

Appendix A

Natural Resource Analysis

A.1 Natural Resource Protection

A.1.1 Sector Plan Requirements: F.S. § 163.3245

Pursuant to F.S. § 163.3245, a sector plan must include the adoption of a long-term master plan (LTMP) and two or more detailed specific area plans (DSAP) whose purpose is implementation of the LTMP. According to the following sections of the rule, an approved LTMP must include the following components for the purposes of natural resource identification and protection: 163.3245(3)(a)(1) *“a framework map that, at a minimum, generally depicts areas of urban, agricultural, rural and conservation land use”*; 163.3245(3)(a)(5) *“a general identification of regionally significant natural resources within the planning area based on the best available data and policies setting forth the procedures for protection or conservation of specific resources consistent with the overall conservation and development strategy for the planning area”*; and 163.3245(3)(a)(6) *“general principles and guidelines addressing...the protection and, as appropriate, restoration and management of lands identified for permanent preservation through recordation of conservation easements...which shall be phased or staged in coordination with detailed specific area plans to reflect phased or staged development with the planning area...[and] general principles and guidelines addressing [the protection of] wildlife and natural areas.”*

Pursuant to F.S. § 163.3245, a DSAP must be consistent with the adopted long-term master plan and must include conditions and commitments that provide for natural resource protection, including: 163.3245(3)(b)(7) *“detailed analysis and identification of specific measures to ensure the protection and, as appropriate, restoration and management of lands within the boundary of the DSAP identified for permanent preservation through recordation of conservation easements consistent with s. 704.06, which easements shall be effective before or concurrent with the effective date of the DSAP and other important resources both within and outside the host jurisdiction.”*; and 163.3245(3)(b)(8) *“detailed principles and guidelines...[for the purpose of] protecting wildlife and natural areas...”*

A.1.2 Nassau County Comprehensive Plan: East Nassau Community Planning Area (ENCPA)

The ENCPA Master Land Use Plan (Master Plan) was adopted as an amendment to the Nassau County (County) Comprehensive Plan (Comp Plan) on October 18, 2010. The ENCPA Master Plan meets the requirements for, and was adopted as a LTMP, pursuant to the Florida sector plan statute (F.S. 163.3245).

The primary goal of the ENCPA Master Plan is to promote sustainable and efficient regional land use. One of the guiding principles includes the protection of natural resources through the establishment of the Conservation Habitat Network (CHN). The CHN was designed to include a mosaic of wetlands, surface waters and uplands to provide for landscape connectivity and protection of significant natural resources within the 24,000 (±) acre ENCPA. The CHN within the overall ENCPA contains the majority (~80%) of large connected wetland strands and a majority (~80%) of the mapped 100 year floodplain. The protection of large wetland strands and contiguous upland areas within the CHN will provide long-term benefits for the aquatic, wetland dependent, and terrestrial wildlife that currently utilize these habitats. This will also ensure that conserved wetlands and contiguous uplands will be protected in perpetuity. Preserving this mix of wetland and uplands within the proposed CHN conservation corridors will provide a variety of habitats needed by listed wildlife, provide corridors that connect major habitats allowing indigenous wildlife to move across the property without interference from proposed development, and contribute to the long-term sustainability of the wildlife communities.

Consistent with F.S. 163.3245(3)(a)(1), the adopted Comp Plan Future Land Use Map (FLUM) includes the ENCPA boundary which “*generally depicts areas of urban, agricultural, rural and conservation land us.*”. Consistent with F.S. 163.3245(3)(a)(5), the FLUM depicts the adopted CHN which “[*identifies*] *regionally significant natural resources within the planning area...*”. Consistent with F.S. 163.3245(3)(a)(6), and 163.3245(3)(b)(7) and (8), all lands within the CHN must comply with the following guidelines and standards adopted in the Comp Plan Future Land Use Element (FLUE; Policy FL. 13.07):

- Prior to development of portions of the ENCPA that abut boundaries of the CHN which preserve wildlife habitat, a management plan shall be developed that promotes maintenance of native species diversity in such areas and which may include provision for controlled burns.
- New roadway crossings of wildlife corridors within the CHN for development activity shall be permitted in conjunction with the design of the internal road network, but shall be minimized to the greatest extent practical.

- Road crossings within the CHN will be sized appropriately and incorporate fencing or other design features as may be necessary to direct species to the crossing and enhance effectiveness of such crossings.
- Prior to commencement of development within the ENCPA, an environmental education program shall be developed for the CHN and implemented in conjunction with a property owners association, environmental group or other community association or governmental agency so as to encourage protection of the wildlife and natural habitats incorporated within the CHN.
- The boundaries of the CHN are identified on the County FLUM. The boundaries of the CHN shall be formally established as conservation tracts or placed under conservation easements when an abutting development parcel to portions of the CHN undergoes development permitting in accordance with the requirements of the St. John's River Water Management District (SJRWMD) and pursuant to the following criteria:
 - the final boundary of wetland edges forming the CHN boundary shall be consistent with the limits of the jurisdictional wetlands and associated buffers as established in the applicable SJRWMD permit;
 - the final boundary of upland edges forming the CHN boundary shall be established generally consistent with the FLUM, recognizing that minor adjustments may be warranted based on more or refined data and any boundary adjustments in the upland area shall 1) continue to provide for an appropriate width given the functions of the CHN in that particular location (i.e., wetlands species or habitat protection), the specific site conditions along such boundary and the wildlife uses to be protected and 2) ensure that the integrity of the CHN as a wildlife corridor and wetland and species habitat protection area is not materially and adversely affected by alteration of such boundary; and
 - boundary modifications meeting all of the criteria described in this policy shall be incorporated into the CHN and the ENCPA Master Plan upon issuance of the applicable SJRWMD permits and shall be effective without the requirement for an amendment to the FLUM, ENCPA FLUE policies or any other Comp Plan Elements defined in Chapter 163, F.S.
- Silvicultural and agricultural activities allowed in the Agricultural classification of the FLUE of the Comp Plan, excluding residential land uses, shall continue to be allowed within the CHN. When the final boundaries of any portion of the CHN are established as described above, a silvicultural management plan

will be developed in accordance with best management practices to protect the overall conservation objective of such portion of the CHN.

In addition to compliance with the guidelines listed above, all development within the ENCPA must also comply with all goals, objectives and policies within the Comp Plan Conservation Element (CS).

A.1.3 Local, State and Federal Natural Resource Regulations

A.1.3.1 Wetlands and Surface Waters

The approximate extent of wetlands and surface waters within the DSAP 1 Area (Property) was determined through photointerpretation and selective groundtruthing, during preliminary field studies. The Property includes approximately 1,653 acres of wetlands and approximately 11.3 acres of surface waters (Figure A1.1). Wetlands have not been flagged, mapped using a Global Positioning System (GPS) unit, surveyed or agency verified at this time.

Wetland protection within the Property is regulated by the SJRWMD, the Department of the Army, Corps of Engineers (ACOE), and Nassau County. Prior to development, the extent of state jurisdictional wetlands and surface waters will be determined based on the Florida unified wetland delineation methodology (Chapter 62-340, Florida Administrative Code [F.A.C.]). Dredge and fill activities, and mitigation for these activities, are regulated by the state through the Environmental Resource Permit (ERP) program, and implemented jointly by the Florida Department of Environmental Protection (FDEP) and the five water management districts. The ACOE regulates the depositing of dredged or fill material within "waters of the United States, including wetlands" through the Clean Water Act § 404 permitting process. The ACOE will require that jurisdictional wetlands be determined pursuant to the 1987 Wetland Delineation Manual and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region*: (November 2010), and through application of the "*Rapanos Guidance*" of June 5, 2007. Further, issuance of an environmental resource permit from the Florida Department of Environmental Protection (FDEP) will serve as state water quality certification required under § 401 of the Clean Water Act.



Legend

-  Out Parcel Boundary
-  Wetlands and Surface Waters

Source: Wetland delineation based on photointerpretation and selective groundtruthing by BDA, 02/2012

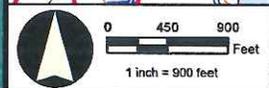


FIGURE A1.1.
APPROXIMATE WETLAND EXTENT BASED ON PHOTOINTERPRETATION AND SELECTIVE
GROUNDTRUTHING OF THE EAST NASSAU DSAP 1 PROJECT SITE, NASSAU COUNTY, FLORIDA.

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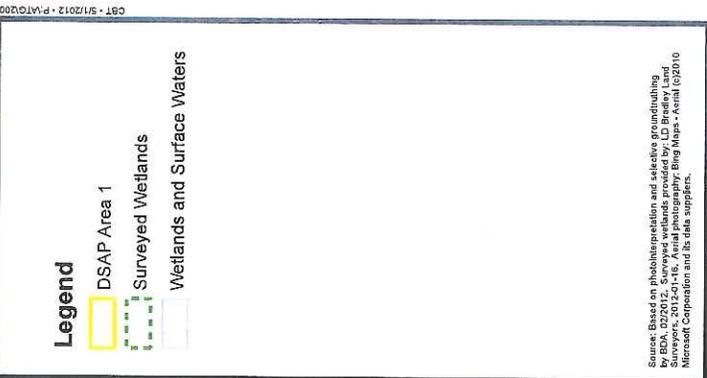
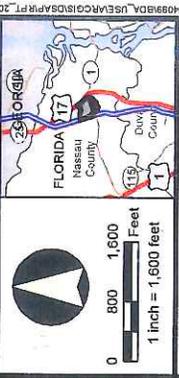
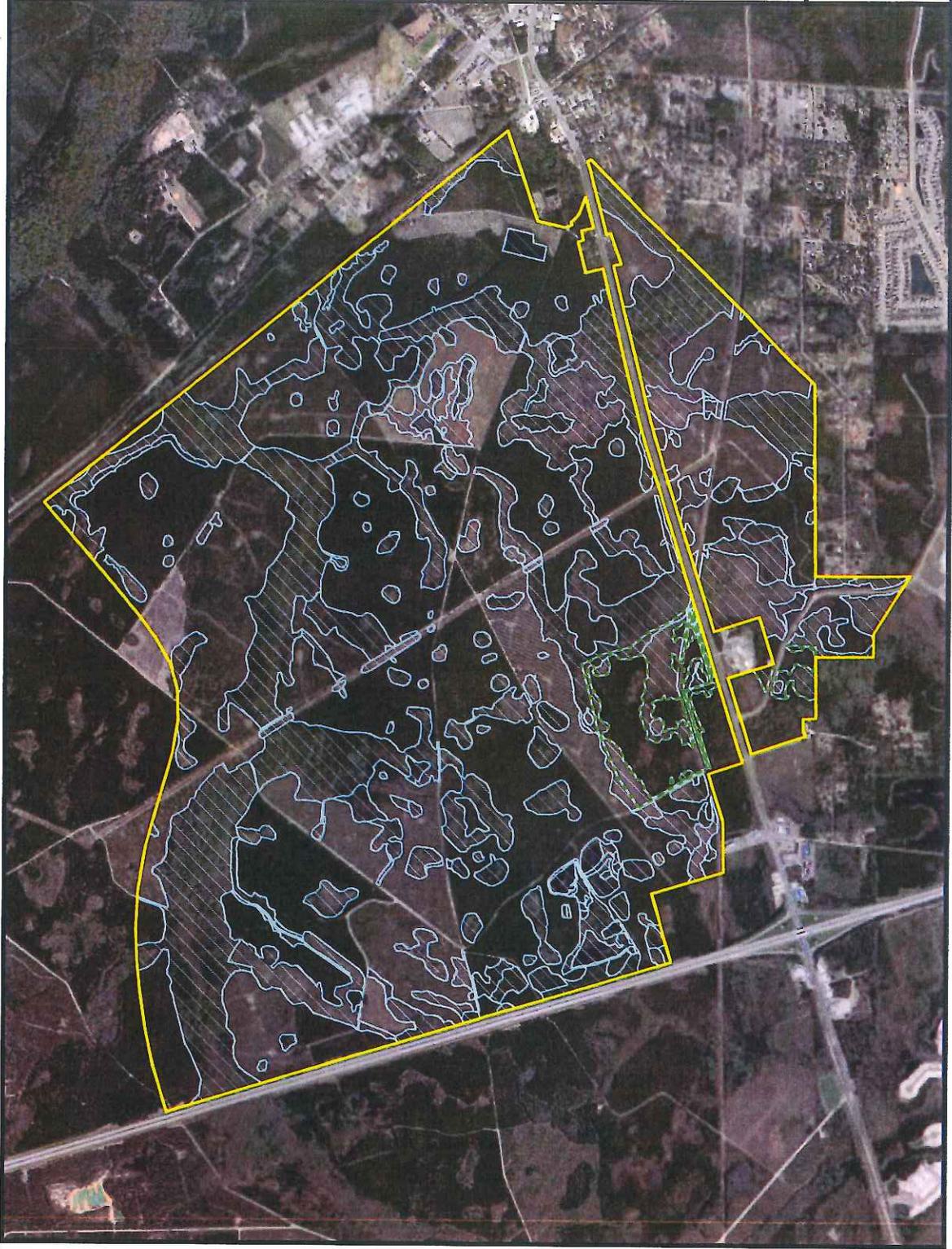


FIGURE A1.1.
APPROXIMATE WETLAND EXTENT BASED ON PHOTOINTERPRETATION AND SELECTIVE GROUNDTRUTHING OF THE EAST NASSAU DSAP 1 PROJECT SITE, NASSAU COUNTY, FLORIDA.



