FLORIDA DEPARTMENT OF TRANSPORTATION

SR 869 (SAWGRASS EXPRESSWAY) WIDENING
PROJECT DEVELOPMENT & ENVIRONMENT (PD&E) STUDY

From West of US 441 (SR 7) to Powerline Road (SR 845)

FPID No.: 437153-1-22-01 • ETDM No.: 14280 • Broward County

NATURAL RESOURCE EVALUATION

DRAFT

FEBRUARY 2024

Natural Resources Evaluation Report

Florida's Turnpike Enterprise

SR 869/ Sawgrass Expressway PD&E Study

Limits of Project: From US 441/SR 7 to Powerline Road (SR 845)

Broward County, Florida

Financial Management Number: 437153-1-22-01

ETDM Number: 14280

Date: November 2023

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022 and executed by the Federal Highway Administration and FDOT.

NATURAL RESOURCES EVALUATION

Florida Department of Transportation
Florida's Turnpike Enterprise

SR 869/Sawgrass Expressway
Project Development and Environment (PD&E) Study
Broward County, Florida

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DRAFT

JANUARY 2024

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1.0 PROJECT OVERVIEW

1.1 PROJECT DESCRIPTION AND LOCATION

The Florida Department of Transportation (FDOT), Florida's Turnpike Enterprise (FTE), is performing a Project Development and Environment (PD&E) Study for State Road 869 (Sawgrass Expressway)/Sawgrass Expressway from west of US 441/SR 7 to Powerline Road (SR 845), a distance of approximately 4 miles (see ***Figure 1.1***). The objective of this PD&E Study is to evaluate corridor modifications to improve operations and interchange access. The proposed improvements will address existing and future traffic needs, improve travel time reliability, enhance safety, and provide long-term mobility options along the corridor. The study is evaluating additional lanes, new collector distributor roadway systems and interchange improvements. This Natural Resources Evaluation describes existing environmental conditions and potential impacts to protected species and wildlife habitats, wetlands, and Essential Fish Habitat (EFH) from the proposed project.

The study also includes 2.7 miles of the Florida's Turnpike (SR 91) from Wiles Road to the Broward/Palm Beach County Line. The study area is located in Broward County and traverses the cities of Parkland, Coral Springs, Coconut Creek, and Deerfield Beach, as well as an area of unincorporated Broward County.

The Sawgrass Expressway is a tolled 21-mile limited access facility located in northern Broward County. Between west of US 441 and the Florida's Turnpike, the corridor consists primarily of six travel lanes (three in each direction). This segment of the corridor is functionally classified as a Divided Urban Principal Arterial Expressway and has a posted speed limit of 65 miles per hour. Between the Florida's Turnpike and Powerline Road the corridor changes to SW 10th Street with primarily six non-tolled travel lanes (three in each direction) and a functional classification of Urban Principal Arterial Other. The posted speed of this section is 45 miles per hour. The access management classification of the corridor is Class 1.

The Florida's Turnpike is also a tolled limited access facility that runs north-south from Interstate 95 to Interstate 75. Between Wiles Road and the County Line, the corridor consists primarily of six travel lanes (three in each direction). This segment of the corridor is functionally classified as a Divided Urban Principal Arterial Expressway and has a posted speed limit of 65 miles per hour. The access management classification of the corridor is Class 1.

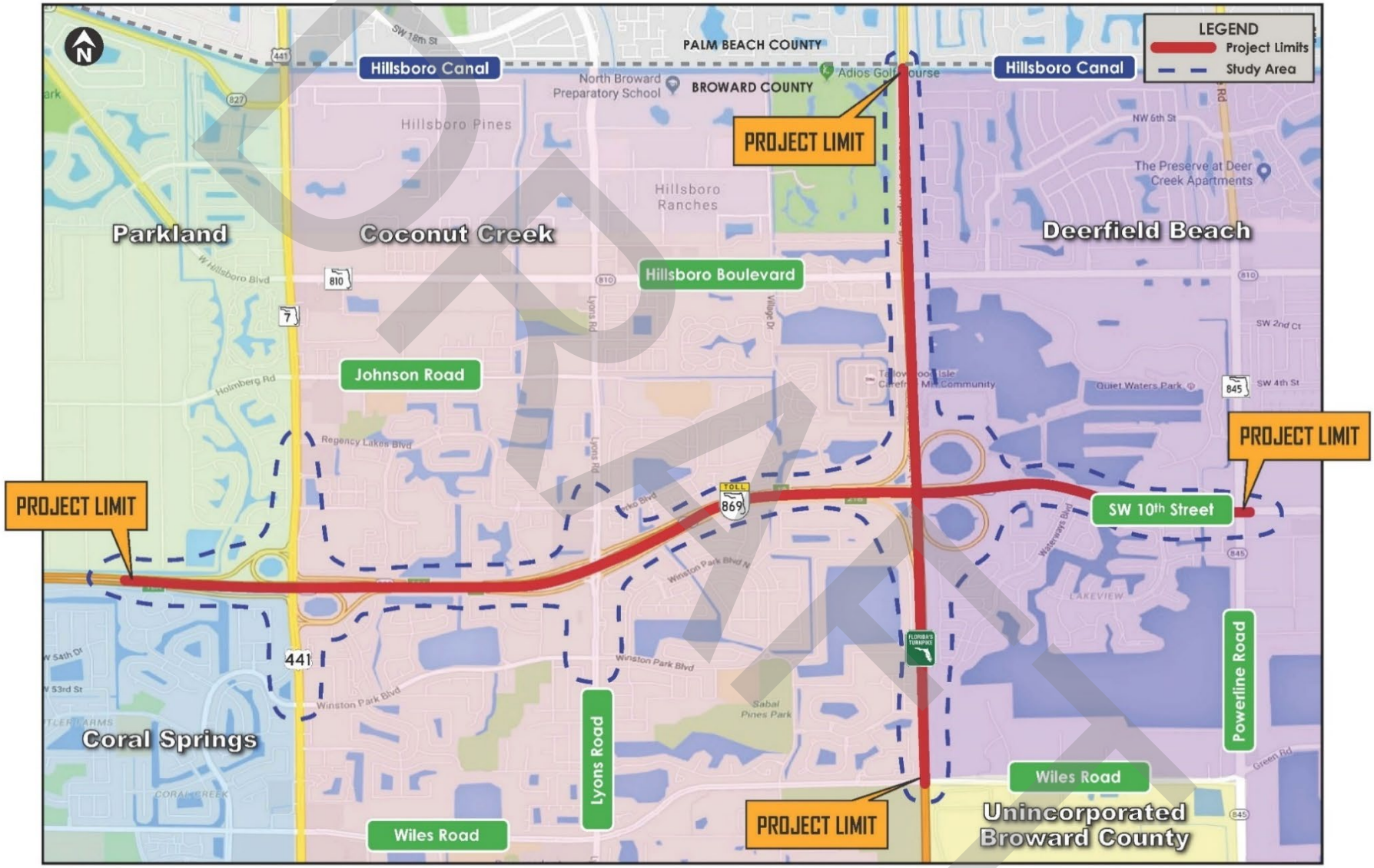

Figure 1.1 – Project Location Map

1.2 Purpose and Need of the Project

The primary purpose of this project is to add lanes to meet future transportation demand, improve travel time reliability and provide long-term mobility options. The project also includes operational and safety enhancements to the US 441, Lyons Road, and Florida's Turnpike interchanges.

The need for the project is based on the following factors:

Capacity – A *Systems Interchange Modification Report* dated January 2024 was prepared by FTE for this PD&E Study. The existing 2016 and future 2045 Annual Average Daily Traffic (AADT) volumes are listed in ***Table 1.1*** and ***Table 1.2***.

In 2016, the Sawgrass Expressway carried an AADT volume of 86,200 vehicles west of US 441 and 81,700 vehicles between US 441 and Lyons Road. The segment between Lyons Road and Florida's Turnpike carried 81,700 vehicles and the segment east of Florida's Turnpike up to Powerline Road carried 37,700 vehicles.

The 2045 AADT forecast estimate is 131,100 vehicles west of US 441 and 128,900 vehicles between US 441 and Lyons Road. The segment between Lyons Road and Florida's Turnpike is estimated to carry 138,900 vehicles and the segment east of Florida's Turnpike up to Powerline Road is estimated at 71,900 vehicles. The 2045 AADT volumes represent a 52-91% increase in traffic from the year 2016 to 2045.

Table 1.1 – Annual Average Daily Traffic (AADT) Volumes

Roadway	Segment	2016 AADT	2045 AADT	% Increase
Sawgrass Expressway	West of US 441	86,200	131,100	52%
	US 441 and Lyons Road	81,700	128,900	58%
	Lyons Road and Florida's Turnpike	81,700	138,900	70%
SW 10th Street	Florida's Turnpike and Powerline Road	37,700	71,900	91%

Source: Systems Interchange Modification Report – January 2024

According to the *Systems Interchange Modification Report*, additional lanes are needed along the Sawgrass Expressway corridor by the year 2025. West of US 441, one additional lane is needed by the year 2025 and two additional lanes are needed by the year 2033. Between US 441 and Lyons Road, one additional lane is needed by the year 2025 and two lanes by 2028. Between Lyons Road and Florida's Turnpike, one additional lane is needed by the year 2025 and two

additional lanes are needed by the year 2028. Between Florida's Turnpike and Powerline Road, one additional lane is needed by the year 2025.

Table 1.2 – Florida's Turnpike Annual Average Daily Traffic (AADT) Volume

Roadway	Segment	2016 AADT	2045 AADT	% Increase
Florida's Turnpike	Glades Road and Sawgrass Expressway	106,800	153,100	43%
	Sawgrass Expressway and Sample Road	90,800	130,300	44%

Source: Systems Interchange Modification Report – January 2024

According to the *Systems Interchange Modification Report*, additional lanes are needed along the Florida's Turnpike corridor by the year 2025. South of the Sawgrass Expressway, one additional lane is needed by the year 2026, and north of the Sawgrass Expressway, one additional lane is needed by the year 2025 and two additional lanes by 2045.

Several interchanges and adjacent intersections are operating at an unacceptable level of service. If additional lanes are not added to the corridor, the congestion within the project limits will get considerably worse with longer peak periods, more crashes and deteriorating travel time reliability.

Travel Time Reliability – In urban areas, many motorists have accepted traffic congestion as an unpleasant fact and have adjusted their schedules or allowed extra time for work, school, and other time-sensitive trips. However, they are less tolerant of unexpected delays that cause them to be late for work or important meetings, miss appointments, or lose money due to disruption of shipping and just-in-time deliveries.

Travel time reliability measures the extent of this unexpected delay. Travel time reliability is defined as the consistency or dependability in travel times, as measured from day-to-day and/or across different times of the day.

To gauge travel reliability on the Sawgrass Expressway, the average travel speeds between US 441 and Florida's Turnpike were obtained for a 7-day period (March 14, 2016, through March 20, 2016) and plotted. The results are shown in ***Figure 1.2***. As shown on the figure, the average travel speeds in the northbound/eastbound direction are dropping below 50 miles per hour during the morning peak with 95th percentile dropping to below 20 miles per hour.

Traffic volumes along the Sawgrass Expressway are expected to increase by 52% to 91% in the next 25 years. Without any improvements, the increasing traffic congestion will further deteriorate travel reliability along the corridor. Residents and workers will avoid destinations along the Sawgrass Expressway negatively affecting the economic vitality of the area.

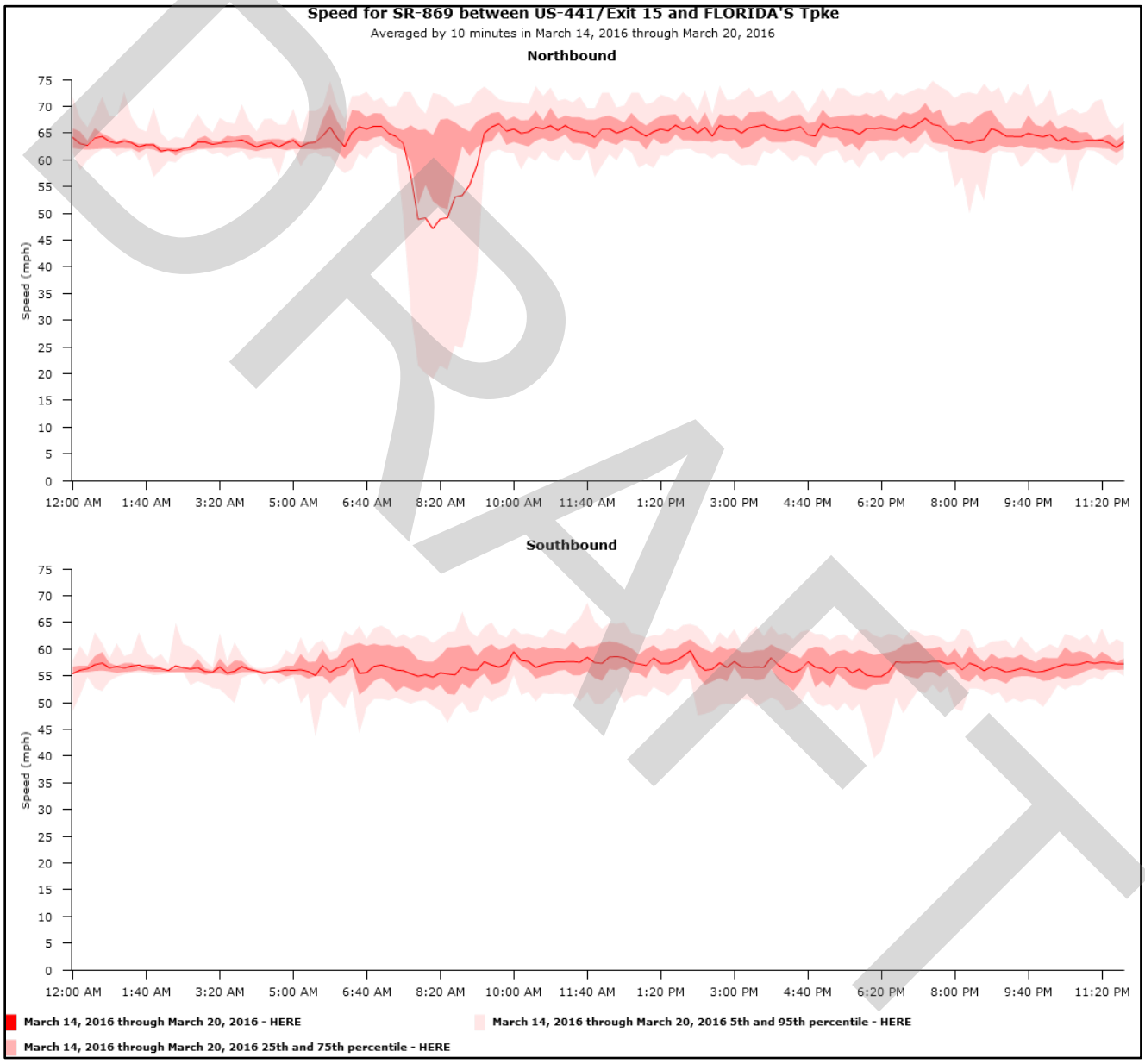

Figure 1.2 – Sawgrass Expressway Travel Time Reliability

System Linkage – Continuity in the transportation system is essential for efficient vehicle movements, travel patterns and safety. The Sawgrass Expressway is part of the State's Strategic Intermodal System (SIS) and the National Highway System (NHS) providing connectivity to Interstate 595, Interstate 75, Florida's Turnpike, and Interstate 95. The corridor also connects the local multi-modal transportation network by providing access to the Sunrise Park and Ride at the Amerant Bank Arena (formerly known as BB&T Center) and linking the existing Express Bus service along I-595 to Downtown Fort Lauderdale and Downtown Miami.

Additional lanes are proposed on the Sawgrass Expressway from south of Sunrise Boulevard to west of US 441 and on Florida's Turnpike both north and south of the Sawgrass Expressway. The segment corridor from US 441 to Florida's Turnpike is the last segment missing the needed additional lanes to continue to provide a reliable system linkage with the Florida's Turnpike and to the east.

Modal Interrelationships – The Sawgrass Expressway is part of the SIS and NHS networks. Additional lanes along the corridor will enhance the mobility of goods by alleviating current and future congestion along the corridor and surrounding freight and transit networks.

Transportation Demand – The continued growth within Broward County, particularly by the number of Developments of Regional Impact that have been approved in western Broward County, will drive the need for further infrastructure improvements including the widening of the Sawgrass Expressway. The existing 2016 AADT volumes measured along the corridor range from 37,700 between Florida's Turnpike and Powerline Road to as high as 86,200 west of US 441. The 2045 AADT forecasts show this traffic will grow to 71,900 between Florida's Turnpike and Powerline Road and to as high as 131,100 between US 441 and Lyons Road. This increase in demand reflects a 52% to 91% increase in future traffic necessitating capacity and operational improvement strategies to address this need.

Social Demands and Economic Development – The Sawgrass Expressway connects the cities of Coral Springs, City of Parkland, Coconut Creek, and Deerfield Beach to the Florida's Turnpike. Travel demand on the Sawgrass Expressway is directly related to population and employment changes within Broward County and the cities within the corridor. The projected population of Broward County and cities adjacent to the Sawgrass Expressway is shown in ***Table 1.3***.

Table 1.3 – 2020 and 2045 Population

Year	Broward County	City of Coral Springs	City of Parkland	City of Coconut Creek	Deerfield Beach
2020[1]	1,944,375	134,394	34,670	57,833	86,859
2045[2]	2,237,840	142,885	32,848	64,885	93,188
2020-2045 Change	15%	6%	-5%	12%	7%

Source: [1] – United States Census 2020, [2] – Broward MPO 2045 Long Range Transportation Plan & Broward County and Municipal Population Forecast and Allocation Model 2017

The population of Broward County is expected to increase by 15% from 2020 to 2045 while the cities directly adjacent to the Sawgrass Expressway are projected to grow between 6% and 12%, except for the City of Parkland. This projected increase in population will result in increased traffic on Sawgrass Expressway and adjacent roadway network.

Emergency Evacuation – Sawgrass Expressway serves as part of the emergency evacuation route network designated by the Florida Division of Emergency Management and by Broward County. This corridor is critical in facilitating traffic movement during emergency evacuation periods as it connects to other major arterials and highways of the state evacuation route network (i.e., I-595, I-75, Florida's Turnpike and to I-95 via the arterial portion of Sawgrass Expressway known as SW 10th Street to the east). Increasing the capacity of the Sawgrass Expressway will reduce evacuation times needed for residents of Broward County during emergency and hurricane evacuations.

Long Term Mobility Option – Sawgrass Expressway, within the project limits, is currently operating at LOS D or better with several intersections operating at LOS F. The 2045 traffic forecasts, based on population and employment projections, show an increase of 43% to 91% in future traffic volumes. A long-term mobility option is needed that will not only serve current traffic volumes but will accommodate future projected growth. Without this option, the residents and workers in the surrounding area will face severe congestion leading to decreasing productivity that would affect the economic viability of cities surrounding the Sawgrass Expressway.

2.0 EXISTING CONDITIONS

The methodology utilized for evaluating the existing conditions within the study area consisted of data gathering in the areas of roadway, bridge, and engineering characteristics. The existing conditions assessment began with the collection and review of all data pertaining to the existing facilities through reviewing existing documents, conducting on-site inventories, and collecting pertinent data that would serve as a basis for evaluation. The assessment was performed for the following three facilities:

1. Sawgrass Expressway between west of US 441 and Florida's Turnpike (Limited Access Segment)
2. SW 10th Street between Florida's Turnpike and Powerline Road (Arterial Segment)
3. Florida's Turnpike between Wiles Road and the Broward/Palm Beach County Line (Limited Access)

2.1 ROADWAY

Sawgrass Expressway – Sawgrass Expressway, between west of US 441 and Florida's Turnpike, consists of four to six 12-foot wide travel lanes (two to three lanes in each direction) with 12-foot wide auxiliary lanes at select locations and 12-foot wide inside and outside shoulders. The median width varies within this segment of the corridor. The section between west of US 441 and east of Lyons Road has a 64-foot wide depressed grassed median separated by guardrail (see ***Figure 2.1*** and ***Figure 2.2***). The section between east of Lyons Road and Florida's Turnpike narrows down to a 2-foot wide median barrier wall (see ***Figure 2.3***). This section also has a two-lane collector-distributor roadway system with 12-foot wide travel lanes and 12-foot wide auxiliary lanes on both sides of the corridor providing ramp access to and from the Florida's Turnpike. Inside and outside shoulder widths vary depending on the number of lanes, tolling point locations and ramp gores.

SW 10th Street – SW 10th Street, between Florida's Turnpike and Powerline Road, consists of six 12-foot wide travel lanes (three lanes in each direction) and a raised grassed curbed median. The median width varies between 30-65 feet wide. The median currently accommodates landscape vegetation and exclusive left-turn lanes at the intersections (see ***Figure 2.4***).

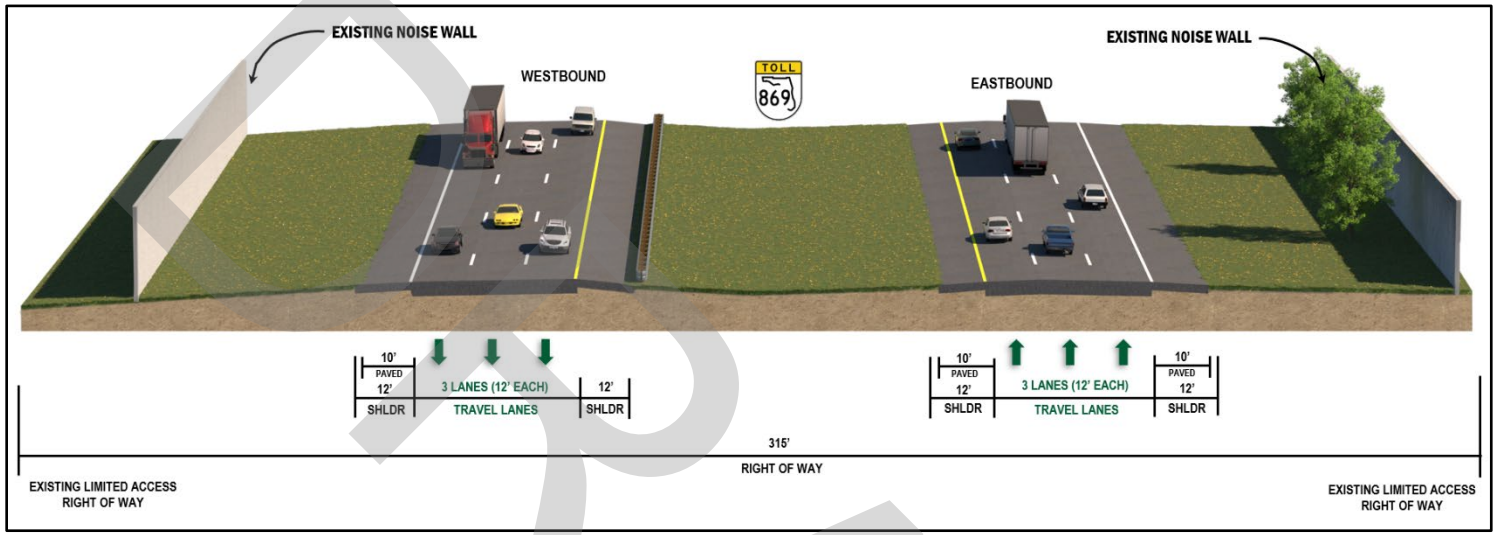

Figure 2.1 – Existing Roadway Section West of US 441

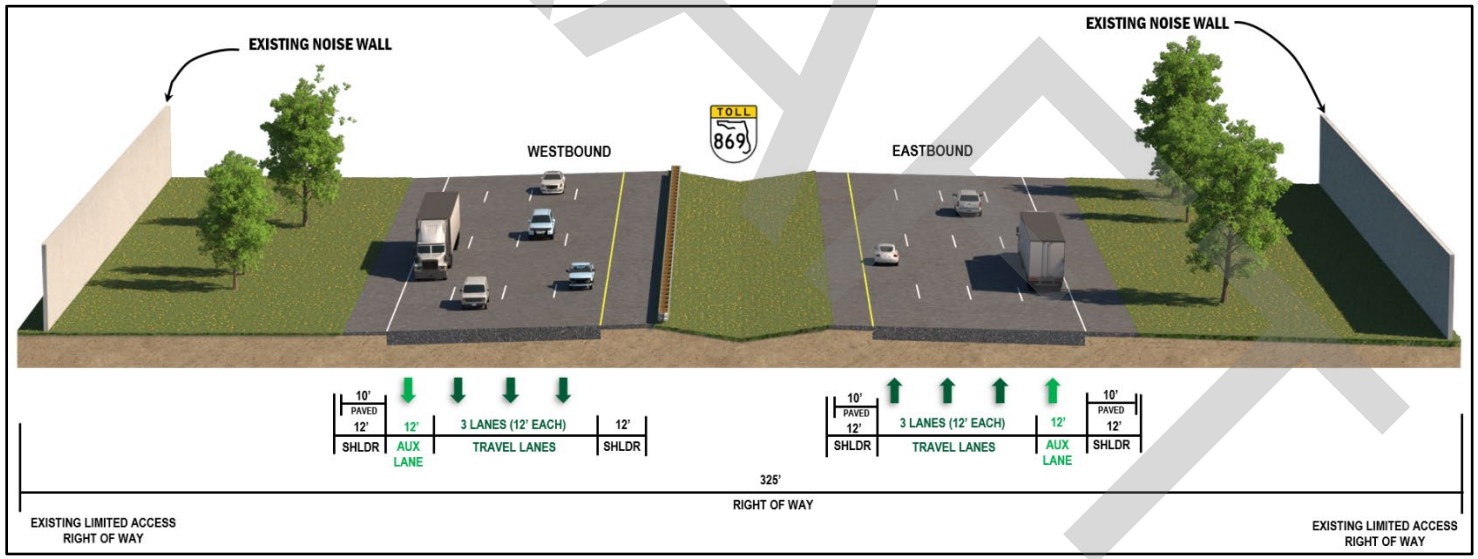

Figure 2.2 – Existing Roadway Section between US 441 and Lyons Road

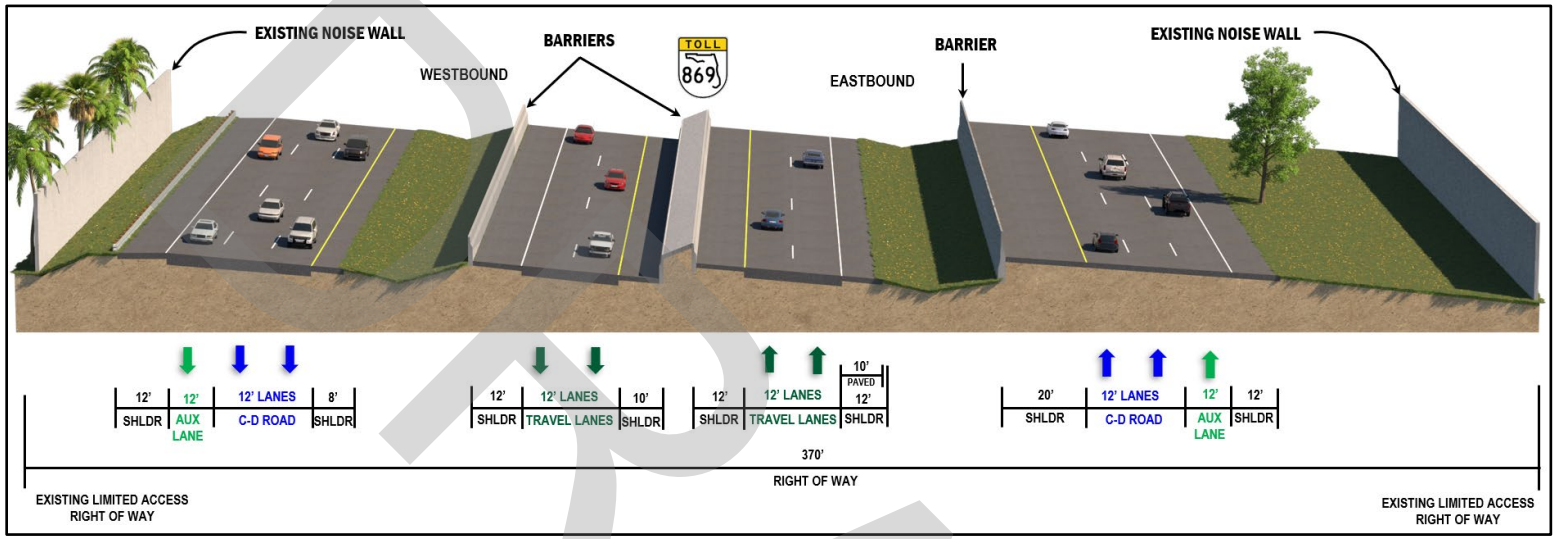

Figure 2.3 – Existing Roadway Section between Lyons Road and Florida's Turnpike

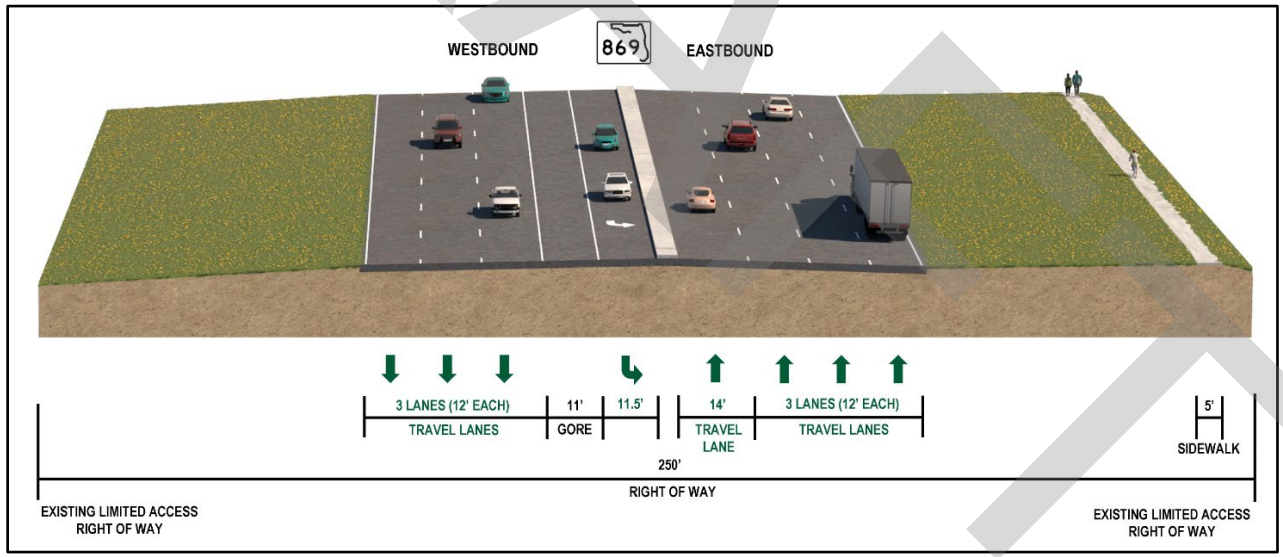

Figure 2.4 – Existing Roadway Section between Florida's Turnpike and Powerline Road

Florida's Turnpike – Florida's Turnpike, between Wiles Road and the County Line, consists of six 12-foot wide travel lanes (three lanes in each direction) with 8.5-10-foot wide inside shoulders, 12-foot wide outside shoulders and a 2-foot wide median barrier wall (see ***Figure 2.5*** and ***Figure 2.6***).

There are three roadway improvement projects committed within the study area.

1. FDOT District Four FPID# 439891-1 – This project is adding two limited access connector lanes in each direction and other corridor improvements along SW 10th Street between Florida's Turnpike and I-95.
2. FTE FPID# 446024-2 – This project is extending the southbound on-ramp acceleration lane from Sawgrass Expressway eastbound by 1,436 feet.
3. FTE FPID# 415927-4 – This project is adding one more travel lane in each direction along Florida's Turnpike between Sawgrass Expressway and north of Glades Road.

These improvement projects are expected to be opened to traffic before the implementation of this project.

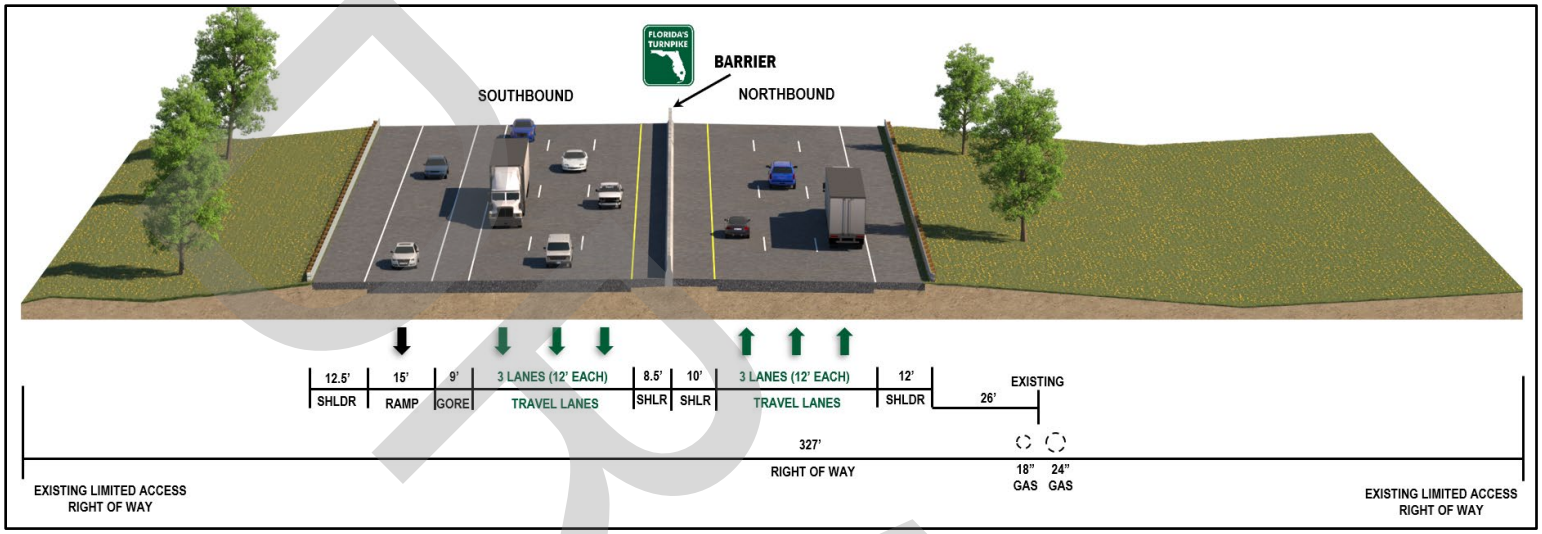

Figure 2.5 – Existing Roadway Section between Wiles Road and Sawgrass Expressway

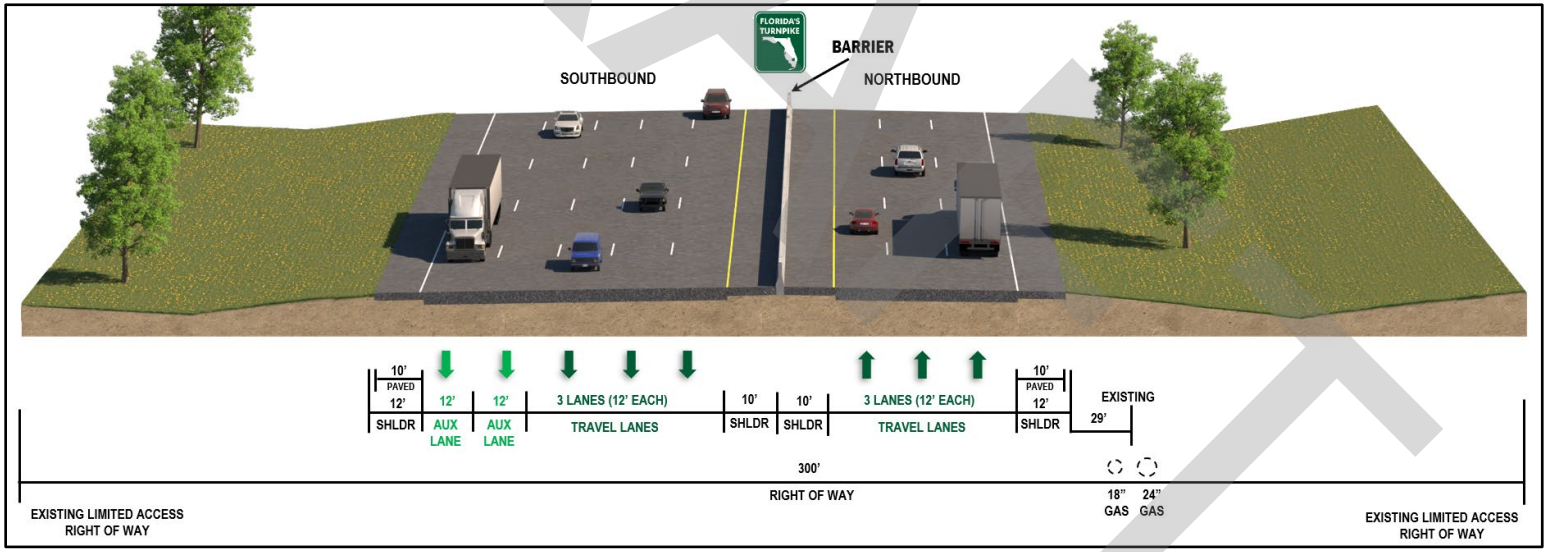

Figure 2.6 – Existing Roadway Section between Sawgrass Expressway and the County Line

2.2 RIGHT OF WAY

The Sawgrass Expressway existing right of way varies within the study limits due to the number of closely spaced interchanges, where it varies to accommodate entrance and exit ramps.

The Florida's Turnpike existing right of way also varies within the study limits. The right of way is generally consistent throughout the corridor except when approaching the Sawgrass Expressway Interchange, where it varies to accommodate entrance and exit ramps. ***Table 2.1*** summarizes the right of way along both corridors.

Table 2.1 – Summary of Existing Right of Way

Roadway	Roadway Section	Type of Right Away	Right of Way Width (feet)
Sawgrass Expressway	University Drive – US 441	Limited Access	315
	US 441 – Lyons Road	Limited Access	325
	Lyons Road – Florida's Turnpike	Limited Access	370
SW 10th Street	Florida's Turnpike – Powerline Road	Controlled Access	250
Florida's Turnpike	Wiles Road – Sawgrass Expressway	Limited Access	327
	Sawgrass Expressway – Broward/Palm Beach County Line	Limited Access	300

Source: FDOT Right of Way Survey

3.0 PROJECT ALTERNATIVES

The objective of this PD&E Study is to evaluate corridor modifications to improve operations and interchange access. To keep up with the growing traffic demand within the study area, multiple conceptual alternatives were considered during the initial phase of the study, including a No-Build Alternative. The No-Build Alternative maintains the existing roadway configuration and any other planned improvements along the corridor.

All conceptual alternatives were screened based on travel demand, capacity, tolling, signing, access, geometrics, and right of way availability in order to select a preferred alternative. The alternatives analysis process consisted of six steps throughout the study (see ***Figure 3.1***).

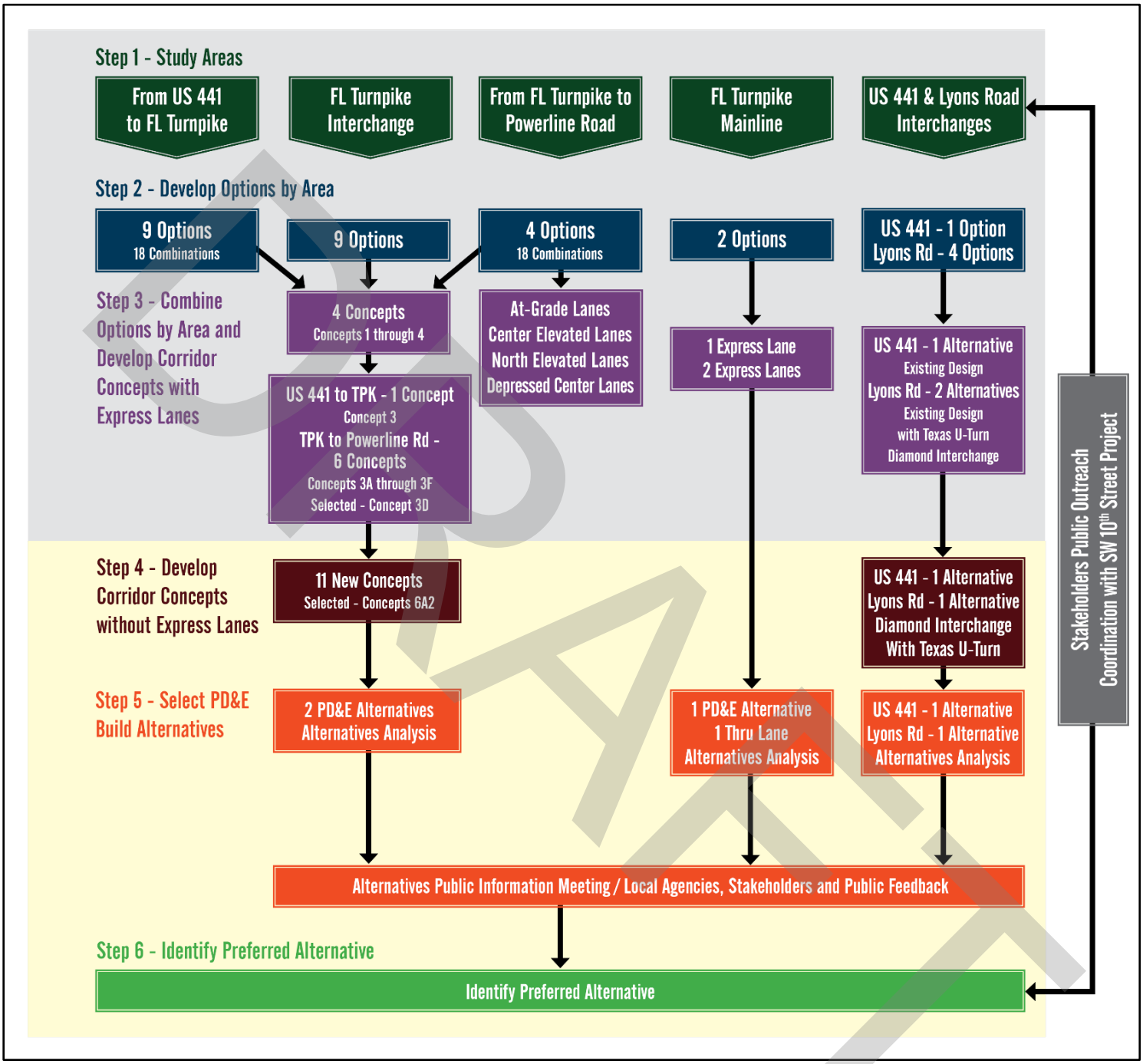

Figure 3.1 – Alternatives Analysis Process

The first step of the process was to divide the study area based on roadway characteristics. Once divided, the second step was to develop options with improvements that will meet the needs of the divided areas. The improvements varied by area including, but not limited to, adding express lanes, combining off-ramp exits, adding lanes to the on- and off-ramps, new interchange ramp connections, interchange modifications, and extending the existing collector distributor roadway systems. During the third step, selected improvement options were combined by area and developed corridor concepts that covered the entire study area. These corridor improvements included the implementation of express lanes along both the Sawgrass Expressway and Florida's Turnpike.

In 2020, FTE no longer considered adding express lanes to both Sawgrass Expressway and Florida's Turnpike. Policy changes at the time allowed for FDOT and FTE to look at other freeway widening alternatives. Therefore, during step four, a series of new corridor concepts were developed with additional travel lanes, interchange modifications and other corridor improvements. During this step a corridor concept was selected to be evaluated further during the alternatives analysis. During step five, from the corridor concept selected, two PD&E build alternatives were developed, analyzed, and presented to the local agencies, stakeholders, and public during an Alternatives Public Information Meeting. During step six, FTE addressed all the comments from the public meeting and identified a preferred alternative.

3.1 Preferred Alternative

Sawgrass Expressway – The preferred alternative proposes to widen the Sawgrass Expressway to four travel lanes in each direction with auxiliary lanes at select locations. The preferred alternative also includes collector distributor roadway systems on both sides of the corridor. The collector distributor roadway systems will separate local traffic and interchange traffic from the mainline traffic. Separating traffic patterns reduces lane changes, weaving maneuvers, speed differentials and friction along the corridor. The collector distributor roadway systems will be barrier separated from the Sawgrass Expressway mainline lanes.

Sawgrass Expressway, west of US 441, will consist of 12-foot wide travel lanes and auxiliary lanes with 15-foot wide inside shoulders, 12-foot wide outside shoulders and a 2-foot wide median barrier wall (see ***Figure 3.2***). This section is consistent with the proposed Sawgrass Expressway widening project to the west between

Atlantic Boulevard and west of US 441 (FPID# 435461-1). Between US 441 and Lyons Road, the roadway section will consist of 12-foot wide travel lanes and auxiliary lanes with 15-foot wide inside shoulders, 12-foot wide outside shoulders and a 2-foot wide median barrier wall. The collector distributor roadway systems begin at US 441 and end at the Florida's Turnpike. Between US 441 and Lyons Road, the collector distributor roadway system will consist of two 12-foot wide travel lanes with varying inside and outside shoulders widths between 8-12 feet wide separated from the mainlines lanes with a 2-foot wide barrier wall (see ***Figure 3.3***).

Between Lyons Road and Florida's Turnpike, the roadway section will consist of 12-foot wide travel lanes and auxiliary lanes with varying inside and outside shoulders widths between 12-14 feet wide and a 2-foot wide median barrier wall. The collector distributor roadway system will consist of two 12-foot wide travel lanes and one auxiliary lane with varying inside and outside shoulders widths between 8-12 feet wide separated from the mainlines lanes with a 2-foot wide barrier wall (see ***Figure 3.4***).

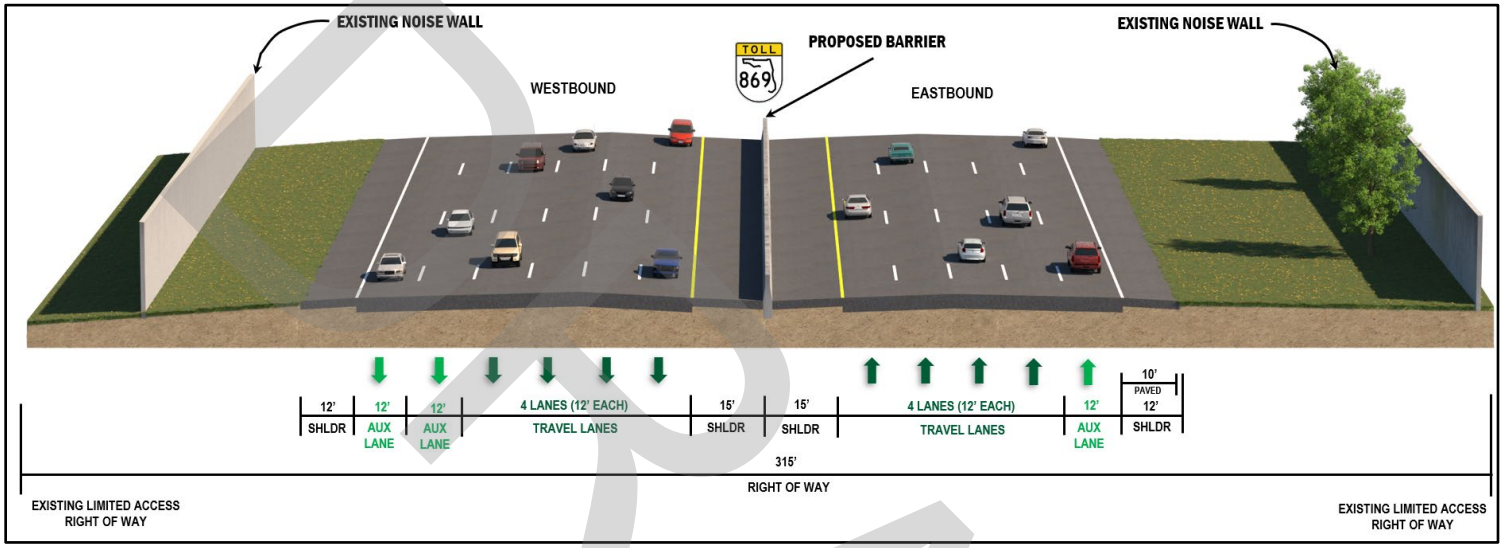

Figure 3.2 – Preferred Alternative Roadway Section West of US 441

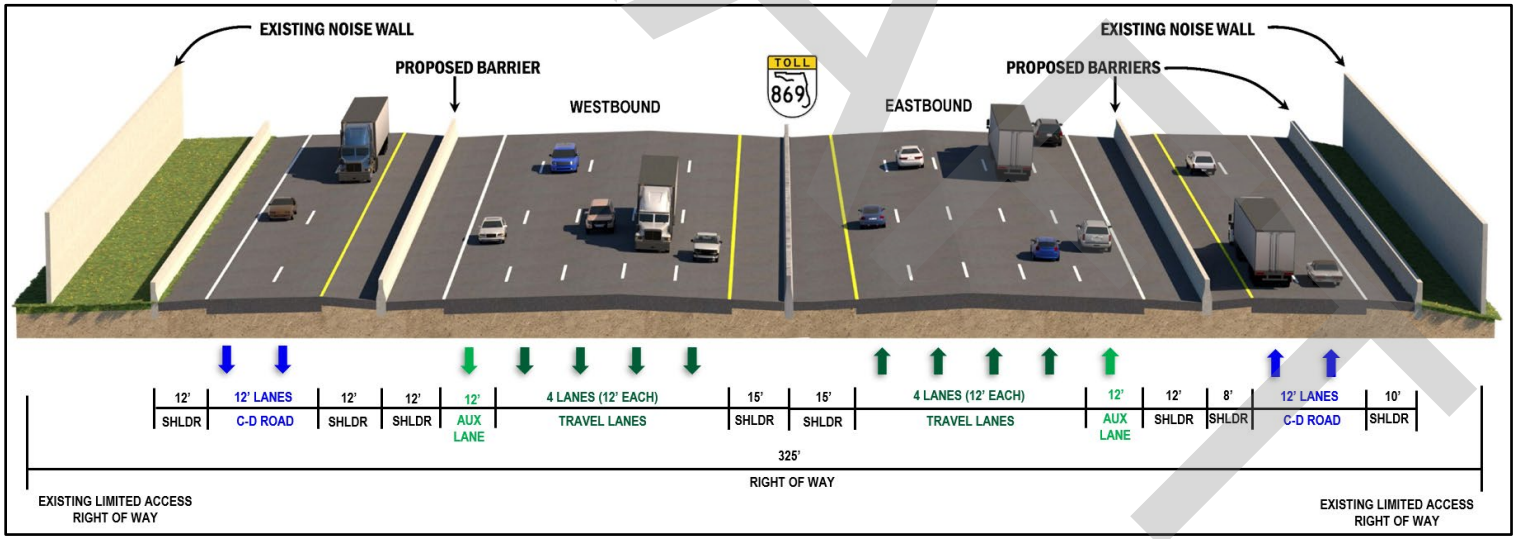

Figure 3.3 – Preferred Alternative Roadway Section between US 441 and Lyons Road

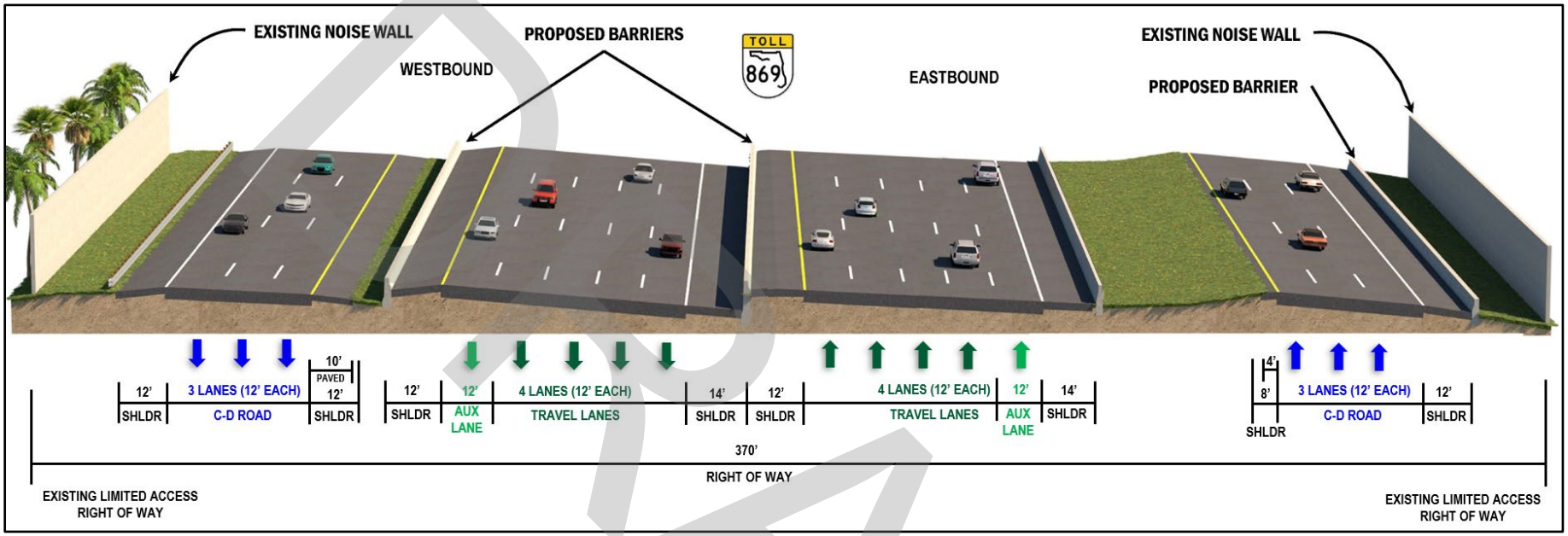

Figure 3.4 – Preferred Alternative Roadway Section between Lyons Road and Florida's Turnpike

SW 10th Street – SW 10th Street, between Florida's Turnpike and Powerline Road, will consist of two separate roadway corridors: 1) SW 10th Street and 2) SW 10th Street Connector. This roadway section overlaps with the SW 10th Street project currently underway by FDOT District Four (FPID# 439891-1). This project is proposing to add two limited access connector lanes in each direction on the north side of the existing SW 10th Street corridor between Florida's Turnpike and I-95. The FDOT project is also proposing other corridor improvements along the SW 10th Street existing corridor (see ***Figure 3.5***). Some of the major improvements within this roadway section between Florida's Turnpike and Powerline Road are listed below:

- Realign the existing SW 10th Street corridor to the south to leave space on the north side for the new connector lanes. The new south corridor alignment will consist of 11-foot wide travel lanes, auxiliary lanes and turn lanes. The corridor will also have a raised center median and a shared-use path along the south side of the roadway.
- The connector lanes will begin and end at the Sawgrass Expressway within the Florida's Turnpike Interchange and will be grade separated over Powerline Road.
- A new SW 10th Street westbound bridge structure will be constructed just east of the Florida's Turnpike to allow the new connector lanes to cross under from the north side to the inside to merge with the Sawgrass Expressway to the west.
- Intersection improvements at Waterways Boulevard, Independence Drive and Powerline Road.

All the improvements listed above are expected to be constructed and opened to traffic before the implementation of the Sawgrass Expressway project. The Sawgrass Expressway widening project will tie to the FDOT SW 10th Street project east of the Florida's Turnpike.

Florida's Turnpike – The preferred alternative proposes to widen the Florida's Turnpike between Wiles Road and the County Line to four travel lanes and one thru lane in each direction for a total of ten lanes, with auxiliary lanes at select locations (see ***Figure 3.6*** and ***Figure 3.7***). Thru lanes are additional travel lanes that help provide congestion relief in high traffic areas. These lanes offer customers making longer, more regional trips, the ability to bypass the local traffic entering and exiting the road. Customers pay the same amount to use the thru lanes as they do in any other lane on the toll road. All mainline lanes and shoulders are 12-foot wide, with a 2-foot wide median barrier wall.

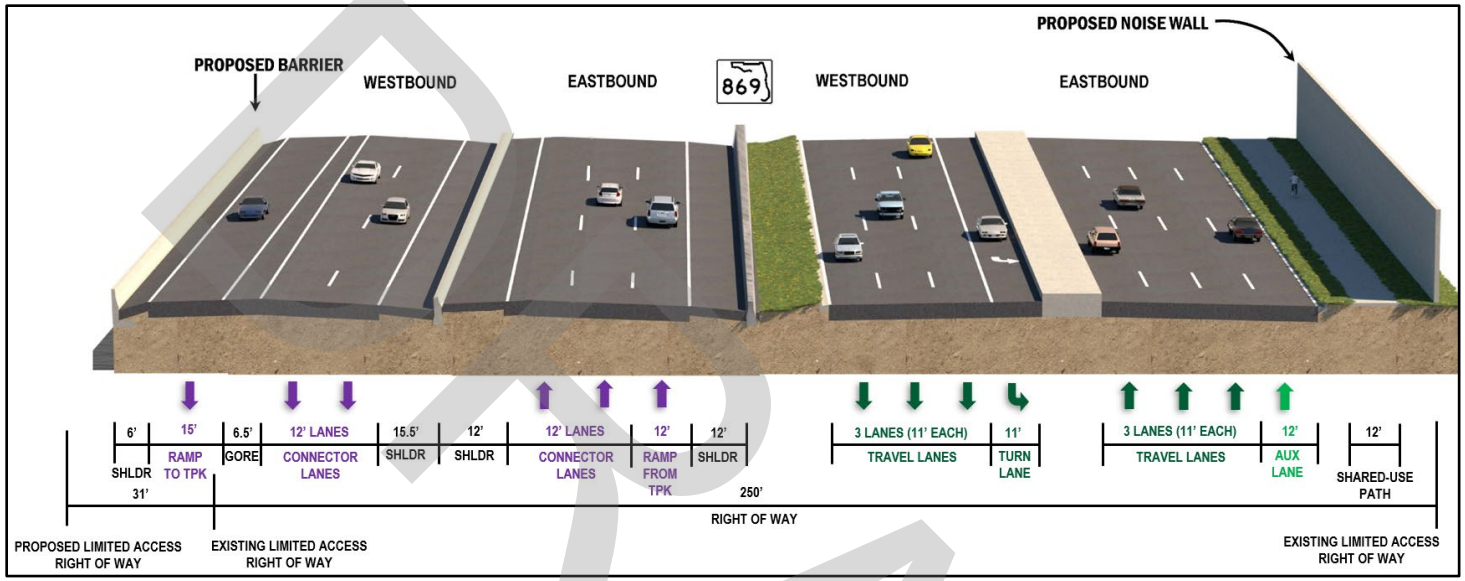

Figure 3.5 – Preferred Alternative Roadway Section between Florida's Turnpike and Powerline Road

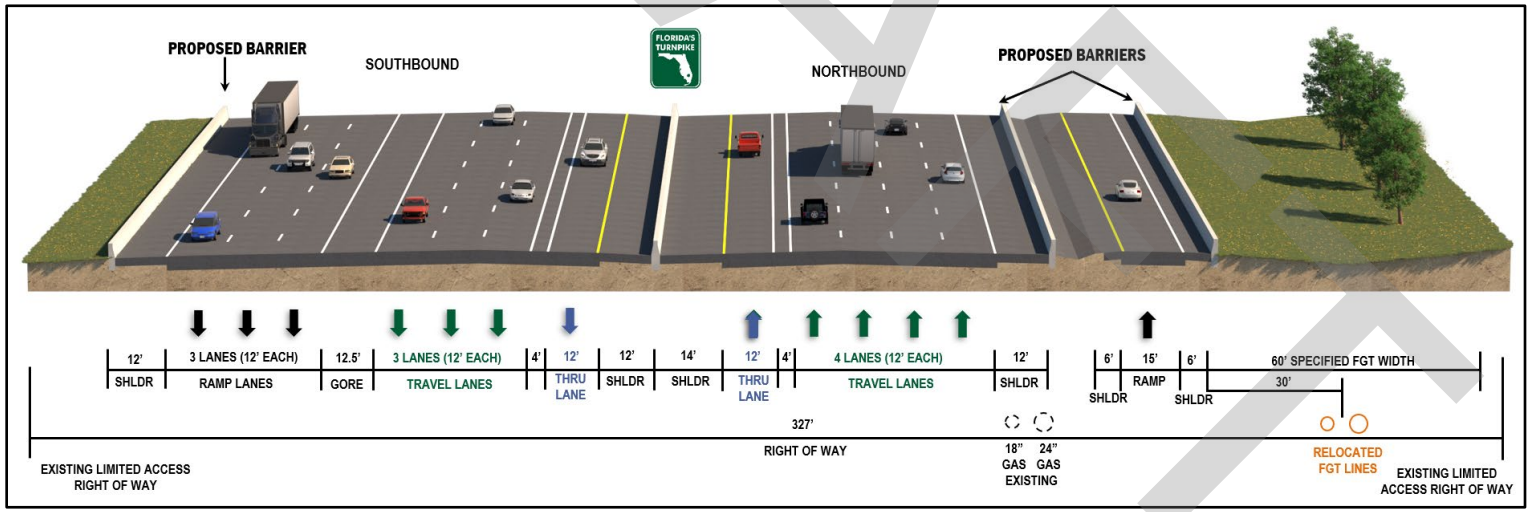

Figure 3.6 – Preferred Alternative Roadway Section between Wiles Road and Sawgrass Expressway

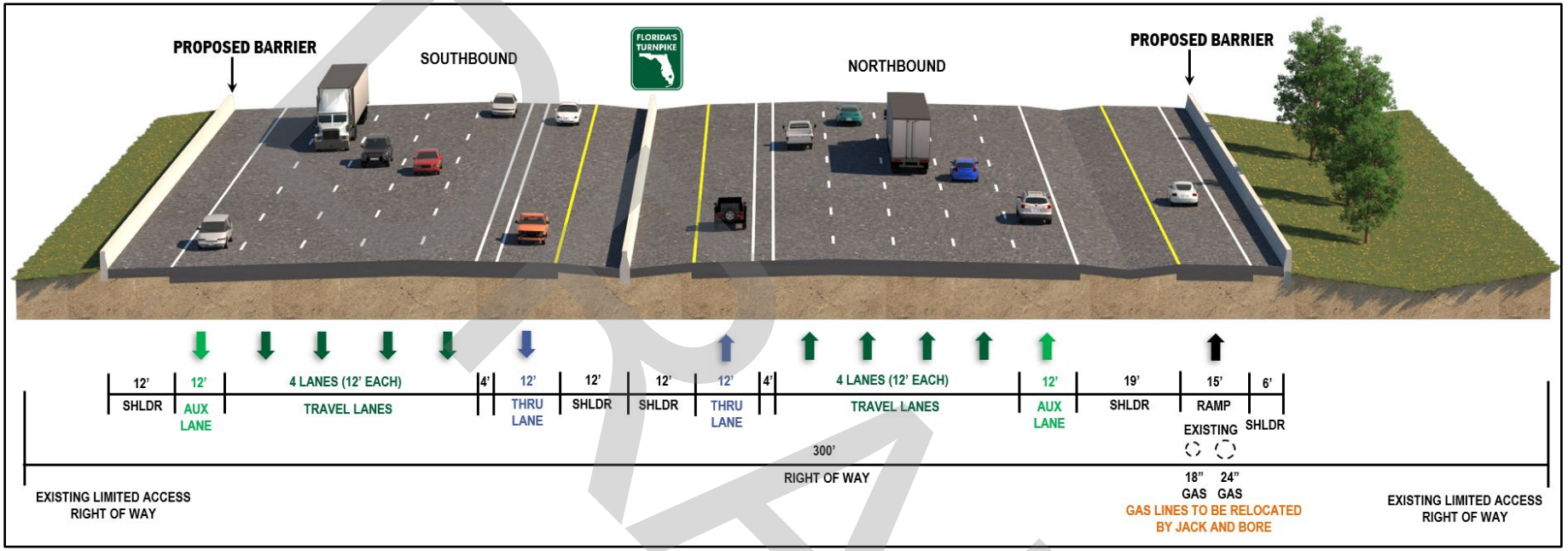

Figure 3.7 – Preferred Alternative Roadway Section between Sawgrass Expressway and the County Line

US 441 – The preferred alternative is proposing one new bridge structure over US 441 for the westbound collector distributor roadway system. The preferred alternative is also proposing intersection improvements at the adjacent signalized intersections, Winston Park Boulevard to the south and Regency Lakes Boulevard to the north. At Winston Park Boulevard, the recommendation is to add a second left-turn lane eastbound and westbound. At Regency Lakes Boulevard, the recommendation is to add a second left-turn lane southbound.

