ROADWAY CONCEPTUAL ANALYSIS ECOLOGICAL SUMMARY

Reams Road
from south of Summerlake Park to Taborfield Avenue
Orange County, Florida

Prepared for:

ORANGE COUNTY PUBLIC WORKS DEPARTMENT
4200 South John Young Parkway
Orlando, Florida
Phone: 407.386.7900

On behalf of:

Inwood Consulting Engineers, Inc.
3000 Dovera Drive, Suite 200
Oviedo, Florida 32756

Prepared by:

MSE GROUP

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Introduction

Orange County is conducting the Reams Road Roadway Conceptual Analysis (RCA) Study. The primary study corridor is on Reams Road from south of Summerlake Park Boulevard to Taborfield Avenue (Study Area) (approximately 3.1 miles) (Figure 1 – Location Map). Reams Road is proposed as a four lane divided roadway within right-of-way (ROW) widths recommended by the Lakeside Village Specific Area Plan. The roadway segments included in this study comprise a major component of the critical roadway network required to support Orange County's vision for the Horizon West Planning Area.

The RCA will evaluate the operational capacity of the existing sections of Reams Road, assess current and future travel demand in the area, and identify operational enhancements to reduce congestion and improve travel times and safety while people and vehicles move along the corridor. The study will also include design traffic projections and identify conceptual improvement recommendations within the proposed ROW.

This Reams Road RCA Ecological Summary documents potential jurisdictional wetland and/or other surface water communities, the potential occurrence of federal and/ or state-listed wildlife within the Study Area, and the likelihood of involvement during project implementation.

Methodology

The Study Area was reviewed by biologists with MSE Group (MSE) to evaluate the existing ecological conditions. The evaluation included a review of current and historic aerial photography, and ground-truth activities, including pedestrian and vehicular surveys. The jurisdictional extent of wetlands and other surface water systems were identified in general accordance with the *1987 Corps of Engineers Wetlands Delineation Manual* (Technical Report Y-87-1), *November 2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic Gulf Coastal Plan Region,* and the State of Florida's *Delineation of the Landward Extent of Wetlands and Surface Waters* (Chapter 62-340, Florida Administrative Code). In the event wetland boundaries differed between the two methods, the more "wetland inclusive" extent was used to define that particular wetland system's boundary. The landward extent of other surface water systems was recognized to be at the top-of-bank for ditches with side slopes of 1-foot vertical to 4-feet horizontal or steeper, or using the seasonal high for swales with side slopes flatter than 1-foot vertical to 4-feet horizontal. Wetlands and other surface waters observed were classified using the South Florida Water Management District's (SFWMD) land use data, and the U.S. Fish and Wildlife Service's (FWS) classification system as described in their *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin, et. al, 1979). Ground-truthing of wetland and other surface water assessments were conducted along the Study Area in June, July, and August 2017 using handheld Global Positioning Systems (GPS) devices. In the field, wetlands, and other surface waters were generally delineated from west to east along the Study Area within the existing ROW of Reams Road, and all proposed stormwater pond area locations.

The evaluation included database queries to determine occurrence, or potential for occurrence, of wildlife species listed as Threatened (T) and/or Endangered (E) by FWS and/or Florida Fish and Wildlife Conservation Commission (FWC), and listed as Species of Special Concern (SSC) by FWC. This report provides documentation of the current ecological conditions, soil and hydrologic information, and occurrence/potential for occurrence of T, E, or SSC wildlife, and their respective habitat.

The following were reviewed for current and historic conditions along the Study Area prior to field verification:

- Current and historical aerial photography (Figure 2 – Aerial Location Map)
- U.S. Geological Survey (USGS) Topographic Maps (Figure 3 – USGS Topographic Quadrangle Map)
- National Resources Conservation Service (NRCS) Soil Survey Maps (Figure 4 – NRCS Soil Survey Map)
- South Florida Water Management District Land Use (Figure 5 – Land Use Map)
- Florida Natural Areas Inventory (FNAI) Tracking List Orange County
- Atlas of Florida Plants Institute for Systematic Botany
- Florida Department of Agriculture and Consumer Services Endangered, Threatened and Commercially Exploited Plants of Florida
- FWS North Florida Ecological Services Office Species Account

Pedestrian transects were conducted along the Study Area by MSE personnel in June, August, and September 2017 to evaluate the following:

- onsite vegetative communities
- jurisdictional wetlands and/or other surface waters
- habitat within the Study Area, or immediately adjacent, with potential to support federal and/or state-listed wildlife species

General Site Conditions

The Reams Road RCA Study Area is located east of State Road (SR) 429 and west of Winter Garden-Vineland Road. Specifically, the Study Area begins south of the intersection of Summerlake Park and Reams Road and commences to the east at Taborfield Avenue. The SFWMD land use database, current and historical aerials, and NRCS soil survey were reviewed for the Study Area. Additionally, pedestrian and vehicular transects were conducted on several occasions to document current site conditions, and are described below.

Soils

The soil survey geological (SSURGO) database, created by NRCS for Orange County, Florida, identifies the following soil types as occurring within the project limits:

- 3 – Basinger Fine Sand, depressional (Hydric)
- 20 – Immokalee Fine Sand
- 34 – Pomello Fine Sand, 0 to 5% Slope
- 41 – Samsula – Hontoon – Basinger Association, depressional (Hydric)
- 42 – Sanibel Muck (Hydric)
- 44 – Smyrna – Smyrna, Wet, Fine Sand, 0 to 2% Slopes (Hydric components)
- 47 – Tavares – Millhopper Complex, 0 to 5% Slopes
- 50 – Urban Land (Hydric components)
- 54 – Zolfo Fine Sand, 0 to 2% Slopes

Soils identified within the Study Area range from poorly drained to moderately well-drained, and are depicted in Figure 4 – NRCS Soil Survey Map.

Land Uses

The SFWMD land use database was reviewed for vegetative community types within the Study Area (Figure 5 – Land Use Map). The predominant land uses within the Study Area consist of single-family and multi-family residential development, commercial development, undeveloped forested land, forested and herbaceous wetland systems, and other surface waters.

Wetlands

The SFWMD land use database was reviewed for vegetative community types within the Study Area (Figure 5 – Land Use Map). The character, condition, and quality of wetland systems within the Study Area have experienced vegetative and hydrologic alterations as a result of adjacent residential and commercial development, and bisected by Reams Road. Major wetland systems are hydrologically connected to Lake Reams, and Lake Sharp, located north of Reams Road. Each wetland was field verified and dominant vegetative species recorded. Wetlands and/or other surface waters were reviewed from west to east (Figure 6 – Wetland and Surface Water Location Map), and are discussed in detail below.

Wetland 1

Wetland 1 is located west of Reams Road and south of Summerlake Park Boulevard. This system is classified as FLUCFCS 6170 – Mixed Wetland Hardwood. Wetland 1 is a large forested wetland system vegetatively comprised of a mixed canopy of cypress (*Taxodium* sp.), water oak (*Quercus nigra*), black gum (*Nyssa sylvatica*), red bay (*Persea borbonia*), dahoon holly (*Illex cassine*), cinnamon fern (*Osmunda cinnamomea*), and standing water. This system continues offsite.

Wetland 2

Wetland 2 is located east of Reams Road, and north of a multi-family residential dwelling. Wetland 2 is classified as FLUCFCS 6170 – Mixed Wetland Hardwood and is vegetatively comprised of water oak, slash pine (*Pinus elliottii*), red bay, dahoon holly, cinnamon fern, and grapevine (*Vitis* spp.)

Wetland 3

Wetland 3, located west of Reams Road and within the south border of Pond 2A, is classified as FLUCFCS 6430 – Wet Prairie. Wetland 3 is an herbaceous system vegetatively comprised of red root (*Lachnanthes caroliniana*), rushes (*Juncus* spp.), chalky bluestem (*Andropogon* spp.), bahiagrass (*Paspalum notatum*), and standing water.

Wetland 4

Wetland 4 is located southwest of Reams Road, and east of the easement to proposed Pond 2B. This system is classified as FLUCFCS 6210 – Cypress. Wetland 4 is vegetatively comprised of a dominant canopy of cypress, with scattered red bay, and dahoon holly, with an understory of ferns, red root, and standing water.

Wetland 5

Wetland 5 is located north of Reams Road, adjacent to The Church of Jesus Christ of Latter-Day Saints of Windermere. This wetland system is classified as FLUCFCS 6170 – Mixed Wetland Hardwood and is vegetatively comprised of a mixed canopy of slash pine, red maple (*Acer rubrum*), red bay, dahoon holly, with scattered cypress, and standing water. Wetland 5 is part of a larger system that continues offsite.

Wetland 6

Wetland 6 is located southwest of Reams Road and is hydrologically connected via a box culvert to Wetland 7. Wetland 6 is classified as FLUCFCS 6210 – Cypress. This system has a dominant canopy of cypress, with an understory of primrose willow (*Ludwigia* sp.), maidencane (*Panicum hemitomon*), pickerelweed (*Pontederia cordata*), cattail (*Typha* sp.), and standing water.

Wetland 7

Wetland 7 is located northeast of Reams Road and is hydrologically connected via a culvert to Wetland 6. Wetland 7 is classified as FLUCFCS 6210 – Cypress, and is vegetatively comprised of cypress, primrose willow, Brazilian pepper (*Schinus terebinthifolius*), maidencane, pickerelweed, and standing water.

Wetland 8

Wetland 8 is located north of Reams Road and east of Center Drive. Wetland 8 is classified as FLUCFCS 6210 – Cypress, and is vegetatively comprised of cypress, red bay, dahoon holly, primrose willow, pickerel weed, swamp fern, cattails, ceasarweed (*Urena lobate*), and standing water.

Wetland 9

Wetland 9 is located north of Reams Road and west of Newmarket Drive. Wetland 9 is classified as FLUCFCS 6210 – Cypress and is vegetatively comprised of a dominant canopy of cypress, with scattered red bay, and dahoon holly. The groundcover consists of swamp fern, cinnamon fern, duckweed (*Lemna* sp.), and standing water.

Wetland 9A

Wetland 9A is located north of Reams Road and west of Newmarket Drive. Wetland 9 is classified as FLUCFCS 6210-Cypress and is vegetatively comprised of a dominant canopy of cypress, with scattered red bay and dahoon holly. The groundcover includes swamp fern and cinnamon fern, with standing water present.

Wetland 10

Wetland 10 is located south of Reams Road and west of Bay Court. Wetland 10 is classified as FLUCFCS 6210 – Cypress and is vegetatively comprised of cypress, red bay, dahoon holly, and primrose willow.

Wetland 11

Wetland 11 located south of Reams Road and west of Aldendale Street. Wetland 11 is defined as FLUCFCS 6170 - Mixed Wetland Hardwood system with slash pines, red bay, dahoon holly, cabbage

palms (*Sabal palmetto*), wax myrtle, primrose willow, water oak, and elephant ear (*Colocasia esculenta*).

Wetland 12

Wetland 12 is located southeast of Reams Road, within an improved pasture, and is classified as 6430 – Wet Prairie. Wetland 12 is vegetatively comprised of red root, rushes, chalky bluestem, and bahiagrass.

Wetland 13

Wetland 13 is located north of Reams Road and west of Via Trieste Drive. Wetland 13 is classified as FLUCFCS 6170 – Mixed Forested Hardwood and is comprised of red bay, red maple, slash pine, saw palmetto, winged sumac (*Rhus copallinum*), and muscadine grapevine.

Wetland 14

Wetland 14 is located south of Reams Road within an improved pasture. Wetland 14 is classified as FLUCFCS 6445 – Emergent Aquatic Vegetation – Water Lily. Wetland 14 is an open water pond dominated with water lilies (*Nymphaea* spp.).

Other Surface Waters

Surface Waters 1 &2

Surface waters 1 and 2 are located southeast of Reams Road within the easement for Pond 5D. These areas are characterized as FLUCFCS 5300 – Reservoirs. These are small cattle ponds within pasture area. These systems consist of open water and maintained bahiagrass.

Federal and State-Listed Species

Federal and State Listed Flora

Florida Natural Areas Inventory

Florida Natural Areas Inventory (FNAI) is a non-profit conservation organization and maintains a database of recorded occurrences of imperiled plant and wildlife species, and rare habitat types. The FNAI classifies imperiled species not as threatened or endangered, but by a 5-tiered ranking system on a global and state-wide basis. Although FNAI is not a regulatory or law enforcement agency, the FNAI database was consulted for this study due to their comprehensive wildlife species occurrence records.

The FNAI tracking list for Orange County was reviewed for federal and/or state listed flora known to occur in Orange County, and the potential for such species to occur within the Study Area. Listed flora species are those categorized by FWS and/or FWC as T, E, or SSC, thereby receiving a level of protection because of their listed status. The potential occurrence of listed flora species identified within the proposed project is based on the type of vegetative communities present. The probability of each species occurring within the Study Area was ranked using the following requirements:

1. No – indicates no suitable habitat present. Suitable habitat is defined as intact natural land that is typically used by the species under consideration.
2. Low – indicates that marginally suitable habitat may exist within the property, but the species was not observed during field observations. Marginal describes natural land that has been

altered from its native state due to human activity, ecological succession, or conversion; however, a species under consideration could still inhabit.

3. Moderate – indicates that suitable habitat exists within the property but the species was not observed during field observations.
4. High – indicates that suitable habitat exists within the property and the species of interest was observed during field observations.

Table 1 provides a summary of federally and/or state-listed flora species known to occur in Orange County and their potential for occurrence within the limits of the Study Area.

Table 1: Federal and State Listed Plant Species Documented in Orange County and the Potential for Occurrence within the Reams Road Study Area.

Scientific Name	Common Name	Habitat	FWS Status	FWC Status	Occurrence Potential
Bonamia grandiflora	Florida bonamia	Sand pine scrub with evergreen scrub oaks, bare sunny sand areas, road rights-of-way, fire lanes	T	E	Low
Calopogon multiflorus	many-flowered grass-pink	Fire maintained damp pinelands and meadows	--	T	Low
Centrosema arenicola	sand butterfly pea	sandhill, scrubby flatwoods, dry upland woods	--	E	Low
Chionanthus pygmaeus	pygmy fringe tree	scrub, sandhill, xeric hammock	--	E	Low
Deeringothamnus pulchellus	beautiful pawpaw	open slash or longleaf pine flatwoods with wiregrass and dwarf live oak understory	E	E	Low
Eriogonum longifolium var. gnaphalifolium	scrub buckwheat	Sandhill, oak-hickory scrub on yellow sands, high pineland between scrub and sandhill, turkey oak barrens	T	E	Low
Illicium parviflorum	star anise	Banks of spring-run or seepage streams, bottomland forest, hydric hammock, baygall dominated by red maple and sweet bay	--	E	Low
Lechea cernua	scrub pinweed	Fire-maintained scrub	--	T	Low
Lupinus westianus var. aridorum	scrub lupine	Sand pine scrub	E	E	Low
Matelea floridana	Florida spiny-pod	Mesic hammock	--	E	Low
Monotropa hypopithys	pinesap	Moist, shaded, temperate forests	--	E	Low
Najas filifolia	narrowleaf naiad	Freshwater ponds	--	T	Low
Nemastylis floridana	celestial lily	wet flatwoods, prairies, marshes, cabbage palm hammocks edge	--	E	Moderate
Nolina atopocarpa	Florida beargrass	Flatwoods, savannas, shell middens	--	T	No
Nolina brittoniana	Britton's beargrass	Scrub, sandhill, scrubby flatwoods, xeric hammock	E	E	Low

Scientific Name	Common Name	Habitat	FWS Status	FWC Status	Occurrence Potential
Ophioglossum palmatum	hand fern	Old leaf bases of cabbage palms in maritime hammocks and wet hammocks	--	E	Low
Panicum abscissum	cutthroat grass	Seepage slopes	--	E	No
Paronychia chartacea	Papery whitlow-wort	Sandy openings around sandhill upland lakes and karst ponds; Lake Whales Ridge scrub	T	E	Low
Pecluma plumula	plume polypody	Tree branches, limestone in hammocks, wet woods, and limesinks	--	E	Low
Polygonella myriophylla	sandlace	Open, sandy areas within scrub, mostly white sand	E	E	Low
Prunus geniculate	scrub plum	Sandhill and oak scrub	--	E	Low
Pteroglossaspis ecristata	giant orchid	Sandhill, scrub, pine flatwoods, pine rocklands	--	T	Low
Stylisma abdita	scrub stylisma	Scrub, high pine	--	E	Low
Warea amplexifolia	Wide-leaf warea	Sandhill with longleaf pine and wiregrass; Lake Wales Ridge	--	E	Low
Zephyranthes simpsonii	redmargin zephyrlily	Wet pinelands, pastures and roadsides	--	T	Low

Occurrence Potential = No, Low, Moderate, High.
Code Key: E = Endangered, T = Threatened, SSC= Species of Special Concern, T S/A = Threatened Similar in Appearance
Data Source: Florida Natural Areas Inventory (FNAI) Tracking List Orange County Updated July 2017; Atlas of Florida Plants Institute for Systematic Botany; Florida Department of Agriculture and Consumer Services Endangered, Threatened and Commercially Exploited Plants of Florida; U.S. Fish & Wildlife Services North Florida Ecological Services Office Species Account/Biologue.

Federal and State Agencies Listed Wildlife Species Regulatory Overview

Federal and state agencies are charged with protecting endangered, threatened, and species of special concern wildlife, and their critical habitat. A discussion of each agency charged with protection of these species within the Study Area follows.

