEM1/PFO3C	0.600	0.600	0	0	0
Pine Island Maintenance Center	Wetland E	PEM1/PSS3C	0.600	0.600	0	0	0
Daniel Beard Center	Wetland W	PEM1B	0.600	0.533	-0.067	0.009	0.0006
Trail Center Housing Area	Wetland H	PFO2/PSS3/PEM1C	0.600	0.533	-0.067	0.010	0.0007
Shark Valley Administrative Area and Visitor Center	Wetland J	PSS3/PEM1F and PUB/PABH	0.700	0.633	-0.067	0.157	0.0105
Shark Valley Observation Tower	Wetland K	PSS3/PEM1F and PUBH	0.700	0.567	-0.133	0.467	0.062
Flamingo Wastewater Treatment Plant	Wetland L	E2SS3P, E2EM1P, and E2USHx	0.700	0.700	0	0	0
Flamingo Water Treatment Plant	Wetland M	E2SS3P and E2EM1P	0.700	0.700	0	0	0
Flamingo Water Treatment Plant	Wetland N	PEM1B	0.400	0.400	0	0	0
Flamingo Visitor Center and Campground	Wetlands S and T	E2SS3P and E2EM1P	0.700	0.700	0	0	0
Flamingo Visitor Center and Campground	Wetland U	E2SS3P and E2EM1P	0.700	0.700	0	0	0
West Lake Area	Wetland V	E2SS3P	0.700	0.567	-0.133	0.183	0.024
<b>Total</b>						<b>0.826</b>	<b>0.098</b>

Note:

1. The Degree of Ecological Change is the difference between the Pre-Project Wetland Assessment Area UMAM Score and the Post-Project UMAM Score.

## 8.2 Wetland Mitigation

Proposed mitigation will compensate for unavoidable impacts to wetlands on the project sites and replace locally important ecological functions and services that will be permanently lost. The NPS Procedural Manual 77-1 states that wetland compensation is required if adverse impacts on wetlands from the project total 0.1 acre or more (NPS 2016). Permanent impacts on the wetlands associated with the action alternatives would result in 35,989 square feet (0.826 acre) of impacts; therefore, compensatory mitigation is required. Of this amount, 32,787 square feet (0.753 acre) of wetland impacts would occur in undisturbed vegetated areas. As described in Section 4.1.2.4, to determine the number of mitigation bank credits or amount of regional off-site mitigation needed to offset impacts, the functional loss of each impact assessment area is determined by calculating the change in overall score between pre- and post-project conditions multiplied by the acreage of permanent impact (Table 8).

It is anticipated that mitigation for wetland impacts from this project will be offset through in-kind compensatory mitigation within EVER partially based on the results of the preliminary UMAM scores for each impacted wetland. Under NPS policy, compensation for wetland impacts or losses will require at least 1 acre of wetlands be restored for each acre destroyed or degraded (1:1 wetland mitigation on a per-acre basis) regardless of wetland condition. If a UMAM score is less than the acreage of a wetland (based on quality), the NPS must restore the same (or greater) acreage of the wetland being impacted. The wetland restored for mitigation should be near the same quality as the one impacted. The NPS is committed to mitigating wetland impacts associated with the proposed project such that the project results in no net loss of wetlands. In addition to meeting FDEP and USACE-based requirements for compensating for wetland impacts resulting from this work, NPS policy requires a minimum 1:1 compensation on a per-acre basis for new impacts to wetland plant communities that result from NPS actions. Impacts resulting from this project must meet the 1:1 required compensation for any newly impacted areas resulting from the proposed action.

Any temporary impacts to wetlands will be allowed to recover naturally in order to avoid and minimize the introduction or spread of non-native and invasive plant and animal species. If necessary, and in coordination with the EVER biologist, any fill, mulch, reseeding, and sod material brought into EVER must be free of non-native, invasive plants and animals, and noxious weeds.



Finally, NPS will continue to work to identify any measures to further minimize impacts to wetlands throughout the duration of the project.

Below are additional proposed measures to mitigate impacts to wetlands from the proposed actions.

- Implement pre-and post-construction erosion control best management practices (BMPs) for drainage, erosion, and sediment control to prevent or reduce runoff from entering wetlands.
- Inspect and maintain erosion and sediment control BMPs on a regular basis and after each measurable rainfall to ensure they are functioning properly.
- Adhere to all BMPs resulting from required regulatory permits.
- Orange construction fencing (4 feet) will be placed along the limits of disturbance. An NPS staff member or representative will be on site when the wetland fill is being placed and graded to make sure equipment does not impact wetlands beyond the fencing.

### 8.3 Floodplain Mitigation

In accordance with EO 13690, the NPS is committed to constructing the proposed project in a manner that meets the FFRMS to increase resilience against flooding and help preserve the natural values of floodplains. Using the Freeboard Value Approach where FEMA-based 100-year base flood elevation levels are known, all Class I actions (non-critical actions) will have an elevation of FEMA base flood +2 feet or higher to reduce hazards to human life and property due the flooding. For Class III actions (non-critical actions), consideration should be given to providing additional levels of flood protection such as posting signs informing visitors of flood risk and suggested actions in the event of flooding.

DO 77-2 requires federal agencies to develop guidance on the following: reducing the risk of flood loss; minimizing impacts of floods on human safety, health, and welfare; and restoring and preserving natural and beneficial values served by floodplain resources (NPS 2007).

Below are additional proposed measures to mitigate impacts to floodplains from the proposed actions.

- Implement pre-and post-construction erosion control BMPs for drainage, erosion, and sediment control to prevent or reduce runoff from entering the water column.
- Inspect and maintain erosion and sediment control BMPs on a regular basis and after each measurable rainfall to ensure they are functioning properly.
- Adhere to all BMPs resulting from required regulatory permits. To mitigate potential risk to human health and safety, a flood response plan will be developed. This plan will include a forecasting system, a flood alert system, and a pre-flood evacuation plan.
- To mitigate potential risk to human health and safety, a flood response plan would be developed. Appropriate measures will be employed to prevent or control spills of fuels, lubricants, or other contaminants during project construction. Actions would be consistent

with state water quality standards and Clean Water Act, Section 401 certification requirements.

Where the FEMA-based 100-year base flood elevation levels are not known, elevations were determined per Florida Building Code Section R322.2.1-Elevation Requirements, which states buildings in flood hazard areas shall have the lowest floors elevated to or above the base flood elevation plus 1 foot. For these areas, the base elevation was determined using the crown elevation of the paved road nearest to the proposed buildings plus adding 4 inches to the selected base elevation (Stanley Consultants 2023).

## 9 Conclusions

The proposed project would include construction activities that are located in wetlands and the regulatory 100-year floodplain. However, no detriments to the overall functions of the larger wetland systems or to the floodplain are expected. The wetlands proposed to be impacted by the project were evaluated based upon several factors including previous disturbances, existing vegetation and hydrology, and potential wildlife use. The purpose of this project is to address the physical and operational deficiencies of EVER's potable water and wastewater system by improving the system's efficiency, operation, safety, and climate resiliency. The proposed project would replace the potable water distribution and wastewater collection systems in the Flamingo District; the Pine Island District; the Shark Valley District; and the Loop Road District including the Tamiami Ranger Station, Loop Road Environmental Education Center, and the Trail Center Housing Area. Under the No Action Alternative, the NPS would maintain the existing conditions of the water and wastewater systems managed by EVER, which are currently outdated and in need of repair and upgrade.

There is no practical alternative to the construction of the proposed project that completely avoids impacts to wetlands or the 100-year regulatory floodplain. The proposed project would mitigate for impacts to wetlands and floodplain values and functions. Mitigation and compliance with regulations and policies to prevent negative impacts to wetlands and floodplains and other environmental values as well as loss of property or human life would be strictly adhered to during construction. Individual permits with other federal and cooperating state and local agencies would be obtained prior to commencing construction. No long-term adverse impacts to wetlands or floodplains would occur from implementing the proposed project. Therefore, the NPS finds the proposed project to be acceptable under EO 11990 for wetlands and under EO 11988 for the protection of floodplains.

## 10 References

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- NPS, 2023. *Environmental Assessment – Everglades National Park Rehabilitation of Parkwide Water and Wastewater Systems*. November 2023.

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- Stanley Consultants. 2023. *Design Build Schematic Design – Rehabilitate Parkwide Water and Wastewater Systems*. Prepared for National Park Service. June 29, 2023.



## Attachment A

# Delineated Wetlands and Waters Within the Project Site

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**Figure 1a:**  
**Wetland Delineation Maps**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

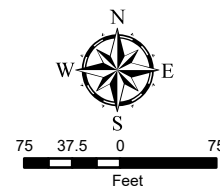
**Legend**

- Topography -  
(0.5 - Foot Contour Interval)
- Study Area
- Sampling Point

**Wetlands**

**Cowardin Class**

- PUB
- PSS
- PEM
- PFO



**SOURCES:**  
Topography: National Park Service (2022)  
Aerial Imagery: Esri (2023)

1 inch equals 150 feet.