Lyons Road – The preferred alternative is proposing two new bridge structures over Lyons Road for the eastbound and westbound collector distributor roadway systems. Another improvement at Lyons Road is the reconfiguration of the Sawgrass Expressway Interchange to a diamond interchange plus additional turn lanes at the ramp terminals. The preferred alternative is also proposing intersection improvements at the adjacent signalized intersections, Winston Park Boulevard to the south and Serko Boulevard to the north. At Winston Park Boulevard, the recommendation is to add a second left-turn lane southbound and northbound and a through-left-shared lane eastbound and westbound. At Serko Boulevard, the recommendation is to add a second left-turn lane southbound, northbound, eastbound, and westbound. The project also proposes to extend the existing bike lanes north to the Serko Boulevard intersection. This improvement will provide full multimodal connectivity under the Sawgrass Expressway and a safer route for bicyclists enhancing the mobility within the corridor.

Florida's Turnpike Interchange – The preferred alternative widens and improves the existing ramps. Some of these improvements include:

- Eliminating the northbound weaving section between the two loop ramps.
- Eastbound to northbound loop ramp widening to two lanes.
- Adding a southbound to westbound direct connection to the Sawgrass Expressway westbound lanes.
- Northbound to westbound loop ramp widening to two lanes.
- Eastbound to southbound ramp widening to two lanes.

The preferred alternative also adds the missing direct connection ramps between SW 10th Street and Florida's Turnpike. The proposed new direct connections are:

- Florida's Turnpike southbound to SW 10th Street eastbound
- Florida's Turnpike southbound to SW 10th Street Connector eastbound
- SW 10th Street westbound to Florida's Turnpike southbound
- SW 10th Street Connector westbound to Florida's Turnpike southbound
- SW 10th Street westbound to Florida's Turnpike northbound
- SW 10th Street Connector westbound to Florida's Turnpike northbound
- Florida's Turnpike northbound to SW 10th Street eastbound
- Florida's Turnpike northbound to SW 10th Street Connector eastbound

Figure 3.8 shows a schematic line diagram of the preferred alternative.

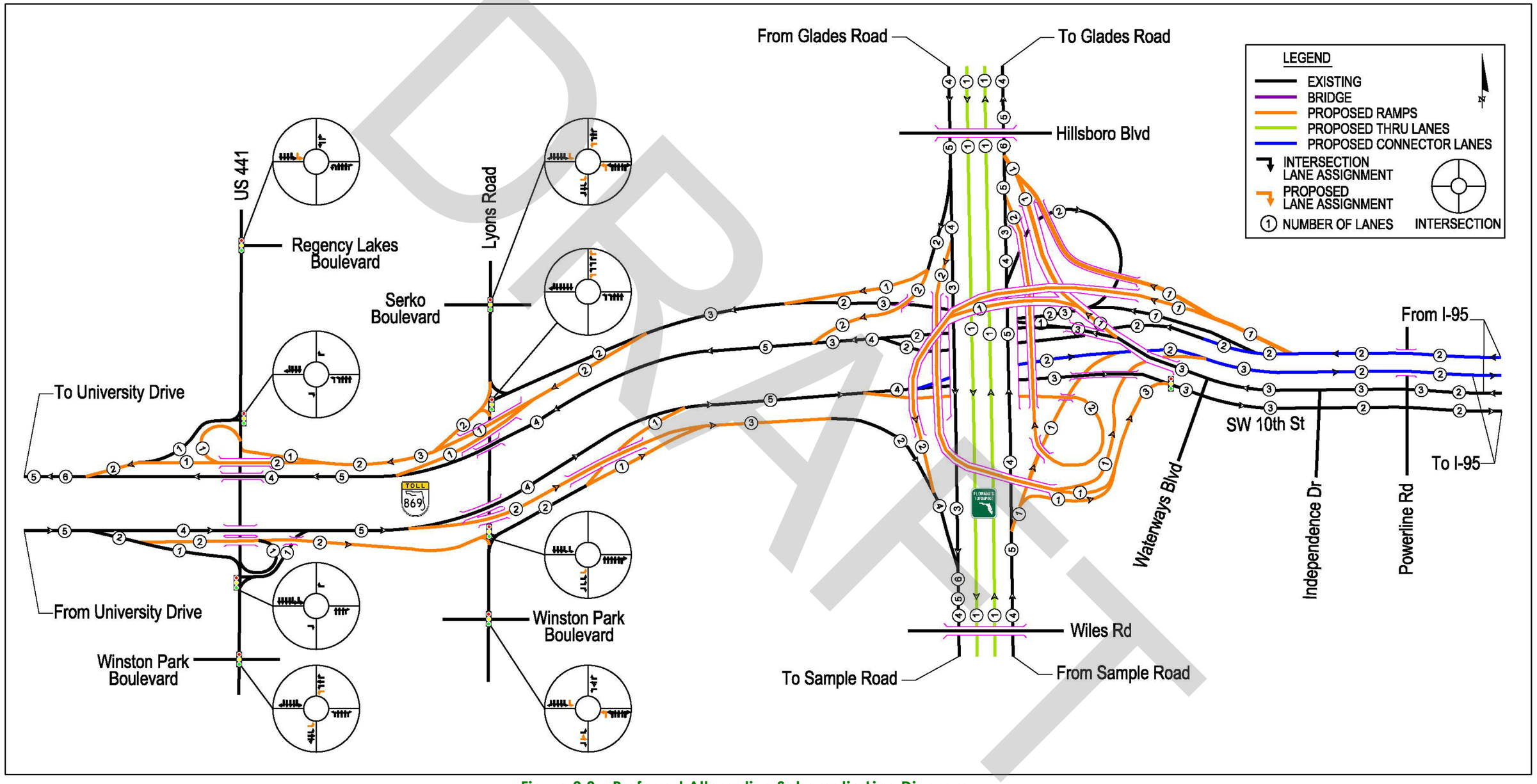

Figure 3.8 – Preferred Alternative Schematic Line Diagram

4.0 PROJECT AREA DESCRIPTION

The project is located in northern Broward County near the communities of Coral Springs, Parkland, Coconut Creek, and Deerfield Beach. The term "project corridor" is used in this document to refer to the footprint of the Preferred Alternative, an area that includes the existing plus the proposed right-of-way, and which represents the limits of construction for the Preferred Alternative. The term "project area" represents a larger expanse that encompasses the project corridor as well as all land within 500 feet (***Figures 4.1*** and ***4.2***). The project area is heavily urbanized and lacks undisturbed natural plant communities. Predominant land uses include residential, commercial, and industrial. Quiet Waters Park is located in the northeast quadrant of the interchange of Sawgrass Expressway and Florida's Turnpike. Acquisition of new right-of-way is proposed under the preferred alternative along the southern and western edges of Quiet Waters Park and to the southwest of the intersection Sawgrass Expressway and Florida's Turnpike. The project corridor extends north on Florida's Turnpike and terminates at the Hillsboro Canal, which forms the boundary between Broward and Palm Beach Counties.

4.1 LAND USE

Land use cover descriptions provided for both uplands and wetlands are classified utilizing the *Florida Land Use Cover and Forms Classifications System* (FLUCCS) designations. Previous and existing land uses in the project area were initially determined utilizing US Geological Survey (USGS) maps, historical images, aerial photographs, and land use mapping from the South Florida Water Management District (SFWMD) (2017-2019). Land use categories in the project area reported by SFWMD were verified in the field. Field reviews generally confirmed the SFWMD land use mapping with very minor adjustments. Land use categories in the project area as mapped by SFWMD are shown in ***Figures 4.1*** *and* ***4.2*** and each land use category in the project area is described below.

Fixed Single Family Units (Low Density Urban) (FLUCCS – 1110)
Fixed single-family structures are usually identified by their sizes, shapes, and the character of the associated developed area. Residential areas include the main houses, garages and other outbuildings, and the developed portions of the lot (lawns, gardens, mowed areas, fenced land, drives and paths, etc.). This land use type occurs near the western end of the project area, both north and south of Sawgrass Expressway and approximately 1 mile west of US 441.

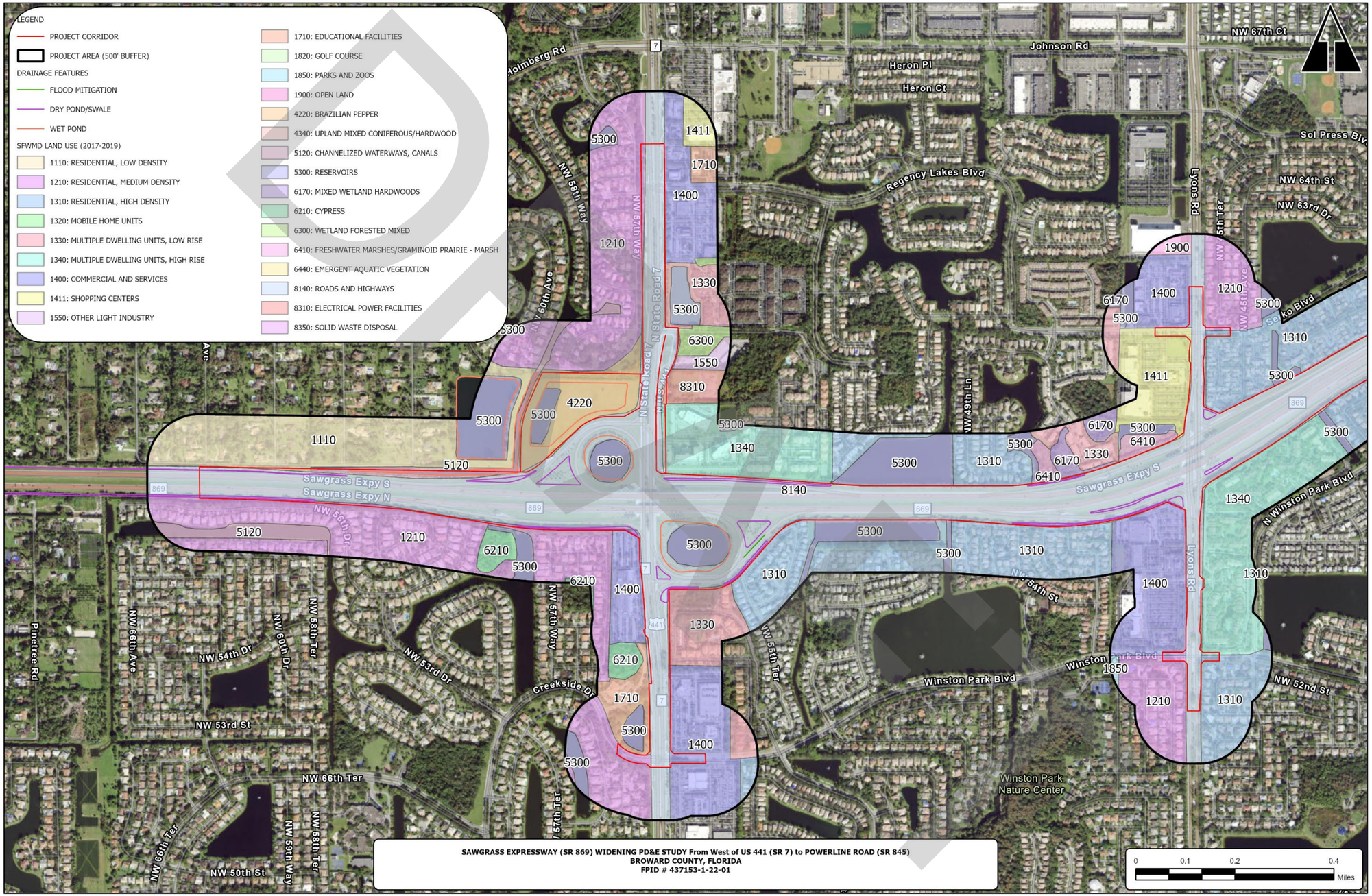

Figure 4.1 — Land Use in Western Project Area

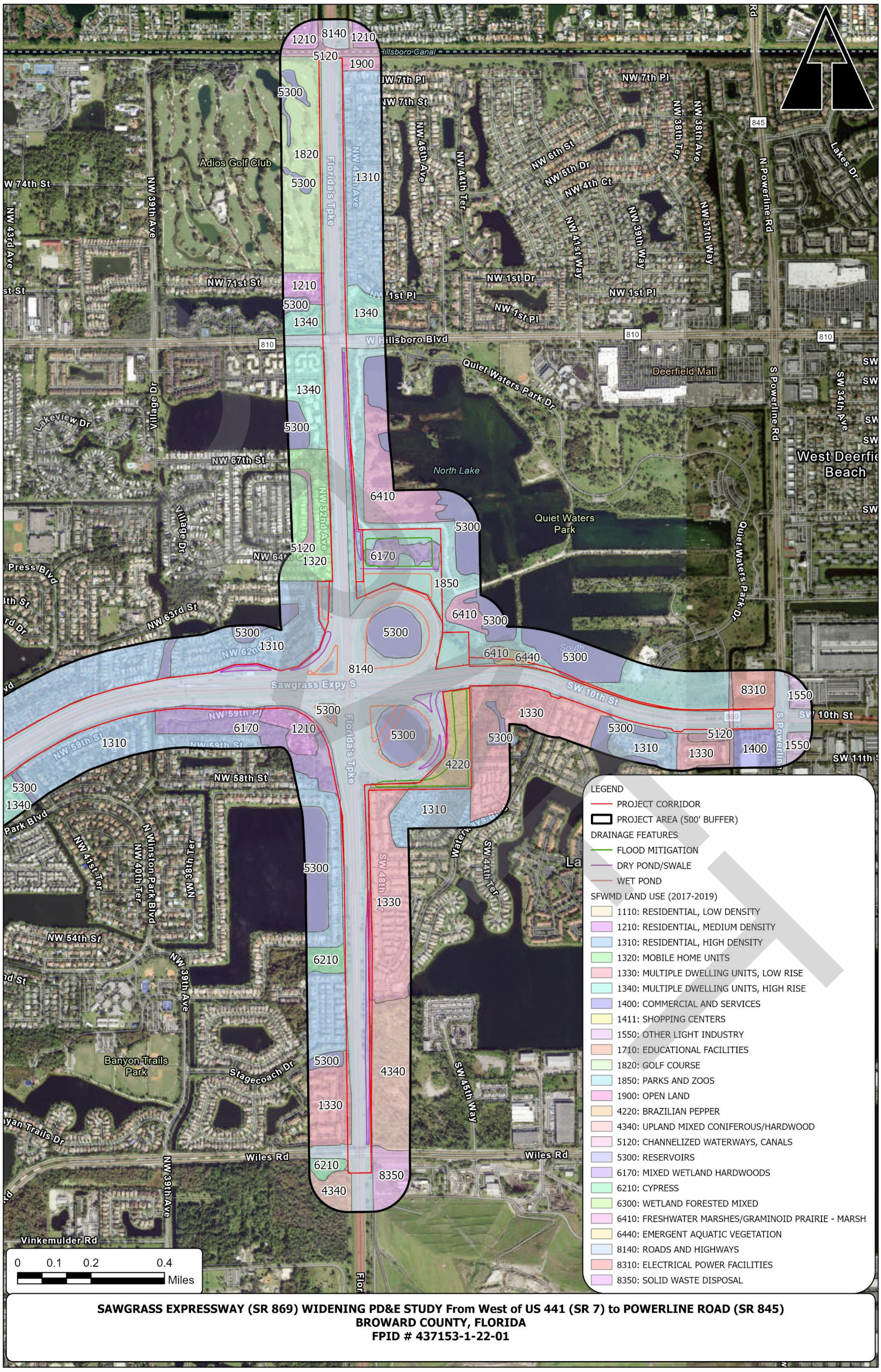

Figure 4.2 — Land Use in Eastern Project Area

Fixed Single Family Units (Medium Density Urban) (FLUCCS - 1210)

Two to five single-family structures per acre meet density requirements for this class. Fixed single family structures are usually easily identified by their sizes, shapes, and character of the associated developed area. The roof area appears to cover less than half of the lot area. This land use type is found in large pockets throughout the project area including 0.6 mile west of US 441, 0.4 mile south of the interchange with US 441, adjacent to Lyons Road on the eastern side immediately north of Sawgrass Expressway, 0.6 mile northeast of Lyons Road at Sawgrass Expressway, and along the western side of Florida's Turnpike adjacent to the intersection of Sawgrass Expressway.

Fixed Single Family Units (High Density Urban) (FLUCCS - 1310)

This category refers to six or more single-family structures per acre. Fixed single family structures are usually easily identified by their sizes, shapes, and character of the associated developed area. The roof area appears to cover more than half of the lot area. This land use type is found in two locations in the project area, approximately 0.3 mile northeast of the intersection of Sawgrass Expressway and Lyons Road and approximately 0.3 mile west of the intersection at Powerline Road.

Mobile Home Units (FLUCCS – 1320)

This category refers to rectangular and light-toned structures, from 8' to 12' wide and 30' to 50' long that may or may not be on permanent foundations. Mobile home residential areas are found almost anywhere that fixed-unit single-family residential areas are found. They occur in rural areas, at the urban fringe (often as infill among older, lower-density residential areas), and in medium- and high-density residential areas (often either adjacent to or incorporated within the newer subdivision developments or "housing estates"). In most instances, mobile home areas have clear boundaries which abut other residential areas, open areas, agricultural areas, limited-access highways, and large water bodies. This class is found in one location in the project area along the west side of the Florida's Turnpike, approximately 0.25 mile north of Sawgrass Expressway.

Multiple Dwelling Units- Low Rise (FLUCCS – 1330)

This category refers to two-story town houses, one- or two-story "garden apartments" and duplexes. Most of the low-rise residential areas are newer developments. They commonly occur at the urban fringe, often as infill developments among older, lower-density residential areas. In most instances the low-density housing developments have clear boundaries which abut other

residential areas, agricultural areas, limited-access highways, and large water bodies, etc. This land use type is found in two locations in the project area. The first along the west side of Florida's Turnpike approximately 0.9 mile south of Sawgrass Expressway and the second just south of Sawgrass Expressway approximately 0.3 mile east of Florida's Turnpike.

Multiple Dwelling Units- High Rise (FLUCCS – 1340)

This category includes town houses, apartments and condominiums of three stories or more. Most of the high-rise residential areas are newer developments. They commonly occur within high-density areas of detached single-family housing and low-rise residential structures. They are often adjacent to shopping centers, commercial strip developments, and downtown commercial areas. In some instances, groups of high-rise developments have clear, but irregular boundaries, with other intensive land uses, but equally often, they occur as scattered developments with a well-defined boundary for only a single building or a small group of buildings. This is common with newer developments. This land use type is found in two places in the project area. One along Lyons Road on the eastern side, south of the intersection with Sawgrass Expressway and the other along the west side of Florida's Turnpike, approximately 0.6 mile north of Sawgrass Expressway.

Commercial and Services (FLUCCS – 1400)

This category includes a broad range of uses which can be difficult to differentiate individually. Only the Level 3 classes 1460 Oil and Gas Storage and 1480 Cemeteries, and the Level 4 classes 1411 Shopping Centers and 1423 Junk Yards are delineated separately. This broad class includes many operations providing diverse products and services which often occur in complex mixtures. Subclasses include retail and wholesale, professional, cultural and entertainment, and tourist services, as well as others. This class is found in multiple locations in the project area, including to the southwest and northeast of the intersection of Sawgrass Expressway and US 441, along the west side of Lyons Road immediately south and approximately 0.2 mile north of the intersection with Sawgrass Expressway, and along the east side of Powerline Road north and south of the intersection with Sawgrass Expressway.

Shopping Centers (FLUCCS – 1411)

This category refers to varying size and shape buildings with common parking facilities for customers, having the structures arranged around the parking area. Buildings may be made up of single structures with multiple units (strip stores),

single structures for a single unit (such as a department/discount store) or multiple unconnected buildings for multiple units (upscale "bungalow" or "cottage" units). This land use type is found in urban and suburban settings throughout the project area, especially along major highways and at highway and road intersections. These land uses (especially smaller shopping centers) may also be adjacent to or within residential areas. The boundaries of shopping centers are usually regular and distinct. This land use type is found adjacent to the northwest of the intersection of Sawgrass Expressway and Lyons Road.

Parks and Zoos (FLUCCS – 1850)

This category refers to operational facilities that make up the active service areas of various outdoor and recreational land uses. The class includes public and private parks - both rural and urban, campgrounds, zoos, fairgrounds, botanical gardens and other. The parks may contain a variety of sub-activities, including play facilities, athletic fields, small museums, zoos, exhibit areas, campgrounds, swimming areas, monuments and fountains, gardens and other facilities. This land use type in the project area represents Quiet Waters Park. Quiet Waters Park is a Broward County Park that includes multiple lakes, hiking and mountain biking trails, and facilities for park visitors. The main park entrance is off of Powerline Road, north of the project. Recreational trails, a lake and a smaller pond that are lined with wetland vegetation occur along the southern edge of Quiet Waters Park, adjacent to the existing right-of-way. Recreational trails and an unpaved road occur along the western boundary of Quiet Waters Park, abutting Florida's Turnpike right-of-way.

Citrus Groves (FLUCCS – 2210)

This category includes active citrus groves, such as oranges, grapefruits and tangerines. Citrus is typically planted on well-drained, sandier textured soils, but hydric soils have also been converted to citrus groves in some places. Artificial drainage and irrigation are used in most cases to keep soils in acceptable moisture ranges. This land use category is found in one location of the project area on the north side of Sawgrass Expressway approximately 0.3 mile east of the intersection of US 441.

Brazilian Pepper (FLUCCS – 4220)

This category refers to the exotic, pestilent tree species found on peninsular Florida from the Tampa Bay area southward. Brazilian pepper grows on a broad range of sites in South Florida, ranging from mangroves to pinelands. It thrives on disturbed soils and in newly created habitats resulting from drainage and farming.

It is an early invader of disturbed sites, and it also becomes established in the understory of dense forests, then capturing the site when gaps occur in the canopy. This community is disturbance dependent. Accordingly, it can occur anywhere within the landscape where disturbance or man's influence results in acceptable conditions for establishment of this aggressive and invasive exotic shrub. The community can be found along almost every roadway and canal throughout the district. Areas of former agriculture or abandoned development are also prime targets for invasion by this species. This class is found in 4 locations in the project area. One area is northeast of the Sawgrass Expressway and US 441 intersection. The other three areas are near the intersection of Sawgrass Expressway and Florida's Turnpike.

Upland Mixed Coniferous/Hardwood (FLUCCS – 4340)

This category is used for those forested areas in which neither upland conifers nor hardwoods achieve 67 percent crown canopy dominance. It may include communities such as oak-pine-hickory, Brazilian pepper, live oak, wax myrtle-willow (not hydric), mixed temperate or tropical hardwoods, and beech-magnolia. Upland pine communities include slash, longleaf, and sand pines. Upland Mixed Coniferous/Hardwoods are found in one location in the project area on the east side of Florida's Turnpike approximately 0.7 mile south of the intersection with Sawgrass Expressway.

Channelized River, Stream, Waterway (FLUCCS – 5120)

This class includes artificially improved rivers, creeks, canals and other linear water bodies flowing across the landscape within man-made (or substantially man-made or altered) channels. They are delineated where they average 50 feet or greater in width. Where the water course is interrupted by a control structure, the impounded water area will be classified as 5300 Reservoirs. This class is found in two locations in the project area. On the north side of Sawgrass Expressway approximately 0.4 mile west of the intersection of US 441 and approximately 0.2 mile southwest of the intersection of Sawgrass Expressway and Powerline Road.

Reservoirs (FLUCCS – 5300)

Reservoirs are artificial impoundments of water, or water bodies that have been significantly modified from their natural state. They are used for irrigation, flood control, municipal and rural water supplies, stormwater treatment, recreation and hydro-electric power generation. This class is found in five locations in the project area. Adjacent to the northwest of the intersection of Sawgrass Expressway and US 441, north and south of Sawgrass Expressway approximately .06 mile east of

the intersection with US 441, approximately 0.7 mile northeast of the intersection with Florida's Turnpike, approximately 0.9 mile southeast of the intersection with Florida's Turnpike, and approximately 0.2 mile southwest of the intersection with Powerline Road.

Mixed Wetland Hardwoods (FLUCCS – 6170)

This class is a general class for any wetland hardwood forests that do not fall in to one of the other 6100 subclasses (bay swamps, mangroves, cabbage palms or exotic species). Examples of this class include bottomland and floodplain communities dominated by hardwoods, willow swamps and mixed hardwoods found in other landscape positions. This class is found in two locations of the project area. One approximately 0.1 mile southwest of the intersection with Florida's Turnpike and the other approximately 0.2 mile northeast of the intersection with Florida's Turnpike.

Cypress (FLUCCS – 6210)

This class is for forested wetland communities in which pond cypress or bald cypress comprises over 67 percent of the forest canopy. In the case of pond cypress, common associates are swamp tupelo, slash pine and black titi. In the case of bald cypress, common associates are water tupelo, swamp cottonwood, red maple, American elm, pumpkin ash, Carolina ash, overcup oak and water hickory. Bald cypress may be associated with laurel and water oaks, sweet gum and sweet bay on drier sites. This land use category is present in the project area at the southwest corner of the intersection of Wiles Road and Florida's Turnpike and approximately 0.8 mile southwest of the intersection of Sawgrass Expressway and Florida's Turnpike.

Freshwater Marshes/Graminiod Prairie-Marsh (FLUCCS – 6410)

This class is used for wetlands communities characterized by herbaceous plant species that occur on sites where surface water is present for extended periods during the growing season but is absent by the end of the growing season in most years. This class is found in one location of the project area adjacent to the northwest of the intersection of Sawgrass Expressway and Lyons Road.

Emergent Aquatic Vegetation (FLUCCS – 6440)

This class is for wetland plant species that includes both floating vegetation and vegetation which is found either partially or completely above the water surface. This land use type is found in one location in the project area at the southern end of Quiet Waters Park adjacent to Sawgrass Expressway.

Roads and Highways (FLUCCS – 8140)
This class includes those highways exceeding 100 feet in width, with 4 or more lanes and median strips. The intent of this data layer is to include only the major transportation corridors.

Electrical Power Facilities (FLUCCS – 8310)
This category includes fossil fuel and nuclear plants. Subsidiary facilities included are cooling ponds or towers, canals and facilities for receiving and storing fuel (coal, oil), parking areas and transformer yards. This land use type occurs in one place in the project area, adjacent to the northwest of the intersection of Sawgrass Expressway and Powerline Road.

Electrical Power Transmission Lines (FLUCCS – 8320)
This class includes only high-voltage power transmission lines. The rights-of-way are not usually shared with any other utilities and have a distinct appearance due to design considerations. The rights-of-way appear as long, linear strips that transect the landscape. This land use type occurs in one place in the project area, north and south of Sawgrass Expressway approximately 1.0 mile west of the intersection with US 441.

Solid Waste Disposal (FLUCCS – 8350)
This class includes sanitary landfills, dumps and other waste disposal areas. The sites may be publicly or privately operated and may or may not be permitted. It does include dumps and landfills that are found at private operations such as farms, institutions, industrial and commercial sites, if they meet size criteria. However, it does not include storage of uniform wastes and residuals that are part of a normal process stream, such as mine tailings and treatment plant sludges. These are treated as subsidiary to the operation and included with the applicable land use. This class is found in one location of the project area southeast of the intersection of Powerline Road and Wiles Road.

4.2 Elevation And Hydrology

The study area is located on relatively flat land with a ground elevation ranging between approximately 81 and 101 feet. ***Figure 4.3*** shows an elevation map created with data collected by the National Oceanic and Atmospheric Administration and the U.S. Department of Commerce in 2007 using Light Detection and Ranging (LIDAR) in North American Datum 1983 (NAD 83).

Major hydrologic features and wetlands mapped by the US Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) in the project area are shown in ***Figure 4.4*** *and* ***4.5***. The NWI maps Riverine and Freshwater Pond areas in multiple locations that are manmade drainage and stormwater features. There are two patches for Freshwater forested/shrub wetlands south of Sawgrass Expressway and immediately west of Florida's Turnpike. The project corridor includes areas mapped as Lake and Freshwater Pond along the southern edge of Quiet Waters Park.

According to the flow pattern map from the SFWMD, groundwater flow in the project area is generally to the east-southeast. The project is underlain by the Biscayne Aquifer which is a Sole Source Aquifer as identified by the U.S. Environmental Protection Agency (USEPA). Based on a review of the Florida Department of Health website (http://gis.doh.state.fl.us/ehwater/index.html), no potable wells are present with the project area.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (updated August 18, 2014), most of the project area is located outside the 500-year floodplain (Zone X). There are three small areas within the project area mapped as being within the 500-year floodplain (Zones AE and AH). Areas mapped as flood zone AE and AH are located 0.25 mile northwest of the intersection of US 441 and Sawgrass Expressway, drainage areas and stormwater ponds at the intersection of US 441 and Sawgrass Expressway, surface water ponds north and south of Sawgrass Expressway approximately 0.3 mile east of the intersection of US 441 and Sawgrass Expressway, north and south of Sawgrass Expressway at the intersection of Sawgrass Expressway and Lyons Road, drainage ditches north and south of Sawgrass Expressway from the intersection of Sawgrass Expressway and Lyons Road to the intersection of Sawgrass Expressway and Florida's Turnpike, and the drainage areas and stormwater ponds at the intersection of Sawgrass Expressway and Florida's Turnpike.

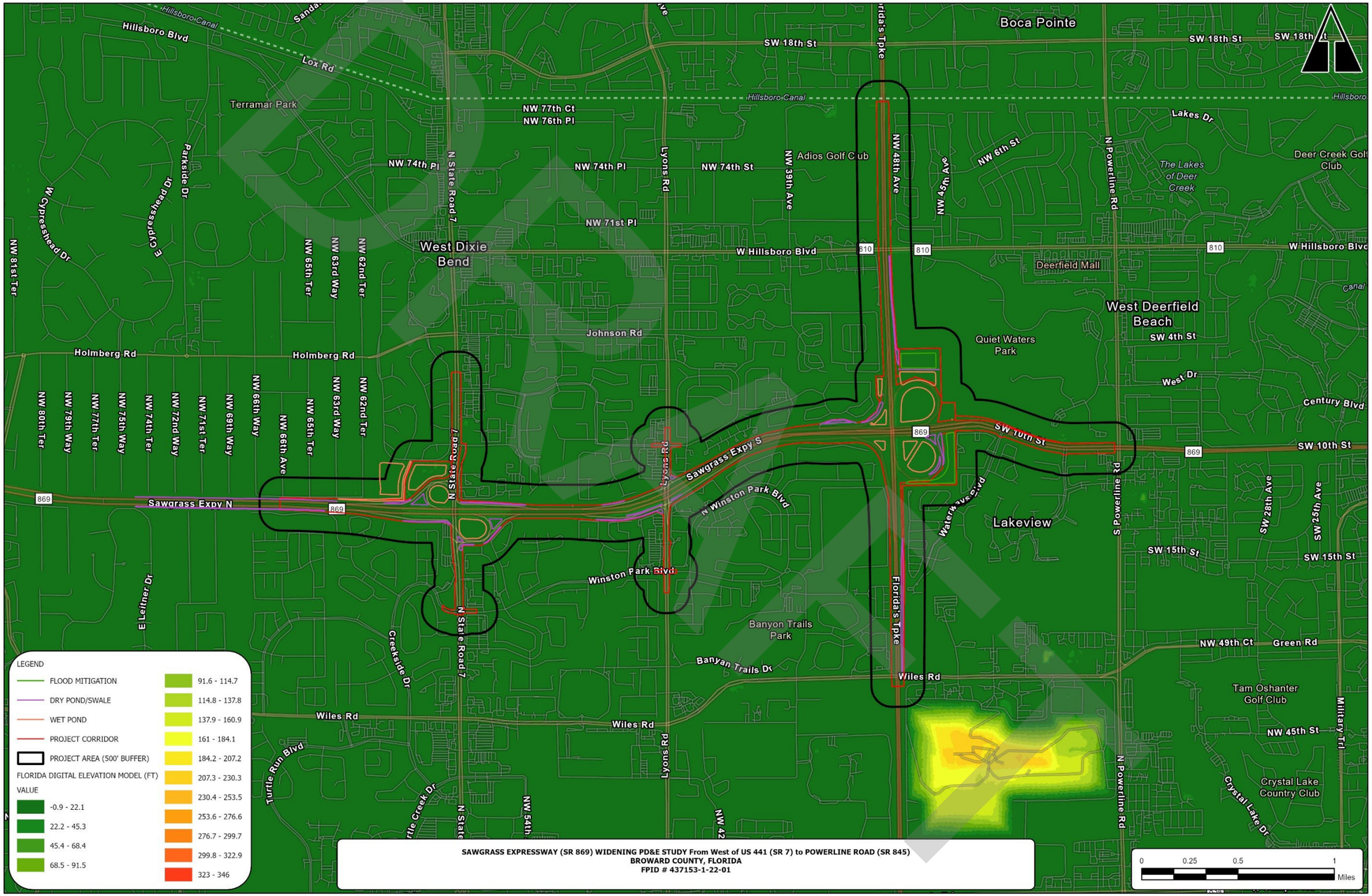

Figure 4.3 — Elevation

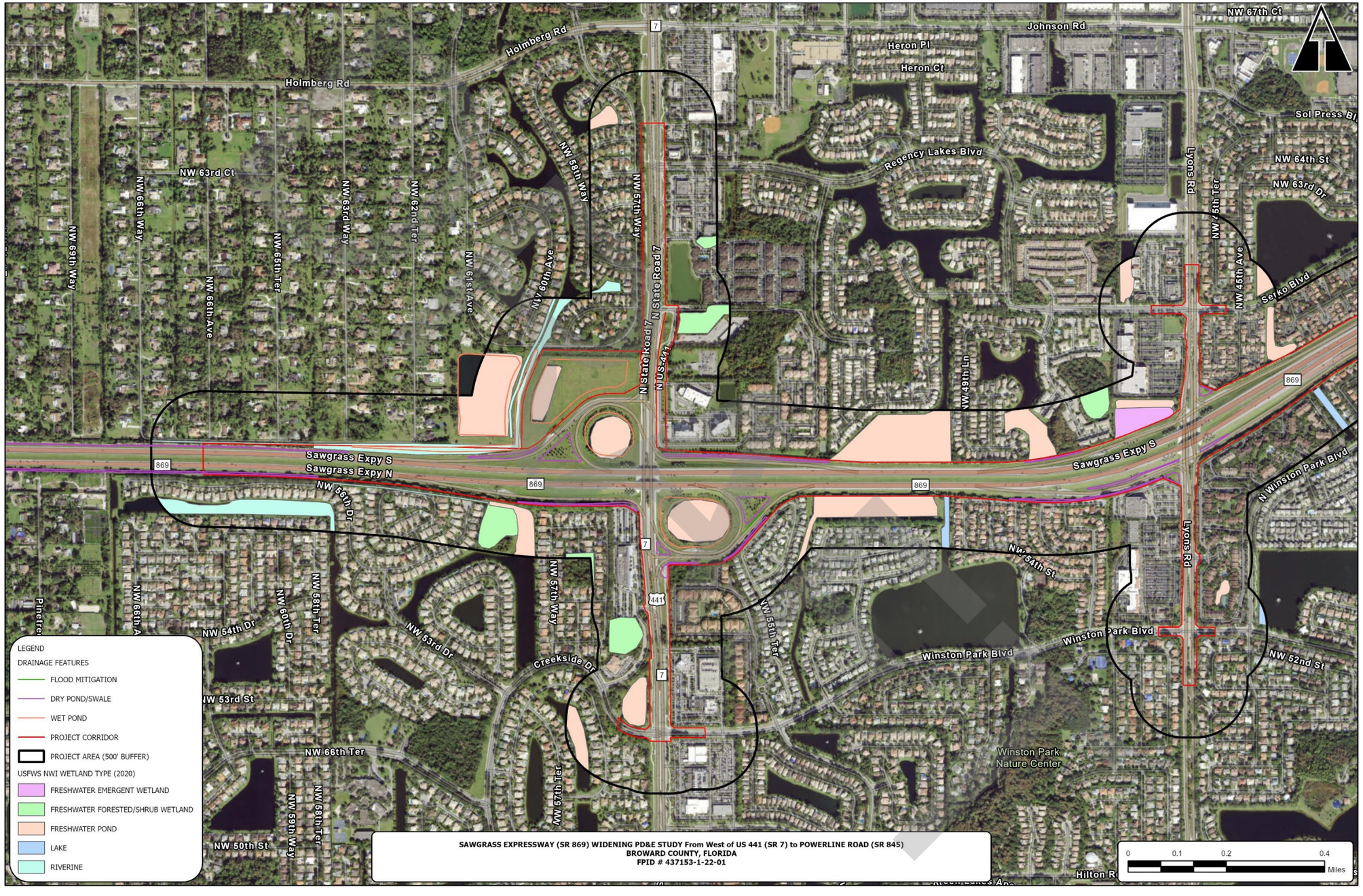

Figure 4.4 — National Wetlands Inventory in Western Project Area

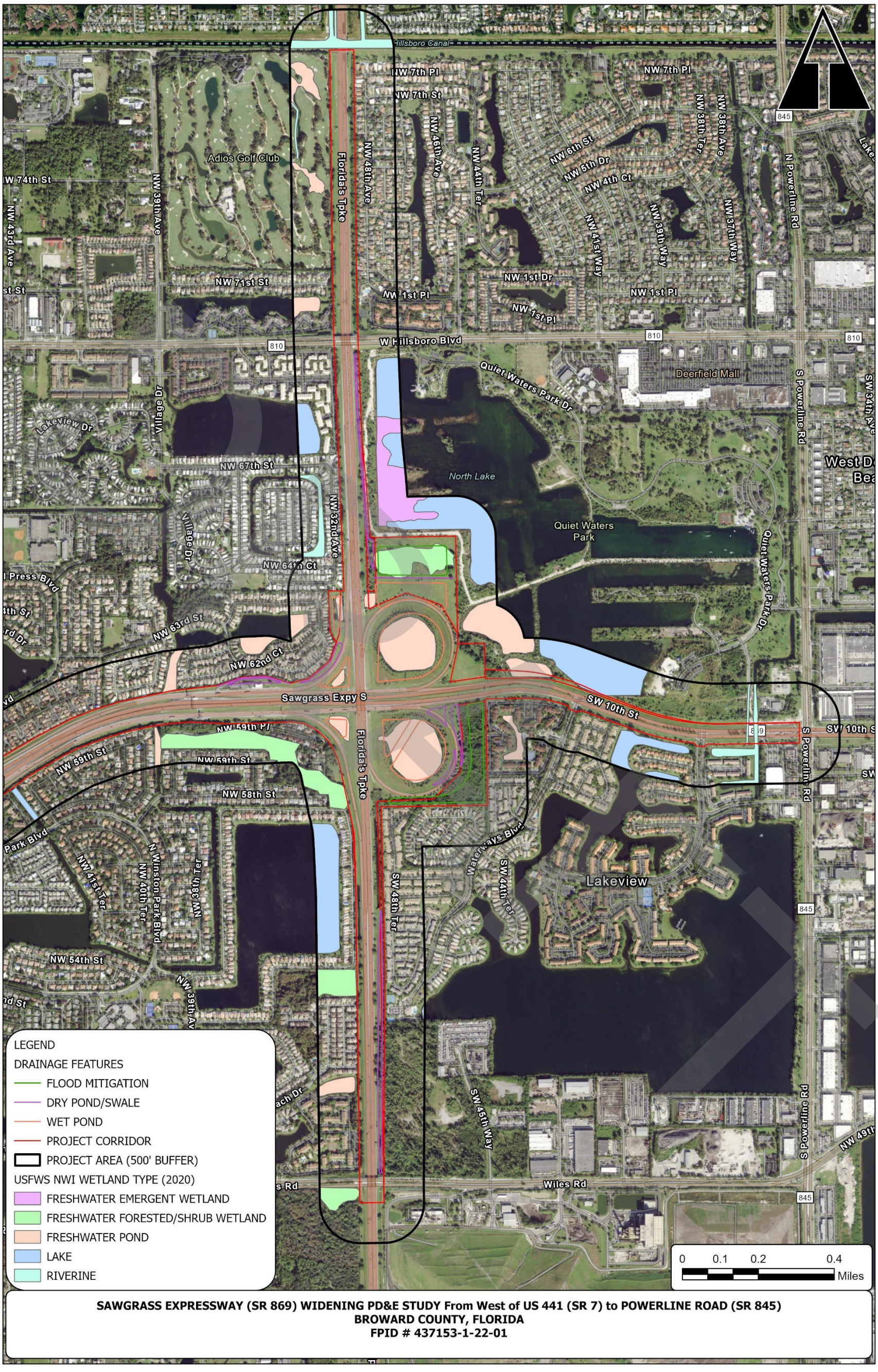

Figure 4.5 — National Wetlands Inventory in Eastern Project Area

4.3 SOILS

The Natural Resources Conservation Service (NRCS) (2014) indicates 11 soil types occur in the project area, and nine soil types exist within the project corridor, where soil disturbance would occur under the Preferred Alternative (***Figures 4.6*** *and* ***4.7***). The soil types in the project area are listed in ***Table 4.1*** along with descriptions and ratings from NRCS. One hydric soil is known to occur in the project area: Plantation Muck. Neither prime farmland soils nor farmland soils of unique importance occur within the project area.

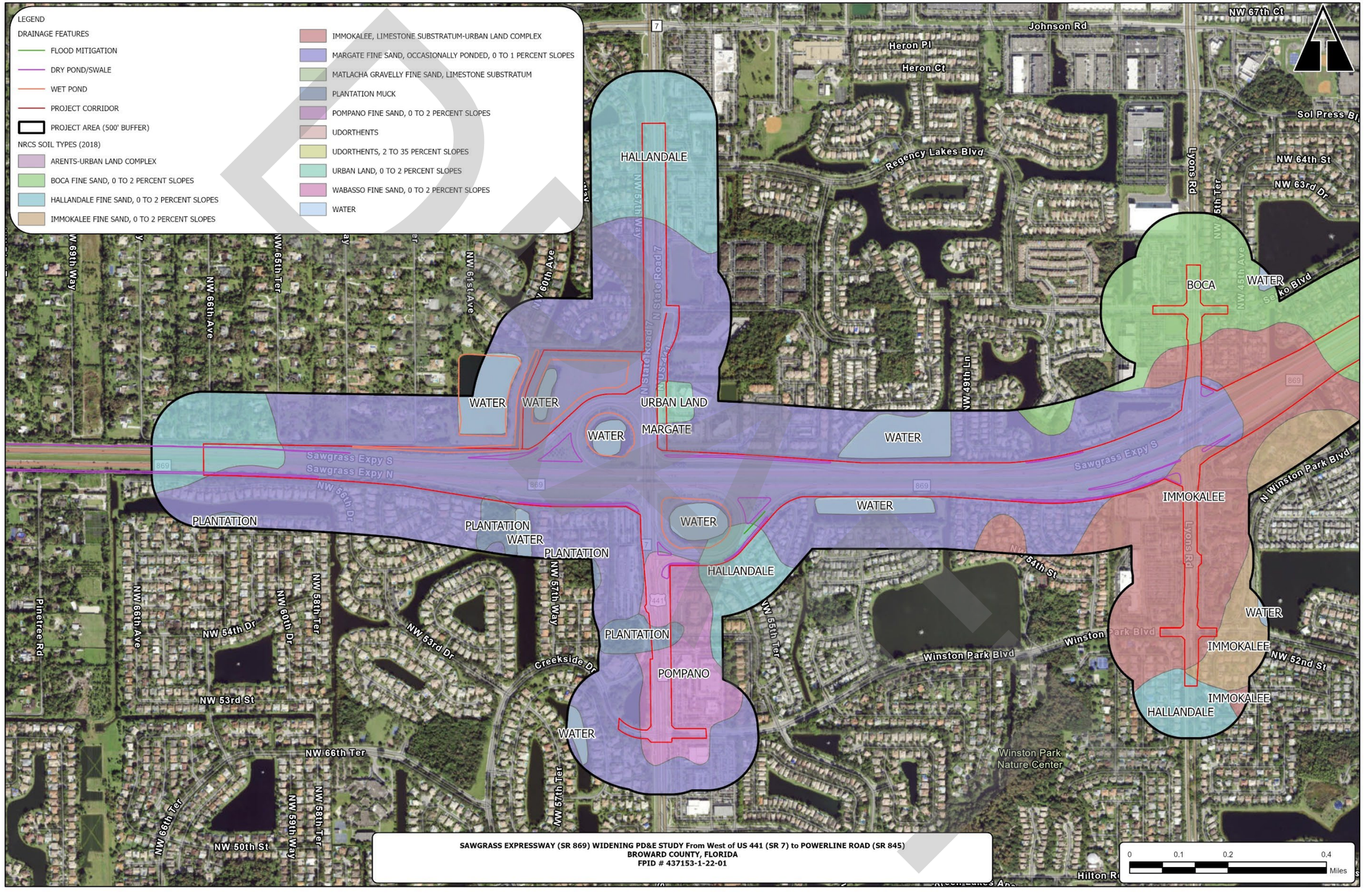

Figure 4.6 — Soil Map in Western Project Area

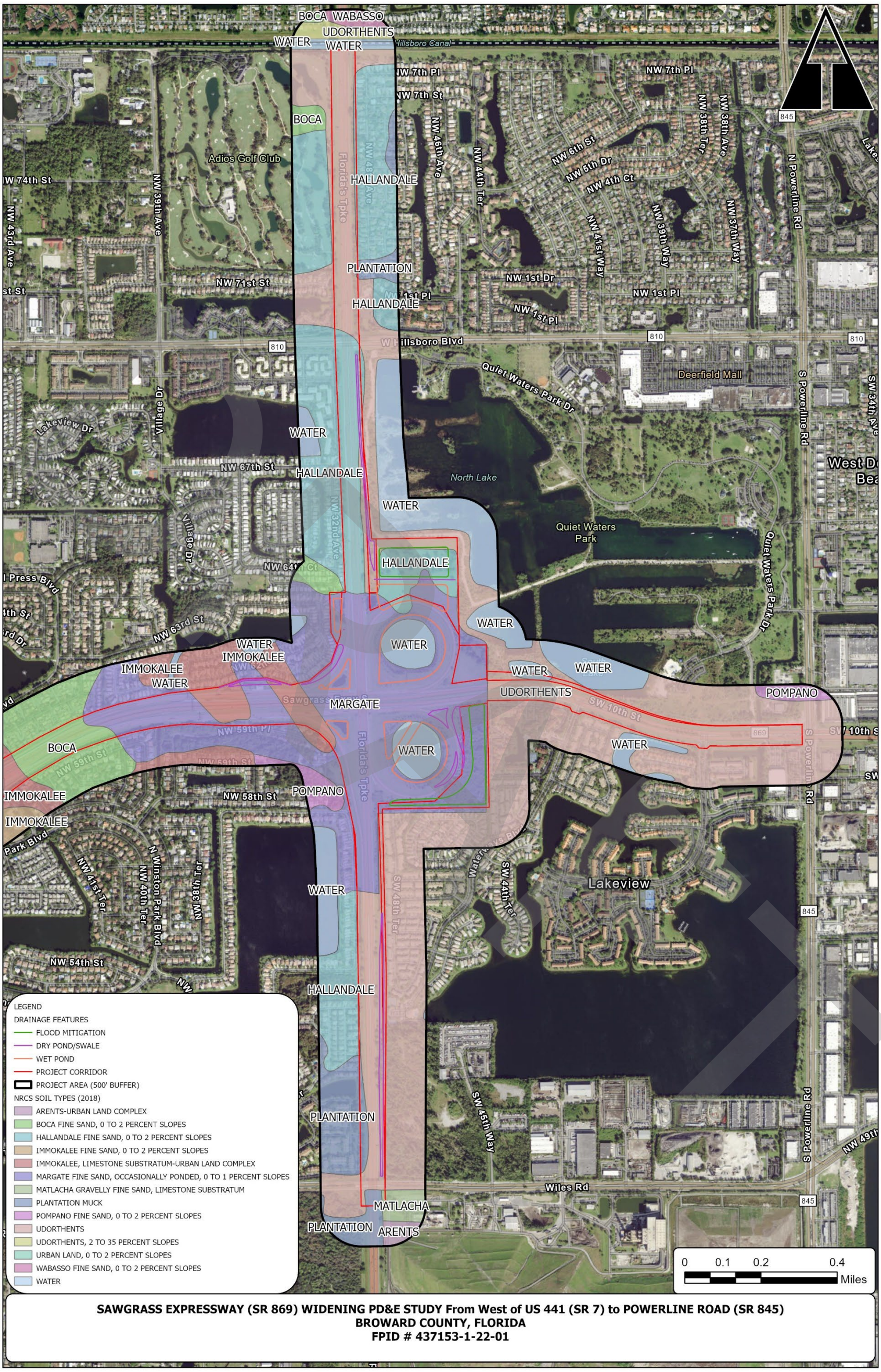

Figure 4.7 — Soil Map in Central Project Area

Table 4.1— NRCS Soil Types in Project Area

Soil Type	Environmental Association	Approximate Percent of Project Area
Arents- Urban Land Complex	This soil type consists of soils that have been filled, graded, and shaped for urban development. It is found north of Port Everglades, where the natural soils have been extensively modified by excavation for canals and open water areas and filling in of adjacent areas. There is little natural vegetation. This is not a hydric soil.	1.1%
Boca fine sand	This soil type consists of nearly level, poorly drained, sandy soil underlain by limestone. It is in low, broad, wet areas and along grassy, poorly defined drainageways. **This is a hydric soil**.	3.7%
Hallandale fine sand	This soil type consists of nearly level, poorly drained, sandy soil underlain by limestone. It is in broad flats east of the Everglades and west of the Atlantic Coastal Ridge. **This is a hydric soil**.	17.2%
Immokalee fine sand	This soil type consists of nearly level, deep, poorly drained, sandy soil that has a layer well coated with organic matter. It is on broad, low ridges in the eastern part of the survey area. This is not a hydric soil.	4.0%
Immokalee, limestone substratum- Urban land complex	This complex consists of Immokalee, limestone substratum, and Urban land. Depth to the water table depends on the established drainage in the area and the amount of fill material that has been added, but the water table is deeper in most areas than is normal for undrained Immokalee soils. This is not a hydric soil.	6.1%
Margate fine sand	This soil type consists of nearly level, poorly drained, sandy soil that is underlain by limestone. It is on nearly level, low terraces between the Everglades and the low, sandy Atlantic Coastal Ridge. **This is a hydric soil**.	34.6%
Matlacha gravelly fine sand- limestone substratum	This soil type consists of soils that are nearly level, somewhat poorly drained that form as a result of earthmoving operations in areas that are underlain by limestone bedrock. Most natural vegetation has been removed. The existing vegetation consists of South Florida slash pine and various scattered weeds. This is not a hydric soil.	0.7%
Plantation muck	This soil type consists of nearly level, very poorly drained soil that has a muck surface layer over sandy mineral material. **This is a hydric soil**.	3.3%
Pompano fine sand	This soil type consists of nearly level, poorly drained soil. A large part of the acreage is natural vegetation- St. John's wort and wax myrtle. **This is a hydric soil**.	3.3%
Udorthents	This soil type consists of moderately well drained to excessively drained soils that have been disturbed by cuffing or filling, and areas that are covered by buildings and pavement. The areas are mostly larger than five acres. This is not a hydric soil.	18.4%
Urban land	This map unit consists of areas that are more than 70 percent covered by airports, shopping centers, parking lots, large buildings, streets and sidewalks, and other structures, so that the natural soil is not readily observable. This is not a hydric soil.	0.2%
Water	-	7.4%
	TOTAL	100%

5.0 METHODOLOGY

This project was evaluated for impacts to protected plant and animal species and their habitats as well as wetlands and surface waters. No Essential Fish Habitat occurs in the project area. The following data sources and methods were used to establish the baseline environmental conditions and evaluate potential impacts. No notable data gaps were identified and pertinent Efficient Transportation Decision Making (ETDM) comments are presented along with responses.

5.1 DATA COLLECTION

Preliminary data collection utilized literature reviews, the ETDM system, database reviews and agency coordination to identify Federal and state listed species and wetlands with potential to occur in the project area. Soil maps, land use maps and aerial imagery were also used. Specific information sources and databases utilized for assessment of potential impacts include the following:

- ETDM Summary Report for SR 869 (Project # 14280)
- USFWS environmental conservation online system
- Florida Natural Areas Inventory (FNAI) databases
- Florida Fish and Wildlife Conservation Service (FWC) databases
- USFWS National Wetland Inventory (NWI) maps
- Florida Fish and Wildlife Conservation Commission (FWC) Water Bird Locator (http://atoll.floridamarine.org/waterBirds/)
- FWC Bald Eagle Nest Locator
- USFWS wood stork (*Mycteria americana*) nesting colonies map tool
- SFWMD land use GIS layers
- U.S. Department of Agriculture NRCS Web Soil Survey

5.2 ETDM PROCESS

Environmental Technical Advisory Team (ETAT) members were invited to the project kickoff meeting and were involved in the ETDM process. USFWS and FWC commented on potential impacts to wildlife and habitats through the ETDM process. During the ETDM process the project's effect on wildlife and habitat was

rated as *minimal* by the USFWS, FTE, and FWC and *none* by the USDA. FTE and USEPA assigned a degree of effect of "Moderate", and US Army Corps of Engineers, SFWMD, NMFS, and USFWS all assigned a degree of effect of "Minimal" regarding wetlands and surface waters. FTE and USEPA assigned a degree of effect of "Moderate" and SFWMD assigned a degree of effect of "Minimal", regarding water quality and quantity. For Coastal and Marine resources, FTE, SFWMD, and NMFS assigned a degree of effect of "None". The project will have no involvement with coastal and marine resources, including Essential Fish Habitat.

5.2.1 Comments Regarding Wildlife and Habitats

FWC responded that the project has very little potential for adverse impacts to fish and wildlife resources. Their main concern was the possible presence of burrowing owls in grassy or bare areas within or adjacent to road right of way. The USFWS provided a list of species with potential to occur in the project area and noted the presence of a nearby bald eagle nest. Surveys were recommended by USFWS for Everglade snail kite and tiny polygala along with an evaluation of potential impacts to species that could occur in the project area.

5.2.2 Responses To Comments Regarding Wildlife And Habitats

There is no record of burrowing owls in the project area, and none were detected during field investigations. Species noted by FWC and USFWS with potential to occur in the project area are addressed in this document. Surveys for specific species were not performed during this PD&E study because of the long-anticipated time before design and construction phases.

5.2.3 Comments Regarding Wetlands and Water Quality

The USEPA noted that surface waters cover a significant portion of the land in the project vicinity and that untreated stormwater runoff is a concern. The Florida Department of Environmental Protection (FDEP) noted that effects on wetlands could result from direct fill and removal of vegetation or through sediments and/or pollutants entering receiving waters and wetlands. SFWMD noted that an Environmental Resource Permit will be required, and impacts may require mitigation. The US Army Corps of Engineers noted that project activities could result in sediments and/or pollutants entering receiving waters, increasing receiving water temperatures, and entering wetlands. The National Marine Fisheries Service (NMFS) noted that the project would not impact wetlands that

support National Oceanic and Atmospheric Administration (NOAA) trust fishery resources. USFWS did not comment on wetlands but did note the need for compensatory mitigation for unavoidable impacts.

5.2.4 Responses To Comments Regarding Wetlands and Water Quality

Wetlands were identified during the PD&E study and the potential impacts are described in this document. During design, a wetland delineation is anticipated that will precisely measure the extent of impacts and score the value of the wetlands. Unavoidable impacts to wetlands are anticipated to require an Environmental Resource Permit from SFWMD as well as potential mitigation. The *FDOT Standard Specifications for Road and Bridge Construction* will be implemented to help reduce impacts to downstream habitats.

5.3 Field Investigations

Field investigations of the project corridor and surrounding areas began in 2016, on September 30 and included inspections of existing habitats in the vicinity of the project. Eagle Nest Monitoring occurred from October 2017 through May 2018, with subsequent checks to determine the status of any renesting. Intensive field investigations to confirm habitat types and land use as well as wetland boundaries were conducted on October 14 and 18, 2019.

6.0 PROTECTED SPECIES AND HABITAT

The Endangered Species Act of 1973, as amended, and the Florida Endangered and Threatened Species Act, Section 379.2291, Florida Statutes, grant the USFWS and FWC, respectively, authority to regulate certain wildlife species. Federal agencies are required to consult with USFWS or National Marine Fisheries Service (NMFS) to ensure federal actions are not likely to jeopardize the continued existence of federally endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. The Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act provide additional protections to many bird species. In Florida, black bears and all bat species are protected by FWC. This analysis of potential impacts to protected species is consistent with Part 2, Chapter 16 of the PD&E Manual.

The protected species addressed in this document are listed in ***Table 6.1***. Federal and state listed species with potential to occur in the project corridor were identified through coordination with USFWS and FWC, particularly through the ETDM process, as well as review of existing habitats. In evaluating the likelihood of a species to occur in the project area, the terms "Unlikely, Low, Medium, High" are used and defined for general use here. Typically, a species is considered unlikely to occur in the project area if they have particularly specialized habitat associations (like wetlands or pine rocklands) that do not occur in the project area. If potential habitat is present but there are no known adjacent/nearby populations and limited dispersal abilities, species will be considered as having low probabilities of occurrence in the project area. Species with limited dispersal abilities but wider ranges, species with larger, more distributed ranges/populations (like gopher tortoise), or species with more robust dispersal abilities (like some birds) are considered as having a medium probability of occurrence. Species with high dispersal abilities (like many birds) and wide habitat associations, or species with nearby populations or particularly attractive potential habitat are considered as having a high probability of occurrence. These probabilities of occurrence are qualitative and general in nature and each species has highly unique aspects of their ecology and conservation that can locally affect the probability of occurrence.

Table 6.1 - Listed Species Potentially Occurring in Project Area

Common Name	Scientific Name	Federal Status	State Status	Occurrence Potential in Project Area	Effect Determination
Bald eagle	*Haliaeetus leucocephalus*	BGEPA	-	High	No Impacts
Beach jacquemontia	*Jacquemontia reclinate*	FE	-	Unlikely	No Effect
Burrowing owl	*Athene cunicularia*	-	ST	Low	NAEA
Eastern indigo snake	*Drymarchon corais couperi*	FT	-	Low	MANLAA
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	FE	-	Medium	MANLAA
Sandhill crane	*Grus canadensis*	-	ST	Unlikely	NAEA
Southeastern American kestrel	*Falco sparverius paulus*	-	ST	Unlikely	NAEA
Tiny polygala	*Polygala smallii*	FE	-	Unlikely	No Effect
Wood stork	*Mycteria americana*	FE	-	High	MANLAA

Notes: FE = Federally Endangered, FT = Federally Threatened, ST = State-Threatened, BGEPA = Gold and Bald Eagle Protection Act, MANLAA- May Affect, Not Likely to Adversely Affect, NAEA- No Adverse Effect Anticipated

The project is within the USFWS consultation area for Everglade snail kite. The project occurs within the Core Foraging Areas of the Wakodahatchee, Lox NC-4, Sawgrass Ford, and Emerald Estates 1 and 2 Griffin Wood Stork Colonies.