U.S. Fish and Wildlife Service

U.S. Fish and Wildlife Service (FWS) regulate impacts to protected species pursuant to Section 9 of the Endangered Species Act. The FWS is typically involved in the wetland permitting process through consultation with the U.S. Army Corps of Engineers (USACE). In accordance with the Fish and Wildlife Coordination Act [16 USC 662], the USACE must consult with the FWS on any project receiving a Section 404 permit to ensure that impacts to wildlife are avoided or minimized. The FWS classifies imperiled plant and wildlife species as "Endangered" or "Threatened" (with those in the greatest peril of extinction listed as endangered). The FWS has issued specific guidelines for the management of some protected species. The project Study Area falls within FWS's jurisdiction and consultation area for the eastern indigo snake, sand skink, and wood stork. Details regarding the eastern indigo snake, sand skink, and wood stork are provided below.

Florida Fish and Wildlife Conservation Commission

Florida Fish and Wildlife Conservation Commission (FWC) regulate impacts to state-protected wildlife species pursuant to the Florida State Constitution as implemented via Sec. 39 F.A.C. The FWC classifies imperiled wildlife species as "Endangered," "Threatened," or "Species of Special Concern" (in order of peril). Florida Fish and Wildlife Conservation Commission maintains a database of recorded occurrences of listed animal species, and has developed guidelines for the management of some protected wildlife species in Florida. These management guidelines vary with the species according to rarity, habitat requirements, and compatibility with development. Detailed permitting for the state-protected gopher tortoise is provided below.

Federal and State-Listed Wildlife Species

Literature reviews and database queries were conducted to identify federally and/or state-listed wildlife species known to occur in Orange County as well as the potential occurrence of such species utilizing the Study Area. Federal and/or state-listed wildlife species are those categorized by FWS and/or FWC as T, E, or SSC, thereby receiving a level of protection because of their listed status. The potential occurrence of listed species identified within the Study Area is based on the type and quality of present vegetative communities, and surrounding land uses. The probability of each wildlife species occurring within the Study Area was ranked using the following requirements:

1. No – indicates no suitable habitat present. Suitable habitat is defined as intact natural land that is typically used by a species under consideration.
2. Low – indicates that marginally suitable habitat may exist within the property, but the species was not observed during field observations. Marginal describes natural land that has been altered from its native state due to human activity, ecological succession, or conversion; however, a species under consideration could still inhabit.
3. Moderate – indicates that suitable habitat exists within the property but the species was not observed during field observations.
4. High – indicates that suitable habitat exists within the property and the species of interest was observed during field observations.

Table 2 provides a summary of those federally and/or state-listed species known to occur in Orange County, and their potential for occurrence within the Study Area. A discussion of federal and/or state listed wildlife with the occurrence potential of “moderate” or “high” are discussed in detail below. During field observations the American alligator, gopher tortoise, Florida sandhill crane, roseate spoonbill, and wood stork were observed.

Table 2: Federal and State-Listed Wildlife Species Documented in Orange County and the Potential for Occurrence within the Reams Road Study Area

Scientific Name	Common Name	FWS Status	FWC Status	Occurrence Potential
Fish				
Pteronotropis welaka	bluenose shiner	--	T	No
Reptiles				
Drymarchon corais couperi	eastern indigo snake	T	T	Moderate

Scientific Name	Common Name	FWS Status	FWC Status	Occurrence Potential
Neoseps reynoldsi	sand skink	T	T	Moderate
Gopherus polyphemus	gopher tortoise	--	T	High
Pituophis melanoleucus	pine snake	--	T	Moderate
Stilosoma extenuatum	short-tailed snake	--	T	Low
Alligator mississippiensis	American alligator	T S/A	T S/A	High
Birds				
Haliaeetus leucocephalus	bald eagle	--	--	Low
Aphelocoma coeruluscens	Florida scrub-jay	T	T	Low
Speotyto cunicularia floridana	Florida burrowing owl	--	T	Low
Egretta caerulea	little blue heron	--	T	Moderate
Egretta tricolor	tricolored heron	--	T	Moderate
Falco sparverius paulus	southeastern American kestrel	--	T	Low
Grus canadensis pratensis	Florida sandhill crane	--	T	High
Mycteria americana	wood stork	T	T	High
Polyborus plancus audubinii	Audubon's crested caracara	T	T	Low
Pandion haliaetus	osprey	--	SSC*	Moderate
Picoides borealis	red-cockaded woodpecker	E	--	Low
Platalea ajaja	roseate spoonbill	--	T	High
Sternula antillarum	least tern	--	T	Low
Mammals				
Sciurus niger shermani	Sherman's fox squirrel	--	SSC	Low

Occurrence Potential = No, Low, Moderate, High.
Code Key: E = Endangered, T = Threatened, SSC= Species of Special Concern, T S/A = Threatened Similar in Appearance
Data Source: URL: *Florida's endangered species, and threatened species* dated May 2017: http://myfwc.com/media/1515251/threatened_endangered_species.pdf and Florida Natural Areas Inventory (FNAI) Tracking List Orange County Updated July 2017.
***Monroe County, Florida ONLY**

Bald Eagle

Although the bald eagle (*Haliaeetus leucocephalus*) has been delisted, the species remains protected through the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. Florida has one of the densest concentrations of nesting bald eagles in the lower 48 states. Bald eagles typically nest and roost in forested habitats consisting of mature canopy trees located along habitat edges allowing an unobstructed view of surrounding areas. Daytime roosts are in the highest trees and adjacent to shorelines. High quality foraging habitat for bald eagles has a diversity and abundance of prey, access to shallow water, and tall trees or structures. Their diet consists of fish, birds, and small mammals (FWC). A FWS permit is needed for activities with the potential to disturb nesting bald eagles, or to remove or "take" a bald eagle nest.

The FWC Bald Eagle Nest locator was queried for known bald eagle nest sites within a one-mile radius of the project Study Area. No documented bald eagle nest sites were identified within the one-mile radius search.

It is anticipated that the proposed project will not adversely affect the bald eagle.

Federally Listed Species

American Alligator

The American alligator (*Alligator mississippiensis*) is listed as threatened due to similarity in appearance to the American crocodile (*Crocodylus acutus*) by FWS. The American alligator inhabits fresh and brackish marshes, ponds, lakes, rivers, swamps, bayous and large spring runs and are known to inhabit salt marsh and estuarine habitats in some parts of the state (Scott 2004). Alligators play a vital role in creating and maintaining microhabitats (gator holes), which can benefit a host of species for refuge to water source habitats. Nests consist of a mound of compacted earth and vegetation usually four to seven feet in diameter (Scott 2004). Nesting season occurs in the spring. The alligator has a wide variety of food sources which include fish, ducks, wading birds, raccoons, and turtles.

The American alligator has been known to inhibit existing stormwater management ponds, and was observed within the limits of the Study Area, specifically within Wetland 7, and has been observed using the culvert to cross between the two wetland systems. The proposed project includes widening the travel lanes through this section of the Study Area, and maintaining the hydrologic connection to the wetland systems to the north and south of Reams Road. The proposed project may affect, but is not likely to adversely affect the American alligator.

Sand Skink

The sand skink (*Neoseps reynoldsi*) is a unique lizard adapted to an underground existence, and is listed as threatened by FWS. This species occurs only on Florida's central ridges requiring high elevations and appropriate soil types. The sand skink inhabits loose sands of sand pine-rosemary scrub, less often longleaf pine-turkey oak (sandhill) or turkey oak "barrens" adjacent to scrub, especially high pine-scrub ecotones (FWS, 1999). However, the sand skink is known to occur in areas with dense undergrowth and extensive canopy closure. It is fossorial (usually within 8 cm of surface) but can be found under logs, leaf litter, and other surface debris. Well-drained sands in open glades free of rooted plants are optimal, whereas dry, porous sands are unfavorable; moisture under leaf litter is important in regulation of body temperature and for successful egg incubation. The sand skink eats mainly beetle larvae and termites as well as adult beetles, spiders, caterpillars, and larval antlions (FWS, 1999).

The Study Area is located within the FWS Sand and Blue-tailed Mole Skinks Consultation Area (Appendix A – FWS Sand and Blue-tailed Mole Skinks Consultation Area Map). Appropriate soil type and elevations (82 feet above sea level or higher) for the sand skink are located within the Study Area (Figure 7 – Potential Suitable Sand Skink Habitat). When the location, elevation, and onsite soil types are appropriate, then either: (1) a skink survey is necessary to determine if the site is occupied or (2) conservation measures should be implemented.

The FWS designed the Sand and Bluetail Mole Skink Conservation Guidelines (April 4, 2012) to assess the relative risk of taking sand skinks. The FWS assumes presence of the sand skink if the three criteria (location, soils, and elevation) are met. In order to determine absence, a visual pedestrian survey should be conducted. The pedestrian survey may be conducted at any time of the year, however tracks are more detectable in the spring (March through May), and in the fall (October to November) (Sand

Skink Protocol, 2011). If the sand skink is found to be present, FWS will assume a presence within an 80-foot radius of skink evidence, provided there are no physical barriers (canals, roads, etc).

If the pedestrian survey is negative, a coverboard survey is necessary to verify the absence of the species. Coverboard surveys should be conducted from March 1 through May 15, and follow the FWS survey protocol. Negative pedestrian and coverboard surveys indicate a low risk of take to the sand skink.

Should the pedestrian and/or coverboard survey indicate a presence of the sand skink then mitigation credits may be purchased from a FWS approved mitigation bank to offset the habitat loss. The proposed project may affect, is not likely to adversely affect the sand skink.

Eastern Indigo Snake

The eastern indigo snake (*Drymarchon corais couperi*) is listed as threatened by the FWS. The species occurs in a variety of terrestrial habitats. The eastern indigo snake prefers uplands, but will also utilize wetlands and agricultural areas (FWS 2013). Eastern indigo snakes have large home ranges, generally requiring 124 to 248+ acres of undisturbed habitat during the warmer months and 25 acres in winter months (Hallam et al. 1998). This species is known to use gopher tortoise burrows as a refuge from the elements, including cold temperatures and fire, but are also known to take refuge in stumps, roots and debris piles. In northern Florida, it winters mostly in gopher tortoise burrows (Hipes et al. 2000). The eastern indigo snake consumes rats, rabbits, snakes, amphibians, eggs, birds, turtles and baby alligators. Breeding ranges from November to April, with egg laying occurring from April to June (FWS 2013).

Using the FWS *Eastern Indigo Snake Programmatic Effect Determination Key*, revised July 2017, the project receives a “not likely to adversely affect” (NLAA) the eastern indigo snake. The proposed project is **1)** not located within open water or a salt marsh, **2)** will impact less than 25 acres of xeric habitat and **3)** has known holes, cavities, active or inactive gopher tortoise burrows or other underground refugia where a snake could be buried, trapped and/or injured during project activities.

The FWS Field office requires notification if the Standard Protection Measures for the Eastern Indigo Snake, August 2013, will be implemented (Appendix B – Standard Protection Measures for the Eastern Indigo Snake) at least 30 days prior to clearing/land alteration activities. Additionally, permit conditions may require that all gopher tortoise burrows, active or inactive be excavated prior to site manipulation near the burrows to allow any potential indigo snakes to vacate the vicinity.

Wood Stork

The wood stork (*Mycteria americana*) is listed as threatened by FWS. This species is typically found in freshwater marshes, swamps, lagoons, ponds, flooded fields, depressions in marshes, and brackish wetlands. The critical foraging areas for this species include areas of very shallow water, generally six to ten inches in depth, where there is an abundance of small fishes and other aquatic life. These small fish may include mosquitofish, sailfin mollies, flagfish, and several species of sunfish. Wood storks may also prey on frogs, salamanders, snakes, crayfish, insects, and baby alligators (Scott 2004).

The Study Area is located within the 15-mile core foraging habitat for two wood stork colonies (FWS 2015). Foraging areas include drainage features, small water bodies, and a stormwater pond. Using the *Corps of Engineers and U.S. Fish and Wildlife Service Effect Determination Key for the Wood Stork in Central and North Peninsular Florida*, the Study Area is not within 2,500 feet of an active colony site, and will likely impact no greater than 0.5 acre of Suitable Foraging Habitat (SFH), therefore the proposed project is not likely to adversely affect the wood stork.

State Listed Species

Gopher Tortoise

The gopher tortoise (*Gopherus polyphemus*) is listed by the State of Florida as threatened. The gopher tortoise inhabits subterranean burrows in dry upland habitats. Vegetative communities most often inhabited by gopher tortoises include longleaf pine sandhills, xeric oak hammocks, scrub, pine flatwoods, dry prairies and coastal dunes. Gopher tortoises can also be found in pastures, ruderal fields, and grassy roadsides. To be suitable for gopher tortoises, the habitat must have well-drained sandy soils for digging burrows, herbaceous plants, and open sunny areas for nesting, and basking. Periodic natural fires play an important role in maintaining tortoise habitat by opening up the canopy and promoting growth of herbaceous plants used for forage. If natural fires are suppressed, the habitat becomes unsuitable for gopher tortoises (Cox 1987). Gopher tortoise burrows are an important habitat to many native species. It is estimated that 39 invertebrates and 42 vertebrate species use the gopher tortoise burrow to some degree (Cox 1987). Of those species, protected species that are frequent inhabitants of the gopher tortoise burrow include the Florida pine snake, eastern indigo snake, and burrowing owl. This commensal relationship warranted field investigation for such species within the Study Area.

The project Study Area contains suitable habitat for the gopher tortoise. Gopher tortoise burrows were observed within proposed Pond 4B. Prior to development, a survey of all suitable habitat for gopher tortoises, in accordance with FWC guidelines, should be conducted. Gopher tortoises must be relocated before any land clearing or development occurs. FWC provides four options for the land owner to address the presence of gopher tortoises:

1. Avoid development
2. Avoid destruction of tortoise burrows
3. Relocate tortoises on-site (permit required)
4. Relocate tortoises off-site (permit required)

It is anticipated that the relocation of gopher tortoises to a long-term off-site recipient site may be required for the construction of proposed project with gopher tortoise burrows.

Florida Pine Snake

The Florida pine snake (*Pituophis melanoleucus*) is listed as threatened by FWC. The Florida pine snake is found in sandhills, including old fields and pastures, with a moderate to open canopy and dry sandy soils, in which it burrows. The pine snake is also found in sand pine scrub and scrubby flatwoods; and often coexists with pocket gophers and gopher tortoises (FNAI 2001). The diet of the

Florida pine snake primarily consists of moles, rabbits, mice, rats, squirrels, lizards, and other snakes and their eggs (Ernst and Ernst 2003).

The Florida pine snake was not observed within the limits of the Study Area, however suitable habitat is available, specifically where gopher tortoise burrows were identified (proposed Pond 4B). Excavation of gopher tortoise burrows provides reasonable assurance that the Florida pine snake will not be impacted.

Florida Sandhill Crane

The Florida sandhill crane (*Grus canadensis pratensis*) is listed as threatened by FWC. The Florida sandhill crane is a non-migratory bird found in freshwater marshes, prairies, and pastures (FNAI 2001). These birds nest in freshwater ponds and marshes, with an average water depth of 5 to 13 inches, and sites vary from year to year due to the fluctuation of water levels. Their diet consists of berries, seeds, insects, mice, small birds, snakes, lizards, and frogs.

Florida Fish and Wildlife Conservation Commission recommend conducting surveys to determine if active nest sites are present between December and August. If the FWC survey protocol is followed (Appendix C – Florida Sandhill Crane Survey Protocol) and no active nests are detected, then no further review or coordination with FWC is required. The Florida sandhill crane was observed foraging within residential areas and the grassy roadside within the Study Area, and no active nest sites were detected. Marginally suitable nesting habitat is found within the Study Area, however no nest sites were observed and water levels were not adequate at the time of site review.

It is anticipated that the proposed project will not impact the Florida sandhill crane.

Wading Birds

The little blue heron (*Egretta caerulea*) is listed as threatened by FWC. The little blue heron is typically found in marshes, ponds, lakes, meadows, mudflats, lagoons, streams, mangrove lagoons, and other bodies of shallow water. The little blue heron's diet consists of various types of fishes, amphibians and invertebrates. Nesting generally occurs in both coastal and freshwater environments in swamps and/or mangrove forests. They are also known to share nesting sites with other wading birds to form rookery colonies (Rodgers 1996).

The tri-colored heron (*Egretta tricolor*) is listed as threatened by FWC. This species is typically found in habitats similar to the little blue heron and snowy egret, which include marshes, ponds, sloughs and freshwater areas. Tri-colored herons typically feed on small fishes, amphibians, crustaceans, snails, worms and aquatic insects. Nesting can occur in a variety of wetland trees including willow, wax myrtle, marsh elder, pond apple, and buttonbush. Breeding in freshwater rookeries occurs during periods of high water in freshwater wetlands.

The roseate spoonbill (*Platalea ajaja*) is listed as threatened by FWC. This species typically nests on coastal mangrove islands or in Brazilian pepper on man-made dredge spoil islands near suitable foraging habitat and occasionally in willow heads at freshwater sites (FNAI 2011). Roseate spoonbills forage in shallow waters, including marine tidal flats and ponds, coastal marshes, mangrove-dominated inlets and pools, and freshwater sloughs and marshes. The diet of the roseate spoonbill primarily consists of crayfish, shrimp, crabs, and small fish (FWC).

The little blue heron and the tri-colored heron were not observed during field reviews. The roseate spoonbill was observed foraging within the existing stormwater management system (Pond 1). Measures to mitigate wetland impacts can be designed to provide additional benefits to wetland dependent protected wildlife species potentially impacted by the project.

