SAJ-2017-02731
Approved JD Form 1
Gravity Flow Route

US Army Corps of Engineers

**APPROVED JURISDICTIONAL DETERMINATION FORM**
**U.S. Army Corps of Engineers**

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

## SECTION I: BACKGROUND INFORMATION

**A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): 11 July 2018**

**B. DISTRICT OFFICE, FILE NAME, AND NUMBER: CESAJ-RD-SP, Schwartz Single Family Residence, SAJ-2017-02731**

**C. PROJECT LOCATION AND BACKGROUND INFORMATION:** The project site is located 17437 70th Street North, Section 26, Township 42 South, Range 40 East, Loxahatchee, Palm Beach County, Florida.

Two Approved Jurisdictional Determination Forms were completed to document the Significant Nexus Determination (SND) for two separate water flow routes. The Indian Trial Improvement District (ITID) provided a map (Attachment 2) that outlines the direction of flow from the project site to two separate TNWs under two different flow scenarios. The first, under normal water levels, water will gravity flow through a series of ITID canals to the Central and South Florida (C&SF) C-51 Canal. The second, under high water levels, the water flow direction is manipulated by the use of three different pump stations throughout the ITID and water from the project site will be pumped north and west through a series of ITID canals and discharge into the C&SF L-8 Canal. In this approved juridictional determination, two forms are utilized to represent the two different flow paths and SNDs and are referenced as (1) Gravity Flow and (2) Pumped Flow throughout the entire document including 5 attachments. This form will document the SND under gravity flow conditions.

State:Florida County/parish/borough: Palm Beach County City: Loxahatchee
Center coordinates of site (lat/long in degree decimal format): Lat. 26.781718° **N**, Long. -80.318404° **W**.
Universal Transverse Mercator: 17
Name of nearest waterbody: Indian Trails Improvement District (ITID) un-named north/south canal
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Central and South Florida (C&SF) C-51 Canal
Name of watershed or Hydrologic Unit Code (HUC): The gravity flow pathway includes two watersheds/ Hydrologic Unit Code (HUC) 12 areas: (1) HUC 12, 030902010100, for Corbett Wildlife Management Area; and (2) HUC 12, 030902060900, for the Lower West Palm Beach Canal.

☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

**D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):**

☒ Office (Desk) Determination. Date: 20 October 2017, 14 February 2018, 23 May 2018, 5 July 2018
☒ Field Determination. Date(s): 19 October 2017, 11 January 2018, and 19 June 2018

## SECTION II: SUMMARY OF FINDINGS

**A. RHA SECTION 10 DETERMINATION OF JURISDICTION.**

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

**B. CWA SECTION 404 DETERMINATION OF JURISDICTION.**

There **Are** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
   - ☐ TNWs, including territorial seas
   - ☐ Wetlands adjacent to TNWs
   - ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   - ☐ Non-RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   - ☒ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   - ☐ Impoundments of jurisdictional waters
   - ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

Non-wetland waters: linear feet: width (ft) and/or acres.
Wetlands: 1.04 acres.

c. **Limits (boundaries) of jurisdiction** based on: **1987 Delineation Manual**
Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain:

## SECTION III: CWA ANALYSIS

### A. TNWs AND WETLANDS ADJACENT TO TNWs

**The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below**.

1. **TNW**
Identify TNW: .

Summarize rationale supporting determination: .

2. **Wetland adjacent to TNW**
Summarize rationale supporting conclusion that wetland is "adjacent": .

### B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

**This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.**

**The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.**

**A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.**

**If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.**

1. **Characteristics of non-TNWs that flow directly or indirectly into TNW**

(i) **General Area Conditions:**
Watershed size: 196,538 **acres** See Attachment 1, Figure 9. The gravity flow pathway includes two watersheds/ Hydrologic Unit Code (HUC) 12 areas: (1) HUC 12, 030902010100, for Corbett Wildlife Management Area; and (2) HUC 12, 030902060900, for the Lower West Palm Beach Canal.
Drainage area: 154,307 **acres.** See Attachment 1, Figure 10. The Gravity flow pathway includes two South Florida Water Management District (SFWMD) drainage basins, the L-8 and C-51 W.
Average annual rainfall: 60.99 inches
Average annual snowfall: 0 inches

[3] Supporting documentation is presented in Section III.F.
[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

**(ii) Physical Characteristics:**

(a) Relationship with TNW:

☐ Tributary flows directly into TNW.

☒ Tributary flows through **3** tributaries before entering TNW.

Project waters are **10-15** river miles from TNW.
Project waters are **1 (or less)** river miles from RPW.
Project waters are **5-10** aerial (straight) miles from TNW.
Project waters are **1 (or less)** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain: .

Identify flow route to TNW[5]: See Attachment 1 Figure 7 and 8. Water from the north end of the project area will gravity flow south by overland sheetflow and subsurface flow into the swale located within parcel's boundaries, immediately north of 70th Street North. The section of the roadside swale located within the property boundaries is contiguous with the adjacent wetlands on site and considered part of the onsite wetlands. Water from the onsite swale will continue to flow east of the project area within the roadside swale and become the non-jurisdictional conveyance, Attachment 1, Figure 2 and Figure 12. Water will continue to flow east for 0.16 miles within the non-jurisdictional conveyance/swale, where it will discharge into Tributary A/ ITID unnamed north-south canal. Water will flow 0.14 miles north within Tributary A, where it will discharge into Tributary B/ITID unnamed east-west canal. Water will continue to flow east in Tributary B for 4.41 miles, where it discharges into Tributary C. Tributary B changes names several times in the ITID map, Attachment 2. It starts as an unnamed ITID canal to ITID "D" Canal, to ITID "C" Canal. Water in Tributary C will flow south approximately 8.18 miles where it will discharge into the C&SF C-51 Canal, a TNW.
Tributary stream order, if known: unknown.

(b) General Tributary Characteristics (check all that apply):

**Tributary** is: ☐ Natural

☒ Artificial (man-made). Explain: Tributaries A, B, and C were constructed by the ITID for controlling the levels of water within Loxahatchee and the surrounding area. The canals were dug from a mixture of uplands and wetlands to drain the surrounding areas, provide flood control, and to convert the land use to low density residential and agricultural development.

☒ Manipulated (man-altered). Explain: The ITID is responsible for managing the water levels and direction of flow within Loxahatchee and the entire 298 district area. The road side swales are designed to capture stormwater runoff, where it is discharged through culverts into the interior canal system (Attachment 2). A series of canals and pump stations either allow water to gravity flow or be pumped to manage water levels during the rainy season. There are two general flow conditions, which water can travel to a TNW, (1) by gravity and (2) by the manipulation of water through the use of pumps. The tributary details provided here in this section is by gravity flow, using the diagram provided in Attachment 2 as well as Figures 7 and 8 of Attachment 1.

**Tributary A** properties with respect to top of bank (estimate):
Average width: 20 feet
Average depth: 1-2 feet
Average side slopes: **2:1.**

**Tributary B** properties with respect to top of bank (estimate):
Average width: 40 feet
Average depth: 3-5 feet
Average side slopes: **2:1.**

**Tributary C** properties with respect to top of bank (estimate):
Average width: 130 feet
Average depth: 10-15 feet
Average side slopes: **2:1.**

Primary tributary substrate composition (check all that apply):

| | | |
|---|---|---|
| ☒ Silts | ☐ Sands | ☐ Concrete |
| ☐ Cobbles | ☐ Gravel | ☐ Muck |
| ☐ Bedrock | ☐ Vegetation. Type/% cover: | |
| ☐ Other. Explain: . | | |

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: The tributaries are generally open water with vegetated side slopes. Vegetation is generally maintained and/or mowed, and contains a varitey of obligate, facultative wet and facultative vegetation, depending on water levels and location..

Presence of run/riffle/pool complexes. Explain: N/A.

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

Tributary geometry: **Relatively straight**
Tributary gradient (approximate average slope): 2 %

(c) Flow:
Tributary provides for: **Seasonal flow**
Estimate average number of flow events in review area/year: **20 (or greater)**
Describe flow regime: Water flows continuously for at least a period of three month during the wet season, which generally starts in May of each year. If water levels get too high the system may be switched from gravity flow to pumped flow conditions, changing the direction of flow. Pumped flow route is described in Approved Jurisdictional Determination Form 2.
Other information on duration and volume: .

Surface flow is: **Discrete and confined.** Characteristics: Flow within the tributaries is limited to the edges of the canal banks and footprint of the ITID canals. .

Subsurface flow: **Unknown**. Explain findings: It is presumed that subsurface would gravity flow to the east/ southeast as the topography of the land is lower in the east and south east side of the watershed..
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☒ Bed and banks
☒ OHWM[6] (check all indicators that apply):
- ☐ clear, natural line impressed on the bank
- ☐ changes in the character of soil
- ☐ shelving
- ☒ vegetation matted down, bent, or absent
- ☐ leaf litter disturbed or washed away
- ☐ sediment deposition
- ☒ water staining
- ☐ other (list):
- ☐ the presence of litter and debris
- ☐ destruction of terrestrial vegetation
- ☐ the presence of wrack line
- ☐ sediment sorting
- ☐ scour
- ☒ multiple observed or predicted flow events
- ☐ abrupt change in plant community

☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
☐ High Tide Line indicated by:
- ☐ oil or scum line along shore objects
- ☐ fine shell or debris deposits (foreshore)
- ☐ physical markings/characteristics
- ☐ tidal gauges
- ☐ other (list):

☐ Mean High Water Mark indicated by:
- ☐ survey to available datum;
- ☐ physical markings;
- ☐ vegetation lines/changes in vegetation types.