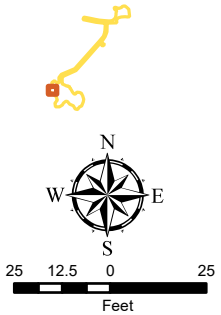






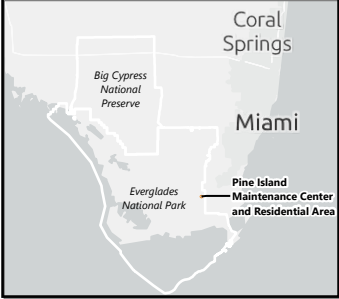
**Figure 1b:**  
**Wetland Delineation Maps**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

- Legend**
- Topography - (0.5 - Foot Contour Interval)
  - Study Area
  - Sampling Point
  - Wetlands**
  - Cowardin Class
    - PSS
    - PEM

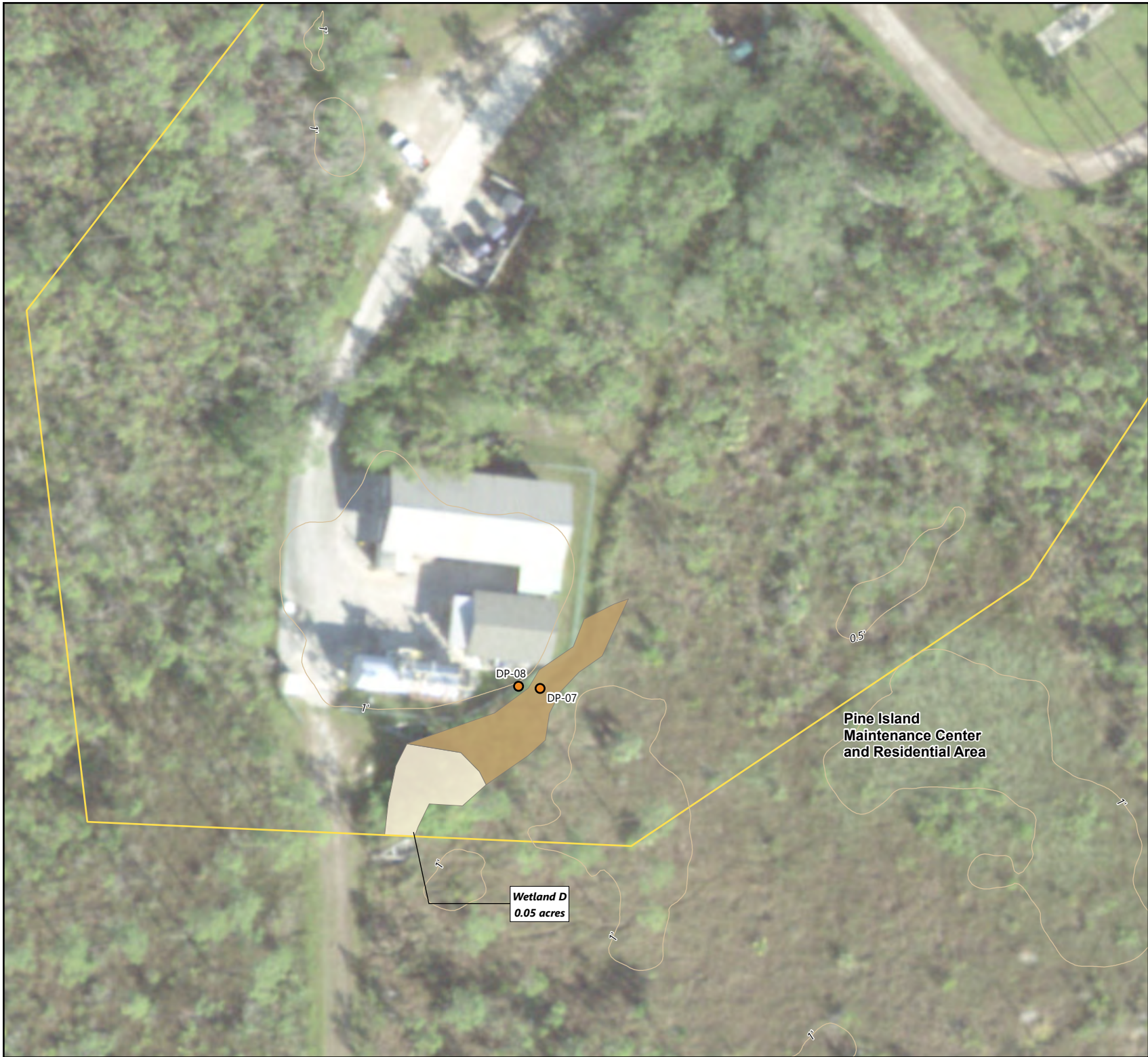


**SOURCES:**  
Topography: National Park Service (2022)  
Aerial Imagery: Esri (2023)

1 inch equals 50 feet.







**Figure 1c:**  
**Wetland Delineation Maps**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

- Topography - (0.5 - Foot Contour Interval)
- Study Area
- Sampling Point

**Wetlands**

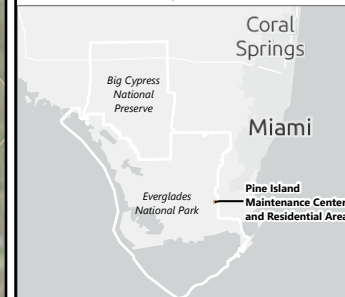
Cowardin Class

- PSS
- PEM



**SOURCES:**  
 Topography: National Park Service (2022)  
 Aerial Imagery: Esri (2023)

1 inch equals 50 feet.







**Figure 1d:**  
**Wetland Delineation Maps**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

Topography -  
 (0.5 - Foot Contour Interval)

Study Area

Sampling Point

**Wetlands**

Cowardin Class

PSS

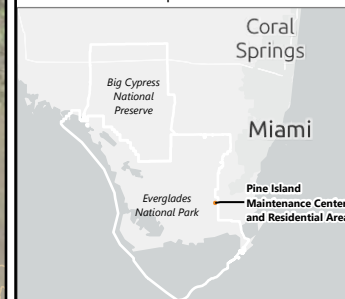
PEM



125 62.5 0 125  
 Feet

**SOURCES:**  
 Topography: National Park Service (2022)  
 Aerial Imagery: Esri (2023)

1 inch equals 250 feet.











**Figure 1f:**  
Wetland Delineation Maps  
Rehabilitation of Parkwide Water and  
Wastewater Systems

**Legend**

Topography -  
(0.5 - Foot Contour Interval)

Study Area

Sampling Point

**Wetlands**

Cowardin Class

PUB

PSS

PEM



125 62.5 0 125  
Feet

**SOURCES:**  
Topography: National Park Service (2022)  
Aerial Imagery: Esri (2023)

1 inch equals 250 feet.







**Figure 1g:**  
**Wetland Delineation Maps**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

— Topography -  
 (0.5 - Foot Contour Interval)

Study Area

Sampling Point

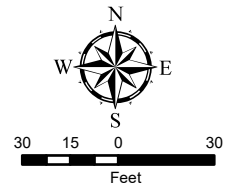
**Wetlands**

Cowardin Class

PUB

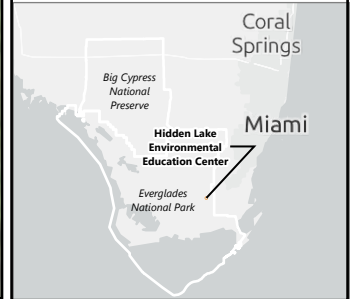
PSS

PEM



**SOURCES:**  
 Topography: National Park Service (2022)  
 Aerial Imagery: Esri (2023)

1 inch equals 60 feet.



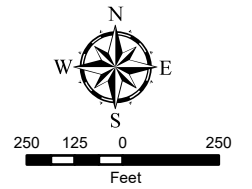




**Figure 1h:**  
**Wetland Delineation Maps**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

- Topography -  
(0.5 - Foot Contour Interval)
- Study Area



**SOURCES:**  
Topography: National Park Service (2022)  
Aerial Imagery: Esri (2023)

1 inch equals 500 feet.







**Figure 1:**  
Wetland Delineation Maps  
Rehabilitation of Parkwide Water and  
Wastewater Systems

**Legend**

— Topography -  
(0.5 - Foot Contour Interval)

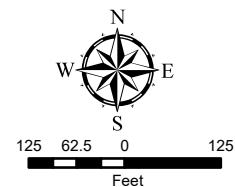
Study Area

Sampling Point

**Wetlands**

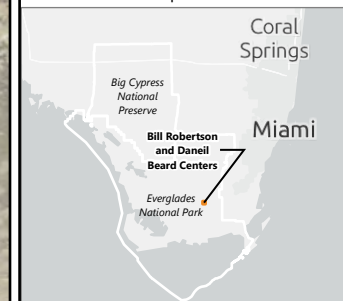
Cowardin Class

PEM



**SOURCES:**  
Topography: National Park Service (2022)  
Aerial Imagery: Esri (2023)

1 inch equals 250 feet.







**Figure 1j:**  
Wetland Delineation Maps  
Rehabilitation of Parkwide Water and  
Wastewater Systems

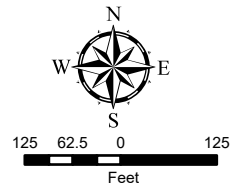
**Legend**

- Study Area
- Sampling Point

**Wetlands**

Cowardin Class

- PUB
- PSS
- PEM
- PFO



**SOURCES:**  
Topography: National Park Service (2022)  
Aerial Imagery: Esri (2023)

1 inch equals 250 feet.



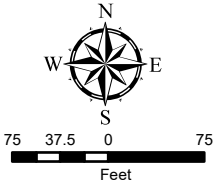
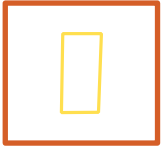




**Figure 1k:**  
**Wetland Delineation Maps**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

- Topography -  
(0.5 - Foot Contour Interval)
- Study Area



**SOURCES:**  
Topography: National Park Service (2022)  
Aerial Imagery: Esri (2023)

1 inch equals 150 feet.