Non-listed Wildlife Species

In addition to federal and/or state-listed wildlife species, the Study Area supports additional wildlife species. Wildlife species noted within the Study Area during field reviews include: red-shoulder hawk (*Buteo lineatus*), great egret (*Ardea alba*), great blue heron (*Ardea herodias*), common grackle (*Quiscalus quiscula*), mockingbird (*Mimus polyglottos*), raccoon (*Procyon lotor*), wild boar (*Sus scrofa*), white tailed deer (*Odocoileus virginianus*), and brown anole (*Anolis sagrei*). In addition, wetland systems within the Study Area provide resting, nesting, and foraging opportunities for wetland dependent species and migratory birds.

Avoidance and Minimization to Federal and/or State-Listed Wildlife Species

The potential impact to federal and/or state-listed wildlife species was evaluated based upon the occurrence determinations for Orange County, Florida reviewed in Table 2. Further analysis will be required to specifically address quantities of impact, current status of wildlife species, and other design and/or construction measures which can be incorporated to reduce or eliminate the potential impact.

Wildlife Crossing Corridor Evaluation

As part of the Reams Road RCA process, the project team evaluated the opportunity of implementing wildlife crossings within the Study Area. Wildlife crossings are most often associated with roadways where natural habitat is located on either side of a crossing and those natural areas can be protected from site conversion through preservation or conservation. Wildlife crossings allow for terrestrial wildlife to move uninterrupted and safely through a roadway corridor from one side to the other, from natural habitat to natural habitat. This study found little evidence of use by listed wildlife species within the Study Area however common wildlife species like raccoons, rabbits, opossums, snakes and turtles are known to occur in the Study Area.

Current Corridor Condition

The current Study Area is a mix of residential and commercial development, and natural vegetated communities. The current configuration of Reams Road is predominantly a two-lane roadway with little to no shoulders. Natural vegetation consists of forested wetlands, marshes, upland forests and pasture areas. These natural communities are being developed at an accelerated rate; during this study, two new development projects have begun.

Future Corridor Condition

A review of existing and pending Orange County development permits along the Study Area shows that a tremendous amount of growth and development is planned in the area. Of the 50± distinct properties/parcels throughout the Study Area, only 14 do not currently have permitted or pending permit development plans. Of those 14, several will be utilized for stormwater management ponds to support roadway improvements and resolve some drainage issues within the Study Area.

Evaluation Criteria

Detailed analysis of the Study Area for wildlife crossing implementation included review of biodiversity database (Figure 8 – Biodiversity Map), identification and location of conservation lands and/or public lands, current and future development plans, as well as input from citizens. While there is no significant listed wildlife species presence within the Study Area, there have been records of common wildlife species (i.e. raccoons, opossums, etc.) identified.

Two critical evaluation criteria, when determining the implementation and placement of wildlife crossings, are the presence of natural habitat on both sides of the roadway that is protected from site alteration, and the ability to construct a fence along the roadway to guide wildlife to the crossing. Therefore, if a potential wildlife crossing location currently has natural habitat on both sides of the roadway that is under private ownership, and the property owner prohibits the construction of a fence, or reserves the right to move or remove the wildlife fence in the future, the long-term viability of the location is greatly diminished. Using these criteria the viability of wildlife crossings within the Reams Road Study Area is limited.

Selection of Potential Wildlife Crossing Locations

Using the evaluation criteria above, along with biodiversity data available for the Study Area, existing natural communities, and input from citizens, two potential wildlife locations were identified: 1) east of Disney property, west of Newmarket Drive/Bay Court 2) at the existing large box culvert crossing located east of Greenbank Boulevard (Figure 9).

Application of Evaluation Criteria to Potential Wildlife Crossing Locations

Wildlife Crossing Location 1 - East of the Disney parking lot, West of Newmarket Drive/Bay Court

Wildlife Crossing Location 1 has natural habitat consisting of wetlands and uplands on both sides of the roadway. The property on both sides of the roadway in this location is owned by a development subsidiary of Walt Disney Parks and Resorts. Conversations with Disney representatives indicate that a wildlife crossing and fencing on both sides of the roadway could be constructed at this time. However, Disney is reserving the right to relocate the fence on the south side of the property away from the roadway in the future to allow the frontage property to be developed. This would reduce the effectiveness of a wildlife crossing in this location.

Wildlife Crossing Location 2 – East of Greenbank Boulevard

The County currently identifies this area as a wildlife crossing and has installed flashing signs identifying the area as such. Wildlife Crossing Location 2 has natural wetland habitat on both sides of the road. Although the properties on both sides of the roadway are privately owned, the proposed crossing location serves as a hydrologic connection between the wetlands. Therefore, it is unlikely that the wetlands will be developed in the future. This would allow a guiding fence to be constructed adjacent to the wetlands.

Conclusion

Wildlife Crossing Location 1 – East of the Disney parking lot, West of Newmarket Drive/Bay Court

Based on the information and analysis presented above, it is concluded that a wildlife crossing east of the Disney parking lot and west of New Market Boulevard is not justified due to the lack of sustainable

natural communities (i.e. preservation or conservation lands) on both sides of the roadway in the future. A wildlife crossing in this location may be reconsidered in the future should plans to develop the frontage on the south side of the roadway be altered.

Wildlife Crossing Location 2 – east of Greenbank Boulevard

A wildlife crossing could be supported east of Greenbank Boulevard. Final configuration of the components of the crossing will be determined during roadway design. The wildlife crossing would be at an existing box culvert, would include an appropriately sized RCP pipe with an inlet grate in the median to allow for light penetration. The pipe would be placed nine inches above the seasonal high-water level, providing a dry crossing for wildlife species to utilize. Additionally, a herpetological fence would be installed along both the north and south right-of-way, extending from upland limit to upland limit on either side of the flow way. The herpetological fence would be buried one foot in the ground with three feet above to discourage digging under the fencing and minimize access over the fence. A crossing in this location is viable as this is a major drainage feature in the area and must be maintained in the future to provide hydrologic flow and flood control.

Wetland and/or Surface Water Regulatory Overview and Permitting Requirements

Wetland systems are regulated at federal, state and local levels making the presence of such systems important in planning for transportation projects. A discussion of each agency with potential jurisdiction over wetlands within the Study Area follows.

U.S. Army Corps of Engineers

The USACE regulates the discharge of dredge or fill material in water of the U.S. under Section 404 of the Clean Water Act, and in navigable waters of the U.S. under Sections 9 and 10 of the Rivers and Harbors Act of 1899. The term “navigable waters of the U.S.” is defined to include all waters that are subject to the ebb and flow of the tide, and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce (USACE Guidebook). In 1985, the U.S. Environmental Protection Agency (EPA) signed a Migratory Bird Memo which suggested that the movement of birds across state lines could be used as a link to interstate commerce. The USACE adopted the regulation in 1986 as the “Migratory Bird Rule” (MBR) which allowed the USACE to assert jurisdiction over nearly all-natural water bodies, including wetlands that could be or were used as habitat by migratory birds.

The USACE (Federal Register 1982) and the EPA (Federal Register 1980) jointly define wetlands as: “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” and “wetlands generally include swamps, marshes, bogs, and similar areas” (Corps of Engineers Wetlands Delineation Manuel 1987).

Impacts to wetland systems deemed jurisdictional by the USACE require a Standard, General, or Nationwide Permit.

- General Permits are issued on a nationwide or regional basis for a category of activities that are similar in nature and cause only minimal individual and cumulative impacts. General Permits are

reviewed every five years and have been developed as a way to reduce the burden of the regulatory program on the public and ensure timely issuance of permits.

- Nationwide Permits are activity specific and are issued when there are generally less than 0.5-acres of impact, and may not require full compensation mitigation. Nationwide Permit 14 Linear Transportation Projects regulates activities associated with roads, highways, railways, trails, airport runways, and taxiway. For a NWP 14 in non-tidal waters, there must be less than 0.5-acre of impacts of water of the U.S.

- Standard Permits are required when the proposed project does not meet the criteria of a General Permit or Nationwide Permit.

South Florida Water Management District

South Florida Water Management District regulates impacts to wetlands and/or other surface waters pursuant to Part IV, Chapter 373 of the F.S., and in accordance with Chapters 40E-4, 40E-40; 40E-41 and 40E-400 of the Florida Administration Code. South Florida Water Management District generally requires an Environmental Resource Permit (ERP) to impact wetlands, which are typically defined as stated above by the USACE. Permit thresholds have been developed to determine which type of permit may be required, and generally require mitigation for impacts to wetland systems that are over 0.5 acre in size. In addition, SFWMD considers secondary impacts to wetland systems, which average 25-feet into the wetland system. In order to reduce secondary wetland impacts, SFWMD generally requires a 15-foot minimum and 25-foot average upland buffer to be preserved around a wetland system.

Potential Impact of Project Alignment and Proposed Surface Water Management Ponds

The existing conditions of the Study Area were evaluated to determine the potential for adverse wetland and/or other surface water impacts.

Impacts to Wetland and/or Other Surface Waters

Wetland and/or other surface water impacts (approximate) associated with roadway improvements and proposed pond placements are identified below in Table 3.

Table 3: Approximate Wetland Impacts within the Reams Road Study Area.

Wetland/Other Surface Water ID	FLUCFCS Code	Roadway Impact (ac)*	Proposed Pond ID	Proposed Pond Impact (ac)*
Wetland 1	6170	1.30	1B	2.23
Wetland 2	6170	--	1A	0.28
Wetland 3	6430	--	2A	0.12
Wetland 4	6210	0.08	2B	0.44
Wetland 5	6170	--	3A	1.34
Wetland 6	6210	0.46	--	--
Wetland 7	6210	0.33	--	--
Wetland 8	6210	0.53	--	--
Wetland 9	6210	--	4A-1	0.5
Wetland 9A	6210	--	4A-2	0.26
Wetland 10	6210	0.03	4B-1	0.49
Wetland 11	6170	0.38	5A	0.32
Wetland 12	6430	--	5A	0.49
Wetland 13	6170	0.23	--	--
Surface Water 1	5300	--	5D	.03
Surface Water 2	5300	--	5D	.003

* Impact acreages are based on approximate limits and should be field delineated and surveyed prior to permitting activities.

Secondary Impacts

Secondary impacts to aquatic or wetland dependent wildlife species are reviewed by SFWMD during the permit process. Pursuant to Section 10.1.1(f) of the SFWMD ERP application an applicant must ensure that a regulated activity will not cause adverse secondary impacts to the water resources (62-330.301(1)(f), F.A.C.). Secondary impact criteria consist of four parts in which the applicant must provide reasonable assurance that the impacts from construction, alteration, and intended or reasonable expected uses of a proposed project: 1) will not cause violations of water quality standards or adverse impacts to the functions of wetlands or other surface waters; 2) will not adversely impact the ecological value of uplands to federal and/or state listed aquatic and wetland dependent wildlife species for enabling existing nesting or denning by these species (excluding areas needed for foraging; or wildlife corridors); 3) will not impact any significant historical or archeological resource; and, 4) will not cause adverse impacts in later phases which are very closely linked and casually related to the intended project.

Generally, secondary impacts to the habitat functions of wetlands will not be considered adverse if buffers, with a minimum width of 15 feet and an average width of 25 feet, are provided adjacent to the wetlands that will remain. Buffers must be maintained in their natural/undisturbed condition, except for drainage features, provided the construction or use of these features does not adversely impact wetlands. Wetlands or other surface waters cannot be filled to create upland buffers.

Secondary impacts associated with stormwater pond placement, and roadway improvements would need to be addressed to ensure the proposed hydroperiod of the stormwater management system would not adversely affect the hydrology of the adjacent wetland systems.

Cumulative Impacts

Cumulative impacts of a proposed project are regulated by SFWMD pursuant to Section 10.1.1(g) of SFWMD ERP application. During the review process an applicant must provide reasonable assurance that construction activities will not cause unacceptable cumulative impacts to wetlands and other surface waters in the same drainage basin as the proposed activities. During this review SFWMD considers potential future projects that may have environmental impacts, which, without the current project, would not otherwise be constructed.

If an applicant proposes to mitigate these adverse impacts within the same drainage basin as the impacts, and if the mitigation fully offsets these impacts, then the proposed construction will be considered to have no unacceptable cumulative impacts to wetlands and surface waters. Reams Road falls within the Reedy Creek Basin; therefore, mitigation may be required within the Reedy Creek Basin to offset cumulative impacts.

Avoidance and Minimization

The proposed construction and widening of Reams Road is intended to improve the level of service and enhance safety for the general public. Due State and County roadway design criteria, improvements to Reams Road may provide little opportunity to avoid or minimize adverse wetland impacts within the existing ROW.

The Reams Road RCA identifies several proposed stormwater management pond locations within the Study Area. Site planning may include the use of existing stormwater management ponds, or reconfiguration of stormwater management ponds to avoid wetland impacts. It is anticipated that jurisdictional wetland and/or other surface water systems within the Reams Road Study Area will be avoided and/or minimized to the greatest extent practical while maintaining safety and function. Further avoidance and minimization efforts of wetlands will be evaluated during the design and construction phases.

Mitigation Assessments

Federal, state, and local government agencies with regulatory authority over wetland and/or other surface waters generally require mitigation to offset unavoidable impacts as a condition of the permit. Mitigation requirements are based on a compilation of wetland parameters including quality, type, function, and size. Impacts to wetlands and/or other surface waters will be avoided and minimized to the maximum extent possible while maintaining safe and sound engineering and construction practices. Primarily, avoidance and minimization efforts are related to the proposed stormwater management pond locations.

A mitigation plan that adequately offsets adverse impacts will be developed and implemented**.** Adverse wetland impacts that may result from the construction of this project will be mitigated, satisfying the requirements of Part IV. Chapter 373, F.S. and 33 U.S.C.s.1344. Compensatory mitigation for this project will be completed through the use of mitigation banks and/or any other mitigation options that satisfy federal and state requirements.

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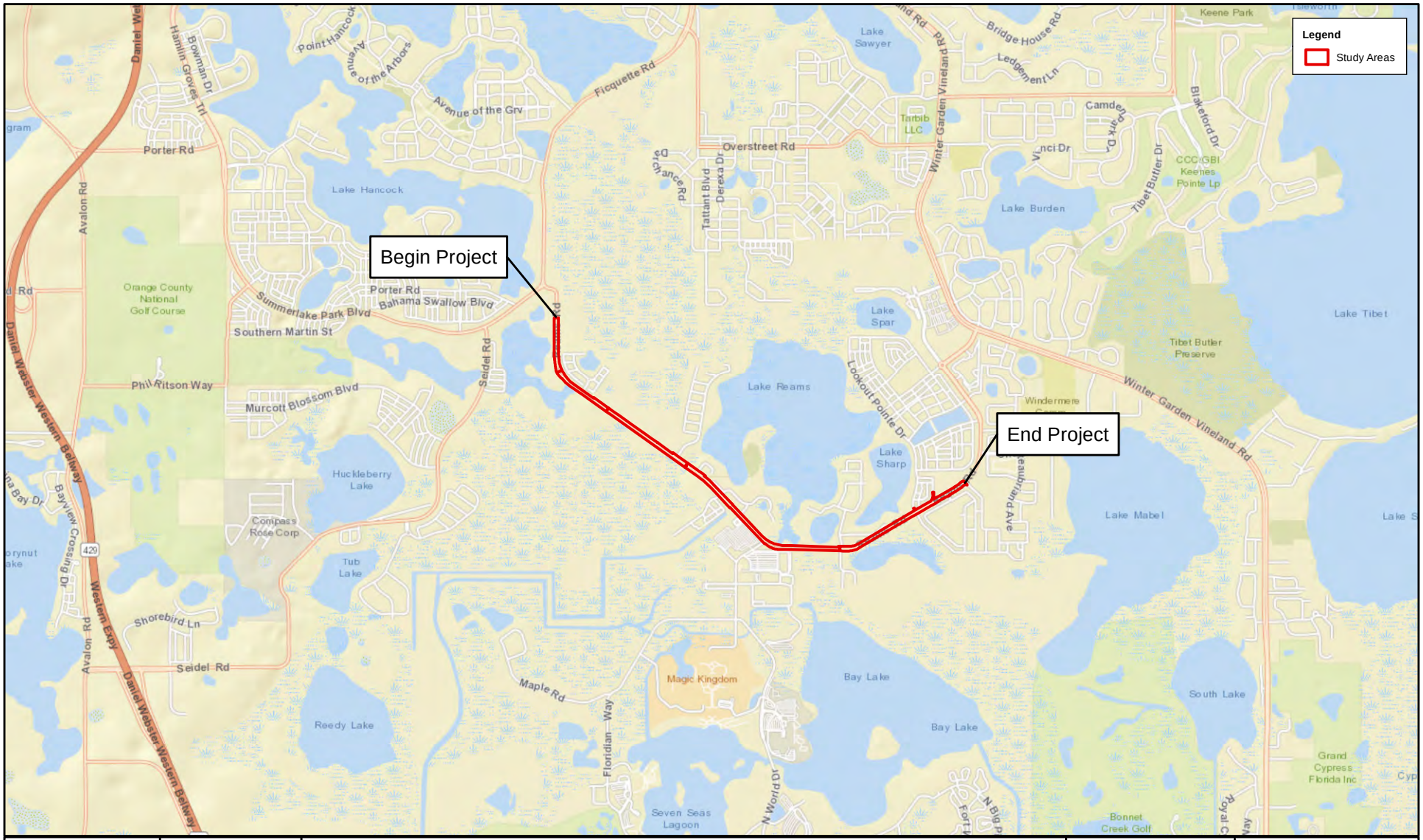
Figures