**(iii) Chemical Characteristics:**
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: Tannin stained, clear, lawn runoff water. Water quality varies depending on the rate of flow, and quantity of water.
Identify specific pollutants, if known: Pollutants include nitrogen and phosporus from lawn fertilizers, as well as sediments from side slopes and pesticides..

**(iv) Biological Characteristics. Channel supports (check all that apply):**
☐ Riparian corridor. Characteristics (type, average width): .
☒ Wetland fringe. Characteristics: Obligate, facultative wet, and facultative vegetation emergent vegetation exists along the littoral shelves of Tributaries A, B and C. These areas are foraging habitat for federally listed and non-listed species as well as other invertebrates.
☒ Habitat for:
☒ Federally Listed species. Explain findings: Wood Stork (Mycteria americana), Eastern Indigo Snake (Drymarchon couperi), Everglade Snail Kite (Rostrhamus sociabilis plumbeus). Tributaries A and B, and the littoral shelves of Tributary C are located within 18.6 miles of three wood stork nesting colonies: 619220 Palm Beach County Solid Waste Authority, 619315, and Loxahatchee 1. According to the Habitat Management Guidelines for the Wood Stork in the Southeast Region, written by John C. Ogden, storks feed primarily on small fish between 1-8 inches in length. Successful foraging sites are those where the water is between 2-15 inches deep. Suitable foraging habitat and prey as outlined above are located within Tributaries A and B and along the shallower littoral areas of Tributary C. Fish between 1 and 8 inches long were observed within Tributaries A and B during the site visit conducted on 19 June 2018.

[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7] Ibid.

Tributaries A, B, and C are located within the Consultation Area of the Everglade Snail Kite and contain suitable foraging habitat for the species. During the 19 June 2018 site visit, the exotic apple snail egg casings (Pomacea maculata) were observed on the culverts and attached to littoral vegetation at the edges of the Tributaries. This indicates a potential food source for the Everglade snail kite within the tributaries.

By letter dated 1 August 2017, the U.S. Fish and Wildlife Service (Service) provided a written description of Eastern indigo snake habitat in south Florida to include pine flatwoods, tropical hammocks, and the edges of freshwater marshes, which are located adjacent to Tributaries A, B, and C. Additionally the upper parts of the berms and levees surrounding the tributaries are prime gopher tortoise habitat, which is also an indicator of eastern indigo snake habitat. .

☒ Fish/spawn areas. Explain findings: Fish were observed in Tributaries A and B. Fish ranged in size from 1 inch to almost 8 iches. No fish were observed within Tributary C, but due to the size and depth of the tributary, reasonable scientific judgement presumes their existence.

☐ Other environmentally-sensitive species. Explain findings: .

☒ Aquatic/wildlife diversity. Explain findings: Tributaries A, B and C support an aquatic ecosystem that supports aquatic plants, fish, invertebrates, amphibians, wading birds, raptors, and other avian species, and reptiles such as snakes and alligators.

**2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

**(i) Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size:1.04 acres

Wetland type. Explain:Palustrine Forested.

Wetland quality. Explain:Low to Moderate. The site contains less than 50% coverage of Class I and II invasive/exotic species as listed by the Florida Exotic Pest Plant Council. The southwest corner of the site contains the most invasive/exotic vegetation and it is also the highest elevation. Vegetation includes Brazilian pepper (Schinus terebinthifolius), lygodium (Lygodium microphyllum), and Melaleuca (Melaleuca quinquenervia). The remainder of the site contains a canopy of Melaleuca, intermixed with earleaf acacia (Acacia auriculiformis), Brazilian pepper (Schinus terebinthifolia), and slash pine (Pinus ellottii). The understory consists of mostly native desirable wetland vegetation including swamp fern (Blechnum serrulatum), chain fern (Woodwardia virginica), cocoplum (Chrysobalanus Icaco), Spike rush (Eleocharis cellulosa), lanceleaf arrowhead (Sagittaria lancifolia), Virginia dayflower (Commelina virginica), and sawgrass (Cladium jamaicense). The hydrology of the wetland is also fairly good, small amphibians and invertebrates were observed during the October 2017 site visit. The soils are slightly disturbed and show signs of slight disturbance, such as the pocket of loamy/clay (0.06 acres) documented as uplands on the site because the soils did not qualify for any of the hydric soil indicators. Therefore the quality of wetlands on site is moderate. Additionally a modified Wetland Rapid Assessment Procedure (MWRAP) Functional assessment was conducted for the review area. It received an MWRAP score of 0.40 out of a possible 1.0.

Project wetlands cross or serve as state boundaries. Explain: N/A.

(b) General Flow Relationship with Non-TNW:

Flow is: **Ephemeral flow**. Explain: During periods of high water, when the onsite wetlands become saturated, water will overland and subsurface flow into the adjacent road side swale/non jurisdictional conveyance.

Surface flow is**: Overland sheetflow**

Characteristics: Water from the north end of the project area will gravity flow south by overland sheetflow and subsurface flow into the swale loacted within parcel's boundaries, immediately north of 70th Street North. The section of the roadside swale located within the property boundaries is contiguous with the adjacent wetlands on site and considered part of the onsite wetlands. Water from the onsite swale will continue to flow east of the project area within the roadside swale and become the non-jurisdictional conveyance that discharges into Tributary A. The swale is designed to collect stormwater from properties and discharge it into the adjacent canals (Attachment 2). The location of the swale, that is considered wetlands, and the adjacent road side swale/ non-juridictional conveyance is shown in Attachment 1, Figure 2 and Figure 12.

Subsurface flow: **Yes**. Explain findings: No formal testing for subsurface flow was completed for the site. Water tables were observed at all three data points sampled both during the wet (October) and dry (January) seasons. Data point 1 was sampled during the wet season, and a water table was observed 2 inches from the soil surface. The remainder of the site during the 19 October 2018 site visit had standing water covering about 95 percent of the site. Data points 2 and 3 were sampled during the dry season, when there was no standing water on site. Data point 2 had a visible water table 12 inches from the soil surface and data point 3 had a visible water table 14 inches from the soil surface. Data points 1 and 2 qualified for the primary hydrologic indicator for having a water table within 12 inches of the soil surface and data point 3 qualified for the dry season water table, a secondary indicator of hydrology. Since water tables were observed during both the wet and dry seasons throughout the site, there is presumably subsurface flow into the adjacent stormwater swale/non-jurisdictional conveyance.

☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

☐ Directly abutting

☒ Not directly abutting

☒ Discrete wetland hydrologic connection. Explain: The wetland is contiguous with the non-jurisdictional swale which provides an overland and subsurface hydrologic connection to Tributary A.

☒ Ecological connection. Explain: The flora and fauna within the project area, through the significant nexus conveyance provide foraging and habitat for a variety of listed and non-listed wildlife including raptors such as hawks, owls, osprey, and Everglade snail kite, wading birds such as wood storks, limpkins, and state listed species such as herons, and white ibis. Additionally indigo snake and gopher tortoise habitat is located within and adjacent to the project area and along the water's flow path to the TNW.

☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **10-15** river miles from TNW.
Project waters are **5-10** aerial (straight) miles from TNW.
Flow is from: **Wetland to navigable waters.**
Estimate approximate location of wetland as within the **20 - 50-year** floodplain.

**(ii) Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: During the 19 Ocotber 2017 site visit, 90% of the site contained standing water. Water was clear and ranged from 1 to 24 inches in depth.

Identify specific pollutants, if known: Waters within the wetland may contain pesticides, fertilizers, fecal coliform from pet waste, oil, gasoline, or other pollutants commonly associated with suburban development and assocaited infrastructure.

**(iii) Biological Characteristics. Wetland supports (check all that apply):**

☐ Riparian buffer. Characteristics (type, average width): .

☒ Vegetation type/percent cover. Explain: See Attachment 4 for Data Sheets and photos from site visits conducted on 19 October 2017 and 11 January 2018.

☒ Habitat for:

☒ Federally Listed species. Explain findings:Wood Stork (Mycteria americana), Eastern Indigo Snake (Drymarchon couperi). The project site contains is located within 18.6 miles of two wood stork nesting colonies: 619220 Palm Beach County Solid Waste Authority and 619315. According to the Habitat Management Guidelines for the Wood Stork in the Southeast Region, written by John C. Ogden, storks feed primarily on small fish between 1-8 inches in length. Successful foraging sites are those where the water is between 2-15 inches deep. Suitable foraging habitat and prey as outlined above are located within the project site as observed during the wet season. Additionally, the site contains suitable habitat for the eastern indigo snake. By letter dated 1 August 2017, the U.S. Fish and Wildlife Service (Service) provided a written description of eastern indigo snake habitat in south Florida to include pine flatwoods, tropical hammocks, and the edges of freshwater marshes.

☐ Fish/spawn areas. Explain findings: .

☐ Other environmentally-sensitive species. Explain findings: .

☒ Aquatic/wildlife diversity. Explain findings: During the 19 October 2017 site visit, tad poles and frogs were observed within the standing water on site. Small fish were also observed ranging from 1-2 inches in length. The open and deeper areas provide foraging and resting habitats for a variety of ambibians, invertebrates, avian, and repile species.