The USFWS Critical Habitat Portal was used to locate designated Critical Habitat and assess potential impacts from the project. No designated Critical Habitat occurs in or adjacent to the project area, so no destruction or adverse modification of critical habitat is anticipated. The nearest designated Critical Habitat is for the Everglade snail kite (*Rostrhamus sociabilis plumbeus*) and occurs in Arthur R. Marshall Loxahatchee National Wildlife Refuge approximately 4.9 miles west of the project corridor.

Bald eagle nest BO003 was located in a tree approximately 500 feet north of the project, in the northeast quadrant of the interchange of Sawgrass Expressway and Florida's Turnpike (***Figure 6.1***). That nest was damaged in storms and is no

longer present. The most recently active nest location in this area is within Quiet Waters Park and is located more than 660 feet from the project. USFWS and FWC generally do not require any special protective measure if a bald eagle nest is further than 660 feet from the project.

FWC noted through the ETDM that burrowing owls historically occupied the project area. There are no other documented occurrences of listed species within the study area, and none were noted in the FNAI element occurrences database or through the ETDM process.

According to the FWC Water Bird Locator, the nearest reported active waterbird colony (Colony 619309) is approximately 5.6 miles northwest of the project corridor. The project is outside the 300-foot buffer FWC proposes as a standardized buffer around high priority wading bird nesting colonies, so no impacts to waterbird colonies are anticipated.

Habitats are mapped by FLUCCS code in ***Figures 4.1*** *and* ***4.2*** and were confirmed in the field with minor revisions. Sightings or indications of protected species and sensitive environmental features are shown in ***Figure 6.1***. Below is a description of each species in ***Table 6.1*** along with pertinent aspects of their ecology, conservation, and potential habitat in the project area. Federally listed species are also considered to be state listed.

6.1 Federally Protected Species in the Project Area

Below is a description of each species in ***Table 6.1*** along with pertinent aspects of their ecology, conservation, and potential habitat in the project area.

6.1.1 Bald Eagle

The Federal Bald and Golden Eagle Protection Act [16 U.S.C. § 668-668(d)] prohibits anyone from taking, possessing, or transporting a bald eagle or golden eagle, or the parts, nests, or eggs of such birds without prior authorization. This includes inactive nests as well as active nests. The bald eagle was removed from the Federal endangered species list in 2007 and from the State of Florida endangered species list in 2008. The species is also protected under FWC's bald eagle rule (F.A.C. 68A- 16.002).

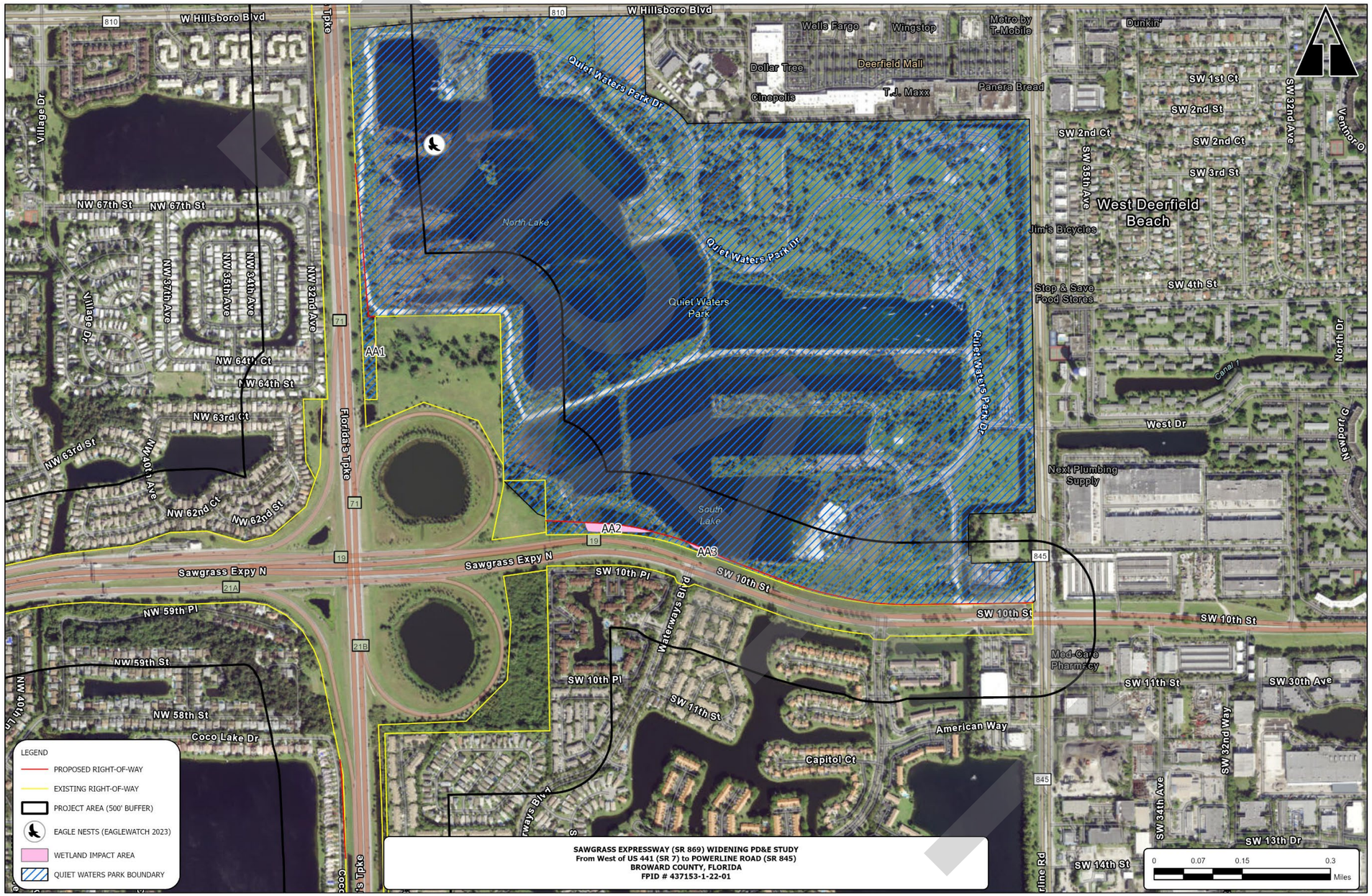

Figure 6.1 Sensitive Environmental Features

Bald eagles roost and nest in trees and are typically found close to fresh or salt water where the eagles can catch fish. Nests are usually constructed in large trees isolated from human disturbance. Adult bald eagles typically remain within Florida year-round, though sub-adults may migrate and wander further north. Bald eagles eat a wide variety of prey, often scavenging roadkill and carrion or capturing fish and waterfowl from the water surface. Bald eagles once ranged across North America except for the desert southwest and were especially abundant in Florida. Populations in North America began to decline as early as the 18th century due to habitat loss and direct persecution through shooting, trapping and poisoning. Widespread use of DDT in the 20th century greatly exacerbated these declines by causing heavy nesting failures. DDT was banned in the U.S. in 1972 and the number of eagle nesting territories in Florida has steadily increased since.

Portions of this project occur within 660 feet of two previously documented bald eagle nests, one referred to as Nest BO003 and the second referred to as Alternative Nest 1. Those two nests trees are approximately 160 feet apart, within FDOT ROW. As part of this PD&E Study, nest monitoring occurred from October 2017 through May 2018 and is documented in the attached Bald Eagle Nest Monitoring Report (***Appendix A***). Both nests were damaged during storms and neither nest remains. A new nest location, inside the boundaries of Quiet Waters Park and more than 660 feet from the proposed project, has been the site of the most recent nesting activity. Additional detail is provided below and in ***Appendix A***.

The BO003 nest tree was located in the northeast quadrant of the intersection of Sawgrass Expressway and Florida's Turnpike, adjacent to Quiet Waters Park but on FDOT right of way. According to the Audubon EagleWatch Program (https://cbop.audubon.org/conservation/about-eaglewatch-program), Nest BO003 was first recorded as active in 2014. Initial monitoring efforts revealed that Nest BO003 was heavily damaged by storms and adult eagles were observed building a new nest in a nearby tree. That new nest was referred to as Alternative Nest 1 during this PD&E Study and successfully produced one chick in 2018 but was later damaged by a storm. There are no apparent significant nesting materials remaining in either tree.

The FWC Bald Eagle Nest Locator online has been discontinued and does not provide updated nest locations. Citizen scientists contribute photographs and observations at a website named Bald Eagles of Broward County (http://bald-eagles-of-broward-county-florida.17.s1.nabble.com/). That site provides a history of the nesting activity in this bald eagle territory. During 2019/2020 and subsequent nesting seasons, a nest was documented in an Australian pine on an island within Quiet Waters Park. This appears to be the current nest location for this bald eagle breeding territory and is located more than 1,000 feet from the project. Reports on that website note that adult eagles and a juvenile were observed in the area in September 2023. Because there is no remaining nesting material in the storm-damaged trees of Nest BO003 and Alternative Nest 1, both Nest BO003 and Alternative Nest 1 are considered "lost nests". Trees or structures that are the sites of lost nests for at least two consecutive nesting season no longer require FWC Eagle Permits.

Because the nearest active bald eagle nest is located greater than 660 feet from project activities, no additional coordination, permits, or special construction conditions are required. If bald eagles were to establish a nest within 660 feet of the project, then coordination would be required with USFWS and FWC. That coordination would likely result in implementation of the USFWS Bald Eagle Guidelines (USFWS 2007) and possibly the need for an FWC Eagle Permit. Due to the distance from the project, no impacts to bald eagles are anticipated.

6.1.2 BEACH JACQUEMONTIA (ENDANGERED- FEDERAL)

Beach jacquemontia is a flowering plant that is a member of the morning glory family. It is a perennial vine with white to light-pink flowers that appear from November to May. It is endemic to southeast Florida and primarily inhabits coastal strands and maritime hammocks. Development and habitat modification have severely reduced the availability of these habitats and few individuals of Beach jacquemontia remain.

The project area does not contain any habitats suitable for Beach jacquemontia. There are no documented occurrences of this species in the project area, and none were detected during field surveys. For these reasons, a determination of ***No Effect*** is made for Beach jacquemontia.

6.1.3 EASTERN INDIGO SNAKE (THREATENED-FEDERAL)

Habitat loss is the primary threat to eastern indigo snakes and the most recent five-year status review of the species reported that populations are declining. In central, south central, and coastal Florida, the eastern indigo snake inhabits hammocks, coastal scrub, dry glades, palmetto flats, prairie, brushy riparian areas, and wet fields (Matthews and Moseley 1990, Tennant 1997, Ernst and Ernst 2003).

Vegetated lands in the project area contain potential habitat for eastern indigo snakes including those mapped by SFWMD as Open Land (FLUCCS 1900), Channelized Waterways and Canals (FLUCCS 5120), Upland Hardwood Forests (FLUCCS 4220), Upland Mixed Forest (FLUCCS 4340), and some Recreational (FLUCCS 1850) in Quiet Waters Park. No gopher tortoise burrows or other refugia that are occasionally inhabited by eastern indigo snakes were found in the project corridor. The nearest reported occurrence of an eastern indigo snake in the FNAI database is 6.6 miles to the northeast.

The Eastern Indigo Snake Programmatic Effect Determination Key (USFWS 2017)(***Appendix B***) was followed in evaluating potential impacts from the proposed project:

A. Project is not located in open water or salt marsh……*go to* B
B. Permit will be conditioned for use of the Service's *Standard Protection Measures For The Eastern Indigo Snake* during site preparation and project construction……*go to* C
C. There are no gopher tortoise burrows, holes, cavities, or other refugia where a snake could be buried or trapped and injured during project activities……*NLAA*

Because the project will implement the USFWS *Standard Protection Measures for the Eastern Indigo Snake* (2021)(***Appendix B***) and will impact less than 25 acres of eastern indigo snake habitat, and because no gopher tortoise burrows or other refugia were found in the project area, a determination of ***May Affect, Not Likely to Adversely Affect*** is made for the eastern indigo snake.

6.1.4 EVERGLADE SNAIL KITE (*ENDANGERED- FEDERAL*)

The Everglade snail kite is one of three subspecies of *R. sociabilis* and its historic range included much of Florida as well as Cuba and northwestern Honduras. Today, the Florida population of Everglade snail kites is considered a distinct

population (USFWS 2014c) and its range has constricted to central and southern portions of the state. Everglade snail kites inhabit freshwater marshes and the shallow, grassy shoreline of lakes where they search for their primary food source, apple snails (Pomacea). Everglade snail kites fly low over the water or perch and search for apple snails, which they pluck with their talons from at or near the water surface.

The primary threat to snail kites is the loss and degradation of wetland habitats through draining and urbanization, which can directly remove habitat or alter hydroperiods that affect habitat quality. Increased harassment by humans is also a threat as it may cause adults to flee the nest, leaving eggs and young exposed to predators and harsh environmental conditions. The introduction of exotic snail species and declines in water quality have also been identified as threats to the everglade snail kite. Populations dropped to extremely low levels in the early 20th century but have generally been increasing since 1969 (USFWS 2014c).

The project occurs in the USFWS consultation area for Everglade snail kite. Potential foraging habitat for everglade snail kites in the project area can occur along the margins of areas mapped as Channelized Waterways (FLUCCS 5120), Reservoirs (FLUCCS 5300), and Streams and Waterways (FLUCCS 5120) and also potentially in wetlands like Vegetated Non-Forested Wetlands (FLUCCS 6410), Wetland Coniferous Forests (FLUCCS 6210), Wetland Forested Mixed (FLUCCS 6210), and Wetland Hardwood Forests (FLUCCS 6170). Most of this potential foraging habitat is extremely low quality because vegetation management prevents the emergent vegetation typical of natural foraging habitat. The wetlands in Quiet Waters Park support a more robust emergent plant community and form higher quality potential foraging habitat. The project area lacks the seclusion and dense vegetation typical of nesting habitat. Apple snails, the prey of Everglade snail kites, were observed in the B-7 Canal during field surveys. No snail kites are documented in the project area and none were detected during field surveys, though surveys specifically for snail kites were not performed. The nearest locality of an Everglade snail kite reported by FNAI is approximately 12 miles to the west.

The project occurs within the range of Everglade snail kite and direct impacts to potential snail kite foraging habitat would occur along where the project impacts wetlands in Quiet Waters Park. If Everglade snail kites were present during construction, it is anticipated that they would relocate a short distance away.

Additional potential foraging habitat is locally common and abundant in Quiet Waters Park and other nearby locations. For these reasons, and because no Everglade snail kites have been documented in the project area, a determination of ***May Affect, Not Likely to Adversely Affect*** is made for this species.

6.1.5 TINY POLYGALA (ENDANGERED-FEDERAL)

Tiny polygala is a perennial herb that grows up to four inches tall and flowers throughout the year. They are endemic to the Atlantic coastal ridge of Florida and there are only 11 remaining documented populations, most of which are on conservation lands. Tiny polygala inhabits pine rockland, scrub, sandhill and open coastal spoil piles. These habitat types do not occur in the project area and there are no documented occurrences of tiny polygala in the project area. No tiny polygala were observed during field investigations. Because of a lack of suitable habitat and no documented presence, a determination of ***No Effect*** is made for tiny polygala.

6.1.6 WOOD STORK (THREATENED-FEDERAL)

The main threat to wood storks stems from the loss, fragmentation, and modification of habitat, typically through urban encroachment and alterations of hydrology. Wood stork population data suggest a decline in the area and quality of breeding and foraging habitats range wide. However, data from 1991 to 1995 suggest an increasing number of nests within the U.S. breeding range.

Wood storks occur in a variety of wetland habitats, including freshwater marshes, stock ponds, shallow, seasonally flooded roadside and agricultural ditches, narrow tidal creeks, managed impoundments, and depressions in cypress heads and swamp sloughs. Because of their foraging method of wading and feeling for prey with their open bill, wood stork forage most effectively in shallow water with highly concentrated prey. High quality foraging conditions include relatively calm water with a depth of 5 to 15 inches lacking dense vegetation. Wood storks form nesting colonies that are typically located in medium to tall trees that are isolated and protected by open water so that human disturbance and exposure to land-based predators is minimized.

Wood stork Suitable Foraging Habitat can include the margins of areas mapped as Channelized Waterways (FLUCCS 5120), Reservoirs (FLUCCS 5300), and Streams

and Waterways (FLUCCS 5120). Most of these areas are either unsuitable or are low-quality habitat due to inappropriate depths and likely diminished prey communities. Suitable Foraging Habitat can also occur in areas mapped as Vegetated Non-Forested Wetlands (FLUCCS 6410), Wetland Coniferous Forests (FLUCCS 6210), Wetland Forested Mixed (FLUCCS 6210), and Wetland Hardwood Forests (FLUCCS 6170). The wetlands in Quiet Waters Park form higher quality potential foraging habitat, although dense vegetation limits the habitat quality in most of these areas. The project area lacks the seclusion and separation typical of wood stork nesting habitat.

For this region of Florida, the USFWS has defined a wood stork Core Foraging Area as being within 18.6 miles of a wood stork nesting colony. The project occurs within the Core Foraging Area of the Wakodahatchee, Lox NC-4, Sawgrass Ford, and Emerald Estates 1 and 2 Griffin Wood Stork Colonies. The USFWS *Wood Stork Effect Determination Key* (***Appendix C***) was used to evaluate the potential effects of the project on wood storks:

A. Project impacts Suitable Foraging Habitat (SFH) at a location greater than 0.76 km (0.47 mile) from a colony site……*go to* B
B. Project impact to SFH is greater in scope than 0.20 hectare (one-half acre)……*go to* C
C. Project impacts to SFH within the CFA of a colony site……*go to* E
E. Project provides SFH compensation in accordance with the CWA section 404(b)(1) guidelines and is not contrary to the HMG; habitat compensation is within the appropriate CFA or within the service area of a Service-approved mitigation bank; and habitat compensation replaces foraging value, consisting of wetland enhancement or restoration matching the hydroperiod of the wetlands affected, and provides foraging value similar to, or higher than, that of impacted wetlands……*NLAA*

The proposed project would impact approximately 0.84 acre of wood stork Suitable Foraging Habitat that requires mitigation. Because the project would impact more than one-half acre of Suitable Foraging Habitat within the Core Foraging Areas of wood stork colonies, and because the project will provide suitable compensatory mitigation, a determination of ***May Affect, Not Likely to Adversely Affect*** is made for this species.

6.2 State Protected Species in the Project Area

6.2.1 Florida Burrowing owl (Threatened-Florida)

The Florida burrowing owl is a state Species of Special Concern and occurs throughout the state, although it is patchily distributed. Some human activities, such as land clearing and draining of wetlands, have increased their range in Florida but have exposed owls to additional threats. They traditionally inhabited native prairies and now can be found in pastures, agricultural fields, golf courses, airports, and vacant lots.

FWC noted that Florida burrowing owls historically occupied the project area. No burrowing owls were detected during field surveys and FNAI did not report any documented occurrences in the project area. Any open land within the project area, like roadsides or embankments, canal embankments, or golf courses could be potential nesting habitat for Florida burrowing owl. However, burrowing owl colonies are typically conspicuous and well documented and no burrowing owls were identified in the project area during records research or field surveys. Because the project is within the range of the Florida burrowing owl, but because none are documented within the project area, a determination of ***No Adverse Effect Anticipated*** is made for this species.

6.2.2 Florida Sandhill crane (Threatened-Florida)

The Florida Sandhill Crane is a state threatened wading bird species that occurs predominantly in central and southern Florida. Two subspecies of sandhill crane occur in Florida. The Florida sandhill crane (*Grus canadensis ssp. pratensis*) is a non-migratory year-round resident of Florida, while the greater sandhill crane (*G.c. tabida*) only winters in Florida. Suitable foraging habitat for sandhill cranes typically includes freshwater marshes, prairies, and pastures.

The project area lies within the range of Florida sandhill cranes; however, no sandhill cranes were detected during field surveys and FNAI did not report any documented occurrences in the project area. Potential foraging habitat is present within the project corridor in Quiet Waters Park; however, the project area lacks the seclusion and mats of vegetation in shallow water typical of nesting habitat. Sandhill cranes are highly mobile and it is anticipated that they would

relocate to nearby available habitats if disturbed during construction, so only minor and short term construction impacts are anticipated. For the above reasons, a determination of **No Adverse Effect Anticipated** is made for this species.

6.2.3 Southeastern American Kestrel

The Southeastern American kestrel is a state threatened bird species that occurs throughout Florida, although it is patchily distributed. The Southeastern American kestrel is a subspecies of American kestrel and is a non-migratory resident of Florida. Southeast American kestrels nest in cavities in trees excavated by other species or natural processes. Suitable foraging habitat for Southeastern American kestrel includes open woodlands, sandhills, and fire-maintained savannah pine habitats. They are also known to occasionally inhabit pastures and open fields located in residential areas.

General field surveys were conducted and no kestrels were detected in the project area; however, specific surveys for kestrel were not conducted. FNAI did not report any documented occurrences of Southeast American kestrels in the project area. No trees with cavities that might form potential roosts were detected during field surveys, so no impacts to roosting habitat are anticipated. Southeast American kestrels are highly mobile and could potentially forage in any open portions of the project area. It is anticipated that if they were disturbed during construction, any Southeast American kestrels that might be present would relocate to nearby available habitats, so construction impacts would be minor and short-term. For these reasons, a determination of **No Adverse Effect Anticipated** is made for Southeast American kestrel.

6.3 Potential Impacts to Protected Species and Habitats

The No-Build Alternative would have no direct impacts on listed species or habitats; however, the No-Build Alternative would not address the needs of the proposed project. The extent of potential direct impacts from the preferred alternative were assessed by overlaying habitat types (as mapped by SFWMD and compared with USFWS NWI maps and field investigations) onto the project corridor, which represents the footprint of direct impacts. Typical sections for the Preferred Alternative along with illustrations and an aerial view of the roadway are provided in Section 3.0.

6.3.1 Direct Impacts to Protected Species and Habitats

Anticipated direct impacts to wood stork Suitable Foraging Habitat and upland habitats are summarized in ***Table 6.2***. These impacts would occur where additional right-of-way is required on the property of Quiet Waters Park as well as to a small strip of landscaped uplands adjacent to the ramp from Sawgrass Expressway eastbound to Florida's Turnpike southbound.

The wood stork Suitable Foraging Habitat impacts would occur along the southern edge of Quiet Waters Park, where there is a lake and pond that would be impacted by the preferred alternative. These areas are mapped by SFWMD as Reservoirs (FLUCCS 5300), Emergent Aquatic Vegetation (FLUCCS 6440), and Freshwater Marshes/Graminoid Prairie (FLUCCS 6410) (***Figure 4.2***). These areas are mapped by the USFWS NWI as Freshwater Pond and Lake (***Figure 4.5***). The area mapped as Streams and Waterways (FLUCCS 5120) is incorrectly mapped. In this area the canal is underground and no impacts to this land use type are anticipated under the preferred alternative.

Upland habitat impacts from new right-of-way as measured by SWFWMD FLUCCS code includes impacts to Parks and Zoos (FLUCCS 1850), north of SW 10th Street and East of Florida's Turnpike, along the edges of Quiet Waters Park. The impacts reported as Transportation (FLUCCS 8140) would actually occur to the landscaped area next to Coco Lake Drive, in the southwest quadrant of the intersection of Sawgrass Expressway and Florida's Turnpike. Acreages of direct impacts outside the existing FTE right-of-way are presented by FLUCCS code in ***Table 6.3***.

Table 6.2 Direct Impacts to Habitats

Preferred Alternative	Jurisdictional Wetland Impacts (acre)	Wood Stork Suitable Foraging Habitat Impacts (acre)	Upland Habitat Impacts (acre)
No-Build	0	-	-
Preferred Alternative	0	0.8	4.27

Table 6.3 Direct Impacts Outside Existing Right-of-Way by FLUCCS Code

Land Use/Land Cover	FLUCCS CODE	Impacts Under Preferred Alternative (acre)
Parks And Zoos	1850	4.27
Reservoirs	5300	0.16
Streams And Waterways (Incorrectly Mapped, This Area Is Upland And The Canal Is Underground)	5120	0.01
Freshwater Marshes/Graminoid Prairie	6410	0.07
Emergent Aquatic Vegetation	6440	0.57
Transportation	8140	0.43
Electrical Power Facilities	8310	0.03
	TOTAL	**5.53 acres**

6.3.2 Indirect and Secondary Impacts to Protected Species and Habitats

Indirect Impacts are those impacts that are linked and causally related to the proposed project and may be temporary or permanent. For transportation projects, indirect impacts typically include disturbance to areas adjacent to the

project area. These impacts include the short-term impacts associated with road construction activities as well as other long-term impacts due to the proximity of the roadway to wildlife habitat.

Potential short-term indirect impacts from the Preferred Alternatives could result from the use of heavy equipment (and avoidance of construction areas by wildlife), the staging or stockpiling of equipment and materials, and sedimentation resulting from increased erosion associated with soil disturbance. The *FDOT Standard Specifications for Road and Bridge Construction* will be implemented and include BMPs (such as installation of silt fencing and erosion control devices) that will avoid and minimize indirect impacts. Staging and stockpiling locations will also be coordinated with the construction project manager and Florida's Turnpike Enterprise environmental staff and will be located outside of wetlands.

Secondary Impacts are those that may result separately, but in direct response to the project. An example of a secondary impact would be development on vacant land that is spurred by improvements to an adjacent roadway. This project is consistent with local and regional land use planning; therefore, no secondary impacts are anticipated from the proposed project.

6.3.3 Cumulative Impacts to Protected Species and Habitats

A "cumulative impact", according to the definition in the Council of Environmental Quality Regulations (40 CFR 1508.7), is "the impact on the environment, which results from the incremental impacts of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions." Direct impacts from the Preferred Alternative include 0.84 acres of impacts to wetlands and 5.37 acres of impacts to uplands, all within Quiet Waters Park. None of these areas contain designated Critical Habitat for listed species so no destruction or adverse modification of Critical Habitat is anticipated. No adverse impacts to listed species are anticipated.

BMPs will be implemented to reduce potential impacts from construction, runoff and sedimentation. Mitigation will be provided for unavoidable impacts to wetlands and wood stork Suitable Foraging Habitat, as applicable, during the

design/permitting phase of the project. For these reasons, cumulative impacts to listed species are not anticipated as a result of the proposed project.

6.3.4 Avoidance, Minimization, and Mitigation

Sensitive environmental features, such as wetlands, nesting areas, and known species occurrences were identified early during the PD&E process so that alternatives could be developed that avoid and minimize impacts as much as practicable. To minimize impacts to wildlife habitats, alternatives followed the existing Sawgrass Expressway corridor. Standard BMPs for construction of roads and bridges will be observed during all construction activities. The USFWS *Standard Protection Measures for the Eastern Indigo Snake* (2021) will be implemented to reduce potential impacts.

Unavoidable impacts to wood stork Suitable Foraging Habitat and wetlands will require mitigation. Mitigation for impacts to wood stork Suitable Foraging Habitat is anticipated to be achieved through wetland mitigation banks concurrent with wetland mitigation requirements, which are described in Section 7.

7.0 WETLANDS EVALUATION

Wetlands, as stated in Section 373.019(27) F.S. and in 33 CFR 328.3(b) and as used by the U.S. Army Corps of Engineers in administering Section 404 of the Clean Water Act, are defined as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

Surface waters are considered by Section 373.019(21) F.S. to be waters on the surface of the earth, contained in bounds created naturally or artificially, including, the Atlantic Ocean, the Gulf of Mexico, bays, bayous, sounds, estuaries, lagoons, lakes, ponds, impoundments, rivers, streams, springs, creeks, branches, sloughs, tributaries, and other watercourses. Regulatory agencies do not typically require mitigation for impacts to surface waters other than wetlands.

Wetlands and Other Surface Waters (OSW) in the project area were initially mapped using land use data from the SFWMD (***Figures 4.1*** *and* ***4.2***) and then supplemented with field observations and additional research. Wetland boundaries were determined in the field primarily using three parameters as indicators: presence of hydrophytic vegetation, hydric soils, and hydrology, utilizing methodologies consistent with the US Army Corps of Engineers *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region* (2010), Chapter 62-340, Florida Administrative Code, and the *Florida Wetlands Delineation Manual* (Gilbert et. Al. 2011).

7.1 WETLANDS AND OTHER SURFACE WATERS IN THE PROJECT AREA

Other Surface Waters and wetlands in the broader Project Area mapped by SFWMD included Channelized Waterways (FLUCCS 5120), Reservoirs (FLUCCS 5300), Mixed Wetland Hardwoods (FLUCCS – 6170), Cypress (FLUCCS – 6210), Wetland Forested Mixed (FLUCCS – 6300), Freshwater Marshes/Graminoid Prairie-Marsh (FLUCCS – 6410), and Emergent Aquatic Vegetation (FLUCCS – 6440) (***Figures 4.1*** *and* ***4.2***). Field investigations and additional research revealed that the wetlands mapped in Quiet Waters Park are considered OSWs because they are manmade and were cut into uplands. For this reason, they are not considered wetlands within the jurisdiction of the SFWMD or the US Army Corps of Engineers.

7.2 Potential Impacts to Wetlands

The No-Build Alternative would have no impacts on wetlands or other surface waters; however, the No-Build Alternative would not address the needs of the proposed project. The extent of potential impacts from the Preferred Alternative was assessed by overlaying wetland limits (as mapped by SFWMD and updated using in the field investigations) with the Preferred Alternative. Typical sections for the Preferred Alternative along with illustrations and an aerial view of the roadway are provided in Section 3.0.

7.2.1 Direct Wetland Impacts

Under the Preferred Alternative, there would be no direct impacts to wetlands because none are present within the project corridor, where impacts would occur. Although land use types that include wetlands are mapped by SFWMD within the areas of impact in Quiet Waters Park, these are manmade features cut into uplands and are not considered jurisdictional wetlands.

7.2.2 Indirect Wetland Impacts

Indirect Impacts are those impacts that are linked and causally related to the proposed project and may be temporary or permanent. For transportation projects, indirect impacts typically include disturbance to areas adjacent to the project area. These impacts include the short-term impacts associated with road construction activities as well as other long-term impacts due to the proximity of the roadway to wildlife habitat.

Potential short-term indirect impacts from the Preferred Alternative could result from the use of heavy equipment, staging or stockpiling of equipment and materials, or other activities that contribute to sedimentation and erosion through from soil disturbance. BMPs typically associated with road construction projects will be implemented and maintained throughout all construction activities to minimize indirect impacts. Staging and stockpiling locations will be coordinated with the construction project manager and Florida's Turnpike Enterprise environmental staff.

Secondary Impacts are those that may result separately, but in direct response to the project. An example of a secondary impact would be development on vacant land that is spurred by improvements to an adjacent roadway. This

project is consistent with local and regional land use planning; therefore, no secondary impacts are anticipated from the proposed project.

7.2.3 Cumulative Wetland Impacts

A "cumulative impact", according to the definition in the Council of Environmental Quality Regulations (40 CFR 1508.7), is "the impact on the environment, which results from the incremental impacts of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions." The project will have no cumulative impacts on wetlands because no wetland impacts are anticipated under the Preferred Alternative. Downstream impacts from erosion and sedimentation will be avoided and minimized through the application of standard Best Management Practices (BMPs). These include the installation and maintenance of silt fence and other erosion control devices.

7.2.4 Wetland Impact Avoidance, Minimization, and Mitigation

Sensitive environmental features, such as wetlands and OSW were identified early during the PD&E process so that alternatives could be developed that avoid and minimize impacts as much as practicable. To minimize impacts, alternatives followed the existing Sawgrass Expressway corridor as much as possible while meeting current roadway safety standards.

The FDOT *Standards Specifications for Road and Bridge Construction* will be implemented to further minimize impacts and will include erosion control devices to help protect downstream habitats. Minimization measures, which may include reductions in the typical section, use of retaining walls to minimize roadway embankments and similar measures will be considered during the project design phase. Because no jurisdictional wetlands would be impacted under the Preferred Alternative, no mitigation for wetlands is anticipated.

8.0 Conclusions, Anticipated Permits, and Commitments

The No-Build and the Preferred Alternative were evaluated for potential impacts to protected species and habitats and to wetlands using a review of existing literature and data, GIS resources, coordination with regulatory agencies, and field surveys. The "No-Build" Alternative would have no impacts on protected species or wetlands. However, the "No-Build" Alternative would not address the needs of the proposed project.

No adverse impacts are anticipated to any listed species. Effect determinations for protected species are reported in ***Table 8.1***. A determination of May Affect, Not Likely to Adversely Affect is made for eastern indigo snake, Everglade snail kite, and wood stork. Determinations of No Effect are anticipated for beach jacquemontia and tiny polygala and no impacts are anticipated to bald eagles. A determination of No Adverse Effect Anticipated is made for burrowing owl, sandhill crane, and Southeastern American kestrel.

No impacts to jurisdictional wetlands area anticipated. Under the Preferred Alternative, 0.8 acres of unavoidable impacts are anticipated to wood stork Suitable Foraging Habitat. These areas of impact are within Quiet Waters Park and are considered OSWs and not jurisdictional wetlands because they are manmade. The Loxahatchee Mitigation Bank has a service area that includes the project and is located in the same watershed. According to the June 2023 credit ledger, the Loxahatchee Mitigation Bank has sufficient credits available for Freshwater Forested and Freshwater Herbaceous Wetlands, which can typically be used for wood stork mitigation.

Table 8.1 Effect Determinations

Common Name	Federal Status	State Status	Effect Determination
Bald eagle	BGEPA	-	No Impacts
Beach jacquemontia	FE	-	No Effect
Burrowing owl	-	ST	NAEA
Eastern indigo snake	FT	-	MANLAA
Everglades snail kite	FE	-	MANLAA
Sandhill crane	-	ST	NAEA
Southeastern American kestrel	-	ST	NAEA
Tiny polygala	FE	-	No Effect
Wood stork	FE	-	MANLAA

MANLAA= May affect, not likely to adversely affect; NAEA= No Adverse Effect Anticipated; BGEPA= Bald and Golden Eagle Protection Act, FE= Federally Listed as Endangered, FT= Federally Listed as Threatened, ST= State Threatened

8.1 Anticipated Permits

A SFWMD Environmental Resource Permit will be required for impacts to the existing stormwater management system and because of an increase in impermeable cover. A Dewatering Permit is anticipated for any dewatering during construction, and a National Pollution Discharge Elimination System Permit will be necessary. The project is not anticipated to fall within the jurisdiction of the US Army Corps of Engineers. FTE is exempt from Broward County permitting within FTE right-of-way, so no permits from the county are anticipated.

8.2 Commitments

FDOT commits to:

- Minimize adverse impacts to the eastern indigo snake during construction, by implementing the USFWS *Standard Protection Measures for the Eastern Indigo Snake* (USFWS 2021);
- Provide compensatory mitigation for unavoidable impacts to wood stork Suitable Foraging Habitat at a USFWS-approved mitigation bank, in accordance with the USFWS Wood Stork Effect Determination Key;

9.0 REFERENCES

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APPENDIX A: BALD EAGLE NEST MONITORING REPORT

BALD EAGLE NEST MONITORING REPORT

Sawgrass Expressway (SR 869) Widening
Project Development & Environment Study

Project Study Limits:
From West of US 441 (SR 7) to Powerline Road (SR 845)
Mileposts 18.0–22.0
ETDM Number 14280

Broward County
FPID Number 437153-1-22-01

Prepared for:
Florida's Turnpike Enterprise
Turkey Lake Service Plaza, Milepost 263
Ocoee, FL 34761

Prepared By:
Metric Engineering
13940 SW 136th St.
Miami, FL 33186

In Coordination With:
The Corradino Group
5200 NW 33rd Avenue, Suite 203
Fort Lauderdale, FL 33309

AUGUST 2018

DRAFT

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1.0 Introduction

The Florida Department of Transportation (FDOT), Florida's Turnpike Enterprise (FTE), has recently started a Project Development and Environment (PD&E) Study for the Sawgrass Expressway (SR 869) from west of US 441 (SR 7) to Powerline Road (SR 845), in Broward County, Florida. The objective of this PD&E Study is to evaluate corridor improvements that will add highway and interchange capacity along with the implementation of an express lanes system and interchange improvements. The study will address existing and future traffic needs, improved travel time reliability, enhanced safety and long-term mobility options along the corridor. The study will evaluate dynamically priced express lanes along the corridor and improvements to the interchanges at US 441, Lyons Road and Florida's Turnpike as well as the Powerline Road intersection.

The Sawgrass Expressway corridor study limits run from west of US 441 to east of Powerline Road for a total length of approximately 4 miles (see ***Figure 1.1***). The study also includes two miles of the Florida's Turnpike (SR 91) from Wiles Road to Hillsboro Boulevard (SR 810). The study area includes the US 441, Lyons Road and Florida's Turnpike interchanges as well as the adjacent signalized intersections and the Powerline Road intersection. The study area traverses the cities of Parkland, Coral Springs, Coconut Creek and Deerfield Beach, as well as an area of unincorporated Broward County. The PD&E Study will evaluate the social, economic, physical and environmental impacts associated with the potential improvements.

The Sawgrass corridor, within the study limits, currently has six general toll lanes (three in each direction) and auxiliary lanes at selected locations. The existing limited access right of way width varies within the study limits, but is generally 300 feet. The right of way is typical throughout the corridor except at the interchanges, where it varies to accommodate entrance and exit ramps. The Sawgrass Expressway is designated as a Strategic Intermodal System (SIS) facility. The SIS is a statewide network of Florida's transportation facilities that are regionally significant to the state to move people, goods and services. This corridor also serves as part of the emergency evacuation route network designated by the Florida Division of Emergency Management and is part of the National Highway System.

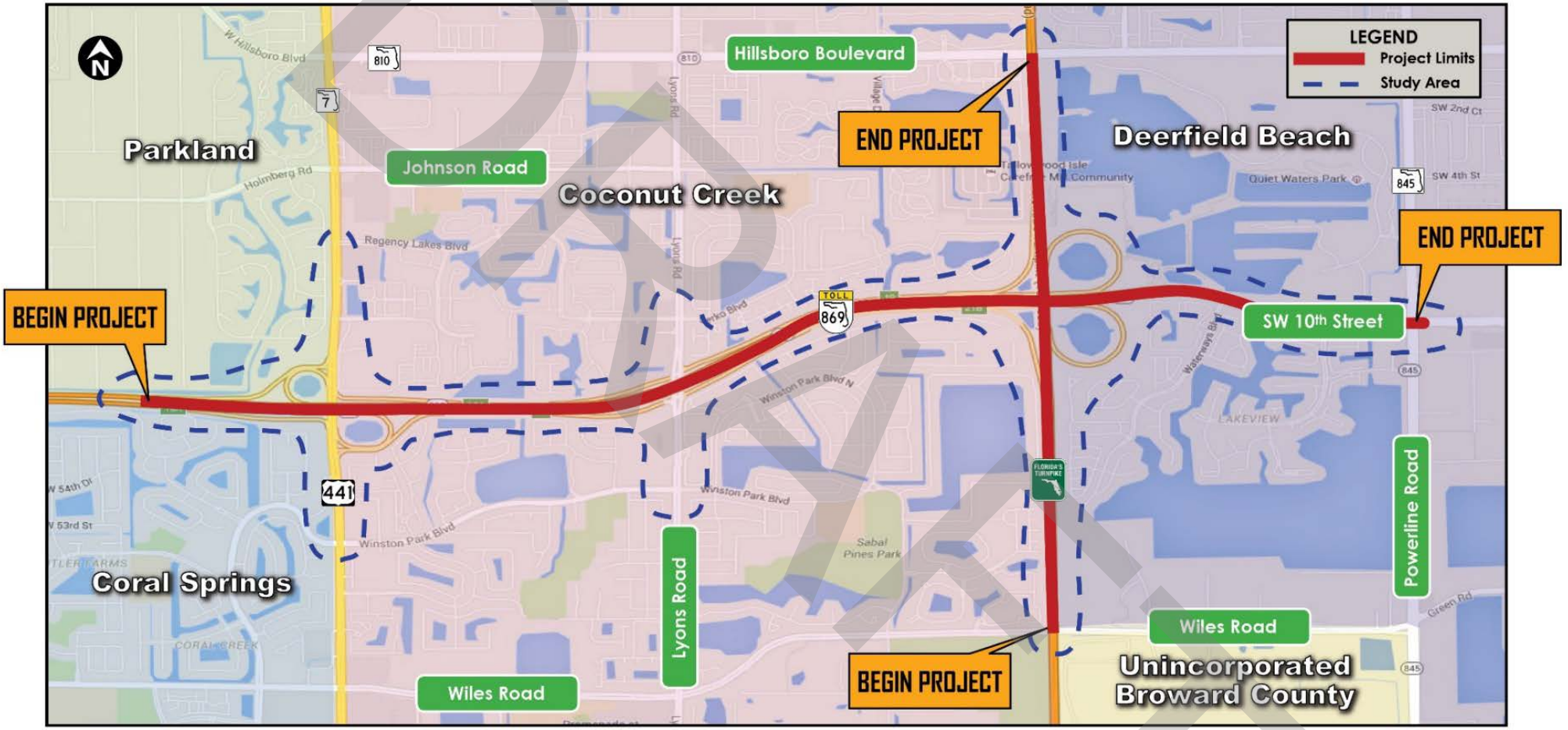

Figure 1.1: Project Location Map

Portions of this project occur within 660 feet of a previously documented bald eagle (*Haliaeetus leucocephalus*) nest, numbered Nest BO003. This report describes the methods and summarizes results of eagle nest monitoring from October 2017 through May 2018.

The BO003 nest tree is located in the northeast quadrant of the intersection of Sawgrass Expressway and Florida's Turnpike, adjacent to Quiet Waters Park but on FDOT right of way. According to the Florida Fish and Wildlife Conservation Commission (FWC) Eagle Nest Locator Tool (FWC 2017), Nest BO003 was first recorded as active in 2014. This was the first and last time monitoring at this nest is reported by FWC. As part of the Sawgrass Expressway PD&E Study, nest monitoring was initiated at Nest BO003 and the surrounding nesting territory in October 2017. The goal of nest monitoring was to determine nest activity/productivity and to reveal common flight paths and eagle behavior patterns. New or previously undocumented eagle nests in this nesting territory were also sought.

Initial monitoring efforts revealed that Nest BO003 was heavily damaged by storms and adult eagles were observed building a new nest in a nearby tree. That new nest was temporarily assigned the name Alternate Nest 1 (Alt. Nest 1) and became the focus of monitoring activities. Alt. Nest 1 is located in a mature strangler fig (*Ficus aurea*) approximately 160 feet southwest of Nest BO003, on FDOT right of way. Alt. Nest 1 successfully produced one chick in 2018.

2.0 Bald Eagle Nest Monitoring

2.1 Methods

Bald eagle nest monitoring generally followed the methods described in *Bald Eagle Monitoring Guidelines* (U.S. Fish and Wildlife Service [USFWS] 2007) as well as the *FWC Bald Eagle (Haliaeetus leucocephalus) Management Plan Handbook* (FWC 2010). However, there was no construction to evaluate for potential disturbance to eagles and surveys were limited to one hour every other week for 16 weeks. A nest monitoring observation point was established within the FDOT right of way. The observation point was adjusted to remain further than 330 feet but within 660 feet of any active eagle nest and to maintain clear views of the nest tree (see ***Figure 2.1***). In accordance with USFWS (2007), all observations of eagles were made from inside a parked vehicle and binoculars were available to the observers.

2.2 Results

Alt. Nest 1 is located in a mature strangler fig (*Ficus aurea*) approximately 395 feet north of Sawgrass Expressway. It is approximately 240 feet east of the ramp from Florida's Turnpike northbound to Sawgrass Expressway westbound. There is no visual buffer of mature trees or concealing vegetation growing between the Alt. Nest 1 tree and Sawgrass Expressway. The approximate location of Alt. Nest 1 is 26°18'25.33" N and 80°09'54.12" W (WGS 84 Datum).

Alt. Nest 1 was active during the 2017-2018 nesting season and produced one chick that fledged. Nest and monitoring locations are shown on ***Figure 2.1*** along with the 330- and 660-foot buffers around Alt. Nest 1. The results of eagle nest monitoring are summarized in ***Table 2.1*** and were documented in greater detail in individual eagle survey reports.

Nest BO003 was located in a mature slash pine (*Pinus elliottii*) approximately 480 feet north of Sawgrass Expressway. Several trees and shrubby vegetation grow between the roadway and the BO003 nest tree, providing a small visual buffer. A previous field investigation revealed that Nest BO003 occurred at Latitude 26°18'25.67" N and Longitude 80°09'53.91" W (WGS 84 Datum). Over multiple site inspections in 2016 and 2017 prior to October 2017, Nest BO003 was observed to be partially degraded and showing signs of structural failure. By May 4, 2018, there was no nest material remaining

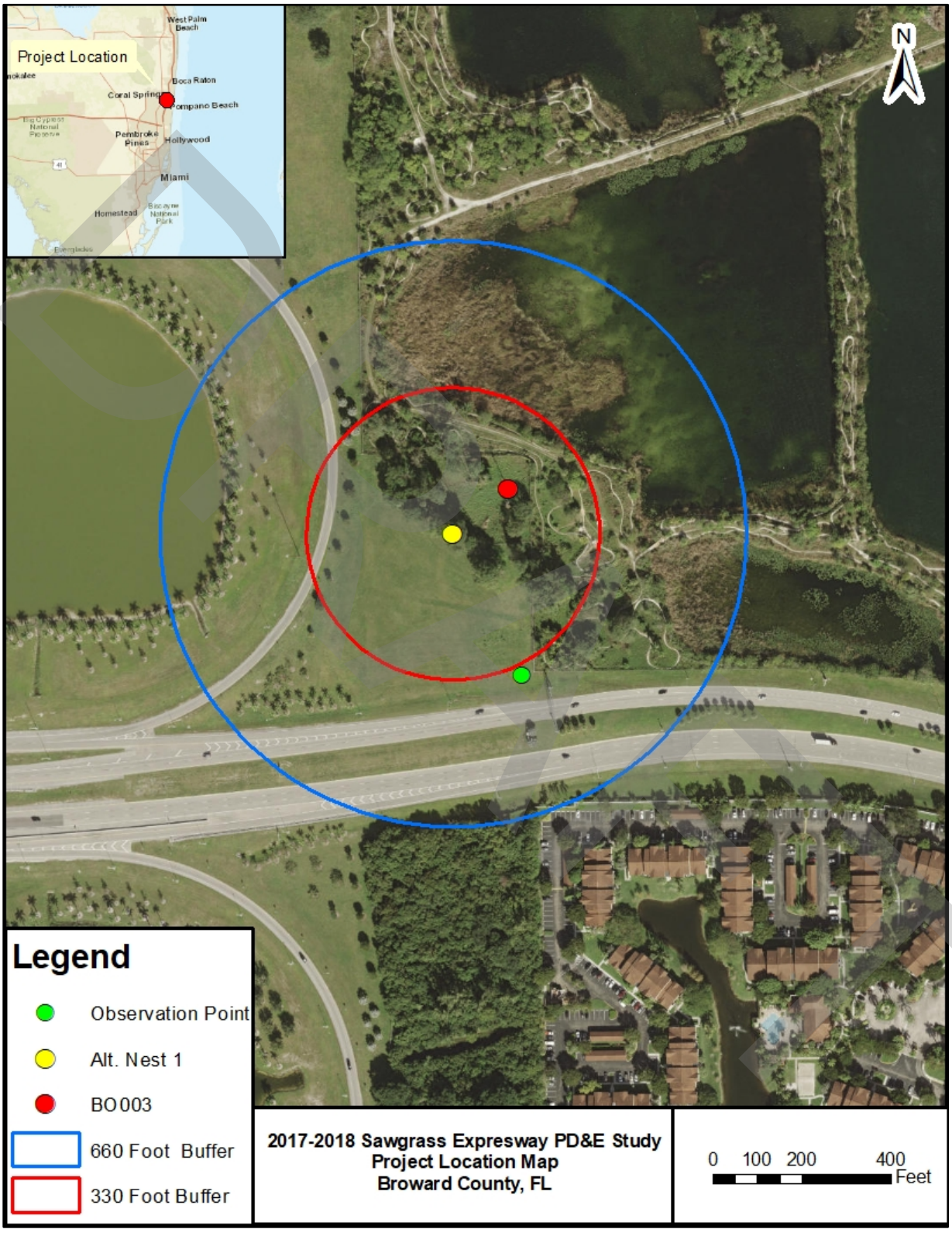

Figure 2.1: Alternate Nest 1 Location and USFWS Buffers

Table 2.1: Alternate Nest 1 Monitoring Results			
Date of Monitoring	**# Adult Eagles Observed**	**# Sub-adult Eagles Observed**	**Behavior Observed**
Oct. 20, 2017	2	-	Two adults were observed perched in a tree southeast of Alt. Nest 1. They flew in a circle around Alt. Nest 1 and then returned to the same tree. One adult later flew from this perch in a northeasterly direction.
Nov. 1, 2017	2	-	Two adults observed nest building at Alt. Nest 1. Nest material was gathered in areas northwest (in Quiet Waters Park) and southwest of the nest. The eagles were observed flying directly over the expressway onramp.
Nov. 15, 2017	2	-	Two adult eagles observed in Alt. Nest 1. One was observed nest building.
Nov. 30, 2017	2	-	Two adult eagles observed nest building at Alt. Nest 1. Nest material was gathered in areas to the northeast (Quiet Waters Park) of the nest. One eagle observed perching in tree of Nest BO003. One adult eagle was present in the nest at all times.
Dec. 15, 2017	2	-	One adult eagle gathered nest materials from the northeast (Quite Waters Park) and the northwest (within the loop of the exit ramp from the Turnpike). One adult eagle was present in the nest at all times.
Dec. 29, 2017	1	-	One adult eagle flew north from Alt. Nest 1 twice, only to return to the nest promptly each time. Only one eagle was observed during this monitoring event.
Jan. 11, 2018	2	-	One adult eagle flew south, over Sawgrass Expressway. Both adult eagles stayed near the nest, with one being in or near the nest at all times.
Jan. 26, 2018	2	-	Both adult eagles were observed pursuing a black vulture that was near the nest southward, over Sawgrass Expressway. One adult eagle flew south to the holding pond on the south side of Sawgrass Expressway. Both adult eagles stayed in or near the nest consistently.
Feb. 12, 2018	2	1	Two adult eagles were active, flying in several directions and returning to the nest with nesting materials. One sub-adult eagle was observed moving about in the nest.
Feb. 23, 2018	2	1	One sub-adult eagle was moving about the nest for most of the two-hour monitoring event. One adult eagle perched near the nest for most of the time, while the other adult eagle flew to the southwest, over the Sawgrass Expressway and the Turnpike.
March 9, 2018	2	1	One juvenile eagle was observed moving about the nest. Two adult eagles were observed flying southwest over the Turnpike, with one returning to the nest from that direction with a fish.
March 24, 2018	2	1	One juvenile eagle was observed moving about in the nest and on surrounding branches. Two adult eagles were observed perching near the nest, with one of them flying north.
April 7, 2018	2	1	One adult eagle was observed flying to the nest with a fish from the south. The juvenile eagle was observed flying short distances to and from the nest. All three eagles were observed flying west, over the onramp to the Sawgrass Expressway.
April 20, 2018	2	1	One adult and one juvenile eagle were observed flying west, over the offramp from the Sawgrass Expressway, and then north, out of sight. One adult eagle was observed flying north from Alt. Nest 1.
May 4, 2018	-	-	No eagles were observed during this monitoring event.

in the tree. No additional nests besides BO003 and Alt. Nest 1 were identified in the vicinity of the project.

Two adult eagles were observed in the Alt. Nest 1 territory during the first monitoring event, on October 20, 2017. During subsequent monitoring events, adult eagles were observed flying throughout the nest territory and surround areas, as well as building and perching in Alt. Nest 1 (***Photographs 2.1 and 2.2***). An eagle chick was first observed in Alt. Nest 1 on February 12, 2018. On March 24, 2018 that juvenile eagle was observed moving around the nest and surrounding tree branches. The juvenile eagle was observed flying short distances on April 7, 2018. No eagles were observed during the final monitoring event on May 4, 2018 and nest monitoring was concluded.

Photograph 2.1: Adult eagle in flight with nest material

Photograph 2.2: Adult eagle at Alt. Nest 1

During monitoring, adult eagles were repeatedly observed flying south from the nest territory over the project area. Multiple lakes and a landfill occur south of the project and may offer foraging opportunities to eagles. Copies of all field datasheets and maps of eagle flight paths and activities are provided as ***Appendix A***.

3.0 Discussion and Recommendations

No nesting material remains in the tree at the site of Nest BO003. Though Nest BO003 was partially damaged prior to Hurricane Irma, the high winds from Hurricane Irma appear to have contributed to the ultimate collapse of the nest. Alt. Nest 1 was active during the 2017/2018 nesting season and produced one chick. In Spring 2018, two adults and a juvenile eagle were repeatedly observed in the Alt. Nest 1 territory. The juvenile eagle was capable of self-controlled flight by April 7, 2018. Adult eagles were regularly observed within 660 feet of Alt. Nest 1 and were also repeatedly observed flying south from the nest territory, over Sawgrass Expressway. A landfill is located approximately 1.4 miles south of the nest and is a potential food source for the eagles. Multiple lakes also occur south of the nest and likely offer foraging opportunities for eagles. Both of these potential foraging habitats could attract eagles from Alt. Nest 1, necessitating flight southwards over the project. Alt. Nest 1 is approximately 395 feet from the existing Sawgrass Expressway.

An Incidental Take Permit from USFWS (described in 50 CFR § 22.26) is required for activities, such as highway construction within 660 feet of a nest, which may disturb nesting eagles. In the nesting season (October 1 through May 15), USFWS requires nest monitoring during construction within 660 feet of an active nest. USFWS generally recommends that no activities which may disturb eagles be conducted within 330 feet of a nest during nesting season. Coordination with USFWS and FWC regarding eagle nest monitoring, seasonal restrictions on construction, and necessary permitting is recommended prior to construction.

4.0 References

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APPENDIX A

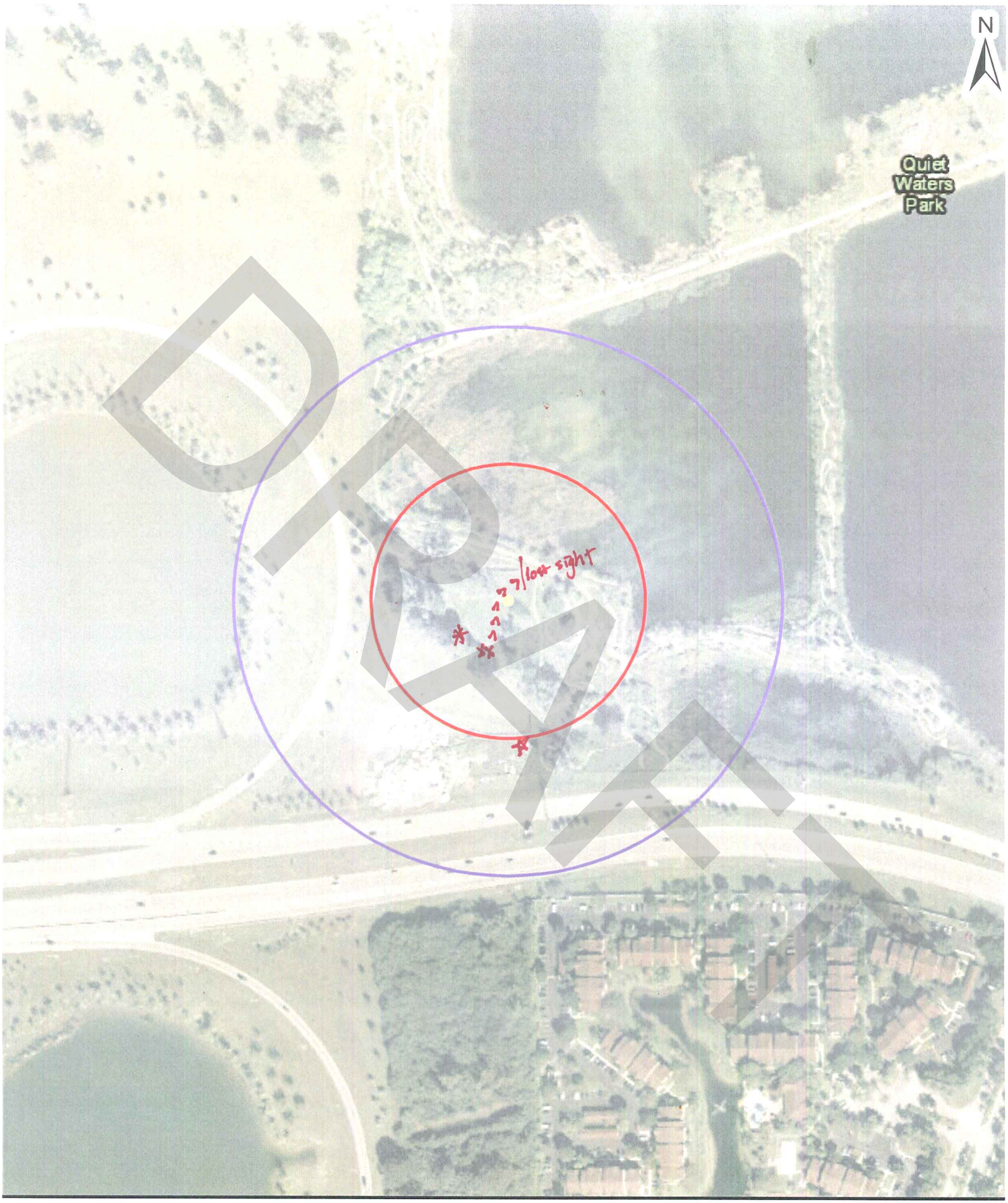
Copies of Field Datasheets

Date: 10/20/17

Personnel: Jake Ripp & Cassandra O'Donahue

Time: 7:47 a.m.

* observation point
^ flight path & Direction
* potential new nest location
X → perch location



Date: 10/20/17

Personnel: Jake Ripp & Cassandra O'Donahue

Time: 8:17 a.m.

* observation point
^ flight path & Direction
X Perch location
* potential new nest location

0 75 150 300 450 600
Fee

Bald Eagle Monitoring Data Report

Nest #: Quiet Waters Park, Broward County FL Start Time: 7:00 AM Name of Monitor: Jake Ripp ; Cassandra O'Donahue

Date: 10/20/17 End Time: 9:00 AM # Adult Present: 2 # Young Present: Ø

Tree Status[1]: L Tree type[2]: P

Time	Behavioral activity observed (list all that apply): —				
	Weather conditions	T: 79°F	W: ENE 8 mph	C: ~40%	P: Ø
7:00 AM	Notes/Comments: No Activity				
Time	Behavioral activity observed (list all that apply): Flying, Perching				
	Weather conditions	T: 79°F	W: E 8mph	C: ~40%	P: Ø
7:47 AM	Notes/Comments: 2 Mature eagles took off from perch, flew in circle, disappeared behind tree line (possibly perched again in same tree)				
Time	Behavioral activity observed (list all that apply): Flying				
	Weather conditions	T: 79°F	W: ENE 9mph	C: ~20%	P: Ø
8:17 AM	Notes/Comments: 1 of the eagles flew from perch towards lake; disappeared behind tree line				
Time	Behavioral activity observed (list all that apply): —				
	Weather conditions	T: 80°F	W: E 14 mph	C: ~20%	P: Ø
9:00 AM	Notes/Comments: No Activity				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Signature of Monitor 10/20/17 Date

Bald Eagle Monitoring Data Report

Nest #: Quiet Waters Park, Broward County FL Start Time: 7:00 AM Name of Monitor: Cassandra O'Donahue

Date: 11/01/17 End Time: 9:00 AM # Adult Present: 2 # Young Present: Ø

Tree Status[1]: L Tree type[2]:

Time	Behavioral activity observed (list all that apply): —			
	Weather conditions	T: 66°F	W: NW 3mph	C: 10%	P: Ø
7:00 AM	Notes/Comments: No Activity			
Time	Behavioral activity observed (list all that apply):			
	Weather conditions	T: 66°F	W: NNW 3mph	C: 10%	P: Ø
7:22 AM	Notes/Comments: One adult eagle flew from behind far NW corner of treeline, up to a branch on Alt Nest 1 tree, and into Alt. Nest 1.			
Time	Behavioral activity observed (list all that apply):			
	Weather conditions	T: 66°F	W: NNW 4mph	C: 10%	P: Ø
7:28 AM	Notes/Comments: One adult eagle flew from behind far NW corner of the treeline, and perched in Alt. Nest 1.			
Time	Behavioral activity observed (list all that apply):			
	Weather conditions	T: 66°F	W: NNW 6mph	C: 10%	P: Ø
7:32 AM	Notes/Comments: Both adult eagles flew sequentially from Alt. Nest 1, behind treeline directly NNW of observation point, and perched in tree N of observation point.			