DES: KJT	RVS: SLM
DRN: KJT	APR: JMS
DATE: 3/16/2018	

Source:
Street View Map: ESRI
Study Area: Inwood Consulting

LOCATION MAP

REAMS ROAD ROADWAY CONCEPTUAL ANALYSIS
SUMMERLAKE PARK TO TABORFIELD AVENUE

ORANGE COUNTY, FLORIDA
CONTRACT NO. Y16-816-CH

0 0.25 0.5
Miles

ORANGE COUNTY FLORIDA

FIGURE 1

DES: KJT	RVS: SLM
DRN: KJT	APR: JMS
DATE: 3/16/2018	

Source:
Aerial Map: Inwood Consulting
Study Area: Inwood Consulting

AERIAL LOCATION MAP

REAMS ROAD ROADWAY CONCEPTUAL ANALYSIS
SUMMERLAKE PARK TO TABORFIELD AVENUE

ORANGE COUNTY, FLORIDA
CONTRACT NO. Y16-816-CH

0 250 500
Feet

ORANGE COUNTY FLORIDA

FIGURE 2.1

DES: KJT	RVS: SLM
DRN: KJT	APR: JMS
DATE: 3/16/2018	

Source:
Aerial Map: Inwood Consulting
Study Area: Inwood Consulting

AERIAL LOCATION MAP

REAMS ROAD ROADWAY CONCEPTUAL ANALYSIS
SUMMERLAKE PARK TO TABORFIELD AVENUE

ORANGE COUNTY, FLORIDA
CONTRACT NO. Y16-816-CH

0 250 500
Feet

ORANGE COUNTY FLORIDA

FIGURE 2.2

DES: KJT	RVS: SLM
DRN: KJT	APR: JMS
DATE: 3/16/2018	

Source:
Aerial Map: Inwood Consulting
Study Area: Inwood Consulting

AERIAL LOCATION MAP

REAMS ROAD ROADWAY CONCEPTUAL ANALYSIS
SUMMERLAKE PARK TO TABORFIELD AVENUE

ORANGE COUNTY, FLORIDA
CONTRACT NO. Y16-816-CH

0 250 500
Feet

ORANGE COUNTY FLORIDA

FIGURE 2.3

DES: KJT	RVS: SLM
DRN: KJT	APR: JMS
DATE: 3/16/2018	

Source:
Topographic Quad Map: ESRI
Study Area: Inwood Consulting

TOPOGRAPHIC QUADRANGLE MAP

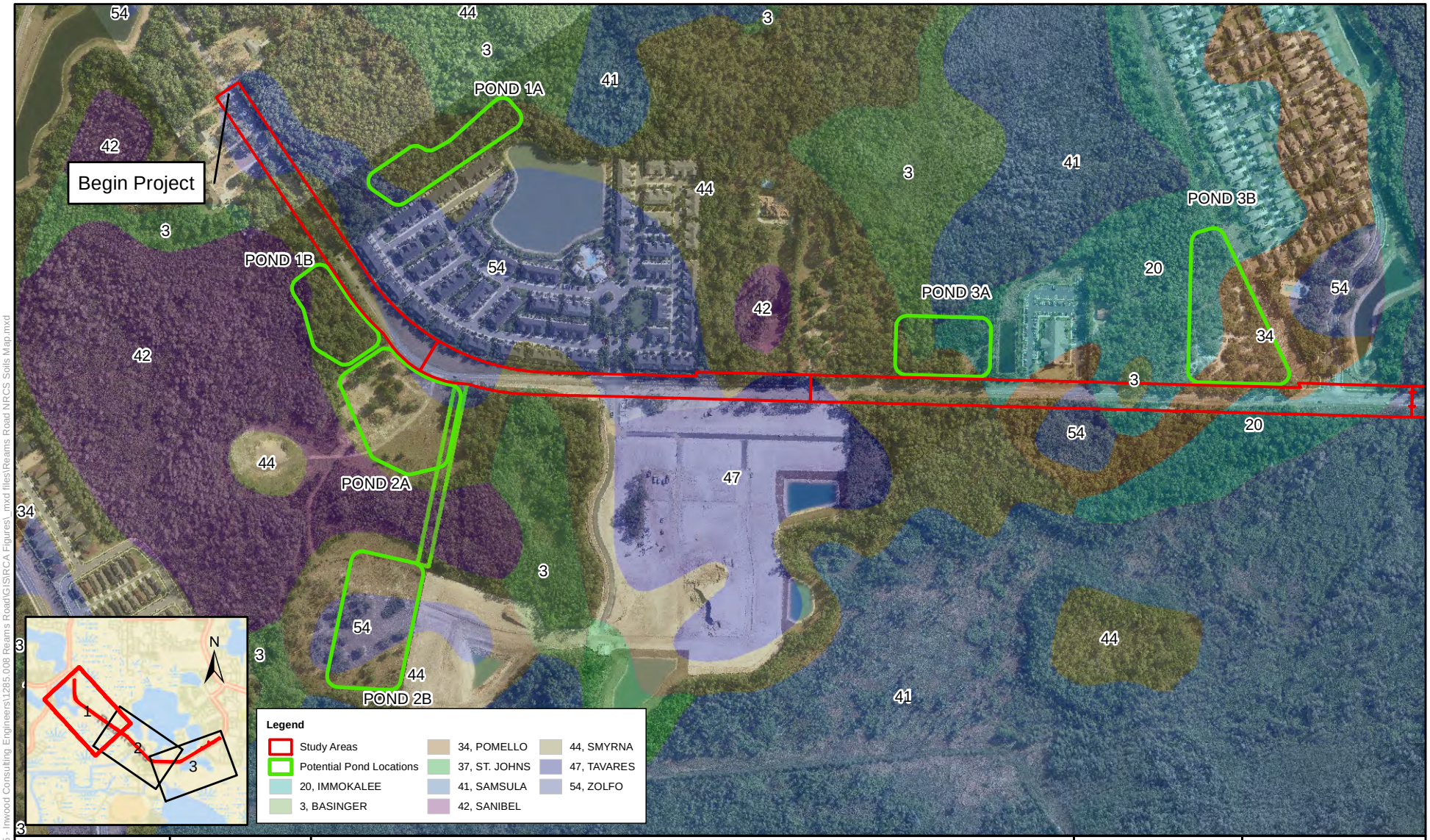
REAMS ROAD ROADWAY CONCEPTUAL ANALYSIS
SUMMERLAKE PARK TO TABORFIELD AVENUE

ORANGE COUNTY, FLORIDA
CONTRACT NO. Y16-816-CH

0 500 1,000
Feet

ORANGE COUNTY FLORIDA

FIGURE 3



DES: KJT	RVS: SLM
DRN: KJT	APR: JMS
DATE: 3/16/2018	

Source:
Aerial Map: Inwood Consulting
Study Area: Inwood Consulting
Soil Data: NRCS

NRCS SOIL SURVEY MAP

REAMS ROAD ROADWAY CONCEPTUAL ANALYSIS
SUMMERLAKE PARK TO TABORFIELD AVENUE

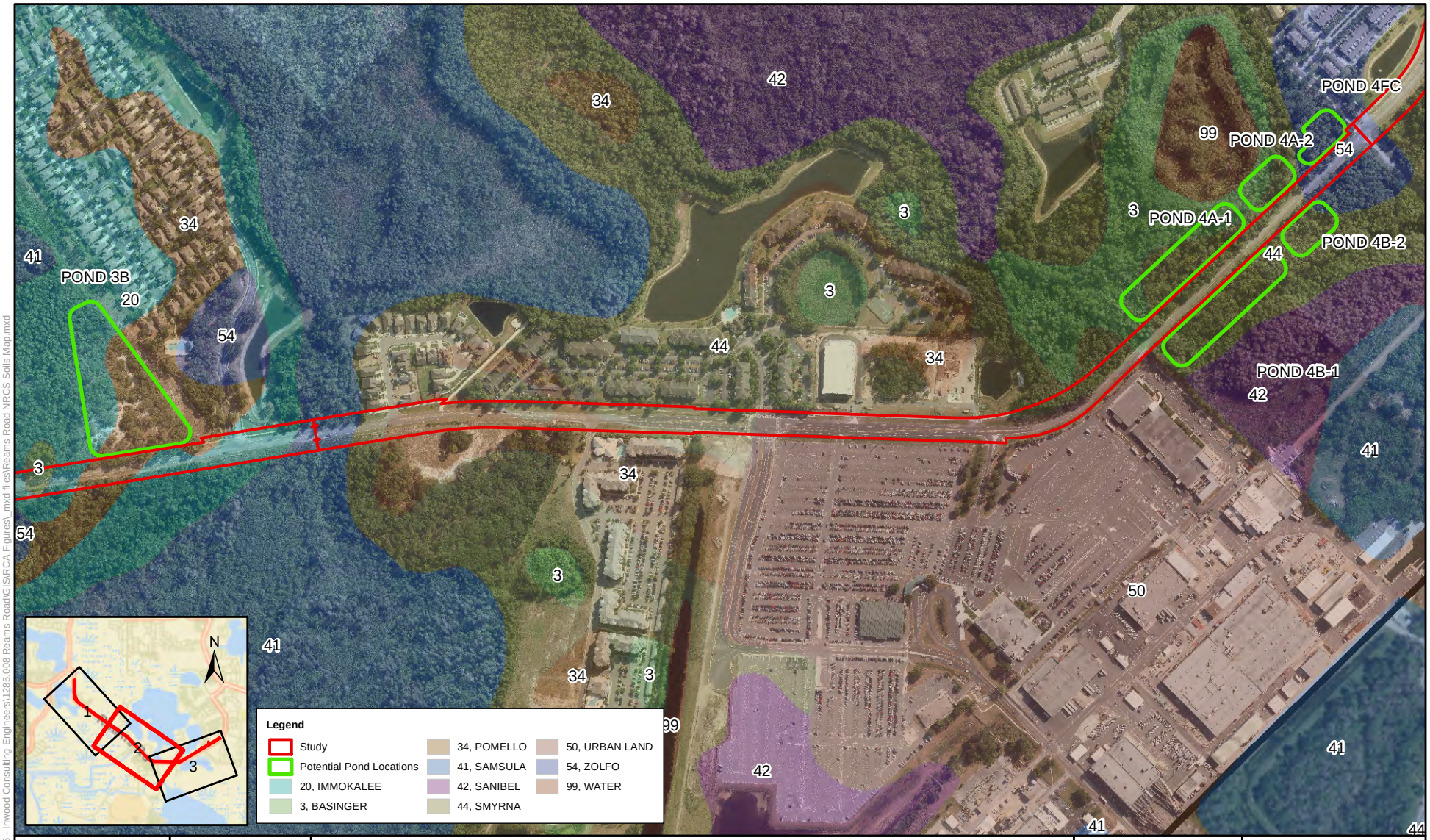
ORANGE COUNTY, FLORIDA
CONTRACT NO. Y16-816-CH

0 250 500
Feet

ORANGE COUNTY FLORIDA

FIGURE 4.1

Document Path: T:\GIS_Client Files\1285 - Inwood Consulting Engineers\1285.008 Reams Road\GIS\RCA Figures_mxd files\Reams Road NRCS Soils Map.mxd



DES: KJT	RVS: SLM
DRN: KJT	APR: JMS
DATE: 3/16/2018	

Source:
Aerial Map: Inwood Consulting
Study Area: Inwood Consulting
Soil Data: NRCS

NRCS SOIL SURVEY MAP

REAMS ROAD ROADWAY CONCEPTUAL ANALYSIS
SUMMERLAKE PARK TO TABORFIELD AVENUE

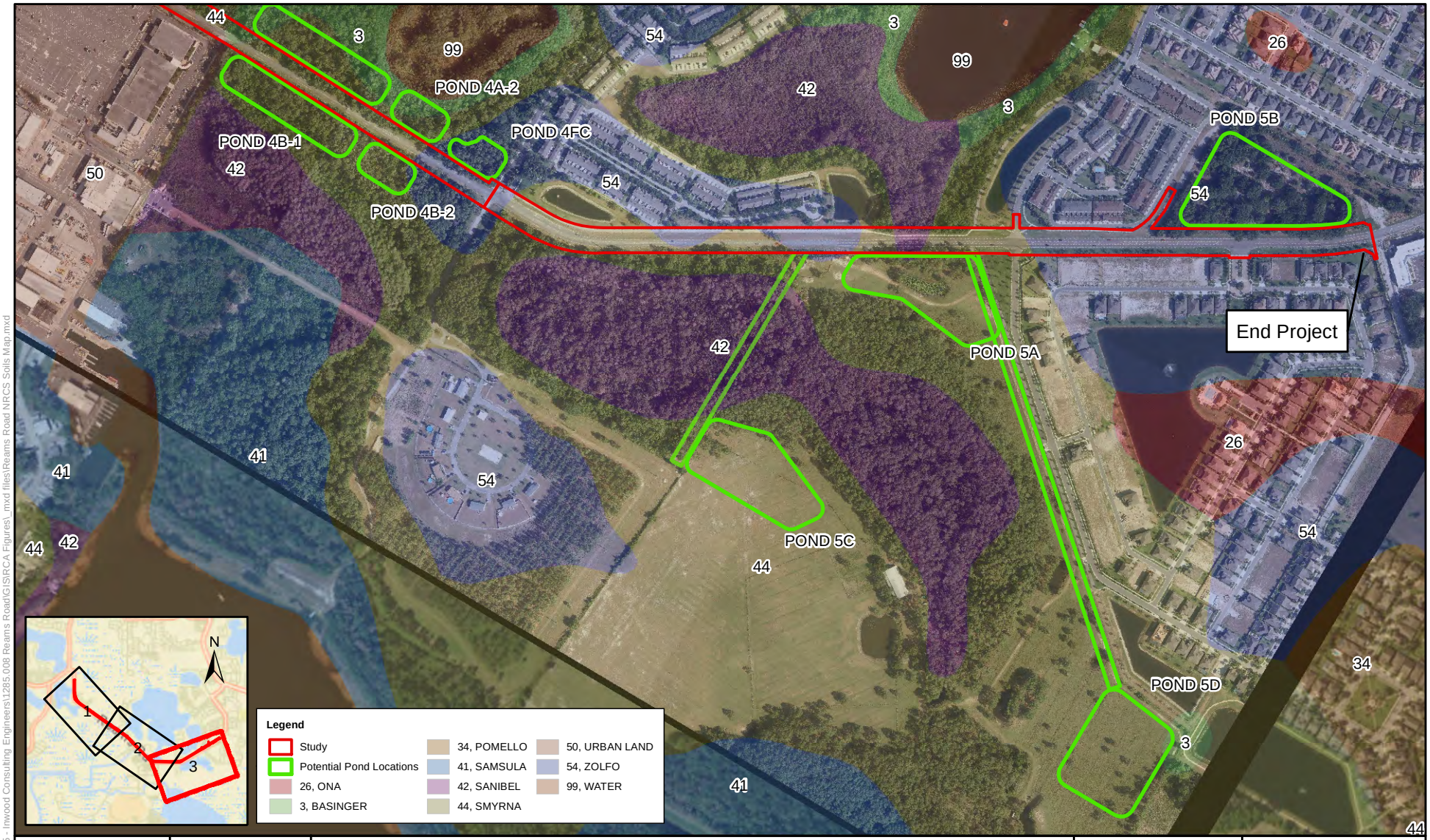
ORANGE COUNTY, FLORIDA
CONTRACT NO. Y16-816-CH

0 250 500
Feet

ORANGE COUNTY FLORIDA

FIGURE 4.2

Document Path: T:\GIS_Client Files\1285 - Inwood Consulting Engineers\1285.008 Reams Road\GIS\RCA Figures_mxd files\Reams Road NRCS Soils Map.mxd



DES: KJT	RVS: SLM
DRN: KJT	APR: JMS
DATE: 3/16/2018	

Source:
Aerial Map: Inwood Consulting
Study Area: Inwood Consulting
Soil Data: NRCS

NRCS SOIL SURVEY MAP

REAMS ROAD ROADWAY CONCEPTUAL ANALYSIS
SUMMERLAKE PARK TO TABORFIELD AVENUE

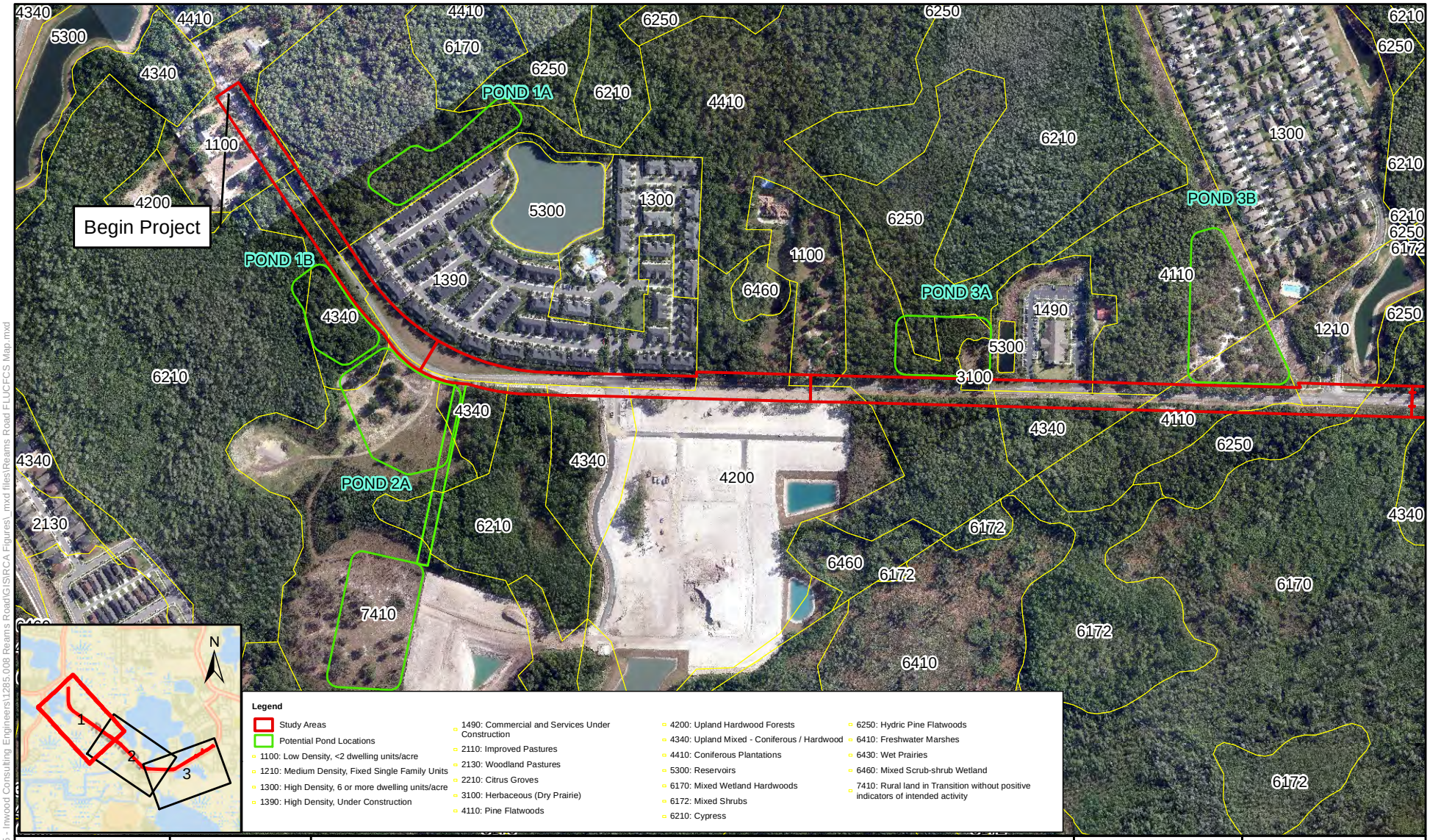
ORANGE COUNTY, FLORIDA
CONTRACT NO. Y16-816-CH