**3. Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: **30 (or more)**
Approximately ( 848.63 ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following: The location of the similarly situated wetlands are found in Attachment 1, Figures 15 &16.

| # | Wetland Name/Number | Abutting (Y/N) | Size (acres) |
|---|---|---|---|
| 1 | Wetland A | Y | 0.07 |
| 2 | Wetland B | Y | 2.6 |
| 3 | Wetland C | Y | 1.24 |
| 4 | Wetland D | Y | 1.18 |
| 5 | Wetland E | Y | 1.33 |
| 6 | Wetland F | Y | 1.32 |
| 7 | Wetland G | Y | 1.1 |
| 8 | Wetland H | Y | 1.37 |
| 9 | Wetland I | Y | 1.45 |
| 10 | Wetland J | Y | 2.8 |
| 11 | Wetland K | Y | 1.8 |
| 12 | Wetland L | Y | 0.97 |

| | | | |
|---|---|---|---|
| 13 | Wetland M | Y | 0.54 |
| 14 | Wetland N | Y | 0.97 |
| 15 | Wetland O | Y | 1.18 |
| 16 | Wetland P | Y | 1.25 |
| 17 | Wetland Q | Y | 0.89 |
| 18 | Wetland R | Y | 0.49 |
| 19 | Wetland S | Y | 1 |
| 20 | Wetland T | Y | 3.28 |
| 21 | Wetland U | Y | 1 |
| 22 | Wetland V | Y | 1 |
| 23 | Wetland W | Y | 0.68 |
| 24 | Wetland X | Y | 1.1 |
| 25 | Wetland Y | Y | 1.91 |
| 26 | Wetland Z | Y | 1.57 |
| 27 | Wetland AA | Y | 2.26 |
| 28 | Wetland AB | Y | 2.36 |
| 29 | Wetland AC | Y | 2.56 |
| 30 | Wetland AD | Y | 2 |
| 31 | Wetland AE | Y | 3.92 |
| 32 | Wetland AF | Y | 2.67 |
| 33 | Wetland AG | Y | 1.17 |
| 34 | Wetland AH | Y | 1.12 |
| 35 | Wetland AI | Y | 1.18 |
| 36 | Wetland AJ | Y | 783 |
| 37 | Wetland AK | Y | 12.3 |
| **Total** | | | **848.63** |

Summarize overall biological, chemical and physical functions being performed: The 848.63 acres of similarly situated wetlands adjacent to the non-jurisdictional conveyance and Tributaries A, B and C serve as habitat for listed and non-listed species, provide water quality treatment for stormwater runoff from adjacent properties, trapping of sediments and pollution control, detrital export, and groundwater filtration and recharged.

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## C. SIGNIFICANT NEXUS DETERMINATION

**A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.**

**Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:**

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

**Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:**

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

   **Note**: ***On 1 December 2008, the US Supreme Court declined to hear the McWane/Robison case. This case involved a federal appeals court (11th Circuit) ruling that had the effect of overturning a criminal conviction of an industrial pipe manufacturer found guilty of illegally dumping oil, lead, zinc, grease, and other pollutants into Avondale Creek in Alabama, a permanently flowing stream that eventually flows into the navigable Black Warrior River. The appeals court overturned the case because they interpreted the Rapanos decision as requiring a significant nexus determination on all waters except TNWs and wetlands adjacent to the TNWs, and in this case a significant nexus determination was not performed on Avondale Creek, an RPW.***

   ***The 2 December 2008 Rapanos guidance acknowledges (footnote 16, bottom of page 3) the Supreme Court's refusal to hear the McWane/Robison case. Therefore, in the 11th Circuit (Florida, Georgia, and Alabama) the McWane/Robison decision, which contradicted the June 2007 Rapanos Guidance concerning jurisdiction of RPWs and wetlands directing abutting RPWs, is final. Therefore, when performing an approved JD, the Corps must perform a significant nexus determination on ALL waters and wetlands except for TNWs and wetlands adjacent to TNWs.***

   Physical:
   The direction of water flow from the project site to a TNW was provided by the ITID Director of Stormwater Operation (See Attachment 2). The ITID is responsible for managing the water within the road side swales and canals within Loxahatchee. The system is designed so that stormwater will collect in the roadside swales and discharge by subsurface and overland flow by culverts into the smaller east-west and north-south canals. The smaller canals, discharge to medium and then large canals, which ultimately discharge to TNWs. There are two general flow conditions, which water can travel to a TNW from the project site (1) by gravity and (2) by the manipulation of water through the use of pumps. This significant nexus determination outlines the flow from the project site to the C&SF C-51 Canal, a TNW, through gravity flow. A second approved jurisdictional determination (Form 2) is attached to show the significant nexus under pumped conditions, which water ultimately flows north and west to the C&SF L-8 canal, another TNW.

   Historically the project area was entirely a wetland as part of a mosaic wetland slough system as shown in Attachment 1, Figures 3-5. According to the site visits conducted on 19 October 2017 and 11 January 2018, the project area includes a 1.04 acre wetland area (Attachment 1, Figure 2) that has a canopy of varying coverages of Melaleuca, intermixed with earleaf acacia (Acacia auriculiformis), Brazilian pepper (Schinus terebinthifolia), and slash pine (Pinus ellottii). The understory, where present, consists of mostly native desirable wetland vegetation including swamp fern (Blechnum serrulatum), chain fern (Woodwardia virginica), cocoplum (Chrysobalanus Icaco), Spike rush (Eleocharis cellulosa), lanceleaf arrowhead (Sagittaria lancifolia), Virginia dayflower (Commelina virginica), and sawgrass (Cladium jamaicense). There is a 0.06 acre area, within the 1.15 acre parcel that has a canopy dominated by earleaf acacia that was determined to have non-hydric soil based on the soil description because only a 12-inch soil plug could be obtained due to water refusal.

   Water tables were observed at all three data points sampled both during the wet (October) and dry (January) seasons. Data point 1 was sampled during the wet season, and a water table was observed 2 inches from the soil surface. The remainder of the site during the 19 October 2018 site visit had standing water covering about 95 percent of the site. Data points 2 and 3 were sampled during the dry season, when there was no standing water on site. Data point 2 had a visible water table 12 inches from the soil surface and data point 3 had a visible water table 14 inches from the soil surface. Since water tables were observed during both the wet and dry seasons throughout the site, there is presumably subsurface flow into the adjacent stormwater swale/non-jurisdictional conveyance.

   Water flows from the project area by overland and subsurface flow east into the adjacent roadside swale located on the north side of 70th Street North, and continues to flow unobstructed through four culverts under existing driveways before discharging through a fifth culvert into Tributary A (Attachment 1, Figure 12), a total of 0.16 miles. As shown in Figure 12, water was observed on 19 June 2018, discharging from the non-jurisdictional conveyance culvert into Tributary A., a relatively permanent water. The water within Tributary A flows north, 0.14 miles where it will discharge into Tributary B, a relatively permanent water. Onsite

observations on 19 June 2018 confirmed the northern flow direction within Tributary A. Additionally during the 19 June 2018 site visit, the resident, who owns the home immediately east of Tributary A, on the north side of 70th Street North confirmed that "strong flow to the north trapped her escaped peacock" in Tributary A earlier in the month.

According to the ITID, flow map in Attachment 2, water will continue to gravity flow east in Tributary B for 4.41 miles, where it discharges into Tributary C, a relatively permanent water. Tributary B changes names several times in the ITID map, Attachment 2. It starts as an unnamed ITID canal to ITID "D" Canal, to ITID "C" Canal. During the 19 June 2018 site visit Corps observed water flowing within Tributary B, to the east. Vegetation was matted down within the canal providing evidence of regular flows to the east, see Attachment 1 Figure 14. Water in Tributary C will flow south approximately 8.18 miles where it will discharge into the C&SF C-51 Canal, a TNW. There are approximately 848.63 acres of wetland directly abutting Tributaries A, B, and C. Water from the C&SF C-51 Canal flows east and eventually discharges into the Lake Worth Lagoon, tidal waters.

Chemical:
The project area wetlands in combination with the similarly situated wetlands that encompass the relevant reach drainage area provide water quality treatment for stormwater runoff from adjacent low-density single family residential properties by trapping of sediments and nutrients creating pollution control, detrital export, and groundwater filtration and groundwater recharge.

Biological:

The wetlands within the drainage area encompassed by the relevant reach tributary intercept runoff from the surrounding uplands. This water helps to concentrate and route detritus from the uplands, as well as that produced by the wetland vegetation itself, to the waters and TNW further down the landscape. Specifically, large quantities of decomposing biomass are conveyed to the RPW and TNW thereby providing important primary productivity toward the biological maintenance of the food web supported by the TNW. The residence time of water may be relatively short during periods of peak flow when water levels are highest, and therefore would favor rapid delivery of pollutants, including both dissolved and particulate chemicals typically found in moderately developed suburban to rural landscapes such as N, P, sediment, oil, tar, gasoline, fertilizers, pesticides, and pet waste. However, during much of the year flow volumes are much lower and residence times are substantially increased, allowing dissolved and suspended pollutants to interact with sediments and vegetation, thus likely ameliorating the poorer water quality conditions present during higher flow periods. Pollutants being contributed to these wetlands by surrounding uplands are reasonably concluded to include constituents typical of roadside runoff as well as those commonly associated with suburban development. Additional important chemical and physical water quality functions such as denitrification, carbon storage, and sediment and phosphorous retention are also provided by the similarly situated wetlands.