**Figure 1:**  
**Wetland Delineation Maps**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

— Topography -  
 (0.5 - Foot Contour Interval)

Study Area

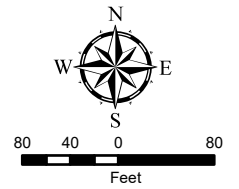
● Sampling Point

**Wetlands**

Cowardin Class

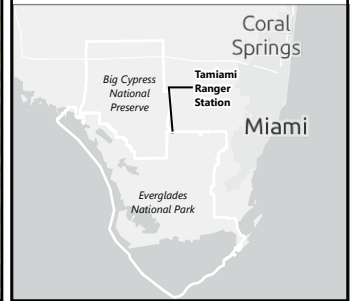
PAB

PSS

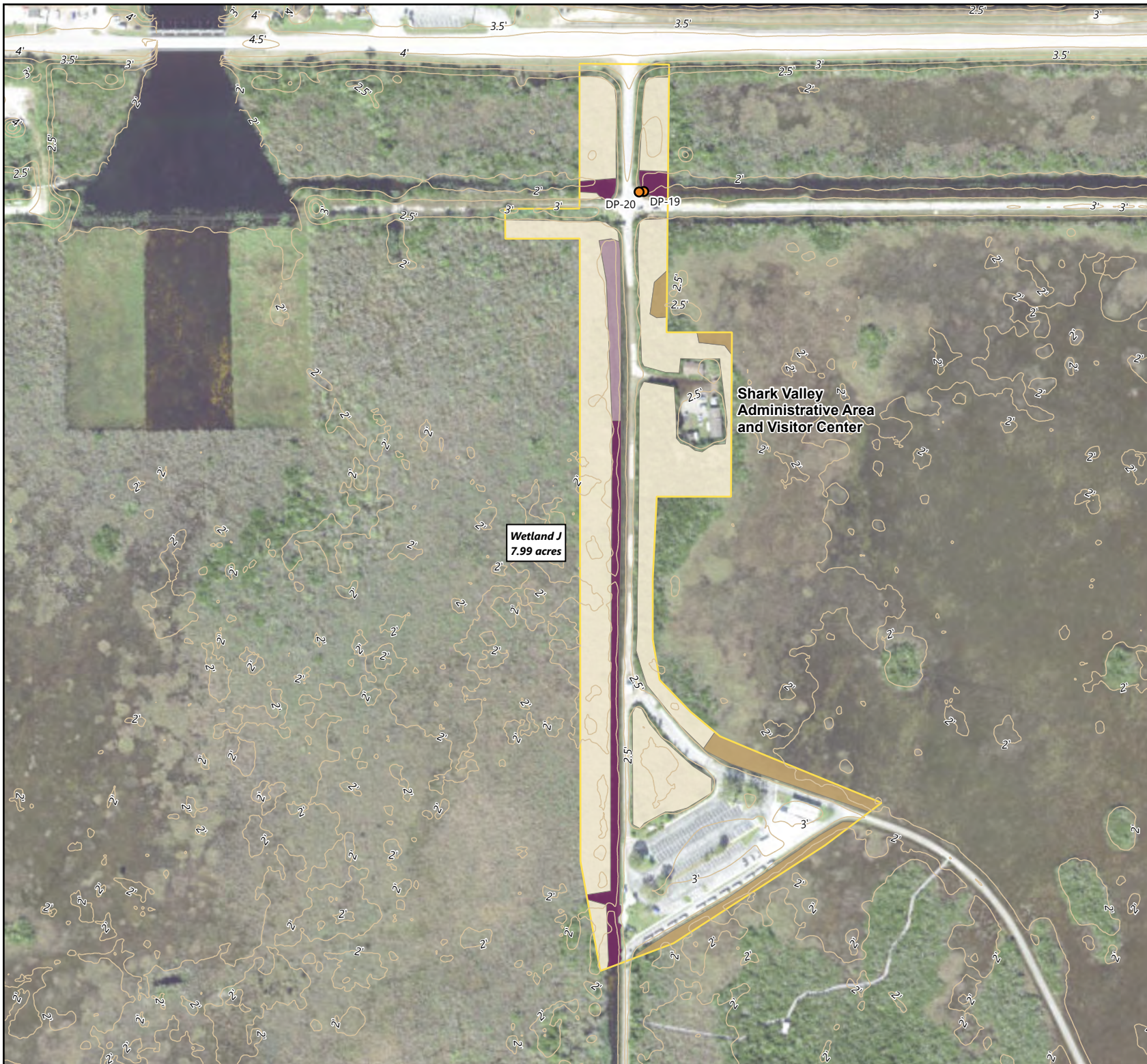


**SOURCES:**  
 Wetland I Continues Off Site  
 Topography: National Park Service (2022)  
 Aerial Imagery: Esri (2023)

1 inch equals 160 feet.







**Figure 1m:**  
**Wetland Delineation Maps**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

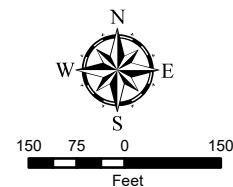
**Legend**

- Topography - (0.5 - Foot Contour Interval)
- Study Area
- Sampling Point

**Wetlands**

**Cowardin Class**

- PAB
- PUB
- PSS
- PEM



**SOURCES:**  
 Topography: National Park Service (2022)  
 Aerial Imagery: Esri (2023)

1 inch equals 300 feet.







**Figure 1n:**  
Wetland Delineation Maps  
Rehabilitation of Parkwide Water and  
Wastewater Systems

**Legend**

Topography -  
(0.5 - Foot Contour Interval)

Study Area

Sampling Point

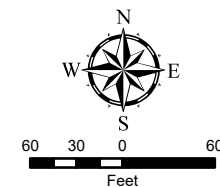
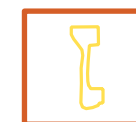
**Wetlands**

Cowardin Class

PUB

PSS

PEM



**SOURCES:**  
Topography: National Park Service (2022)  
Aerial Imagery: Esri (2023)

1 inch equals 120 feet.







**Figure 1o:**  
**Wetland Delineation Maps**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

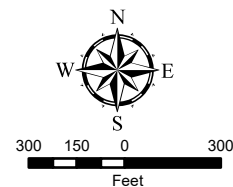
**Legend**

- Topography - (0.5 - Foot Contour Interval)
- Study Area
- Sampling Point

**Wetlands**

**Cowardin Class**

- E1UB
- E2EM
- E2US
- E2SS
- PEM



**SOURCES:**  
 Topography: National Park Service (2022)  
 Aerial Imagery: Esri (2023)

1 inch equals 600 feet.







**Figure 1p:**  
Wetland Delineation Maps  
Rehabilitation of Parkwide Water and  
Wastewater Systems

**Legend**

Topography -  
(0.5 - Foot Contour Interval)

Study Area

Sampling Point

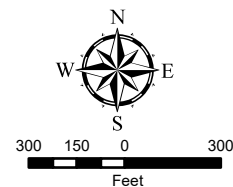
**Wetlands**

Cowardin Class

E1UB

E2EM

E2SS



**SOURCES:**  
Topography: National Park Service (2022)  
Aerial Imagery: Esri (2023)

1 inch equals 600 feet.







**Figure 1q:**  
**Wetland Delineation Maps**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

— Topography -  
(0.5 - Foot Contour Interval)

Study Area

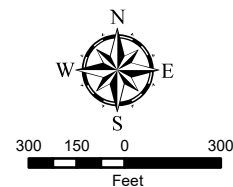
Sampling Point

**Wetlands**

Cowardin Class

E2EM

E2SS



**SOURCES:**  
Topography: National Park Service (2022)  
Aerial Imagery: Esri (2023)

1 inch equals 600 feet.







**Figure 1r:**  
**Wetland Delineation Maps**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

— Topography -  
(0.5 - Foot Contour Interval)

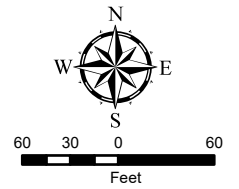
Study Area

Sampling Point

**Wetlands**

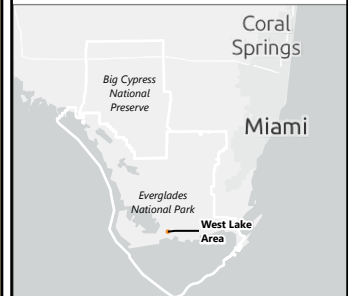
Cowardin Class

E2SS



**SOURCES:**  
Topography: National Park Service (2022)  
Aerial Imagery: Esri (2023)

1 inch equals 120 feet.