0 250 500
Feet

ORANGE COUNTY FLORIDA

FIGURE 4.3

Document Path: T:\GIS_Client Files\1285 - Inwood Consulting Engineers\1285.008 Reams Road\GIS\RCA Figures_mxd files\Reams Road NRCS Soils Map.mxd



DES: KJT	RVS: SLM
DRN: KJT	APR: JMS
DATE: 3/16/2018	

Source:
Aerial & Study Area: Inwood Consulting
Land Use Data: SFWMD & MSE Group

LAND USE MAP

REAMS ROAD ROADWAY CONCEPTUAL ANALYSIS
SUMMERLAKE PARK TO TABORFIELD AVENUE

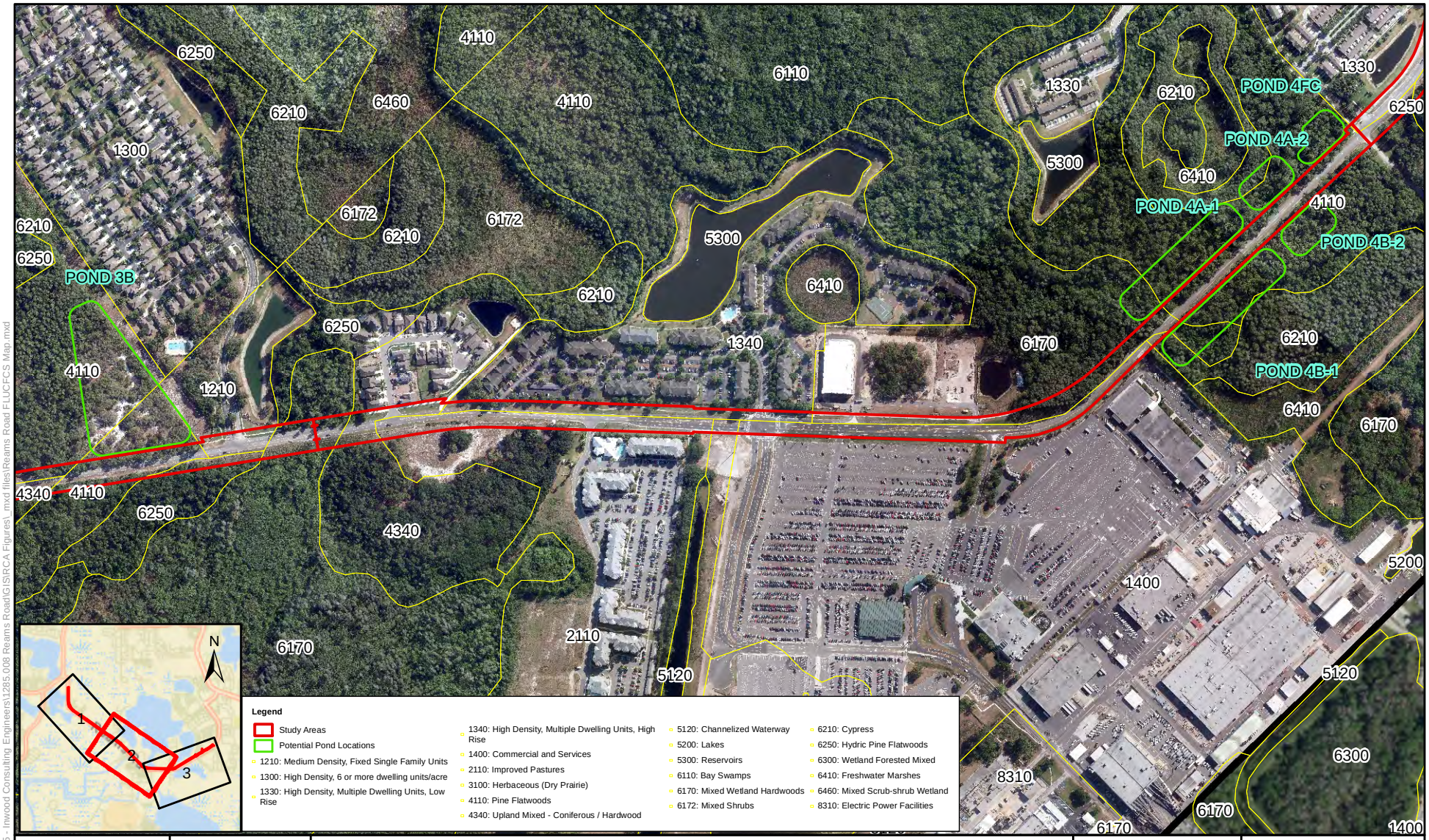
ORANGE COUNTY, FLORIDA
CONTRACT NO. Y16-816-CH

0 250 500
Feet

ORANGE COUNTY FLORIDA

FIGURE 5.1

Document Path: T:\GIS_Client Files\1285 - Inwood Consulting Engineers\1285.008 Reams Road\GIS\RCA Figures_mxd files\Reams Road FLUCFCS Map.mxd



DES: KJT	RVS: SLM
DRN: KJT	APR: JMS
DATE: 3/16/2018	

Source:
Aerial & Study Area: Inwood Consulting
Land Use Data: SFWMD & MSE Group

LAND USE MAP

REAMS ROAD ROADWAY CONCEPTUAL ANALYSIS
SUMMERLAKE PARK TO TABORFIELD AVENUE

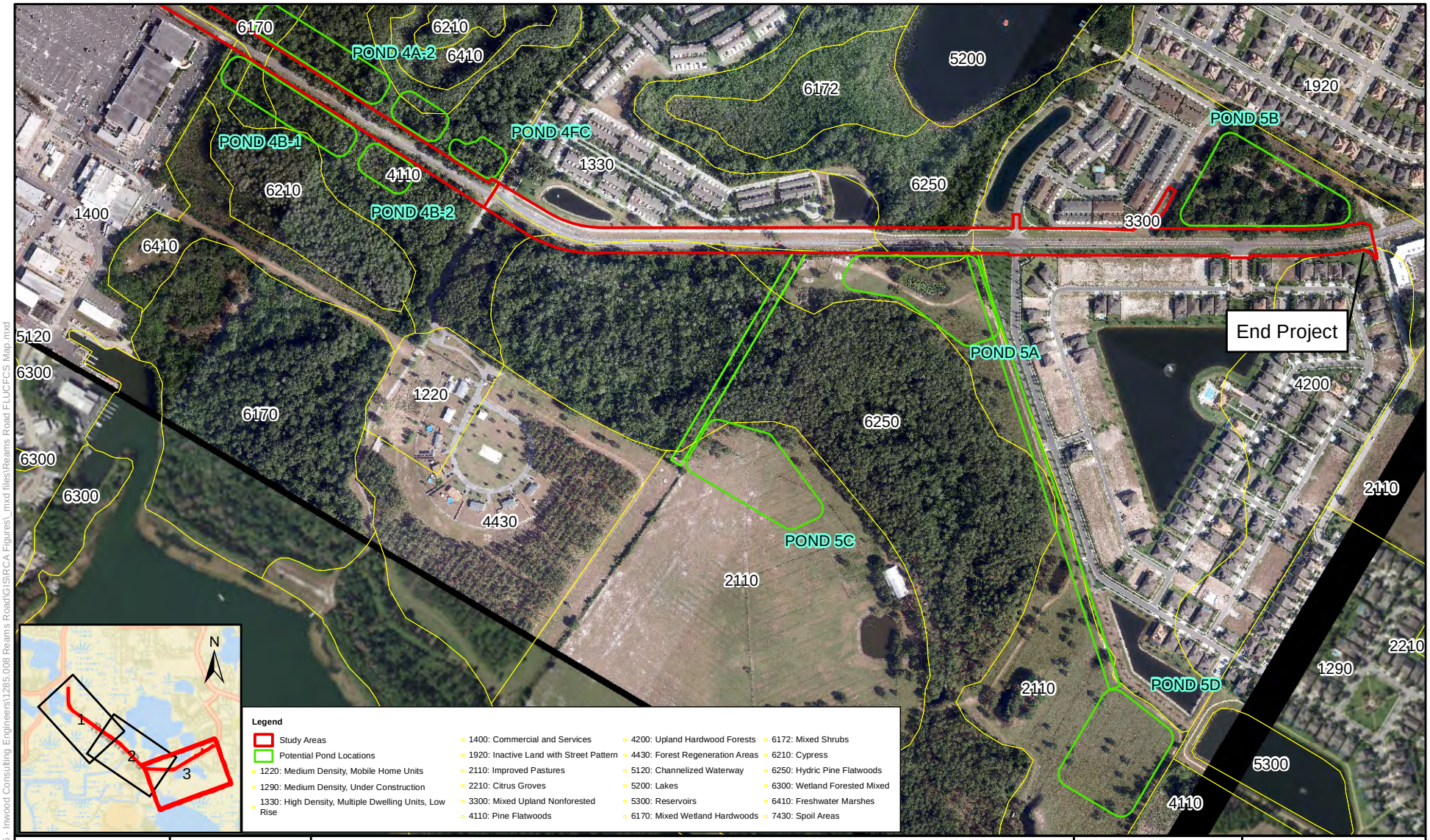
ORANGE COUNTY, FLORIDA
CONTRACT NO. Y16-816-CH

0 250 500
Feet

ORANGE COUNTY FLORIDA

FIGURE 5.2

Document Path: T:\GIS_Client Files\1285 - Inwood Consulting Engineers\1285.008 Reams Road\GIS\RCA Figures_mxd files\Reams Road FLUCFCS Map.mxd



DES: KJT	RVS: SLM
DRN: KJT	APR: JMS
DATE: 3/16/2018	

Source:
Aerial & Study Area: Inwood Consulting
Land Use Data: SFWMD & MSE Group

LAND USE MAP

REAMS ROAD ROADWAY CONCEPTUAL ANALYSIS
SUMMERLAKE PARK TO TABORFIELD AVENUE

ORANGE COUNTY, FLORIDA
CONTRACT NO. Y16-816-CH

0 250 500
Feet

ORANGE COUNTY FLORIDA

FIGURE 5.3

Document Path: T:\GIS_Client Files\1285 - Inwood Consulting Engineers\1285.008 Reams Road\GIS\RCA Figures_mxd files\Reams Road FLUCFCS Map.mxd