The wetlands within the project area, similarly situated wetlands and those along Tributaries A, B, and C, are of utmost importance biologically since the majority of wetlands and other non-wetland areas in the watershed have been altered for agriculture, residential, or other purposes. These wetlands provide breeding grounds for species that cannot reproduce in faster-moving water and move between wetlands and uplands over their lifecycle. The wetlands, along with the tributary system, provides wildlife habitat (e.g. feeding, nesting, spawning, and rearing of young) for many aquatic species that live and forage in traditional navigable waters. The wetlands also maintain a more consistent water temperature that the larger tributaries (Tributary C), which is important to many aquatic species. The close proximity of the wetlands, and occasional surface water connections, may affect the species distribution and diversity in these wetlands. Specifically, surface water connections to more permanent water bodies allow the introduction of fish species that would otherwise not be present in these wetlands. This will in turn have a direct effect on the species of amphibians and reptiles that can use the wetlands.

Specifically the wetlands within the project area, adjacent to the non-jurisdictional conveyance, Tributaries A, B, and C, and adjacent wetlands support a variety of Threatened and endangered species, including wood stork and Everglade snail kite foraging habitat, eastern indigo snake habitat. Tributaries A and B, and the littoral shelves of Tributary C are located within 18.6 miles of three wood stork nesting colonies: 619220 Palm Beach County Solid Waste Authority, 619315, and Loxahatchee 1. According to the Habitat Management Guidelines for the Wood Stork in the Southeast Region, written by John C. Ogden, storks feed primarily on small fish between 1-8 inches in length. Successful foraging sites are those where the water is between 2-15 inches deep. Suitable foraging habitat and prey as outlined above are located within Tributaries A and B, along the shallower littoral areas of Tributary C, and may be located within the adjacent 848.63 acres of wetlands. Fish between 1 and 8 inches long were observed within Tributaries A and B during the site visit conducted on 19 June 2018, and fish 1-2 inches long were observed within the project area's wetland on the 19 October 2017 site visit.

Tributaries A, B, and C are located within the Consultation Area of the Everglade Snail Kite and contain suitable foraging habitat for the species. During the 19 June 2018 site visit, the exotic apple snail egg casings (*Pomacea maculata*) were observed on the culverts and attached to littoral vegetation at the edges of the Tributaries. This indicates a potential food source for the Everglade snail kite along the tributaries and potentially within the 848.63 acres of adjacent wetlands.

By letter dated 1 August 2017, the U.S. Fish and Wildlife Service (Service) provided a written description of eastern indigo snake habitat in south Florida to include pine flatwoods, tropical hammocks, and the edges of freshwater marshes, which are located adjacent to the project area, Tributaries A, B, and C, and the 848.63 acres of adjacent wetlands. Additionally the upper parts of the berms and levees surrounding the tributaries are prime gopher tortoise habitat, which is also an indicator of eastern indigo snake habitat.

In addition, to the listed species above a variety of non-listed species utilize the aquatic ecosystems within the project area, non-jurisdictional conveyance, Tributaries A, B, and C, and the 848.63 acres of similarly situated wetlands to as foraging and nesting habitat. These species include aquatic plants, fish, invertebrates, amphibians, wading birds, raptors, and other avian species, and reptiles such as snakes and alligators.

Considering the high potential for development in the area and existing water quality issues within the watershed, specifically along the flow path from the project area to the TNW, the functions of the wetlands in the project area play an important role relating to downstream water quality. Based on the biological, chemical, and physical functions described above, this office has concluded that a Significant Nexus exists between this relevant reach, its similarly situated adjacent wetlands and the downstream TNW.

## D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

     Provide estimates for jurisdictional waters in the review area (check all that apply):
     - ☐ Tributary waters: linear feet width (ft).
     - ☐ Other non-wetland waters: acres.
       Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   - ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   - ☐ Tributary waters: linear feet width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☒ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: **1.04** acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**

[8] See Footnote # 3.

☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.**[9]
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

**E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):**[10]
☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

**Identify water body and summarize rationale supporting determination:** .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .
☐ Wetlands: acres.

**F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):**
☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
☐ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

## SECTION IV: DATA SOURCES.

**A. SUPPORTING DATA. Data reviewed for JD (check all that apply** - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

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[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

☐ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: .
☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☒ Data sheets prepared by the Corps: Jerilyn Ashworth in Attachment 4.
☐ Corps navigable waters' study: .
☒ U.S. Geological Survey Hydrologic Atlas: See Attachment 1. Hydrologic Unit Code (HUC) 12 areas: (1) HUC 12, 030902010100, for Corbett Wildlife Management Area; and (2) HUC 12, 030902060900, for the Lower West Palm Beach Canal, for a total watershed area of 307 square miles/ 196,538 acres.
☐ USGS NHD data.
☒ USGS 8 and 12 digit HUC maps.
☐ U.S. Geological Survey map(s). Cite scale & quad name: .
☒ USDA Natural Resources Conservation Service Soil Survey. Citation:Riviera fine sand, depressional, 0-1 percent slopes, All NRCS soil maps located in Attachment 3.
☒ National wetlands inventory map(s). Cite name: Attachment 1, Figure 6 contains a figure with the Nationsl Wetland Inventory Map. Project area is located within Palustrine Emergent Layer of the National Wetland Inventory. Class: Scrub-shrub; Subclass Broadleaf deciduous, seasonally flooded and partially drained.
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date):Google Earth and University of Florida Historical Aerial Imagery, Attachment 1.
or ☒ Other (Name & Date): Site visit photos in Attachment 4 from 19 Ocotber 2017 and 11 January 2018..
☒ Previous determination(s). File no. and date of response letter: Preliminary Jurisdictional determination dated 14 February 2018.
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☒ Other information (please specify): U.S. Department of Agriculture, NRCS, National Water and Climate Center Rainfall Data, WETS Tables were downloaded for West Palm Beach International Airport, Period Of Record from 1938-2018. Using the data as downloaded from the WETS table, two Direct Antecedent Rainfall Evaluation Method (DAREM) Analyses were conducted for each site visit, (19 October 2017 and 11 January 2018), to determine if the climatic conditions during the site visits were completed during a period of normal, above normal or below normal rainfall. The DAREM analysis for the West Palm Beach International Airport Station showed that rainfall was normal during both site visits. See Attachment 5 for the DAREM analyses and WETS tables.

**B. ADDITIONAL COMMENTS TO SUPPORT JD:**

The Corps completed two site visits to the project review area at the request of the applicant. The first site visit was completed on 19 October 2017 during the height of the wet season and a second site visit was completed on 11 January 2018, during the dry season. All delineations were completed in accordance with the 1987 Wetland Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region, Version 2.0, November 2010. The Regional Supplements to the Corps of Engineers Wetland Delineation Manual (hereafter called the Corps Manual). The Corps Manual provides technical guidance and procedures, from a national perspective, for identifying and delineating wetlands that may be subject to regulatory jurisdiction under Section 404 of the Clean Water Act (33 U.S.C. 1344) or Section 10 of the Rivers and Harbors Act (33 U.S.C. 403). According to the Corps Manual, identification of wetlands is based on a three-factor approach involving indicators of hydrophytic vegetation, hydric soil, and wetland hydrology.

The initial site visit to determine the extent of wetlands on site was completed on 19 October 2017. The site was accessed from the 70th Street North, and Corps personnel walked from the southern edge north, about one third of the site. Standing water was observed throughout the site as shown in Attachment 4. Frogs and small fish were also observed within the water on site. There were also water marks noted on the slash pine and melaleuca trees. Only the southern portion of the site was accessible due to high water levels, approximately 18 + inches. One higher elevation area was observed at the southwest corner of the site, located 15 feet north of the southern edge of the property and approximately 30 feet east of the west boundary. It was the only observable dry area within the site and had the most disturbed vegetation (exotic/invasive), thus Data Point 1 was recorded. The plot size of the data point was 15 feet to the south and 30 feet from the soil plug on the north, west and east sides.

At Data Point 1, all three factors were evaluated, hydrology, hydrophytic vegetation, and hydric soils, using the Corps Manual and Atlantic and Gulf Coastal Plain Region, Version 2.0 data sheets. Wetland hydrology indicators are used in combination with indicators of hydric soil and hydrophytic vegetation to determine whether an area is a wetland under the Corps Manual. Indicators of hydrophytic vegetation and hydric soil generally reflect a site's medium- to long-term wetness history. They provide readily observable evidence that episodes of inundation or soil saturation lasting more than a few days during the growing season have occurred repeatedly over a period of years and that the timing, duration, and frequency of wet conditions have been sufficient to produce a characteristic wetland plant community and hydric soil morphology. If hydrology has not been altered, vegetation and soils provide strong evidence that wetland hydrology is present (National Research Council 1995). Wetland hydrology indicators provide evidence that the site has a continuing wetland hydrologic regime and that hydric soils and hydrophytic vegetation are not relicts of a past hydrologic regime. Wetland hydrology indicators confirm that an episode of inundation or soil saturation occurred recently, but may provide little additional information about the timing, duration, or frequency of such events (National Research Council 1995). In order for an area to qualify as having wetland hydrology, one primary indicator or two

secondary indicators must be present and recorded. The hydrology at the data point 1 included four primary indicators of hydrology: (1) Surface Water, A1; (2) High Water Table, A2; (3) Saturation, A3; and (4) Water-Stained Leaves, B9. The site also contained two secondary indicators of hydrology: (1) Geomorphic Position, D2 and (2) FAC-Neutral Test, D5. Since this data point surpassed the required one primary or two secondary hydrologic indicators, the data point was considered to have wetland hydrology.