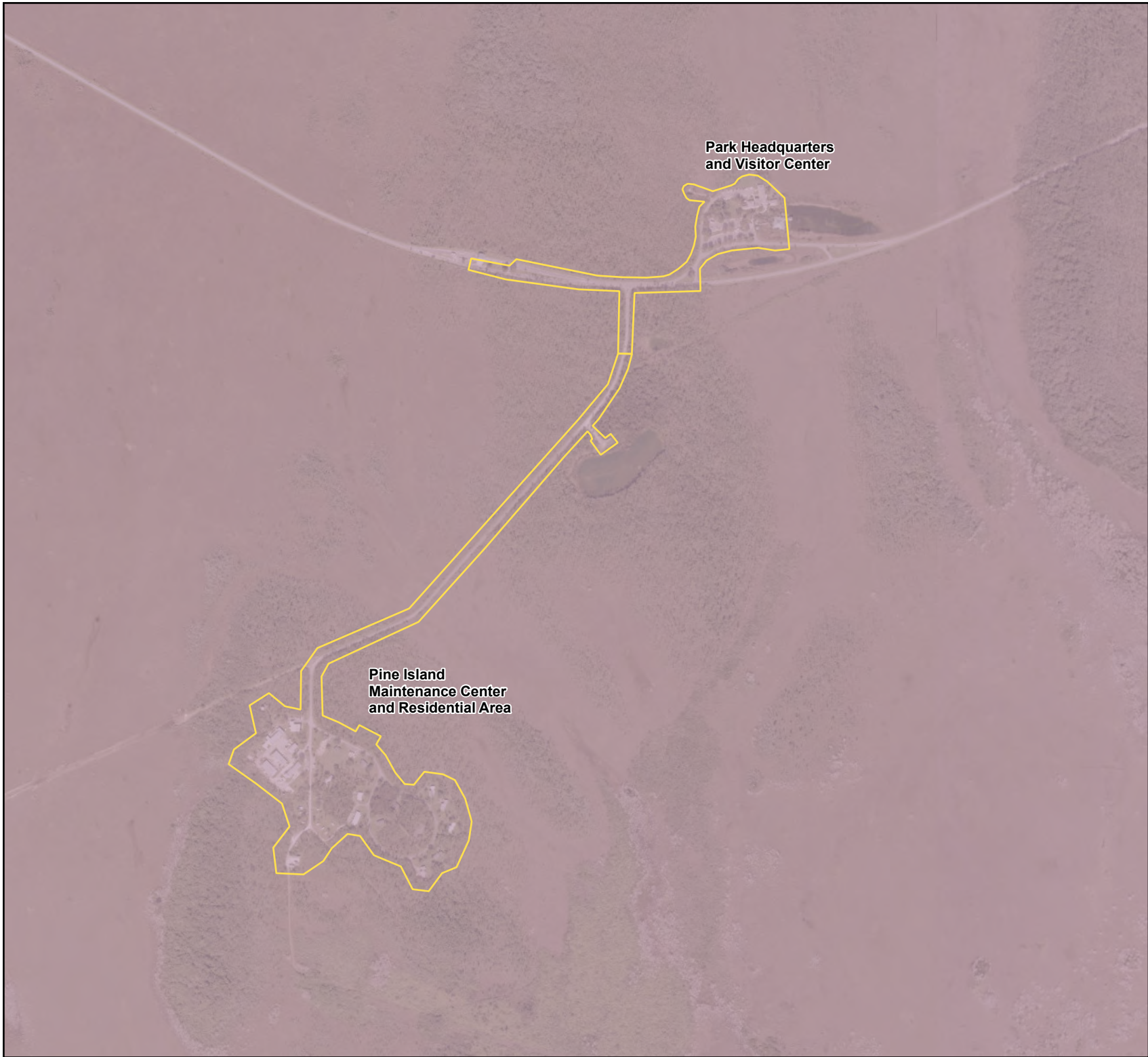


# Attachment B

## FEMA Floodplain Maps

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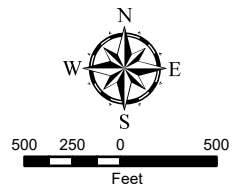
**Figure 2a:**  
**FEMA Flood Zone Maps by Study Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

Study Area

FEMA Flood Zone

D



1 inch equals 1,000 feet








**Figure 2b:**  
**FEMA Flood Zone Maps by Study Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

 Study Area

FEMA Flood Zone

 D



100 50 0 100  
Feet

1 inch equals 200 feet





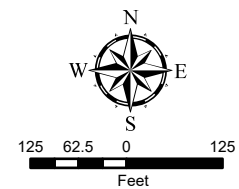




**Figure 2c:**  
**FEMA Flood Zone Maps by Study Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

-  Study Area
-  FEMA Flood Zone  
D



1 inch equals 250 feet








Long Pine Key  
Campground



**Figure 2d:**  
**FEMA Flood Zone Maps by Study Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

 Study Area

FEMA Flood Zone

 D



200 100 0 200  
Feet

1 inch equals 400 feet








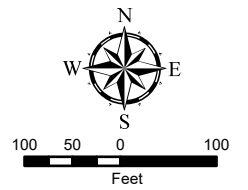
**Figure 2e:**  
**FEMA Flood Zone Maps by Study Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

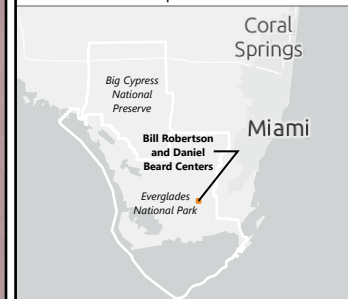
 Study Area

FEMA Flood Zone

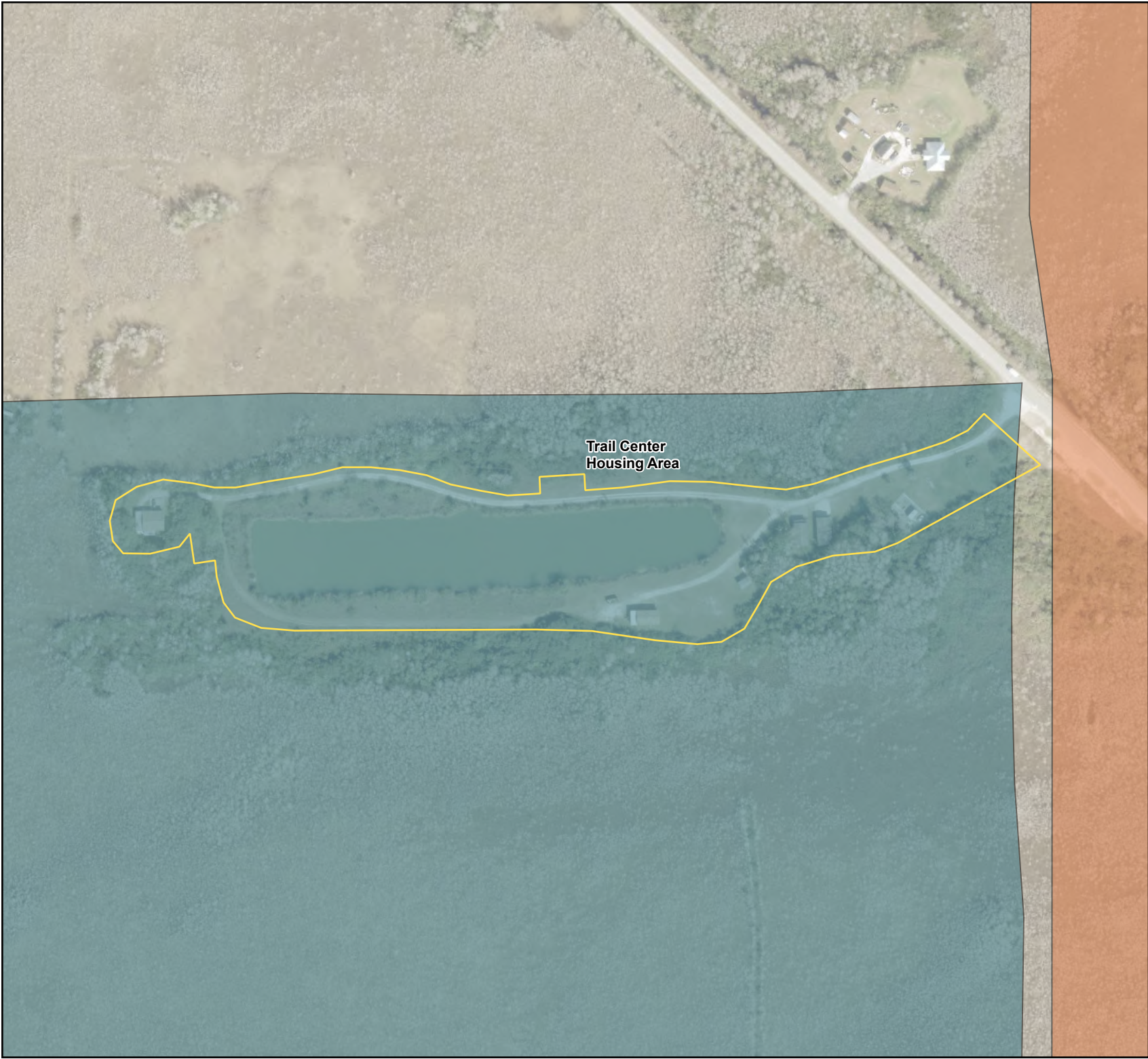
 D



1 inch equals 200 feet






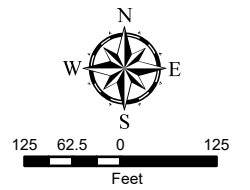




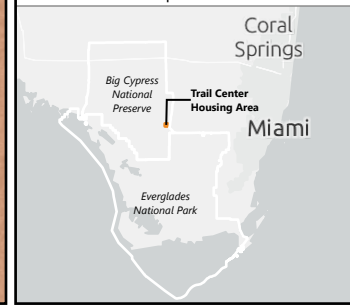
**Figure 2f:**  
**FEMA Flood Zone Maps by Study Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