Source: Based on the high-resolution aerial photos provided by BDA, 02/2012. Surveyed wetlands provided by Surveyors, 2012-01-16. Aerial photography: Bing Maps - Aerial © 2010 Microsoft Corporation and its data suppliers.



Legend

-  Out Parcel Boundary
-  Wetlands and Surface Waters

Source: Wetland delineation based on photointerpretation and selective groundtruthing by BDA, 02/2012.

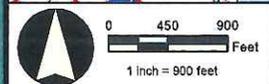


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GROUNDTRUTHING OF THE EAST NASSAU DSAP 1 PROJECT SITE, NASSAU COUNTY, FLORIDA.

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In addition to state and federal regulations, wetland protection within the Property is also regulated by Nassau County. Field-verified jurisdictional wetlands are designated as Conservation I on the County FLUM. Proposed development must be directed away from wetlands “...by clustering the development to maintain the largest contiguous wetland area practicable and to preserve the pre-development wetland conditions” in accordance with the Comp Plan. As described above, provisions for wetland protection are also included within the Conservation Habitat Network (CHN) guidelines and standards described in Policy FL.13.07 of the Comp Plan. The CHN not only includes wetlands and surface waters but also a network of adjacent uplands depicted as Conservation on the ENCPA Master Plan. Uplands designated as Conservation areas in the CHN will serve as a buffer between jurisdictional wetlands and developable tracts. The final boundaries of wetlands and upland buffers will be formally determined when an abutting development parcel undergoes permitting in accordance with requirements of the SJRWMD. As described in Policy FL.13.07, any modifications to the CHN boundary as depicted on the ENCPA Master Plan which result in a reduction in the upland Conservation area shall provide for an appropriate width, given the functions of the CHN in that particular location (i.e. wetland species or habitat protection), the specific site conditions along such boundary and the wildlife uses to be protected. This compensation will ensure that the integrity of the CHN as a wildlife corridor and habitat protection area is not materially or adversely affected by the alteration of the CHN boundary.

Impacts to jurisdictional wetlands and conservation areas will be purposely avoided, except in cases where no other feasible or practical alternatives exist that will permit a reasonable use of the land or where there is an overriding public benefit. In such cases, final determination of impacts due to wetland encroachment, alteration, or removal will be coordinated, mitigated, and permitted through completion of state and federal regulatory authority approvals and permitting. Mitigation requirements for unavoidable impacts to wetlands must be determined using the UMAM functional analysis. Stormwater runoff generated on the Property will be treated by an extensive Surface Water Management System that will incorporate retention and detention ponds. Final impact and mitigation boundaries and acreages will be determined through state and federal permitting processes, and will be consistent with County goals, objectives and policies.

A.1.3.2 Listed Species

Based on preliminary field studies, a moderate to high likelihood of occurrence exists for several listed bird species due to the presence of potentially suitable nesting and/or foraging habitat within the Property (*see section A.4.1.2 for details*). Freshwater marsh and emergent vegetation associated with former borrow areas on the western side of the central parcel of the Property may provide potentially suitable foraging habitat for protected wading bird species such as wood stork. These borrow area marshes may also provide potentially suitable nesting habitat for Florida

sandhill cranes. Further, forested wetlands and marshes on the Property also have the potential to provide suitable habitat for limpkins. The likelihood of occurrence for the southeastern American kestrel is moderate due to the presence of potentially suitable foraging habitat in the form of open herbaceous cover within onsite utility easements. The wooden utility poles within the easements also potentially provide for suitable nesting sites. Although, no eagle nests have been documented by the FWC, or observed during preliminary field studies, the likelihood of an eagle nest occurring within the Property is moderate. This is due to the presence of large pine trees suitable for nesting, the presence of potential foraging habitat, and the proximity of the Property to potentially suitable off-site foraging habitat. The potential for occurrence of Worthington's marsh wren is considered high due to the presence of salt marsh habitat adjacent to the northern-most and southern-most parcels of the Property.

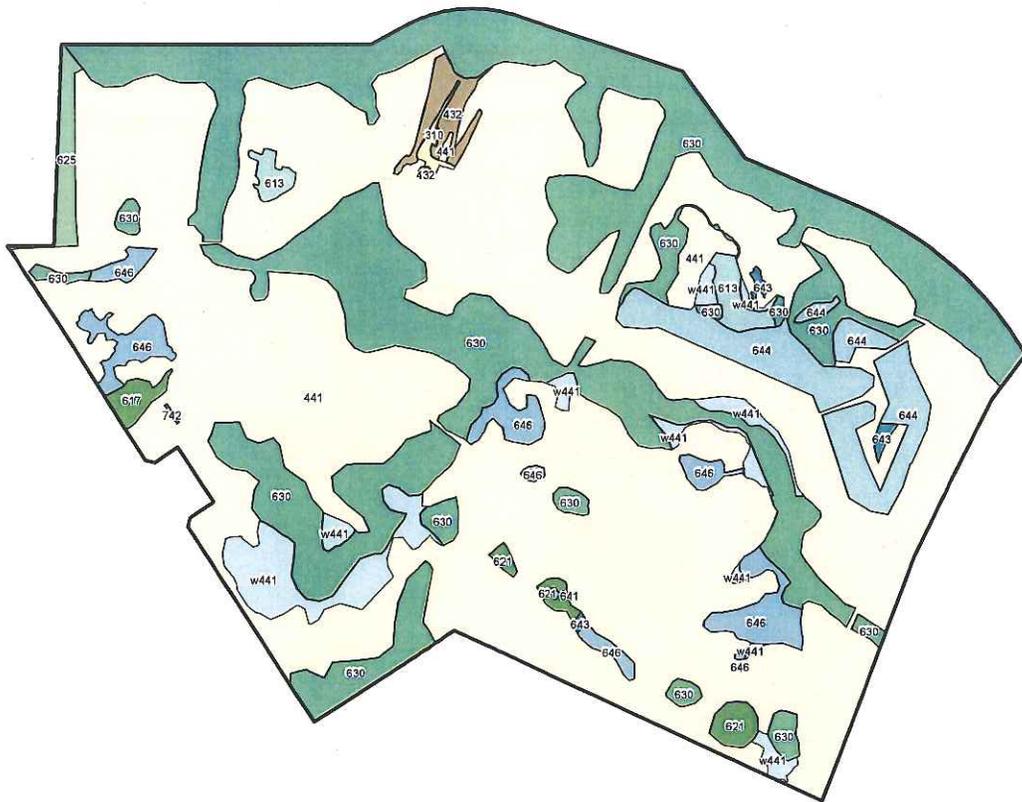
Coordination will be initiated with the USFWS and/or FWC for guidance prior to undertaking any activity that may result in the disturbance of a listed species. We will comply with all appropriate state and federal wildlife regulations and guidelines to ensure that development activities within the Property do not jeopardize any listed species.

A.1.3.3 Natural Resource Management

F.S. 163.3245(3)(b)(7) requires the *"identification of measures to ensure the protection, and as appropriate restoration and management of lands"* within the DSAP. Consistent with this requirement, areas designated as conservation (CHN) within the approved LTMP will be included in a detailed conservation and land management plan that is developed specifically for the DSAP area. This DSAP-specific conservation and management plan will take into consideration the type, location and ecological condition of wetlands and other vegetative communities, as well as the needs of any listed species that occur on the Property. In accordance with F.S. 163.3245 and Comp Plan Policy FL. 13.07, wetlands within the Property that are located within the approved CHN will be placed under conservation easements or formally established as conservation tracts as adjacent areas within the DSAP are developed.

A.2 Ecological Communities

Land use and vegetative cover types within the Property were classified based on FLUCFCS data obtained from the SJRWMD Geographic Information System (GIS) database, along with selective photointerpretation and groundtruthing (Figure A2.1). Botanical nomenclature is per Wunderlin and Hansen (Wunderlin, Richard P. and Bruce F. Hansen. 2003. *Guide to the Vascular Plants of Florida*, second edition. University Press of Florida. 787 pp.).



Legend

Out Parcel Boundary

FLUCFCS

- 310 - Herbaceous (Dry Prairie)
- 432 - Sand Live Oak
- 441 - Coniferous Plantations
- 613 - Gum Swamps
- 617 - Mixed Wetland Hardwoods

- 621 - Cypress
- 625 - Hydric Pine Flatwoods
- 630 - Wetland Forested Mixed
- 641 - Freshwater Marshes
- 643 - Wet Prairies
- 644 - Emergent Aquatic Vegetation
- 646 - Treeless Hydric Savanna
- 621 - Cypress
- 625 - Hydric Pine Flatwoods
- 630 - Wetland Forested Mixed
- 641 - Freshwater Marshes
- 643 - Wet Prairies
- 644 - Emergent Aquatic Vegetation
- 646 - Treeless Hydric Savanna

- 742 - Borrow Areas
- w441 - Wet Coniferous Plantations

Source: Vegetative delineation based on photointerpretation and selective groundtruthing by BDA, 02/2012; land use/cover categories derived from FLUCFCS Handbook, FDOT 1999.

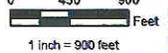


FIGURE A2.1.
FLORIDA LAND USE, COVER, AND FORMS CLASSIFICATION SYSTEM MAP OF THE EAST NASSAU DSAP 1 PROJECT SITE, NASSAU COUNTY, FLORIDA