The Corps Manual defines hydrophytic vegetation as the community of macrophytes that occurs in areas where inundation or soil saturation is either permanent or of sufficient frequency and duration to influence plant occurrence. The manual uses a plant-community approach to evaluate vegetation. Hydrophytic vegetation decisions are based on the assemblage of plant species growing on a site, rather than the presence or absence of particular indicator species. Hydrophytic vegetation is present when the plant community is dominated by species that require or can tolerate prolonged inundation or soil saturation during the growing season. All plants species, have been divided into one of five categories containing a wetland indicator status: obligate (OBL), facultative wet (FACW), facultative (FAC), facultative upland (FACU), and upland (UPL). The most recent update to the National Wetland Plant List was completed in 2016 and used for the delineation of the project area.

Data point 1 used the Dominance Test to qualify the vegetation on site as hydrophytic. The "50/20 rule" was used to determine the dominant species across all the strata observed. Three dominant species were recorded for the data point, two of the species have a FAC wetland indicator status, and one species is FACW. Since more than half (100% on data sheet 1) of the dominant plant species were rated as OBL, FACW, or FAC, the dominance test for vegetation has been fulfilled. Therefore the Corps determined that this data point contained hydrophytic vegetation.

The National Technical Committee for Hydric Soils (NTCHS) defines a hydric soil as a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (USDA Soil Conservation Service 1994). Most hydric soils exhibit characteristic morphologies that result from repeated periods of saturation or inundation that last more than a few days. Saturation or inundation, when combined with microbial activity in the soil, causes the depletion of oxygen. This anaerobiosis promotes certain biogeochemical processes, such as the accumulation of organic matter and the reduction, translocation, or accumulation of iron and other reducible elements. These processes result in distinctive characteristics that persist in the soil during both wet and dry periods, making them particularly useful for identifying hydric soils in the field (USDA Natural Resources Conservation Service 2010). Hydric soil indicators are formed predominantly by the accumulation or loss of iron, manganese, sulfur, or carbon compounds in a saturated and anaerobic environment. If one or more hydric soil indicators are present, then the soil is considered hydric. The soil plug from data point 1 qualified has hydric because three hydric soil indicators were recorded: (1) Strip Matrix, S6; (2) Polyvalue Below Surface, S8; and (3) Thin Dark Surface, S9.

Data Point 1 contained all three factors, wetland hydrology, hydrophytic vegetation, and hydric soil, therefore it was considered to be a wetland. Initially, after the 19 October 2017 site visit, the Corps determined the entire site to be a wetland. Using reasonable scientific judgement, since a majority of the site was inaccessible due to high water levels, the Corps reasoned that if this area highest in elevation, qualified as a wetland, then the remainder of the lower elevations with higher qualify facultative wet and obligate vegetation on the site would also qualify as wetlands. A preliminary jurisdictional determination was issued on 20 October 2017. The applicant did not sign the preliminary JD and requested that another site visit be conducted during the dry season, when the site was not flooded.

A second site visit was conducted on 11 January 2018. Two additional data points were recorded. Data point 2 was taken in an area with a canopy dominated by earleaf Acacia (Acacia auriculiformis) and did not contain an understory of swamp fern (Blechnum serrulatum). The plot was measured to have only a 20-foot diameter, due to the location of earleaf acacia. This deviates from the Corps Manual, which requires a 30-foot radius. At Data Point 2, the Corps observed and recorded three primary indicators of hydrology: (1) High Water Table, A2; (2) Water Marks, B1; and (3) Water-Stained Leave, B9. A water table was observed within 12 inches of the soil surface. Water marks were observed on the base of the trees within the plot sampled and water-stained leaves were photographed using the Corps Manual for comparison (Attachment 4). The site also contained two secondary indicators of hydrology: (1) Geomorphic Position, D2 and (2) FAC-Neutral Test, D5. Since this data point surpassed the required one primary or two secondary hydrologic indicators, the data point was considered to have wetland hydrology. Data point 2 used the Dominance Test to qualify the vegetation on site as hydrophytic. The "50/20 rule" was used to determine the dominant species across all the strata observed. Six dominant species were recorded for the data point, two of the species have a FAC wetland indicator status, two were FACW, and two species were UPL. Since more than half (66.7% on data sheet 2) of the dominant plant species were rated as OBL, FACW, or FAC, the dominance test for vegetation has been fulfilled. Therefore the Corps determined that this data point contained hydrophytic vegetation.

Data point 2 did not have soils that were considered hydric. The top two soil horizons had a loamy/clay texture because they passed the "bounce test" as outlined in the Corps Manual. Since only a 12-inch soil plug was sampled, due to water refusal, it cannot be determined if the soil would have passed the hydric soil indicator for A-11, Depleted below Dark Surface. The thickness requirement for the depleted layer in the A-11 hydric soil description is 6 inches, and the documented 3rd horizon was only four inches thick, ending at 12 inches. Therefore, a 0.06 acre area was removed from the review area and deemed upland, because a hydric soil indicator was not present within the described soil profile.

A third data point was taken, just to the north of Data Point 2, in an area dominated by a canopy of Melaleuca with an understory of cocoplum and swamp fern. The plot size for Data Point 3, was the standard 30-foot radius as required by the Corps Manual. The Corps observed and recorded two primary indicators of hydrology: Water Marks, B1 and Water-Stained Leave, B9 and three secondary indicators of hydrology: (1) Dry-season Water Table, C2; (2) Geomorphic Position, D2; and (3) FAC-Neutral test, D5. A water table was observed 14-inches from the soil surface. In order to qualify for a dry season water table, water must be observed within the soil pit 24 inches from the

soil surface. Water-stained leaves and water marks were photographed observed on the base of the trees within the plot sampled, see Attachment 4. Since this data point surpassed the required one primary or two secondary hydrologic indicators, the data point was considered to have wetland hydrology. Data point 3 used the Dominance Test to qualify the vegetation on site as hydrophytic. The "50/20 rule" was used to determine the dominant species across all the strata observed. Seven dominant species were recorded for the data point, three of the species have a FAC wetland indicator status, three were FACW, and one species was UPL. Since more than half (85.7% on Data Sheet 3) of the dominant plant species were rated as OBL, FACW, or FAC, the dominance test for vegetation has been fulfilled. Therefore the Corps determined that this data point contained hydrophytic vegetation. The soil plug from data point 3 qualified has hydric because one hydric soil indicators was recorded: Strip Matrix, S6. Therefore since Data Point 3 contained all three factors, wetland hydrology, hydrophytic vegetation, and hydric soil, it was documented as a wetland.

No additional data points were sampled because the Corps determined that data points 1 and 3 were representative of the remaining habitat on site. Therefore the Corps is claiming that the site contains 1.04 acres of jurisdictional wetlands. The remaining 0.11 acres contains a 0.05 acre section of roadway within the delineated property boundaries and the 0.06 acre section of uplands as described above. The data sheets and site visit photos are located in Attachment 4 of this Approved Jurisdictional Determination.

Based on the biological, chemical, and physical functions described above, this office has concluded that a Significant Nexus exists between the relevant reach tributary and its adjacent wetlands, including the project area wetlands, to the downstream TNW and therefore the project area wetlands are subject to regulation under Section 404 of the Clean Water Act.

References:

National Research Council. 1995. *Wetlands: Characteristics and boundaries*. Washington, DC: National Academy Press.

U.S. Army Corps of Engineers, 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)*. ERDC/EL TR-10-20. Vicksburg, MS: U.S. Army Engineer Research and Development Center. (http://www.saj.usace.army mil/Missions/Regulatory/Source-Book/)

USDA Natural Resources Conservation Service. 1994. *National food security act manual, third edition* (as amended). Washington, DC. (http://www.nrcs.usda.gov/programs/compliance/index html)

USDA Natural Resources Conservation Service. 2010. *Field indicators of hydric soils in the United States, Version 7.0*. ed. L. M. Vasilas, G. W. Hurt, and C. V. Noble. Washington, DC: USDA NRCS in cooperation with the National Technical Committee for Hydric Soils. (http://soils.usda.gov/use/hydric/)

SAJ-2017-02731
Approved JD Form 2
Pumped Flow Route

US Army Corps of Engineers

**APPROVED JURISDICTIONAL DETERMINATION FORM**
**U.S. Army Corps of Engineers**

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

## SECTION I: BACKGROUND INFORMATION

**A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): 11 July 2018**

**B. DISTRICT OFFICE, FILE NAME, AND NUMBER: CESAJ-RD-SP, Schwartz Single Family Residence, SAJ-2017-02731**

**C. PROJECT LOCATION AND BACKGROUND INFORMATION:** The project site is located 17437 70th Street North, Section 26, Township 42 South, Range 40 East, Loxahatchee, Palm Beach County, Florida.

Two Approved Jurisdictional Determination Forms were completed to document the Significant Nexus Determination (SND) for two separate water flow routes. The Indian Trial Improvement District (ITID) provided a map (Attachment 2) that outlines the direction of flow from the project site to two separate TNWs under two different flow scenarios. The first, under normal water levels, water will gravity flow through a series of ITID canals to the Central and South Florida (C&SF) C-51 Canal. The second, under high water levels, the water flow direction is manipulated by the use of three different pump stations throughout the ITID and water from the project site will be pumped north and west through a series of ITID canals and discharge into the C&SF L-8 Canal. In this approved juridictional determination, two forms are utilized to represent the two different flow paths and SNDs and are referenced as (1) Gravity Flow and (2) Pumped Flow throughout the entire document including 5 attachments. This form will document the SND under pumped flow conditions.