-  Study Area
- FEMA Flood Zone
  -  A
  -  AE



1 inch equals 250 feet






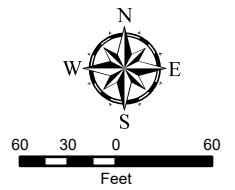




**Figure 2g:**  
**FEMA Flood Zone Maps by Study Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

-  Study Area
-  FEMA Flood Zone
-  AE



1 inch equals 120 feet








**Figure 2h:**  
**FEMA Flood Zone Maps by Study Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

 Study Area

FEMA Flood Zone

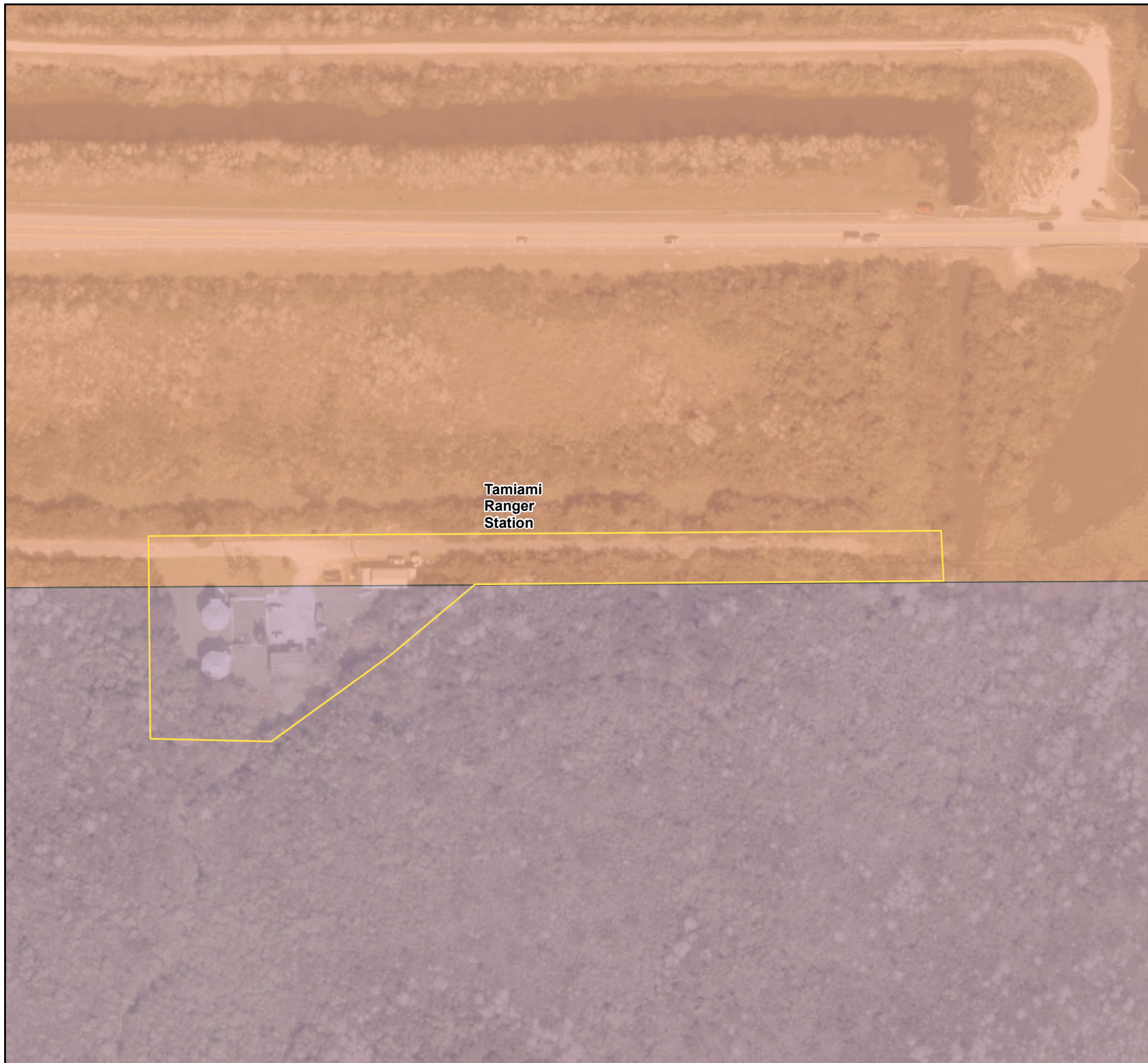
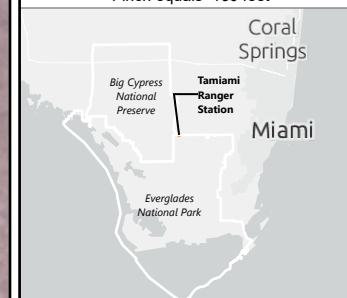
 A

 D



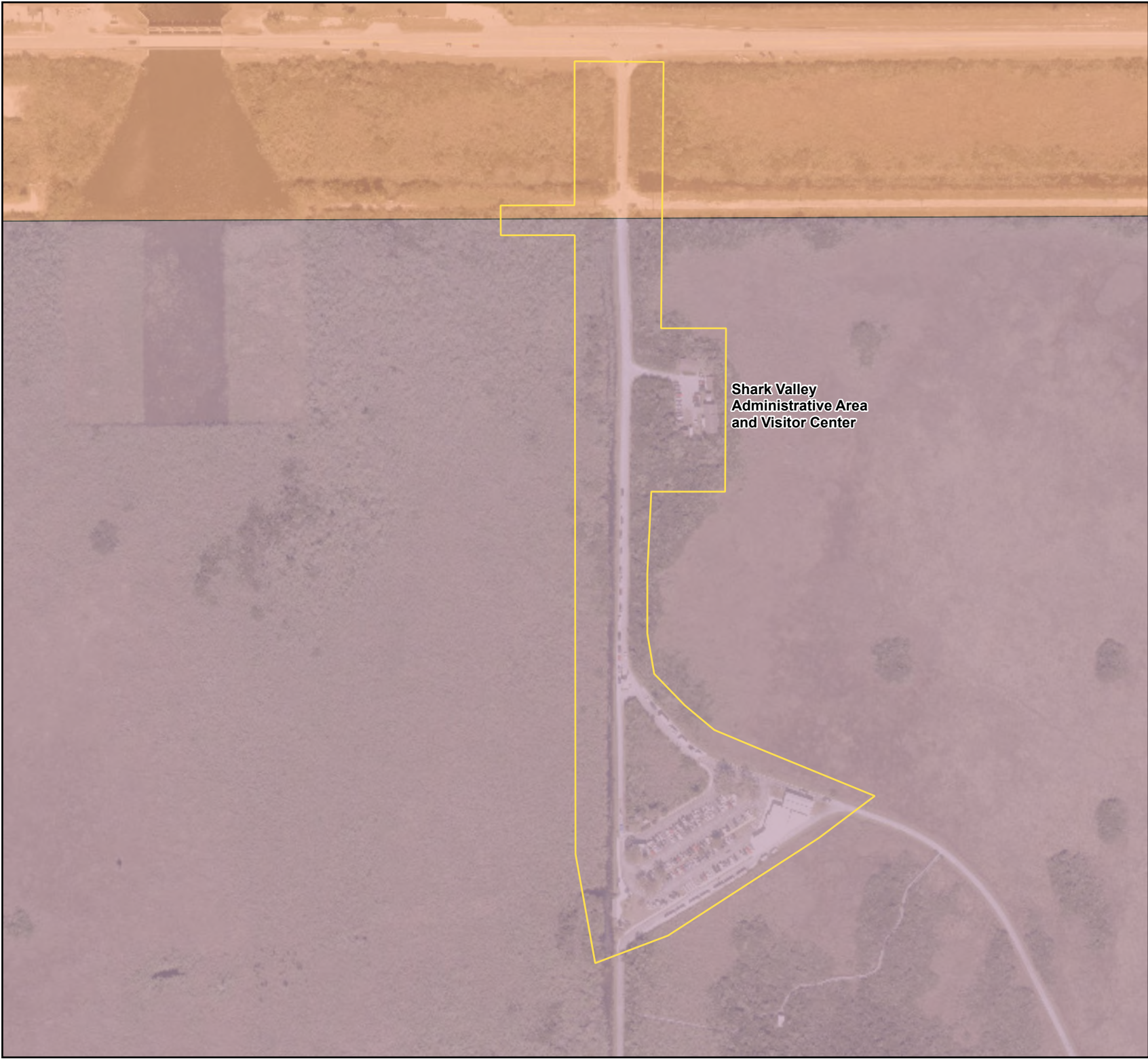
80 40 0 80  
Feet

1 inch equals 160 feet






**Tamiami  
Ranger  
Station**

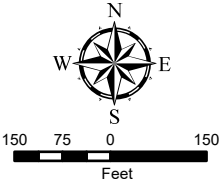




**Figure 21:**  
**FEMA Flood Zone Maps by Study Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

-  Study Area
- FEMA Flood Zone
  -  A
  -  D



1 inch equals 300 feet



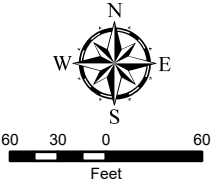




**Figure 2j:**  
**FEMA Flood Zone Maps by Study Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

- Study Area
- FEMA Flood Zone
  - D



1 inch equals 120 feet

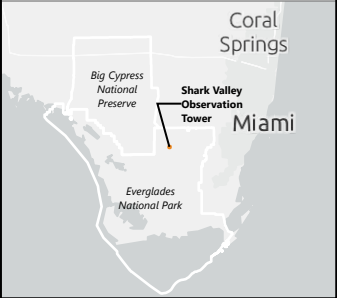


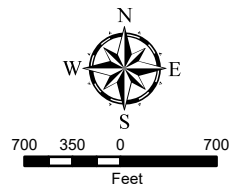




Figure 2k:  
FEMA Flood Zone Maps by Study Area  
Rehabilitation of Parkwide Water and  
Wastewater Systems

**Legend**

- Study Area
- FEMA Flood Zone
  - AE
  - VE



1 inch equals 1,400 feet





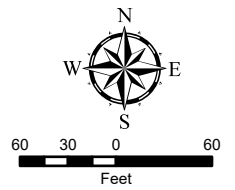




**Figure 21:**  
**FEMA Flood Zone Maps by Study Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

-  Study Area
- FEMA Flood Zone
  -  D



1 inch equals 120 feet



## Attachment C

# Proposed Wetland Impacts Within the Project Site

---

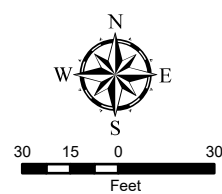




**Figure 3a:**  
**Wetland Impact Locations by Project Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

- Project Area
- Temporary Impact
- Disturbance Area
- Delineated Wetland



**SOURCE:**  
Aerial Imagery: Esri (2023)  
1 inch equals 60 feet

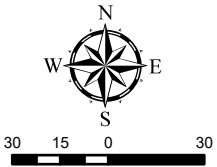
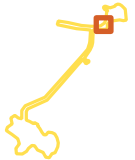






**Figure 3b:**  
**Wetland Impact Locations by Project Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

- Legend**
- Project Area
  - Temporary Impact
  - Disturbance Area
  - Delineated Wetland



**SOURCE:**  
Aerial Imagery: Esri (2023)  
1 inch equals 60 feet

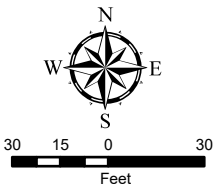






**Figure 3c:**  
**Wetland Impact Locations by Project Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

- Legend**
- Project Area
  - Temporary Impact
  - Disturbance Area
  - Delineated Wetland