DES: KJT	RVS: SLM
DRN: KJT	APR: JMS
DATE: 3/16/2018	

Source:
Aerial Map: Inwood Consulting
Study Area: Inwood Consulting

WETLAND/SURFACE WATER MAP

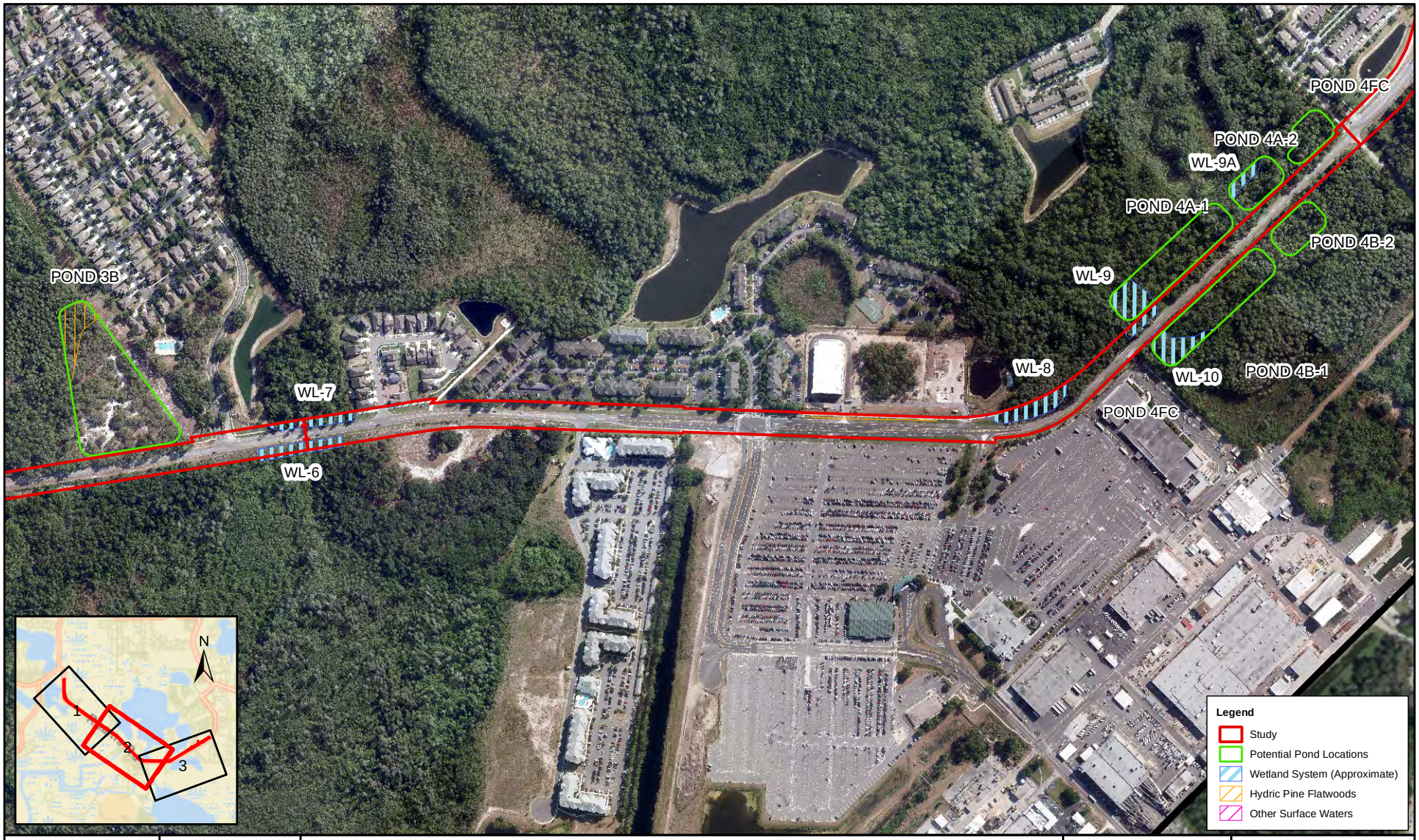
REAMS ROAD ROADWAY CONCEPTUAL ANALYSIS
SUMMERLAKE PARK TO TABORFIELD AVENUE

ORANGE COUNTY, FLORIDA
CONTRACT NO. Y16-816-CH

0 250 500
Feet

ORANGE COUNTY FLORIDA

FIGURE 6.1



DES: KJT	RVS: SLM
DRN: KJT	APR: JMS
DATE: 3/16/2018	

Source:
Aerial Map: Inwood Consulting
Study Area: Inwood Consulting

WETLAND/SURFACE WATER MAP

REAMS ROAD ROADWAY CONCEPTUAL ANALYSIS
SUMMERLAKE PARK TO TABORFIELD AVENUE

ORANGE COUNTY, FLORIDA
CONTRACT NO. Y16-816-CH

0 250 500
Feet

ORANGE COUNTY FLORIDA

FIGURE 6.2

DES: KJT	RVS: SLM
DRN: KJT	APR: JMS
DATE: 3/16/2018	

Source:
Aerial Map: Inwood Consulting
Study Area: Inwood Consulting

WETLAND/SURFACE WATER MAP

REAMS ROAD ROADWAY CONCEPTUAL ANALYSIS
SUMMERLAKE PARK TO TABORFIELD AVENUE

ORANGE COUNTY, FLORIDA
CONTRACT NO. Y16-816-CH

0 250 500
Feet

ORANGE COUNTY FLORIDA

FIGURE 6.3

DES: KJT	RVS: SLM
DRN: KJT	APR: JMS
DATE: 3/16/2018	

Source:
Location Map: Inwood Consulting
Study Area: Inwood Consulting

SUITABLE SAND SKINK HABITAT MAP

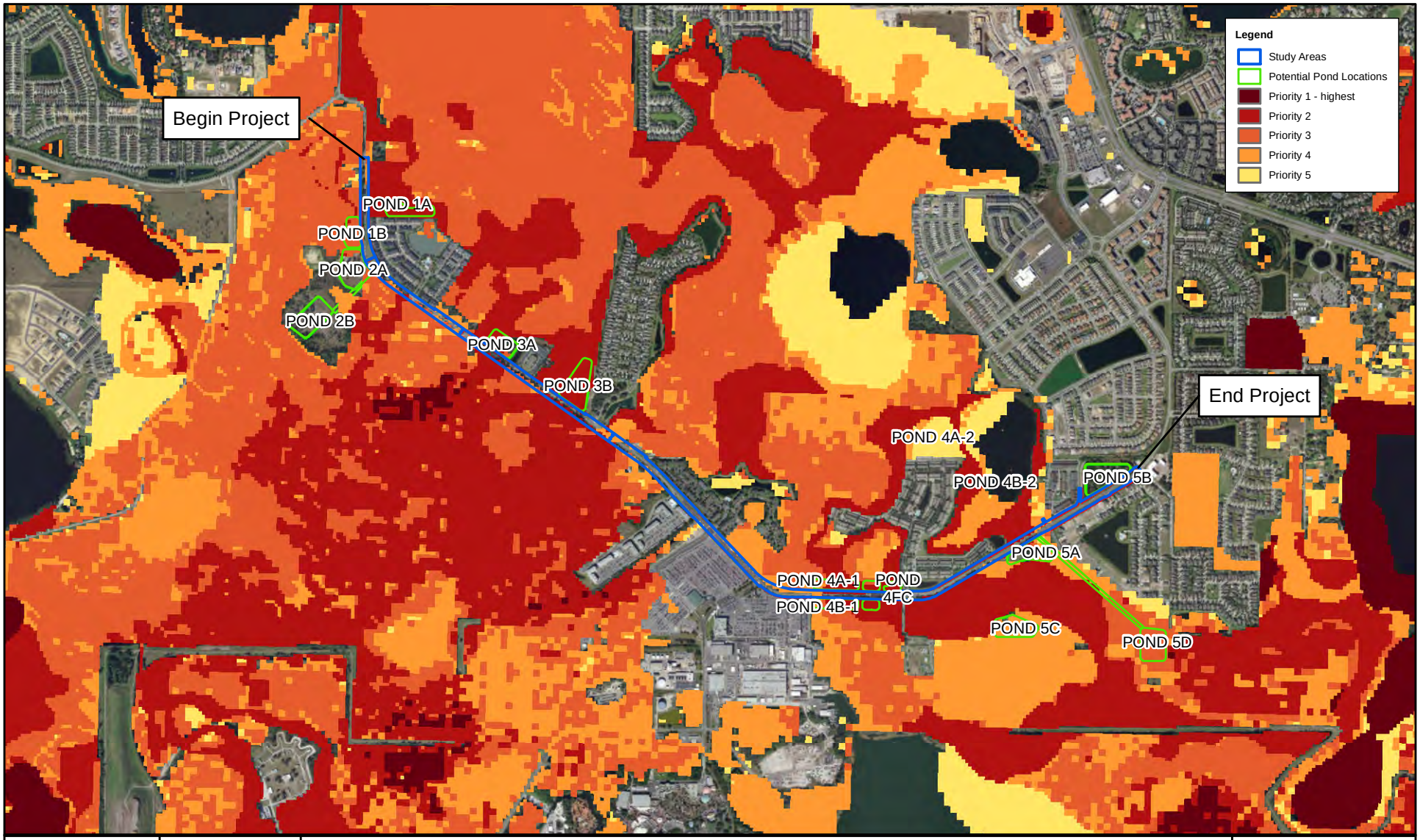
REAMS ROAD ROADWAY CONCEPTUAL ANALYSIS
SUMMERLAKE PARK TO TABORFIELD AVENUE

ORANGE COUNTY, FLORIDA
CONTRACT NO. Y16-816-CH

0 500 1,000
Feet

ORANGE COUNTY FLORIDA

FIGURE 7



DES: KJT	RVS: SLM
DRN: KJT	APR: JMS
DATE: 3/16/2018	

Source: FNAI, Inwood Consulting

BIODIVERSITY MAP

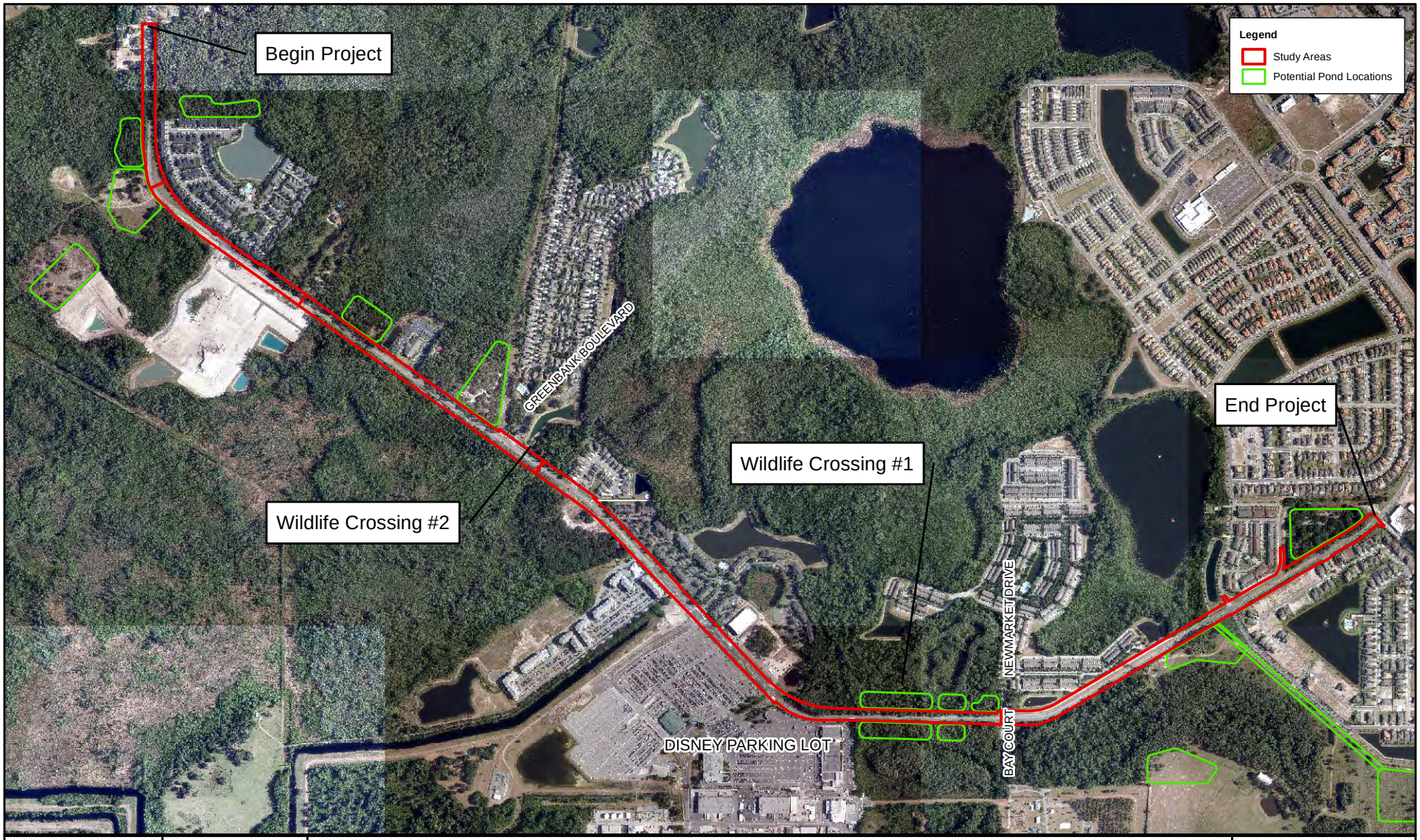
REAMS ROAD ROADWAY CONCEPTUAL ANALYSIS
SUMMERLAKE PARK TO TABORFIELD AVENUE

ORANGE COUNTY, FLORIDA
CONTRACT NO. Y16-816-CH

0 0.25 0.5
Miles

ORANGE COUNTY FLORIDA

FIGURE 8



DES: KJT	RVS:
DRN: KJT	APR: JMS
DATE: 3/16/2018	

0 0.25 0.5
Miles
Source: Inwood Consulting

POTENTIAL WILDLIFE CROSSING LOCATIONS MAP

REAMS ROAD ROADWAY CONCEPTUAL ANALYSIS
SUMMERLAKE PARK TO TABORFIELD AVENUE

ORANGE COUNTY, FLORIDA
CONTRACT NO. Y16-816-CH

ORANGE COUNTY FLORIDA

FIGURE 9

Appendix A – USFWS Sand and Blue-tailed Mole Skinks Consultation Area Map

United States Department of the Interior

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

October 20, 2017

Memorandum

To: Jay Herrington, Project Leader, North Florida Ecological Services Office
Roxanna Hinzman, Project Leader, South Florida Ecological Services Office

From: Larry Williams, State Supervisor, Florida Ecological Services

Subject: Statewide radius for sand skink (*Plestiodon [Neoseps] reynoldsi*) incidental take

The North and South Florida Ecological Services Offices consult on projects affecting habitat that is potentially occupied by the sand skink. In order to achieve a consistent approach across the State, staff and supervisors from the North Florida Ecological Services Office; South Florida Ecological Services Office; the Service Scientific Integrity Officer; and the State Supervisor met on July 18, 2017, to discuss and decide on a legally and scientifically defensible radius around a sand skink track for the purpose of quantifying and issuing incidental take. The provisional decision that day was to change the radius from 188 feet (ft) to 80 ft from a skink track. From the date of this memo forward, both offices will use the 80 ft radius. If scientific information becomes available that demonstrates 80 ft may no longer be scientifically and legally defensible, the Service will consider the new information and, if appropriate, adjust the radius.

The purpose of this memo is to document this decision and provide standard language that can be inserted into a biological opinion (BO) or Habitat Conservation Plan/Incidental Take Permit (HCP/ITP) that explains the scientific basis for the 80 ft radius. The standard language and associated references are found below.

Standard Language to use in drafting BOs and HCP/ITPs

When quantifying the amount or extent of take, the Service uses the best scientific and commercial data available to establish a radius around a sand skink track where the species is reasonably certain to occur. While no studies have established a home range (the area in which an individual usually confines its daily feeding, breeding, and sheltering activities) for sand skinks, the Service has evaluated the best scientific and commercial data available relative to sand skink movements, as well as the home ranges of other similar-sized lizards. After reviewing this information, the Service has determined that sand skinks are reasonably certain to feed, breed, and shelter within 80 ft of a sand skink track when the habitat is suitable.

The information that supports 80 ft as the radius includes: 1) Penney (2001), who reported translocated sand skinks moved a median distance of 25.6 meters (m) (84 ft; n = 64);
2) Schrey et al. (2011, p. 63), who conducted a genetic analysis of sand skinks (n = 470) within

25 m of each other, and reported "the Florida sand skink occurs with higher genetic similarity than expected by chance within 25 m (82 ft)"; and 3) Perry and Garland (2002, p. 1877), who reviewed the literature and examined home range as a function of snout-vent length in lizards. Of the 489 data sets they examined, 108 met their criteria for their analysis. Lizards of the Autarchoglossa (the clade that contains all skink species) with snout-vent lengths ranging from 30 millimeters (mm) to 100 mm (*i.e.*, the range representative of sand skinks) had home ranges of approximately 10 m^2 to approximately 1,700 m^2 (p. 1877). A 1,700 m^2 area has a radius of 23 m (75 ft). Therefore, the Service's opinion is any suitable habitat within 80 ft of a sand skink track is reasonably certain to be occupied, and any activities that occur within that radius which are reasonably certain to harm or harass sand skinks would be considered incidental take as defined by the Endangered Species Act.

The Service acknowledges that some sand skinks move (disperse) farther than an 80 ft radius. However, the Service has made a range-wide determination for Florida that any sand skink on a given site is reasonably certain to occupy all suitable habitat within 80 ft of a track. In applying this radius, a circle will be drawn around a radius that extends 80 ft outward from a track. If circles do not overlap, the space between circles will not be considered occupied when quantifying incidental take.

REFERENCES

Penney, K.M. 2001. Factors affecting translocation success and estimates of dispersal and movement patterns of the sand skink *Neoseps reynoldsi* on restored scrub. Master's thesis. University of South Florida; Tampa, Florida.

Perry, G. and T. Garland. 2002. Lizard home ranges revisited: effects of sex, body size, diet, habitat, and phylogeny. Ecology 83(7):1870–1885.

Schrey, A.W., A.M. Fox, H.R. Mushinsky, and E.D. McCoy. 2011. Fire increases variance in genetic characteristics of Florida sand skink (*Plestiodon reynoldsi*) local populations. Molecular Ecology 20:56-66.

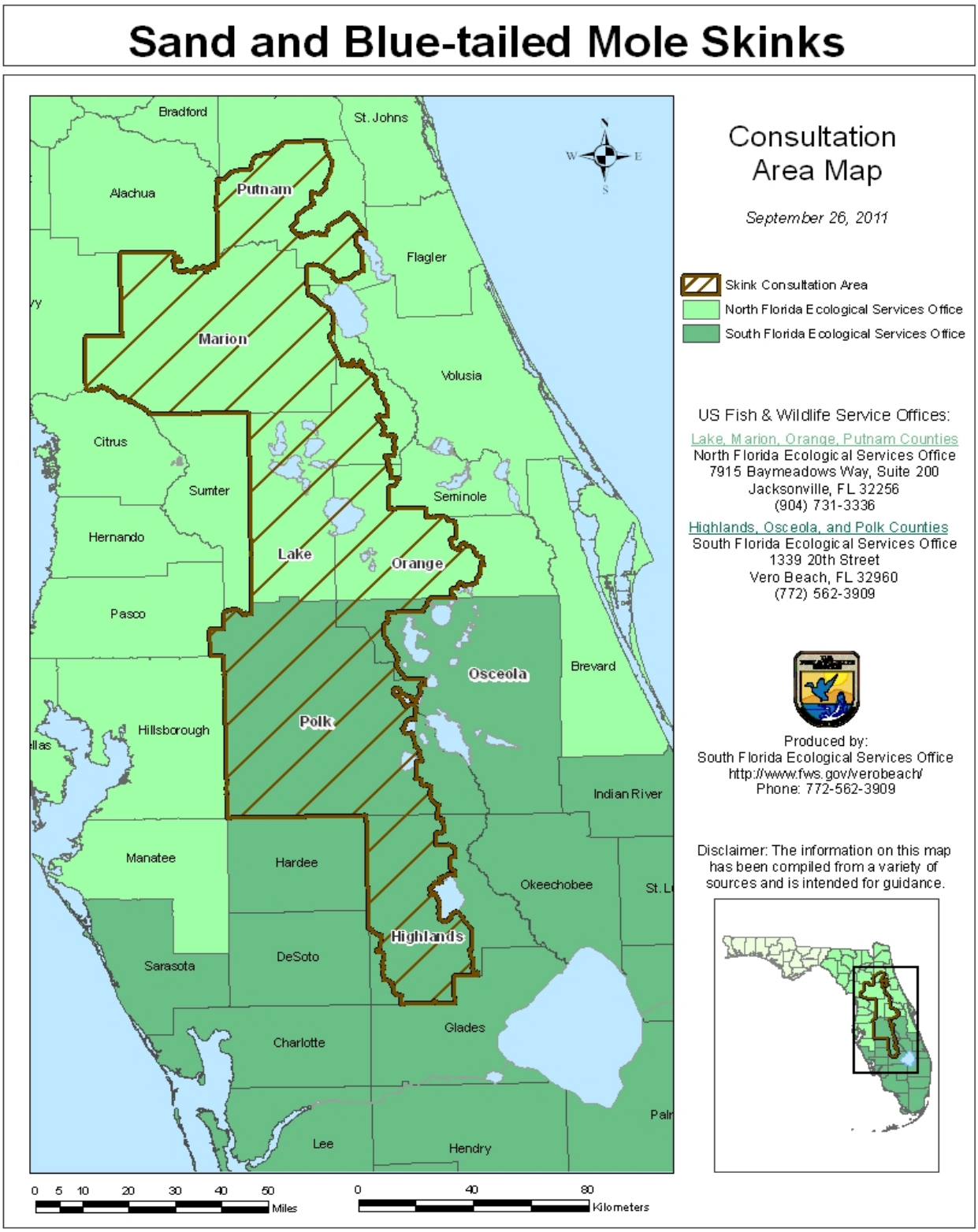


Figure 1. Sand skink and blue-tailed mole skink consultation area. County names depicted in shadowed bold text indicate the counties where skinks are known to occur.

Appendix B – Standard Protection Measures for the Eastern Indigo Snake

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.

Appendix C – Florida Sandhill Crane Survey Protocol

Florida Sandhill Crane

Antigone canadensis pratensis

Photograph by FWC.

Species Overview

Status: Listed as state Threatened on Florida's Endangered and Threatened Species List.

Current Protections

- 68A-27.003(a), F.A.C., No person shall take, possess, or sell any of the endangered or threatened species included in this subsection, or parts thereof or their nests or eggs except as allowed by specific federal or state permit or authorization.
- 68A-27.001(4), F.A.C., Take – to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct. The term "harm" in the definition of take means an act which actually kills or injures fish or wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. The term "harass" in the definition of take means an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering.
- Florida sandhill cranes, active nests, eggs, and young also are protected under the Federal Migratory Bird Treaty Act, state Rule 68A-16.001, F.A.C., and state Rule 68A-4.001, F.A.C.
- Intentional feeding of sandhill cranes is prohibited under Rule 68A-4.001(5) F.A.C.