State:Florida County/parish/borough: Palm Beach County City: Loxahatchee
Center coordinates of site (lat/long in degree decimal format): Lat. 26.781718° **N**, Long. -80.318404° **W**.
Universal Transverse Mercator: 17
Name of nearest waterbody: Indian Trails Improvement District (ITID) un-named north/south canal
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: C&SF L-8 Canal
Name of watershed or Hydrologic Unit Code (HUC): HUC 12, 030902010100, for Corbett Wildlife Management Area
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

**D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):**
☒ Office (Desk) Determination. Date: 20 October 2017, 14 February 2018, 23 May 2018, 5 July 2018
☒ Field Determination. Date(s): 19 October 2017, 11 January 2018, and 19 June 2018

## SECTION II: SUMMARY OF FINDINGS

**A. RHA SECTION 10 DETERMINATION OF JURISDICTION.**

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

**B. CWA SECTION 404 DETERMINATION OF JURISDICTION.**

There **Are** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
   ☐ TNWs, including territorial seas
   ☐ Wetlands adjacent to TNWs
   ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   ☐ Non-RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   ☒ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   ☐ Impoundments of jurisdictional waters
   ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: linear feet: width (ft) and/or acres.
   Wetlands: 1.04 acres.

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

c. **Limits (boundaries) of jurisdiction** based on: **1987 Delineation Manual**
Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain:

## SECTION III: CWA ANALYSIS

### A. TNWs AND WETLANDS ADJACENT TO TNWs

**The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below**.

1. **TNW**
Identify TNW: .

Summarize rationale supporting determination: .

2. **Wetland adjacent to TNW**
Summarize rationale supporting conclusion that wetland is "adjacent": .

### B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

**This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.**

**The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.**

**A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.**

**If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.**

1. **Characteristics of non-TNWs that flow directly or indirectly into TNW**

(i) **General Area Conditions:**
Watershed size: 108,660 **acres** See Attachment 1, Figure 19. The pumped flow pathway is located within the watershed/ Hydrologic Unit Code (HUC) 12: 030902010100, for Corbett Wildlife Management Area
Drainage area: 106,286 **acres.** See Attachment 1, Figure 20. The pumped flow pathway is located within the South Florida Water Management District (SFWMD) L-8 Drainage Basin.
Average annual rainfall: 60.99 inches
Average annual snowfall: 0 inches

(ii) **Physical Characteristics:**
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.

[3] Supporting documentation is presented in Section III.F.
[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

☒ Tributary flows through **3** tributaries before entering TNW.

Project waters are **10-15** river miles from TNW.
Project waters are **1 (or less)** river miles from RPW.
Project waters are **2-5** aerial (straight) miles from TNW.
Project waters are **1 (or less)** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain: N/A.

Identify flow route to TNW[5]: See Attachment 1 Figure 7, 17, and 18. Water from the north end of the project area will gravity flow south by overland sheetflow and subsurface flow into the swale located within parcel's boundaries, immediately north of 70th Street North. The section of the roadside swale located within the property boundaries is contiguous with the adjacent wetlands on site and considered part of the onsite wetlands. Water from the onsite swale will continue to flow east of the project area within the roadside swale and become the non-jurisdictional conveyance; see Attachment 1, Figures 2 and 12. Water will continue to flow east for 0.16 miles within the non-jurisdictional conveyance/swale, where it will discharge into Tributary A/ ITID unnamed north-south canal and RPW. Water will flow 0.14 miles north within Tributary A, where it will discharge into Tributary B/ITID unnamed east-west canal and RPW. Water will continue to flow east in Tributary B for 0.24 miles, where it discharges into Tributary C. Water will be pumped/flow north in Tributary C, also known as ITID "L" Canal for 2.28 miles where it will discharge through a series of culverts into Tributary D, the ITID "M-O" Canal. The water will be pumped/flow west within Tributary D/ ITID "M-O" Canal for 4.62 miles where it will discharge through ITID Pump Station 3, into Tributary E, which is the perimeter canal within the ITID M1 Reservoir/Impoundment and water will flow west through a second structure on the northwest corner of the M-1 Reservoir/Impoundment into the second half of Tributary E, flowing a total of 3.55 miles prior to discharging into the C&SF L-8 Canal, a TNW.
Tributary stream order, if known: unknown.

(b) General Tributary Characteristics (check all that apply):
**Tributary** is: ☐ Natural
☒ Artificial (man-made). Explain: Tributaries A, B, C, D, and E were constructed by the ITID for controlling the levels of water within Loxahatchee and the surrounding area. The canals were dug from a mixture of uplands and wetlands to drain the surrounding areas, provide flood control, and to convert the land use to low density residential and agricultural development.
☒ Manipulated (man-altered). Explain: The ITID is responsible for managing the water levels and direction of flow within Loxahatchee and the entire 298 district area. The road side swales are designed to capture stormwater runoff, where it is discharged through culverts into the interior canal system (Attachment 2). A series of canals and pump stations either allow water to gravity flow or be pumped to manage water levels during the rainy season. There are two general flow conditions, which water can travel to a TNW, (1) by gravity and (2) by the manipulation of water through the use of pumps. The tributary details provided here in this section is by pumped flow, using the diagram provided in Attachment 2 as well as Figures 7 and 18 of Attachment 1.

**Tributary A** properties with respect to top of bank (estimate):
Average width: 20 feet
Average depth: 1-2 feet
Average side slopes: **2:1.**

**Tributary B** properties with respect to top of bank (estimate):
Average width: 40 feet
Average depth: 3-5 feet
Average side slopes: **2:1.**

**Tributary C** properties with respect to top of bank (estimate):
Average width: 100 feet
Average depth: 10-15 feet
Average side slopes: **2:1.**

**Tributary D** properties with respect to top of bank (estimate):
Average width: 110 feet
Average depth: 10-15 feet
Average side slopes: **2:1.**

**Tributary E** properties with respect to top of bank (estimate):
Average width: 60 feet
Average depth: 10 feet
Average side slopes: **2:1.**

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

Primary tributary substrate composition (check all that apply):

- ☒ Silts
- ☐ Sands
- ☐ Concrete
- ☐ Cobbles
- ☐ Gravel
- ☐ Muck
- ☐ Bedrock
- ☐ Vegetation. Type/% cover:
- ☐ Other. Explain: .

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: The tributaries are generally open water with vegetated side slopes. Vegetation is generally maintained and/or mowed, and contains a varitey of obligate, facultative wet and facultative vegetation, depending on water levels and location..

Presence of run/riffle/pool complexes. Explain: N/A.

Tributary geometry: **Relatively straight**

Tributary gradient (approximate average slope): 2 %

(c) Flow:

Tributary provides for: **Seasonal flow**

Estimate average number of flow events in review area/year: **20 (or greater)**

Describe flow regime: Water flows continuously for at least a period of three month during the wet season, which generally starts in May of each year. If water levels get too high the system may be switched from gravity flow to pumped flow conditions, changing the direction of flow. Gravity flow route is described in Approved Jurisdictional Determination Form 1.

Other information on duration and volume: .

Surface flow is: **Discrete and confined.** Characteristics: Flow within the tributaries is limited to the edges of the canal banks and footprint of the ITID canals. .

Subsurface flow: **Unknown**. Explain findings:

- ☐ Dye (or other) test performed: .

Tributary has (check all that apply):

- ☒ Bed and banks
- ☒ OHWM[6] (check all indicators that apply):
  - ☐ clear, natural line impressed on the bank
  - ☐ changes in the character of soil
  - ☐ shelving
  - ☒ vegetation matted down, bent, or absent
  - ☐ leaf litter disturbed or washed away
  - ☐ sediment deposition
  - ☒ water staining
  - ☐ other (list):
  - ☐ the presence of litter and debris
  - ☐ destruction of terrestrial vegetation
  - ☐ the presence of wrack line
  - ☐ sediment sorting
  - ☐ scour
  - ☒ multiple observed or predicted flow events
  - ☐ abrupt change in plant community
- ☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

- ☐ High Tide Line indicated by:
  - ☐ oil or scum line along shore objects
  - ☐ fine shell or debris deposits (foreshore)
  - ☐ physical markings/characteristics
  - ☐ tidal gauges
  - ☐ other (list):
- ☐ Mean High Water Mark indicated by:
  - ☐ survey to available datum;
  - ☐ physical markings;
  - ☐ vegetation lines/changes in vegetation types.

**(iii) Chemical Characteristics:**

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).

Explain: Tannin stained, clear, lawn runoff water. Water quality varies depending on the rate of flow, and quantity of water.

Identify specific pollutants, if known: Waters may contain pesticides, fertilizers, fecal coliform from pet waste, oil, gasoline, or other pollutants commonly associated with suburban development, such as phosphorus and nitrogen associated with lawn fertilizers, and assocaited infrastructure..

**(iv) Biological Characteristics. Channel supports (check all that apply):**

- ☐ Riparian corridor. Characteristics (type, average width): .

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.

[7]Ibid.

☒ Wetland fringe. Characteristics: Obligate, facultative wet, and facultative vegetation emergent vegetation exists along the littoral shelves of Tributaries A, B, C, D, and E. These areas are foraging habitat for federally listed and non-listed species as well as other invertebrates.

☒ Habitat for:

☒ Federally Listed species. Explain findings: Wood Stork (Mycteria americana), Eastern Indigo Snake (Drymarchon couperi), Everglade Snail Kite (Rostrhamus sociabilis plumbeus). Tributaries A and B, and the littoral shelves of Tributaries C, D, and E are located within 18.6 miles of two wood stork nesting colonies: 619220 Palm Beach County Solid Waste Authority and 619315. According to the Habitat Management Guidelines for the Wood Stork in the Southeast Region, written by John C. Ogden, storks feed primarily on small fish between 1-8 inches in length. Successful foraging sites are those where the water is between 2-15 inches deep. Suitable foraging habitat and prey as outlined above are located within Tributaries A and B and along the shallower littoral areas of Tributary C. Fish between 1 and 8 inches long were observed within Tributaries A and B during the site visit conducted on 19 June 2018.