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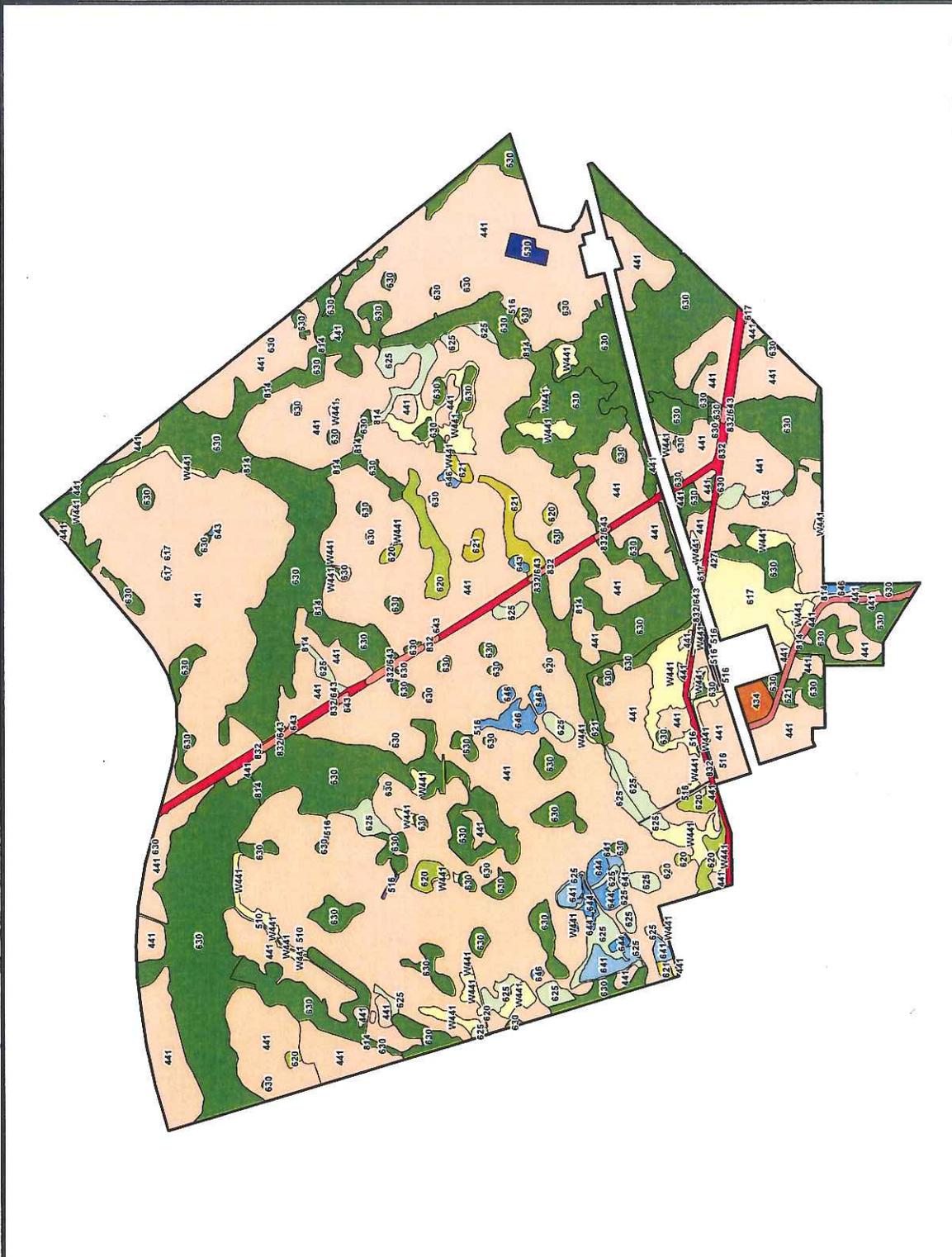
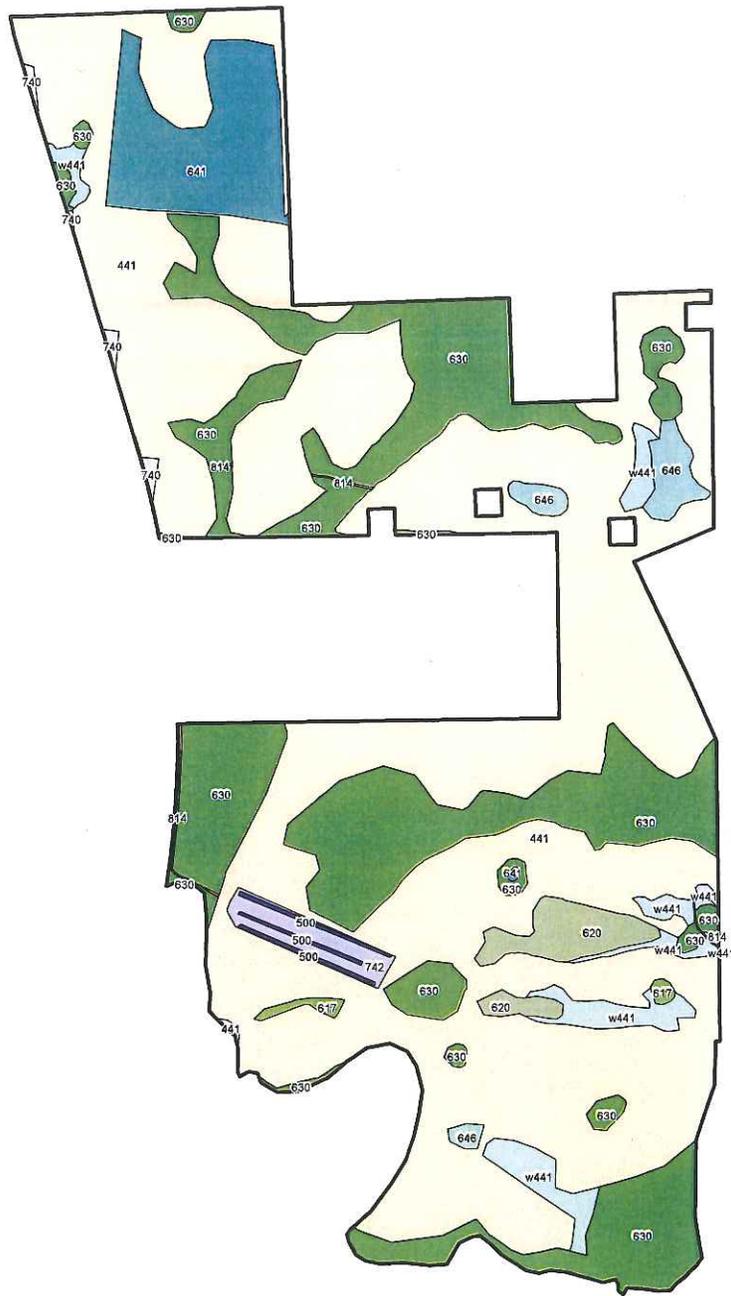


FIGURE A2.1.
 FLORIDA LAND USE, COVER, AND FORMS
 CLASSIFICATION SYSTEM MAP OF THE
 EAST NASSAU DSAP 1 PROJECT SITE,
 NASSAU COUNTY, FLORIDA



Legend

Out Parcel Boundary

FLUCFCS

441 - Coniferous Plantations

500 - Water

617 - Mixed Wetland Hardwoods

620 - Wetland Coniferous Forests

630 - Wetland Forested Mixed

641 - Freshwater Marshes

646 - Treeless Hydric Savanna

740 - Disturbed Land

742 - Borrow Areas

814 - Roads and Highways

w441 - Wet Coniferous Plantations

Source: Vegetative delineation based on photointerpretation and selective groundtruthing by BDA, 02/2012; land use/cover categories derived from FLUCFCS Handbook, FDOT 1998.

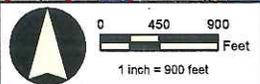


FIGURE A2.1.
FLORIDA LAND USE, COVER, AND FORMS CLASSIFICATION SYSTEM MAP OF THE
EAST NASSAU DSAP 1 PROJECT SITE, NASSAU COUNTY, FLORIDA

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A.2.1 Wetlands and Surface Waters

The Property (northern, central and southern parcels) contains approximately 1,653 acres of wetlands and approximately 11.3 acres of surface waters, based on photointerpretation and selective groundtruthing. Wetland communities are dominated by mixed forested wetlands (approximately 1,190.7 acres), wet planted pine (approximately 138.0 acres) and hydric pine flatwoods (approximately 80.1 acres). Other wetland communities within the Property include cypress swamps, scrub-shrub wetlands, mixed hardwood wetlands, coniferous wetlands, wet prairies, freshwater marsh and areas with emergent aquatic vegetation (Figure A1.1). All wetland acreages are preliminary and are subject to change based on field survey and agency review.

Open Water (500)

The southern parcel of the Property contains approximately 1.9 acres of open water associated with a man-made borrow area.

Swales (510)

Vegetated swales (approximately one acre), that transport flow during storms, generally have planted pine on their perimeter. They also include the following herbaceous groundcover species: velvet witchgrass (*Dichanthelium scoparium*), blackberry, manyflower marshpennywort (*Hydrocotyle umbellata*), sugarcane plumegrass (*Saccharum giganteum*), soft rush (*Juncus effusus*), clustered sedge (*Carex glaucescens*), scattered cypress (*Taxodium* sp.), red maple, and warty panicgrass (*Panicum verrucosum*).

Ditches (516)

Ditches (approximately 3.2 acres) within the Property include laurel oak, slash pine, red maple, wax myrtle, greenbrier, broomsedge bluestem, cinnamon fern, and Virginia chain fern.

Reservoirs (530)

A 5.2-acre reservoir that was formerly a borrow area is located on the southeastern side of the central parcel of the Property. Littoral vegetation and emergent aquatic vegetation are minimal.

Mixed Wetland Hardwoods (617)

Canopy vegetation within mixed wetland hardwoods (approximately 39.5 acres) is comprised of cypress, slash pine, and red maple. The shrub layer is generally comprised of slash pine, wax myrtle, swamp bay, saw palmetto, and gallberry. Herbaceous groundcover species include velvet witchgrass, chalky bluestem (*Andropogon virginicus* var. *glauca*), woodoats, sugarcane plumegrass, and Virginia chain fern, among others.

Wetland Coniferous Forests (620)

Approximately 43.8 acres of coniferous wetlands are located within the Property. The canopy stratum is comprised of cypress, slash pine, sweetgum, and swamp tupelo (*Nyssa sylvatica* var. *biflora*). Sub-canopy species include

slash pine, cypress, red maple, swamp tupelo, and swamp bay. The shrub layer is comprised of slash pine, wax myrtle, swamp bay, saw palmetto, gallberry, cypress, and myrtle dahoon (*Ilex cassine* var. *myrtifolia*). The herbaceous groundcover generally includes velvet witchgrass, warty panicgrass, slash pine seedlings, beaksedge (*Rhynchospora* sp.), bog white violet (*Viola lanceolata*), slender flattop goldenrod (*Euthamia caroliniana*), chalky bluestem, woodoats, sugarcane plumegrass, Virginia chain fern, woolly witchgrass (*Dichantherium scabriusculum*), sandweed (*Hypericum fasciculatum*), gallberry, blackberry, clustered sedge, club-moss (*Lycopodiella* sp.), swamp bay, dogfennel (*Eupatorium capillifolium*), purple bluestem (*Andropogon glomeratus* var. *glaucoopsis*), sweetgum, cinnamon fern, sedge (*Carex* sp.), and camphorweed (*Pluchea* sp.).

Cypress (621)

The canopy of cypress swamps (approximately 21.6 acres) is generally comprised of cypress, slash pine, red maple, swamp bay, and swamp tupelo. The sub-canopy includes slash pine, swamp bay, and cypress. The shrub stratum often includes groundsel tree (*Baccharis halimifolia*) and gallberry. Groundcover species often include sugarcane plumegrass, yellow jessamine, purple bluestem, spadeleaf (*Centella asiatica*), and woolly witchgrass, among others.

Hydric Pine Flatwoods (625)

The canopy stratum of hydric pine flatwoods (approximately 80.1 acres) on the Property is generally comprised of slash pine, with scattered cypress, red maple, laurel oak, swamp tupelo, and swamp bay. The sub-canopy often includes slash pine, laurel oak, swamp bay, loblolly bay, red maple, swamp tupelo, sweetgum, and dahoon. The shrub layer is comprised of loblolly bay, slash pine, wax myrtle, swamp bay, saw palmetto, gallberry, and fetterbush (*Lyonia lucida*). Herbaceous groundcover species often include velvet witchgrass, woodoats, maidencane (*Panicum hemitomon*), sugarcane plumegrass, bushy bluestem (*Andropogon glomeratus*), slash pine, purple bluestem, woolly witchgrass, Virginia chain fern, sandweed, blue maidencane (*Amphicarpum muhlenbergianum*), spadeleaf, and laurel greenbrier (*Smilax laurifolia*), among others.

Forested Wetland Mixed (630)

The canopy stratum within mixed forested wetlands (approximately 1,190.7 acres) is comprised of red maple, cypress, sweetgum, laurel oak, swamp tupelo, slash pine, dahoon, and myrtle dahoon. The subcanopy stratum is comprised of cabbage palm, red maple, sweetgum, laurel oak, loblolly bay, myrtle dahoon, slash pine, cypress, and swamp bay. The shrub stratum is comprised of wax myrtle, cabbage palm, saw palmetto, fetterbush, wax myrtle, and dwarf palmetto (*Sabal minor*). Herbaceous groundcover species often include greenbrier, woodoats, roundpod St. John's-wort (*Hypericum cistifolium*), manyflower marshpennywort, cabbage palm, sweetgum, warty panicgrass, soft rush, blackberry, sedge, velvet witchgrass, camphorweed, purple bluestem, Virginia chain fern, netted chain fern (*Woodwardia areolata*), sugarcane plumegrass, sawtooth blackberry (*Rubus argutus*),

swamp bay, Virginia iris (*Iris virginica*), sandweed, blue maidencane, and maidencane.

Freshwater Marshes (641)

Approximately 45.2 acres of freshwater marsh exist on the Property within a series of former borrow areas in the central parcel, and within a large system in the southern parcel. Shrub vegetation on islands within the marshes includes swamp bay, gallberry, myrtle dahoon, red cedar, slash pine, and wax myrtle. Marsh groundcover vegetation includes sand cordgrass (*Spartina bakeri*), grassleaf rush (*Juncus marginatus*), yelloweyed grass (*Xyris* sp.), sandweed, bushy bluestem, fireweed (*Erechtites hieraciifolius*), witchgrass (*Dichanthelium* sp.), slender flattop goldenrod, and lovegrass (*Eragrostis* sp.), among others.

Wet Prairies (643)

Wet prairies (approximately 12.1 acres) within the Property are characterized by maidencane, chalky bluestem, slender flattop goldenrod, velvet witchgrass, soft rush, sawtooth blackberry, bushy bluestem, spadeleaf, turkey tangle fogfruit (*Phyla nodiflora*), and occasional slash pine. Rarely canopy-sized slash pine and shrub-sized groundsel tree are present.

Within the utility easement (832) in the central parcel of the Property, wet prairies are comprised of chalky bluestem, velvet witchgrass, sugarcane plumegrass, sandweed, bushy bluestem, blackberry, slash pine saplings, swamp bay saplings, sweetgum saplings, yelloweyed grass, gallberry, witchgrass, blue maidencane, slender flattop goldenrod, and myrtle dahoon.

Emergent Aquatic Vegetation (644)

Approximately 36.8 acres of emergent aquatic vegetation is located on the west side of the central parcel of the Property within a series of former borrow areas. Vegetation within these areas is primarily comprised of American white waterlily (*Nymphaea odorata*) and bladderwort (*Utricularia* sp.).

Mixed Scrub-Shrub Wetland (646)

The shrub stratum within scrub-shrub wetlands on the Property (approximately 39.7 acres) is generally comprised of fetterbush, slash pine, myrtle dahoon, highbush blueberry (*Vaccinium corymbosum*), Carolina willow (*Salix caroliniana*), groundsel tree, and wax myrtle, among others. Groundcover species generally include woodoats, beaksedge, sedge, redtop panicum (*Panicum rigidulum*), warty panicgrass, thistle (*Cirsium* sp.), purple bluestem, and woolly witchgrass, among others.