**SOURCE:**  
Aerial Imagery: Esri (2023)  
1 inch equals 60 feet



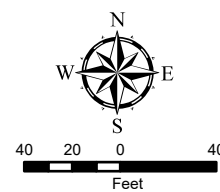




**Figure 3d:**  
**Wetland Impact Locations by Project Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

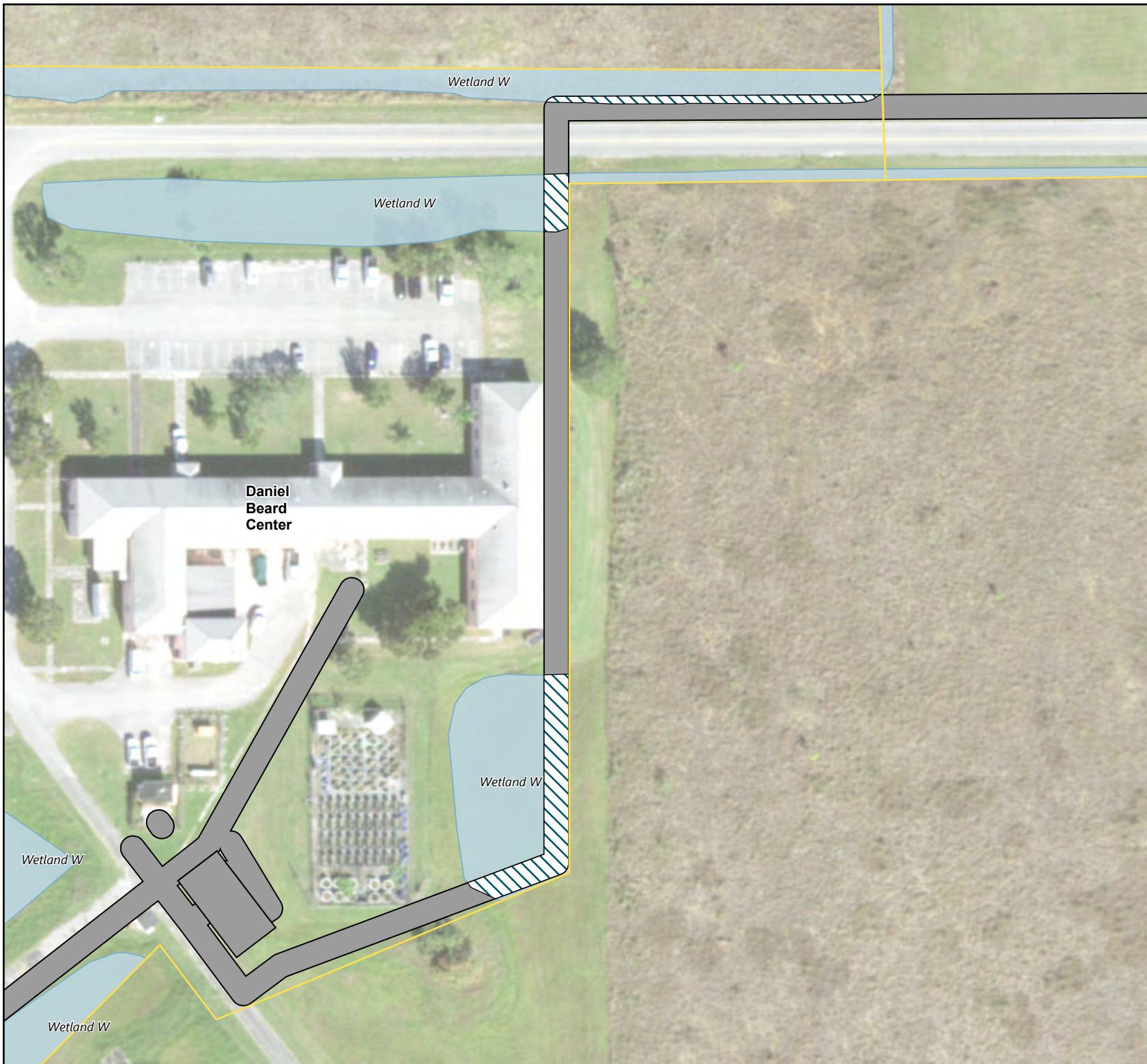
- Project Area
- Temporary Impact
- Disturbance Area
- Delineated Wetland



**SOURCE:**  
Aerial Imagery: Esri (2023)  
1 inch equals 80 feet



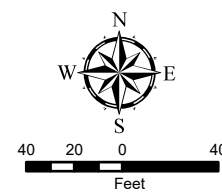




**Figure 3e:**  
Wetland Impact Locations by Project Area  
Rehabilitation of Parkwide Water and  
Wastewater Systems

**Legend**

- Project Area
- Temporary Impact
- Disturbance Area
- Delineated Wetland



**SOURCE:**  
Aerial Imagery: Esri (2023)  
1 inch equals 80 feet



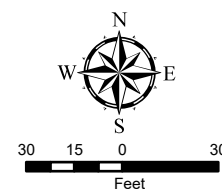




**Figure 3f:**  
Wetland Impact Locations by Project Area  
Rehabilitation of Parkwide Water and  
Wastewater Systems

**Legend**

- Project Area
- Permanent Impact
- Disturbance Area
- Delineated Wetland



**SOURCE:**  
Aerial Imagery: Esri (2023)  
1 inch equals 60 feet



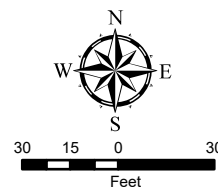




**Figure 3g:**  
Wetland Impact Locations by Project Area  
Rehabilitation of Parkwide Water and  
Wastewater Systems

**Legend**

- Project Area
- Permanent Impact
- Temporary Impact
- Disturbance Area
- Delineated Wetland



**SOURCE:**  
Aerial Imagery: Esri (2023)  
1 inch equals 60 feet



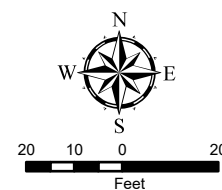




**Figure 3h:**  
**Wetland Impact Locations by Project Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

-  Project Area
-  Temporary Impact
-  Disturbance Area
-  Delineated Wetland



**SOURCE:**  
Aerial Imagery: Esri (2023)  
1 inch equals 40 feet



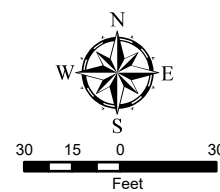




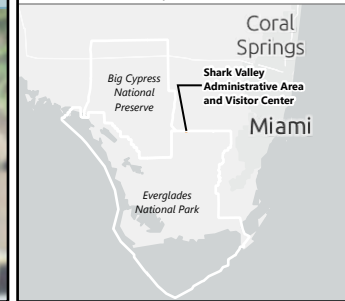
**Figure 3i:**  
**Wetland Impact Locations by Project Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

-  Project Area
-  Permanent Impact
-  Temporary Impact
-  Disturbance Area
-  Delineated Wetland



**SOURCE:**  
Aerial Imagery: Esri (2023)  
1 inch equals 60 feet





Shark Valley  
Administrative Area  
and Visitor Center





Wetland J

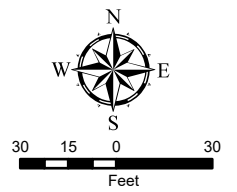
Wetland J



**Figure 3j:**  
Wetland Impact Locations by Project Area  
Rehabilitation of Parkwide Water and  
Wastewater Systems

**Legend**

-  Project Area
-  Temporary Impact
-  Disturbance Area
-  Delineated Wetland



**SOURCE:**  
Aerial Imagery: Esri (2023)  
1 inch equals 60 feet



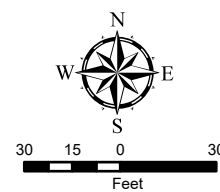




**Figure 3k:**  
**Wetland Impact Locations by Project Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

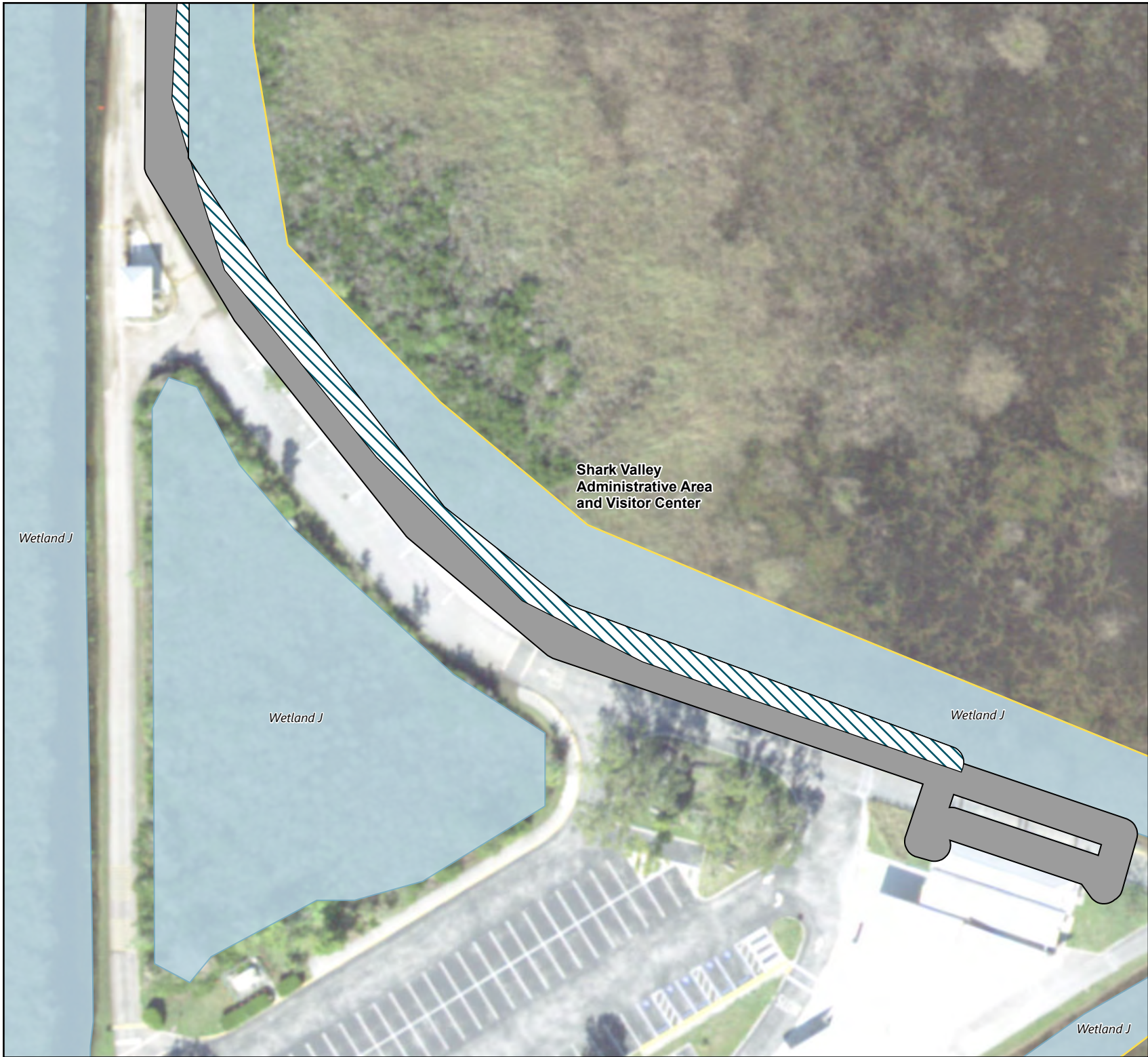
-  Project Area
-  Temporary Impact
-  Disturbance Area
-  Delineated Wetland