Tributaries A, B, C, D, and E are located within the Consultation Area of the Everglade Snail Kite and contain suitable foraging habitat for the species. During the 19 June 2018 site visit, the exotic apple snail egg casings (Pomacea maculata) were observed on the culverts and attached to littoral vegetation at the edges of the Tributaries. This indicates a potential food source for the Everglade snail kite within the tributaries.

By letter dated 1 August 2017, the U.S. Fish and Wildlife Service (Service) provided a written description of Eastern indigo snake habitat in south Florida to include pine flatwoods, tropical hammocks, and the edges of freshwater marshes, which are located adjacent to Tributaries A, B, C, D, and E. Additionally the upper parts of the berms and levees surrounding the tributaries are prime gopher tortoise habitat, which is also an indicator of eastern indigo snake habitat.

☒ Fish/spawn areas. Explain findings: Fish were observed in Tributaries A and B. Fish ranged in size from 1 inch to almost 8 iches. No fish were observed within Tributary C, D and E but due to the size and depth of the tributary, reasonable scientific judgement presumes their existence.

☐ Other environmentally-sensitive species. Explain findings: .

☒ Aquatic/wildlife diversity. Explain findings: Tributaries A, B, C, D, and E support an aquatic ecosystem that supports aquatic plants, fish, invertebrates, amphibians, wading birds, raptors, and other avian species, and reptiles such as snakes and alligators.

**2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

**(i) Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size: 1.04 acres

Wetland type. Explain:Palustrine Forested.

Wetland quality. Explain:Low to Moderate. The site contains less than 50% coverage of Class I and II invasive/exotic species as listed by the Florida Exotic Pest Plant Council. The southwest corner of the site contains the most invasive/exotic vegetation and it is also the highest elevation. Vegetation includes Brazilian pepper (Schinus terebinthifolius), lygodium (Lygodium microphyllum), and Melaleuca (Melaleuca quinquenervia). The remainder of the site contains a canopy of Melaleuca, intermixed with earleaf acacia (Acacia auriculiformis), Brazilian pepper (Schinus terebinthifolia), and slash pine (Pinus ellottii). The understory consists of mostly native desirable wetland vegetation including swamp fern (Blechnum serrulatum), chain fern (Woodwardia virginica), cocoplum (Chrysobalanus Icaco), Spike rush (Eleocharis cellulosa), lanceleaf arrowhead (Sagittaria lancifolia), Virginia dayflower (Commelina virginica), and sawgrass (Cladium jamaicense). The hydrology of the wetland is also fairly good, small amphibians and invertebrates were observed during the October 2017 site visit. The soils are slightly disturbed and show signs of slight disturbance, such as the pocket of loamy/clay (0.06 acres) documented as uplands on the site because the soils did not qualify for any of the hydric soil indicators. Therefore the quality of wetlands on site is moderate. Additionally a modified Wetland Rapid Assessment Procedure (MWRAP) Functional assessment was conducted for the review area. It received an MWRAP score of 0.40 out of a possible 1.0.

Project wetlands cross or serve as state boundaries. Explain: N/A.

(b) General Flow Relationship with Non-TNW:

Flow is: **Ephemeral flow**. Explain: During periods of high water, when the onsite wetlands become saturated, water will overland and subsurface flow into the adjacent road side swale/non jurisdictional conveyance.

Surface flow is**: Overland sheetflow**

Characteristics: Water from the north end of the project area will gravity flow south by overland sheetflow and subsurface flow into the swale loacted within parcel's boundaries, immediately north of 70th Street North. The section of the roadside swale located within the property boundaries is contiguous with the adjacent wetlands on site and considered part of the onsite wetlands. Water from the onsite swale will continue to flow east of the project area within the roadside swale and become the non-jurisdictional conveyance that discharges into Tributary A. The swale is designed to collect stormwater from properties and discharge it into the adjacent canals (Attachment 2). The location of the swale, that is considered wetlands, and the adjacent road side swale/ non-juridictional conveyance is shown in Attachment 1, Figure 2 and Figure 12.

Subsurface flow: **Yes**. Explain findings: No formal testing for subsurface flow was completed for the site. Water tables were observed at all three data points sampled both during the wet (October) and dry (January) seasons. Data point 1 was sampled

during the wet season, and a water table was observed 2 inches from the soil surface. The remainder of the site during the 19 October 2018 site visit had standing water covering about 95 percent of the site. Data points 2 and 3 were sampled during the dry season, when there was no standing water on site. Data point 2 had a visible water table 12 inches from the soil surface and data point 3 had a visible water table 14 inches from the soil surface. Data points 1 and 2 qualified for the primary hydrologic indicator for having a water table within 12 inches of the soil surface and data point 3 qualified for the dry season water table, a secondary indicator of hydrology. Since water tables were observed during both the wet and dry seasons throughout the site, there is presumably subsurface flow into the adjacent stormwater swale/non-jurisdictional conveyance.

☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

☐ Directly abutting

☒ Not directly abutting

☒ Discrete wetland hydrologic connection. Explain: The wetland is contiguous with the non-jurisdictional swale which provides an overland and subsurface hydrologic connection to Tributary A.

☒ Ecological connection. Explain: The flora and fauna within the project area, through the significant nexus conveyance provide foraging and habitat for a variety of listed and non-listed wildlife including raptors such as hawks, owls, osprey, and Everglade snail kite, wading birds such as wood storks, limpkins, and state listed species such as herons, and white ibis. Additionally indigo snake and gopher tortoise habitat is located within and adjacent to the project area and along the water's flow path to the TNW.

☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **10-15** river miles from TNW.

Project waters are **5-10** aerial (straight) miles from TNW.

Flow is from: **Wetland to navigable waters.**

Estimate approximate location of wetland as within the **20 - 50-year** floodplain.

**(ii) Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: During the 19 Ocotber 2017 site visit, 90% of the site contained standing water. Water was clear and ranged from 1 to 24 inches in depth.

Identify specific pollutants, if known: Waters within the wetland may contain pesticides, fertilizers, fecal coliform from pet waste, oil, gasoline, or other pollutants commonly associated with suburban development and assocaited infrastructure.

**(iii) Biological Characteristics. Wetland supports (check all that apply):**

☐ Riparian buffer. Characteristics (type, average width): .

☒ Vegetation type/percent cover. Explain: See Attachment 4 for Data Sheets and photos from site visits conducted on 19 October 2017 and 11 January 2018.

☒ Habitat for:

☒ Federally Listed species. Explain findings:Wood Stork (Mycteria americana), Eastern Indigo Snake (Drymarchon couperi). The project site contains is located within 18.6 miles of two wood stork nesting colonies: 619220 Palm Beach County Solid Waste Authority and 619315. According to the Habitat Management Guidelines for the Wood Stork in the Southeast Region, written by John C. Ogden, storks feed primarily on small fish between 1-8 inches in length. Successful foraging sites are those where the water is between 2-15 inches deep. Suitable foraging habitat and prey as outlined above are located within the project site as observed during the wet season. Additionally, the site contains suitable habitat for the eastern indigo snake. By letter dated 1 August 2017, the U.S. Fish and Wildlife Service (Service) provided a written description of eastern indigo snake habitat in south Florida to include pine flatwoods, tropical hammocks, and the edges of freshwater marshes.

☐ Fish/spawn areas. Explain findings: .

☐ Other environmentally-sensitive species. Explain findings: .

☒ Aquatic/wildlife diversity. Explain findings: During the 19 October 2017 site visit, tad poles and frogs were observed within the standing water on site. Small fish were also observed ranging from 1-2 inches in length. The open and deeper areas provide foraging and resting habitats for a variety of ambibians, invertebrates, avian, and repile species.

**3. Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: **30 (or more)**

Approximately ( 848.63 ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following: See Attachment 1. Figures 21 and 22 for the location of the similarly situated wetlands.

| # | Wetland Name/Number | Abutting (Y/N) | Size (acres) |
|---|---|---|---|
| 1 | Wetland A | Y | 0.7 |
| 2 | Wetland B | Y | 2.6 |
| 3 | Wetland C | Y | 2.1 |
| 4 | Wetland D | Y | 1.61 |

| | | | |
|---|---|---|---|
| 5 | Wetland E | Y | 0.71 |
| 6 | Wetland F | Y | 1.63 |
| 7 | Wetland G | Y | 0.93 |
| 8 | Wetland H | Y | 3.92 |
| 9 | Wetland I | Y | 1.28 |
| 10 | Wetland J | Y | 1.1 |
| 11 | Wetland K | Y | 1.1 |
| 12 | Wetland L | Y | 1.65 |
| 13 | Wetland M | Y | 1.1 |
| 14 | Wetland N | Y | 1.67 |
| 15 | Wetland O | Y | 1.18 |
| 16 | Wetland P | Y | 2.47 |
| 17 | Wetland Q | Y | 1.73 |
| 18 | Wetland R | Y | 1 |
| 19 | Wetland S | Y | 1.48 |
| 20 | Wetland T | Y | 1.35 |
| 21 | Wetland U | Y | 1.14 |
| 22 | Wetland V | Y | 1.29 |
| 23 | Wetland W | Y | 85,961 |
| 24 | Wetland X | Y | 3 |
| 25 | Wetland Y | Y | 626 |
| 26 | Wetland Z | Y | 1,883 |
| 27 | Wetland AA | Y | 317 |
| 28 | Wetland AB | Y | 0.95 |
| 29 | Wetland AC | Y | 5.47 |
| 30 | Wetland AD | Y | 2.28 |
| 31 | Wetland AE | Y | 4.52 |
| 32 | Wetland AF | Y | 2.22 |
| 33 | Wetland AG | Y | 1.87 |
| 34 | Wetland AH | Y | 1.88 |
| 35 | Wetland AI | Y | 0.87 |
| 36 | Wetland AJ | Y | 1.98 |
| 37 | Wetland AK | Y | 0.98 |
| 38 | Wetland AL | Y | 2.44 |
| 39 | Wetland AM | Y | 3.13 |
| **Total** | | | **88,852.33** |

Summarize overall biological, chemical and physical functions being performed: The 88,852.33 acres of similarly situated wetlands adjacent to the non-jurisdictional conveyance and Tributaries A, B, C, D, and E serve as habitat for listed and non-listed species, provide water quality treatment for stormwater runoff from adjacent properties, trapping of sediments and pollution control, detrital export, and groundwater filtration and recharged.