Wet Coniferous Plantation (W441)

Wet coniferous plantations (approximately 138.0 acres) are primarily comprised of planted slash pine (various stand ages), with rare occurrences of red maple, loblolly bay, sweetgum, dahoon, cabbage palm, and swamp bay, and very rare occurrences of cypress. The sub-canopy stratum is generally comprised of wax myrtle, swamp bay, groundsel tree, and red

cedar. Herbaceous groundcover vegetation is comprised of a variety of species including soft rush, sugarcane plumegrass, creeping primrosewillow (*Ludwigia repens*), other primrosewillow (*Ludwigia* sp.) species, sedge, Carolina redroot (*Lachnanthes caroliana*), sundew (*Drosera* sp.), camphorweed, spikerush (*Eleocharis* sp.), maidencane, yelloweyed grass, velvet witchgrass, slash pine seedlings, rush (*Juncus* sp.), beaksedge, bushy bluestem, purple bluestem, cudweed (*Pseudognaphalium* sp.), dogfennel, witchgrass, pipewort (*Eriocaulon* sp.), bogbutton (*Lachnocaulon* sp.), bog white violet, blue maidencane, maidencane, and sandweed.

A.2.2 Uplands

The Property contains ~ 2,621.7 acres of upland communities (~ 60.7%), based on preliminary photointerpretation and groundtruthing. Upland communities are dominated by Coniferous Plantations (441), which represent approximately 97.3% (~ 2,549.6 acres) of total upland acreage.

Herbaceous Land (310)

The Property contains ~1.1 acres of open herbaceous land characterized by witchgrass (*Dichantherium* sp.), chalky bluestem (*Andropogon virginicus* var. *glaucus*), dogfennel (*Eupatorium capillifolium*), blackberry (*Rubus* sp.), scattered sand live oak (*Quercus virginiana*) saplings, laurel oak (*Quercus laurifolia*) saplings, hickory (*Carya* sp.) saplings, everlasting (*Gnaphalium* sp.), pawpaw (*Asimina* sp.), yellow jessamine (*Gelsemium sempervirens*), hairy indigo (*Indigofera hirsute*) and deerberry (*Vaccinium stamineum*).

Live Oak (427)

A small area of live oak (*Quercus virginiana*), (0.2 acres) is located on the western side of the central parcel of the Property. Canopy species are comprised of live oak, laurel oak (*Quercus laurifolia*), water oak (*Quercus nigra*), red cedar (*Juniperus virginiana*), dahoon (*Ilex cassine*), southern magnolia (*Magnolia grandiflora*), and cabbage palm (*Sabal palmetto*). The shrub layer consists of saw palmetto (*Serenoa repens*), wax myrtle (*Myrica cerifera*), and sapling-sized canopy species. The herbaceous groundcover contains woodoats (*Chasmanthium* sp.), woodsgrass (*Oplismenus hirtellus*), crabgrass (*Digitaria* sp.), and panicgrass (*Panicum* sp.).

Sand Live Oak (432)

The Property contains ~5.3 acres of sand live oak. The canopy is dominated by sand live oak, laurel oak, hickory and red cedar. The groundcover is comprised of blackberry, blue huckleberry (*Gaylussacia tomentosa*), grape (*Vitis* sp.) vine, and netted nutrush (*Scleria reticularis*).

Hardwood Conifer Mixed (434)

Approximately 6.7 acres of upland within the Property is characterized as hardwood conifer mixed forest. The canopy stratum is comprised of slash pine (*Pinus elliottii*), sweetgum (*Liquidambar styraciflua*), water oak, and laurel oak. The sub-canopy is comprised of cabbage palm, red cedar,

camphortree (*Cinnamomum camphora*), and sapling-sized canopy species. The groundcover is comprised of greenbrier (*Smilax* sp.), blackberry, cabbage palm seedlings, swamp bay (*Persea palustris*) seedlings, and yellow jessamine (*Gelsemium sempervirens*).

Coniferous Plantation (441)

The Property contains approximately 2,549.6 acres of planted pine (*Pinus* sp.). The canopy stratum within actively managed silvicultural areas is comprised primarily of planted slash pine with limited occurrences of naturally recruited sand live oak (*Quercus geminata*), cabbage palm, laurel oak, sweetgum, and red maple (*Acer rubrum*). Sub-canopy species include loblolly bay (*Gordonia lasianthus*), laurel oak, and swamp bay. The shrub layer is generally comprised of saw palmetto, wax myrtle, and gallberry (*Ilex glabra*). The herbaceous groundcover is generally sparse, but where present is comprised of gallberry, Virginia chain fern (*Woodwardia virginica*), and cinnamon fern (*Osmunda cinnamomea*).

Disturbed Lands (740)

The Property contains ~1.5 acres of land cleared for billboards.

Borrow Area (742)

The Property contains ~6.3 acres of man-made borrow areas within the southern parcel. This borrow area contains three deep linear channels with open water and minimal emergent vegetation.

Roads and Highways (814)

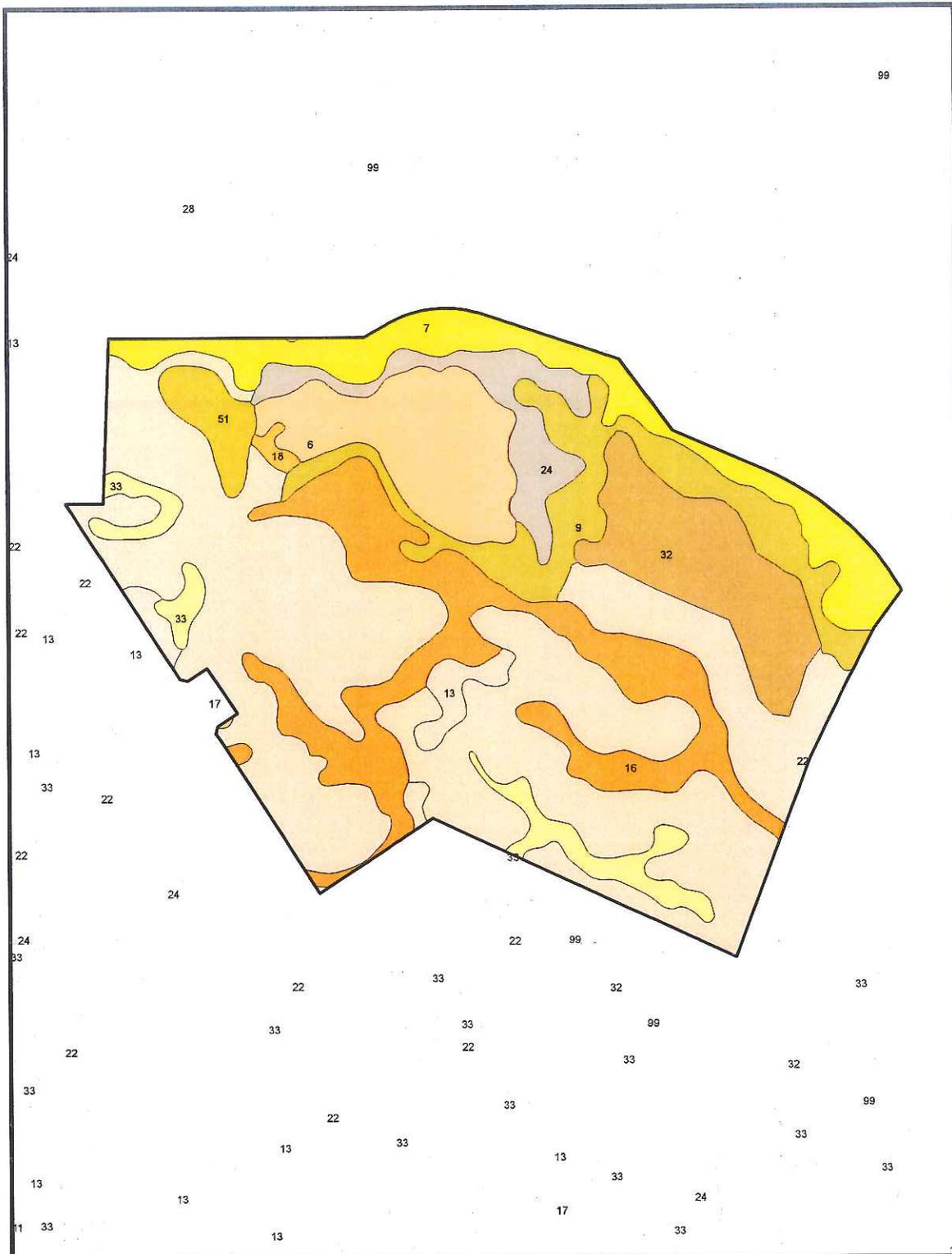
Over 9.5 acres of field roads are located throughout the Property.

Electrical Power Transmission Lines (Utility Easement) (832)

Upland vegetative communities within utility easements on the Property (approximately 41.5 acres) are regularly managed, maintaining a shrub layer comprised of live oak, wax myrtle, gallberry, and red cedar. The herbaceous stratum is comprised of gallberry, bracken fern (*Pteridium aquilinum*), blackberry, broomsedge bluestem (*Andropogon virginicus*), and grape (*Vitis* sp.) vine.

**A.3 Natural Resources Conservation
Service Soils**

The U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) Soil Survey Geographic database for Nassau County, Florida, identifies the following soil types within the Property (Figure A3.1): Hurricane-Pottsburg fine sands, 0 to 5 percent slopes (6), Leon fine sand (9), Mandarin fine sand (10), Chaires fine sand (11), Goldhead fine sand (13), Rutledge mucky fine sand, frequently flooded (14), Buccaneer clay, frequently flooded (15), Ellabelle mucky fine sand, frequently flooded (16), Sapelo-Leon fine sand (22), Kingsferry fine sand (24), Aqualfs, loamy (32), Goldhead-



Legend

Out Parcel Boundary	16 - Ellabelle mucky fine sand, frequently flooded	33 - Goldhead-Meadowbrook fine sands, depressional
NRCS Soils	17 - Urban land	51 - Albany fine sand, 0 to 5 percent slopes
06 - Hurricane-Pottsburg fine sands, 0 to 5 percent slopes	18 - Lynn Haven-Wesconnnet-Leon complex, depressional	
07 - Kingsland mucky peat, frequently flooded	22 - Sapelo-Leon fine sand	
09 - Leon fine sand	24 - Kingsferry fine sand	
13 - Goldhead fine sand	28 - Tisonia mucky peat, tidal	
	32 - Aqualfs, loamy	

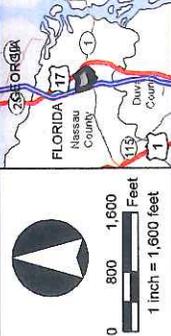
Source: U.S. Department of Agriculture, Natural Resources Conservation Service, Soil Survey Geographic (SSURGO) database.

1 inch = 900 feet

FIGURE A3.1.
NATURAL RESOURCES CONSERVATION SERVICE SOILS MAP OF THE EAST NASSAU DSAP 1 PROJECT SITE, NASSAU COUNTY, FLORIDA