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Cass O'Don — Signature of Monitor

11/01/17 — Date

Nest #: Broward County, Quiet Waters Park, FL Monitoring Date: 11/01/17

Monitor's signature: Anne O'Dell

Supervisor's signature: _____

Time	Behavioral activity observed (list all that apply):				
7:36AM	Weather conditions	T: 66°F	W: NNW 6mph	C: 15%	P: Ø
	~~Description of ongoing construction events~~: Notes and Comments: One adult eagle flew from perch, behind treeline to the NW. Seconds later, it flew around the treeline in the far NW corner with a branch in its talons, flew up to Alt. Nest 1, and perched.				
	Notes/Comments:				
7:40AM	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 66°F	W: NNW 6mph	C: 15%	P: Ø
	~~Description of ongoing construction events~~: Notes/Comments: Adult eagle flew from Alt. Nest 1, behind treeline to the NW. One minute later the adult eagle flew from behind the far NW corner of the treeline up to alt. Nest 1 with branch in talons.				
	Notes/Comments:				
7:46AM	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 66°F	W: N 6mph	C: 15%	P: Ø
	~~Description of ongoing construction events~~: Notes/Comments: Other adult eagle flew from perch, behind treeline to NW. Flew out from behind far NW corner of treeline up to Alt. Nest 1. Both eagles started altering the nest arrangement.				
	Notes/Comments:				
7:50AM	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 66°F	W: N 5mph	C: 15%	P: Ø
	~~Description of ongoing construction events~~: Notes/Comments: One adult eagle took off from Alt. Nest 1 and flew in a NE direction behind tree line to east of observation point. Other adult eagle flew from Alt. Nest 1 in a NNE direction.				
	Notes/Comments:				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Anne O'Dell
Signature of Monitor

_____
Signature of Supervisor

11/01/17
Date

Quiet Waters Park
Nest #: Broward County, FL **Monitoring Date:** 11/01/17

Monitor's signature: Carol O'Dell

Supervisor's signature: _____

Time	Behavioral activity observed (list all that apply):				
7:55AM	Weather conditions	T: 66°F	W: NNW 5mph	C: 15%	P: Ø
	~~Description of ongoing construction events~~: Notes/Comments: One adult eagle flew from behind E treeline up to Alt. Nest 1 and perched. One minute later, other adult eagle flew from behind tree line directly N of observation point, up to Alt. Nest 1 and perched. Both eagles moving around in nest with heads going in and out of view (up and down).				
	Notes/Comments:				
8:02 AM	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 66°F	W: NNW 4mph	C: 20%	P: Ø
	~~Description of ongoing construction events~~: Notes/Comments: Both adult eagles took off sequentially from perch at Alt. Nest 1 and flew behind treeline to the north. One reappeared directly N, flying NE but disappeared again behind NE treeline.				
	Notes/Comments:				
8:05 AM	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 66°F	W: NNE 4mph	C: 20%	P: Ø
	~~Description of ongoing construction events~~: Notes/Comments: Both adult eagles flew from behind far NW corner of treeline up to Alt. Nest 1, together.				
	Notes/Comments:				
8:11AM	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 66°F	W: NNW 4mph	C: 20%	P: Ø
	~~Description of ongoing construction events~~: Notes/Comments: One adult eagle flew from Alt. Nest 1 on the southern side of the NW treeline, up to the far corner of NW tree line and disappeared. Returned within seconds with nest material to Alternate Nest 1.				
	Notes/Comments:				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Carol O'Dell
Signature of Monitor

_____
Signature of Supervisor

11/01/17
Date

Nest #: Quiet Waters Park Broward County, FL Monitoring Date: 11/01/17

Time	Behavioral activity observed (list all that apply):				
8:16 AM	Weather conditions	T: 67° F	W: NNW 4mph	C: 20%	P: ∅
	~~Description of ongoing construction events~~: Notes/Comments: One adult eagle flew from Alt. Nest 1, directly west, over Expressway onramp, gathered nest materials, and circled back to Alt. Nest 1 on south side of NW treeline.				
	Notes/Comments:				
8:20 AM	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 67° F	W: NNW 4mph	C: 20%	P: ∅
	~~Description of ongoing construction events~~: Notes/Comments: Both eagles took off sequentially from Alt. Nest 1, N, behind treeline. One came back within one minute with nesting materials. [redacted]t. Other came back one minute later with nesting materials.				
	Notes/Comments: Both had flown to Alt. Nest 1 from behind far NW corner of treeline.				
8:27 AM	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 67° F	W: NNW 8mph	C: 15%	P: ∅
	~~Description of ongoing construction events~~: Notes/Comments: One adult eagle flew from Alt. Nest 1, W towards Expressway on ramp, picked up twigs/branches, and flew back to Alt. Nest 1. Started preening itself.				
	Notes/Comments: Other eagle pulled off foliage adjacent to Alt. Nest 1 and added it to the nest.				
8:36 AM	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 68° F	W: NNW 5mph	C: 10%	P: ∅
	~~Description of ongoing construction events~~: Notes/Comments: One adult eagle takes off from Alt. Nest 1 and flies NNE behind treeline, comes into view directly in front of observation point and disappears again behind treeline to NW. Reappears in far NW corner of treeline with nesting				
	Notes/Comments: materials. Flies to Alt. Nest 1. * Lawn mowing and leaf blowing started in Expressway Median*				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Signature of Monitor | Signature of Supervisor | 11/01/17 Date

Nest #: Quiet Waters Park Broward County, FL Monitoring Date: 11/01/17 Page 5

Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 68°F	W: N 8mph	C: 10%	P: Ø
8:48 AM	~~Description of ongoing construction events~~: Notes/Comments: One adult eagle flew from Alt. Nest 1, SW into open field, picked up sticks and foliage and returned to Alt. Nest 1. Repeated same action at 8:49 AM.				
	Notes/Comments:				

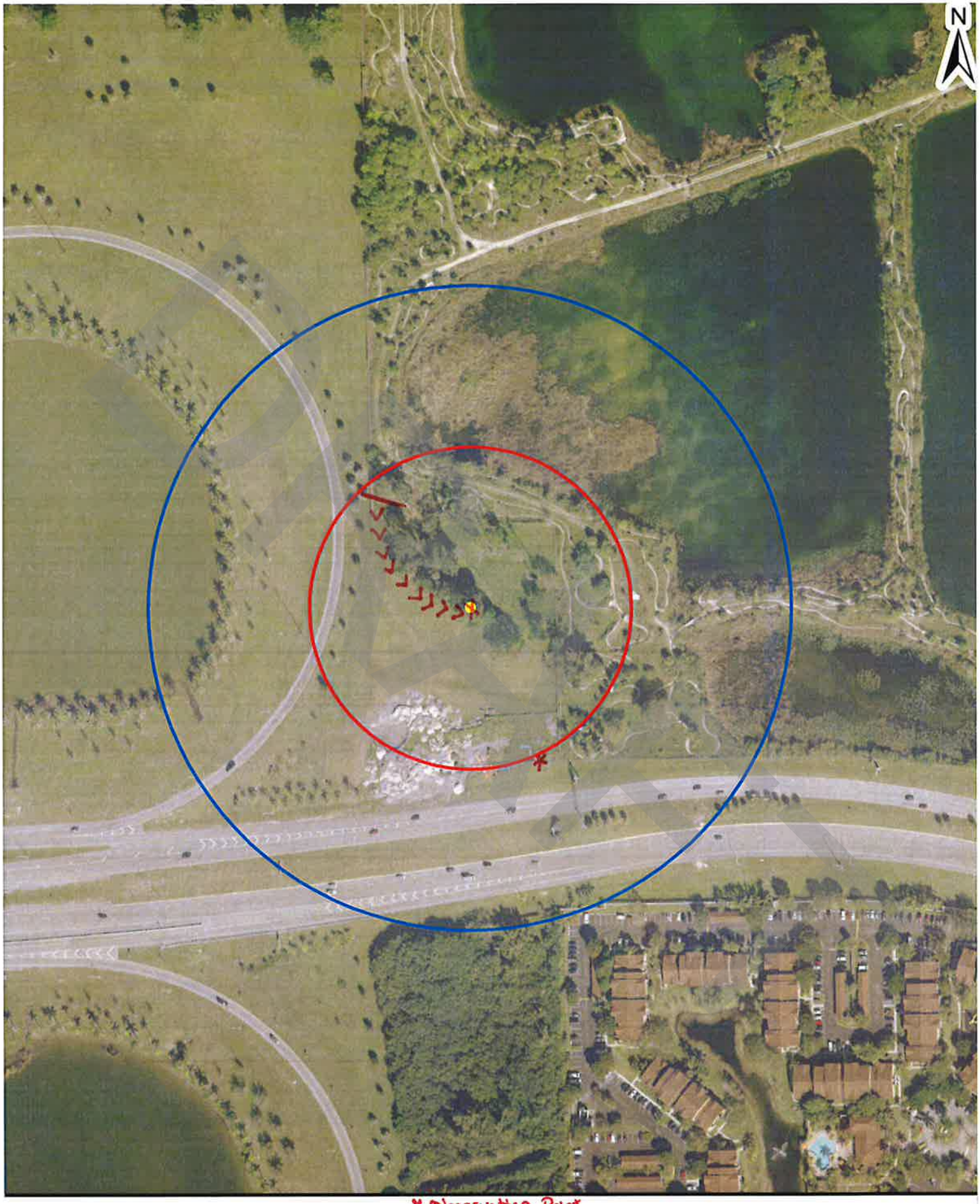
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 69°F	W: N 8mph	C: 5%	P: Ø
8:56 AM	~~Description of ongoing construction events~~: Notes/Comments: One adult eagle flew SW, turned NW, flew over Expressway onramp, over to its open field, picked up nest materials, and returned to Alt. Nest 1. *Lawn Mowing has moved farther east, away from nest area*				
	Notes/Comments:				

Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 69°F	W: N 8mph	C: 5%	P: Ø
9:00 AM	~~Description of ongoing construction events~~: Notes/Comments: No Activity				
	Notes/Comments:				

Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Description of ongoing construction events:				
	Notes/Comments:				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

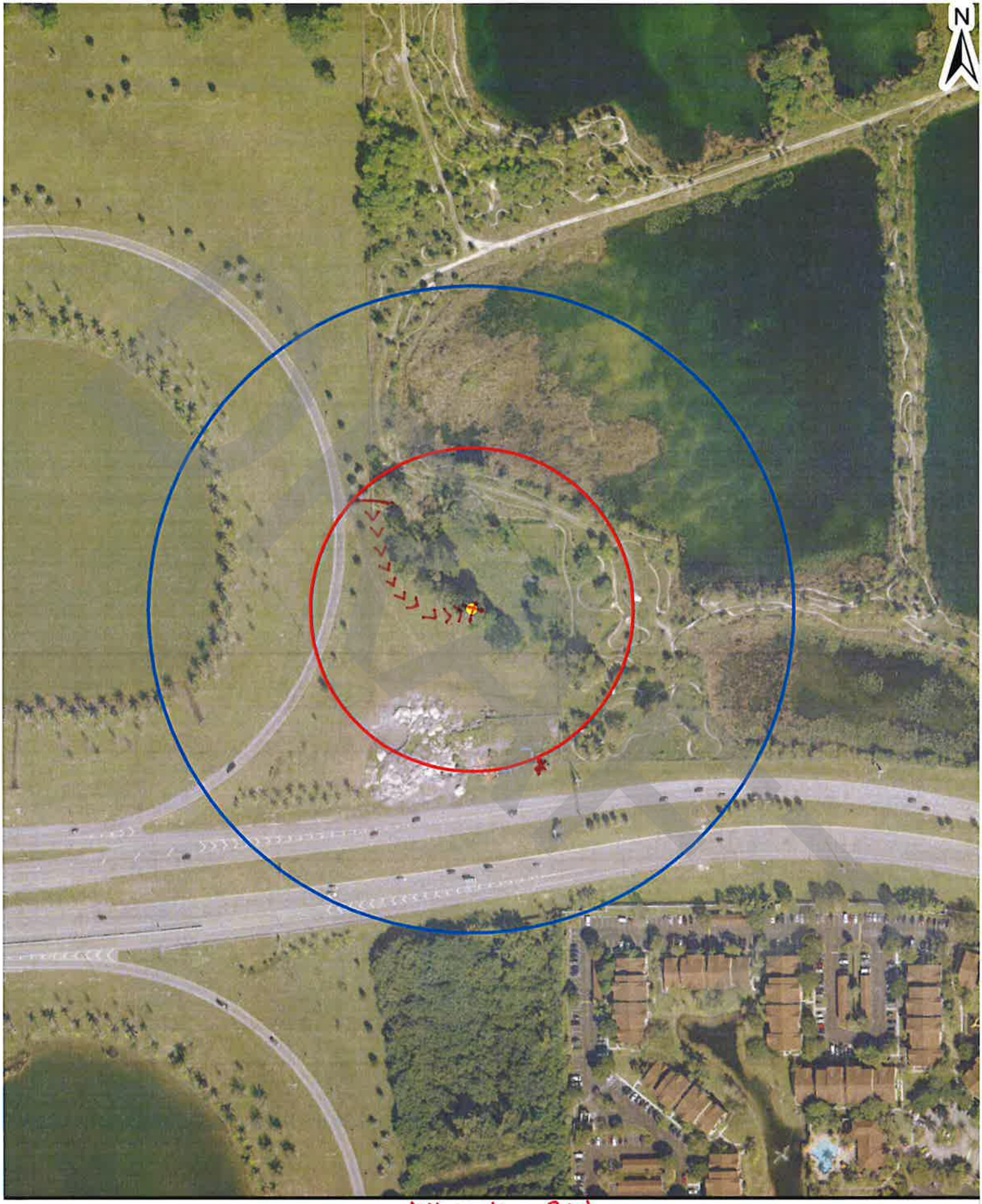
Signature of Monitor _____ Signature of Supervisor _____ 11/01/17 Date



ıte: 11/01/17

ersonnel: Cassandra O'Donahue

me: 7:22 AM



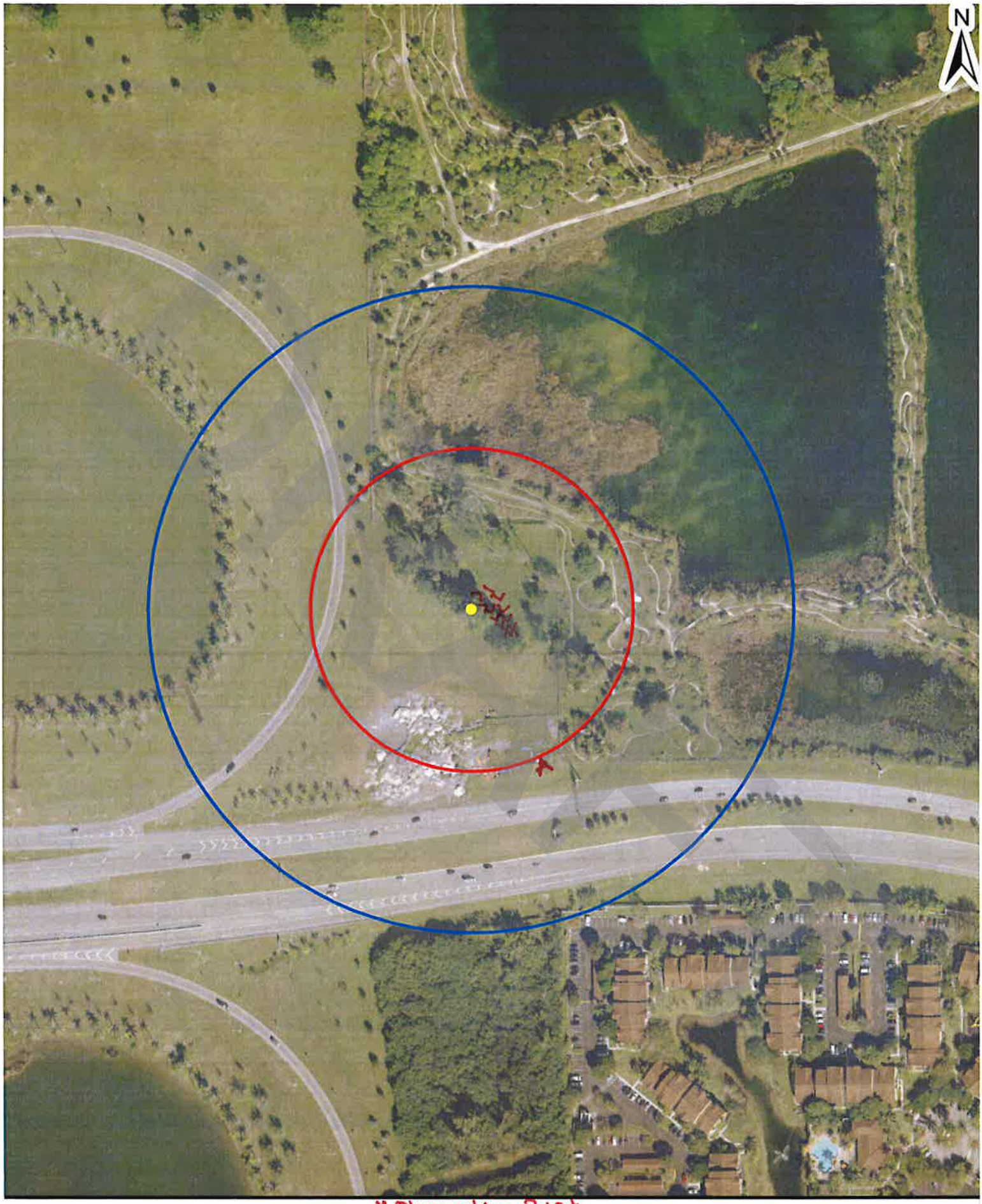
ıte: 11/01/17

ɾrsonnel: Cassandra O'Donahue

me: 7:28 AM

*Observation Point
^Flight Path and Direction
× Pitch Location
— Last Sight

0 62.5125 250 375 500
Fe



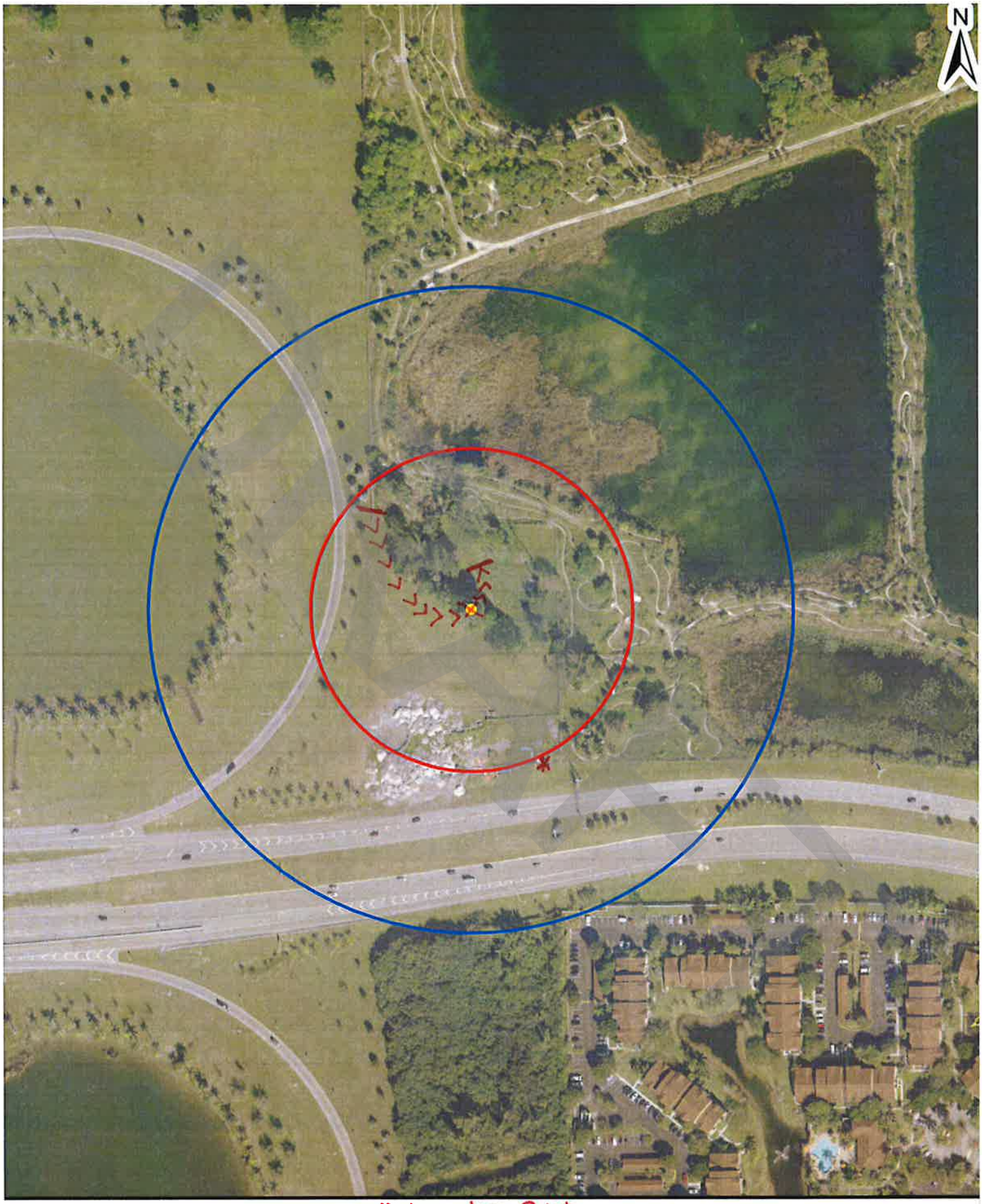
ıte: 11/01/17

ersonnel: Cassandra O'Donahue

me: 7:32 AM

* Observation Point
^ Flight Path and Direction
X Perch Location
— Lost Sight

0 62.5125 250 375 500
Fe



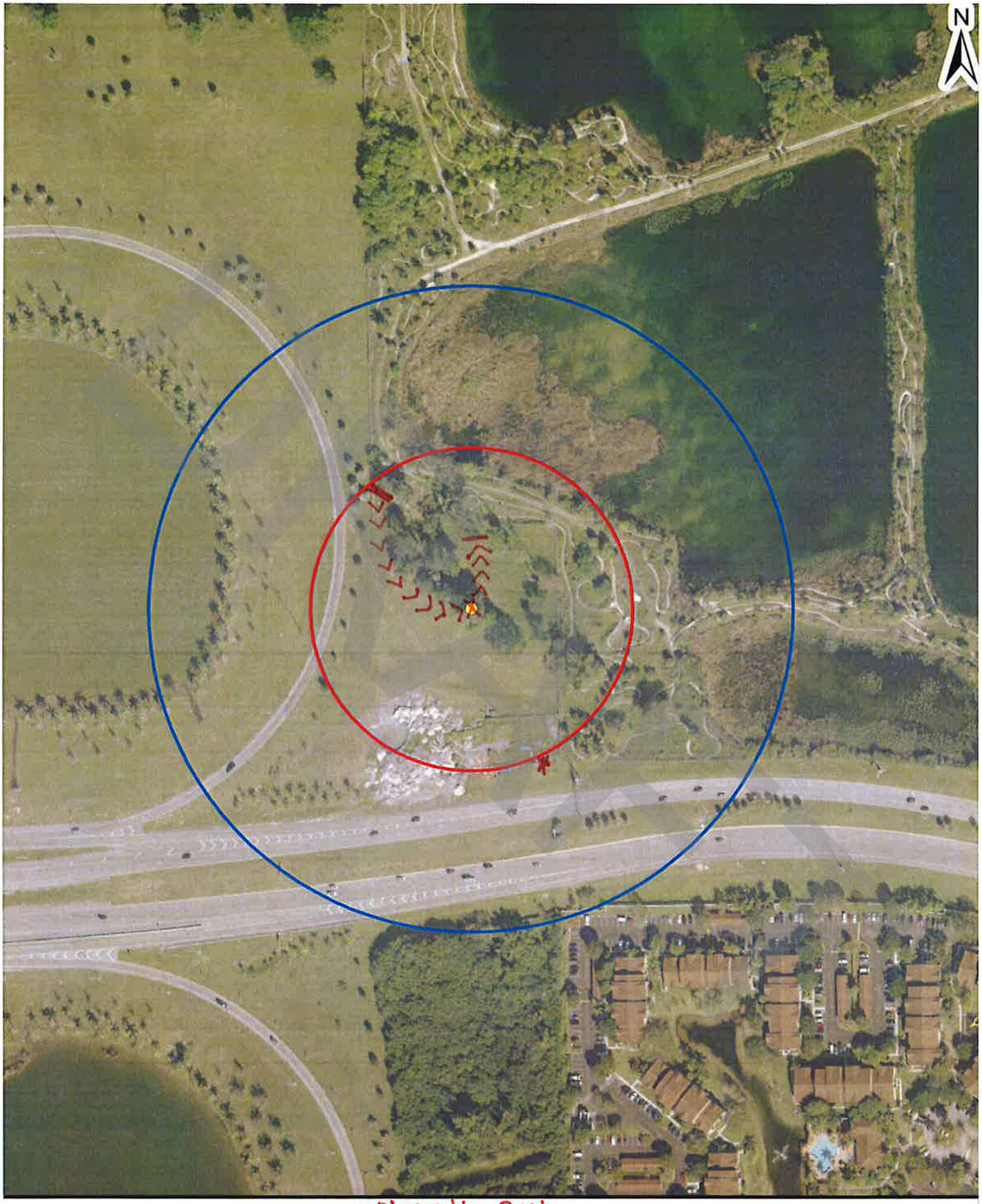
ıte: 11/01/17

ɪrsonnel: Cassandra O'Donahue

me: 7:36 AM

* Observation Point
^ Flight Path and Direction
x Perch Location
— Last Sight

0 62.5125 250 375 500
Fe



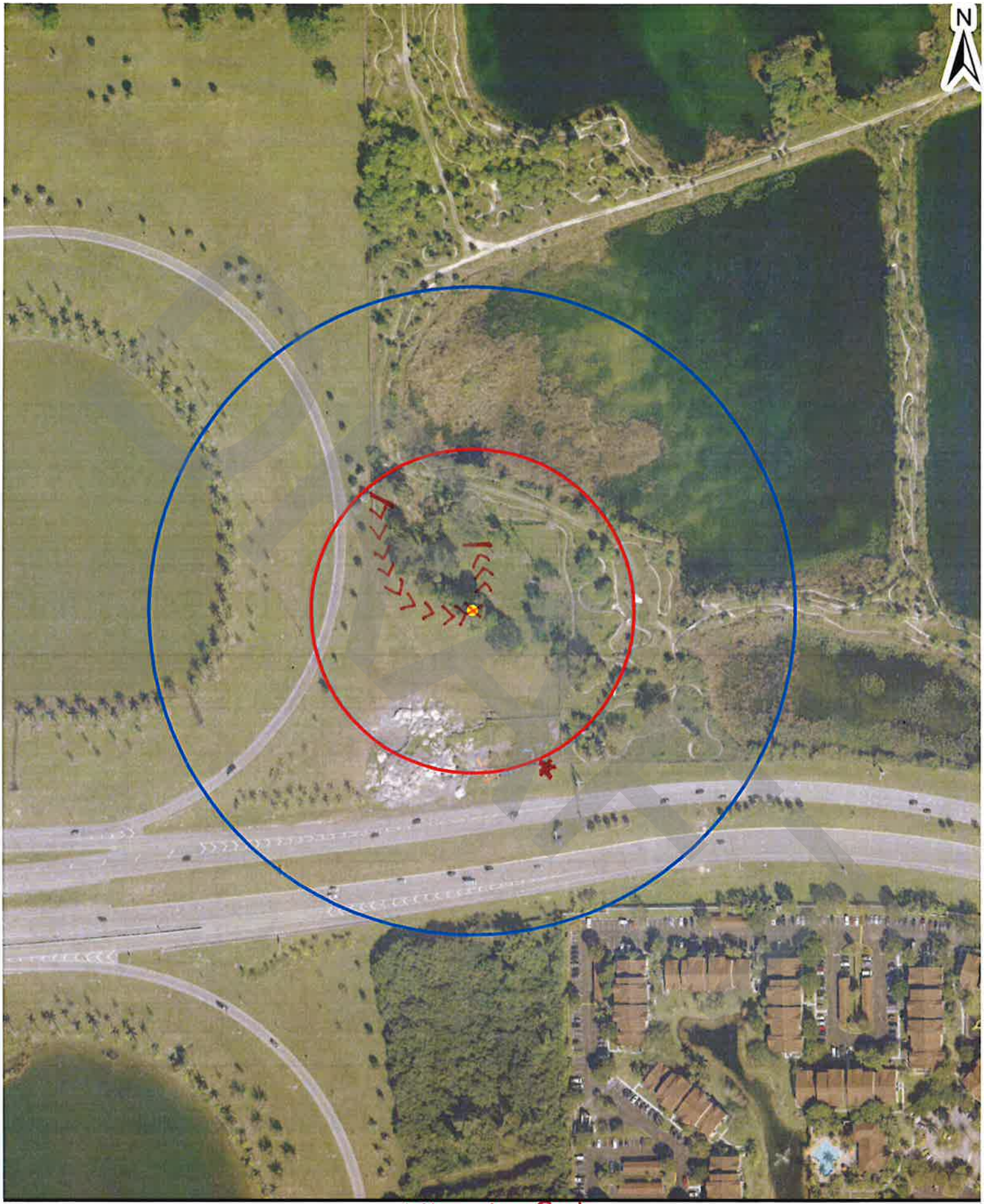
ıte: 11/01/17

ırsonnel: Cassandra O'Donahue

me: 7:40AM

* Observation Point
↖ Flight Path and Direction
× Perch Location
— Lost Sight

0 62.5125 250 375 500
Fe

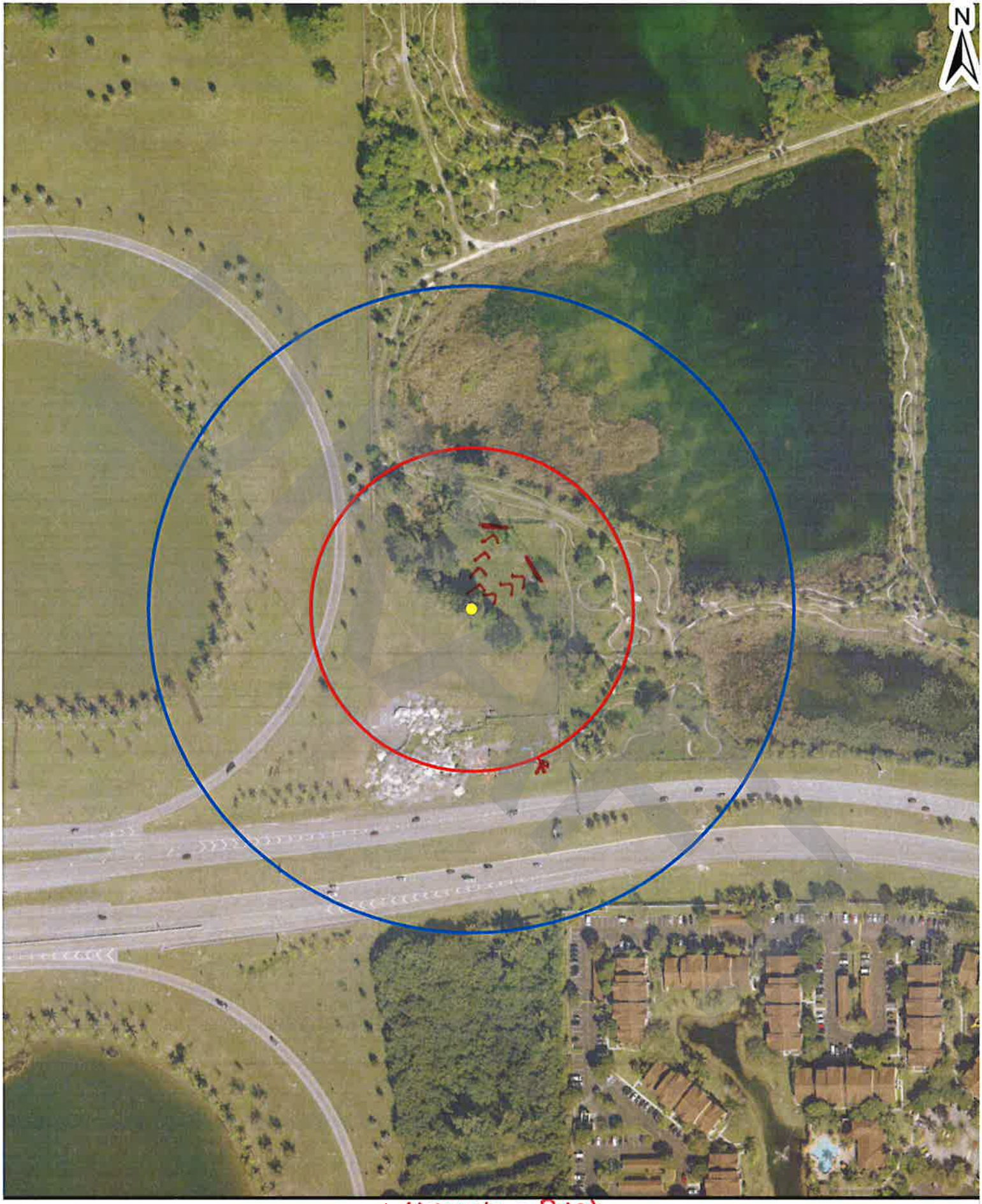


ıte: 11/01/17

ɪrsonnel: Cassandra O'Donahue

ıme: 7:46 AM

*Observation Point
^ Flight Path and Direction
X Perch Location
— Lost Sight

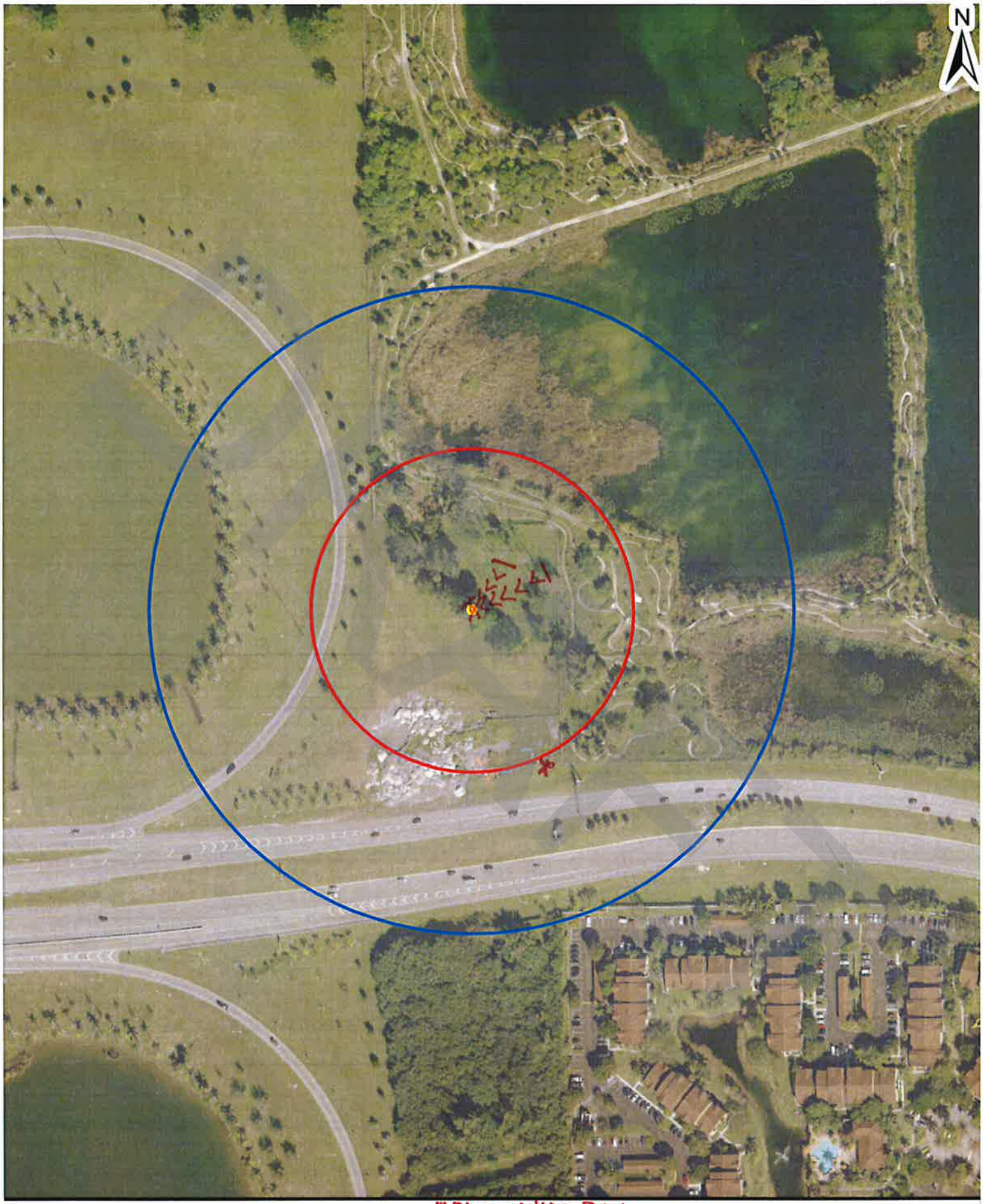


ıte: 11/01/17

ersonnel: Cassandra O'Donahue

me: 7:50 AM

* Observation Point
^ Flight Path and Direction
x Perch Location
— Lost Sight



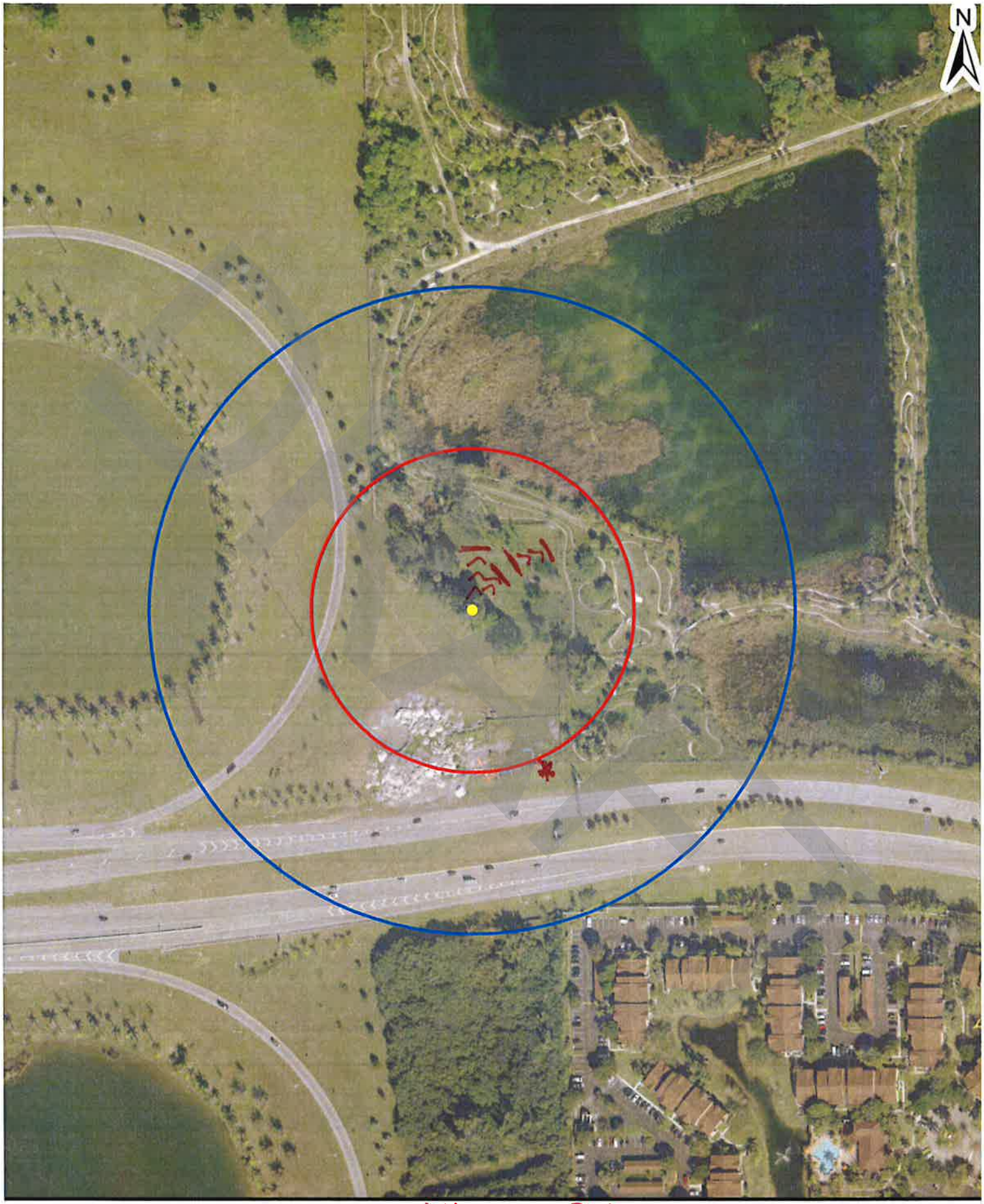
ıte: 11/01/17

ırsonnel: Cassandra O'Donahue

me: 7:55 AM

* Observation Point
↑ Flight Path and Direction
X Perch Location
– Lost Sight

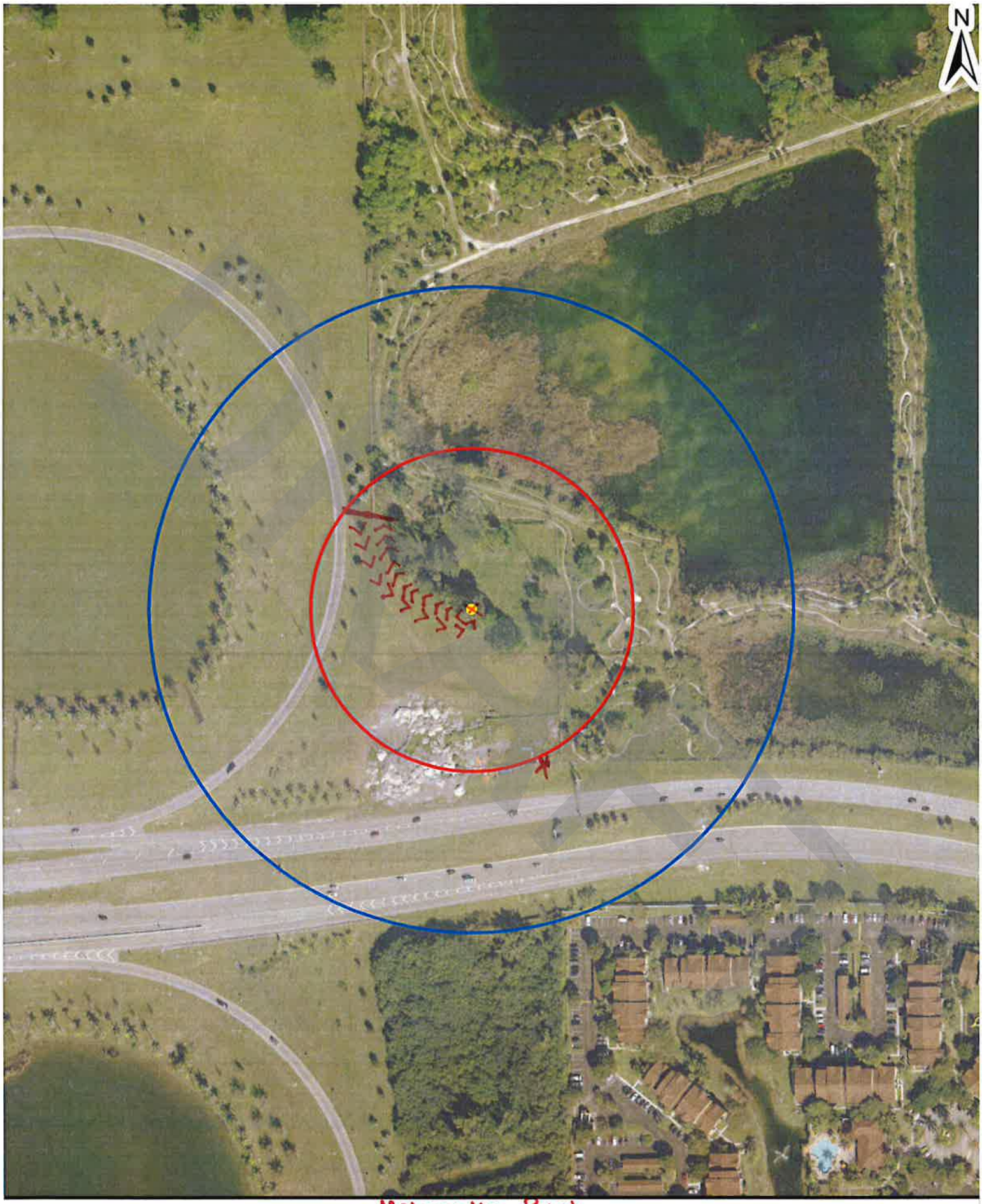
0 62.5125 250 375 500
Fe



ate: 11/01/17
ersonnel: Cassandra O'Donahue
me: 8:02 AM

* Observation Point
^ Flight Path and Direction
x Perch Location
— Lost Sight

0 62.5125 250 375 500
Fe

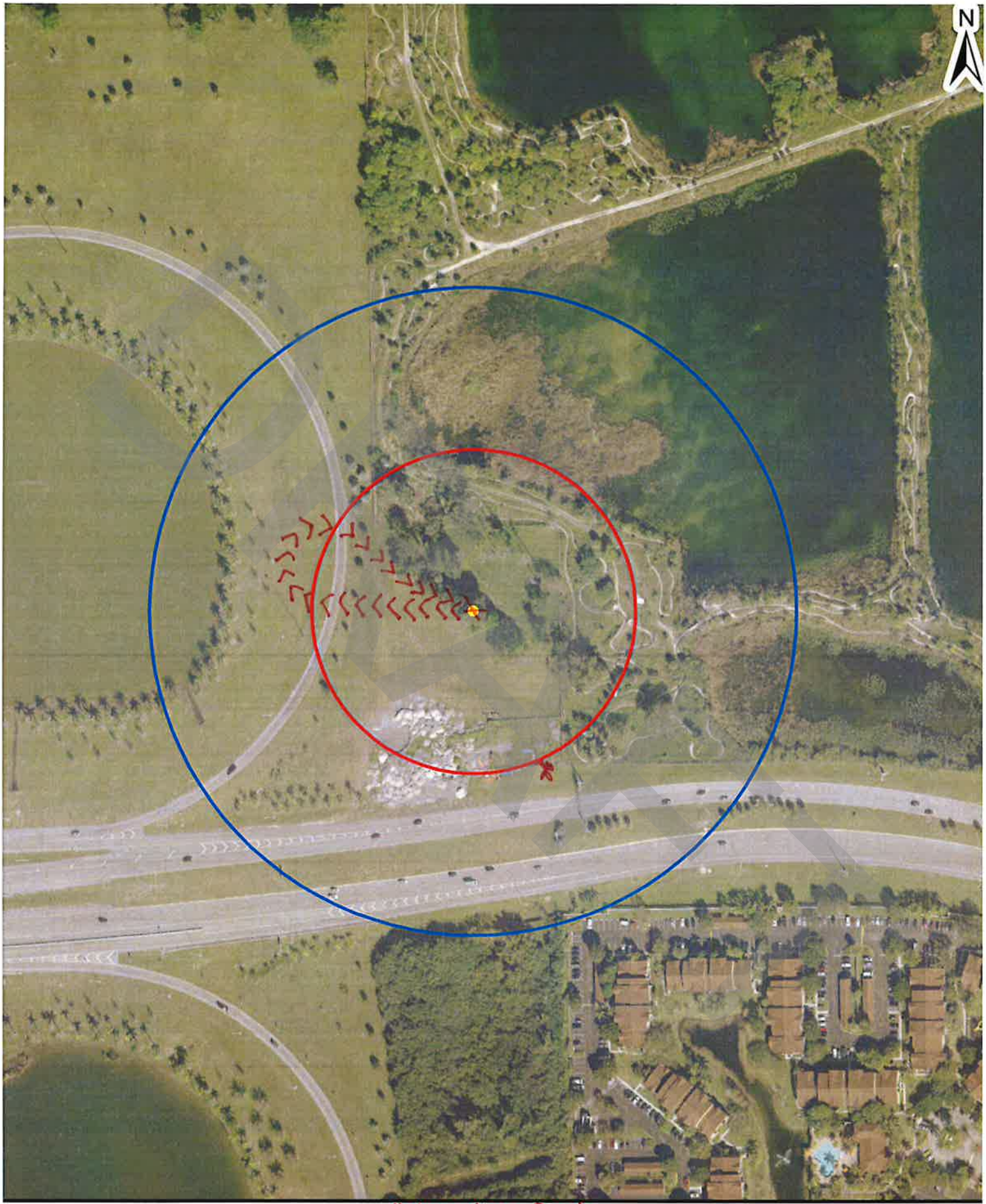


ıte: 11/01/17

ersonnel: Cassandra O'Donahue

me: 8:11 AM

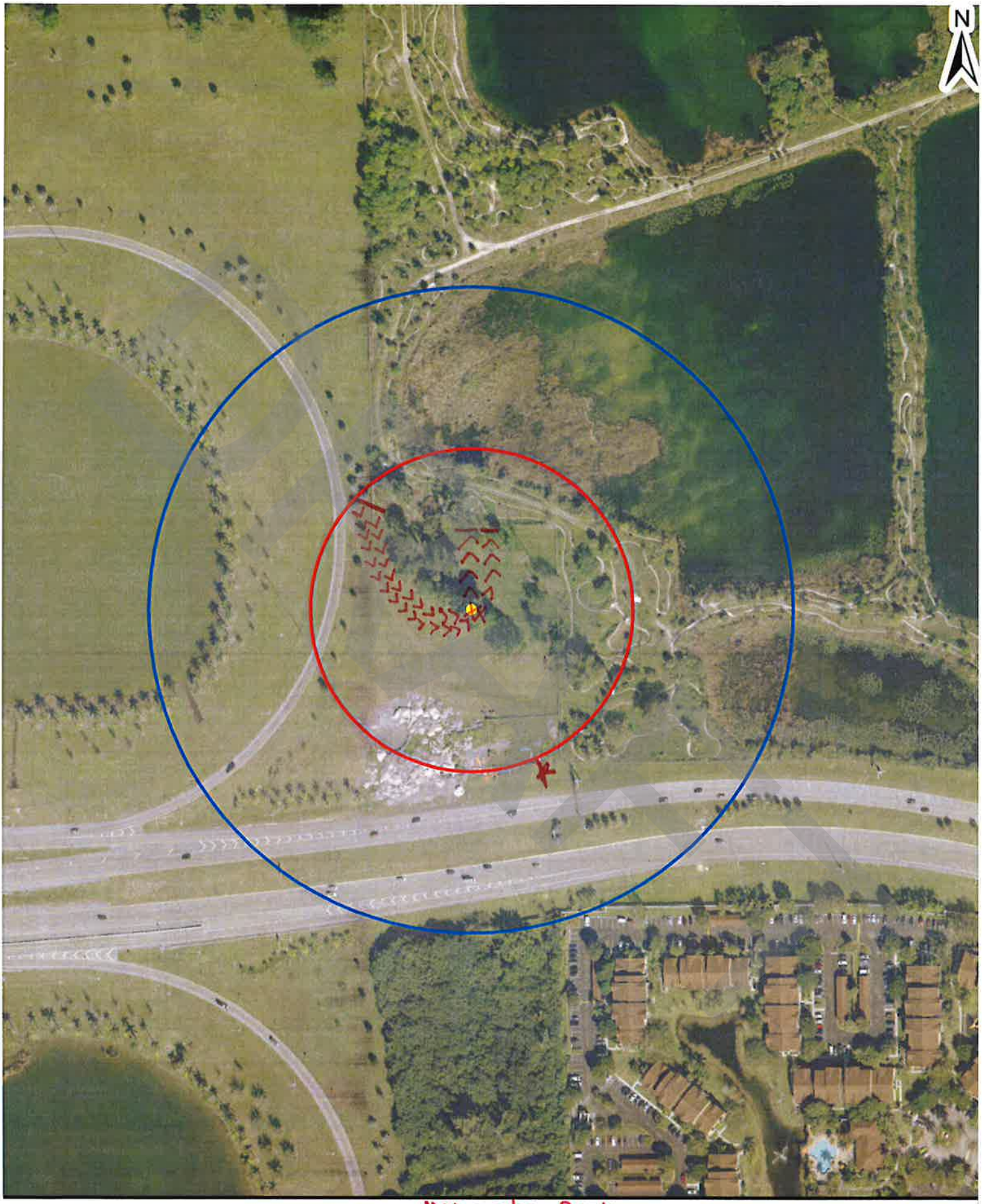
Observation Point
↗ Flight Path and Direction
X Perch Location



ate: 11/01/17

ersonnel: Cassandra O'Donahue

me: 8:16 AM



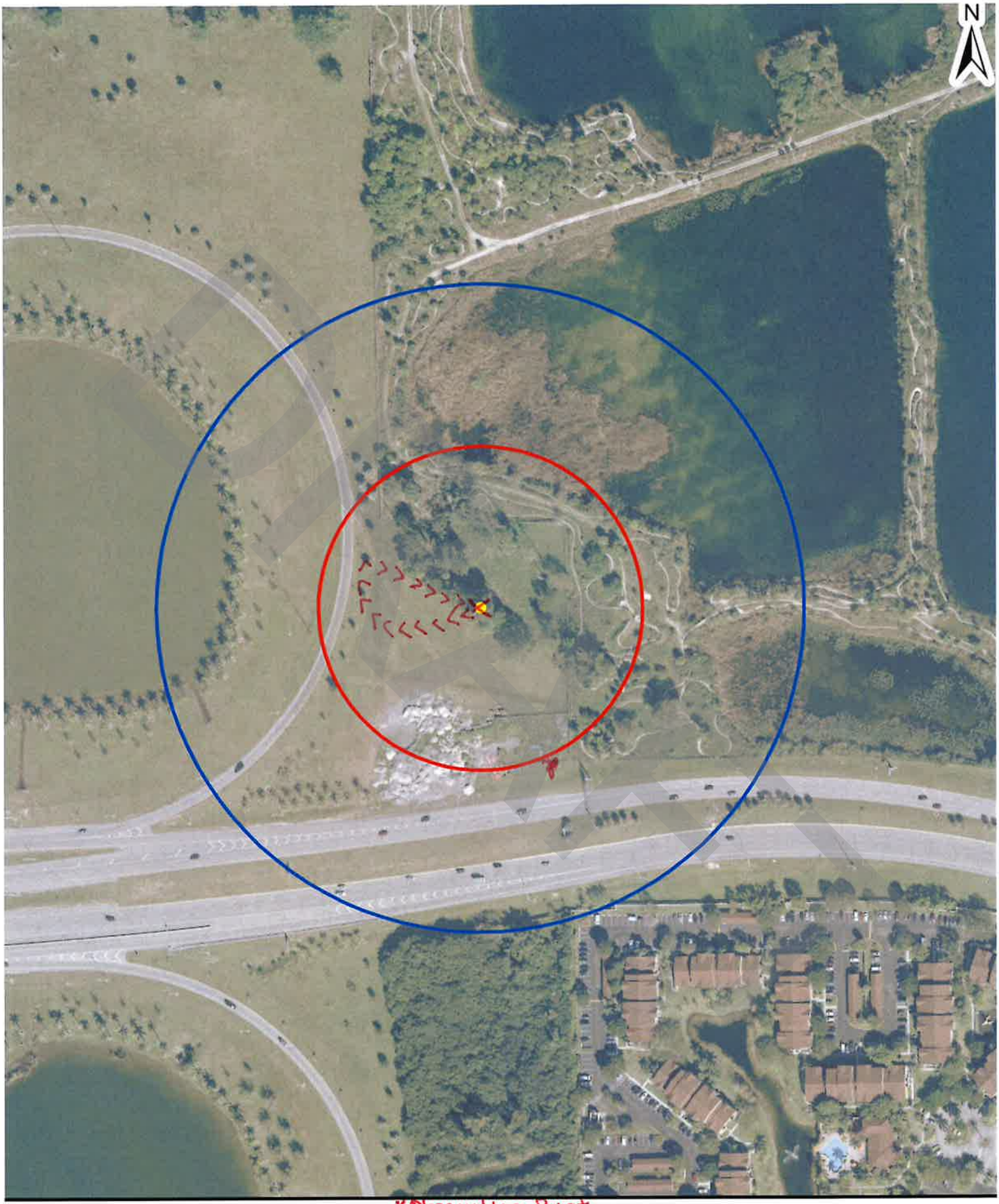
ıte: 11/01/17

ɪrsonnel: Cassandra O'Donahue

me: 8:20 AM

*Observation Point
^Flight Path and Direction
X Perch Location
– Lost Sight

0 62.5125 250 375 500
Fe



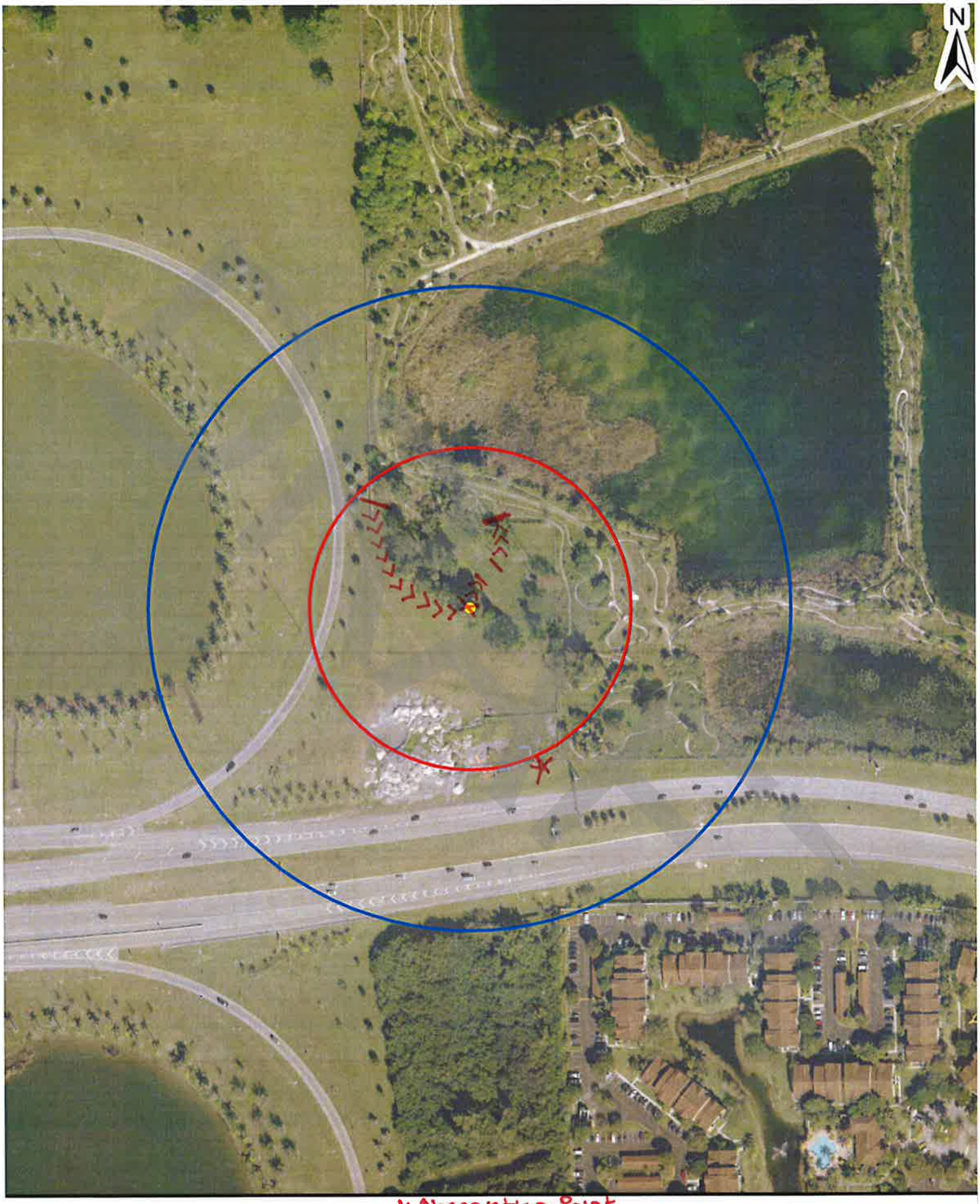
ate: 11/01/17

ersonnel: Cassandra O'Donahue

ime: 8:27

*Observation Point
^Flight Path and Direction
X Perch Location
— Lost Sight

0 62.5 125 250 375 500
Fee

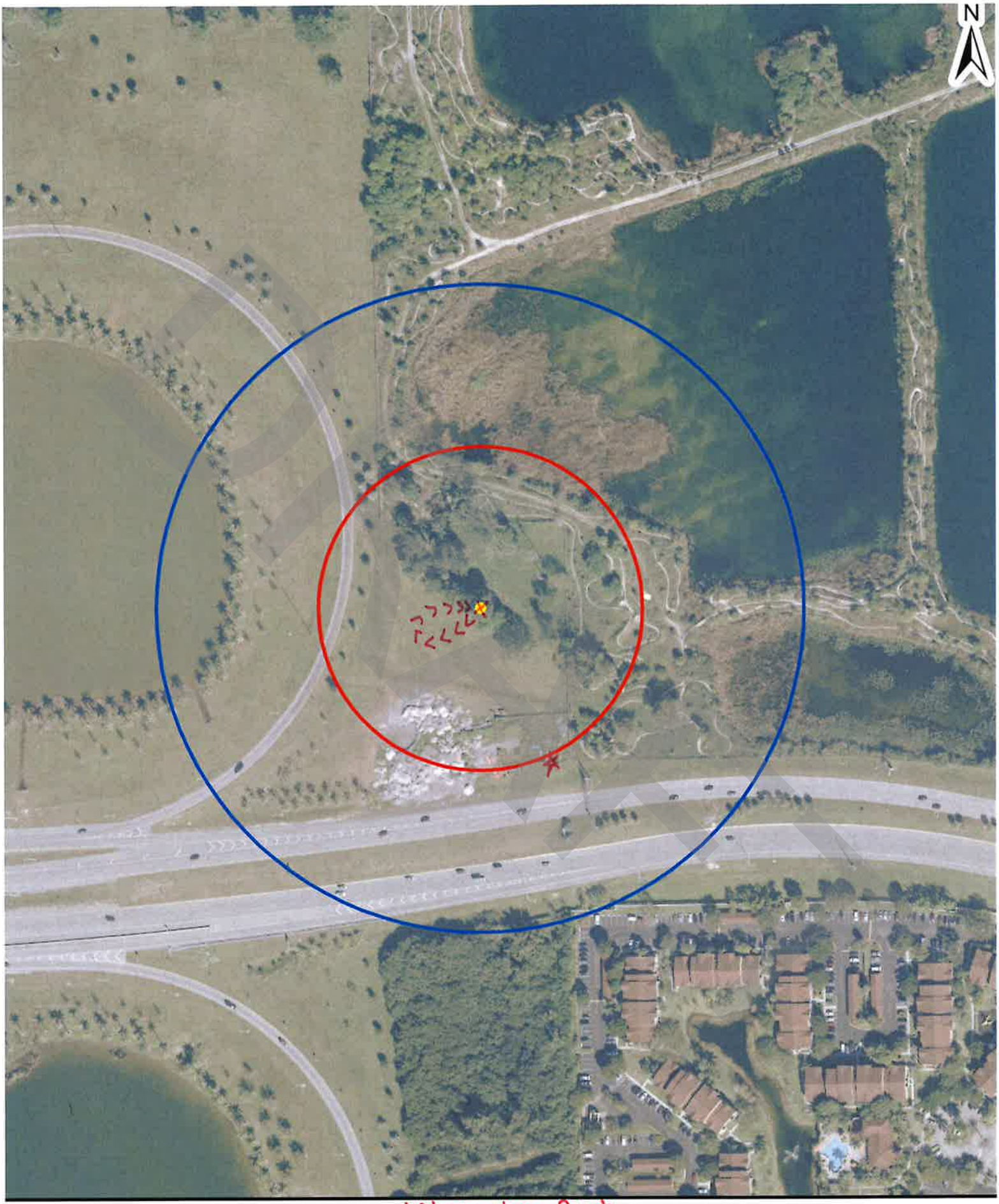


ıte: 11/01/17

ɪrsonnel: Cassandra O'Donahue

me: 8:36AM

* Observation Point
^ Flight Path and Direction
X Perch Location
— Lost Sight



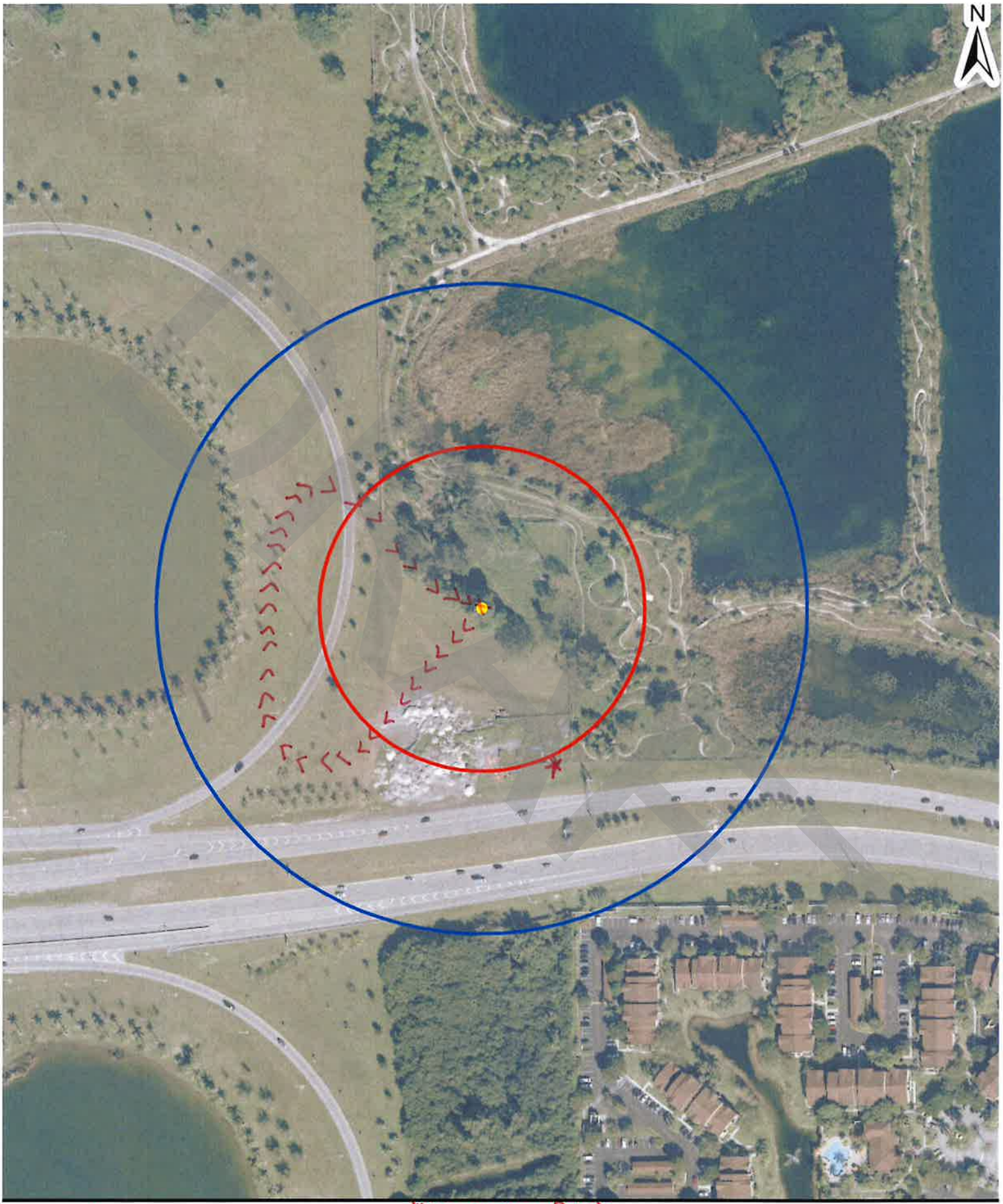
ate: 11/01/17

ersonnel: Cassandra O'Donahue

ime: 8:48 AM

*Observation Point
^Flight Path and Direction
x Perch Location
— Lost Sight

0 62.5 125 250 375 500
Fee



ate: 11/01/17

ersonnel: Cassandra O'Donahue

ime: 8:56 AM

* Observation Point
^ Flight Path and Direction
X Perch Location
– Lost Sight

Bald Eagle Monitoring Data Report

Nest #: Quiet Waters Park, Broward County FL Start Time: 6:10AM Name of Monitor: Cassandra O'Donahue