Biological Background

This section describes the biological background for this species and provides context for the following sections. It focuses on the habitats that support essential behaviors for the Florida sandhill crane, threats faced by the species, and what constitutes significant disruption of essential behavioral patterns. Florida sandhill cranes (*Antigone canadensis pratensis*) occur from southern Georgia, primarily in the Okefenokee Swamp, to the Everglades (Stys 1997). However, most of the population is in peninsular Florida from Alachua County in the north to the northern edge of the Everglades in the south. The migratory greater sandhill crane (*A. c. tabida*) winters in Florida, arriving in October and November and leaving for breeding grounds in northern U.S. and Canada from late January to early March. Although the two sandhill crane subspecies occurring in Florida are difficult to distinguish, those observed in the peninsula from April to September can be assumed to be the resident Florida subspecies. Florida sandhill cranes typically breed from February through April, but the breeding season can extend as early as December and as late as August (Bent 1926, Walkinshaw 1973). The Florida subspecies and *A. c. tabida* are not known to interbreed.

Habitat features that support essential behavioral patterns

Florida sandhill cranes forage in a variety of open habitats, including shallow (0-32 inches deep) herbaceous wetlands, improved pastures, prairies, open pine forests, croplands, golf courses, airports, and sod farms (Stys 1997). Cranes in north Florida spent 86% of their time in 4 habitat types: pasture, freshwater marsh, pasture– marsh transition, and pasture–forest transition (Nesbitt and Williams 1990). Preferred sandhill crane habitat contains short vegetation (e.g., vegetation less than 20 inches high in uplands), and sandhill cranes generally avoid areas with taller vegetation or dense forest canopies (Stys 1997).

Florida sandhill cranes and flightless young. FWC Photograph.

Although Florida sandhill cranes forage in a variety of open habitats, shallow, freshwater marshes are critical for both nesting and roosting (Wood and Nesbitt 2001). Average water depth at the nest ranges from 5 to 13 inches and averages 4 to 12 inches at roosting sites (Walkinshaw 1973, 1976; Bennett 1992). Nesting and roosting locations vary from year to year due to fluctuation in water levels in wetlands across the landscape. Shallow wetlands are particularly important in supporting essential behaviors for this species.

Additionally, uplands directly adjacent to nesting marshes are important for young sandhill cranes for the first several months until they are capable of flying. Young sandhill cranes remain flightless until approximately 70 days after hatching (Nesbitt 1996). Herbaceous wetlands, marsh-pasture transition zones, and adjacent pasture are the most common foraging habitat for young birds during the pre-fledging period (McMillen et al. 1992).

Threats

According to the Species Action Plan (SAP), habitat loss and degradation are the primary threats for sandhill cranes. Much of the remaining sandhill crane habitat is on private lands, underscoring the need to work with private landowners to reduce habitat loss and habitat degradation at nesting sites. Overgrown habitat makes sandhill cranes more vulnerable to predators, and habitat fragmentation forces sandhill cranes to travel farther between wetland and upland sites, which can lead to higher mortality. Given the importance of wetlands for roosting and nesting, changes in the timing or quantity of water can have significant consequences for sandhill cranes (Nesbitt 1996). For example, low water levels can make nests and young more vulnerable to predators and can deter breeding altogether (Nesbitt 1996). Rapid rises in water levels from storm events can flood nests or lead to nest failure. Runoff from impermeable surfaces potentially worsens the effects of storm events (Dwyer and Tanner 1992).

Florida Sandhill crane on a nest, FWC Photograph.

Disturbances in and around wetlands with active nests can significantly impact nesting success. Humans approaching a nest location within 250 feet of a nest site can cause a crane to flush (Dwyer and Tanner 1992). Once flushed, parents can remain off of the nest for 15 minutes to over 4 hours, and some nests are abandoned altogether (Dwyer and Tanner 1992; FWC, unpublished data). Disturbances within 400 feet can interrupt nesting activity and even cause abandonment of the area, even if

the birds do not flush (Stys 1997).

Other threats to sandhill cranes include collisions with vehicles, power lines, and fences (Folk et al. 2001). Adults with pre-fledged young often walk across roadways rather than flying, leading to increased mortality from vehicle strikes. Collisions with power lines can lead to broken necks, wings, and legs (Windingstad 1988). Entanglement with fences can occur when cranes are landing or if cranes cannot walk under or pass through the fence (Nesbitt 1996).

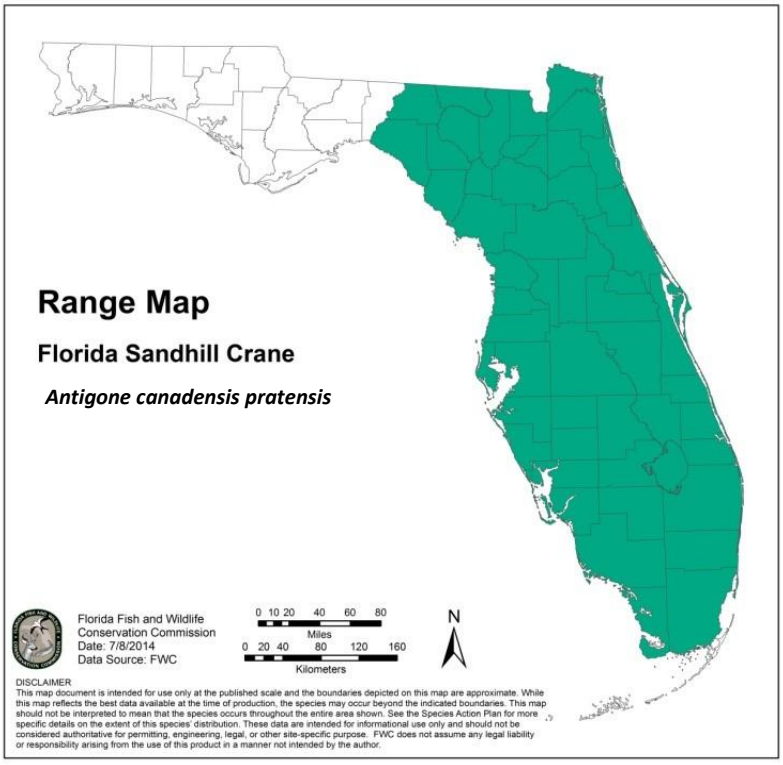
Potential to Significantly Impair Essential Behavioral Patterns

Sandhill cranes rely on shallow wetlands for breeding, feeding, and sheltering. Therefore actions that result in loss of suitable natural wetlands where cranes are foraging, roosting, or nesting can cause significant impairment of essential behavioral patterns. Similarly, actions that degrade occupied suitable natural wetlands through changes in timing, quantity, or quality of water can result in significant impairment of essential behavioral patterns. Flushing cranes from their nests can result in loss or abandonment of active nests, regardless of whether nests occur in natural or man-made wetlands, and can significantly impair breeding. Young, flightless sandhill cranes have been observed foraging 1500 feet from the nest site within weeks of hatching (Layne 1981). Actions that impact upland foraging of flightless young (i.e., young within first 70 days after hatching; Nesbitt 1996) could result in the significant impairment and cause take.

Distribution and Survey Methodology

The map below represents the principle geographic range of the Florida sandhill crane, including intervening areas of unoccupied habitat. This map is for informational purposes only and is not for regulatory purposes. .

Counties: Alachua, Baker, Bradford, Brevard, Broward, Citrus, Charlotte, Clay, Collier, Colombia, DeSoto, Dixie, Duval, Flagler, Gilchrist, Glades, Hamilton, Hardee, Hernando, Hendry, Highlands, Hillsborough, Indian River, Lafayette, Lake, Lee, Levy, Madison, Manatee, Marion, Martin, Miami-Dade, Monroe, Nassau, Okeechobee, Orange, Osceola, Palm Beach, Pasco, Pinellas, Polk, Putnam, Sarasota, Seminole, St. Johns, St. Lucie, Sumter, Suwannee, Taylor, Union, Volusia..



Recommended Survey Methodology

Surveys can be used to determine if Florida Sandhill Cranes are nesting in an area or to confirm that the species are present. Surveys are not required but if conducted in accordance with the methodology described below and the species are not detected, no FWC review or coordination is needed.

Surveys of breeding habitat

Surveys during the breeding season (December to August) are useful for identifying active nests. Nesting primarily occurs from February to April. Surveys are recommended 1) during project planning and 2) immediately prior to project activities:

1) **Project planning.** Surveys are recommended during the early stages of a project (e.g., as part of the Environmental Resource Permit [ERP] process) to identify areas used for nesting in order to aid in development of appropriate avoidance, minimization, and mitigation.
   - Three surveys should be spaced at least 3 weeks apart during the breeding season.
   - The objective of the surveys is to detect nesting activity; thus, if observers detect nesting sandhill cranes in a wetland on the first survey date, there is no need to conduct the second or third survey in that wetland.
   - Spacing the 3 surveys to occur in early March, early April, and early May is ideal.
   - If active nests or flightless young are found, the applicant should coordinate with the FWC during the ERP process (see page 8) to discuss avoidance, minimization, and mitigation.
   - If no active nests or flightless young cranes are found, no further coordination is needed with the FWC regarding sandhill cranes during the ERP process.
2) **Pre-activity (pre-clearing or pre-construction) surveys** are recommended immediately prior to project activities during the breeding season to identify active nests or flightless young in order to avoid, minimize, or mitigate for take of those nests or young.
   - Nesting locations vary from year to year due to fluctuation in water levels in wetlands across the landscape. Therefore, project planning surveys are insufficient to assure that no take of active nests or flightless young will occur.
   - Pre-activity surveys should occur within thirty days of initiation of activities and should include either 1 aerial survey or 2 ground surveys (see methods below).
   - If active nests or flightless young are found and avoidance of take is not feasible, the applicant should contact the FWC to discuss potential minimization and mitigation for take of those nests or young.
   - If active nests or flightless young are not found, no further action is required.

- Aerial transects covering 100% of the suitable nesting habitat are the most effective method for locating nesting sandhill cranes (Stys 1997).
  - Nests typically are easier to detect at higher altitudes (e.g., 500-700 feet).
  - Aerial transects at an altitude above 250 feet are not expected to result in flushing from nests. Note that this minimum altitude is higher than that suggested in the 1997 FWC Nongame Technical Report No. 15.
  - Sandhill cranes may react differently to different types of aircraft, and altitude may need to be adjusted to prevent disturbance.

Florida Sandhill crane and mate on a nest. FWC Photograph.

Surveys from the ground are adequate, provided precautions are taken to avoid flushing nesting cranes. On small sites, one or a few observation points may be sufficient for complete coverage of the area via ground surveys. On larger areas, transects should be spaced to provide approximately 100% coverage of suitable habitat, taking into account the limits on visibility imposed by the vegetation and terrain.

- Sandhill crane nests can be difficult to detect from the ground, and observers should take care to avoid flushing nesting cranes.
- Patiently scan suitable nesting habitat from as far away as practical. Transects through the marsh can result in disturbance and are not recommended. Slowly scanning from the periphery of the marsh from a high vantage point (e.g., standing on a truck) can increase visibility and decrease the probability of disturbance.
- A lone adult sandhill crane observed foraging during the breeding season is a good indicator that nesting may be occurring nearby. Members of a breeding pair exchange nest duties several times per day, and observing a lone bird from a distance may help locate the mate on the nest, if necessary.
- Ground surveys should be conducted during the cool part of the day (dawn to 10 AM and 4 PM to dusk) to avoid exposure of eggs to heat in the event that adults accidentally flush from nests. Sandhill crane breeding pairs engage in “unison calling” early in the morning or when switching incubation duties, which can help identify marshes used for nesting.
- Because of the state and federal regulations (Federal Electric Reliability Council (FERC) Electric Reliability Standard FAC-003-3, National Electrical Safety Code (NESC) section 218, and Florida Public Service Commission (FPSC) mandates) associated with routine vegetation maintenance in powerline right of ways, sandhill crane nests do not have to be located prior to routine vegetation maintenance activities within existing power line right of ways, nor does the existing power line right of way need to be surveyed for the presence of nests or the animals themselves prior to maintenance. Removal of active nests encountered during vegetation maintenance activities is prohibited without appropriate State and Federal authorizations.

Recommended Conservation Practices

Recommendations are general measures that could benefit the species but are not required. No FWC permit is required to conduct these activities.

- Maintain or restore hydrology in areas suitable for sandhill cranes. For example, incorporate culverts

into road design or road improvements that will allow for maintenance and/or restoration of natural hydrology.

- Avoid placement of impermeable surfaces, such as roads or parking lots, adjacent to wetlands suitable for nesting cranes, as this reduces the chance of nest failure due to flooding.
- Maintain quality sandhill crane breeding habitat when possible by ensuring availability of areas with average water depths between 5 to 13 inches from January through April. Water depths in sandhill crane foraging habitat range from 0-32 inches (Stys 1997).
- Include a shallow end or shelf, vegetated with native herbaceous wetland species such as maidencane (*Panicum hemitomon*), pickerelweed (*Pontederia cordata*), and smartweeds (*Polygonum* spp.) when constructing new ponds, provided the ponds are not in areas potentially hazardous to sandhill cranes (e.g., not immediately adjacent to high-traffic roads or ponds used for stormwater treatment).
- Develop a prescribed fire regime that minimizes woody encroachment into wetlands and uplands.
- Take steps when possible to avoid disturbing active nests and flightless young (e.g., conduct activities outside of the breeding season or outside of a 400 foot buffer around active nests when feasible) when conducting land management activities beneficial to wildlife in accordance with Rule 68A-27.007(2)(c), F.A.C.
- Maintain open areas for foraging through cattle grazing, mowing, or other means.
- Add power line markers during power line installation to increase visibility to flying cranes as described in the SAP.
- Avoid or minimize fertilizer, herbicide, and pesticide runoff into wetlands.
- Have signs posted in areas frequented by cranes to alert motorists where vehicle-caused mortality of sandhill cranes is common.
- Discourage feeding of sandhill cranes by people. If sandhill cranes are attracted to human-provided food sources (e.g., bird feeders), remove the source of food until sandhill cranes stop visiting the site.
- Use fencing that is more permeable (i.e., barbed wire versus woven wire or chain link) and less dangerous to cranes when constructing fences in or around wetlands and associated uplands suitable for sandhill cranes.

Measures to Avoid Take

Avoidance Measures that Eliminate the Need for FWC Take Permitting

The following measures will eliminate the need for an FWC take permit.

- Avoid impacts to suitable natural wetlands used by sandhill cranes for breeding, feeding, or sheltering.
- Avoid activities within 400 feet of an active nest (Stys 1997).
- If flightless young are present in a wetland, avoid land use conversion in suitable upland habitat within 1500 feet of the nest site until after young are capable of sustained flight (i.e., young within first 70 days after hatching; Nesbitt 1996, Walkinshaw 1976, Layne 1981).

Examples of Activities Not Expected to Cause Take

This list is not an exhaustive list of exempt actions. Please contact FWC if you are concerned that you could potentially cause take.

- Take of inactive nests, as described in FWC's policy on Nest Removal for Inactive Single-Use Nests of State-designated Threatened Bird Species.

- Approved aversive conditioning methods (see page 11) as described in FWC's policy on Aversive Conditioning of State Listed Species.
- Aerial transect surveys in fixed wing aircraft or helicopters above 250 feet have been demonstrated not to result in flushing from nests. However, the reaction of sandhill cranes may vary depending on the type of aerial activity, and activities should cease or move to a higher altitude if flushing occurs.
- Linear utility and highway right-of-way vegetation maintenance activities outside of the breeding season.
- Cranes are not likely to be disturbed by routine use of roads, homes and other infrastructure, routine agricultural operations, or routine management or repair of linear utilities occurring greater than 400 feet of an active sandhill crane nests or outside the breeding season (December to August). Therefore, in most cases, existing activities of the same degree may continue with little risk of disturbing nesting sandhill cranes.

Florida Forestry Wildlife BMP's and Florida Agricultural Wildlife BMP's

- Agriculture, as defined in Section 570.02, F.S., conducted in accordance with Chapter 5I-8, F.A.C., and the wildlife best management practices (BMPs) adopted in Rule 5I-8.001 and 5M-18.001, F.A.C., by the Department of Agriculture and Consumer Service pursuant to Section 570.94, F.S., is authorized and does not require a permit authorizing incidental take despite any other provision of Rule 68A-27.007 or 68A-27.005, F.A.C.
- Participation in the Florida Forestry Wildlife BMP's and Florida Agricultural Wildlife BMP's program and implementation of these BMP's provides a presumption of compliance with regard to incidental take of Florida Sandhill cranes.
- Forestry and Agricultural BMP's state to avoid heavy equipment operation (except prescribed burning and related activities) within 400 feet of active, known, and visibly apparent Florida Sandhill Crane nests from February to May.