**SOURCE:**  
Aerial Imagery: Esri (2023)  
1 inch equals 60 feet







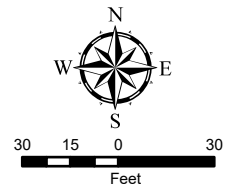




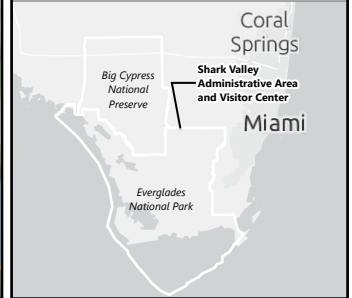
**Figure 31:**  
Wetland Impact Locations by Project Area  
Rehabilitation of Parkwide Water and  
Wastewater Systems

**Legend**

-  Project Area
-  Temporary Impact
-  Disturbance Area
-  Delineated Wetland



**SOURCE:**  
Aerial Imagery: Esri (2023)  
1 inch equals 60 feet



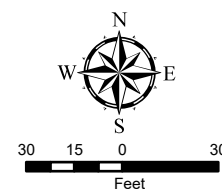




**Figure 3m:**  
Wetland Impact Locations by Project Area  
Rehabilitation of Parkwide Water and  
Wastewater Systems

**Legend**

- Project Area
- Permanent Impact
- Temporary Impact
- Disturbance Area
- Delineated Wetland



**SOURCE:**  
Aerial Imagery: Esri (2023)  
1 inch equals 60 feet



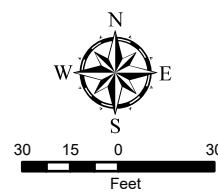




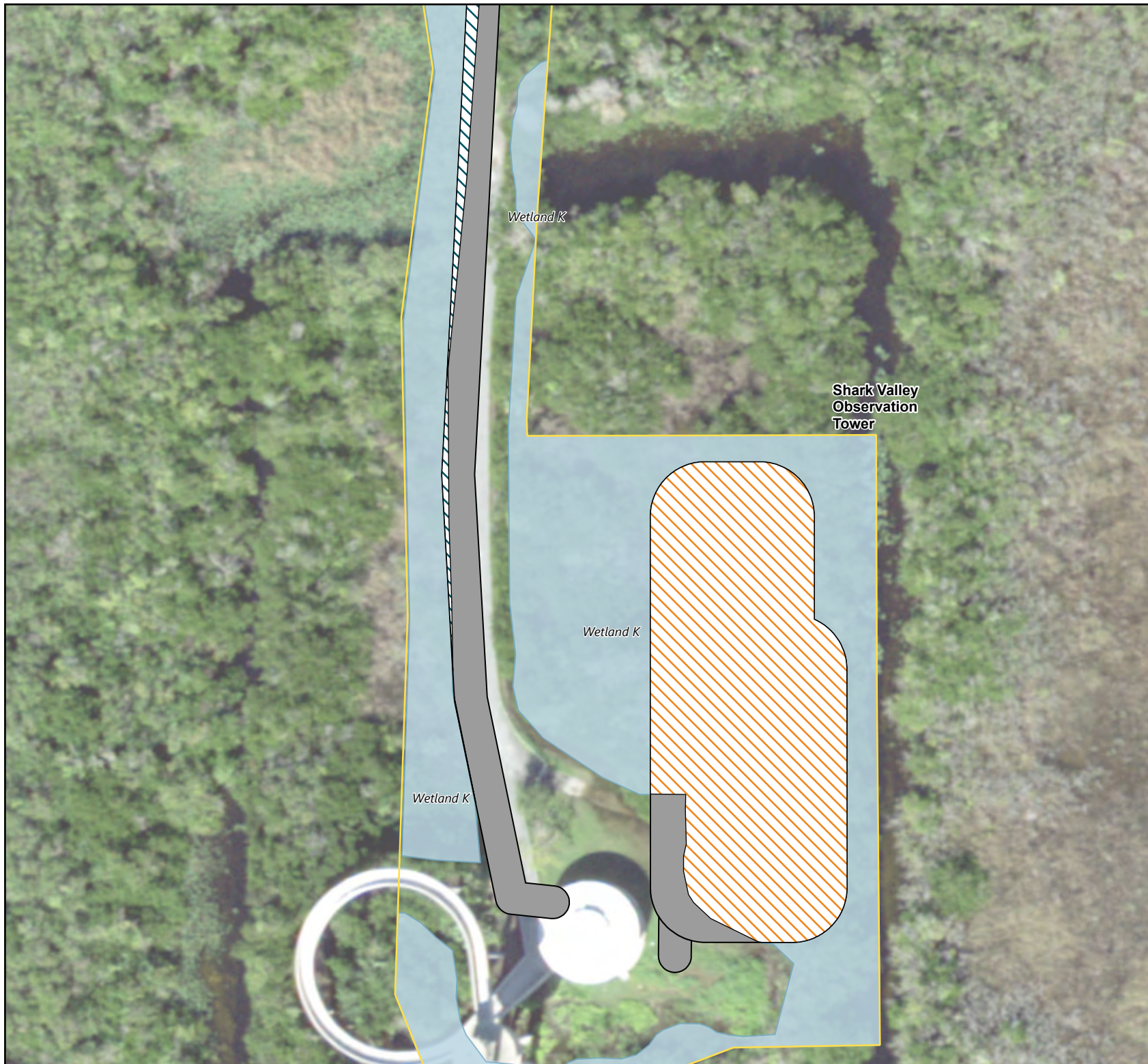
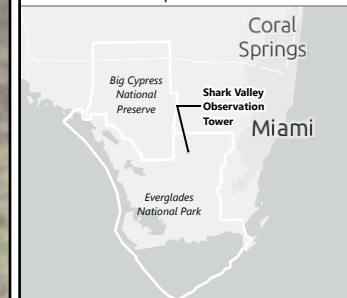
**Figure 3n:**  
**Wetland Impact Locations by Project Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

-  Project Area
-  Permanent Impact
-  Temporary Impact
-  Disturbance Area
-  Delineated Wetland



**SOURCE:**  
Aerial Imagery: Esri (2023)  
1 inch equals 60 feet



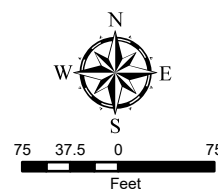




**Figure 3o:**  
Wetland Impact Locations by Project Area  
Rehabilitation of Parkwide Water and  
Wastewater Systems

**Legend**

- Project Area
- Temporary Impact
- Disturbance Area
- Delineated Wetland



**SOURCE:**  
Aerial Imagery: Esri (2023)  
1 inch equals 150 feet



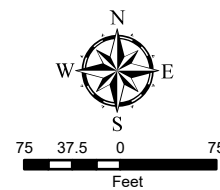




**Figure 3p:**  
**Wetland Impact Locations by Project Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

-  Project Area
-  Temporary Impact
-  Disturbance Area
-  Delineated Wetland



**SOURCE:**  
Aerial Imagery: Esri (2023)  
1 inch equals 150 feet







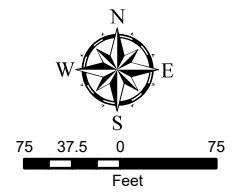




**Figure 3q:**  
**Wetland Impact Locations by Project Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

-  Project Area
-  Temporary Impact
-  Disturbance Area
-  Delineated Wetland



**SOURCE:**  
Aerial Imagery: Esri (2023)  
1 inch equals 150 feet







Flamingo Treatment  
Plants, Residential  
Area, Visitor Center,  
and Campground