Date: 11/15/17 End Time: 8:10AM # Adult Present: 2 # Young Present: Ø

Tree Status[1]: L Tree type[2]: H

Time	Behavioral activity observed (list all that apply):				
6:10AM	Weather conditions	T: 70°F	W: NW 5mph	C: 95%	P: Sprinkle on/off
	Notes/Comments: No Activity				
7:10AM	Weather conditions	T: 69°F	W: NW 8mph	C: 90%	P: Light Rain
	Notes/Comments: No Activity				
8:02AM	Weather conditions	T: 70°F	W: NNW 5mph	C: 50%	P: Ø
	Notes/Comments: One adult eagle flew from behind NW corner of treeline up to Alt. Nest 1 with nesting materials. One adult eagle flew up to nest from behind treeline directly N of observation point.				
8:05AM	Weather conditions	T: 71°F	W: NW 3mph	C: 50%	P: Ø
	Notes/Comments: One adult eagle flew N, behind treeline. Two minutes later, other adult eagle flew N, behind treeline.				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Signature of Monitor 11/15/17 Date

Nest #: Quiet Waters Park Broward County, FL Monitoring Date: 11/15/17 Monitor's signature: [signature]

Supervisor's signature: _____

Time 8:10AM	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 71°F	W: NW 3mph	C: 50%	P: Ø
	Description of ongoing construction events: No Activity				
	Notes/Comments: No Activity				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Description of ongoing construction events:				
	Notes/Comments:				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Description of ongoing construction events:				
	Notes/Comments:				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Description of ongoing construction events:				
	Notes/Comments:				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

[signature]
Signature of Monitor

_____
Signature of Supervisor

11/15/17
Date

Bald Eagle Monitoring Data Report

Nest #: Quiet Waters Park, Broward County FL Start Time: 6:20AM Name of Monitor: Cassandra O'Donahue

Date: 11/30/17 End Time: 8:20AM # Adult Present: 2 # Young Present: Ø

Tree Status[1]: L Tree type[2]: P

Time	Behavioral activity observed (list all that apply):				
6:20AM	Weather conditions	T: 73°F	W: NNE 6mph	C: 40%	P: Ø
	Notes/Comments: No Activity				
6:31AM	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 73°F	W: NE 13mph	C: 35%	P: Ø
	Notes/Comments: One adult eagle flew from behind treeline to the North, south over the open field, and looped back around to Alt. Nest 1. Then flew back North behind the treeline				
7:11AM	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 74°F	W: ENE 8mph	C: 20%	P: Ø
	Notes/Comments: One adult eagle flew from behind treeline to the north, eastward, behind the treeline to the east.				
7:21AM	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 74°F	W: NE 7mph	C: 15%	P: Ø
	Notes/Comments: One adult eagle flew from behind eastern treeline up to Alt. Nest 1 with nest materials. Second adult eagle got up from nest and flew behind eastern treeline.				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Cassandra O'Donahue
Signature of Monitor

11/30/17
Date

Nest #: Quiet Waters Park Broward County, FL Monitoring Date: 11/30/17 Monitor's signature: Conn O'Dell

Supervisor's signature: _____

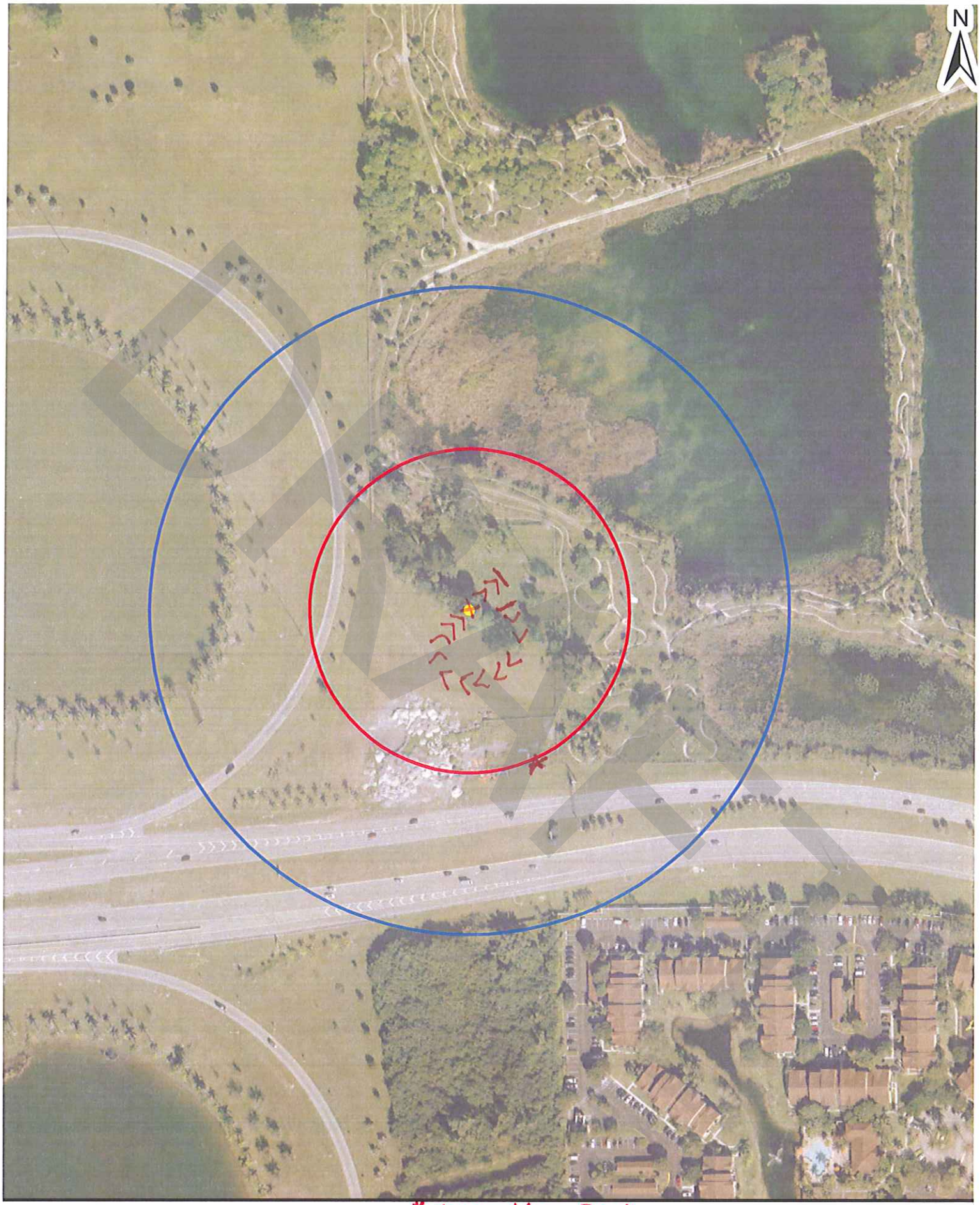
Time: 7:42 AM	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 74°F	W: ENE 11mph	C: 15%	P: 0
	~~Description of ongoing construction events~~: Notes/Comments: One adult eagle flew to Alt. Nest 1 with nest material from NW corner of treeline. Second adult eagle flew from Alt Nest 1 to tree of Nest BO003 and perched.				
	Notes/Comments:				
Time: 8:20 AM	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 75°F	W: NE 11mph	C: 25%	P: 0
	~~Description of ongoing construction events~~: Notes/Comments: One adult eagle still perched in tree of Nest BO003.				
	Notes/Comments:				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Description of ongoing construction events:				
	Notes/Comments:				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Description of ongoing construction events:				
	Notes/Comments:				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Conn O'Dell
Signature of Monitor

_____
Signature of Supervisor

11/30/17
Date

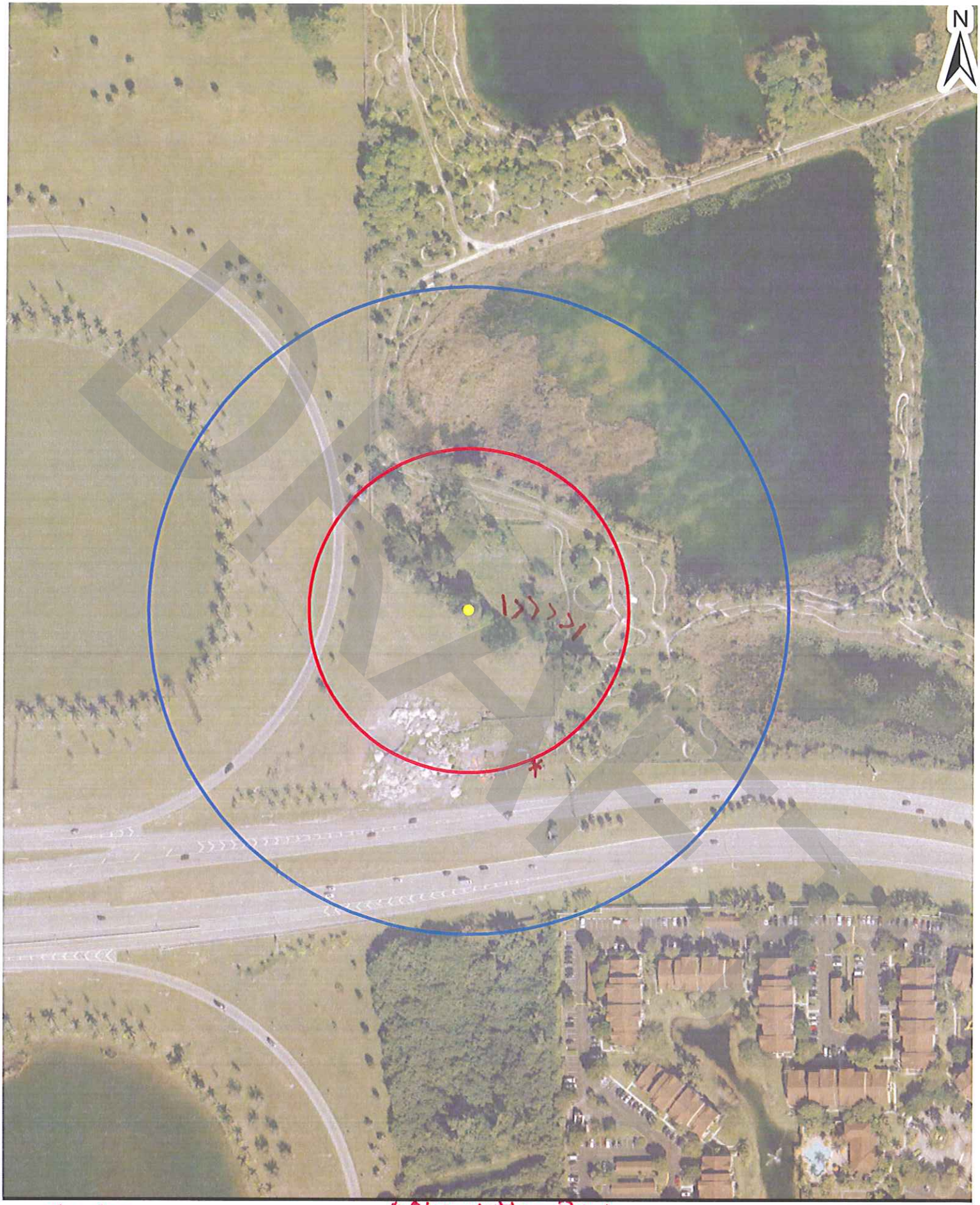


ıte: 11/30/17

ersonnel: Cassandra O'Donahue

me: 6:31 AM

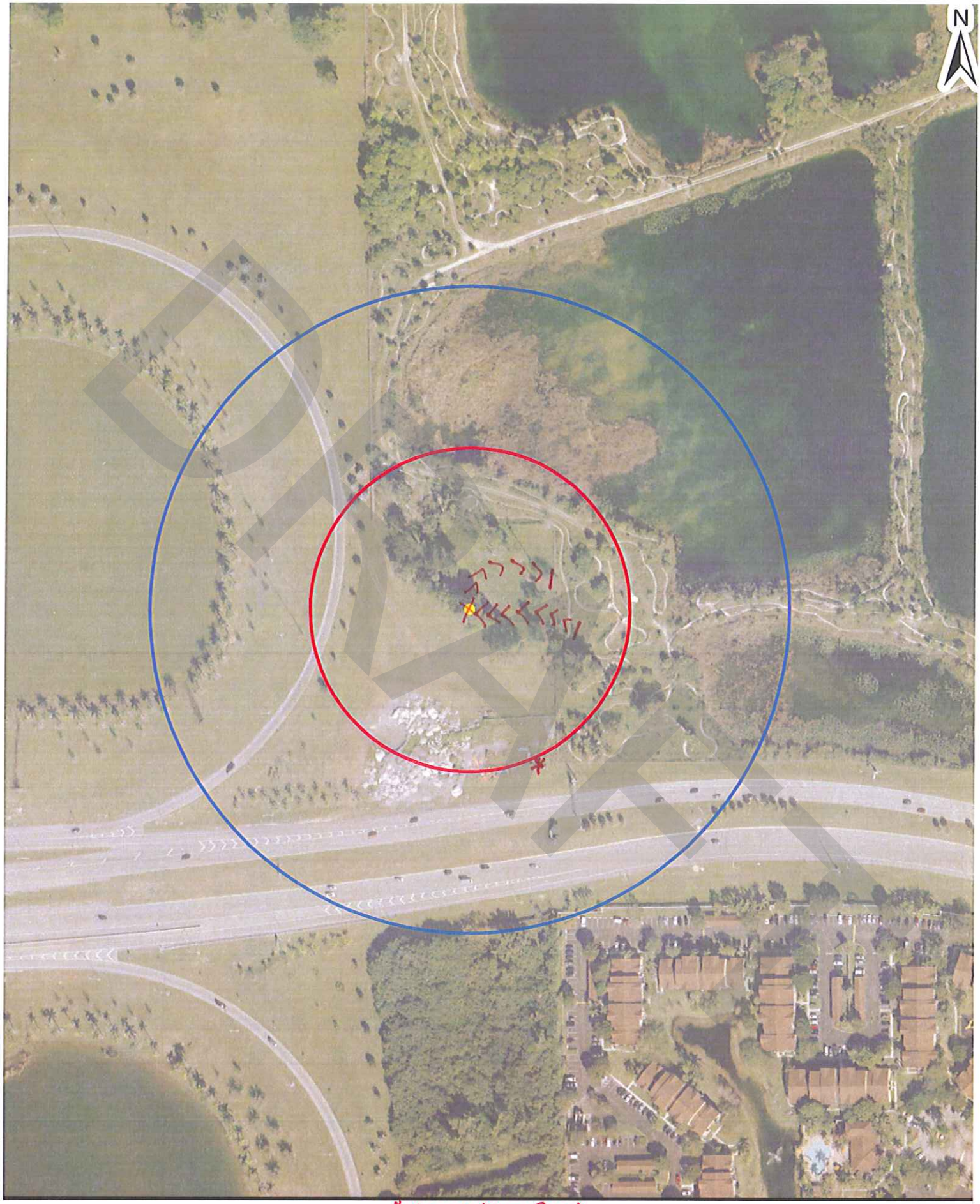
*Observation Point
↑Flight Path and Direction
X Perch Location
—Lost Sight



ıte: 11/30/17

ersonnel: Cassandra O'Donahue

me: 7:17 AM

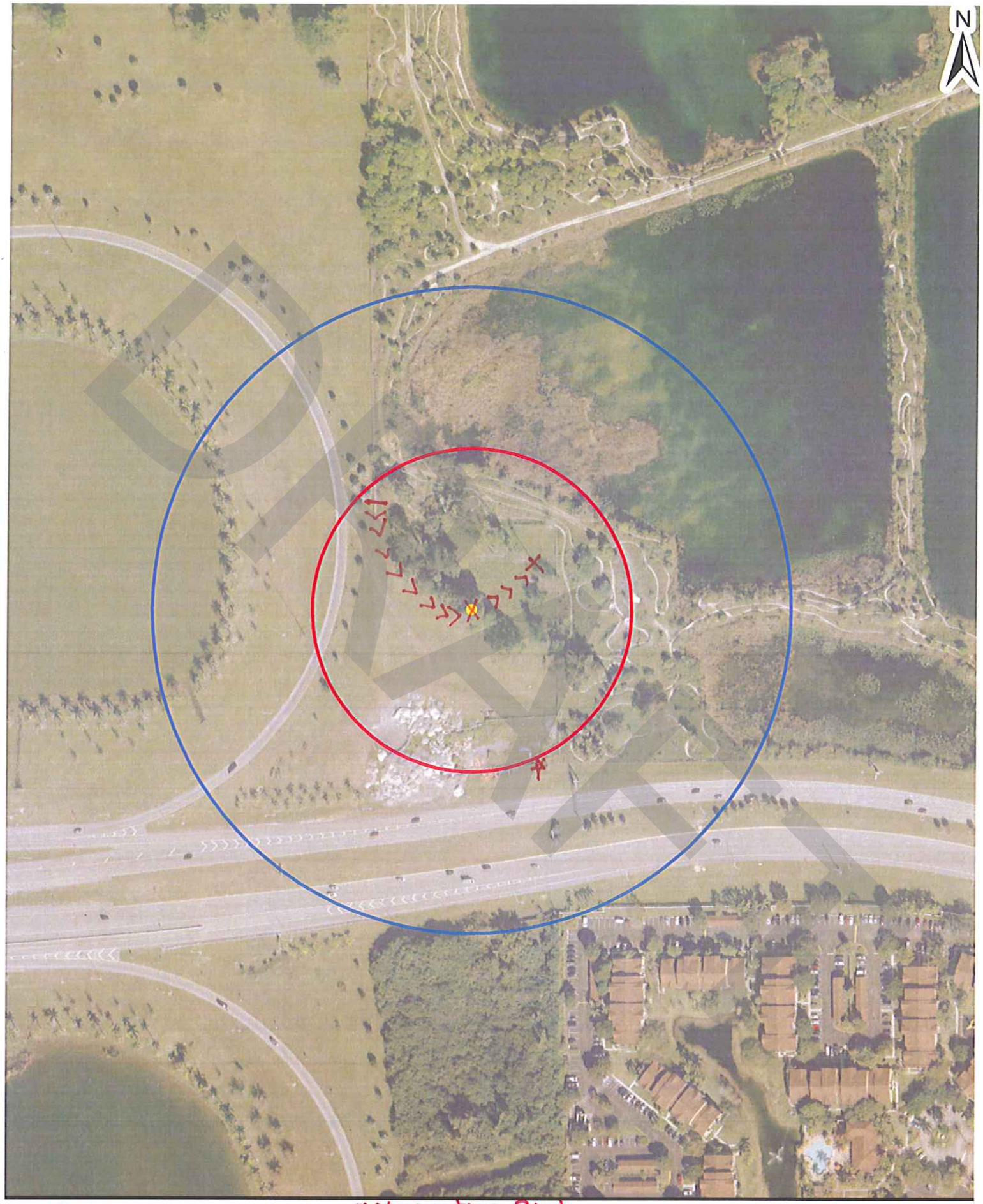


ıte: 11/30/17

ersonnel: Cassandra O'Donahue

me: 7:27 AM

*Observation Point
↑ Flight Path and Direction
X Perch Location
– Lost Sight

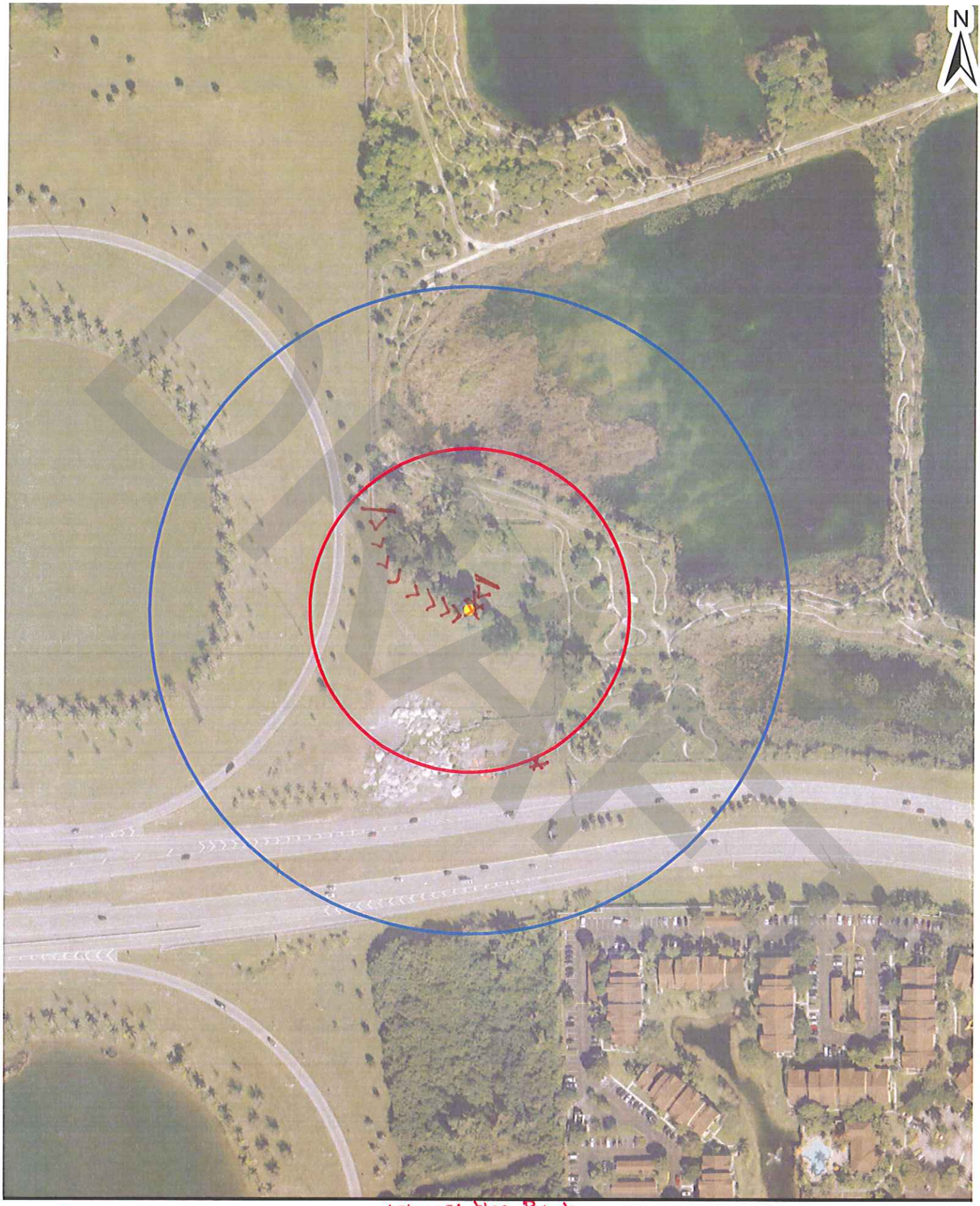


ıte: 11/30/17

ersonnel: Cassandra O'Donahue

me: 7:42 AM

* Observation Point
^ Flight Path and Direction
X Perch Location
– Lost Sight



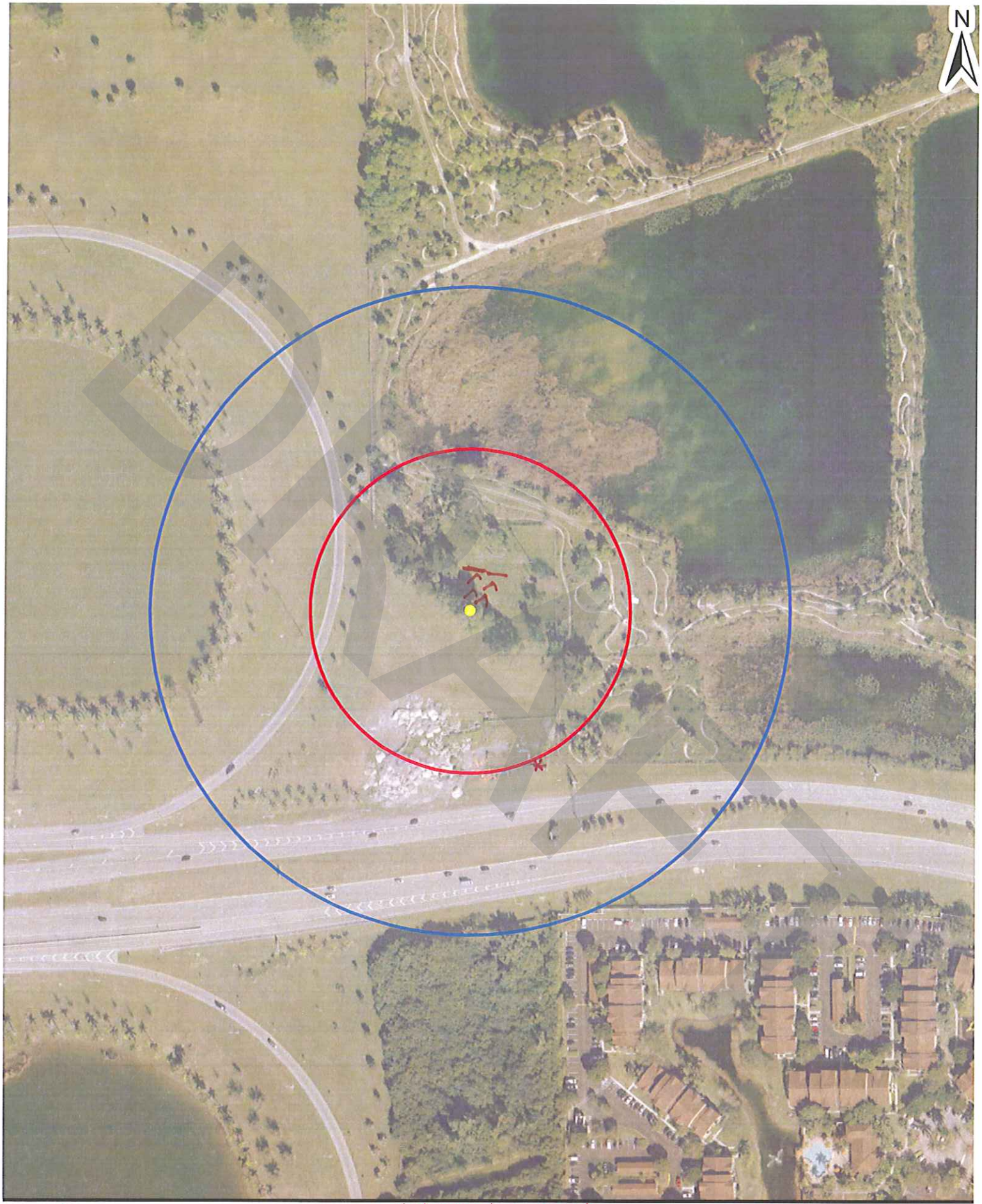
ıte: 11/15/17

ersonnel: Cassandra O'Donahue

me: 8:02 AM

*Observation Point
^Flight Path and Direction
x Perch Location
— Lost Sight

0 62.5125 250 375 500
Fe



ıte: 11/15/17

ersonnel: Cassandra O'Donahue

me: 8:08AM

*Observation Point
^ Flight Path and Direction
x Perch Location
– Lost Sight

Bald Eagle Monitoring Data Report

Nest #: Quiet Waters Park, Broward County FL Start Time: 6:30 AM Name of Monitor: Cassandra O'Donahue

Date: 12/15/17 End Time: 8:30 AM # Adult Present: 2 # Young Present: Ø

Tree Status[1]: L Tree type[2]: P

Time	Behavioral activity observed (list all that apply):				
6:30 AM	Weather conditions	T: 57°F	W: NW 4mph	C: Ø	P: Ø
	Notes/Comments: One adult eagle perched on upper branches of Alt. Nest 1 tree.				
Time	Behavioral activity observed (list all that apply):				
6:39 AM	Weather conditions	T: 57°F	W: NNW 3mph	C: Ø	P: Ø
	Notes/Comments: One adult eagle flew from perch, behind treeline to the north.				
Time	Behavioral activity observed (list all that apply):				
7:09 AM	Weather conditions	T: 57°F	W: E 2mph	C: Ø	P: Ø
	Notes/Comments: One adult eagle flew from behind far NW corner of treeline with nest material to Alt. Nest 1. A second adult eagle popped its head up from the nest. One adult eagle flew North behind treeline.				
Time	Behavioral activity observed (list all that apply):				
7:57 AM	Weather conditions	T: 61°F	W: Ø	C: Ø	P: Ø
	Notes/Comments: One adult eagle flew south from behind N treeline, then flew NW, over the Turnpike exit ramp, picked up nest materials, and flew back to Alt. Nest 1. Then flew N, behind treeline.				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Cassandra O'Donahue
Signature of Monitor

12/15/17
Date

Nest #: Quiet Waters Park Broward County, FL Monitoring Date: 12/15/17 Monitor's signature: Lm O'Dell

Supervisor's signature: _____

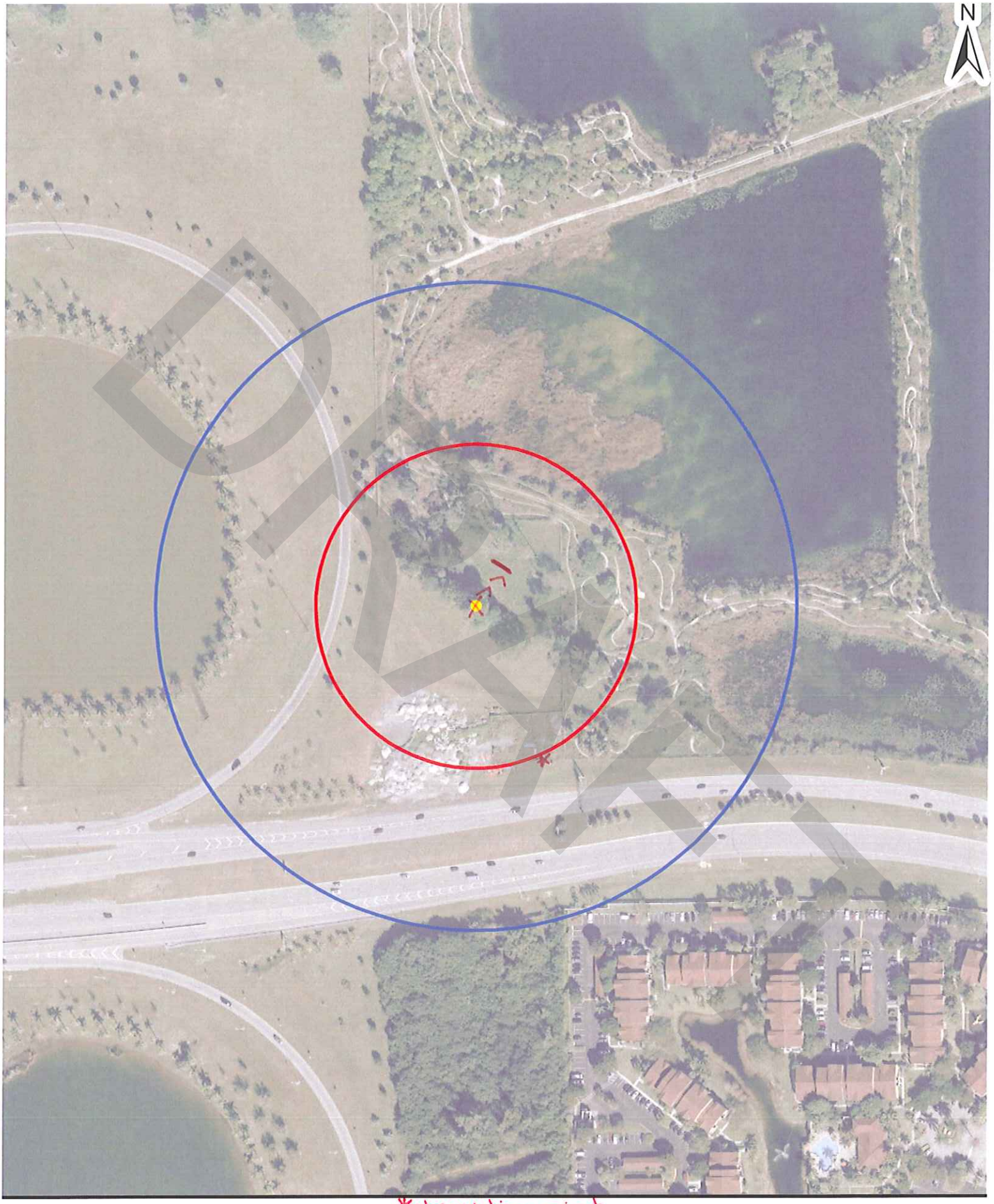
Time	Behavioral activity observed (list all that apply):				
8:30 AM	Weather conditions	T: 63° F	W: NW 2mph	C: Ø	P: Ø
	Description of ongoing construction events: No activity				
	Notes/Comments: No Activity				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Description of ongoing construction events:				
	Notes/Comments:				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Description of ongoing construction events:				
	Notes/Comments:				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Description of ongoing construction events:				
	Notes/Comments:				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Lm O'Dell
Signature of Monitor

_____
Signature of Supervisor

12/15/17
Date

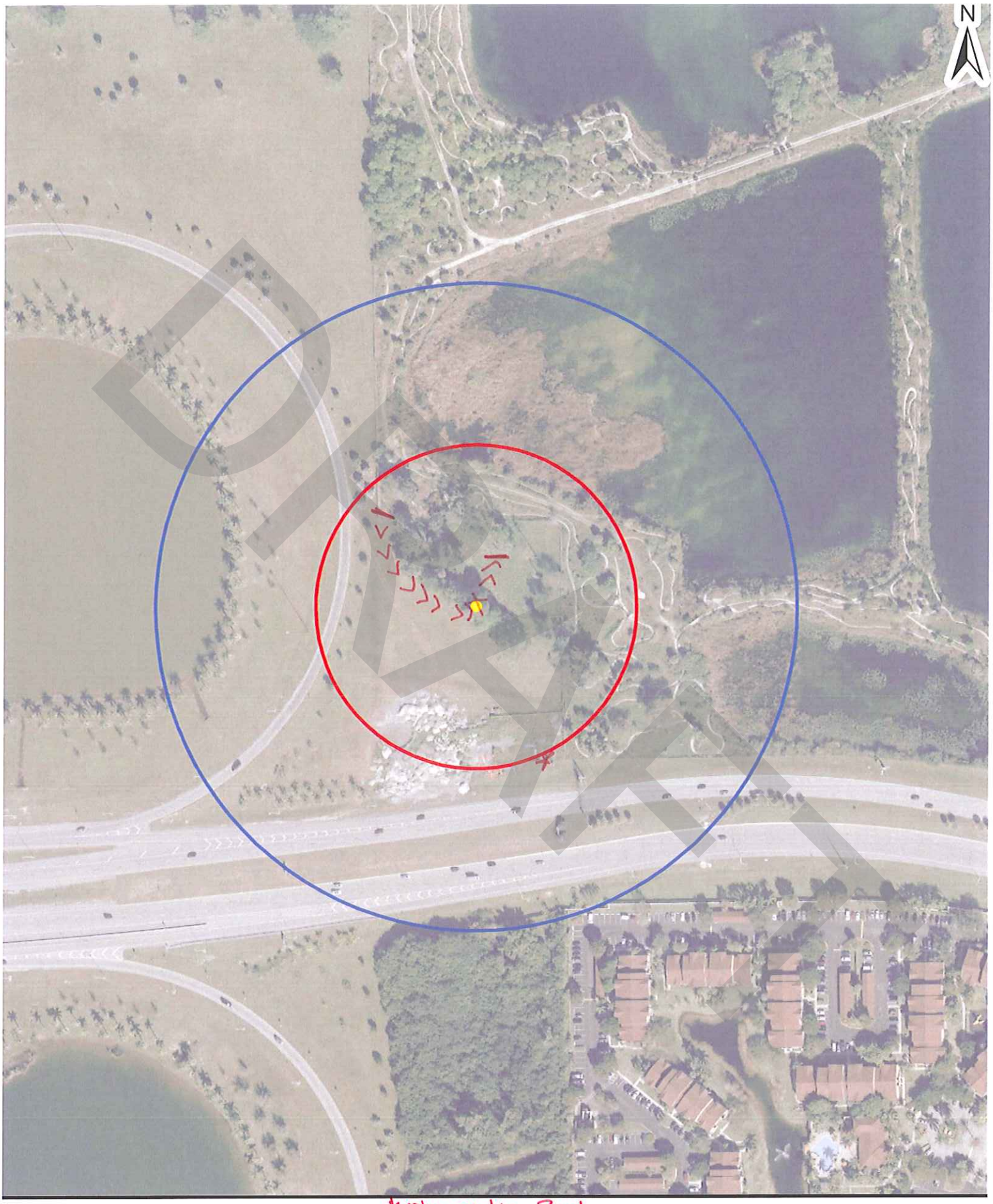


ate: 12/15/17

ersonnel: Cassandra O'Donahue

ime: 6:39 AM

*observation point
^flight path and direction
x perch location
→ lost sight

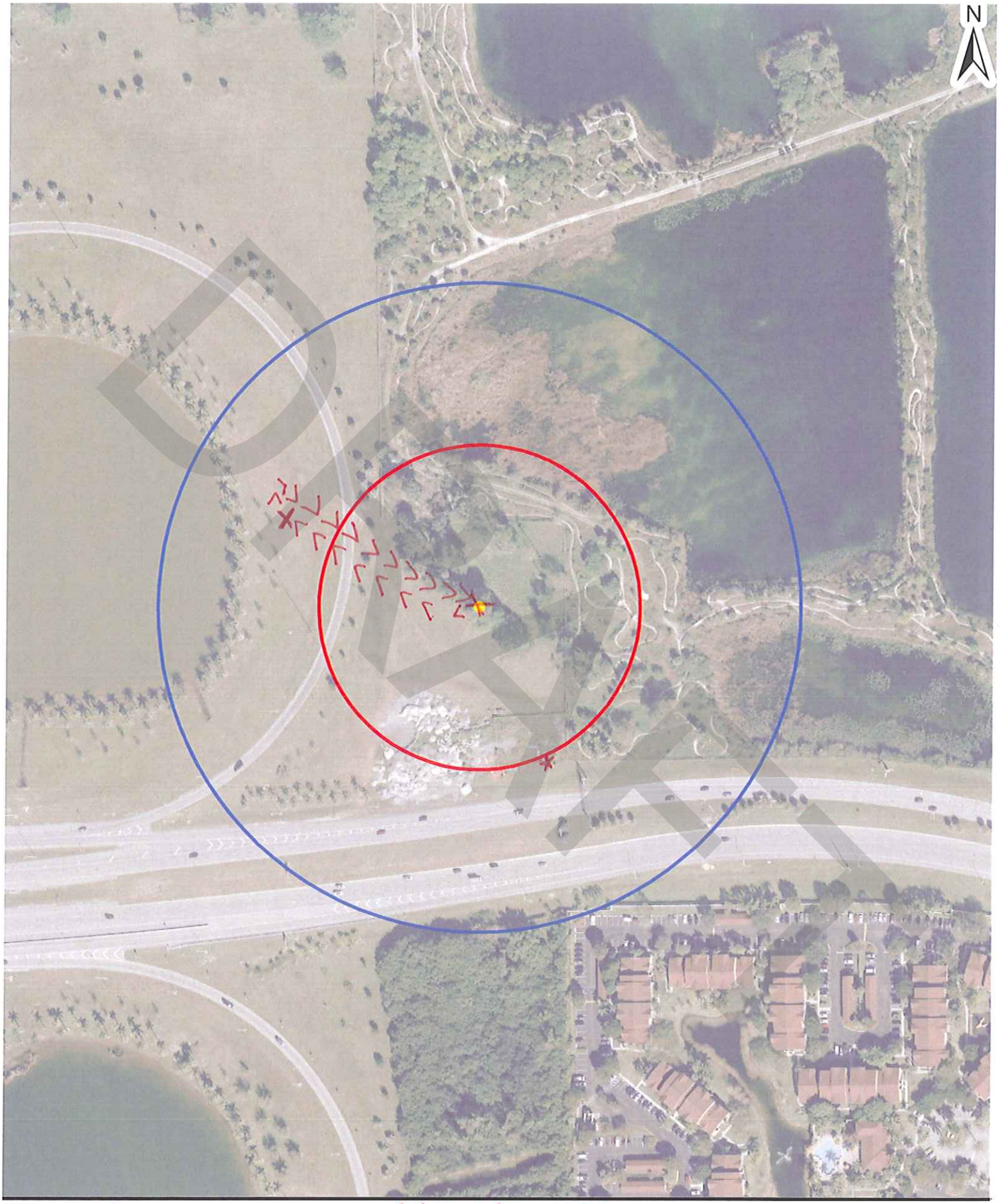


ate: 12/15/17

ersonnel: Cassandra O'Donahue

ime: 7:09 AM

* Observation Point
↑ Flight Path and Direction
X perch location
– lost sight



ate: 12/15/17

ersonnel: Cassandra O'Donahue

ime: 7:57 AM

*observation point
^flight path and direction
Xperch location
– lost sight

0 62.5 125 250 375 500
Fee

Bald Eagle Monitoring Data Report

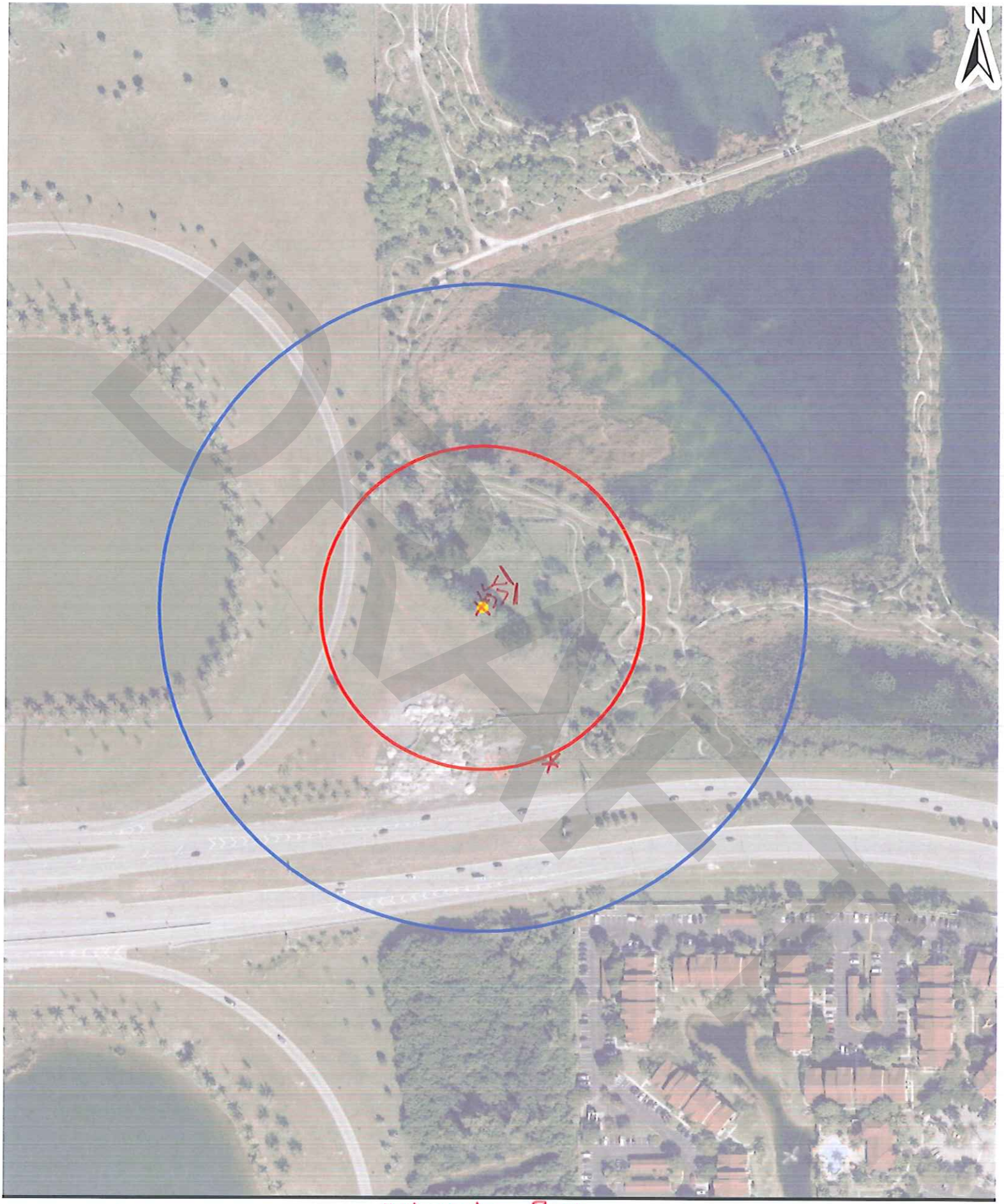
Nest #: Quiet Waters Park, Broward County FL
Start Time: 6:37 AM Name of Monitor: Cassandra O'Donahue
Date: 12/29/17 End Time: 8:37 AM # Adult Present: 1 # Young Present: Ø
Tree Status[1]: L Tree type[2]: P

Time: 6:49 AM	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 61°F	W: NW 10mph	C: 100%	P: Ø
	Notes/Comments: One adult eagle flew from Alt. Nest 1 downwards, behind treeline to the North. Then flew back up to Alt. Nest 1.				
Time: 8:06 AM	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 61°F	W: NNW 4mph	C: 100%	P: Ø
	Notes/Comments: One adult eagle flew from Alt. Nest 1 to a perch on a tree directly North of the observation point, then flew back up to Alt. Nest 1.				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Notes/Comments:				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Notes/Comments:				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Cassandra O'Donahue
Signature of Monitor

12/29/17
Date

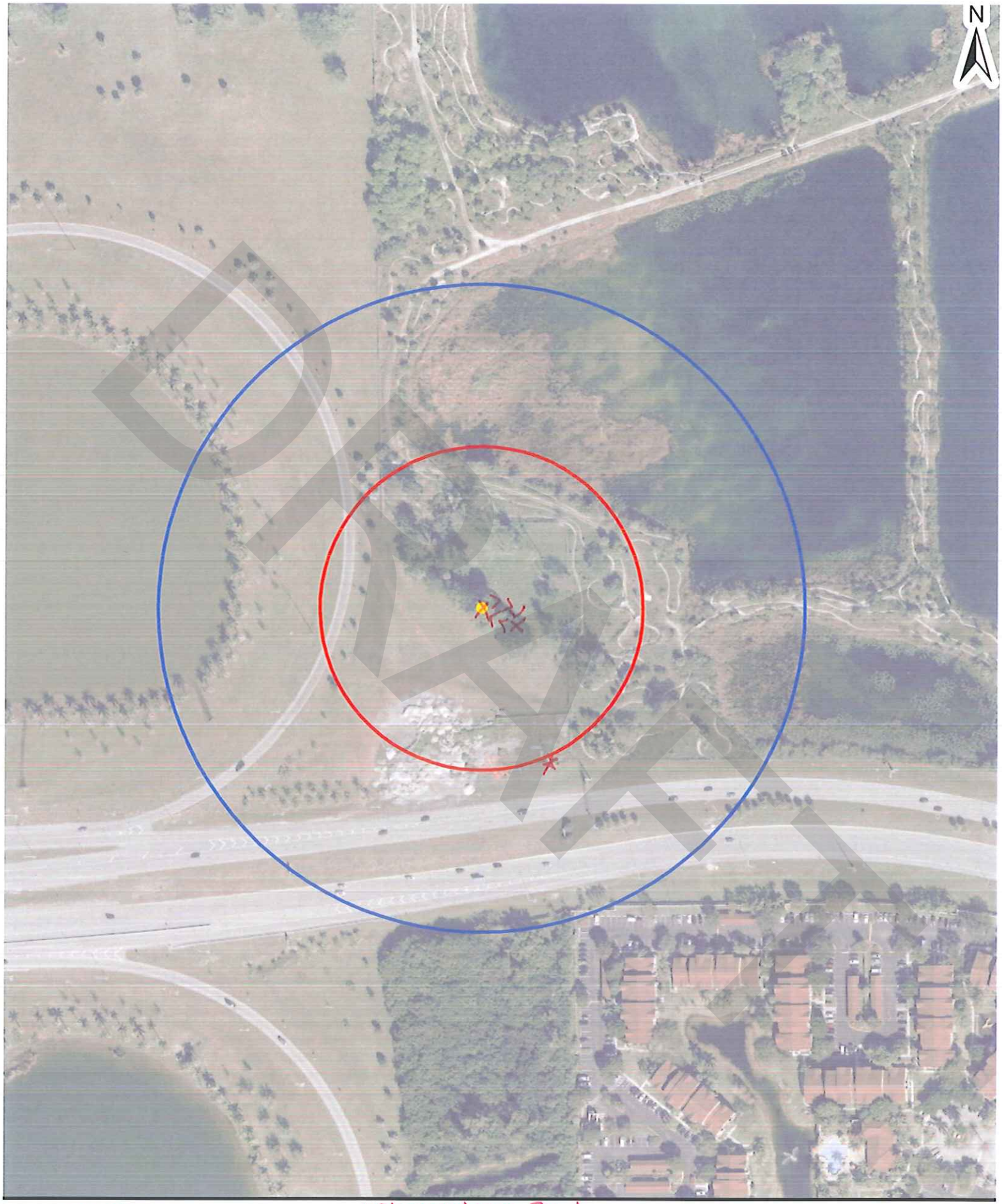


ate: 12/29/17

ersonnel: Cassandra O'Donahue

ime: 6:49 AM

*Observation Point
^Flight Path and Direction
X Perch Location
– Lost Sight



ate: 12/29/17

ersonnel: Cassandra O'Donahue

ime: 8:06 AM

*Observation Point
^ Flight Path and Direction
X Perch Location
- Lost Sight

Bald Eagle Monitoring Data Report

Nest #: Quiet Waters Park, Broward County FL Start Time: 6:40 AM Name of Monitor: Cassandra O'Donahue

Date: 1/11/18 End Time: 8:40 AM # Adult Present: 2 # Young Present: Ø

Tree Status[1]: L Tree type[2]: P

Time	Behavioral activity observed (list all that apply):				
6:50 AM	Weather conditions	T: 70°F	W: SSE 7mph	C: 10%	P: Ø
	Notes/Comments: Two adult eagles are present in Alt. Nest 1.				
Time	Behavioral activity observed (list all that apply):				
7:09 AM	Weather conditions	T: 70°F	W: SE 5mph	C: 10%	P: Ø
	Notes/Comments: One adult eagle flew from Alt. Nest 1 to perch on an adjacent tree to the east. One adult eagle remains in the nest.				
Time	Behavioral activity observed (list all that apply):				
7:28 AM	Weather conditions	T: 71°F	W: SE 7mph	C: 5%	P: Ø
	Notes/Comments: One adult eagle flew from perch on tree, north, behind the tree line, then flew out around far NW corner of the treeline, up to Alt. Nest 1. One adult eagle remains in Alt. Nest 1.				
Time	Behavioral activity observed (list all that apply):				
7:49 AM	Weather conditions	T: 71°F	W: SE 8mph	C: 5%	P: Ø
	Notes/Comments: One adult eagle flew from Alt. Nest 1 south, over Sawgrass Expressway, and past treeline to the south. One adult eagle remains in the nest.				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Cassandra O'Donahue
Signature of Monitor

1/11/18
Date

Nest #: Quiet Waters Park Broward County, FL Monitoring Date: 1/11/18

Monitor's signature: Cindi O'Dell

Supervisor's signature: _____

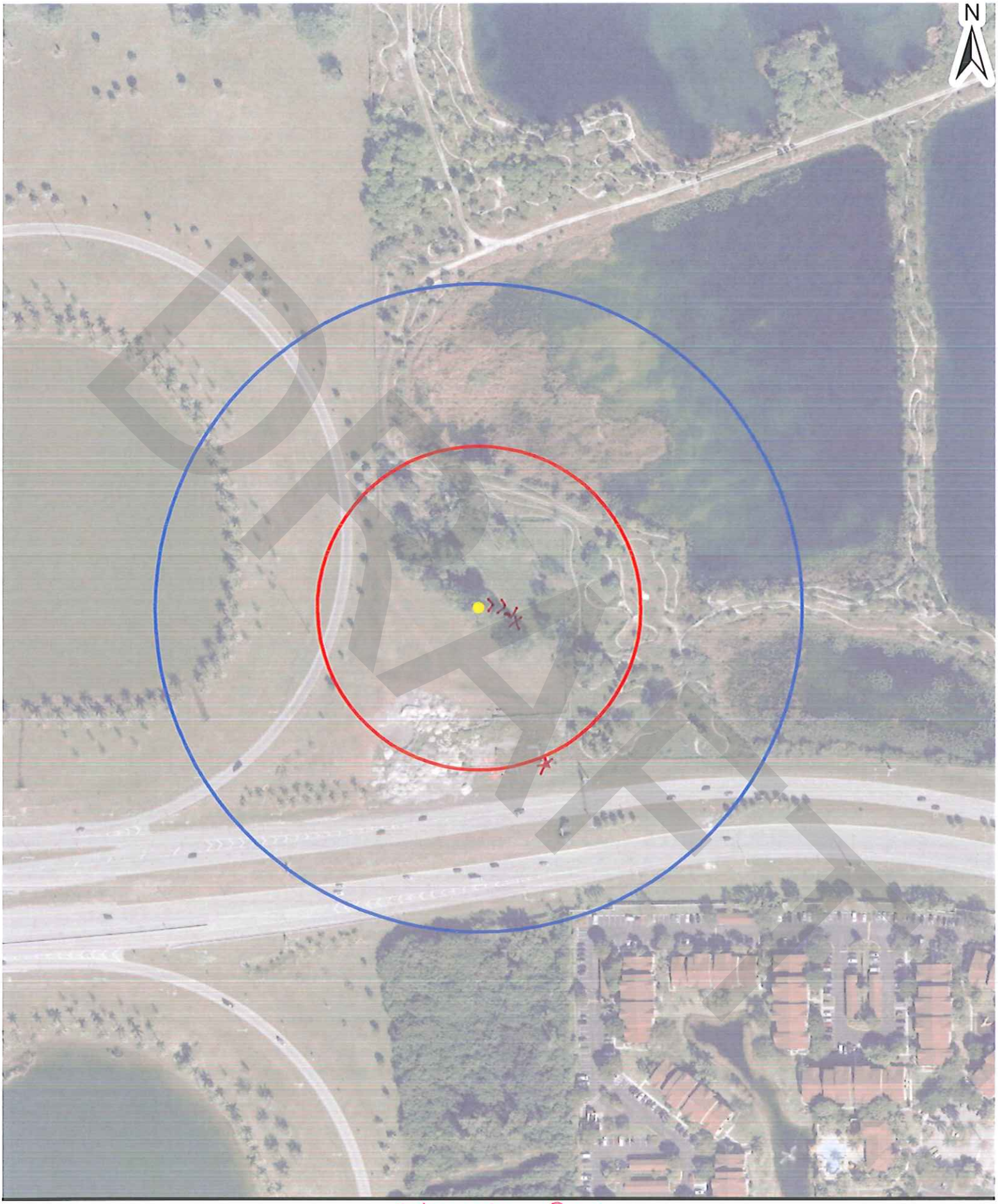
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 73°F	W: SSE 8mph	C: 5%	P: 0
	~~Description of ongoing construction events:~~ Notes/Comments:				
8:28am	One adult eagle flew from Alt. Nest 1 to perch on adjacent tree to the east.				
	Notes/Comments:				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Description of ongoing construction events:				
	Notes/Comments:				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Description of ongoing construction events:				
	Notes/Comments:				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Description of ongoing construction events:				
	Notes/Comments:				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Cindi O'Dell
Signature of Monitor