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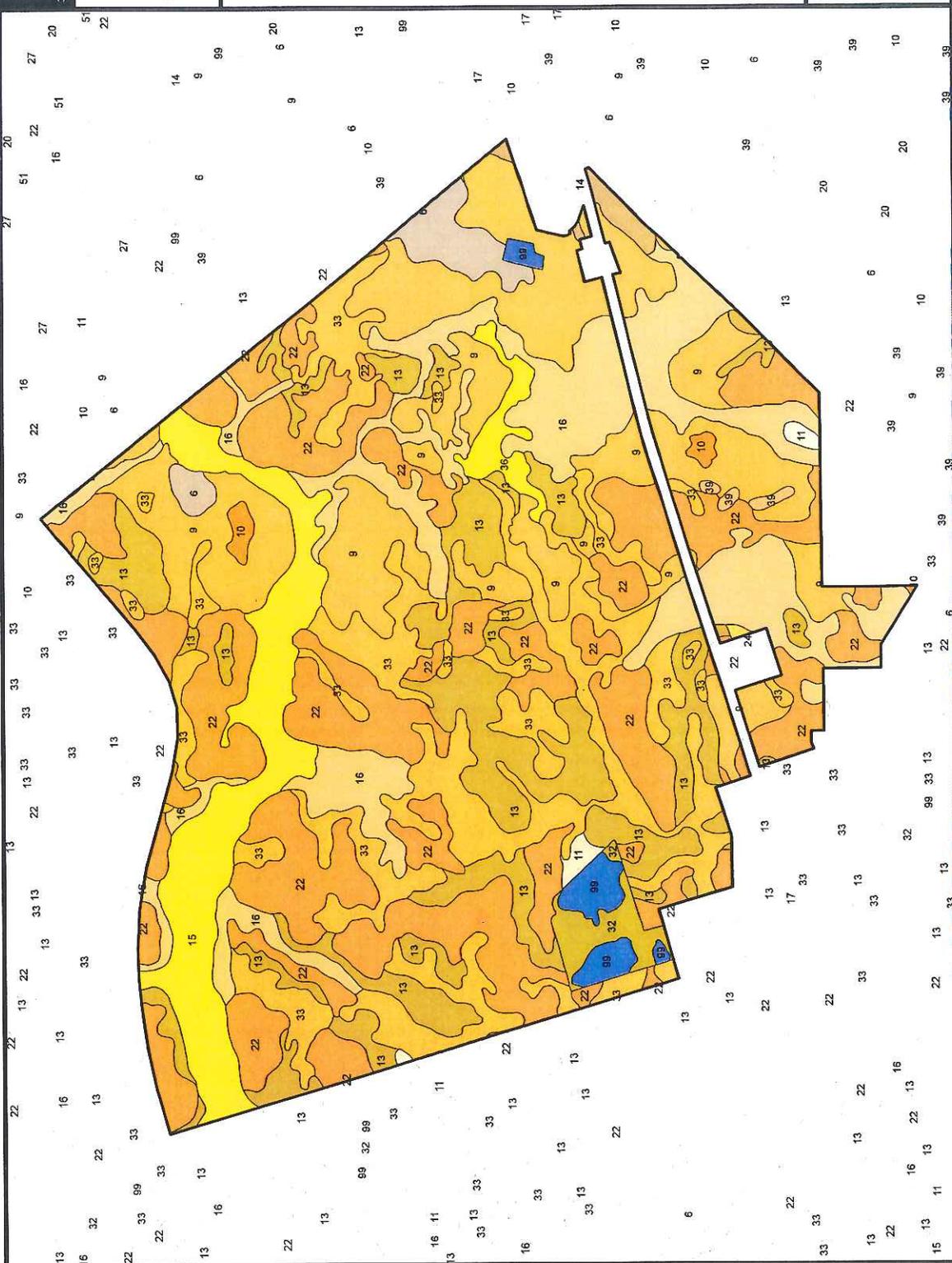
Legend

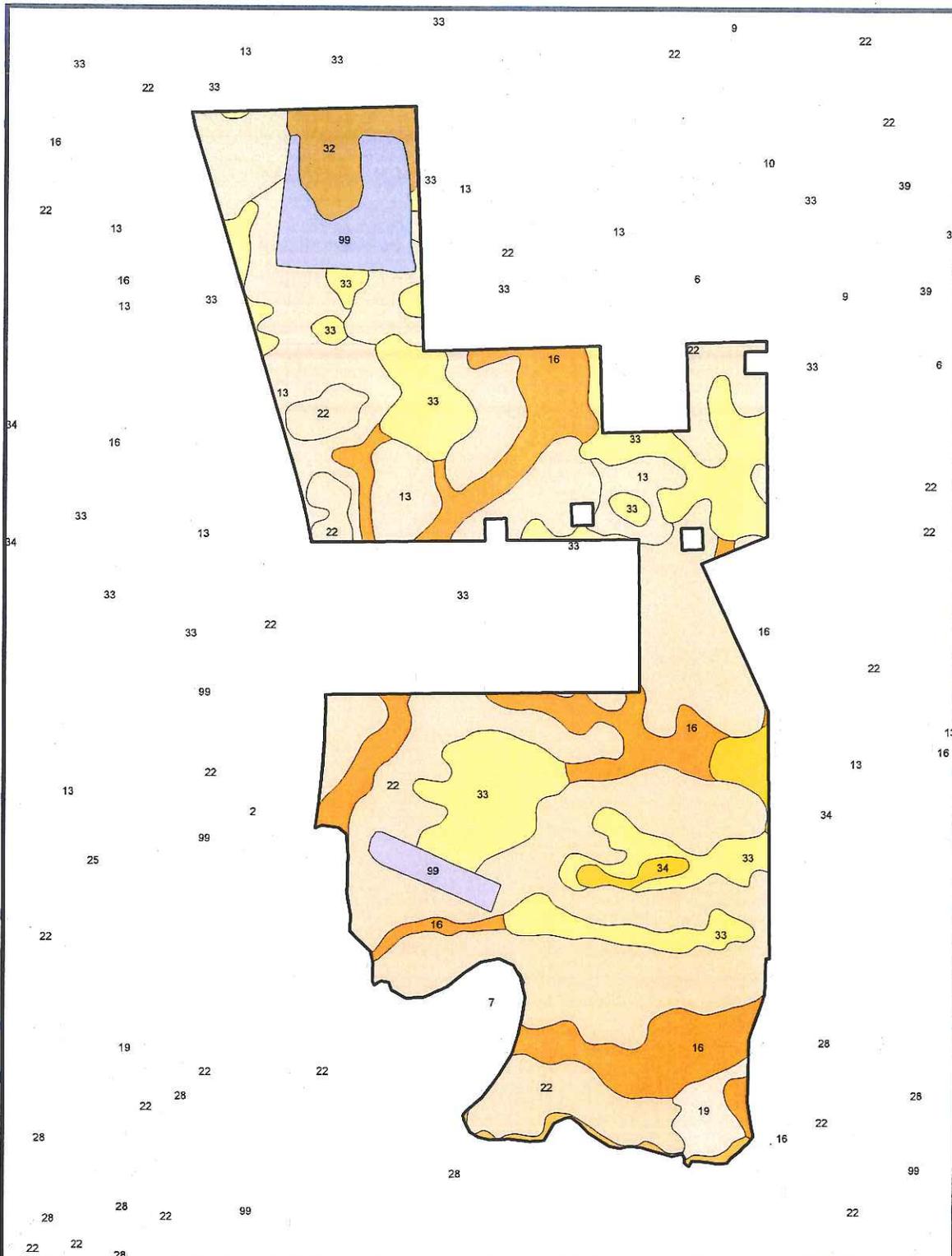
- DSAP Area 1
- NRCS Soils**
- 10 - Mandarin fine sand
- 11 - Chaires fine sand
- 13 - Goldhead fine sand
- 14 - Rutlege mucky fine sand, frequently flooded
- 15 - Buccaneer clay, frequently flooded
- 16 - Ellabelle mucky fine sand, frequently flooded
- 22 - Sapelo-Leon fine sand
- 24 - Kingsterry fine sand
- 32 - Aqualls, loamy sands, depressional
- 33 - Goldhead-Meadowbrook fine sand, depressional
- 36 - Boulogne fine sand
- 39 - Evergreen-Leon mucks, depressional
- 6 - Hurricane-Potsburg fine sands, 0 to 5 percent slopes
- 9 - Leon fine sand
- 99 - Water

Source: U.S. Department of Agriculture, National Resources Conservation Service, Soil Survey Geographic (SSURGO) database.

FIGURE A3.1.

NATURAL RESOURCES CONSERVATION SERVICE SOILS MAP OF THE EAST NASSAU DSAP 1 PROJECT SITE, NASSAU COUNTY, FLORIDA





Legend

Out Parcel Boundary	22 - Sapelo-Leon fine sand
NRCS Soils	28 - Tisonia mucky peat, tidal
07 - Kingsland mucky peat, frequently flooded	32 - Aqualfs, loamy
13 - Goldhead fine sand	33 - Goldhead-Meadowbrook fine sands, depositional
16 - Ellabelle mucky fine sand, frequently flooded	34 - Croatan muck, frequently flooded
19 - Leon fine sand, tidal	99 - Water

Source: U.S. Department of Agriculture, Natural Resources Conservation Service, Soil Survey Geographic (SSURGO) database.

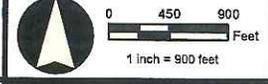
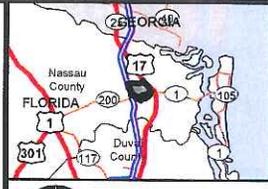


FIGURE A3.1.
NATURAL RESOURCES CONSERVATION SERVICE SOILS MAP OF THE
EAST NASSAU DSAP 1 PROJECT SITE, NASSAU COUNTY, FLORIDA

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Meadowbrook fine sands, depressional (33), Boulogne fine sand (36), and Evergreen-Leon mucks, depressional (39).

A.4 Protected Wildlife and Plant Species Potential Occurrence

State and federal databases were reviewed to determine the likelihood of occurrence for protected and wildlife and species that occur or are likely to occur in within the Property and within Nassau County. Statewide GIS databases (CLIP, FNAI, etc.) of known locations and potential habitat models for rare and imperiled species were researched. Upland and wetland communities were also evaluated during field studies in 2012 to determine the occurrence or likelihood of occurrence for protected wildlife and plant species within the Property.

Species of wildlife and plants protected under provisions of the ESA of 1973, 16 United States Code 1531-1544, December 28, 1973, as amended 1976 – 1982, 1984, and 1988 ESA and Florida rule (68A-27.0001- 27.007, F.A.C.) known to occur within the County are represented in Table A4.1. (Note: The FWC adopted new rules for listing imperiled wildlife species effective on November 15, 2010. Species previously classified as Endangered [E] or Threatened [T] were approved for reclassification as T in June 2011. Final reclassifications for SSC to T or removal from the list and for E or T that were recommended for removal from the list are pending development and approval for implementation of management plans for each species.) The likelihood of occurrence, listed within this table, is based on a comparison of known general habitat requirements by these species with the habitats found on or near the Property, the quantity, quality, and adjacency of these habitats, as well as any observations of these species during preliminary field investigations. The likelihood of occurrence for protected species was rated as observed (i.e., species presence documented), high, moderate, low, unlikely, or not applicable based on knowledge of a species' habitat preference and site conditions. A likelihood of occurrence given as "unlikely" indicates that no, or very limited, suitable habitat for this species exists on site, but the site is within the documented range of the species; "not applicable" indicates that the habitat for this species does not exist on or adjacent to the site and/or the site is not within the documented range of the species.

Table A4.1

Protected Plants and Animals with Potential for Occurrence on the East Nassau DSAP 1 Project Site, Nassau County, Florida.

Species	Habitat of Occurrence	Likelihood of Occurrence	Designated Status ¹	
			USFWS ²	FWC ³⁴
AMPHIBIANS				
<i>Ambystoma cingulatum</i> Frosted flatwoods salamander	Pine flatwoods, cypress swamp	unlikely	FT	ST
<i>Lithobates capito</i> gopher frog	Xeric oak scrub, sand pine scrub, sandhill, upland hardwoods, pine flatwoods, freshwater marsh.	moderate	—	SSC
<i>Notophthalmus perstriatus</i> striped newt	Principally longleaf pine-turkey oak sandhills, but also scrub; occasionally pine flatwoods	unlikely	C	—
REPTILES				
<i>Alligator mississippiensis</i> American alligator	Freshwater marsh, cypress swamp, mixed hardwood swamp, shrub swamp, bottomland hardwoods, lakes, ponds, rivers, streams.	low	FT(S/A)	—
<i>Caretta caretta</i> loggerhead sea turtle	Marine coastal and oceanic waters, beaches.	not applicable	FT	—
<i>Chelonia mydas</i> green sea turtle	Estuarine and marine coastal and oceanic waters, beaches.	not applicable	FE	—
<i>Dermochelys coriacea</i> leatherback sea turtle	Oceanic waters, beaches.	not applicable	FE	—

Table A4.1 Continued.

Species	Habitat of Occurrence	Likelihood of Occurrence	Designated Status ¹	
			USFWS ²	FWC ³⁴
<i>Drymarchon corais couperi</i> eastern indigo snake	Xeric oak scrub, sand pine scrub, sandhill, pine flatwoods, pine rocklands, tropical hardwood hammock, hydric hammock, wet prairie, mangrove swamp.	low	FT	—
<i>Gopherus polyphemus</i> gopher tortoise	Sandhill, sand pine scrub, xeric oak scrub, coastal strand, xeric hammock, dry prairie, pine flatwoods, mixed hardwood-pine forests, ruderal.	observed	—	ST
<i>Lepidocheilus kempii</i> Kemp's ridley sea turtle	Marine coastal waters.	not applicable	FE	—
<i>Pituophis melanoleucus mugitus</i> Florida pine snake	Xeric oak scrub, sand pine scrub, sandhill, scrubby pine flatwoods, old fields on former sandhill and scrub sites.	unlikely	—	SSC
BIRDS				
<i>Aramus guarana</i> limpkin	Freshwater marsh, mixed hardwood swamp, rivers, streams, spring runs, lake margins, ruderal.	moderate	—	SSC
<i>Charadrius melodus</i> piping plover	Beaches, tidal mud flats.	low	FT	—
<i>Cistothorus palustris griseus</i> Worthington's marsh wren	Salt marsh.	high	—	SSC
<i>Egretta caerulea</i> little blue heron	Freshwater marsh, various types of forested wetlands, lakes, streams, salt marsh, mangrove swamp, tidal mud flats.	high	—	SSC

Table A4.1 Continued.