Wetland M

Wetland M

Wetland N

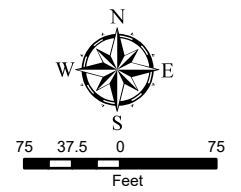
Wetland M



**Figure 3r:**  
Wetland Impact Locations by Project Area  
Rehabilitation of Parkwide Water and  
Wastewater Systems

**Legend**

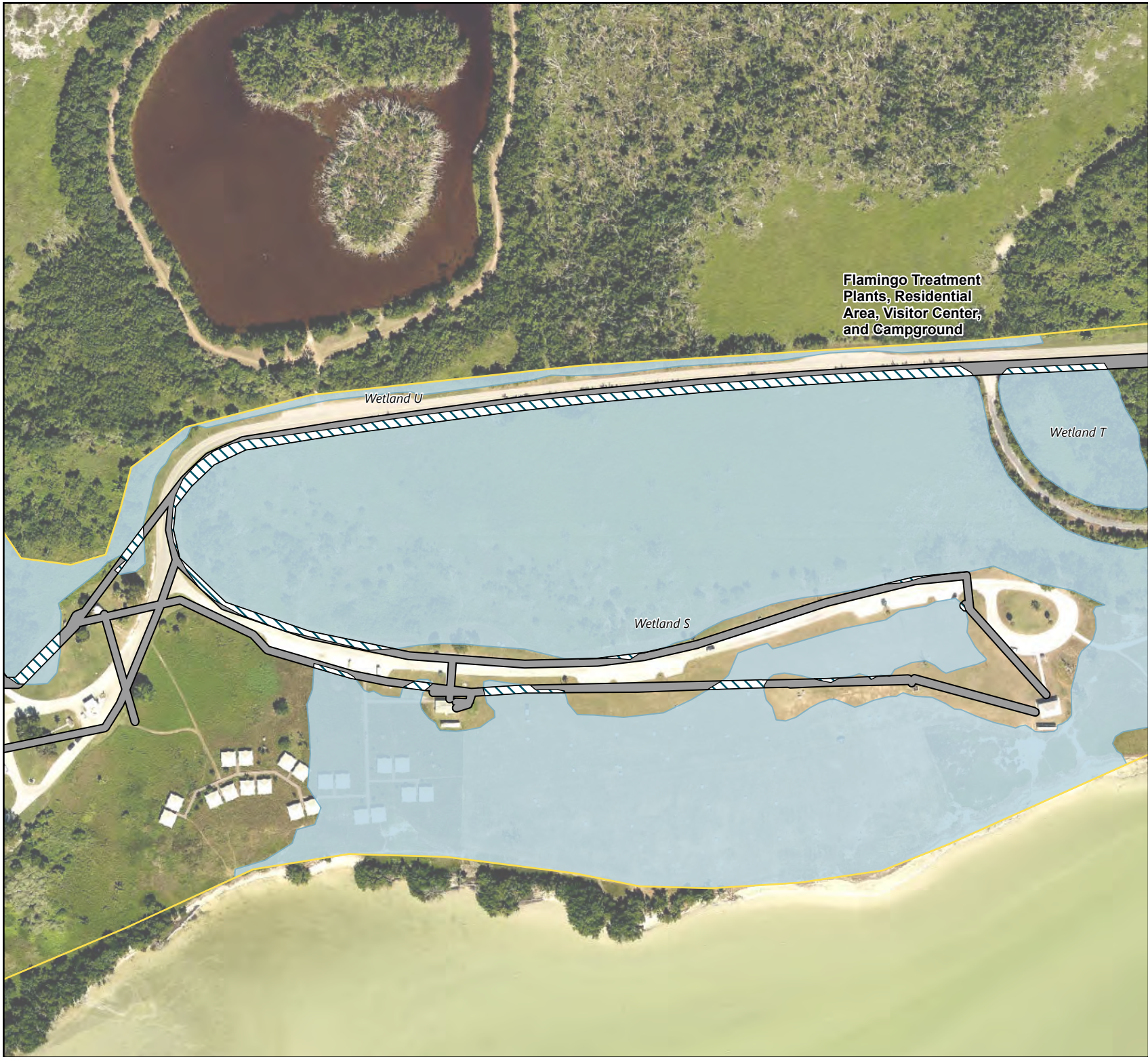
- Project Area
- Temporary Impact
- Disturbance Area
- Delineated Wetland



**SOURCE:**  
Aerial Imagery: Esri (2023)  
1 inch equals 150 feet



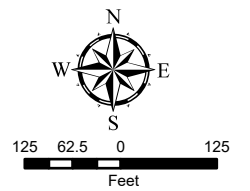




**Figure 3s:**  
Wetland Impact Locations by Project Area  
Rehabilitation of Parkwide Water and  
Wastewater Systems

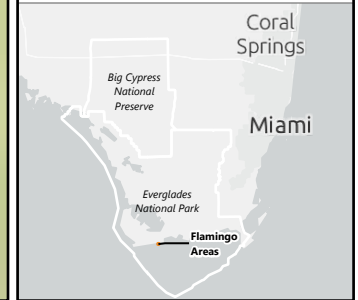
**Legend**

- Project Area
- Temporary Impact
- Disturbance Area
- Delineated Wetland



**SOURCES:**  
Coordinate System: NAD 1983 StatePlane  
Florida East U.S. Survey Feet  
Projection: Transverse Mercator  
Datum: North American 1983

1 inch equals 250 feet



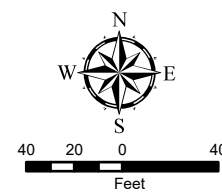




**Figure 3t:**  
**Wetland Impact Locations by Project Area**  
**Rehabilitation of Parkwide Water and**  
**Wastewater Systems**

**Legend**

-  Project Area
-  Permanent Impact
-  Disturbance Area
-  Delineated Wetland



**SOURCE:**  
 Aerial Imagery: Esri (2023)  
 1 inch equals 80 feet



# APPENDIX F: CULTURAL AND HISTORIC RESOURCES



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**Table F-1: Cultural and Historic Resources in the Flamingo Area of Potential Effect**

Site ID	Temporal Affiliation	Site Type	SHPO NRHP Evaluation	Worksite
EVER 230	Early 20 <sup>th</sup> century American	Artifact Scatter (remains of structure)	Not evaluated	Flamingo Area
8MO06553/ EVER 231	19 <sup>th</sup> century American, 1821-1899	Homestead (remains of structure)	Eligible	Flamingo Area
8DA11434/ 8MO01905	1915-1922	Resource Group	Eligible	Flamingo Area and West Lake Area
8MO01908	1915-1922	Resource Group	Eligible	Flamingo Area
8MO01909	1915-1922	Resource Group	Eligible	Flamingo Area
8MO02146	c. 1821	Resource Group	Eligible	Flamingo Area
8MO01912	1956	Historic Building/ Property	Eligible	Flamingo Area
8MO01913	1966	Historic Building/ Property	Eligible	Flamingo Area
8MO01935	1957	Historic Building/ Property	Eligible	Flamingo Area
8MO01936	1959+	Historic Building/ Property	Eligible	Flamingo Area
8MO02147	1963+	Historic Building/ Property	Eligible	Flamingo Area
8MO02148	1956	Historic Building/ Property	Eligible	Flamingo Area
8MO02149	1957	Historic Building/ Property	Eligible	Flamingo Area
MO02150	1955	Historic Building/ Property	Eligible	Flamingo Area
MO02151	1955	Historic Building/ Property	Eligible	Flamingo Area
MO02152	1955	Historic Building/ Property	Eligible	Flamingo Area
MO02334	1958	Historic Building/ Property	Eligible	Flamingo Area
MO02335	1958	Historic Building/ Property	Eligible	Flamingo Area
MO02336	1957	Historic Building/ Property	Not Evaluated	Flamingo Area
MO04522	1968	Historic Building/ Property	Eligible	Flamingo Area
MO04526	1959	Historic Building/ Property	Eligible	Flamingo Area

Notes:

SHPO – State Historic Preservation Office

NRHP - National Register of Historic Places

**Table F-2: Cultural and Historic Resources in the Shark Valley Area of Potential Effect**

Site ID	Temporal Affiliation	Site Type	SHPO NRHP Evaluation	Worksite
8DA15263	ca. 1966	Structure	Eligible	Tower Area
8DA15264	ca. 1966	Structure	Eligible	Tower Area
8DA15148	ca. 1950	Resource Group	Ineligible	Tower Area
8DA15149	ca. 1950	Resource Group	Ineligible	Tower Area
8DA19697	1966	Resource Group	Not Evaluated	Tower Area

Notes:

SHPO – State Historic Preservation Office

NRHP - National Register of Historic Places

**Table F-3: Cultural and Historic Resources in the Main Entrance/Royal Palm Area of Potential Effect**

Site ID	Temporal Affiliation	Site Type	SHPO NRHP Evaluation	Worksite
8DA11794	ca. 1956	Historic Building/ Property	Ineligible	Daniel Beard & Dr. Bill Robertson
8DA11795	1956	Historic Building/ Property	Ineligible	Daniel Beard & Dr. Bill Robertson
8DA09903	1964	Resource Group	NRHP-listed	Daniel Beard & Dr. Bill Robertson
8DA15139	1961	Resource Group	Eligible	Long Pine Key Area
8DA11434/ 8MO01905	20 <sup>th</sup> cent. American, 1900-present	Resource Group	Eligible	Royal Palm Visitor Center and Residential/ Maintenance Area and Visitor Center/ Headquarters Area
8DA11436	20 <sup>th</sup> cent. American, 1900-present	Resource Group	Eligible	Royal Palm Visitor Center and Residential/ Maintenance Area and Visitor Center/ Headquarters Area
8DA15647	Modern, 1950-present	Resource Group	Eligible	Residential/ Maintenance Area
8DA00026/ EVER 155	Glades IIIb	Earth Midden	Eligible	Royal Palm Visitor Center
8DA00027	Glades IIb; Glades IIc	Earth midden	Insufficient information	Royal Palm Visitor Center

Notes:

SHPO – State Historic Preservation Office

NRHP - National Register of Historic Places



**Table F-4: Cultural and Historic Resources in the Loop Road Area of Potential Effect**

Site ID	Temporal Affiliation	Site Type	SHPO NRHP Evaluation	Worksite
8MO01920/ 8DA06984	1928	Resource Group	Not Evaluated	Loop Road Area Education Center and Tamiami Ranger Station
8DA06453/ 8CR00928/ EVER 248	ca. 1909	Resource Group	Eligible	Trail Center Area and Tamiami Ranger Station
8DA06510/ 8CR00927	ca.1928	Resource Group	Eligible	Trail Center Area and Tamiami Ranger Station
8DA15250/ EVER 247	ca. 1962	Resource Group	Eligible	Tamiami Ranger Station
8DA14326	ca. 1963	Historic Structure	Eligible	Tamiami Ranger Station
8DA41323	1962	Historic Bridge	Eligible	Tamiami Ranger Station
AO-01	Twentieth-Century American	Refuse location	Not eligible	Loop Road Education Center

Notes:

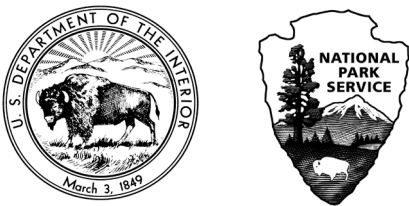
SHPO – State Historic Preservation Office

NRHP - National Register of Historic Places

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As the nation’s principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering wise use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under US administration.

NPS EVER 160/191448 November 2023

US Department of the Interior – National Park Service