_____
Signature of Supervisor

1/11/18
Date



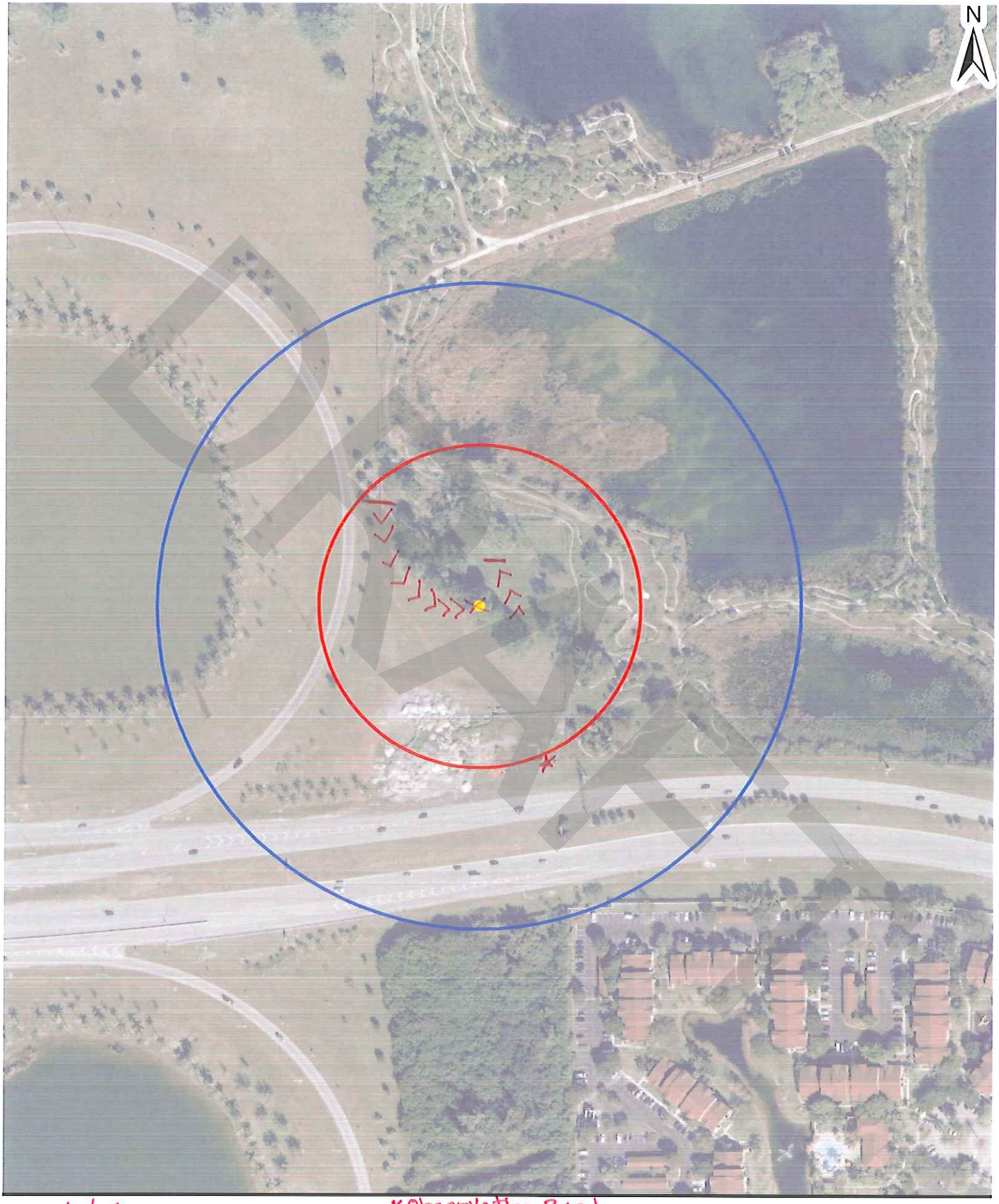
ate: 1/11/18

ersonnel: Cassandra O'Donahue

ime: 7:09 AM

*Observation Point
^ Flight Path and Direction
X Perch Location
— Lost Sight

0 62.5125 250 375 500
Fee

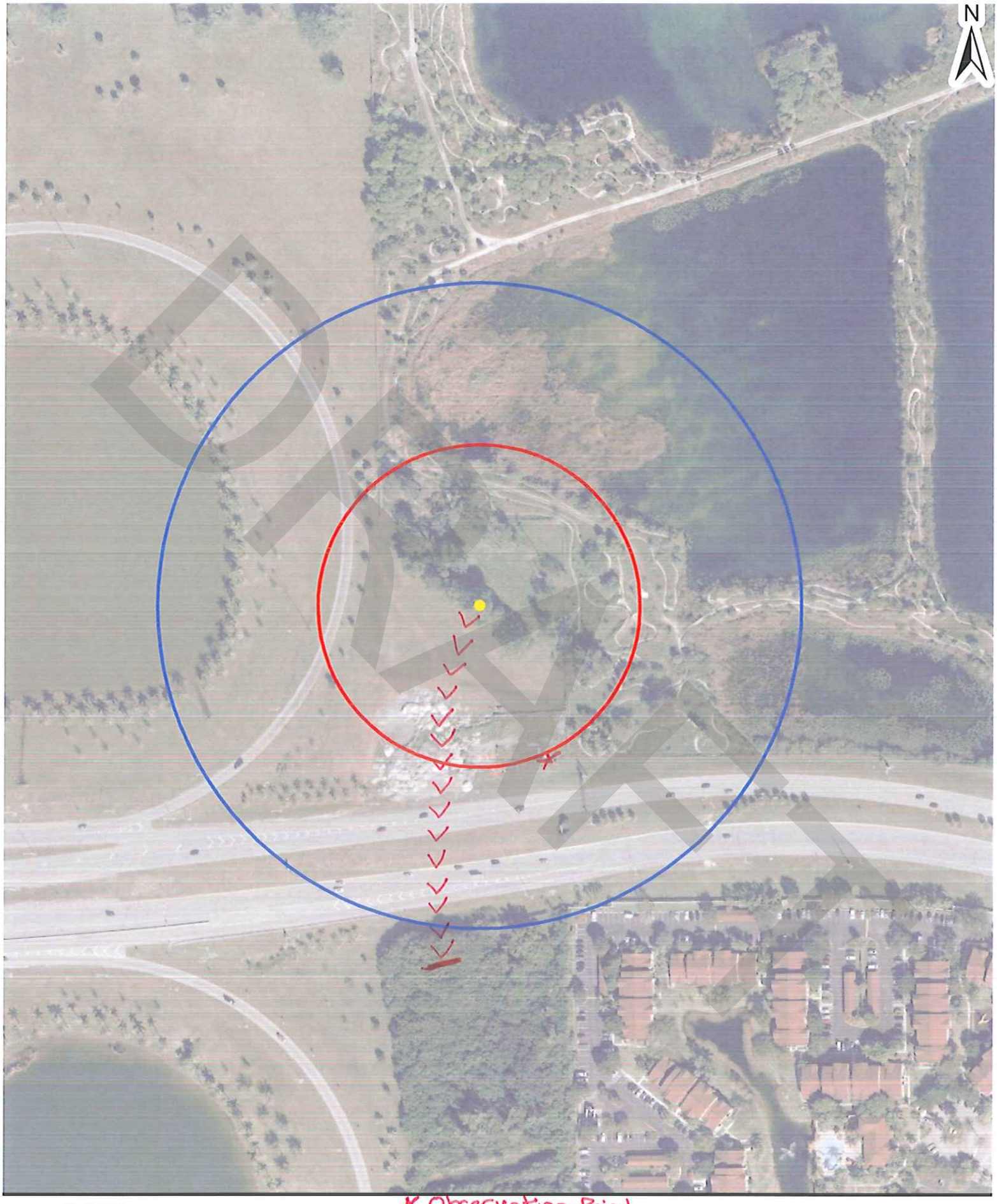


ate: 1/11/18

ersonnel: Cassandra O'Donahue

ime: 7:28AM

*Observation Point
↑ Flight Path and Direction
X Perch Location
– Lost Sight



ate: 1/11/18

ersonnel: Cassandra O'Donahue

ime: 7:49 AM

* Observation Point
^ Flight Path and Direction
X Perch Location
– Lost Sight

Bald Eagle Monitoring Data Report

Nest #: Quiet Waters Park, Broward County FL Start Time: 6:30 AM Name of Monitor: Cassandra O'Donahue

Date: 1/26/18 End Time: 8:30 AM # Adult Present: 2 # Young Present: Ø

Tree Status[1]: L Tree type[2]: H

Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 67°F	W: NE 13mph	C: 80%	P: Ø
6:50 AM	Notes/Comments: One adult eagle is observed sitting on edge of Alt. Nest 1, tending to something in the nest.				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 68°F	W: ENE 11mph	C: 80%	P: Ø
6:54 AM	Notes/Comments: One adult eagle flew out from behind treeline to the north and looped around the field to the south of Alt. Nest 1. Then flew over the treeline to the northeast and back behind the treeline to the north. One adult eagle flew from Alt. Nest 1 to perch on a tree adjacent to the north east.				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 67°F	W: ENE 19mph	C: 80%	P: Ø
7:13 AM	Notes/Comments: Both adult eagles flew out from behind treeline to the north, following a black vulture. The three birds flew around the open field to the south of Alt. Nest. 1, then flew south over Sawgrass Expressway. The black vulture continued to fly south while the two eagles turned north. One adult eagle perched on upper branch of nest tree. One perched on tree adjacent to nest tree to the northeast.				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 68°F	W: E 21mph	C: 80%	P: Ø
7:39 AM	Notes/Comments: One adult eagle flew from perch on Alt. Nest 1 tree north, behind treeline. One adult eagle flew around the far northwest corner of the treeline, up to Alt. Nest 1.				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Cass O'Don _____ 1/26/18

Signature of Monitor Date

Nest #: Quiet Waters Park, Broward County, FL Monitoring Date: 1/26/18 Monitor's signature: _____

Supervisor's signature: Lisa O'Dell

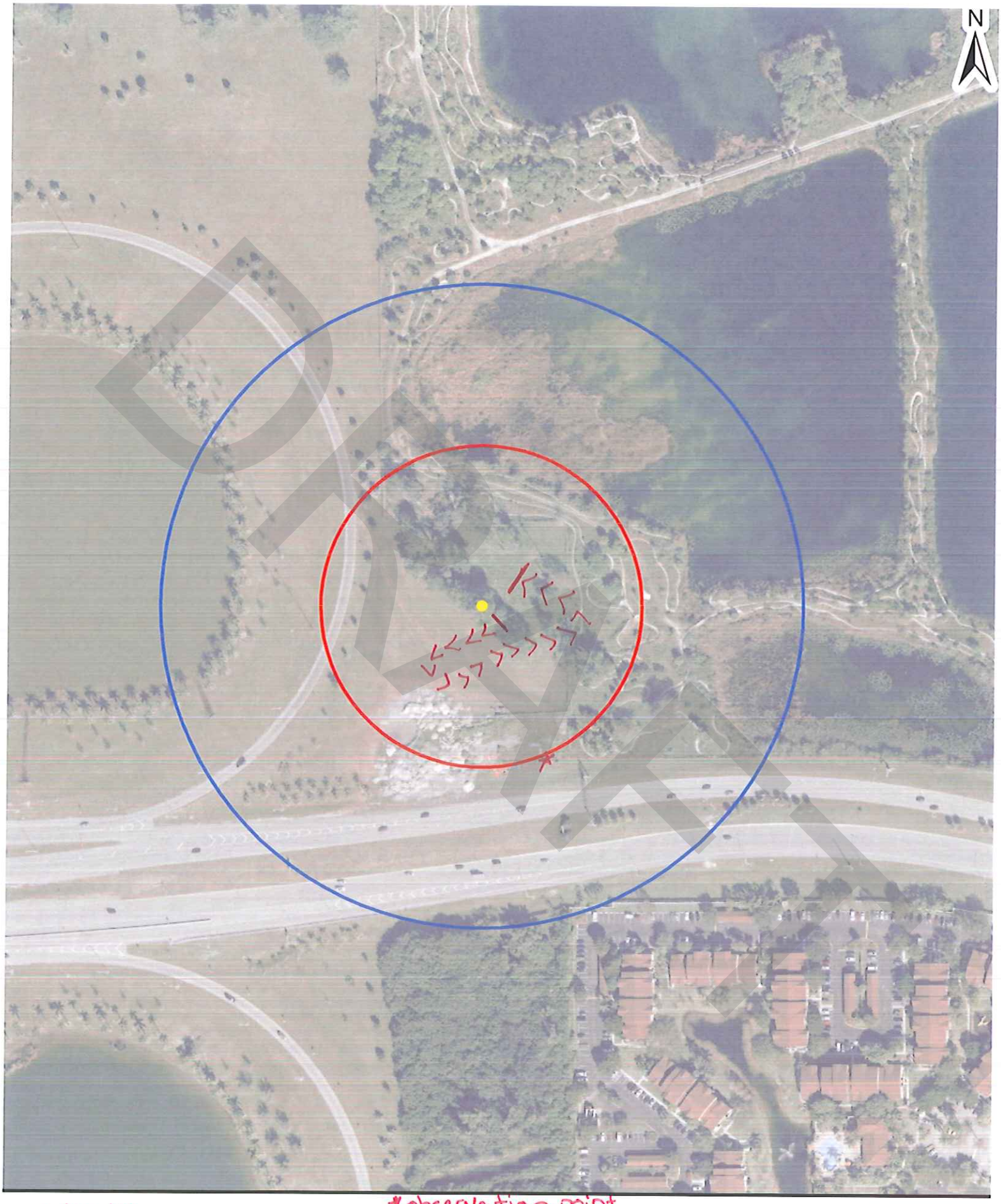
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 68°F	W: ENE 23mph	C: 60%	P: 0
8:21AM	~~Description of ongoing construction events:~~ Notes/Comments: One adult eagle flew up to nest from behind treeline to the North, then flew southwest, over Sawgrass Expressway, to the holding pond on the south side of the Expressway. The eagle flew around the pond and then back north, to perch on tree adjacent to Alt. Nest 1 tree to the Northeast. One adult eagle tended to something in the nest.				
	Notes/Comments:				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Description of ongoing construction events:				
	Notes/Comments:				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Description of ongoing construction events:				
	Notes/Comments:				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Description of ongoing construction events:				
	Notes/Comments:				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Lisa O'Dell
Signature of Monitor

_____
Signature of Supervisor

1/26/18
Date

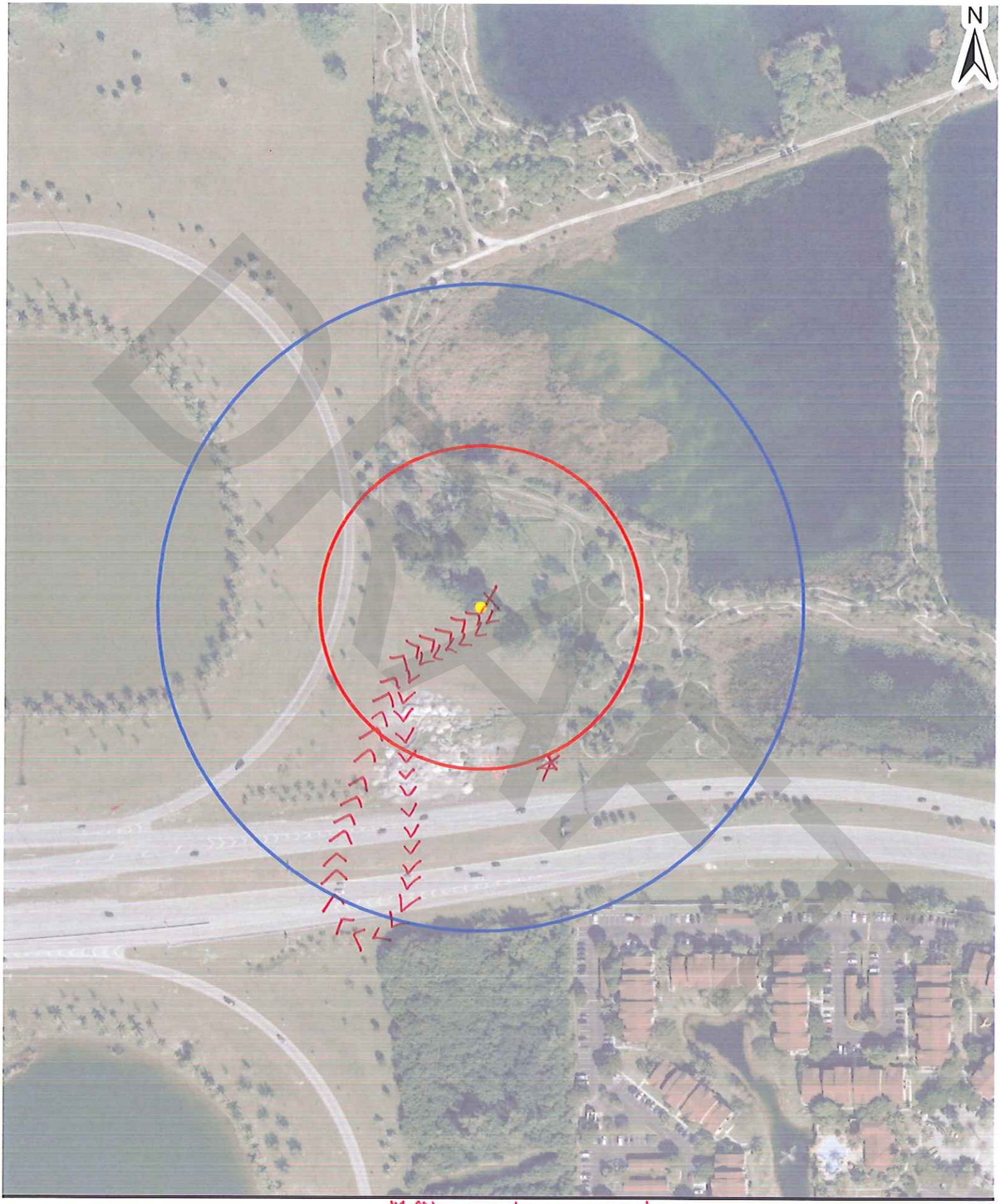


ate: 1/26/18

ersonnel: Cassandra O'Donahue

ime: 6:59 AM

* observation point
/ Flight path and direction
x perch location
– lost sight

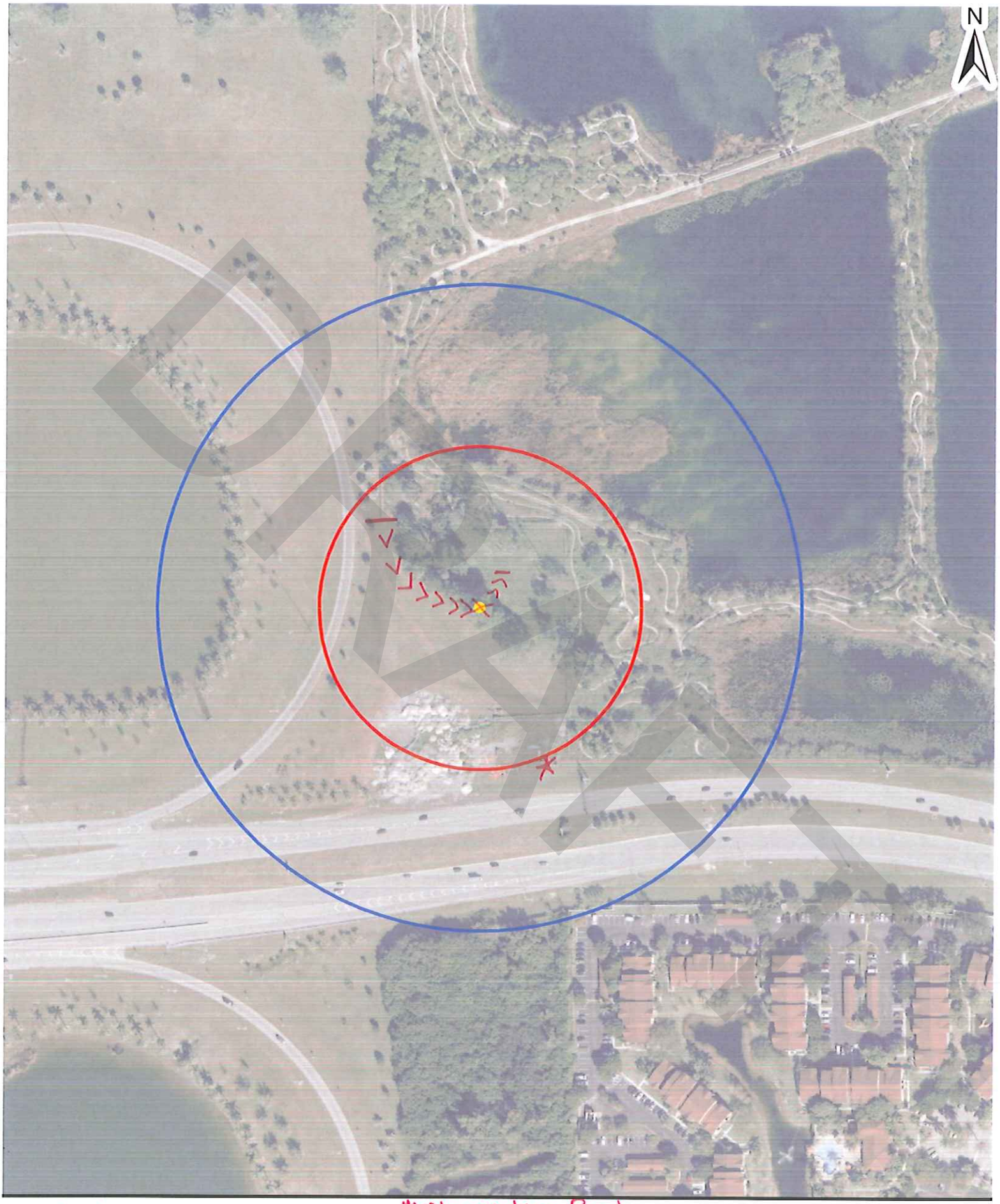


ate: 1/26/18

ersonnel: Cassandra O'Donahue

ime: 7:13AM

* Observation point
^ Flight Path and Direction (of both eagles)
X Perch location
— Lost sight



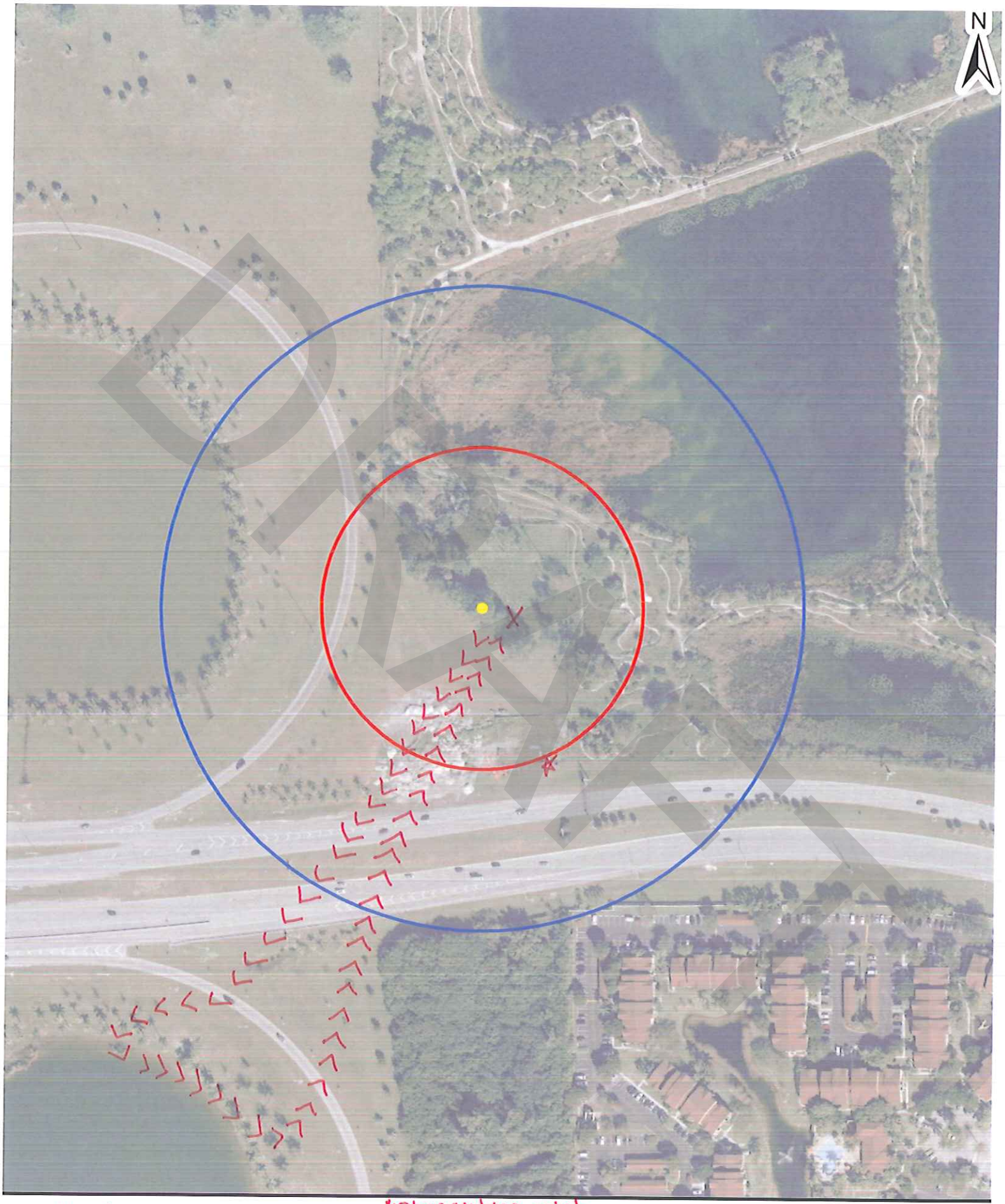
ate: 1/26/18

ersonnel: Cassandra O'Donahue

ime: 7:39 AM

* Observation Point
^ Flight path and direction
X Perch location
— Lost sight

0 62.5 125 250 375 500
Fee



ate: 1/26/18

ersonnel: Cassandra O'Donahue

ime: 8:21 AM

*Observation point
↑Flight path and direction
X Perch location
— Lost sight

Bald Eagle Monitoring Data Report

Nest #: Quiet Waters Park, Broward County FL Start Time: 6:30 AM Name of Monitor: Cassandra O'Donahue

Date: 2/12/18 End Time: 8:30 AM # Adult Present: 2 # Young Present: 1

Tree Status[1]: L Tree type[2]: H

Time	Behavioral activity observed (list all that apply):				
6:30 AM	Weather conditions	T: 74°F	W: SE 6 mph	C: 10%	P: Ø
	Notes/Comments: One adult eagle is perching on upper branch of tree with Alt. Nest 1.				
Time	Behavioral activity observed (list all that apply):				
6:55 AM	Weather conditions	T: 74°F	W: SSE 7mph	C: 10%	P: Ø
	Notes/Comments: One adult eagle flew from perch on tree of Alt. Nest 1 to perch on tree of previous nest BOØØ3. One adult eagle flew up from behind treeline to the north and perched on tree of previous nest BOØØ3. One juvenile is moving about in nest and flapping wings.				
Time	Behavioral activity observed (list all that apply):				
7:00 AM	Weather conditions	T: 74°F	W: SSE 6mph	C: 10%	P: Ø
	Notes/Comments: Both adult eagles flew from perches sequentially to the North. One returned to Alt Nest 1 within 2 minutes carrying nesting materials, then flew to perch on adjacent tree.				
Time	Behavioral activity observed (list all that apply):				
7:22 AM	Weather conditions	T: 74°F	W: SSE 8mph	C: 10%	P: Ø
	Notes/Comments: One adult eagle flew up to Alt Nest 1 from behind the treeline to the north with something in talons, then flew to tree of old nest BOØØ3. 4 minutes later, it flew off to the Northeast.				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Cass O'Dav _____ 2/12/18

Signature of Monitor Date

Quiet Waters Park
Nest #: Broward County, FL Monitoring Date: 2/12/18 Monitor's signature: [signature]
Supervisor's signature: _____

Time	Behavioral activity observed (list all that apply):				
7:31AM	Weather conditions	T: 74°F	W: SSE 5mph	C: 5%	P: 0
	~~Description of ongoing construction events:~~ Notes: One adult eagle flew from N, behind treeline, up to Alt. Nest 1 with branch. One adult flew from Alt. Nest 1 to an adjacent tree,				
	Notes/Comments: ripped off a branch with its talons, and flew back to Alt. Nest 1.				

Time	Behavioral activity observed (list all that apply):				
7:40AM	Weather conditions	T: 74°F	W: SSE 6mph	C: 5%	P: 0
	~~Description of ongoing construction events:~~ Notes: One adult eagle flew NW, over onramp to Sawgrass Expressway, and behind tree line to the far NW. Flew back to Alt. Nest 1 at 7:47AM				
	Notes/Comments: with branches.				

Time	Behavioral activity observed (list all that apply):				
7:49AM	Weather conditions	T: 74°F	W: SE 2mph	C: <5%	P: 0
	~~Description of ongoing construction events:~~ One adult eagle flew southwest, over Sawgrass Expressway, and then east, behind a treeline. One adult eagle flew to perch on adjacent tree.				
	Notes/Comments:				

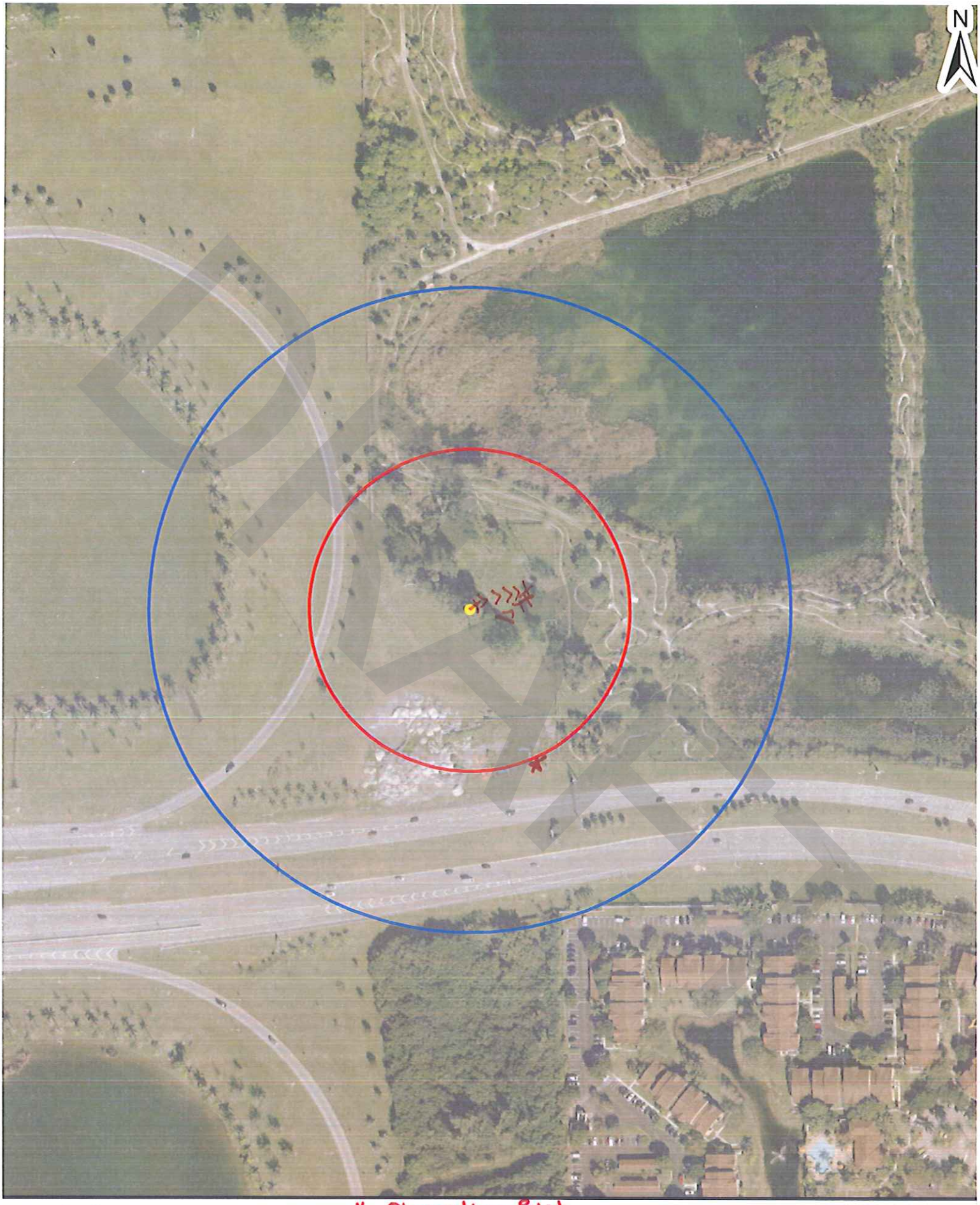
Time	Behavioral activity observed (list all that apply):				
8:22AM	Weather conditions	T: 76°F	W: SE 6mph	C: 10%	P: 0
	~~Description of ongoing construction events:~~ Notes: Adult eagle flew from perch on adjacent tree to Alt. Nest 1.				
	Notes/Comments:				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

[signature]
Signature of Monitor

Signature of Supervisor

2/12/18
Date



ıte: 2/12/18

ɪrsonnel: Cassandra O'Donahue

me: 6:55AM

* Observation Point

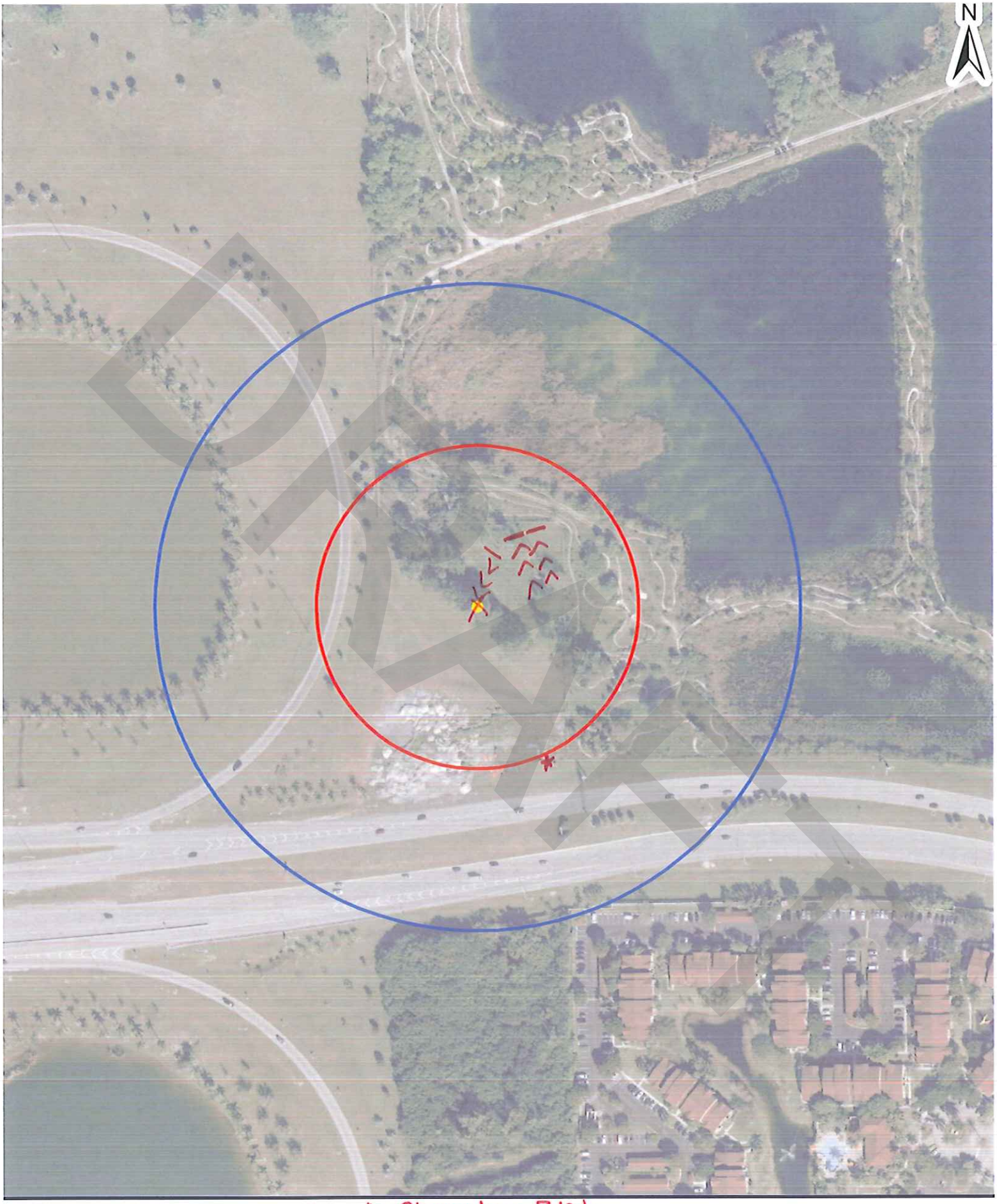
^ Flight Path and Direction

X Perch Location

— Lost Sight

0 62.5 125 250 375 500

Fe



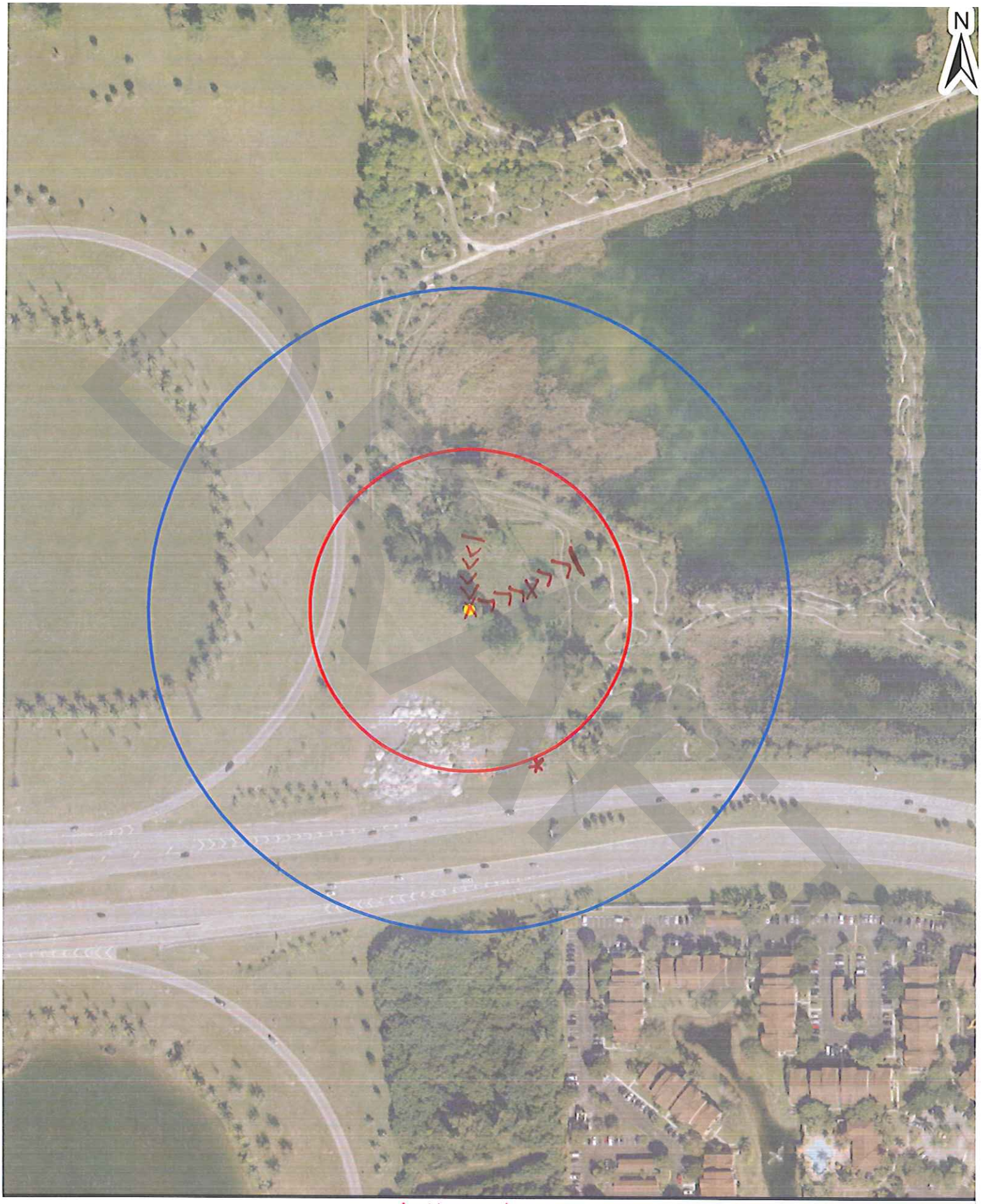
ate: 2/12/18

ersonnel: Cassandra O'Donahue

ime: 7:00 AM

* Observation Point
^ Flight Path and Direction
X Perch Location
— Lost Sight

0 62.5 125 250 375 500
Fee

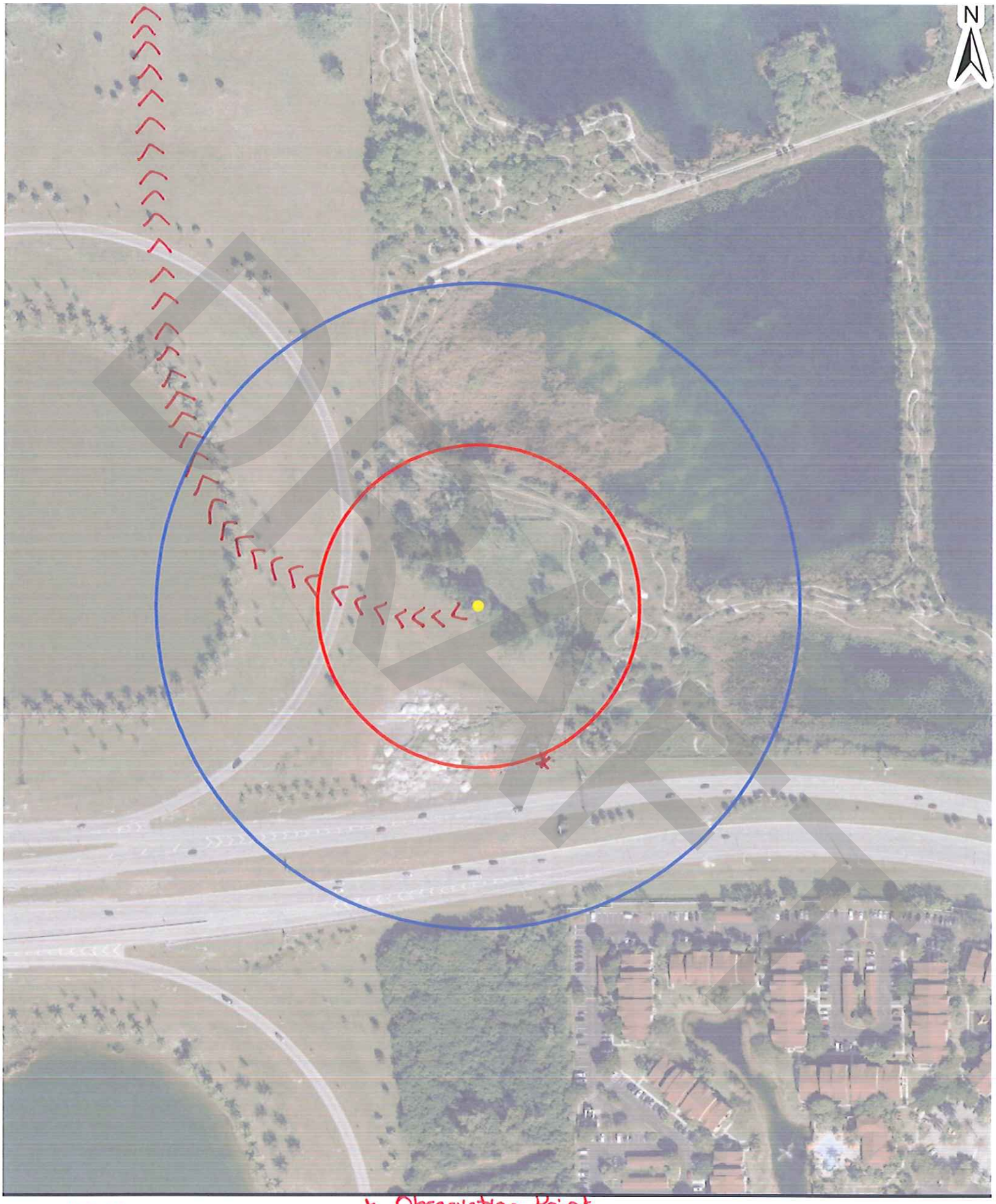


* Observation Point

ıte: 2/12/18

ɪrsonnel: Cassandra O'Donahue

me: 7:22 AM



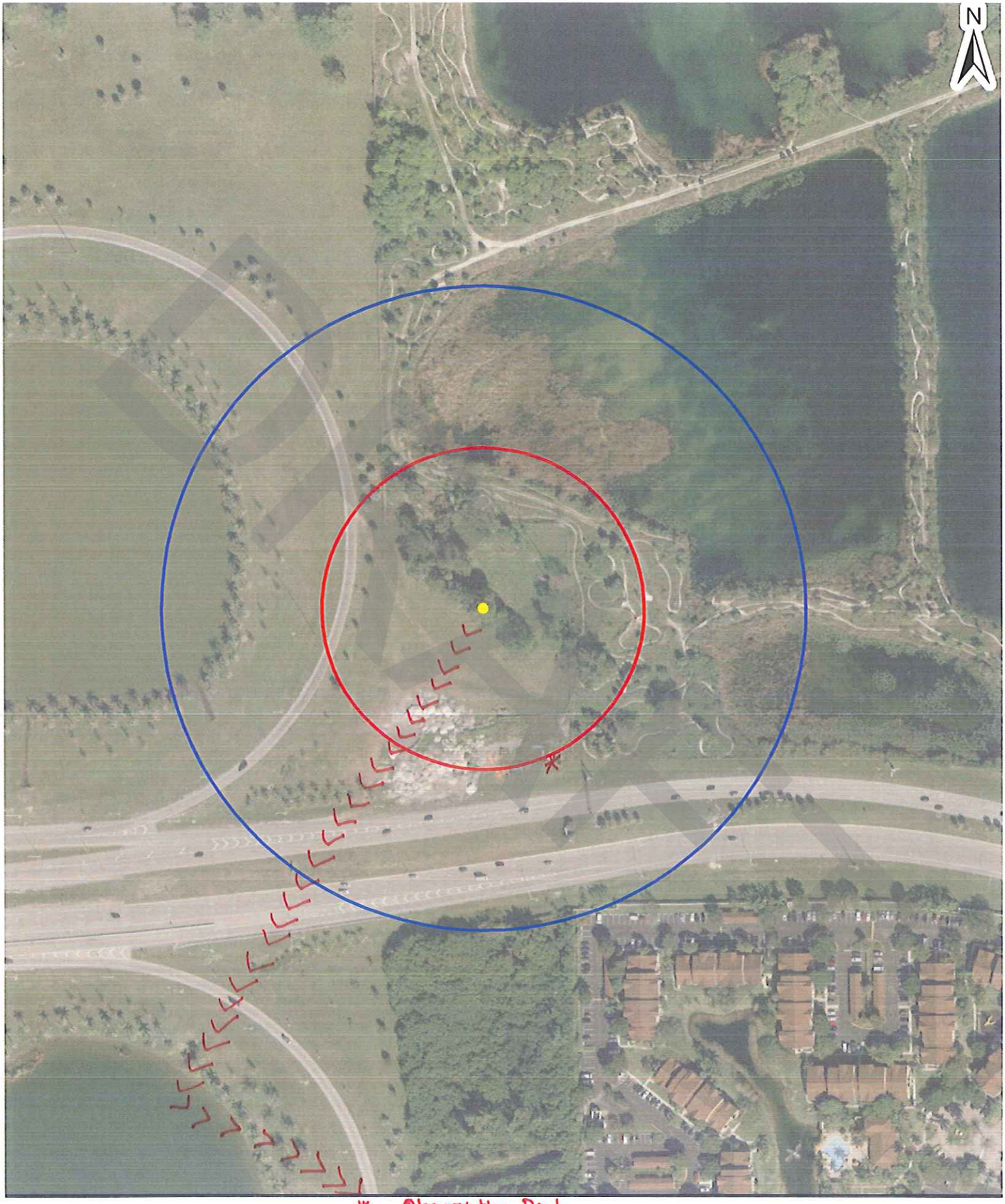
ate: 2/12/18

ersonnel: Cassandra O'Donahue

ime: 7:40AM

* Observation Point
^ Flight Path and Direction
X Perch Location
– Lost Sight

0 62.5 125 250 375 500
Fee



Date: 2/12/18

Personnel: Cassandra O'Donahue

Time: 7:49 AM

* Observation Point

^ Flight Path and Direction

X Perch Location

— Lost sight

Bald Eagle Monitoring Data Report

Nest #: Quiet Waters Park, Broward County FL Start Time: 6:20AM Name of Monitor: Cassandra O'Donahue

Date: 2/23/18 End Time: 8:20AM # Adult Present: 2 # Young Present: 1

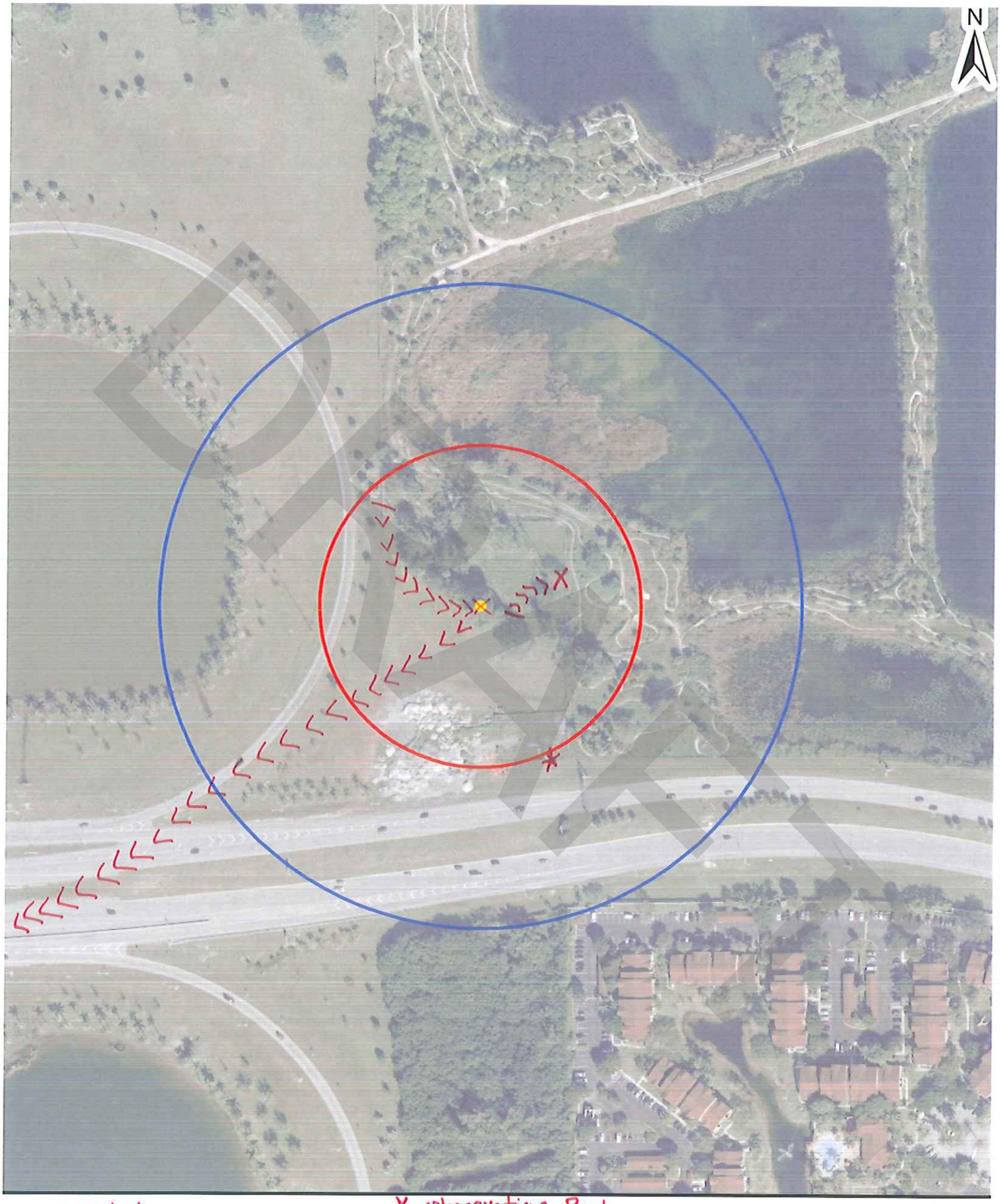
Tree Status[1]: L Tree type[2]: H

Time	Behavioral activity observed (list all that apply):				
6:42AM	Weather conditions	T: 74°F	W: ESE 11mph	C: 80%	P: Ø
	Notes/Comments: One sub-adult eagle is seen moving about the nest and flapping its wings.				
Time	Behavioral activity observed (list all that apply):				
7:5AM	Weather conditions	T: 74°F	W: ESE 5mph	C: 60%	P: Ø
	Notes/Comments: One adult eagle flew from behind the tree line to the far NW up to Alt. Nest 1, then flew over Sawgrass Expressway and Turnpike to the SW. One adult eagle flew up, from behind trees to the north, to perch on a tree to the NE.				
Time	Behavioral activity observed (list all that apply):				
7:54AM	Weather conditions	T: 74°F	W: ESE 15mph	C: 50%	P: Ø
	Notes/Comments: Adult eagle flew from its perch to Alt. Nest 1, appeared to be eating something in the nest, and then flew back to its ~~nest~~ perch.				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Notes/Comments:				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Cass O'Donahue
Signature of Monitor

2/23/18
Date



ate: 2/23/18

ersonnel: Cassandra O'Donahue

ime: 7:35AM

* Observation Point
^ Flight Path and Direction
X Perch Location
– Lost Sight

0 62.5 125 250 375 500
Fee

Bald Eagle Monitoring Data Report

Nest #: Quiet Waters Park, Broward County FL Start Time: 6:05 AM Name of Monitor: Cassandra O'Donahue

Date: 3/9/18 End Time: 7:05 AM # Adult Present: 2 # Young Present: 1

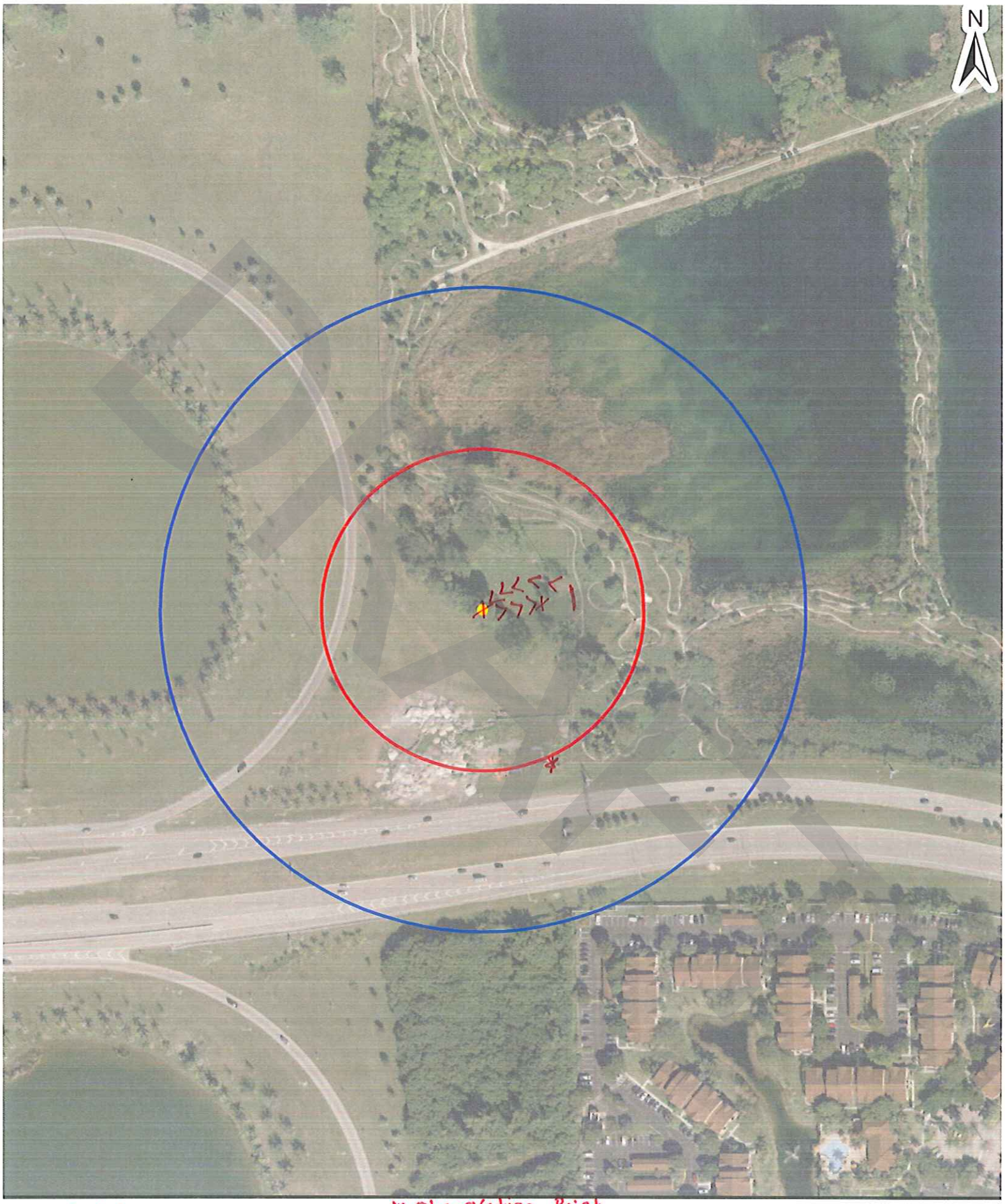
Tree Status[1]: L Tree type[2]: H

Time	Behavioral activity observed (list all that apply):				
6:19 AM	Weather conditions	T: 52°F	W: NW 9mph	C: 95%	P: Ø
	Notes/Comments: One sub-adult eagle stood up in Alt Nest 1, stretched, and flapped its wings.				
Time	Behavioral activity observed (list all that apply):				
6:41 AM	Weather conditions	T: 52°F	W: N 7mph	C: 95%	P: Ø
	Notes/Comments: One adult eagle flew from behind treeline to the NE, up to Alt. Nest 1, and then to a nearby tree (to the NE of Alt. Nest 1) to perch.				
Time	Behavioral activity observed (list all that apply):				
6:44 AM	Weather conditions	T: 52°F	W: N 7mph	C: 95%	P: Ø
	Notes/Comments: One adult eagle flew from its perch on the nearby tree to the West, over the turnpike, and then to the south. One adult eagle flew from behind treeline to the north, westward, over the Turnpike, and then south.				
Time	Behavioral activity observed (list all that apply):				
6:58 AM	Weather conditions	T: 52°F	W: NW 8mph	C: 95%	P: Ø
	Notes/Comments: One adult eagle flew from the south, north, up to Alt. Nest 1 with a fish in its talons. It dropped the fish off in the nest and then flew to perch on a nearby tree.				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Cass O'Donahue
Signature of Monitor