Other Authorizations for Take

- Activities within an airport property in accordance with Rule 68A-9.012, F.A.C.
- Participation in the Florida Forestry Wildlife BMP's and Florida Agricultural Wildlife BMP's program and implementation of these BMP's provides a presumption of compliance with regard to incidental take of the Florida Sandhill crane.
- As described in Rule 68A-27.007(2)(c), F.A.C., land management activities (e.g., exotic species removal) that benefit wildlife and are not inconsistent with FWC Management Plans are authorized and do not require a permit authorizing incidental take.
- In accordance with local, state, and federal regulations (including, but not limited to, Federal Electric Reliability Council (FERC) Electric Reliability Standard FAC-003-3, National Electrical Safety Code (NESC) section 218, and Florida Public Service Commission (FPSC) mandates), routine vegetation maintenance activities within existing power line right of ways that avoid heavy equipment operation within 400 feet of active, known and visibly apparent Florida sandhill crane nests do not require a permit authorizing incidental take.
- In cases where there is an immediate danger to the public's health and/or safety, including imminent or existing power outages that threaten public safety, or in direct response to an official declaration of a state of emergency by the Governor of Florida or a local governmental entity, power restoration activities and non-routine removal or trimming of vegetation within linear right of way in accordance with vegetation management plan that meets applicable federal and state standards does not

require an incidental take permit from the state.

Coordination with Other State and Federal Agencies

The FWC participates in other state and federal regulatory programs as a review agency. During review, FWC identifies and recommends measures to address fish and wildlife resources to be incorporated into other agencies' regulatory processes. FWC provides recommendations for addressing potential impacts to state listed species in permits issued by other agencies. If permits issued by other agencies adequately address all of the requirements for issuing a State-Threatened species take permit, the FWC will consider these regulatory processes to fulfill the requirements of Chapter 68A-27, F.A.C., with a minimal application process. This may be accomplished by issuing a concurrent take permit from the FWC, by a memorandum of understanding with the cooperating agency, or by a programmatic permit issued to another agency. These permits would be issued based on the understanding that implementation of project commitments will satisfy the requirements of Rule 68A-27.007, F.A.C.

Review of Land and Water Conversion Projects with State-Listed Species Conditions for Avoidance, Minimization and Mitigation of Take

- FWC staff, in coordination with other state agencies, provide comments to Federal agencies (e.g., the Army Corps of Engineers) on federal actions, such as projects initiated by a federal agency or permits being approved by a federal agency.
- FWC staff works with landowners, local jurisdictions, and state agencies such as the Department of Economic Opportunity on large-scale land use decisions, including long-term planning projects like sector plans, projects in Areas of Critical State Concern, and large-scale comprehensive plan amendments.
- FWC staff coordinates with state agencies such as the Department of Environmental Protection (DEP) and the five Water Management Districts on the environmental resource permitting (ERP) program, which regulates activities such as dredging and filling in wetlands, flood protection, stormwater management, site grading, building dams and reservoirs, waste facilities, power plant development, power and natural gas transmission projects, oil and natural gas drilling projects, port facility expansion projects, some navigational dredging projects, some docking facilities, and single-family developments such as for homes, boat ramps, and artificial reefs.
- During the ERP process, the FWC will provide guidance on avoidance, minimization, and mitigation measures for sandhill cranes.
- FWC staff will also work with DEP, WMDs, and the applicants during the pre-application and ERP process so that ERP mitigation will satisfy the applicants' responsibilities under Rule 68A-27 F.A.C. and associated rule enforcement policies (see FWC Incidental take Permitting Process below).
- Conservation benefit as defined under Rule 68A-27 F.A.C. may be accomplished through avoidance, minimization, and mitigation measures outlined in the ERP permit. The existing ERP requirements for wetland mitigation include replacement of functional loss from impacts to wetlands. The mitigation includes provisions for perpetual conservation and management. Mitigation achieved through the ERP process could be considered in FWC determinations when mitigation sites include shallow herbaceous wetlands with short vegetation and directly adjacent uplands maintained in an open condition suitable for foraging.

FWC Permitting: Incidental Take

According to Rule 68A-27.001, incidental take is take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Activities that result in impacts to sandhill cranes can require an Incidental

Take Permit from the FWC (see above for actions that do not require a permit). Permits may be issued when there is a scientific or conservation benefit to the species and only upon showing by the applicant that that the permitted activity will not have a negative impact on the survival potential of the species. Scientific benefit, conservation benefit, and negative impacts are evaluated by considering the factors listed in Rule 68A-27.007(2)(b), F.A.C. These conditions are usually accomplished through a combination of avoiding take when practicable, minimizing take that will occur, and mitigating for the permitted take. This section describes the minimization measures and mitigation options available as part of the Incidental Take Permit process for take of sandhill cranes. This list is not an exhaustive list of options.

Minimization Options

The suite of options below can help to reduce or minimize take of the species, and lessen the mitigation necessary to counterbalance take. All of the options below assume that adhering to avoidance measures that eliminate the need for FWC permitting described above is not possible, and that some level of take may occur.

Seasonal, Temporal, and Buffer Measures

- Reducing activities from December to August minimizes take of breeding sandhill cranes. Nesting typically occurs from February to April. However, nesting may occur as early as December and as late as August, and the nesting marsh is important for flightless young for approximately 70 days after hatching.
- Minimize to the extent practicable, activities within 400 feet of active nests to minimize disturbance to nests, eggs, and young (Stys 1997).
- If flightless young are present in a wetland, minimize land use conversion within 1500 feet of the nest site until after young are capable of sustained flight (Walkinshaw 1976, Layne 1981).

Design Modification

- Minimize amount of suitable foraging habitat converted to other land uses.
- Design projects to minimize changes in timing, quantity, or quality of water that could degrade suitable sandhill crane nesting habitat.
- Design projects to avoid or minimize fertilizer, herbicide, and pesticide runoff into wetlands.
- Design new ponds with shallow shelves vegetated with native herbaceous wetland species such as maidencane (*Panicum hemitomon*), pickerelweed (*Pontederia cordata*), and smartweeds (*Polygonum* sp.) to provide breeding, roosting, and foraging opportunities (e.g., not immediately adjacent to high-traffic roads or ponds used for stormwater treatment).
- Avoid placement of impermeable surfaces, such as roads and parking lots, adjacent to wetlands used by nesting cranes. This reduces the chance of nest failure due to flooding and minimizes impacts to foraging habitat needed by flightless young.
- Incorporate culverts into new road designs that will allow for maintenance and/or restoration of natural hydrology.
- Design roads away from suitable wetlands to minimize road mortality.

Method Modification

- Use silt fencing and other methods to minimize impacts to water quality (e.g., turbidity) in shallow wetlands.
- When activities must occur within habitat occupied by nesting cranes, refer to the Seasonal or Temporal Restrictions above to minimize take.
- During power line installation, add power line markers to increase visibility to flying cranes.

- Where vehicle-caused mortality is likely to occur, post signs in areas frequented by cranes to alert motorists.
- Use fencing that is more permeable (i.e., barbed wire versus woven wire or chain link) and less dangerous to cranes when constructing fences in or around nesting wetlands and associated uplands.
  - Barbed wire fencing with 3 strands is better than 4-strand or 5-strand fencing, especially if the bottom strand is 18 inches above the ground (Nesbitt 1996).
  - Woven or welded wire fence, also called hog or animal wire, is more of an impediment to the subspecies.
  - A framed "walk-through" (18 inches high x 24 inches wide) placed periodically (every 0.3 miles) in a woven wire fence would allow cranes to walk through the fence while still restraining livestock (Nesbitt 1996).

Mitigation Options

Mitigation is scalable depending on the impact, with mitigation options for take that significantly impairs or disrupts essential behavioral patterns (e.g., disturbance to nesting cranes). The DEP's ERP process forms a basis of mitigation for loss or degradation of sandhill crane nesting and roosting habitat. Following the ERP process, the FWC will review the resulting wetland mitigation to assess whether the mitigation meets the definition of conservation benefit for sandhill cranes. In most cases, wetland mitigation through the ERP process will satisfy the applicants' responsibilities under Chapter 68A-27 and associated rule enforcement policies. However, under certain circumstances, the FWC may require mitigation specific for take of sandhill cranes to ensure a conservation benefit. Potential options for mitigation are described below. This list is not an exhaustive list of options.

Scientific Benefit

This section describes research and monitoring activities that provide scientific benefit, per Rule 68A-27.007, F.A.C. Conducting or funding these activities can be the sole form of mitigation for a project with FWC approval of methodologies.

- Funding for multi-year implementation of FWC's statewide monitoring protocol for sandhill cranes.
- A study using radio or satellite telemetry to examine movements, home range size, productivity, and survival in urban and suburban areas.

Habitat

Habitat Protection/Acquisition or Management:

- The acquisition option includes wetland mitigation through the ERP program. The management option includes wetland restoration or creation through the ERP program. In either case, the FWC will review the ERP mitigation to evaluate whether it meets the definition of conservation benefit for sandhill cranes. Suitable mitigation sites include shallow herbaceous wetlands with short vegetation and adjacent, open uplands suitable for foraging. Water depth in sandhill crane foraging habitat varies from 0-32 inches, with average water depth in nesting habitat ranging from 5-13 inches from January-April (Stys 1997).
- With few exceptions (e.g., take of an active nest or land use conversion during the time period that they are being used for foraging by flightless young), ERP mitigation is expected to satisfy the applicants' responsibilities under Rule 68A-27 and associated rule enforcement policies, and an FWC permit may be subsequently issued based on the understanding that

implementation of project commitments will satisfy the requirements of 68A-27.005 and 68A-27.007, F.A.C.

Funding

No funding option has been identified at this time. However, funding options as part of mitigation will be considered on a case by case basis.

Information

- Mitigation can be used to support research projects consistent with actions in the SAP.
- Monitoring options can include multi-year monitoring that contributes to a portion of a statewide survey.
- The information option is appropriate in circumstances where ERP mitigation does not satisfy the FWC's definition of conservation benefit for sandhill cranes. For example, additional mitigation may be required if land use conversion in suitable upland habitat within 1500 feet of a nest site cannot take place outside of the timeframe when young are capable of sustained flight.

Programmatic Options

No programmatic option available.

Multispecies Options

- The ERP process can serve as a multi-species option for sandhill cranes and other species that use shallow herbaceous wetlands. In many circumstances, mitigation provided through the ERP process may be sufficient to cover take of sandhill cranes and other state-Threatened wetland dependent species.

FWC Permitting: Intentional Take

Intentional take is not incidental to otherwise lawful activities. Per Chapter 68A-27, F.A.C., intentional take is prohibited and requires a permit. For state-Threatened species, intentional take permits may only be considered for scientific or conservation purposes (defined as activities that further the conservation or survival of the species taken). Permits are issued for state-Threatened species following guidance in Rule 68A-27.007(2)(a), F.A.C.

Risks to Property or People

Intentional take for Human Safety

- Rule 68A-9.012, F.A.C., describes circumstances under which sandhill cranes may be taken on airport property without further state authorization for an imminent threat to aircraft or human safety.
- Permits will be issued only under limited and specific circumstances, in cases where there is an immediate danger to the public's health and/or safety, including imminent or existing power outages that threaten public safety, or in direct response to an official declaration of a state of emergency by the Governor of Florida or a local governmental entity. Applications submitted for this permit must include all information that is required from any other applicant seeking a permit, along with a copy of the official declaration of a state of emergency, if any. This permit process may be handled after the fact or at least after construction activities have already started. An intentional take permit may be issued for such purposes.

Aversive Conditioning

Prior to using approved aversive conditioning methods, landowners should make all practicable attempts to resolve the issue without aversive conditioning, including:

- Removing, to the extent practicable, any attractants (e.g., food sources) contributing to the behavior. It is important to note that intentional feeding of sandhill cranes is prohibited under Rule 68A-4.001 F.A.C. and should be reported to the FWC's Wildlife Alert Hotline (888-404-3922).
- Where feasible, covering or moving automobiles so that cranes cannot see their reflections in the shiny surfaces.
- Temporarily covering reflective surfaces like windows or glass doors with material, where feasible, so that the birds do not see their reflections. For example, surfaces can be made less reflective by rubbing a bar of soap on the surface.
- Temporarily protecting windows or screens by erecting an exclusion "fence," where feasible. For example, such a fence may consist of a string or heavy monofilament line mounted on stakes about 2.5-3 feet off the ground and 3 feet from the parts of homes (window or pool screens) that are being damaged by cranes.
- Protecting windows and screens by planting shrubs or bushes that make the area inaccessible to cranes.
- Placing passive, visual scaring devices (e.g., streamers, Mylar ribbons) on houses or other structures.
- Contacting the FWC's Wildlife Assistance Biologists at regional offices for additional guidance.

In accordance with the FWC's policy on Aversive Conditioning of State Listed Species, no permit is required when using approved aversive conditioning techniques described below. Aversive conditioning may be used to discourage sandhill cranes that exhibit behavior that presents or potentially presents a human safety hazard, causes or is about to cause property damage, or could endanger the life of the crane. **Please note that no aversive conditioning methods are approved within 400 feet of an active nest** without a permit. Approved aversive conditioning methods for sandhill cranes include:

- Spraying with water in a manner unlikely to cause harm.
- Motion-activated sprinklers.
- Use of loud noises, such as air horns, vehicle horns, or propane cannons. Please note that this method is only approved **outside of the breeding season** and is **not** approved for adults accompanied by young that are incapable of sustained flight.
- Chasing cranes from the property by foot or by vehicle in a manner that does not result in physical contact with the birds and does not involve entering suitable nesting habitat. Please note that this method is **not** approved if adults are accompanied by young that are incapable of sustained flight.

As noted in the FWC's policy for aversive conditioning of state-listed species, landowners are encouraged to provide an "after action" report to the Regional Wildlife Assistance Biologist at the appropriate regional office so the FWC can track the frequency of use and effectiveness of aversive conditioning methods. The report should include a description of the conflict, the frequency of aversive conditioning, the methods used, and the response of the sandhill cranes. Any injury and/or

mortality of sandhill cranes resulting from aversive conditioning must be reported immediately to the FWC's Regional Wildlife Assistance Biologist.

Permits Issued for Harassment

In areas not covered by Rule 68A-9.012 F.A.C., any attempt to discourage sandhill cranes that does not comply with the approved aversive conditioning methods specified above is considered harassment and is prohibited without a permit. Examples include, but are not limited to, use of pyrotechnics, non-toxic chemical treatments, aversive conditioning within 400 feet of an active nest, or loud noises or chasing of adult cranes accompanied by flightless young.

Scientific Collecting and Conservation Permits

Scientific collecting permits may be issued for the sandhill crane using guidance found in Rule 68A-27.007(2)(a), F.A.C. Activities requiring a permit include any research that involves capturing, handling, or marking wildlife; conducting biological sampling; or other research that may cause take.

Considerations for Issuing a Scientific Collecting Permit

1) Is the purpose adequate to justify removing the species (if the project requires this)?
   - Permits will be issued if the identified project is consistent with the goal of the SAP (i.e., improvement in status that leads to removal from Florida's Endangered and Threatened Species List), or addresses an identified data gap important for the conservation of the species.
2) Are there direct or indirect effects of issuing the permit on the wild population?
3) Will the permit conflict with program intended to enhance survival of species?
4) Will issuance of the permit reduce the likelihood of extinction?
   - Projects consistent with the goal of the SAP or that fill identified data gaps in species life history or management may reduce the likelihood of extinction. Applications should clearly explain how the proposed research will provide a scientific or conservation purpose for the species.
5) Have the opinions or views of other scientists or other persons or organizations having expertise concerning the species been sought?
6) Is applicant expertise sufficient?
   - Applicants must have prior documented experience with this or similar species; applicants should have met all conditions of previously issued permits; and applicants should have a letter of reference that supports their ability to handle the species.

Relevant to all Scientific Collecting for Florida Sandhill Cranes

- Applications must include a proposal that clearly states the objectives and scope of work of the project, including a justification of how the project will result in a conservation or scientific purpose that benefits the species. The proposal also must include a thorough description of the project's methods, time frame, and final disposition of all individuals. Permit amendment and renewal applications must be "stand alone" (i.e., include all relevant information on objectives and methods).
- Aerial surveys do not require a permit, provided the surveys do not occur at low enough elevation to flush birds from active nests. Aerial transects above 250 feet are not expected to result in flushing from nests, but activities should cease or move to a higher altitude if flushing occurs.

- Ground surveys do not require a permit, provided surveyors remain outside of a 400 foot buffer around active nests.
- Non-destructive habitat sampling near foraging, roosting, and nesting birds does not need a permit provided observers remain outside the identified buffer distances in active nesting sites and nesting birds do not flush.
- Permits may be issued to display a specimen if the specimen was obtained via a rehabilitation facility or was encountered dead.
- Permits may be issued for captive possession (removal from the wild) if the individual is deemed non-releasable.
- Trapping and handling protocols, and a justification of trapping methods, must be included in the permit application and should identify measures to lessen stress for captured sandhill cranes.
- Methodologies for any collection of tissues such as blood should be clearly spelled out, including measures taken to reduce stress/injury to the birds.
- Disposition involving captive possession for any period of time must include a full explanation of whether the facility has the appropriate resources for accomplishing the objectives and for maintaining the animals in a safe and humane manner.
- Federal permits are required from the USFWS to comply with the Migratory Bird Treaty Act and from the USGS Bird Banding Lab for banding, color-marking, specific capture methods, sampling of blood/tissues, collection of feathers, and attachment of transmitters or other data gathering mechanisms. Federal salvage permits are also required to collect any dead individuals (i.e. mortality not due to research activities or incidental take from research activities) or parts of deceased individuals including feathers and tissues.
- Any mortality should be reported immediately to the FWC at the contact information below. The FWC will provide guidance on proper disposal of specimens.
- Active nest sites should be reported as soon as possible to the FWC at the contact information below.
- A final report should be provided to the FWC in the format specified in the permit conditions.

Additional information

Information on Economic Assessment of this guideline can be found at http://myfwc.com/wildlifehabitats/imperiled/management-plans/

Contact

For permitting questions or to report mortalities, contact the FWC at (850) 921-5990 or WildlifePermits@myfwc.com. For more species specific information visit http://myfwc.com/contact/.

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