Species	Habitat of Occurrence	Likelihood of Occurrence	Designated Status ¹	
			USFWS ²	FWC ^{3,4}
<i>Egretta thula</i> snowy egret	Freshwater marsh, various types of forested wetlands, streams, lakes, salt marsh, mangrove swamp, tidal mud flats, impoundments, ditches.	high	—	SSC
<i>Egretta tricolor</i> tricolored heron	Salt marsh, mangrove swamp, tidal mud flats, tidal creeks, tidal ditches, freshwater marsh, various types of forested wetlands, lakes and ponds.	moderate	—	SSC
<i>Eudocimus albus</i> white ibis	Freshwater marsh, various types of forested wetlands, salt marsh, mangrove swamp, tidal mud flats, ruderal.	moderate	—	SSC
<i>Falco sparverius paulus</i> southeastern American kestrel	Sandhill, pine flatwoods, dry prairie, pasture, old field.	moderate	—	ST
<i>Haematopus palliatus</i> American oystercatcher	Beaches, sandbars, tidal mud flats, shellfish beds.	low	—	SSC
<i>Mycteria americana</i> wood stork	Freshwater marsh, various types of forested wetlands, ponds, salt marsh, mangrove swamp, tidal mud flats, lagoons, flooded pastures.	high	FE	—
<i>Pelecanus occidentalis</i> brown pelican	Beaches, mangrove swamp, tidal mud flats, estuarine and marine waters.	low	—	SSC
<i>Picoides borealis</i> red-cockaded woodpecker	Sandhill, pine flatwoods.	unlikely	FE	—

Table A4.1 Continued.

Species	Habitat of Occurrence	Likelihood of Occurrence	Designated Status ¹	
			USFWS ²	FWC ^{3,4}
<i>Rhynchops niger</i> black skimmer	Beaches, tidal mud flats, sandbars, tidal creeks, estuarine bays and lagoons.	unlikely	—	SSC
<i>Sterna antillarum</i> least tern	Beaches, tidal mud flats, estuarine and marine waters, lakes.	unlikely	—	ST
MAMMALS				
<i>Sciurus niger shermani</i> Sherman's fox squirrel	Sandhill, pine flatwoods, pastures.	unlikely	—	SSC
<i>Trichechus manatus latirostris</i> Florida manatee	Estuarine bays and lagoons, seagrass beds, rivers, spring runs.	not applicable	FE	—
<i>Ursus americanus floridanus</i> Florida black bear	Upland hardwood hammock, mixed hardwood-pine forest, pine flatwoods, cabbage palm-live oak hammock, cypress swamp, bay swamp, shrub swamp, hydric hammock, bottomland hardwoods.	unlikely	—	ST

¹ FE = Federally-designated Endangered; FT = Federally-designated Threatened; FT(S/A) = Federally-designated Threatened Due to Similarity of Appearance; C=Candidate for Listing; ST = State-designated Threatened; SSC = State Species of Special Concern.

² U.S. Fish and Wildlife Service.

³ Florida Fish and Wildlife Conservation Commission.

⁴ These state classifications are pending reclassification in accordance with revisions to Rules 68A-27.003, 68A-27.005, 68A-27.0012 and 68A-27.0021, Florida Administrative Code, for managing imperiled species as adopted by the Florida Fish and Wildlife Conservation Commission on September 1, 2010, effective November 15, 2010.

A.4.1 Protected Wildlife Species

A.4.1.1 Amphibians and Reptiles

Gopher Tortoise:

The gopher tortoise (*Gopherus polyphemus*) is listed as T by the FWC but is not listed as a T or E species by the USFWS. However, the USFWS recently determined in their 12-month finding published on July 27, 2011, that listing of the gopher tortoise as a T species in the eastern portion of its range is warranted under the ESA. Gopher tortoises were added to the candidate species list with the publication of the 12-month finding, but, for the time being, the USFWS is precluded from taking further action due to limited resources. Gopher tortoises occur in a variety of natural and disturbed habitats characterized by well-drained loose soils in which to burrow, low-growing herbaceous vegetation used for food, and open sunlit areas for nesting (Diemer 1992, Mushinsky et al. 2006). Gopher tortoises typically inhabit sites with soils that support sandhill, scrub, and pine flatwoods habitats (Enge et al. 2006). Reported annual average home range sizes vary from 1.2 to 4.7 acres for males and from 0.2 to 1.6 acres for females (Enge et al. 2006). Cox et al. (1987) indicate that patches of habitat must be at least 25-50 acres in size to support a minimally viable population of gopher tortoises, but Eubanks et al. (2002) found that 47-101 acres were needed to support populations of this size. Mushinsky et al. (2006) considered 250 acres to be the minimum area necessary to maintain a population of tortoises, and a buffer zone surrounding the 250-acre parcel would provide additional security.

A 100% survey of all areas of suitable gopher tortoise habitat will be required, immediately prior to development, to conclusively determine the population size and distribution of gopher tortoises currently on the Property and evaluate available management options. The presence of gopher tortoises within the Property would generally require development of a management plan to accommodate the species if impacts are anticipated. The plan would then be submitted to the FWC as part of the permit authorization process, prior to development.

The FWC manages and regulates the gopher tortoise under provisions of a *Gopher Tortoise Management Plan* (Management Plan) that includes *Gopher Tortoise Permit Guidelines* (Permit Guidelines) and permit provisions. Permits may be issued when authorization to “take” (i.e. excavate and relocate) gopher tortoises may be necessary. Permit applications may be requested by on-line application. All survey, capture, and relocation activities associated with permits must be conducted by an “Authorized Gopher Tortoise Agent”. Land use planning that anticipates the need to accommodate the conservation needs of gopher tortoises should be designed consistent with the Permit Guidelines.

The FWC generally recommends the following options for avoiding, minimizing, and/or compensating the potential for take of gopher tortoises or their burrows to occur on lands that are proposed for development:

1. Avoid developing in the area occupied by gopher tortoises;
2. Develop so as to avoid gopher tortoise burrows by avoiding concentrations of burrows altogether and/or staying at least 25 feet from entrances of individual burrows; or
3. Relocate gopher tortoises that would otherwise be "taken" to an approved recipient site that is either on or off the development site (a 10 or Fewer Burrows Permit or Conservation Permit will be required).

FWC potential habitat models (Cox et al. 1994, McCoy et al. 2002, Endries et al. 2009) indicate that approximately 35 acres of the Property were mapped as potentially suitable gopher tortoise habitat. However, this acreage is spread out between numerous areas (~10 acres in the northern parcel, ~20 acres in the central parcel and ~5 acres in the southern parcel).

FWC *Gopher Tortoise Permitting Guidelines* require that sites that meet the criteria for *Acceptable* long-term relocation sites for gopher tortoises must be >40 acres in size and have an annual minimum depth to water table of >18 inches. The Property contains <12 acres of soils that meet the criteria for depth to water table, indicating that habitats within the Property are of relatively low quality for gopher tortoises. This information indicates that gopher tortoises and its commensals have a low likelihood of occurring within the Property.

Despite the low potential for occurrence, active gopher tortoise burrows were observed within the northern parcel in an open sandy area characterized by sand live oak (*Quercus geminata*) saplings, pawpaw (*Asimina* sp.), and shiny blueberry (*Vaccinium myrsinites*). Burrows were also observed in adjacent areas of pine plantation. Gopher tortoise surveys will be conducted immediately prior to development of specific parcels, in accordance with Permit Guidelines. Gopher tortoises that occur within areas of the Property that are proposed for development will be relocated to approved on-site or off-site recipient areas, prior to development of adjacent parcels, in accordance with Permit Guidelines.

Eastern Indigo Snake:

The eastern indigo snake (*Dyrmarchon couperi*) is listed as a T species by USFWS. The primary reasons for this listing status are over-collection and habitat loss (Moler 1992). Indigo snakes occur in a variety of habitats throughout Florida, including pine flatwoods, scrubby flatwoods, sandhill, dry prairie, tropical hardwood hammocks, edges of freshwater marshes, agricultural fields, coastal dunes, and human-altered habitats (USFWS 2008). Indigo snakes often winter in the burrows of gopher tortoises in northern portions of the range, but they also may take shelter in hollowed root channels, hollow logs, stump holes, trash piles, or the burrows of rodents,

nine-banded armadillos (*Dasypus novemcinctus*), or land crabs (*Cardisoma guanhumii*) in wetter habitats (USFWS 2008, USFWS 2011). Eastern indigo snakes are capable of moving considerable distances in a short period of time as demonstrated by records of movements of 2.2 miles in 42 days and 2.4 miles in 176 days (USFWS 2008). One individual was observed to have moved 13.8 miles over a two-year period in a mark-recapture study in southeastern Georgia (Stevenson and Hyslop 2010). Reported home range sizes of eastern indigo snakes in peninsular Florida range from 4 to 818 acres (USFWS 2011), and mean home range size reported from one Florida study was 292 acres (Dodd and Barichivich 2007). Radio-telemetry studies of indigo snakes in Georgia have revealed home ranges sizes of 87.5 to 8,885 acres for females and 350 to 3,825 acres for males (Hyslop 2007). Indigo snakes apparently need a mosaic of habitats to complete their life cycle, often feeding along wetland edges (Moler 1992). Population viability modeling suggests that indigo snake populations are susceptible to habitat fragmentation resulting from construction of roads and intensive human developments in occupied habitats, and that large areas protected from roads and human developments are needed to maintain viable snake populations (Breininger et al. 2004).

USFWS (2011) requires surveys to determine the presence of indigo snakes on sites in north and central Florida when impacts are projected for more than 25 acres of xeric habitat or for more than 25 active and inactive gopher tortoise burrows. Occurrence databases available from FWC and the FNAI contain no records of eastern indigo snakes within the Property, but the FNAI database contains a 1970 record of an indigo snake located 2.8 miles northeast of the Property. Older FWC habitat models (Cox et al. 1994) indicate that most of the Property was mapped as potentially suitable indigo snake habitat; however, recent FWC models (Endries et al. 2008; Endries and Enge, unpublished data) indicate that none of the Property was mapped as habitat potentially suitable for indigo snakes, although a large patch of potentially suitable habitat is located just to the northeast of the Property. Indigo snakes have the potential to occur based on several old records in the vicinity of the Property, but the likelihood of occurrence is low based on the rarity and large home range requirements of the species, and the relatively fragmented nature of the landscape surrounding the Property. No indigo snakes were observed during preliminary fieldwork within the Property.

Florida Pine Snake:

The Florida pine snake (*Pituophis melanoleucus mugitus*) is listed as a species of special concern by FWC but is not listed as a threatened or endangered species by USFWS. The Property is within the range of the Florida pine snake as mapped by Franz (1992). Florida pine snakes occur in open xeric habitats, including longleaf pine (*Pinus palustris*) – turkey oak (*Quercus laevis*) sandhills, sand pine (*Pinus clausa*) scrub, scrubby pine (*Pinus* spp.) flatwoods, and old fields on former sandhill sites (Franz 1992). Florida pine snakes are extremely fossorial, seeking out the tunnel systems of pocket gophers (*Geomys pinetis*), and, to a lesser extent, gopher tortoise (*Gopherus polyphemus*) burrows. Two radio-tracked females exhibited home ranges of

27.5 and 30 acres, and 3 males used areas 2-8 times larger in size (Franz 1992).

Available occurrence databases contain no records of Florida pine snakes on or near the Property. FWC habitat models (Cox et al. 1994, Endries et al. 2008) indicate that the Property was not mapped as potentially suitable habitat for Florida pine snakes, nor were there areas of potentially suitable habitat in the landscape surrounding the Property. It is unlikely that Florida pine snakes occur on the Property based on the absence of the xeric vegetation types preferred by this species.

Gopher Frog:

The gopher frog (*Rana capito*) is listed as a species of special concern by FWC but is not listed as a threatened or endangered species by USFWS. The Property is within the range of the gopher frog as mapped by Godley (1992). The distribution of gopher frogs seems to be restricted to that of gopher tortoises (*Gopherus polyphemus*) (Godley 1992). Gopher frogs typically occur in native, xeric, upland habitats, particularly longleaf pine (*Pinus palustris*) – turkey oak (*Quercus laevis*) sandhills which often support the densest populations of gopher tortoises. However, gopher frogs are also known from pine (*Pinus* spp.) flatwoods, sand pine (*Pinus clausa*) scrub, xeric hammocks, and the early successional stages of these communities. Preferred breeding habitats include seasonally flooded, grassy ponds and cypress heads that lack fish populations (Godley 1992). Gopher frogs will disperse up to 1.0 mile from breeding ponds to occupy gopher tortoise burrows, but they may also occupy a variety of other retreats including the burrows of rodents and crayfish, stump holes, and other crevices (Godley 1992).

There are no occurrence database records of gopher frogs on the Property, and FWC habitat models (Endries et al. 2008) indicate that it was not mapped as potentially suitable habitat for gopher frogs. However, there is a moderate likelihood that gopher frogs may occur on the Property based the observations of gopher tortoise burrows.