3/9/18
Date



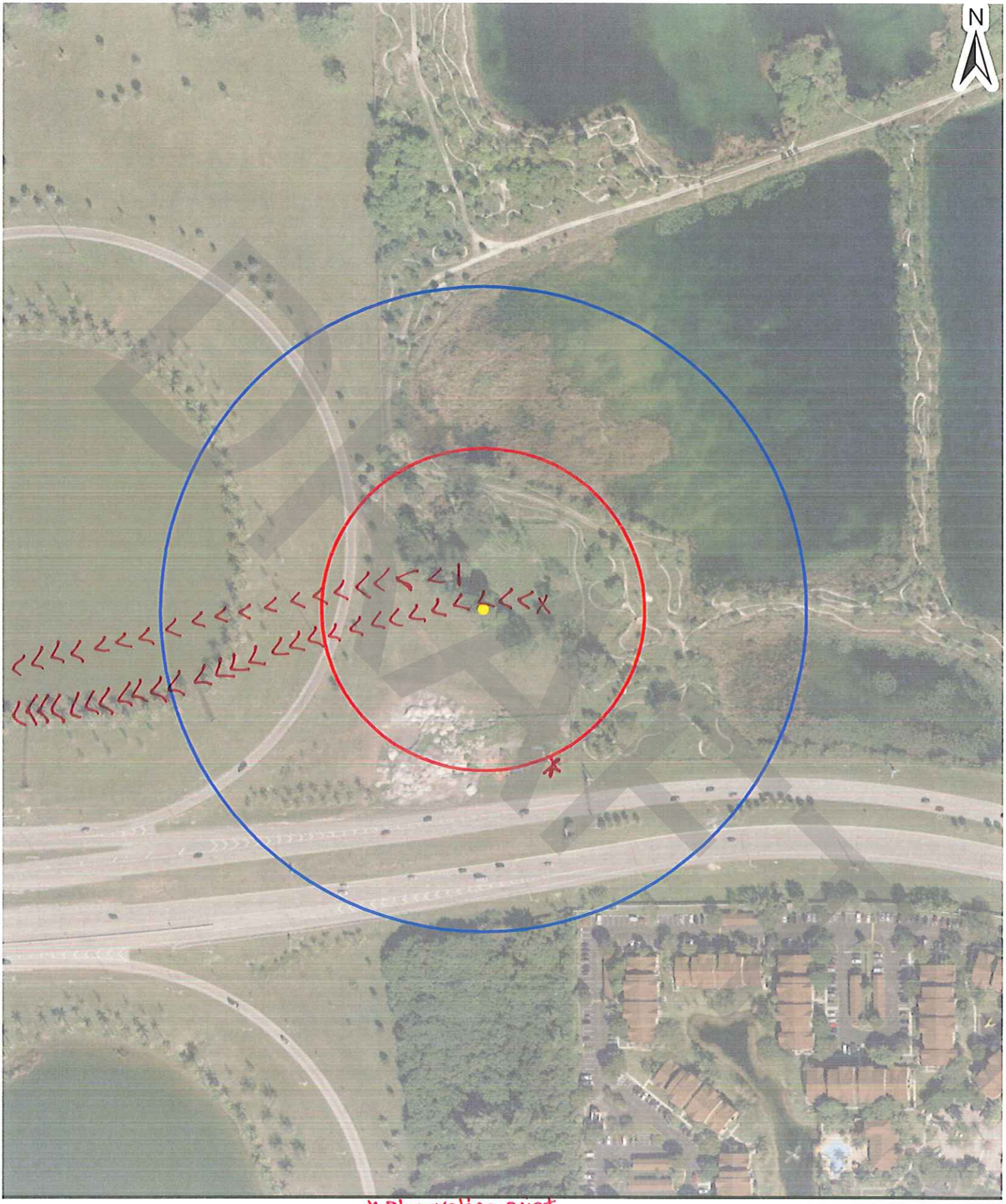
Date: 3/9/18

Personnel: Cassandra O'Donahue

Time: 6:41AM

* Observation Point
↗ Flight path and direction
X Perch location
— Lost sight

0 62.5 125 250 375 500
Fee

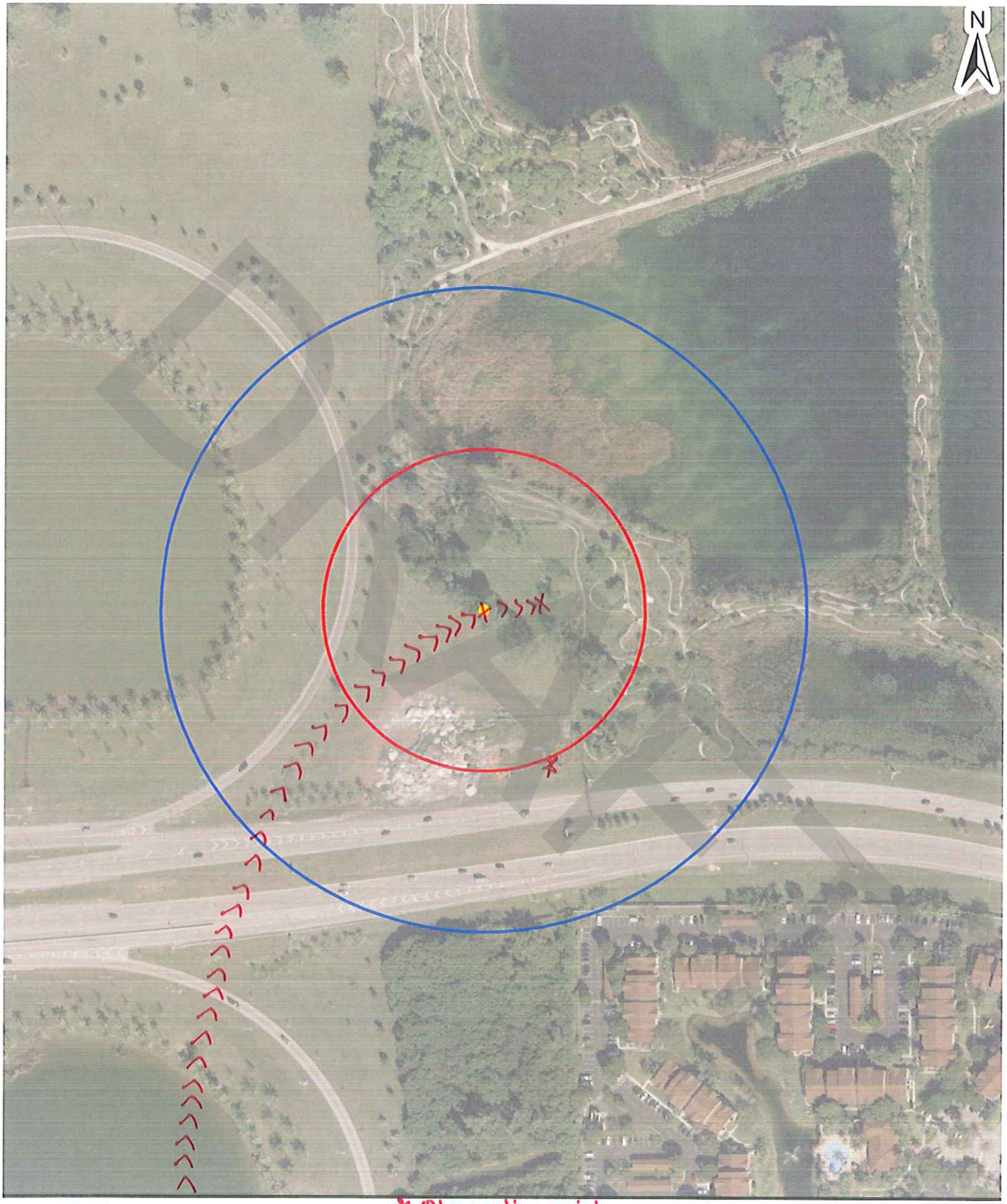


Date: 3/9/18

Personnel: Cassondra O'Donahue

Time: 6:44 AM

* Observation point
^ Flight Path and Direction
X Perch location
— Lost Sight



Date: 3/9/18

Personnel: Cassandra O'Donahue

Time: 6:58 AM

* Observation point
^ Flight path and direction
X Perch location
– Lost sight

0 62.5 125 250 375 500
Fee

Bald Eagle Monitoring Data Report

Nest #: Quiet Waters Park, Broward County FL Start Time: 6:50AM Name of Monitor: Cassandra O'Donahue

Date: 3/24/18 End Time: 7:50AM # Adult Present: 2 # Young Present: 1

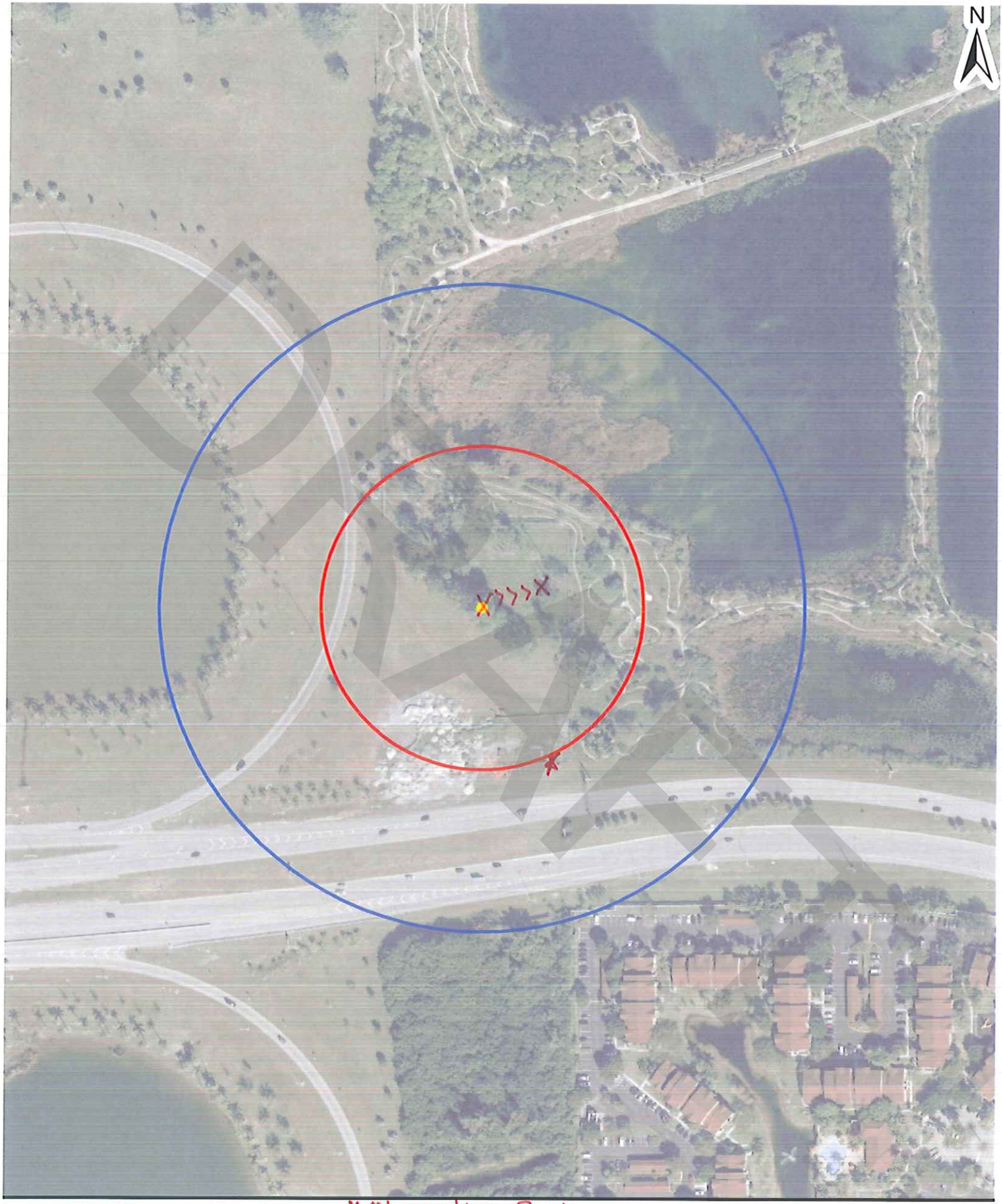
Tree Status[1]: L Tree type[2]: H

Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 60°F	W: NNW 3mph	C: 30%	P: Ø
6:50AM	Notes/Comments: One subadult eagle is perched on Alt. Nest 1. Two adult eagles are perched on two branches adjacent to the nest. The subadult stretches and flaps its wings periodically while jumping from nearby branches to the nest.				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 60°F	W: NNW 5mph	C: 25%	P: Ø
7:04AM	Notes/Comments: One adult eagle flew from perch on Alt. Nest 1 tree to perch on tree where Nest BO#3 once was.				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T: 59°F	W: NNW 4mph	C: 25%	P: Ø
7:12AM	Notes/Comments: Adult eagle flew from perch on Alt. Nest 1's tree, North behind a treeline.				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Notes/Comments:				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Cassandra O'Donahue
Signature of Monitor

3/24/18
Date



ate: 3/24/18

ersonnel: Cassandra O'Donahue

ime: 7:04AM

* Observation Point
^ Flight Path and Direction
X Perch Location
— Lost Sight

0 62.5 125 250 375 500
Fee

Bald Eagle Monitoring Data Report

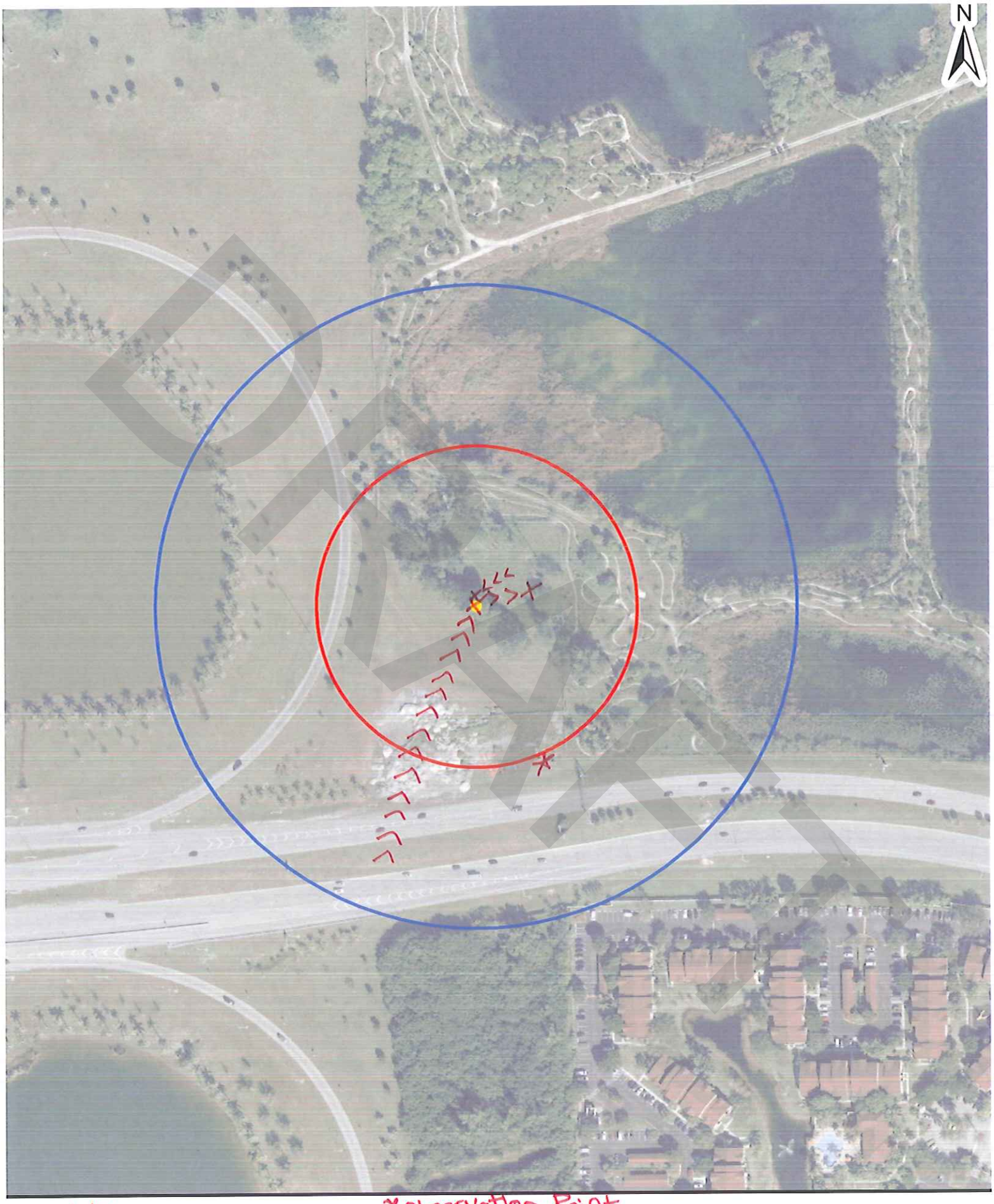
Nest #: Quiet Waters Park, Broward County FL
Start Time: 6:35AM Name of Monitor: Cassandra O'Donahue
Date: 4/7/18 End Time: 7:55AM # Adult Present: 2 # Young Present: 1
Tree Status[1]: L Tree type[2]: H

Time	Behavioral activity observed (list all that apply):				
7:13AM	Weather conditions	T: 72°F	W: S 3mph	C: 2%	P: Ø
	Notes/Comments: One adult eagle flew from the south up to Alt. Nest 1 with a fish. Then flew to perch on tree to the North. One subadult eagle flew from behind treeline to the north up to Alt. Nest 1.				
Time	Behavioral activity observed (list all that apply):				
7:25AM	Weather conditions	T: 72°F	W: SSW 4mph	C: 2%	P: Ø
	Notes/Comments: One adult eagle flew from perch on tree to north, to the ~~west~~ west, over the Turnpike. A second adult eagle flew from behind the treeline to the north, to the west, over the Turnpike				
Time	Behavioral activity observed (list all that apply):				
7:30AM	Weather conditions	T: 72°F	W: SSE 4mph	C: 2%	P: Ø
	Notes/Comments: The subadult eagle flew from Alt Nest 1 west, over the offramp from Turnpike N, and landed in the retention pond area there.				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Notes/Comments:				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Cass O'Don
Signature of Monitor

4/7/18
Date

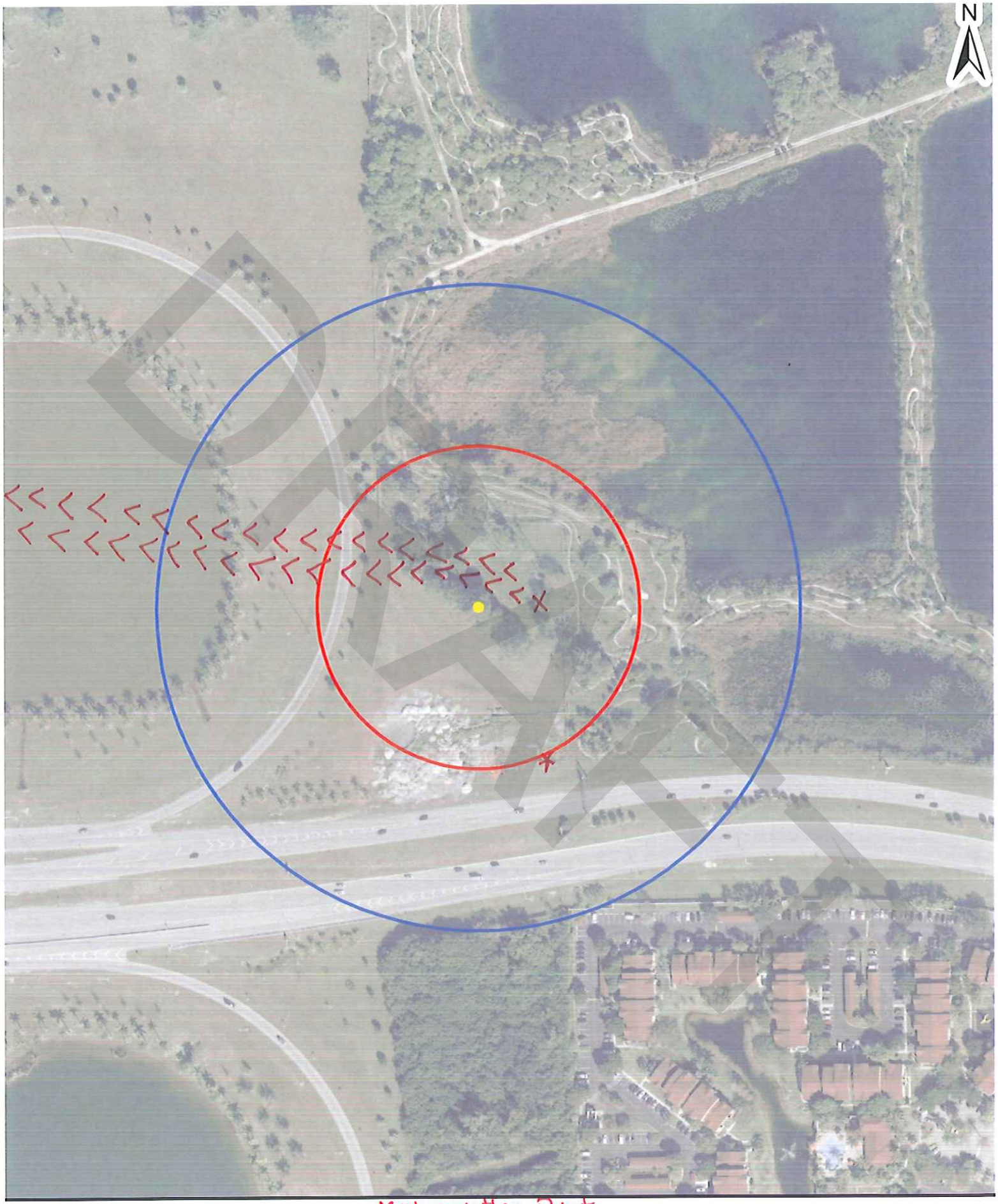


ate: 4/7/18

ersonnel: Cassandra O'Donahue

ime: 7:13 AM

*Observation Point
^ Flight Path and Direction
X Perch Location
- Lost Sight



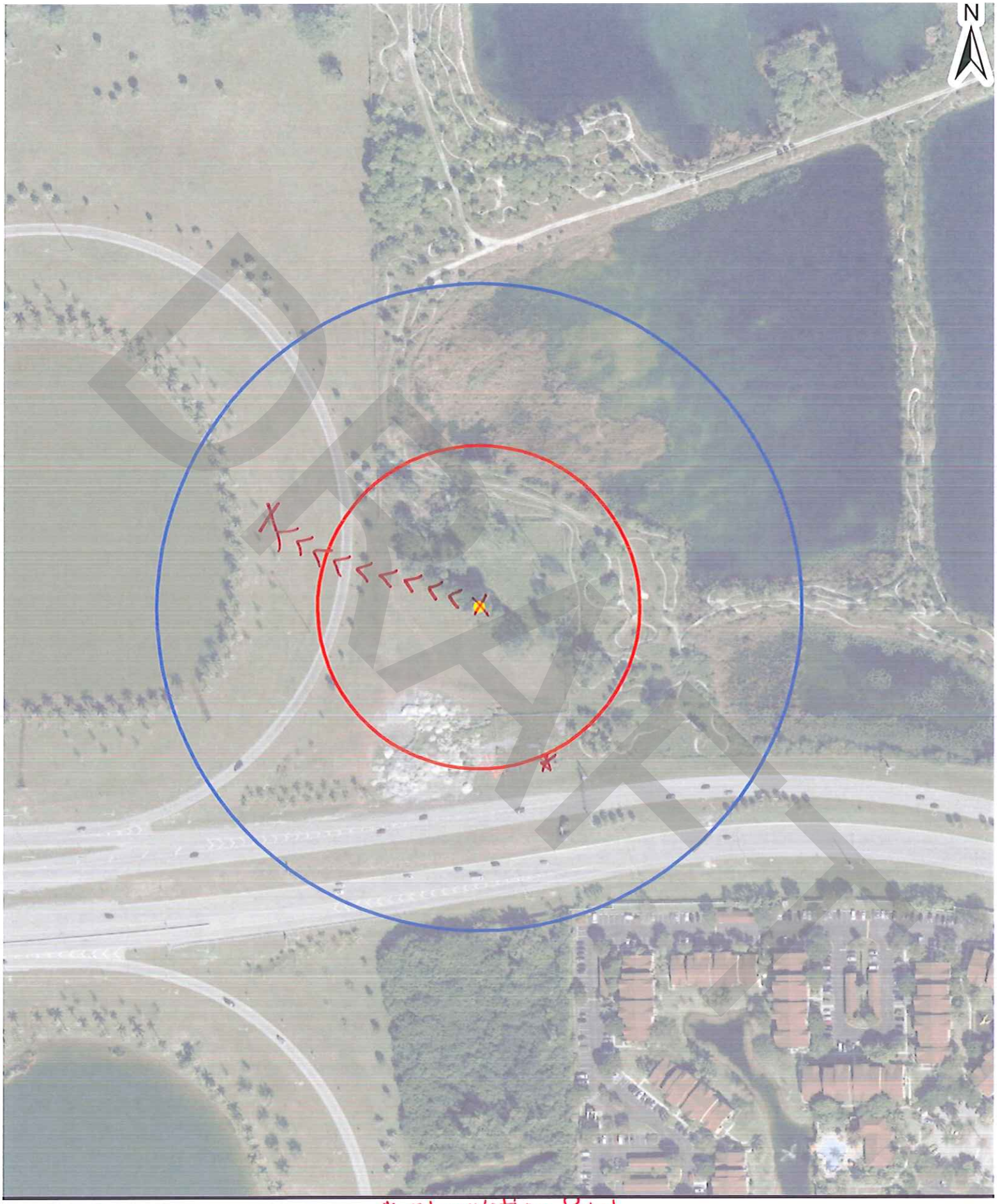
ate: 4/7/18

ersonnel: Cassandra O'Donahue

ime: 7:25 AM

* Observation Point
^ Flight Path and Direction
X Perch Location
– Lost Sight

0 62.5 125 250 375 500
Fee



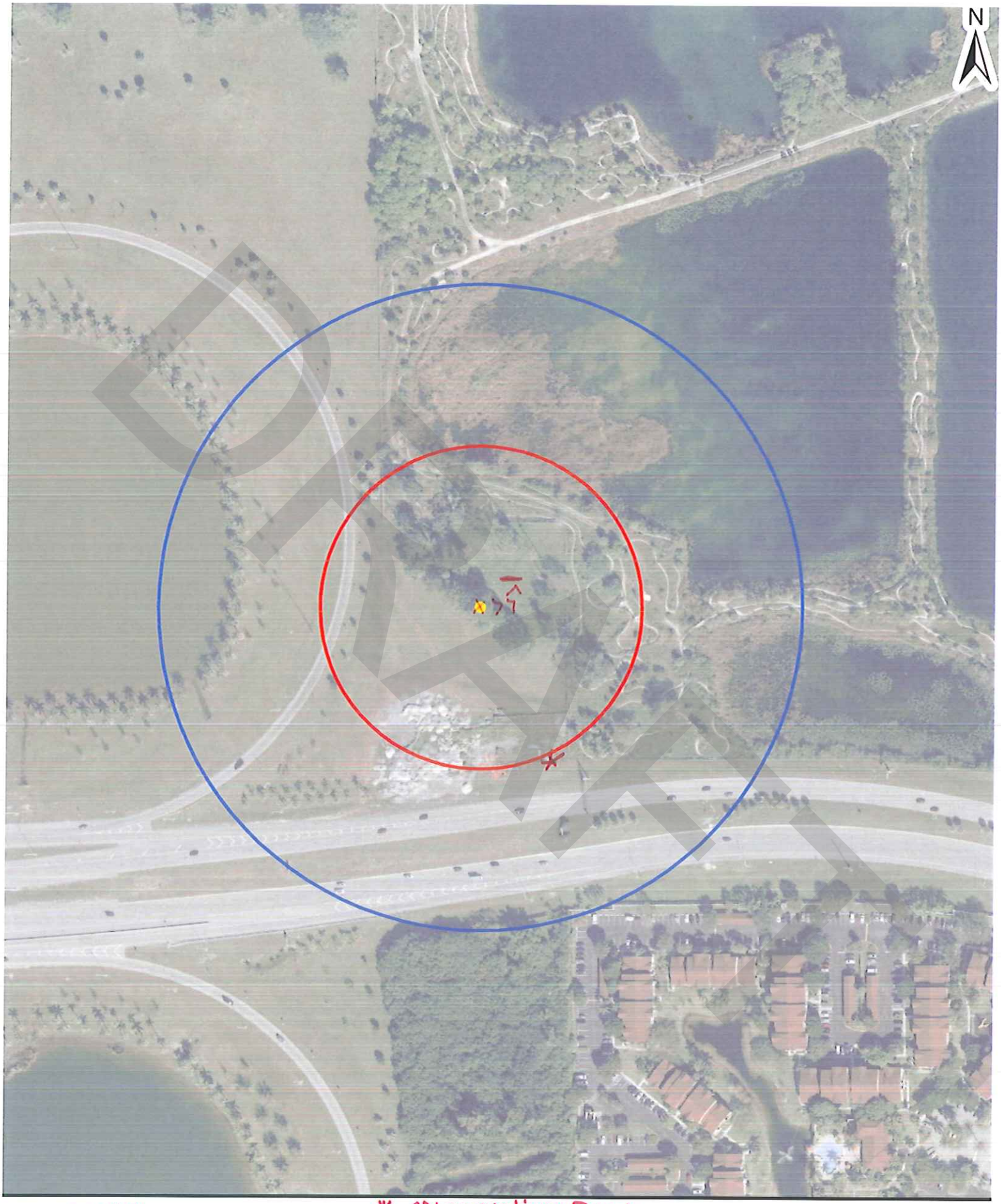
ate: 4/7/18

ersonnel: Cassandra O'Donahue

ime: 7:30AM

* Observation Point
^ Flight Path and Direction
X Perch Location
– Lost Sight

0 62.5 125 250 375 500
Fee



ate: 3/24/18

ersonnel: Cassandra O'Donahue

ime: 7:12 AM

* Observation Point
^ Flight Path and Direction
X Perch Location
— Last Sight

0 62.5 125 250 375 500
Fee

Bald Eagle Monitoring Data Report

Nest #: Quiet Waters Park, Broward County FL Start Time: 6:20AM Name of Monitor: Cassandra O'Donahue

Date: 4/20/18 End Time: 7:20AM # Adult Present: 2 # Young Present: 1

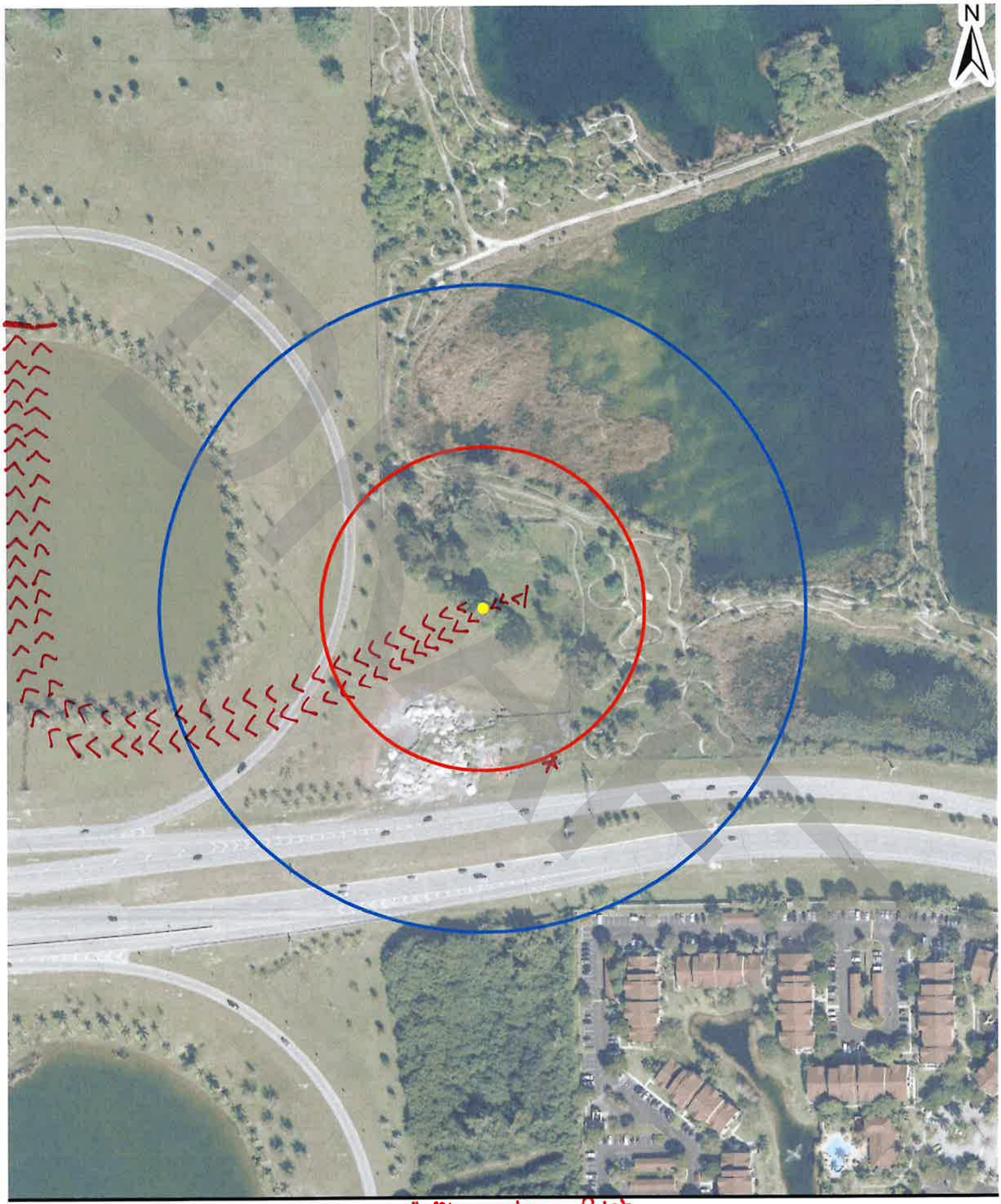
Tree Status[1]: L Tree type[2]: H

Time	Behavioral activity observed (list all that apply):				
6:20AM	Weather conditions	T: 66°F	W: WSW 7mph	C: <5%	P: 0%
	Notes/Comments: One adult and one sub-adult eagle are perched on tree with Alternate Nest 1, near nest.				
Time	Behavioral activity observed (list all that apply):				
6:36AM	Weather conditions	T: 66°F	W: WSW 6mph	C: <5%	P: 0%
	Notes/Comments: One adult eagle flew up to Alternate Nest 1 from behind the treeline to the north, then flew in tandem with one sub-adult eagle westward, over the Turnpike offramp, and then then North, out of sight.				
Time	Behavioral activity observed (list all that apply):				
7:03AM	Weather conditions	T: 66°F	W: W 5mph	C: <5%	P: 0%
	Notes/Comments: One adult eagle left its perch from Alternate Nest 1's tree and flew North, behind the treeline.				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Notes/Comments:				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Cassandra O'Donahue
Signature of Monitor

4/20/18
Date

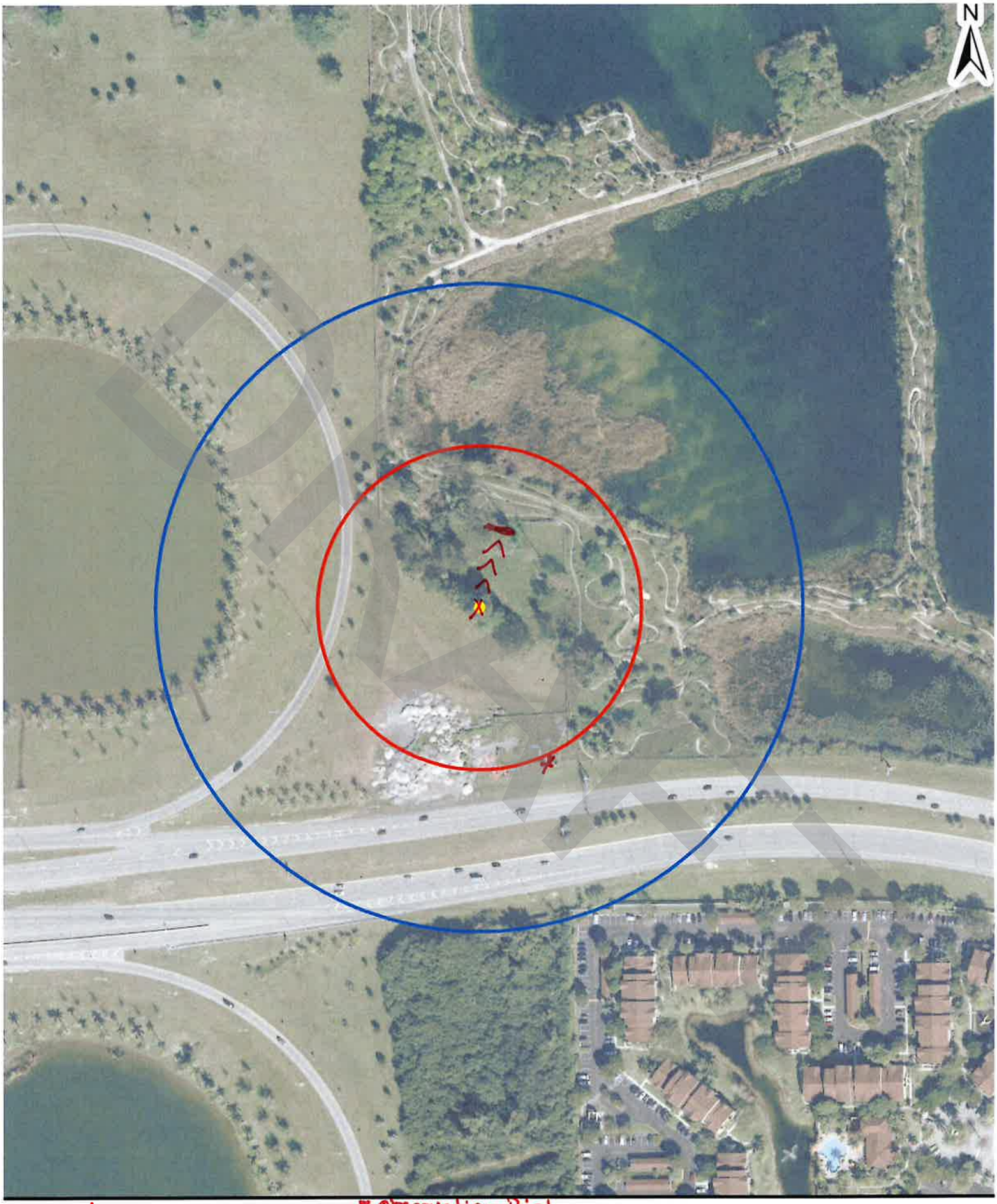


ate: 4/20/18

ersonnel: Cassandra O'Donahue

ime: 6:36 AM

* Observation Point
^ Flight Path and Direction
X Path Location
— Lost Sight



ate: 4/20/18

ersonnel: Cassandra O'Donahue

ime: 7:03 AM

* Observation Point
^ Flight Path and Direction
X Perch Location
– Lost Sight

0 62.5 125 250 375 500
Fee

Bald Eagle Monitoring Data Report

Nest #: Quiet Waters Park, Broward County FL Start Time: 6:10 AM Name of Monitor: Cassandra O'Donahue

Date: 5/4/18 End Time: 7:10 AM # Adult Present: ∅ # Young Present: ∅

Tree Status[1]: L Tree type[2]: H

Time	Behavioral activity observed (list all that apply):				
6:10AM	Weather conditions	T: 74°F	W: E 7mph	C: 25%	P: ∅
	Notes/Comments: No Activity				
Time	Behavioral activity observed (list all that apply):				
7:10AM	Weather conditions	T: 74°F	W: E 5mph	C: 25%	P: ∅
	Notes/Comments: No Activity				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Notes/Comments:				
Time	Behavioral activity observed (list all that apply):				
	Weather conditions	T:	W:	C:	P:
	Notes/Comments:				

Sworn Affidavit: I have read and understand the USFWS Bald Eagle Monitoring Guidelines. This report represents a true, accurate, and representative description of the site conditions and eagle behavior at the time of monitoring.

Cassandra O'Donahue
Signature of Monitor

5/4/18
Date

APPENDIX B: EASTERN INDIGO SNAKE EFFECT DETERMINATION KEY AND STANDARD PROTECTION MEASURES

United States Department of the Interior
U. S. FISH AND WILDLIFE SERVICE
7915 BAYMEADOWS WAY, SUITE 200
JACKSONVILLE, FLORIDA 32256-7517

IN REPLY REFER TO:
August 13, 2013

Colonel Alan M. Dodd, District Engineer
Department of the Army
Jacksonville District Corps of Engineers
P.O Box 4970
Jacksonville, Florida 32232-0019
(Attn: Mr. David S. Hobbie)

RE: Update Addendum to USFWS Concurrence Letter to U.S. Army Corps of Engineers Regarding Use of the Attached Eastern Indigo Snake Programmatic Effect Determination Key

Dear Colonel Dodd:

This letter is to amend the January 25, 2010, letter to the U.S. Army Corps of Engineers regarding the use of the attached eastern indigo snake programmatic effect determination key (key). It supersedes the update addendum issued January 5, 2012.

We have evaluated the original programmatic concurrence and find it suitable and appropriate to extend its use to the remainder of Florida covered by the Panama City Ecological Services Office.

On Page 2

The following replaces the last paragraph above the signatures:

"Thank you for your continued cooperation in the effort to conserve fish and wildlife resources. Any questions or comments should be directed to Annie Dziergowski (North Florida ESO) at 904-731-3089, Harold Mitchell (Panama City ESO) at 850-769-0552, or Victoria Foster (South Florida ESO) at 772-469-4269."

On Page 3

The following replaces both paragraphs under "Scope of the key":

"This key should be used only in the review of permit applications for effects determinations for the eastern indigo snake within the State of Florida, and not for other listed species or for aquatic resources such as Essential Fish Habitat (EFH)."

On Page 4

The following replaces the first paragraph under Conservation Measures:

"The Service routinely concurs with the Corps' "not likely to adversely affect" (NLAA) determination for individual project effects to the eastern indigo snake when assurances are given that

our *Standard Protection Measures for the Eastern Indigo Snake* (Service 2013) located at: http://www.fws.gov/northflorida/IndigoSnakes/indigo-snakes.htm will be used during project site preparation and project construction. There is no designated critical habitat for the eastern indigo snake."

On Page 4 and Page 5 (Couplet D)

The following replaces D. under Conservation Measures:

D. The project will impact less than 25 acres of xeric habitat (scrub, sandhill, or scrubby flatwoods) or less than 25 active and inactive gopher tortoise burrows……*go to* E

The project will impact more than 25 acres of xeric habitat (scrub, sandhill, or scrubby flatwoods) or more than 25 active and inactive gopher tortoise burrows and consultation with the Service is requested[2]…… *"may affect"*

On Page 5

The following replaces footnote #3:

"[3]If excavating potentially occupied burrows, active or inactive, individuals must first obtain state authorization via a FWC Authorized Gopher Tortoise Agent permit. The excavation method selected should also minimize the potential for injury of an indigo snake. Applicants should follow the excavation guidance provided within the most current Gopher Tortoise Permitting Guidelines found at http://myfwc.com/gophertortoise ."

Thank you for making these amendments concerning the Eastern Indigo Snake Key. If you have any questions, please contact Jodie Smithem of my staff at the address on the letterhead, by email at jodie_smithem@fws.gov, or by calling (904)731-3134.

Sincerely,

Dawn Jennings
Acting Field Supervisor

cc:
Panama City Ecological Services Field Office, Panama City, FL
South Florida Ecological Services Field Office, Vero Beach, FL

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

January 25, 2010

David S. Hobbie
Chief, Regulatory Division
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Service Federal Activity Code: 41420-2009-FA-0642
Service Consultation Code: 41420-2009-I-0467
41910-2010-I-0045
Subject: North and South Florida Ecological Services Field Offices Programmatic Concurrence for Use of Original Eastern Indigo Snake Key(s) Until Further Notice

Dear Mr. Hobbie:

The U.S. Fish and Wildlife Service's (Service) South and North Florida Ecological Services Field Offices (FO), through consultation with the U.S. Army Corps of Engineers Jacksonville District (Corps), propose revision to both Programmatic concurrence letters/keys for the federally threatened Eastern Indigo Snake (*Drymarchon corais couperi*), (indigo snake), and now provide one key for both FO's. The original programmatic key was issued by the South Florida FO on November 9, 2007. The North Florida FO issued a revised version of the original key on September 18, 2008. Both keys were similar in content, but reflected differences in geographic work areas between the two Field Offices. The enclosed key satisfies each office's responsibilities under the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C.1531 *et seq.*).

Footnote number 3 in the original keys indicated "A member of the excavation team should be authorized for Incidental Take during excavation through either a section 10(a)(1)(A) permit issued by the Service or an incidental take permit issued by the Florida Fish and Wildlife Conservation Commission (FWC)." We have removed this reference to a Service issued Section 10(a)(1)(A) permit, as one is not necessary for this activity. We also referenced the FWC's revised April 2009 Gopher Tortoise Permitting Guidelines with a link to their website for updated excavation guidance, and have provided a website link to our Standard Protection Measures. All other conditions and criteria apply.

We believe the implementation of the attached key achieves our mutual goal for all users to make consistent effect determinations regarding this species. The use of this key for review of projects

located in all referenced counties in our respective geographic work areas leads the Service to concur with the Corps' determination of "may affect, not likely to adversely affect" (MANLAA) for the Eastern indigo snake. The biological rationale for the determinations is contained within the referenced documents and is submitted in accordance with section 7 of the Act.

Should circumstances change or new information become available regarding the eastern indigo snake or implementation of the key, the determinations may be reconsidered as deemed necessary.

Thank you for your continued cooperation in the effort to conserve fish and wildlife resources. Any questions or comments should be directed to either Allen Webb (Vero Beach) at 772-562-3909, extension 246, or Jay Herrington (Jacksonville) at 904-731-3326.

Sincerely,

Paul Souza
Field Supervisor
South Florida Ecological Services Office

David L. Hankla
Field Supervisor
North Florida Ecological Services Office

Enclosure

cc: electronic only
FWC, Tallahassee, Florida (Dr. Elsa Haubold)
Service, Jacksonville, Florida (Jay Herrington)
Service, Vero Beach, Florida (Sandra Sneckenberger)

Eastern Indigo Snake Programmatic Effect Determination Key

Scope of the key

This key should be used only in the review of permit applications for effects determinations within the North and South Florida Ecological Services Field Offices Geographic Areas of Responsibility (GAR), and not for other listed species or for aquatic resources such as Essential Fish Habitat (EFH). Counties within the **North** Florida GAR include Alachua, Baker, Bradford, Brevard, Citrus, Clay, Columbia, Dixie, Duval, Flagler, Gilchrist, Hamilton, Hernando, Hillsborough, Lafayette, Lake, Levy, Madison, Manatee, Marion, Nassau, Orange, Pasco, Pinellas, Putnam, St. Johns, Seminole, Sumter, Suwannee, Taylor, Union, and Volusia.

Counties in the **South** Florida GAR include Broward, Charlotte, Collier, De Soto, Glades, Hardee, Hendry, Highlands, Lee, Indian River, Martin, Miami-Dade, Monroe, Okeechobee, Osceola, Palm Beach, Polk, Sarasota, St. Lucie.

Habitat

Over most of its range, the eastern indigo snake frequents several habitat types, including pine flatwoods, scrubby flatwoods, high pine, dry prairie, tropical hardwood hammocks, edges of freshwater marshes, agricultural fields, coastal dunes, and human-altered habitats (Service 1999). Eastern indigo snakes appear to need a mosaic of habitats to complete their life cycle. Wherever the eastern indigo snake occurs in xeric habitats, it is closely associated with the gopher tortoise *(Gopherus polyphemus),* the burrows of which provide shelter from winter cold and summer desiccation (Speake et al. 1978; Layne and Steiner 1996). Interspersion of tortoise-inhabited uplands and wetlands improves habitat quality for this species (Landers and Speake 1980; Auffenberg and Franz 1982).

In south Florida, agricultural sites, such as sugar cane fields, created in former wetland areas are occupied by eastern indigo snakes (Enge pers. comm. 2007). Formerly, indigo snakes would have only occupied higher elevation sites within the wetlands. The introduction of agriculture and its associated canal systems has resulted in an increase in rodents and other species of snakes that are prey for eastern indigo snakes. The result is that indigos occur at higher densities in these areas than they did historically.

Even though thermal stress may not be a limiting factor throughout the year in south Florida, indigo snakes still seek and use underground refugia. On the sandy central ridge of central Florida, eastern indigos use gopher tortoise burrows more (62 percent) than other underground refugia (Layne and Steiner 1996). Other underground refugia used include armadillo (*Dasypus novemcinctus*) burrows near citrus groves, cotton rat (*Sigmodon hispidus*) burrows, and land crab (*Cardisoma guanhumi*) burrows in coastal areas (Service 2006). Natural ground holes, hollows at the base of trees or shrubs, ground litter, trash piles, and crevices of rock-lined ditch walls are also used (Layne and Steiner 1996). These refugia are used most frequently where tortoise burrows are not available, principally in low-lying areas off the central and coastal ridges. In extreme south Florida (the Everglades and Florida Keys), indigo snakes are found in tropical

hardwood hammocks, pine rocklands, freshwater marshes, abandoned agricultural land, coastal prairie, mangrove swamps, and human-altered habitats (Steiner et al. 1983). It is suspected that they prefer hammocks and pine forests, because most observations occur in these habitats disproportionately to their presence in the landscape (Steiner et al. 1983). Hammocks may be important breeding areas as juveniles are typically found there. The eastern indigo snake is a snake-eater so the presence of other snake species may be a good indicator of habitat quality.

Conservation Measures

The Service routinely concurs with the Corps' "not likely to adversely affect" (NLAA) determination for individual project effects to the eastern indigo snake when assurances are given that our *Standard Protection Measures for the Eastern Indigo Snake* (Service 2004) located at: http://www.fws.gov/northflorida/IndigoSnakes/indigo-snakes will be used during project site preparation and project construction. There is no designated critical habitat for the eastern indigo snake.

In an effort to reduce correspondence in effect determinations and responses, the Service is providing an Eastern Indigo Snake Effect Determination Key, similar in utility to the West Indian Manatee Effect Determination Key and the Wood Stork Effect Determination Keys presently being utilized by the Corps. If the use of this key results in a Corps' determination of "no effect" for a particular project, the Service supports this determination. If the use of this Key results in a determination of NLAA, the Service concurs with this determination and no additional correspondence will be necessary[1]. This key is subject to revisitation as the Corps and Service deem necessary.

A. Project is not located in open water or salt marsh.....*go to* B

   Project is located solely in open water or salt marsh.....*"no effect"*

B. Permit will be conditioned for use of the Service's *Standard Protection Measures For The Eastern Indigo Snake* during site preparation and project construction.....*go to* C

   Permit will not be conditioned as above for the eastern indigo snake, or it is not known whether an applicant intends to use these measures and consultation with the Service is requested[2] .....*"may affect"*

C. There are gopher tortoise burrows, holes, cavities, or other refugia where a snake could be buried or trapped and injured during project activities .....*go to* D

   There are no gopher tortoise burrows, holes, cavities, or other refugia where a snake could be buried or trapped and injured during project activities .....*"NLAA"*

D. The project will impact less than 25 acres of xeric habitat supporting less than 25 active and inactive gopher tortoise burrows.....*go to* E

The project will impact more than 25 acres of xeric habitat or more than 25 active and inactive gopher tortoise burrows and consultation with the Service is requested[2]..... *"may affect"*

E. Any permit will be conditioned such that all gopher tortoise burrows, active or inactive, will be evacuated prior to site manipulation in the vicinity of the burrow[3]. If an indigo snake is encountered, the snake must be allowed to vacate the area prior to additional site manipulation in the vicinity. Any permit will also be conditioned such that holes, cavities, and snake refugia other than gopher tortoise burrows will be inspected each morning before planned site manipulation of a particular area, and, if occupied by an indigo snake, no work will commence until the snake has vacated the vicinity of proposed work..... *"NLAA"*

Permit will not be conditioned as outlined above and consultation with the Service is requested[2] ..... *"may affect"*

---

[1]With an outcome of "no effect" or "NLAA" as outlined in this key, the requirements of section 7 of the Act are fulfilled for the eastern indigo snake and no further action is required.

[2]Consultation may be concluded informally or formally depending on project impacts.

[3] If burrow excavation is utilized, it should be performed by experienced personnel. The method used should minimize the potential for injury of an indigo snake. Applicants should follow the excavation guidance provided within the Florida Fish and Wildlife Conservation Commission's revised April 2009 Gopher Tortoise Permitting Guidelines located at **http://myfwc.com/License/Permits_ProtectedWildlife.htm#gophertortoise**. A member of the excavation team should be authorized for Incidental Take during excavation through an incidental take permit issued by the Florida Fish and Wildlife Conservation Commission.

STANDARD PROTECTION MEASURES FOR THE EASTERN INDIGO SNAKE
U.S. Fish and Wildlife Service

March 23, 2021

The eastern indigo snake protection/education plan (Plan) below has been developed by the U.S. Fish and Wildlife Service (USFWS) in Florida and Georgia for use by applicants and their construction personnel. At least **30 days prior** to any clearing/land alteration activities, the applicant shall notify the appropriate USFWS Field Office via e-mail that the Plan will be implemented as described below (North Florida Field Office: jaxregs@fws.gov; South Florida Field Office: verobeach@fws.gov; Panama City Field Office: panamacity@fws.gov; Georgia Field Office: gaes_assistance@fws.gov). As long as the signatory of the e-mail certifies compliance with the below Plan (including use of the attached poster and brochure), no further written confirmation or approval from the USFWS is needed and the applicant may move forward with the project.

If the applicant decides to use an eastern indigo snake protection/education plan other than the approved Plan below, written confirmation or approval from the USFWS that the plan is adequate must be obtained. At least 30 days prior to any clearing/land alteration activities, the applicant shall submit their unique plan for review and approval. The USFWS will respond via e-mail, typically within 30 days of receiving the plan, either concurring that the plan is adequate or requesting additional information. A concurrence e-mail from the appropriate USFWS Field Office will fulfill approval requirements.

The Plan materials should consist of: 1) a combination of posters and pamphlets (see **Poster Information** section below); and 2) verbal educational instructions to construction personnel by supervisory or management personnel before any clearing/land alteration activities are initiated (see **Pre-Construction Activities** and **During Construction Activities** sections below).

POSTER INFORMATION

Posters with the following information shall be placed at strategic locations on the construction site and along any proposed access roads (a final poster for Plan compliance, to be printed on 11 x 17in or larger paper and laminated, is attached):

DESCRIPTION: The eastern indigo snake is one of the largest non-venomous snakes in North America, with individuals often reaching up to 8 feet in length. They derive their name from the glossy, blue-black color of their scales above and uniformly slate blue below. Frequently, they have orange to coral reddish coloration in the throat area, yet some specimens have been reported to only have cream coloration on the throat.

These snakes are not typically aggressive and will attempt to crawl away when disturbed. Though indigo snakes rarely bite, they should NOT be handled.

SIMILAR SNAKES: The black racer is the only other solid black snake resembling the eastern indigo snake. However, black racers have a white or cream chin, thinner bodies, and WILL BITE if handled.

LIFE HISTORY: The eastern indigo snake occurs in a wide variety of terrestrial habitat types throughout Florida and Georgia. Although they have a preference for uplands, they also utilize some wetlands and agricultural areas and often move seasonally between upland and lowland habitats, particularly in the northern portions of its range (North Florida and Georgia). Eastern indigo snakes will often seek shelter inside gopher tortoise burrows and other below- and above-ground refugia, such as other animal burrows, stumps, roots, and debris piles. Reliance on xeric sandhill habitats throughout the northern portion of the range in northern Florida and Georgia is due to the dependence on gopher tortoise burrows for shelter during winter. Breeding occurs during October through February. Females may lay from 4 - 12 white eggs as early as April through June, with young hatching in late July through October.

PROTECTION UNDER FEDERAL AND STATE LAW: The eastern indigo snake is classified as a Threatened species by both the USFWS and the Florida Fish and Wildlife Conservation Commission. Taking of eastern indigo snakes is prohibited by the Endangered Species Act without a permit is defined by the USFWS as an attempt to kill, harm, harass, pursue, hunt, shoot, wound, trap, capture, collect, or engage in any such conduct. Penalties include a maximum fine of $25,000 for civil violations and up to $50,000 and/or imprisonment for criminal offenses, if convicted.

Only individuals currently authorized through an issued Incidental Take Statement in association with a USFWS Biological Opinion, or by a Section 10(a)(1)(A) permit issued by the USFWS, to handle an eastern indigo snake are allowed to do so.

IF YOU SEE A <u>LIVE</u> EASTERN INDIGO SNAKE ON THE SITE:

- Cease clearing activities and allow the live eastern indigo snake sufficient time to move away from the site without interference;
- Personnel must NOT attempt to touch or handle snake due to protected status.
- Take photographs of the snake, if possible, for identification and documentation purposes. Â
- Immediately notify supervisor or the applicants designated agent, **and** the appropriate USFWS office, with the location information and condition of the snake.
- If the snake is located in a vicinity where continuation of the clearing or construction activities will cause harm to the snake, the activities must halt until such time that a representative of the USFWS returns the call (within one day) with further guidance as to when activities may resume.

IF YOU SEE A DEAD EASTERN INDIGO SNAKE ON THE SITE:

- Cease clearing activities and immediately notify supervisor or the applicants designated agent, **and** the appropriate USFWS office, with the location information and condition of the snake.
- Take photographs of the snake, if possible, for identification and documentation purposes.
- Thoroughly soak the dead snake in water and then freeze the specimen. The appropriate wildlife agency will retrieve the dead snake.

Telephone numbers of USFWS Florida Field Offices to be contacted if a live or dead eastern indigo snake is encountered:

North Florida Field Office: (904) 731-3336
Panama City Field Office: (850) 769-0552
South Florida Field Office: (772) 562-3909
Georgia Field Office: (706) 613-9493

PRE-CONSTRUCTION ACTIVITIES

1. The applicant or designated agent will post educational posters in the construction office and throughout the construction site, including any access roads. The posters must be clearly visible to all construction staff. A sample poster is attached.

2. Prior to the onset of construction activities, the applicant/designated agent will conduct a meeting with all construction staff (annually for multi-year projects) to discuss identification of the snake, its protected status, what to do if a snake is observed within the project area, and applicable penalties that may be imposed if state and/or federal regulations are violated. An educational brochure including color photographs of the snake will be given to each staff member in attendance and additional copies will be provided to the construction superintendent to make available in the onsite construction office (a final brochure for Plan compliance, to be printed double-sided on 8.5 x 11in paper and then properly folded, is attached). Â Photos of eastern indigo snakes may be accessed on USFWS and/or FWC or GADNR websites.

3. Construction staff will be informed that in the event that an eastern indigo snake (live or dead) is observed on the project site during construction activities, all such activities are to cease until the established procedures are implemented according to the Plan, which includes notification of the appropriate USFWS Field Office. The contact information for the USFWS is provided on the referenced posters and brochures.

DURING CONSTRUCTION ACTIVITIES

1. During initial site clearing activities, an onsite observer may be utilized to determine whether habitat conditions suggest a reasonable probability of an eastern indigo snake sighting (example: discovery of snake sheds, tracks, lots of refugia and cavities present in the area of clearing activities, and presence of gopher tortoises and burrows).

2. If an eastern indigo snake is discovered during gopher tortoise relocation activities (i.e. burrow excavation), the USFWS shall be contacted within one business day to obtain further guidance which may result in further project consultation.

3. Periodically during construction activities, the applicants designated agent should visit the project area to observe the condition of the posters and Plan materials, and replace them as needed. Construction personnel should be reminded of the instructions (above) as to what is expected if any eastern indigo snakes are seen.

POST CONSTRUCTION ACTIVITIES

Whether or not eastern indigo snakes are observed during construction activities, a monitoring report should be submitted to the appropriate USFWS Field Office within 60 days of project completion. The report can be sent electronically to the appropriate USFWS e-mail address listed on page one of this Plan.

APPENDIX C: USFWS WOOD STORK EFFECT DETERMINATION KEY

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

May 18, 2010

Donnie Kinard
Chief, Regulatory Division
Jacksonville District Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Service Federal Activity Code: 41420-2007-FA-1494
Service Consultation Code: 41420-2007-I-0964
Subject: South Florida Programmatic Concurrence
Species: Wood Stork

Dear Mr. Kinard:

This letter addresses minor errors identified in our January 25, 2010, wood stork key and as such, supplants the previous key. The key criteria and wood stork biomass foraging assessment methodology have not been affected by these minor revisions.

The Fish and Wildlife Service's (Service) South Florida Ecological Services Office (SFESO) and the U.S. Army Corps of Engineers Jacksonville District (Corps) have been working together to streamline the consultation process for federally listed species associated with the Corps' wetland permitting program. The Service provided letters to the Corps dated March 23, 2007, and October 18, 2007, in response to a request for a multi-county programmatic concurrence with a criteria-based determination of "may affect, not likely to adversely affect" (NLAA) for the threatened eastern indigo snake (*Drymarchon corais couperi*) and the endangered wood stork (*Mycteria americana*) for projects involving freshwater wetland impacts within specified Florida counties. In our letters, we provided effect determination keys for these two federally listed species, with specific criteria for the Service to concur with a determination of NLAA.

The Service has revisited these keys recently and believes new information provides cause to revise these keys. Specifically, the new information relates to foraging efficiencies and prey base assessments for the wood stork and permitting requirements for the eastern indigo snake. This letter addresses the wood stork key and is submitted in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C. 1531 *et seq.*). The eastern indigo snake key will be provided in a separate letter.

Wood stork

Habitat

The wood stork is primarily associated with freshwater and estuarine habitats that are used for nesting, roosting, and foraging. Wood storks typically construct their nests in medium to tall

trees that occur in stands located either in swamps or on islands surrounded by relatively broad expanses of open water (Ogden 1991, 1996; Rodgers et al. 1996). Successful colonies are those that have limited human disturbance and low exposure to land-based predators. Nesting colonies protected from land-based predators are characterized as those surrounded by large expanses of open water or where the nest trees are inundated at the onset of nesting and remain inundated throughout most of the breeding cycle. These colonies have water depths between 0.9 and 1.5 meters (3 and 5 feet) during the breeding season.

Successful nesting generally involves combinations of average or above-average rainfall during the summer rainy season and an absence of unusually rainy or cold weather during the winter-spring breeding season (Kahl 1964; Rodgers et al. 1987). This pattern produces widespread and prolonged flooding of summer marshes, which maximize production of freshwater fishes, followed by steady drying that concentrate fish during the season when storks nest (Kahl 1964). Successful nesting colonies are those that have a large number of foraging sites. To maintain a wide range of foraging sites, a variety of wetland types should be present, with both short and long hydroperiods. The Service (1999) describes a short hydroperiod as a 1 to 5-month wet/dry cycle, and a long hydroperiod as greater than 5 months. During the wet season, wood storks generally feed in the shallow water of the short-hydroperiod wetlands and in coastal habitats during low tide. During the dry season, foraging shifts to longer hydroperiod interior wetlands as they progressively dry-down (though usually retaining some surface water throughout the dry season).

Wood storks occur in a wide variety of wetland habitats. Typical foraging sites for the wood stork include freshwater marshes and stock ponds, shallow, seasonally flooded roadside and agricultural ditches, narrow tidal creeks and shallow tidal pools, managed impoundments, and depressions in cypress heads and swamp sloughs. Because of their specialized feeding behavior, wood storks forage most effectively in shallow-water areas with highly concentrated prey. Through tactolocation, or grope feeding, wood storks in south Florida feed almost exclusively on fish between 2 and 25 centimeters [cm] (1 and 10 inches) in length (Ogden et al. 1976). Good foraging conditions are characterized by water that is relatively calm, uncluttered by dense thickets of aquatic vegetation, and having a water depth between 5 and 38 cm (5 and 15 inches) deep, although wood storks may forage in other wetlands. Ideally, preferred foraging wetlands would include a mosaic of emergent and shallow open-water areas. The emergent component provides nursery habitat for small fish, frogs, and other aquatic prey and the shallow, open-water areas provide sites for concentration of the prey during seasonal dry-down of the wetland.

Conservation Measures

The Service routinely concurs with the Corps' "may affect, not likely to adversely affect" determination for individual project effects to the wood stork when project effects are insignificant due to scope or location, or if assurances are given that wetland impacts have been avoided, minimized, and adequately compensated such that there is no net loss in foraging potential. We utilize our *Habitat Management Guidelines for the Wood Stork in the Southeast Region* (Service 1990) (Enclosure 1) (HMG) in project evaluation. The HMG is currently under review and once final will replace the enclosed HMG. There is no designated critical habitat for the wood stork.

The SFESO recognizes a 29.9 kilometer [km] (18.6-mile) core foraging area (CFA) around all known wood stork colonies in south Florida. Enclosure 2 (to be updated as necessary) provides locations of colonies and their CFAs in south Florida that have been documented as active within the last 10 years. The Service believes loss of suitable wetlands within these CFAs may reduce foraging opportunities for the wood stork. To minimize adverse effects to the wood stork, we recommend compensation be provided for impacts to foraging habitat. The compensation should consider wetland type, location, function, and value (hydrology, vegetation, prey utilization) to ensure that wetland functions lost due to the project are adequately offset. Wetlands offered as compensation should be of the same hydroperiod and located within the CFAs of the affected wood stork colonies. The Service may accept, under special circumstances, wetland compensation located outside the CFAs of the affected wood stork nesting colonies. On occasion, wetland credits purchased from a "Service Approved" mitigation bank located outside the CFAs could be acceptable to the Service, depending on location of impacted wetlands relative to the permitted service area of the bank, and whether or not the bank has wetlands having the same hydroperiod as the impacted wetland.

In an effort to reduce correspondence in effect determinations and responses, the Service is providing the Wood Stork Effect Determination Key below. If the use of this key results in a Corps determination of "no effect" for a particular project, the Service supports this determination. If the use of this Key results in a determination of NLAA, the Service concurs with this determination[1]. This Key is subject to revisitation as the Corps and Service deem necessary.

The Key is as follows:

A. Project within 0.76 km (0.47 mile)[2] of an active colony site[3] ..... "*may affect*[4]"

Project impacts Suitable Foraging Habitat (SFH)[5] at a location greater than 0.76 km (0.47 mile) from a colony site..... ..... "*go to* B"

[1] With an outcome of "no effect" or "NLAA" as outlined in this key, and the project has less than 20.2 hectares (50 acres) of wetland impacts, the requirements of section 7 of the Act are fulfilled for the wood stork and no further action is required. For projects with greater than 20.2 hectares (50 acres) of wetland impacts, written concurrence of NLAA from the Service is necessary.

[2] Within the secondary zone (the average distance from the border of a colony to the limits of the secondary zone is 0.76 km (2,500 feet, or 0.47 mi).

[3] An active colony is defined as a colony that is currently being used for nesting by wood storks or has historically over the last 10 years been used for nesting by wood storks.

[4] Consultation may be concluded informally or formally depending on project impacts.

[5] Suitable foraging habitat (SFH) includes wetlands that typically have shallow-open water areas that are relatively calm and have a permanent or seasonal water depth between 5 to 38 cm (2 to 15 inches) deep. Other shallow non-wetland water bodies are also SFH. SFH supports and concentrates, or is capable of supporting and concentrating small fish, frogs, and other aquatic prey. Examples of SFH include, but are not limited to freshwater marshes, small ponds, shallow, seasonally flooded roadside or agricultural ditches, seasonally flooded pastures, narrow tidal creeks or shallow tidal pools, managed impoundments, and depressions in cypress heads and swamp sloughs.

Project does not affect SFH……..…..*"no effect*[1]*"*.

B. Project impact to SFH is less than 0.20 hectare (one-half acre)[6]……..……*NLAA*[1]"

Project impact to SFH is greater in scope than 0.20 hectare (one-half acre)....……*go to* C

C. Project impacts to SFH not within the CFA (29.9 km, 18.6 miles) of a colony site ……..…….…….……*go to* D

Project impacts to SFH within the CFA of a colony site ……..…...…….*go to* E

D. Project impacts to SFH have been avoided and minimized to the extent practicable; compensation (Service approved mitigation bank or as provided in accordance with Mitigation Rule 33 CFR Part 332) for unavoidable impacts is proposed in accordance with the CWA section 404(b)(1) guidelines; and habitat compensation replaces the foraging value matching the hydroperiod[7] of the wetlands affected and provides foraging value similar to, or higher than, that of impacted wetlands. See Enclosure 3 for a detailed discussion of the hydroperiod foraging values, an example, and further guidance[8]…….. *NLAA*[1]"

Project not as above.…….... "*may affect*[4]*"*

E. Project provides SFH compensation in accordance with the CWA section 404(b)(1) guidelines and is not contrary to the HMG; habitat compensation is within the appropriate CFA or within the service area of a Service-approved mitigation bank; and habitat compensation replaces foraging value, consisting of wetland enhancement or restoration matching the hydroperiod[7] of the wetlands affected, and provides foraging value similar

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[6] On an individual basis, SFH impacts to wetlands less than 0.20 hectare (one-half acre) generally will not have a measurable effect on wood storks, although we request that the Corps require mitigation for these losses when appropriate. Wood storks are a wide ranging species, and individually, habitat change from impacts to SFH less than one-half acre are not likely to adversely affect wood storks. However, collectively they may have an effect and therefore regular monitoring and reporting of these effects are important.

[7] Several researchers (Flemming et al. 1994; Ceilley and Bortone 2000) believe that the short hydroperiod wetlands provide a more important pre-nesting foraging food source and a greater early nestling survivor value for wood storks than the foraging base (grams of fish per square meter) than long hydroperiod wetlands provide. Although the short hydroperiod wetlands may provide less fish, these prey bases historically were more extensive and met the foraging needs of the pre-nesting storks and the early-age nestlings. Nest productivity may suffer as a result of the loss of short hydroperiod wetlands. We believe that most wetland fill and excavation impacts permitted in south Florida are in short hydroperiod wetlands. Therefore, we believe that it is especially important that impacts to these short hydroperiod wetlands within CFAs are avoided, minimized, and compensated for by enhancement/restoration of short hydroperiod wetlands.

[8] For this Key, the Service requires an analysis of foraging prey base losses and enhancements from the proposed action as shown in the examples in Enclosure 3 for projects with greater than 2.02 hectares (5 acres) of wetland impacts. For projects with less than 2.02 hectares (5 acres) of wetland impacts, an individual foraging prey base analysis is not necessary although type for type wetland compensation is still a requirement of the Key.

to, or higher than, that of impacted wetlands. See Enclosure 3 for a detailed discussion of the hydroperiod foraging values, an example, and further guidance[8]……..... *"NLAA[1]"*

Project does not satisfy these elements ……..……..…..…..... *"may affect[4]"*

This Key does not apply to Comprehensive Everglades Restoration Plan projects, as they will require project-specific consultations with the Service.

Monitoring and Reporting Effects

For the Service to monitor cumulative effects, it is important for the Corps to monitor the number of permits and provide information to the Service regarding the number of permits issued where the effect determination was: "may affect, not likely to adversely affect." We request that the Corps send us an annual summary consisting of: project dates, Corps identification numbers, project acreages, project wetland acreages, and project locations in latitude and longitude in decimal degrees.

Thank you for your cooperation and effort in protecting federally listed species. If you have any questions, please contact Allen Webb at extension 246.

Sincerely yours,

Paul Souza
Field Supervisor
South Florida Ecological Services Office

Enclosures

cc: w/enclosures (electronic only)
Corps, Jacksonville, Florida (Stu Santos)
EPA, West Palm Beach, Florida (Richard Harvey)
FWC, Vero Beach, Florida (Joe Walsh)
Service, Jacksonville, Florida (Billy Brooks)

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HABITAT MANAGEMENT GUIDELINES FOR THE WOOD STORK IN THE SOUTHEAST REGION

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Prepared by

John C. Ogden
Acting Program Manager
Wildlife Research
Everglades National Park

for the

Southeast Region
U.S. Fish and Wildlife Service

Cover design by
Florida Power & Light Company
Miami, Florida

HABITAT MANAGEMENT GUIDELINES FOR THE WOOD STORK IN THE SOUTHEAST REGION

Introduction

A number of Federal and state laws and/or regulations prohibit, cumulatively, such acts as harrassing, disturbing, harming, molesting, pursuing, etc., wood storks, or destroying their nests (see Section VII). Although advisory in nature, these guidelines represent a biological interpretation of what would constitute violations of one or more of such prohibited acts. Their purpose is to mainain and/or improve the environmental conditions that are required for the survival and well-being of wood storks in the southeastern United States, and are designed essentially for application in wood stork/human activity conflicts (principally land development and human intrusion into stork use sites). The emphasis is to avoid or minimize detrimental human-related impacts on wood storks. These guidelines were prepared in consultations with state wildlife agencies and wood stork experts in the four southeastern states where the wood stork is listed as Endangered (Alabama, Florida, Georgia, South Carolina).

General

The wood stork is a gregarious species, which nests in colonies (rookeries), and roosts and feeds in flocks, often in association with other species of long-legged water birds. Storks that nest in the southeastern United States appear to represent a distinct population, separate from the nearest breeding population in Mexico. Storks in the southeastern U.S. population have recently (since 1980) nested in colonies scattered throughout Florida, and at several central-southern Georgia and coastal South Carolina sites. Banded and color-marked storks from central and southern Florida colonies have dispersed during non-breeding seasons as far north as southern Georgia, and the coastal counties in South Carolina and southeastern North Carolina, and as far west as central Alabama and northeastern Mississippi. Storks from a colony in south-central Georgia have wintered between southern Georgia and southern Florida. This U.S. nesting population of wood storks was listed as endangered by the U.S. Fish and Wildlife Service on February 28, 1984 (*Federal Register* 49(4):7332-7335).

Wood storks use freshwater and estuarine wetlands as feeding, nesting, and roosting sites. Although storks are not habitat specialists, their needs are exacting enough, and available habitat is limited enough, so that nesting success and the size of regional populations are closely regulated by year-to-year differences in the quality and quantity of suitable habitat. Storks are especially sensitive to environmental conditions at feeding sites; thus, birds may fly relatively long distances either daily or between regions annually, seeking adequate food resources.

All available evidence suggests that regional declines in wood stork numbers have been largely due to the loss or degradation of essential wetland habitat. An understanding of the qualities of good stork habitat should help to focus protection efforts on those sites

that are seasonally important to regional populations of wood storks. Characteristics of feeding, nesting, and roosting habitat, and management guidelines for each, are presented here by habitat type.

I. Feeding habitat.

A major reason for the wood stork decline has been the loss and degredation of feeding habitat. Storks are especially sensitive to any manipulation of a wetland site that results in either reduced amounts or changes in the timing of food availability.

Storks feed primarily (often almost exclusively) on small fish between 1 and 8 inches in length. Successful foraging sites are those where the water is between 2 and 15 inches deep. Good feeding conditions usually occur where water is relatively calm and uncluttered by dense thickets of aquatic vegetation. Often a dropping water level is necessary to concentrate fish at suitable densities. Conversely, a rise in water, especially when it occurs abruptly, disperses fish and reduces the value of a site as feeding habitat.

The types of wetland sites that provide good feeding conditions for storks include: drying marshes or stock ponds, shallow roadside or agricultural ditches, narrow tidal creeks or shallow tidal pools, and depressions in cypress heads or swamp sloughs. In fact, almost any shallow wetland depression where fish tend to become concentrated, either through local reproduction or the consequences of area drying, may be used by storks.

Nesting wood storks do most of their feeding in wetlands between 5 and 40 miles from the colony, and occasionally at distances as great as 75 miles. Within this colony foraging range and for the 110-150 day life of the colony, and depending on the size of the colony and the nature of the surrounding wetlands, anywhere from 50 to 200 different feeding sites may be used during the breeding season.

Non-breeding storks are free to travel much greater distances and remain in a region only for as long as sufficient food is available. Whether used by breeders or non-breeders, any single feeding site may at one time have small or large numbers of storks (1 to 100+), and be used for one to many days, depending on the quality and quantity of available food. Obviously, feeding sites used by relatively large numbers of storks, and/or frequently used areas, potentially are the more important sites necessary for the maintenance of a regional population of birds.

Differences between years in the seasonal distribution and amount of rainfall usually mean that storks will differ between years in where and when they feed. Successful nesting colonies are those that have a large number of feeding site options, including sites that may be suitable only in years of rainfall extremes. To maintain the wide range of feeding site options requires that many different wetlands, with both relatively short and long annual hydroperiods, be preserved. For example, protecting only the larger wetlands, or those with longer annual hydroperiods, will result in the eventual loss of smaller, seemingly less important wetlands. However, these small scale wetlands are crucial as the only available feeding sites during the wetter periods when the larger habitats are too deeply flooded to be used by storks.

II. Nesting habitat.

Wood storks nest in colonies, and will return to the same colony site for many years so long as that site and surrounding feeding habitat continue to supply the needs of the birds. Storks require between 110 and 150 days for the annual nesting cycle, from the period of courtship until the nestlings become independent. Nesting activity may begin as early as December or as late as March in southern Florida colonies, and between late February and April in colonies located between central Florida and South Carolina. Thus, full term colonies may be active until June-July in south Florida, and as late as July-August at more northern sites. Colony sites may also be used for roosting by storks during other times of the year.

Almost all recent nesting colonies in the southeastern U.S. have been located either in woody vegetation over standing water, or on islands surrounded by broad expanses of open water. The most dominant vegetation in swamp colonies has been cypress, although storks also nest in swamp hardwoods and willows. Nests in island colonies may be in more diverse vegetation, including mangroves (coastal), exotic species such as Australian pine (*Casuarina*) and Brazilian Pepper (*Schinus*), or in low thickets of cactus (*Opuntia*). Nests are usually located 15-75 feet above ground, but may be much lower, especially on island sites when vegetation is low.

Since at least the early 1970's, many colonies in the southeastern U.S. have been located in swamps where water has been impounded due to the construction of levees or roadways. Storks have also nested in dead and dying trees in flooded phosphate surface mines, or in low, woody vegetation on mounded, dredge islands. The use of these altered wetlands or completely "artificial" sites suggests that in some regions or years storks are unable to locate natural nesting habitat that is adequately flooded during the normal breeding season. The readiness with which storks will utilize water impoundments for nesting also suggests that colony sites could be intentionally created and maintained through long-term site management plans. Almost all impoundment sites used by storks become suitable for nesting only fortuitously, and therefore, these sites often do not remain available to storks for many years.

In addition to the irreversible impacts of drainage and destruction of nesting habitat, the greatest threats to colony sites are from human disturbance and predation. Nesting storks show some variation in the levels of human activity they will tolerate near a colony. In general, nesting storks are more tolerant of low levels of human activity near a colony when nests are high in trees than when they are low, and when nests contain partially or completely feathered young than during the period between nest construction and the early nestling period (adults still brooding). When adult storks are forced to leave their nests, eggs or downy young may die quickly (<20 minutes) when exposed to direct sun or rain.

Colonies located in flooded environments must remain flooded if they are to be successful. Often water is between 3 and 5 feet deep in successful colonies during the nesting season. Storks rarely form colonies, even in traditional nesting sites, when they are dry, and may abandon nests if sites become dry during the nesting period. Flooding in colonies may be most important as a defense against mammalian predators. Studies of stork colonies in Georgia and

Florida have shown high rates of raccoon predation when sites dried during the nesting period. A reasonably high water level in an active colony is also a deterrent against both human and domestic animal intrusions.

Although nesting wood storks usually do most feeding away from the colony site (>5 miles), considerable stork activity does occur close to the colony during two periods in the nesting cycle. Adult storks collect almost all nesting material in and near the colony, usually within 2500 feet. Newly fledged storks, near the end of the nesting cycle, spend from 1-4 weeks during the fledging process flying locally in the colony area, and perched in nearby trees or marshy spots on the ground. These birds return daily to their nests to be fed. It is essential that these fledging birds have little or no disturbance as far our as one-half mile within at least one or two quadrants from the colony. Both the adults, while collecting nesting material, and the inexperienced fledglings, do much low, flapping flight within this radius of the colony. At these times, storks potentially are much more likely to strike nearby towers or utility lines.

Colony sites are not necessarily used annually. Regional populations of storks shift nesting locations between years, in response to year-to-year differences in food resources. Thus, regional populations require a range of options for nesting sites, in order to successfully respond to food availability. Protection of colony sites should continue, therefore, for sites that are not used in a given year.

III. Roosting habitat.

Although wood storks tend to roost at sites that are similar to those used for nesting, they also use a wider range of site types for roosting than for nesting. Non-breeding storks, for example, may frequently change roosting sites in response to changing feeding locations, and in the process, are inclined to accept a broad range of relatively temporary roosting sites. Included in the list of frequently used roosting locations are cypress "heads" or swamps (not necessarily flooded if trees are tall), mangrove islands, expansive willow thickets or small, isolated willow "islands" in broad marshes, and on the ground either on levees or in open marshes.

Daily activity patterns at a roost vary depending on the status of the storks using the site. Non-breeding adults or immature birds may remain in roosts during major portions of some days. When storks are feeding close to a roost, they may remain on the feeding grounds until almost dark before making the short flight. Nesting storks traveling long distances (>40 miles) to feeding sites may roost at or near the latter, and return to the colony the next morning. Storks leaving roosts, especially when going long distances, tend to wait for mid-morning thermals to develop before departing.

IV. Management zones and guidelines for feeding sites.

To the maximum extent possible, feeding sites should be protected by adherence to the following protection zones and guidelines:

A. There should be no human intrusion into feeding sites when storks are present. Depending upon the amount of screening vegetation, human activity should be no closer than between 300 feet (where solid vegetation screens exist) and 750 feet (no vegetation screen).

B. Feeding sites should not be subjected to water management practices that alter traditional water levels or the seasonally normal drying patterns and rates. Sharp rises in water levels are especially disruptive to feeding storks.

C. The introduction of contaminants, fertilizers, or herbicides into wetlands that contain stork feeding sites should be avoided, especially those compounds that could adversely alter the diversity and numbers of native fishes, or that could substantially change the characteristics of aquatic vegetation. Increase in the density and height of emergent vegetation can degrade or destroy sites as feeding habitat.

D. Construction of tall towers (especially with guy wires) within three miles, or high power lines (especially across long stretches of open country) within one mile of major feeding sites should be avoided.

V. **Management zones and guidelines for nesting colonies.**

A. Primary zone: This is the most critical area, and must be managed according to recommended guidelines to insure that a colony site survives.

1. Size: The primary zone must extend between 1000 and 1500 feet in all directions from the actual colony boundaries when there are no visual or broad aquatic barriers, and never less than 500 feet even when there are strong visual or aquatic barriers. The exact width of the primary zone in each direction from the colony can vary within this range, depending on the amount of visual screen (tall trees) surrounding the colony, the amount of relatively deep, open water between the colony and the nearest human activity, and the nature of the nearest human activity. In general, storks forming new colonies are more tolerant of existing human activity, than they will be of new human activity that begins after the colony has formed.

2. Recommended Restrictions:

a. Any of the following activities within the primary zone, at any time of the year, are likely to be detrimental to the colony:

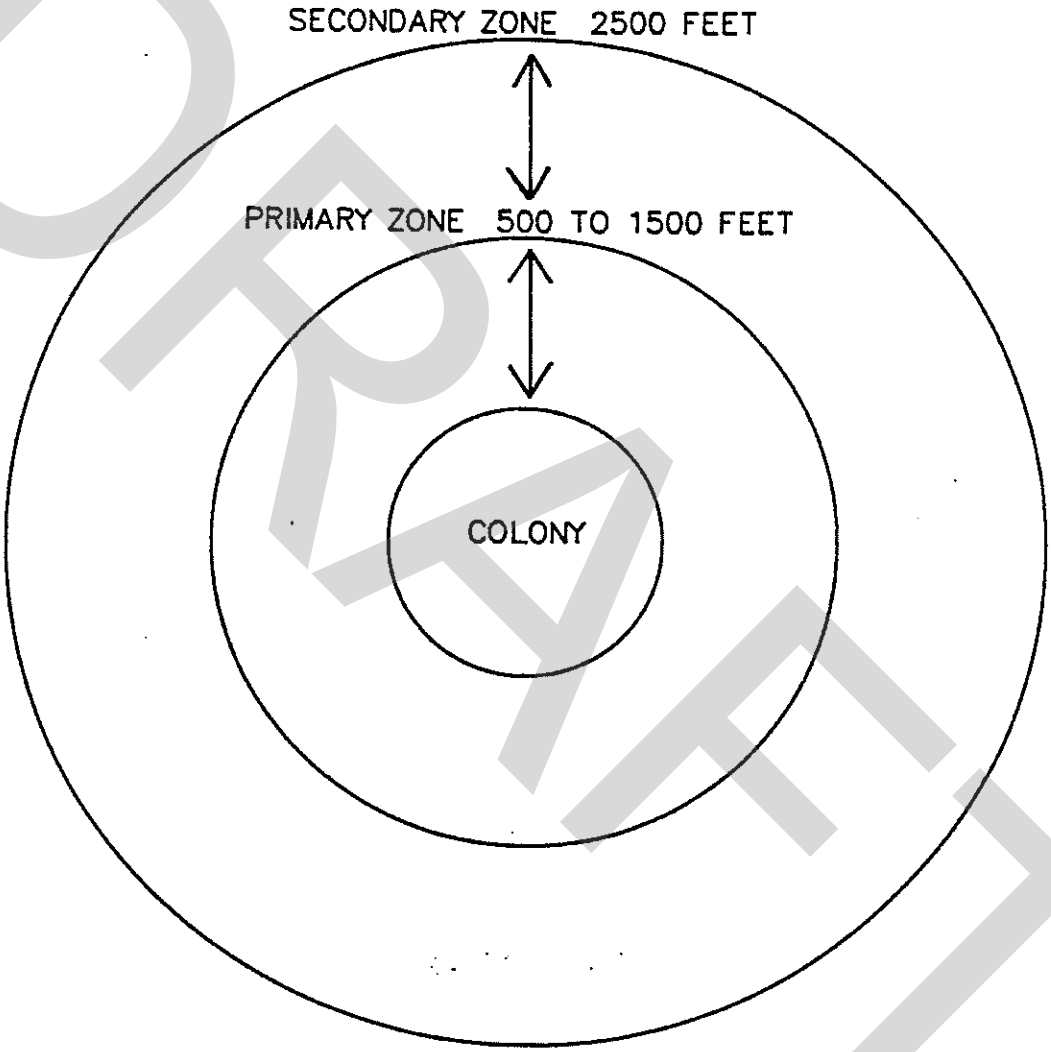
(1) Any lumbering or other removal of vegetation, and

(2) Any activity that reduces the area, depth, or length of flooding in wetlands under and surrounding the colony, except where periodic (less than annual) water control may be required to maintain the health of the aquatic, woody vegetation, and

(3) The construction of any building, roadway, tower, power line, canal, etc.

b. The following activities within the primary zone are likely to be detrimental to a colony if they occur when the colony is active:

(1) Any unauthorized human entry closer than 300 feet of the colony, and


SECONDARY ZONE 2500 FEET
PRIMARY ZONE 500 TO 1500 FEET
COLONY

(2) Any increase or irregular pattern in human activity anywhere in the primary zone, and

(3) Any increase or irregular pattern in activity by animals, including livestock or pets, in the colony, and

(4) Any aircraft operation closer than 500 feet of the colony.

B. Secondary Zone: Restrictions in this zone are needed to minimize disturbances that might impact the primary zone, and to protect essential areas outside of the primary zone. The secondary zone may be used by storks for collecting nesting material, for roosting, loafing, and feeding (especially important to newly fledged young), and may be important as a screen between the colony and areas of relatively intense human activities.

1. Size: The secondary zone should range outward from the primary zone 1000-2000 feet, or to a radius of 2500 feet of the outer edge of the colony.

2. Recommended Restrictions:

a. Activities in the secondary zone which may be detrimental to nesting wood storks include:

(1) Any increase in human activities above the level that existed in the year when the colony first formed, especially when visual screens are lacking, and

(2) Any alteration in the area's hydrology that might cause changes in the primary zone, and

(3) Any substantial (>20 percent) decrease in the area of wetlands and woods of potential value to storks for roosting and feeding.

b. In addition, the probability that low flying storks, or inexperienced, newly-fledged young will strike tall obstructions, requires that high-tension power lines be no closer than one mile (especially across open country or in wetlands) and tall trans-mission towers no closer than 3 miles from active colonies. Other activities, including busy highways and commercial and residential buildings may be present in limited portions of the secondary zone at the time that a new colony first forms. Although storks may tolerate existing levels of human activities, it is important that these human activities not expand substantially.

VI. Roosting site guidelines.

The general characteristics and temporary use-patterns of many stork roosting sites limit the number of specific management recommendations that are possible:

A. Avoid human activities within 500-1000 feet of roost sites during seasons of the year and times of the day when storks may be present. Nocturnal activities in active roosts may be especially disruptive.

B. Protect the vegetative and hydrological characteristics of the more important roosting sites--those used annually and/or used by flocks of 25 or more storks. Potentially, roosting sites may, some day, become nesting sites.

VII. Legal Considerations.

A. Federal Statutes

The U.S. breeding population of the wood stork is protected by the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)(Act). The population was listed as endangered on February 28, 1984 (49 Federal *Register* 7332); wood storks breeding in Alabama, Florida, Georgia, and South Carolina are protected by the Act.

Section 9 of the Endangered Species Act of 1973, as amended, states that it is unlawful for any person subject to the jurisdiction of the United States to take (defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.") any listed species anywhere within the United States.

The wood stork is also federally protected by its listing (50 CFR 10.13) under the Migratory Bird Treaty Act (167 U.S.C. 703-711), which prohibits the taking, killing or possession of migratory birds except as permitted.

B. State Statutes

1. State of Alabama

Section 9-11-232 of Alabama's Fish, Game, and Wildlife regulations curtails the possession, sale, and purchase of wild birds. "Any person, firm, association, or corporation who takes, catches, kills or has in possession at any time, living or dead, any protected wild bird not a game bird or who sells or offers for sale, buys, purchases or offers to buy or purchase any such bird or exchange same for anything of value or who shall sell or expose for sale or buy any part of the plumage, skin, or body of any bird protected by the laws of this state or who shall take or willfully destroy the nests of any wild bird or who shall have such nests or eggs of such birds in his possession, except as otherwise provided by law, shall be guilty of a misdemeanor...

Section 1 of the Alabama Nongame Species Regulation (Regulation 87-GF-7) includes the wood stork in the list of nongame species covered by paragraph (4). " It shall be unlawful to take, capture, kill, possess, sell, trade for anything of monetary value, or offer to sell or trade for anything of monetary value, the following nongame wildlife species (or any parts or reproductive products of such species) without a scientific collection permit and written permission from the Commissioner, Department of Conservation and Natural Resources,..."

2. State of Florida

Rule 39-4.001 of the Florida Wildlife Code prohibits "taking, attempting to take, pursuing, hunting, molesting, capturing, or killing (collectively defined as "taking"), transporting, storing, serving, buying, selling,

possessing, or wantonly or willingly wasting any wildlife or freshwater fish or their nests, eggs, young, homes, or dens except as specifically provided for in other rules of Chapter 39, Florida Administrative Code.

Rule 39-27.011 of the Florida Wildlife Code prohibits "killing, attempting to kill, or wounding any endangered species." The "Official Lists of Endangered and Potentially Endangered Fauna and Flora in Florida" dated 1 July 1988, includes the wood stork, listed as "endangered" by the Florida Game and Fresh Water Fish Commission.

3. State of Georgia

Section 27-1-28 of the Conservation and Natural Resources Code states that "Except as otherwise provided by law, rule, or regulation, it shall be unlawful to hunt, trap, fish, take, possess, or transport any nongame species of wildlife..."

Section 27-1-30 states that, "Except as otherwise provided by law or regulation, it shall be unlawful to disturb, mutilate, or destroy the dens, holes, or homes of any wildlife; "

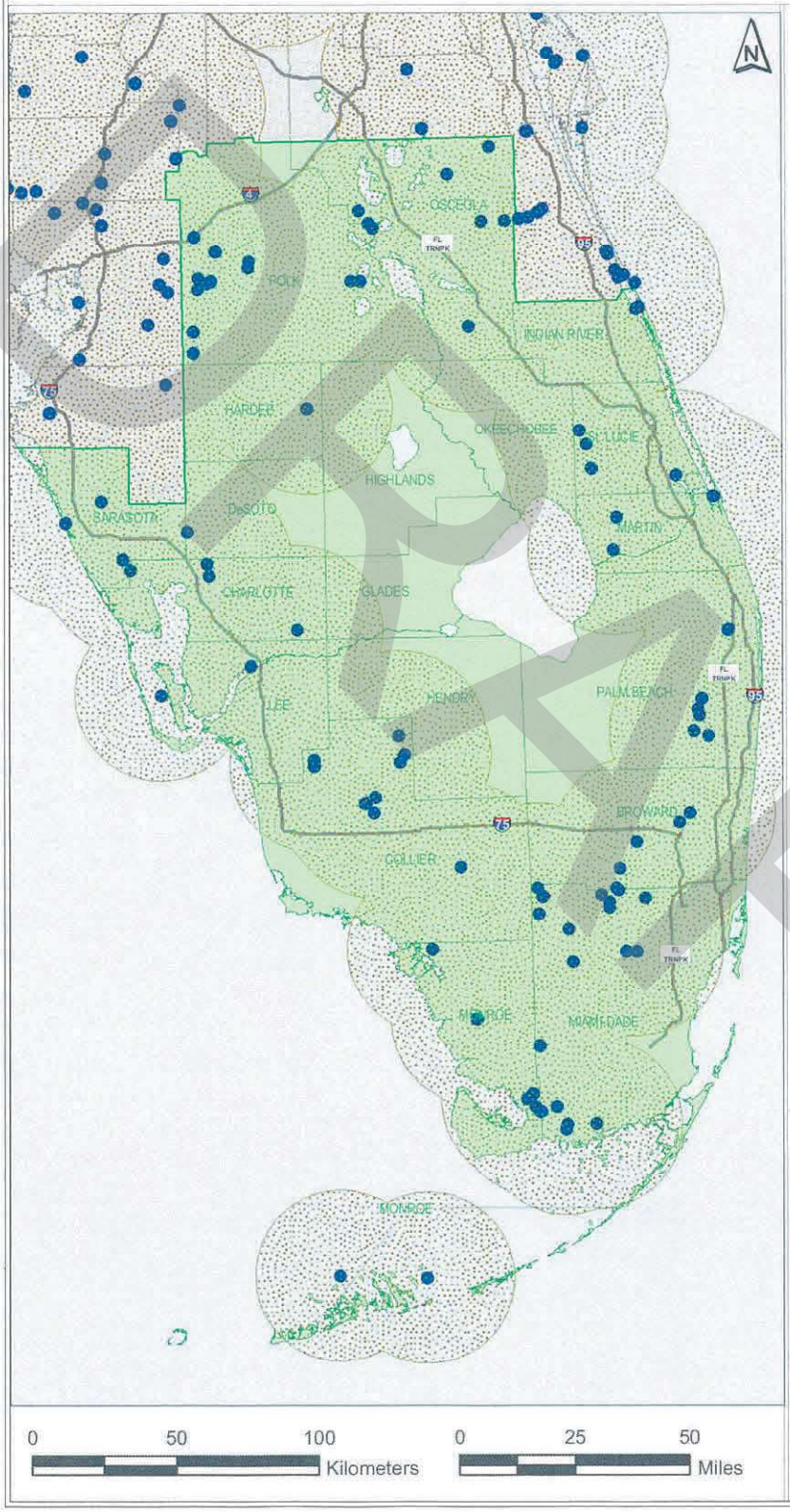
Section 27-3-22 states, in part, "It shall be unlawful for any person to hunt, trap, take, possess, sell, purchase, ship, or transport any hawk, eagle, owl, or any other bird or any part, nest, or egg thereof...".

The wood stork is listed as endangered pursuant to the Endangered Wildlife Act of 1973 (Section 27-3-130 of the Code). Section 391-4-13-.06 of the Rules and Regulations of the Georgia Department of Natural Resources prohibits harassment, capture, sale, killing, or other actions which directly cause the death of animal species protected under the Endangered Wildlife Act. The destruction of habitat of protected species on public lands is also prohibited.

4. State of South Carolina

Section 50-15-40 of the South Carolina Nongame and Endangered Species Conservation Act states, "Except as otherwise provided in this chapter, it shall be unlawful for any person to take, possess, transport, export, process, sell, or offer of sale or ship, and for any common or contract carrier knowingly to transport or receive for shipment any species or subspecies of wildlife appearing on any of the following lists: (1) the list of wildlife indigenous to the State, determined to be endangered within the State...(2) the United States' List of Endangered Native Fish and Wildlife... (3) the United States' List of Endangered Foreign Fish and Wildlife ..."

Wood Stock



Nesting Colonies
Core Foraging Areas

1999 to 2005

- Colony Location
- Core Foraging Area
- South Florida Service Area

U.S. FISH & WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR

Produced by:
South Florida Ecological Services Office
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Phone: 772.562.3909

Enclosure 3

Wood Stork Foraging Analysis: Excerpts of concepts and procedure as presented by the Service in this appendix may be viewed in detail in any one of our recent Biological Opinions for project related impacts to the wood stork. These documents can be found at the internet website address http://www.fws.gov/filedownloads/ftp%5verobeach.

Foraging Habitat

Researchers have shown that wood storks forage most efficiently and effectively in habitats where prey densities are high and the water shallow and canopy open enough to hunt successfully (Ogden et al. 1978, Browder 1984, Coulter 1987). Prey availability to wood storks is dependent on a composite variable consisting of density (number or biomass/m^2) and the vulnerability of the prey items to capture (Gawlik 2002). For wood storks, prey vulnerability appears to be largely controlled by physical access to the foraging site, water depth, the density of submerged vegetation, and the species-specific characteristics of the prey. For example, fish populations may be very dense, but not available (vulnerable) because the water depth is too deep (greater than 30 cm) for storks or the tree canopy at the site is too dense for storks to land. Calm water, about 5-40 cm (2-16 in) in depth, and free of dense aquatic vegetation is ideal (Coulter and Bryan 1993).

Coulter and Bryan's (1993) study suggested that wood storks preferred ponds and marshes, and visited areas with little or no canopy more frequently. Even in foraging sites in swamps, the canopy tended to be sparse. They suggested that open canopies may have contributed to detection of the sites and more importantly may have allowed the storks to negotiate landing more easily than at closed-canopy sites. In their study, the median amount of canopy cover where wood stork foraging was observed was 32 percent. Other researchers (P.C. Frederick, University of Florida, personal communication 2006; J.A. Rodgers, FWC, personal communication 2006) also confirm that wood storks will forage in woodlands, though the woodlands have to be fairly open and vegetation not very dense. Furthermore, the canopies must be open enough for wood storks to take flight quickly to avoid predators.

Melaleuca-infested Wetlands: As discussed previously, wetland suitability for wood stork foraging is partially dependent on vegetation density. Melaleuca is a dense-stand growth plant species, effectively producing a closed canopy and dense understory growth pattern that generally limits a site's accessibility to foraging by wading birds. However, O'Hare and Dalrymple (1997) suggest moderate infestations of melaleuca may have little effect on some species' productivity (*i.e.*, amphibians and reptiles) as long as critical abiotic factors such as hydrology remain. They also note as the levels of infestation increase, usage by wetland dependent species decreases. Their studies also showed that the number of fish species present in a wetland system remain stable at certain levels of melaleuca. However, the availability of the prey base for wood storks and other foraging wading birds is reduced by the restriction of access caused from dense and thick exotic vegetation. Wood storks and other wading birds can forage in these systems in open area pockets (*e.g.*, wind blow-downs), provided multiple conditions are optimal (*e.g.*, water depth, prey density). In O'Hare and Dalrmyple's study (1997), they identify five cover types (Table 1) and

provide information on the number of wetland dependent bird species and the number of individuals observed within each of these vegetation classes (Table 2).

Table 1: Vegetation classes

DMM	75-100 percent mature dense melaleuca coverage
DMS or (SDM)	75-100 percent sapling dense melaleuca coverage
P75	50-75 percent melaleuca coverage
P50	0-50 percent melaleuca coverage
MAR (Marsh)	0-10 percent melaleuca coverage

The number of wetland-dependent species and individuals observed per cover type is shown below in columns 1, 2, and 3 (Table 2). To develop an estimate of the importance a particular wetland type may have (based on density and aerial coverage by exotic species) to wetland dependent species, we developed a foraging suitability value using observational data from O'Hare and Dalrymple (1997). The Foraging Suitability Value as shown in column 5 (Table 2) is calculated by multiplying the number of species by the number of individuals and dividing this value by the maximum number of species and individuals combined (12*132=1584). The results are shown below for each of the cover types in O'Hare and Dalrymple (1997) study (Table 1). As an example, for the P50 cover type, the foraging suitability is calculated by multiplying 11 species times 92 individuals for a total of 1,012. Divide this value by 1,584, which is the maximum number of species times the maximum number of individuals (12*132 = 1,584). The resultant is 0.6389 or 64 percent 11*92=1012/1584*100=63.89).

Table 2: Habitat Foraging Suitability

Cover Type	# of Species (S)	# of Individuals (I)	S*I	Foraging Suitability
DMM	1	2	2	0.001
DMS	4	10	40	0.025
P75	10	59	590	0.372
P50	11	92	1,012	0.639
MAR	12	132	1,584	1.000

This approach was developed to provide us with a method of assessing wetland acreages and their relationship to prey densities and prey availability. We consider wetland dependent bird use to be a general index of food availability. Based on this assessment we developed an exotic foraging suitability index (Table 3):

Table 3. Foraging Suitability Percentages

Exotic Percentage	Foraging Suitability (percent)
Between 0 and 25 percent exotics	100
Between 25 and 50 percent exotics	64
Between 50 and 75 percent exotics	37
Between 75 and 90 percent exotics	3
Between 90 and 100 percent exotics	0

In our assessment however, we consider DMM to represent all exotic species densities between 90 and 100 percent and DMS to represent all exotic species densities between 75 and 90 percent. In our evaluation of a habitat's suitability, the field distinction between an exotic coverage of

90 percent and 100 percent in many situations is not definable, therefore unless otherwise noted in the field reports and in our analysis; we consider a suitability value of 3 percent to represent both densities.

Hydroperiod: The hydroperiod of a wetland can affect the prey densities in a wetland. For instance, research on Everglades fish populations using a variety of quantitative sampling techniques (pull traps, throw traps, block nets) have shown that the density of small forage fish increases with hydroperiod. Marshes inundated for less than120 days of the year average ± 4 fish/m^2; whereas, those flooded for more than 340 days of the year average ± 25 fish/m^2 (Loftus and Eklund 1994, Trexler et al. 2002).

The Service (1999) described a short hydroperiod wetland as wetlands with between 0 and 180-day inundation, and long hydroperiod wetlands as those with greater than 180-day inundation. However, Trexler et al. (2002) defined short hydroperiod wetlands as systems with less than 300 days per year inundation. In our discussion of hydroperiods, we are considering short hydroperiod wetlands to be those that have an inundation of 180 days or fewer.

The most current information on hydroperiods in south Florida was developed by the SFWMD for evaluation of various restoration projects throughout the Everglades Protection Area. In their modeling efforts, they identified the following seven hydroperiods:

Table 4. SFWMD Hydroperiod Classes – Everglades Protection Area

Hydroperiod Class	Days Inundated
Class 1	0-60
Class 2	60-120
Class 3	120-180
Class 4	180-240
Class 5	240-300
Class 6	300-330
Class 7	330-365

Fish Density per Hydroperiod: In the Service's assessment of project related impacts to wood storks, the importance of fish data specific to individual hydroperiods is the principle basis of our assessment. In order to determine the fish density per individual hydroperiod, the Service relied on the number of fish per hydroperiod developed from throw-trap data in Trexler et al.'s (2002) study and did not use the electrofishing data also presented in Trexler et al.'s study that defined fish densities in catch per unit effort, which is not hydroperiod specific. Although the throw-trap sampling generally only samples fish 8 cm or less, the Service believes the data can be used as a surrogate representation of all fish, including those larger than 8 cm, which are typically sampled by either electrofishing or block net sampling.

We base this evaluation on the following assessment. Trexler et al.'s (2002) study included electrofishing data targeting fish greater than 8 cm, the data is recorded in catch per unit effort and in general is not hydroperiod specific. However, Trexler et al. (2002) notes in their assessment of the electrofishing data that in general there is a correlation with the number of fish per unit effort per changes in water depth. In literature reviews of electrofishing data by Chick et

al. (1999 and 2004), they note that electrofishing data provides a useful index of the abundance of larger fish in shallow, vegetated habitat, but length, frequency, and species compositional data should be interpreted with caution. Chick et al. (2004) also noted that electrofishing data for large fish (> 8cm) provided a positive correlation of the number of fish per unit effort (abundance) per changes in hydropeiod. The data in general show that as the hydroperiod decreases, the abundance of larger fishes also decreases.

Studies by Turner et al. (1999), Turner and Trexler (1997), and Carlson and Duever (1979) also noted this abundance trend for fish species sampled. We also noted in our assessment of prey consumption by wood storks in the Ogden et al. (1976) study (Figure 4) (discussed below), that the wood stork's general preference is for fish measuring 1.5 cm to 9 cm, although we also acknowledged that wood storks consume fish larger than the limits discussed in the Ogden et al. (1976) study. A similar assessment is reference by Trexler and Goss (2009) noting a diversity of size ranges of prey available for wading birds to consume, with fish ranging from 6 to 8 cm being the preferred prey for larger species of wading birds, particularly wood storks (Kushlan et al. 1975).

Therefore, since data were not available to quantify densities (biomass) of fish larger than 8 cm to a specific hydroperiod, and Ogden et al.'s (1976) study notes that the wood stork's general preference is for fish measuring 1.5 cm to 9 cm, and that empirical data on fish densities per unit effort correlated positively with changes in water depth, we believe that the Trexler et al. (2002) throw-trap data represents a surrogate assessment tool to predict the changes in total fish density and the corresponding biomass per hydroperiod for our wood stork assessment.

In consideration of this assessment, the Service used the data presented in Trexler et al.'s (2002) study on the number of fish per square-meter per hydroperiod for fish 8 cm or less to be applicable for estimating the total biomass per square-meter per hydroperiod for all fish. In determining the biomass of fish per square-meter per hydroperiod, the Service relied on the summary data provided by Turner et al. (1999), which provides an estimated fish biomass of 6.5 g/m^2 for a Class 7 hydroperiod for all fish and used the number of fish per square-meter per hydroperiod from Trexler et al.'s data to extrapolate biomass values per individual hydroperiods.

Trexler et al.'s (2002) studies in the Everglades provided densities, calculated as the square-root of the number of fish per square meter, for only six hydroperiods; although these cover the same range of hydroperiods developed by the SFWMD. Based on the throw-trap data and Trexler et al.'s (2002) hydroperiods, the square-root fish densities are:

Table 5. Fish Densities per Hydroperiod from Trexler et al. (2002)

Hydroperiod Class	Days Inundated	Fish Density
Class 1	0-120	2.0
Class 2	120-180	3.0
Class 3	180-240	4.0
Class 4	240-300	4.5
Class 5	300-330	4.8
Class 6	330-365	5.0

Trexler et al.'s (2002) fish densities are provided as the square root of the number of fish per square meter. For our assessment, we squared these numbers to provide fish per square meter, a simpler calculation when other prey density factors are included in our evaluation of adverse effects to listed species from the proposed action. We also extrapolated the densities over seven hydroperiods, which is the same number of hydroperiods characterized by the SFWMD. For example, Trexler et al.'s (2002) square-root density of a Class 2 wetland with three fish would equate to a SFWMD Model Class 3 wetland with nine fish. Based on the above discussion, the following mean annual fish densities were extrapolated to the seven SFWMD Model hydroperiods:

Table 6. Extrapolated Fish Densities for SFWMD Hydroperiods

Hydroperiod Class	Days Inundated	Extrapolated Fish Density
Class 1	0-60	2 fish/m^2
Class 2	60-120	4 fish/m^2
Class 3	120-180	9 fish/m^2
Class 4	180-240	16 fish/m^2
Class 5	240-300	20 fish/m^2
Class 6	300-330	23 fish/m^2
Class 7	330-365	25 fish/m^2

Fish Biomass per Hydroperiod: A more important parameter than fish per square-meter in defining fish densities is the biomass these fish provide. In the ENP and WCA-3, based on studies by Turner et al. (1999), Turner and Trexler (1997), and Carlson and Duever (1979), the standing stock (biomass) of large and small fishes combined in unenriched Class 5 and 6 hydroperiod wetlands averaged between 5.5 to 6.5 grams-wet-mass/m^2. In these studies, the data was provided in g/m^2 dry-weight and was converted to g/m^2 wet-weight following the procedures referenced in Kushlan et al. (1986) and also referenced in Turner et al. (1999). The fish density data provided in Turner et al. (1999) included both data from samples representing fish 8 cm or smaller and fish larger than 8 cm and included summaries of Turner and Trexler (1997) data, Carlson and Duever (1979) data, and Loftus and Eklund (1994) data. These data sets also reflected a 0.6 g/m^2 dry-weight correction estimate for fish greater than 8 cm based on Turner et al.'s (1999) block-net rotenone samples.

Relating this information to the hydroperiod classes developed by the SFWMD, we estimated the mean annual biomass densities per hydroperiod. For our assessment, we considered Class 7 hydroperiod wetlands based on Turner et al. (1999) and Trexler et al. (2002) studies to have a mean annual biomass of 6.5 grams-wet-mass/m^2 and to be composed of 25 fish/m^2. The remaining biomass weights per hydroperiod were determined as a direct proportion of the number of fish per total weight of fish for a Class 7 hydroperiod (6.5 grams divided by 25 fish equals 0.26 grams per fish).

For example, given that a Class 3 hydroperiod has a mean annual fish density of 9 fish/m^2, with an average weight of 0.26 grams per fish, the biomass of a Class 3 hydroperiod would be 2.3 grams/m^2 (9*0.26 = 2.3). Based on the above discussion, the biomass per hydroperiod class is:

Table 7. Extrapolated Mean Annual Fish Biomass for SFWMD Hydroperiods

Hydroperiod Class	Days Inundated	Extrapolated Fish Biomass
Class 1	0-60	0.5 gram/m^2
Class 2	60-120	1.0 gram/m^2
Class 3	120-180	2.3 grams/m^2
Class 4	180-240	4.2 grams/m^2
Class 5	240-300	5.2 grams/m^2
Class 6	300-330	6.0 grams/m^2
Class 7	330-365	6.5 grams/m^2

Wood stork suitable prey size: Wood storks are highly selective in their feeding habits and in studies on fish consumed by wood storks, five species of fish comprised over 85 percent of the number and 84 percent of the biomass of over 3,000 prey items collected from adult and nestling wood storks (Ogden et al. 1976). Table 8 lists the fish species consumed by wood storks in Ogden et al. (1976).

Table 8. Primary Fish Species consumed by Wood Storks from Ogden et al. (1976)

Common name	Scientific name	Percent Individuals	Percent Biomass
Sunfishes	*Centrarchidae*	14	44
Yellow bullhead	*Italurus natalis*	2	12
Marsh killifish	*Fundulus confluentus*	18	11
Flagfish	*Jordenella floridae*	32	7
Sailfin molly	*Poecilia latipinna*	20	11

These species were also observed to be consumed in much greater proportions than they occur at feeding sites, and abundant smaller species [*e.g.*, mosquitofish (*Gambusia affinis*), least killifish (*Heterandria formosa*), bluefin killifish (*Lucania goodei*)] are under-represented, which the researchers believed was probably because their small size did not elicit a bill-snapping reflex in these tactile feeders (Coulter et al. 1999). Their studies also showed that, in addition to selecting larger species of fish, wood storks consumed individuals that are significantly larger (>3.5 cm) than the mean size available (2.5 cm), and many were greater than 1-year old (Ogden et al. 1976, Coulter et al. 1999). However, Ogden et al. (1976) also found that wood storks most likely consumed fish that were between 1.5 and 9.0 cm in length (Figure 4 in Ogden et al. 1976).

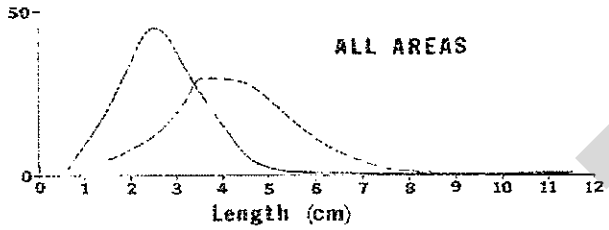

FIGURE 4. Length frequency distribution of fish available to and consumed by Wood Storks in different habitats.

In Ogden et al.'s (1976) Figure 4, the dotted line is the distribution of fish consumed and the solid line is the available fish. Straight interpretation of the area under the dotted line curve

represents the size classes of fish most likely consumed by wood storks and is the basis of our determination of the amount of biomass that is within the size range of fish most likely consumed by wood storks, which in this example is a range size of 1.5 to 9.0 cm in length.

Wood stork suitable prey base (biomass per hydroperiod): To estimate that fraction of the available fish biomass that might be consumed by wood storks, the following analysis was conducted. Trexler et al.'s (2002) 2-year throw trap data of absolute and relative fish abundance per hydroperiod distributed across 20 study sites in the ENP and the WCAs was considered to be representative of the Everglades fish assemblage available to wood storks (n = 37,718 specimens of 33 species). Although Trexler et al.'s (2002) data was based on throw-trap data and representative of fish 8 cm or smaller, the Service believes the data set can be used to predict the biomass/m^2 for total fish (those both smaller and larger than 8 cm). This approach is also supported, based on our assessment of prey consumption by wood storks in Ogden et al.'s (1976) study (Figure 4), that the wood storks general preference is for fish measuring 1.5 cm to 9 cm and is generally inclusive of Trexler et al.'s (2002) throw-trap data of fish 8 cm or smaller.

To estimate the fraction of the fish biomass that might be consumed by wood storks, the Service, using Trexler et al.'s (2002) throw-trap data set, determined the mean biomass of each fish species that fell within the wood stork prey size limits of 1.5 to 9.0 cm. The mean biomass of each fish species was estimated from the length and wet mass relationships for Everglades' icthyofauna developed by Kushlan et al. (1986). The proportion of each species that was outside of this prey length and biomass range was estimated using the species mean and variance provided in Table 1 in Kushlan et al. (1986). These biomass estimates assumed the length and mass distributions of each species was normally distributed and the fish biomass could be estimated by eliminating that portion of each species outside of this size range. These biomass estimates of available fish prey were then standardized to a sum of 6.5 g/m^2 for Class 7 hydroperiod wetlands (Service 2009).

For example, Kushlan et al. (1986) lists the warmouth (*Lepomis gulosus*) with a mean average biomass of 36.76 g. In fish samples collected by Trexler et al. (2002), this species accounted for 0.048 percent (18/37,715=0.000477) of the Everglades freshwater ichthyofauna. Based on an average biomass of 36.76 g (Kushlan et al. 1986), the 0.048 percent representation from Trexler et al. (2002) is equivalent to an average biomass of 1.75 g (36.76*0.048) or 6.57 percent (1.75/26.715) of the estimated average biomass (26.715 g) of Trexler et al.'s (2002) samples (Service 2009).

Standardizing these data to a sample size of 6.5 g/m^2, the warmouth biomass for long hydroperiod wetlands would be about 0.427 g (Service 2009). However, the size frequency distribution (assumed normal) for warmouth (Kushlan et al. 1986) indicate 48 percent are too large for wood storks and 0.6 percent are too small (outside the 1.5 cm to 9 cm size range most likely consumed), so the warmouth biomass within the wood stork's most likely consumed size range is only 0.208 g (0.427*(0.48+0.006)=0.2075) in a 6.5 g/m^2 sample. Using this approach summed over all species in long hydroperiod wetlands, only 3.685 g/m^2 of the 6.5 g/m^2 sample consists of fish within the size range likely consumed by wood storks or about 57 percent (3.685/6.5*100=56.7) of the total biomass available.

An alternative approach to estimate the available biomass is based on Ogden et al. (1976). In their study (Table 8), the sunfishes and four other species that accounted for 84 percent of the biomass eaten by wood storks totaled 2.522 g of the 6.5 g/m^2 sample (Service 2009). Adding the remaining 16 percent from other species in the sample, the total biomass would suggest that 2.97 g of a 6.5 g/m^2 sample are most likely to be consumed by wood storks or about 45.7 percent (2.97/6.5=0.4569)

The mean of these two estimates is 3.33g/m^2 for long hydroperiod wetlands (3.685 + 2.97 = 6.655/ 2 = 3.33). This proportion of available fish prey of a suitable size (3.33 g/m^2 / 6.5 g/m^2 = 0.51 or 51 percent) was then multiplied by the total fish biomass in each hydroperiod class to provide an estimate of the total biomass of a hydroperiod that is the appropriate size and species composition most likely consumed by wood storks.

As an example, a Class 3 SFWMD model hydroperiod wetland with a biomass of 2.3 grams/m^2, adjusted by 51 percent for appropriate size and species composition, provides an available biomass of 1.196 grams/m^2. Following this approach, the biomass per hydroperiod potentially available to predation by wood storks based on size and species composition is:

Table 9. Wood Stork Suitable Prey Base (fish biomass per hydroperiod)

Hydroperiod Class	Days Inundated	Fish Biomass
Class 1	0-60	0.26 gram/m^2
Class 2	60-120	0.52 gram/m^2
Class 3	120-180	1.196 grams/m^2
Class 4	180-240	2.184 grams/m^2
Class 5	240-300	2.704 grams/m^2
Class 6	300-330	3.12 grams/m^2
Class 7	330-365	3.38 grams/m^2

Wood Stork-Wading Bird Prey Consumption Competition: In 2006, (Service 2006), the Service developed an assessment approach that provided a foraging efficiency estimate that 55 percent of the available biomass was actually consumed by wood storks. Since the implementation of this assessment approach, the Service has received comments from various sources concerning the Service's understanding of Fleming et al.'s (1994) assessment of prey base consumed by wood storks versus prey base assumed available to wood stork and the factors included in the 90 percent prey reduction value.

In our original assessment, we noted that, "*Fleming et al. (1994) provided an estimate of 10 percent of the total biomass in their studies of wood stork foraging as the amount that is actually consumed by the storks. However, the Fleming et al. (1994) estimate also includes a second factor, the suitability of the foraging site for wood storks, a factor that we have calculated separately. In their assessment, these two factors accounted for a 90 percent reduction in the biomass actually consumed by the storks. We consider these two factors as equally important and are treated as equal components in the 90 percent reduction; therefore, we consider each factor to represent 45 percent of the reduction. In consideration of this approach, Fleming et al.'s (1994) estimate that 10 percent of the biomass would actually be consumed by the storks would be added to the 45 percent value for an estimate that 55 percent (10 percent plus the remaining 45 percent) of the available biomass would actually be consumed by the storks and is the factor we believe represents the amount of the prey base that is actually consumed by the stork.*"

In a follow-up review of Fleming et al.'s (1994) report, we noted that the 10 percent reference is to prey available to wood storks, not prey consumed by wood storks. We also noted the 90 percent reduction also includes an assessment of prey size, an assessment of prey available by water level (hydroperiod), an assessment of suitability of habitat for foraging (openness), and an assessment for competition with other species, not just the two factors considered originally by the Service (suitability and competition). Therefore, in re-evaluating of our approach, we identified four factors in the 90 percent biomass reduction and not two as we previously considered. We believe these four factors are represented as equal proportions of the 90 percent reduction, which corresponds to an equal split of 22.5 percent for each factor. Since we have accounted previously for three of these factors in our approach (prey size, habitat suitability, and hydroperiod) and they are treated separately in our assessment, we consider a more appropriate foraging efficiency to represent the original 10 percent and the remaining 22.5 percent from the 90 percent reduction discussed above. Following this revised assessment, our competition factor would be 32.5 percent, not the initial estimate of 55 percent.

Other comments reference the methodology's lack of sensitivity to limiting factors, i.e., is there sufficient habitat available across all hydroperiods during critical life stages of wood stork nesting and does this approach over emphasize the foraging biomass of long hydroperiod wetlands with a corresponding under valuation of short hydroperid wetlands. The Service is aware of these questions and is examining alternative ways to assess these concerns. However, until futher research is generated to refine our approach, we continue to support the assessment tool as outlined.

Following this approach, Table 10 has been adjusted to reflect the competition factor and represents the amount of biomass consumed by wood storks and is the basis of our effects assessments (Class 1 hydroperiod with a biomass 0.26 g, multiplied by 0.325, results in a value of 0.08 g [0.25*.325=0.08]) (Table 10).

Table 10 Actual Biomass Consumed by Wood Storks

Hydroperiod Class	Days Inundated	Fish Biomass
Class 1	0-60	0.08 gram/m^2
Class 2	60-120	0.17 gram/m^2
Class 3	120-180	0.39 grams/m^2
Class 4	180-240	0.71 grams/m^2
Class 5	240-300	0.88 grams/m^2
Class 6	300-330	1.01 grams/m^2
Class 7	330-365	1.10 grams/m^2

Sample Project of Biomass Calculations and Corresponding Concurrence Determination

Example 1:

An applicant is proposing to construct a residential development with unavoidable impacts to 5 acres of wetlands and is proposing to restore and preserve 3 acres of wetlands onsite. Data on the onsite wetlands classified these systems as exotic impacted wetlands with greater than 50

percent but less than 75 percent exotics (Table 3) with an average hydroperiod of 120-180 days of inundation.

The equation to calculate the biomass lost is: The number of acres, converted to square-meters, times the amount of actual biomass consumed by the wood stork (Table 10), times the exotic foraging suitability index (Table 3), equals the amount of grams lost, which is converted to kg.

Biomass lost (5*4,047*0.39 (Table 10)*0.37 (Table 3)=2,919.9 grams or 2.92 kg)

In the example provided, the 5 acres of wetlands, converted to square-meters (1 acre= 4,047 m^2) would provide 2.9 kg of biomass (5*4,047*0.39 (Table 10)*0.37 (Table 3)= 2,919.9 grams or 2.9 kg), which would be lost from development.

The equation to calculate the biomass from the preserve is the same, except two calculations are needed, one for the existing biomass available and one for the biomass available after restoration.

Biomass Pre: (3*4,047*0.39(Table 10)*0.37 (Table 3)=1,751.95grams or 1.75 kg)

Biomass Post: (3*4,047*0.39 (Table 10)*1(Table 3)=4,734.99 grams or 4.74 kg)

Net increase: 4.74 kg-1.75 kg = 2.98 kg Compensation Site

Project Site Balance 2.98 kg- 2.92 kg = 0.07kg

The compensation proposed is 3 acres, which is within the same hydroperiod and has the same level of exotics. Following the calculations for the 5 acres, the 3 acres in its current habitat state, provides 1.75 kg (3*4,047*0.39 (Table 10)*0.37 (Table 3)=1,751.95grams or 1.75 kg) and following restoration provides 4.74 kg (3*4,047*0.39 (Table 10)*1(Table 3)=4,734.99 grams or 4.74 kg), a net increase in biomass of 2.98 kg (4.74-1.75=2.98).

Example 1: 5 acre wetland loss, 3 acre wetland enhanced – same hydroperiod - NLAA

Hydroperiod	Existing Footprint		On-site Preserve Area				Net Change*	
			Pre Enhancement		Post Enhancement			
	Acres	Kgrams	Acres	Kgrams	Acres	Kgrams	Acres	Kgrams
Class 1 - 0 to 60 Days								
Class 2 - 60 to 120 Days								
Class 3 - 120 to 180 Days	5	2.92	3	1.75	3	4.74	(5)	0.07
Class 4 - 180 to 240 Days								
Class 5 - 240 to 300 Days								
Class 6 - 300 to 330 Days								
Class 7 - 330 to 365 days								
TOTAL	**5**	**2.92**	**3**	**1.75**	**3**	**4.74**	**(5)**	**0.07**

*Since the net increase in biomass from the restoration provides 2.98 kg and the loss is 2.92 kg, there is a positive outcome (4.74-1.75-2.92=0.07) in the same hydroperiod and Service concurrence with a NLAA is appropriate.

Example 2:

In the above example, if the onsite preserve wetlands were a class 4 hydroperiod, which has a value of 0.71. grams/m^2 instead of a class 3 hydroperiod with a 0.39 grams/m^2 [Table 10]), there would be a loss of 2.92 kg of short hydroperiod wetlands (as above) and a net gain of 8.62 kg of long-hydroperiod wetlands.

Biomass lost: (5*4,047*0.39 (Table 10)*0.37 (Table 3)=2,919.9 grams or 2.92 kg)

The current habitat state of the preserve provides 3.19 kg (3*4,047*0.71 (Table 10)*0.37 (Table 3)=3,189.44 grams or 3.19 kg) and following restoration the preserve provides 8.62 kg (3*4,047*0.71 (Table 10)*1(Table 3)= 8,620.11 grams or 8.62 kg, thus providing a net increase in class 4 hydroperiod biomass of 5.43 kg (8.62-3.19=5.43).

Biomass Pre: (3*4,047*0.71(Table 10)*0.37 (Table 3) = 3,189.44 grams or 3.19 kg)

Biomass Post: (3*4,047*0.71 (Table 10)*1(Table 3)=8,620.11 grams or 8.62 kg)

Net increase: 8.62 kg-3.19 kg = 5.43 kg

Project Site Balance 5.43 kg- 2.92 kg = 2.51 kg

Example 2: 5 acre wetland loss, 3 acre wetland enhanced – different hydroperiod – May Affect

Hydroperiod	Existing Footprint		On-site Preserve Area				Net Change*	
			Pre Enhancement		Post Enhancement			
	Acres	Kgrams	Acres	Kgrams	Acres	Kgrams	Acres	Kgrams
Class 1 - 0 to 60 Days								
Class 2 - 60 to 120 Days								
Class 3 - 120 to 180 Days	5	2.92					(5)	-2.92
Class 4 - 180 to 240 Days			3	3.19	3	8.62	0	5.43
Class 5 - 240 to 300 Days								
Class 6 - 300 to 330 Days								
Class 7 - 330 to 365 days								
TOTAL	**5**	**2.92**	**3**	**3.19**	**3**	**8.62**	**(5)**	**2.51**

In this second example, even though there is an overall increase in biomass, the biomass loss is a different hydroperiod than the biomass gain from restoration, therefore, the Service could not concur with a NLAA and further coordination with the Service is appropriate.

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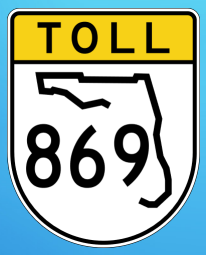

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