Frosted Flatwoods Salamander:

The frosted flatwoods salamander (*Ambystoma cingulatum*) is listed as a T species by the USFWS. The Property is near the eastern edge of the range of the frosted flatwoods salamander as mapped by Ashton (1992). The frosted flatwoods salamander inhabits fire-maintained, open-canopied longleaf pine (*Pinus palustris*) and slash pine savannas and flatwoods on the southeastern coastal plain (Ashton 1992, Means et al. 1996, Palis 1997). Breeding sites include pine flatwoods depressions such as cypress- or blackgum- (*Nyssa sylvatica* var. *biflora*) dominated swamps, graminoid-dominated depressions, roadside ditches, and borrow pits that are generally devoid of large predatory fishes. Management of ephemeral wetlands for herbaceous cover and an open canopy may improve breeding habitat for flatwoods salamanders (Gormon et al. 2009). Adults migrate to breeding sites between October and December and lay eggs on various substrates prior to wetlands filling with water in response to winter rains (Palis 1997). Breeding ponds

range in size from 0.05 - 23.5 acres and generally are <1.6 feet deep (Palis 1996). Post-larval flatwoods salamanders are fossorial, often occupying crayfish (*Procambarus* spp.) burrows, and inhabit mesic pine-wiregrass (*Aristida stricta*) flatwoods and savannas with little to no midstory and an open overstory in the uplands surrounding breeding ponds. Movements of 1.1 miles have been recorded away from breeding ponds and into surrounding pine flatwoods (Ashton 1992), and movements of 985-1,640 feet away from breeding ponds have also been reported (Means et al. 1996). Home range sizes of 0.37 acre have been reported (Ashton 1992), and approximately 2,500 acres of terrestrial habitat surrounding a breeding site is probably needed to sustain a breeding population (Palis 1997). The principal threats to flatwoods salamander populations are habitat destruction as a result of agricultural and silvicultural practices (e.g., clearcutting, mechanical site preparation including bedding), hydrological alteration, fire suppression, and residential and commercial development (Means et al. 1996, Palis 1997).

Available databases contain no records of frosted flatwoods salamanders occurring on or near the Property, which was not mapped as potentially suitable flatwoods salamander habitat by FWC (Endries et al. 2009). Moreover, the Property is outside the documented range of this species, and intensive silvicultural operations have likely eliminated preferred habitats for this species. Frosted flatwoods salamanders are unlikely to occur on the Property.

Striped Newt:

The striped newt (*Notophthalmus perstriatus*) is not listed as a T or E species or a SSC by either the FWC or USFWS. However, the USFWS recently determined in their 12-month finding published on June 7, 2011, that listing of the striped newt as E or T is warranted under the ESA. Striped newts were added to the candidate species list with the publication of the 12-month finding, but for the time being USFWS is precluded from taking further action due to limited resources. The Property is within the range of the striped newt as mapped by Christman and Means (1992). The preferred habitat of striped newts is longleaf pine – turkey oak (*Quercus laevis*) sandhills with an intact ground cover containing wiregrass, but this species is also found in scrub and scrubby flatwoods habitats (Christman and Means 1992, USFWS 2011). Striped newts have long life spans (approximately 12 - 15 years) and a complex life history. They breed exclusively in small (typically less than 12.4 acres), isolated, ephemeral ponds that lack predaceous fish and are interspersed in and surrounded by xeric upland habitats (USFWS 2011). Maidencane has been found at ephemeral ponds where striped newts have been found, and seems to be a good indicator of previous extent of flooding in ponds (LaClaire and Franz 1990, LaClaire 1995).

Striped newts occupy terrestrial habitats at considerable distances from breeding ponds. Striped newts have been observed to have moved up to 2,330 feet from ponds into surrounding uplands (Dodd and Cade 1998), and Dodd (1996) found that only 28 percent of amphibians were captured >1,300 feet from wetlands. Johnson (2003) recommended a protected area

extending 3,280 feet from breeding sites as upland “core habitat” surrounding breeding ponds. Striped newts form metapopulations that persist in isolated fragments of longleaf pine-wiregrass ecosystems, with ponds functioning as focal points for local breeding populations (Johnson 2001, Johnson 2005). Maintaining connectivity between uplands and breeding ponds of diverse hydroperiods is essential for striped newts to recolonize local breeding ponds and maintain metapopulation viability (Johnson 2005, Dodd and Johnson 2007). The principal threats to striped newts have been identified as conversion of natural habitats to intensively managed pine plantations; loss of habitat to urban development; and degradation of habitat due to fire suppression, off-road vehicle use, and road construction (USFWS 2011).

Available databases contain no records of occurrence of striped newts within the Property, and FWC habitat models (Endries et al. 2009) did not map the property as potentially suitable habitat for striped newts. It is unlikely that striped newts occur within the Property based on the absence of documented occurrences, FWC models that indicate that the Property apparently does not support suitable habitats, and because intensive silvicultural operations have likely eliminated preferred habitats for this species.

A.4.1.2 Birds

Bald Eagle:

The bald eagle (*Haliaeetus leucocephalus*) is protected by the USFWS under provisions of the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (effective August 9, 2007). Recovery goals have been achieved for this species; therefore, the bald eagle is no longer listed or protected as a T species under the U.S. ESA of 1973, as amended. The USFWS has implemented National Bald Eagle Management Guidelines (National Guidelines) (May 2007) to assist private landowners and others plan land-use activities in proximity to active bald eagle nests by measures that will minimize the likelihood of causing “disturbance” to nesting bald eagles, as defined under the BGEPA. The FWC also removed the bald eagle from classification and protection as a T species under Florida Rule and implemented a Florida Bald Eagle Management Plan (Florida Plan) (effective May 9, 2008). The Florida Plan includes Florida Bald Eagle Management Guidelines (Florida Guidelines) and permit provisions. We will coordinate with both the USFWS and FWC for guidance prior to undertaking any activity that may result in “disturbance” of nesting bald eagles.

The FWC Bald Eagle Nest Database was reviewed to determine the locations of all nests that occur on or in close proximity to the Property. The FWC database contains no records of bald eagle nests on or within 660 feet of the Property. The nearest recorded bald eagle nest is No. NA001, which is located approximately 5.1 miles southeast of the Property, was last surveyed in 2010 and was determined active at that time.

No bald eagle nests were observed during preliminary field studies. However, a juvenile bald eagle was observed near the large borrow area lake within the southeastern portion of the Property. Large pine trees suitable for nesting exist within several large areas of hydric pine flatwoods (625), and large strands of mixed forested wetlands (630). Due to the presence of large pine trees suitable for nesting, the presence of potential foraging habitat (i.e., large borrow area lakes), and the proximity of the Property to a large body of water (approximately 2.5 miles from the Nassau River), the likelihood of a nest occurring on the Property is moderate.

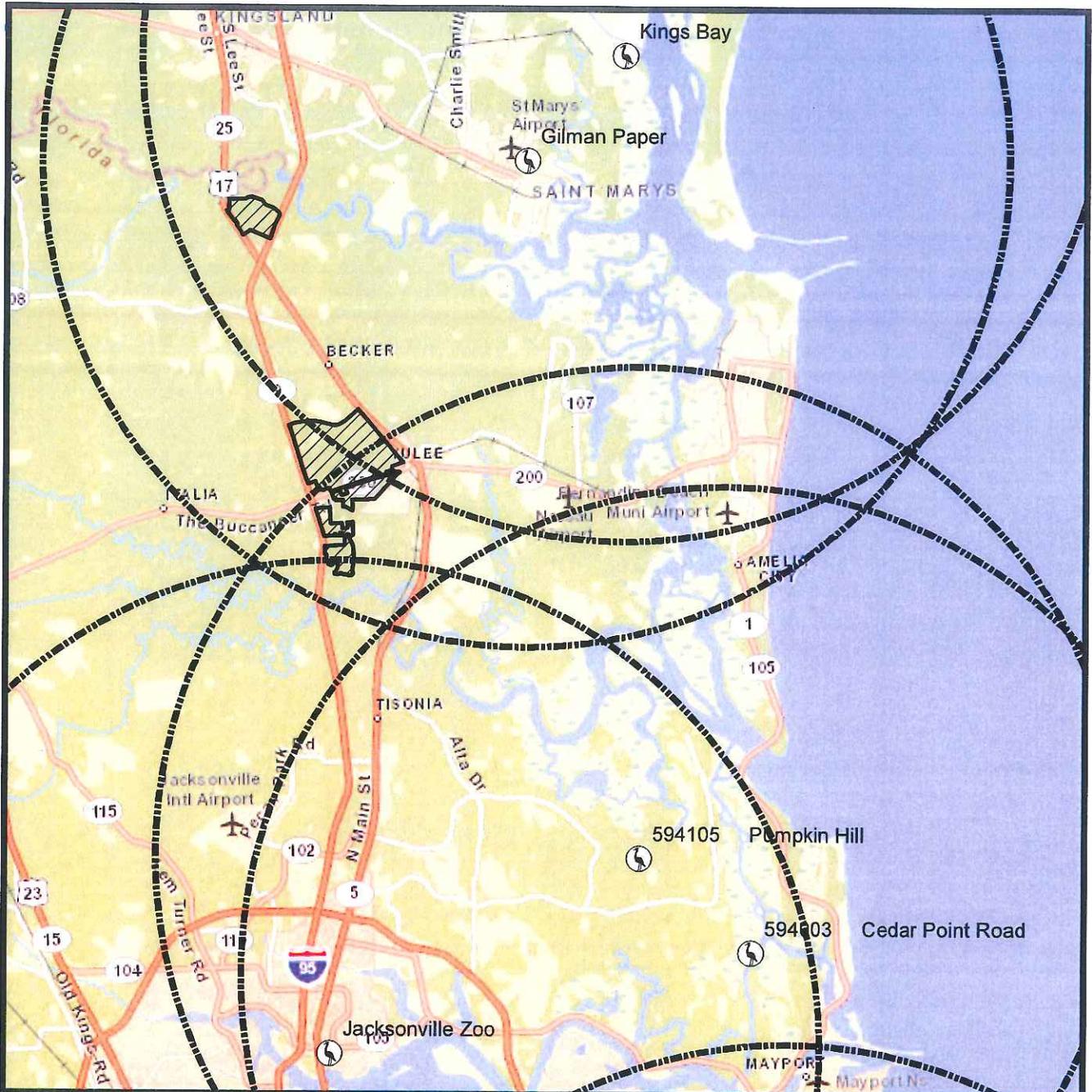
Wood Stork:

The wood stork (*Mycteria americana*) is listed as an E species by USFWS. There are no records of a wood stork nesting colony on the Property based on the most recent FWC statewide survey in 1999 and based on data available from USFWS through 2009. Wood storks typically return to the same rookery sites each year to nest (Ogden 1996). Although wood storks in south Florida will travel up to 18.6 miles from rookeries to forage in wetlands and return food to incubating adults and nestlings during the nesting season (Cox et al. 1994), wetlands within 13 miles of known rookeries are considered by USFWS to comprise Core Foraging Areas for nesting wood storks within the area of north Florida where the Property is located.

The UF database of wood stork nesting colonies through 2010 contains records of two colonies in Florida and one colony in southeast Georgia within 13 miles of the Property (Figure A4.1). The Pumpkin Hill colony (number 594105) is located ~ 11.9 miles southeast of the central parcel of the Property. Wetlands in the southern third of the central parcel are within the USFWS-designated Core Foraging Area for this rookery. Numbers of wood stork nests in the Pumpkin Hill colony since 2002 were as follows: 2009 – not active; 2008 – 22 nests; 2007 – not active; 2006 – not active; 2005 – 42 nests; 2004 – not active; 2003 – 120 nests; and 2002 – 45 nests. The following table summarizes nesting records for nesting colonies within 13 miles of the central and southern parcels, for the period from 2006 through 2010:

Rookery							Distance	
Number	Name	2010	2009	2008	2007	2006	Miles	Direction
594105	Pumpkin Hill	0	ND	75	0	0	10.7	SE
-	Jacksonville Zoo	150	88	86	47	ND	12.6	S
SNN 243	Gilman Paper (GA)	310	220	230	80	110	10.7	NE

In addition, the UF database contains records of three colonies in southeast Georgia within 13 miles of the northern parcel of the Property (Figure A4.1). Nesting records in these colonies for the period from 2006 through 2010 are as follows:



Legend

-  Project Site
-  Wood Stork Nesting Colony
-  Core Foraging Area (13 Miles)

Sources: DSAP 1 boundary received from Barry J. Wilcox, AICP, LEED Green Associate; VHB, Inc. (2012-02-03). Wood stork nesting colony locations and Core Foraging Area boundaries obtained from USFWS, UF, or modeled by BDA. Streets base map obtained online from ESRI.



FIGURE A4.1
WOOD STORK NESTING COLONIES AND CORE FORAGING AREAS NEAR
THE EAST NASSAU DSAP 1 PROJECT SITE, NASSAU COUNTY, FLORIDA

BDA BREEDLOVE, DENNIS & ASSOCIATES, INC.
 Environmental Consultants
 330 W. Canton Ave., Winter Park, FL 32789 • 407-677-1382

Rookery							Distance	
Number	Name	2010	2009	2008	2007	2006	Miles	Direction
SNN 245	Rayland (GA)	0	0	0	0	0	6.1	N
SNN 246	Kings Bay (GA)	0	0	0	0	135	10.2	NE

This information indicates that consultation with USFWS will be necessary if proposed activities affect wetlands on the Property. Wood storks also may forage in on-site wetlands outside of the breeding season if hydrologic conditions are suitable. This information indicates that there is a high likelihood that wood storks may occur on the Property during the nesting season.

Wading Bird Rookeries (1999):

The FWC wading bird rookery database from the 1999 statewide survey contains no records of rookeries used by other protected species of wading birds on the Property, but there are records of two wading bird rookeries within 9.3 miles of the Property. These rookeries were not active in the 1999 statewide survey, but they were active during the 1987-1988 surveys when nests were recorded of snowy egrets (*Egretta thula*) and little blue herons (*Egretta caerulea*), both of which are protected as SSC by FWC. Protected species of wading birds, other than wood storks, will fly up to 9.3 miles from the nesting site to forage in wetlands and return food to incubating adults and nestlings (Cox et al. 1994). Wetlands within 9.3 miles of the rookeries of protected species of wading birds are considered important to wading bird nesting success.

The wetlands on the Property may be important to the nesting success of protected species of wading birds based on past records of nesting within normal foraging distances for wading birds and because wading birds have a tendency to establish new undocumented nesting sites in response to changing hydrologic conditions. Protected species of wading birds may be expected to forage in on-site wetlands during other times of the year if hydrologic conditions are suitable. No wading birds were observed during preliminary field studies within the Property. However, other waterfowl and wading birds (e.g., lesser scaup (*Aythya affinis*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*)) were observed within the borrow area lakes/marsh system on the western side of the Property. The freshwater marsh and emergent vegetation associated with the borrow lakes may provide potentially suitable foraging habitat for protected wading bird species.

Limpkin:

The limpkin (*Aramus guarana*) is listed as a SSC by the FWC. The Property is within the range of limpkins as mapped by Bryan (1996). Limpkins are found

along the wide and well-vegetated shallows of rivers and streams statewide; around lakes in peninsular Florida; and in marshes, broad swales, strand swamps, sloughs, and impoundments in south Florida. The range of the limpkin is almost identical with that of the Florida applesnail (*Pomacea paludosa*), the primary food item in the diet of limpkins (Bryan 1996). Nests are constructed in a wide variety of situations, including slowly sinking aquatic vegetation, among tall marsh grasses, between the knees of bald-cypress, in vine-covered shrubs, in the tops of cabbage palms, and on high cypress branches. Limpkins typically occupy exclusive territories in riparian habitats that abut linearly along rivers and lake edges during nesting season (Bryan 1992). Territories average 1.93 acres in size during high population years and 9.39 acres in more normal years (Bryan 1992).

The eastern third of the central parcel of the Property is within a Breeding Bird Atlas block (Kale et al. 1992) in which limpkins were confirmed to have nested in the late 1980s and early 1990s. FWC habitat models indicate that the forested wetlands within this parcel drain to the east to Lofton Creek were mapped as potentially suitable habitat for limpkins (Endries et al. 2009).

The northern parcel of the Property is ~ 4.4 miles northwest of a BBA block with a record of confirmed nesting. FWC habitat models indicate that the forested wetlands along the northern border of the Property were mapped as potentially suitable habitat for limpkins (Endries et al. 2009). The southern parcel is ~ 1.2 miles southwest of a BBA block with a record of confirmed nesting. FWC habitat models indicate that the forested wetlands along a narrow stream draining the southwestern portion of the Property were mapped as potentially suitable habitat for limpkins (Endries et al. 2009). There is a moderate likelihood that limpkins occur on the Property based the presence of potentially suitable wetlands habitats in relatively close proximity to an area with confirmed nesting records.

Florida Sandhill Crane:

The Florida sandhill crane (*Grus canadensis pratensis*) is listed as T by the FWC. The Florida sandhill crane is a resident, breeding, non-migratory subspecies of sandhill crane (*Grus canadensis*). The greater sandhill crane (*Grus canadensis tabida*) also occurs in Florida as a wintering migrant, arriving in Florida during October and November and beginning spring migration in late February (Stys 1997). Florida sandhill cranes nest in shallow, emergent palustrine wetlands, particularly those dominated by pickerelweed (*Pontederia cordata*) and maidencane. They feed in a variety of open, upland habitats, mostly prairies, but also human-manipulated habitats such as sod farms, ranchlands, pastures, golf courses, airports, and suburban subdivisions (Nesbitt 1996, Wood 2001). Home ranges of individual pairs overlap with those of adjacent pairs, and average approximately 1,100 acres. Core nesting territories within home ranges vary from approximately 300 acres to 625 acres and are aggressively defended from other cranes (*Grus* sp.) (Wood 2001).

No Florida sandhill cranes were observed during preliminary field studies. However, portions of the borrow area lakes on the eastern side of the Property contain freshwater marsh that may provide potentially suitable nesting habitat for sandhill cranes. Therefore, a moderate likelihood exists that Florida sandhill cranes may nest or forage within the Property.

Red-cockaded Woodpecker:

The red-cockaded woodpecker (*Picoides borealis*) is listed as an E species by USFWS. The Property is within the USFWS consultation area for red-cockaded woodpeckers, and it is within the range of the species as mapped by Wood (2001). Nesting habitat for this species consists of open old-growth pine forests >60-80 years old (USFWS 2003). Stands of pines >50 years of age comprise preferred foraging habitat, and red-cockaded woodpeckers usually forage within 0.5 mile of cavity trees (USFWS 2003). Average home range size of red-cockaded woodpeckers in central Florida has been reported as 319 acres (Delotelle et al. 1995). Female red-cockaded woodpeckers usually disperse no further than two miles to establish territories of their own in areas where populations are dense, but in areas where populations are sparsely distributed females may disperse up to 15 miles (USFWS 2003).

FWC and FNAI databases contain no records of red-cockaded woodpecker groups on or near the Property, which was not mapped as potentially suitable habitat for this species by FWC (Endries et al. 2009). The nearest record of red-cockaded woodpecker cavity trees is on a private parcel of land 13.5 miles northwest of the Property. Young pine plantations characterized by high stocking density dominate the uplands on the Property, and habitat conditions on the Property are unsuitable for red-cockaded woodpeckers. The Property is beyond normal foraging and dispersal distances from other known red-cockaded woodpecker cavity trees, and the landscape between known cavity trees and the Property is a mosaic of pine plantations and forested wetlands, making it unlikely that dispersing red-cockaded woodpeckers could reach the Property. It is unlikely that red-cockaded woodpeckers occur within the Property based on the lack of suitable habitat conditions, the disturbed nature of the surrounding landscape, and the distance between the Property and known red-cockaded woodpecker cavity trees.

Southeastern American Kestrel:

The southeastern American kestrel (*Falco sparverius paulus*) is listed as T by FWC. Two subspecies of American kestrels occur in Florida, the eastern American kestrel (*F. s. sparverius*) and the southeastern American kestrel. The eastern kestrel winters in Florida, arriving in September and leaving in the early spring months of March-April (Stys 1993). Southeastern and eastern kestrels co-occur in Florida during the winter, during which time they are virtually indistinguishable in the field. Surveys intended to determine the presence of resident kestrels should be conducted between April and August, and surveys for nesting kestrels ideally would be conducted in April or May (Stys 1993, Wood 2001). Southeastern kestrels are secondary cavity nesters, typically using cavities excavated by other species in trees or snags.

Southeastern kestrels occasionally nest in human structures such as utility poles (Wood 2001). Kestrels feed in open areas, such as croplands, pasture, and open pine woods that are adjacent to nest sites. Home ranges around nest sites range 125-800 acres (Stys 1993, Wood 2001).

Available occurrence databases contain no records of southeastern kestrels on or near the Property, and FWC habitat models (Endries et al. 2009) indicate that the Property does not contain potentially suitable habitat for southeastern American kestrels. A record of nesting kestrels in the Florida Breeding Bird Atlas (BBA; Kale et al. 1992) block is located ~3.2 miles south of the northern parcel of the Property. Also, ~400 feet west of the southern parcel of the Property is a BBA block in which kestrels were confirmed to have nested in the late 1980s and early 1990s. The likelihood of occurrence is moderate for this species, based on the proximity of the Property to an area with a confirmed nesting record and the potential presence of wetland snags that could serve as nesting cavities in close proximity to open clearcut areas that could be used for foraging. Also supporting this designation is the presence of potentially suitable foraging habitat (i.e., open herbaceous cover adjacent to wooded areas) within on-site utility easements, and the presence of potentially suitable nesting sites (i.e., wooden utility poles) within the easements in the central parcel of the Property.

A.4.1.3 Mammals

Florida Black Bear:

The Florida black bear (*Ursus americanus floridanus*) is a wide-ranging omnivore that is listed as T by the FWC. Florida black bears are dependent on forest vegetation, but are not limited to specific forest types (Eason 2003). Forested wetlands provide optimal habitat, but any forested areas of large size with diverse foods and dispersed cover can support bears. Home range sizes vary but average approximately 9,200 acres for females and 39,700 acres for males (Eason 2003). Male Florida black bears have been reported moving distances of 13.7 – 87.0 miles and females have been reported moving 8.7 - 47.9 miles (Maehr et al. 1988, Wooding and Hardiskey 1988, Wooding et al. 1992, Maehr 1997). Individuals tend to be solitary, except for females with young and groups at abundant food sites, but Florida black bears tolerate considerable range overlap (Eason 2003). Reserves ranging in size from 494,200–998,400 acres have been recommended as necessary to support viable populations of black bears (Cox et al. 1994, Kautz and Cox 2001). Although black bears historically ranged throughout Florida, the current range generally consists of the natural and semi-natural landscapes surrounding large parcels of public land throughout the state. Black bear habitat has been mapped as Primary Range and Secondary Range (Simek et al. 2005). Primary Range was defined as areas with evidence of females and reproduction, and factors such as habitat, general bear use, and roadkill records were used to refine range boundaries. Secondary Range was defined as areas outside of Primary Range where general bear use has been

documented by nuisance calls, sightings, and roadkill records, but evidence of females or reproduction has not been confirmed.

FWC databases contain very few records of black bear presence in the landscape surrounding the Property. There is one record of a roadkilled black bear from 1988 on SR A1A approximately 0.35 miles west of the Property, and there is one undated record of a nuisance bear in Yulee approximately 0.25 miles east of the Property. The Property is approximately 34 miles east of the Primary Range of the Osceola black bear population and is approximately 33 miles northeast of the Secondary Range of the Ocala population as mapped by FWC (Simek et al. 2005). The entire Property and most of the surrounding landscape was mapped as potentially suitable habitat for black bears by FWC (Endries et al. 2009) because the area possesses land cover characteristics similar to areas where black bears are known to occur. Despite the two records of roadkilled and nuisance bears near the Property and the presence of potentially suitable habitat on and surrounding the Property, available data indicate that the Property is not in an area known to support a sustainable bear population. Therefore, it is unlikely that black bears regularly occur on the Property.

Therefore, it is unlikely that black bears regularly occur on the Property, but the possibility exists that Florida black bears could occasionally reach the Property as they disperse from Primary and Secondary ranges to the west and southwest.

Sherman's Fox Squirrel:

Sherman's fox squirrel (*Sciurus niger shermanii*) is listed as a species of special concern by FWC but is not listed as a threatened or endangered species by USFWS. The Property is within the range of Sherman's fox squirrels as mapped by Kantola (1992) and Wood (2001). Optimal fox squirrel habitat has been characterized as mature, fire-maintained longleaf pine (*Pinus palustris*) - turkey oak (*Quercus laevis*) sandhills and pine (*Pinus* spp.) flatwoods by Kantola (1992). Preferred habitat has also been described as mature and open pine and pine-hardwood associations by Edwards and Guynn (2003). Sherman's fox squirrels are diurnal, solitary animals whose home ranges may overlap, but separate core home range areas are maintained (Kantola 1992). Male and female home ranges average 196 acres and 82 acres, respectively (Wooding 1997). Due to relatively low population densities and large home range sizes, preserves of at least 5,000-10,000 acres have been recommended as necessary to support viable populations (Kantola 1986, Cox et al. 1994). Available databases contain no occurrence records from the Property, and FWC habitat models (Endries et al. 2009) did not map the Property as potentially suitable for Sherman's fox squirrels. It is unlikely that Sherman's fox squirrels occur on the Property due to the absence of the open mature forest habitats required by this species.

A.4.2 Protected Plant Species

No protected plant species were observed during preliminary field studies within the Property. The FWC WILDOBS database contains no records of rare and imperiled species of wildlife on or near the Property. The FNAI natural heritage database contains no records of rare or imperiled plants, animals, and natural communities on or near the Property.

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