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## C. SIGNIFICANT NEXUS DETERMINATION

**A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity**

**of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.**

**Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:**

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

**Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:**

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

   **Note**: ***On 1 December 2008, the US Supreme Court declined to hear the McWane/Robison case. This case involved a federal appeals court (11th Circuit) ruling that had the effect of overturning a criminal conviction of an industrial pipe manufacturer found guilty of illegally dumping oil, lead, zinc, grease, and other pollutants into Avondale Creek in Alabama, a permanently flowing stream that eventually flows into the navigable Black Warrior River. The appeals court overturned the case because they interpreted the Rapanos decision as requiring a significant nexus determination on all waters except TNWs and wetlands adjacent to the TNWs, and in this case a significant nexus determination was not performed on Avondale Creek, an RPW.***

   ***The 2 December 2008 Rapanos guidance acknowledges (footnote 16, bottom of page 3) the Supreme Court's refusal to hear the McWane/Robison case. Therefore, in the 11th Circuit (Florida, Georgia, and Alabama) the McWane/Robison decision, which contradicted the June 2007 Rapanos Guidance concerning jurisdiction of RPWs and wetlands directing abutting RPWs, is final. Therefore, when performing an approved JD, the Corps must perform a significant nexus determination on ALL waters and wetlands except for TNWs and wetlands adjacent to TNWs.***

   Physical:
   The direction of water flow from the project site to a TNW was provided by the ITID Director of Stormwater Operation (See Attachment 2). The ITID is responsible for managing the water within the road side swales and canals within Loxahatchee. The system is designed so that stormwater will collect in the roadside swales and discharge by subsurface and overland flow by culverts into the smaller east-west and north-south canals. The smaller canals, discharge to medium and then large canals, which ultimately discharge to TNWs. There are two general flow conditions, which water can travel to a TNW from the project site (1) by gravity and (2) by the manipulation of water through the use of pumps. This significant nexus determination outlines the flow from the project site to the C&SF C-51 Canal, a TNW, through gravity flow. A second approved jurisdictional determination (Form 2) is attached to show the significant nexus under pumped conditions, which water ultimately flows north and west to the C&SF L-8 canal, another TNW.

   Historically the project area was entirely a wetland as part of a mosaic wetland slough system as shown in Attachment 1, Figures 3-5. According to the site visits conducted on 19 October 2017 and 11 January 2018, the project area includes a 1.04 acre wetland area (Attachment 1, Figure 2) that has a canopy of varying coverages of Melaleuca, intermixed with earleaf acacia (Acacia auriculiformis), Brazilian pepper (Schinus terebinthifolia), and slash pine (Pinus ellottii). The understory, where present, consists of mostly native desirable wetland vegetation including swamp fern (Blechnum serrulatum), chain fern (Woodwardia virginica), cocoplum (Chrysobalanus Icaco), Spike rush (Eleocharis cellulosa), lanceleaf arrowhead (Sagittaria lancifolia), Virginia dayflower (Commelina virginica), and sawgrass (Cladium jamaicense). There is a 0.06 acre area, within the 1.15 acre parcel that has a canopy

dominated by earleaf acacia that was determined to have non-hydric soil based on the soil description because only a 12-inch soil plug could be obtained due to water refusal.

Water tables were observed at all three data points sampled both during the wet (October) and dry (January) seasons. Data point 1 was sampled during the wet season, and a water table was observed 2 inches from the soil surface. The remainder of the site during the 19 October 2018 site visit had standing water covering about 95 percent of the site. Data points 2 and 3 were sampled during the dry season, when there was no standing water on site. Data point 2 had a visible water table 12 inches from the soil surface and data point 3 had a visible water table 14 inches from the soil surface. Since water tables were observed during both the wet and dry seasons throughout the site, there is presumably subsurface flow into the adjacent stormwater swale/non-jurisdictional conveyance.

See Attachment 1 Figure 7, 17, and 18. Water from the north end of the project area will gravity flow south by overland sheetflow and subsurface flow into the swale located within parcel's boundaries, immediately north of 70th Street North. The section of the roadside swale located within the property boundaries is contiguous with the adjacent wetlands on site and considered part of the onsite wetlands. Water from the onsite swale will continue to flow east of the project area within the roadside swale and become the non-jurisdictional conveyance; see Attachment 1, Figures 2 and 12. Water will continue to flow east for 0.16 miles within the non-jurisdictional conveyance/swale, where it will discharge into Tributary A/ ITID unnamed north-south canal and RPW. Water was observed on 19 June 2018, discharging from the non-jurisdictional conveyance culvert into Tributary A, (Attachment 1, Figure 12). Water will flow 0.14 miles north within Tributary A, where it will discharge into Tributary B/ITID unnamed east-west canal and RPW. Onsite observations on 19 June 2018 confirmed the northern flow direction within Tributary A. Additionally during the 19 June 2018 site visit, the resident, who owns the home immediately east of Tributary A, on the north side of 70$^{th}$ Street North confirmed that “strong flow to the north trapped her escaped peacock” in Tributary A earlier in the month. Water will continue to flow east in Tributary B for 0.24 miles, where it discharges into Tributary C. Water will be pumped/flow north in Tributary C, also known as ITID "L" Canal for 2.28 miles where it will discharge through a series of culverts into Tributary D, the ITID "M-O" Canal. The water will be pumped/flow west within Tributary D/ ITID "M-O" Canal for 4.62 miles where it will discharge through ITID Pump Station 3, into Tributary E, which is the perimeter canal within the ITID M1 Reservoir/Impoundment and water will flow west through a second structure on the northwest corner of the M-1 Reservoir/Impoundment into the second half of Tributary E, flowing a total of 3.55 miles prior to discharging into the C&SF L-8 Canal, a TNW.

Chemical:
The project area wetlands in combination with the similarly situated wetlands that encompass the relevant reach drainage area provide water quality treatment for stormwater runoff from adjacent low-density single family residential properties by trapping of sediments and nutrients creating pollution control, detrital export, and groundwater filtration and groundwater recharge.

Biological:

The wetlands within the drainage area encompassed by the relevant reach tributary intercept runoff from the surrounding uplands. This water helps to concentrate and route detritus from the uplands, as well as that produced by the wetland vegetation itself, to the waters and TNW further down the landscape. Specifically, large quantities of decomposing biomass are conveyed to the RPW and TNW thereby providing important primary productivity toward the biological maintenance of the food web supported by the TNW. The residence time of water may be relatively short during periods of peak flow when water levels are highest, and therefore would favor rapid delivery of pollutants, including both dissolved and particulate chemicals typically found in moderately developed suburban to rural landscapes such as N, P, sediment, oil, tar, gasoline, fertilizers, pesticides, and pet waste. However, during much of the year flow volumes are much lower and residence times are substantially increased, allowing dissolved and suspended pollutants to interact with sediments and vegetation, thus likely ameliorating the poorer water quality conditions present during higher flow periods. Pollutants being contributed to these wetlands by surrounding uplands are reasonably concluded to include constituents typical of roadside runoff as well as those commonly associated with suburban development. Additional important chemical and physical water quality functions such as denitrification, carbon storage, and sediment and phosphorous retention are also provided by the similarly situated wetlands.

The wetlands within the project area, similarly situated wetlands and those along Tributaries A, B, C, D, and E, are of utmost importance biologically since the majority of wetlands and other non-wetland areas in the watershed have been altered for agriculture, residential, or other purposes. These wetlands provide breeding grounds for species that cannot reproduce in faster-moving water and move between wetlands and uplands over their lifecycle. The wetlands, along with the tributary system, provides wildlife habitat (e.g. feeding, nesting, spawning, and rearing of young) for many aquatic species that live and forage in traditional navigable waters. The wetlands also maintain a more consistent water temperature that the larger tributaries (Tributaries C, D, and E), which is important to many aquatic species. The close proximity of the wetlands, and occasional surface water connections, may affect the species distribution and diversity in these wetlands. Specifically, surface water connections to more permanent water bodies allow the introduction of fish species that would otherwise not be present in these wetlands. This will in turn have a direct effect on the species of amphibians and reptiles that can use the wetlands.

Specifically the wetlands within the project area, adjacent to the non-jurisdictional conveyance, Tributaries A, B, C, D, and E and adjacent similarly situated wetlands support a variety of threatened and endangered species, including wood stork and Everglade snail kite foraging habitat, eastern indigo snake habitat. Tributaries A and B, and the littoral shelves of Tributaries C, D, and E are located within 18.6 miles of two wood stork nesting colonies: 619220 Palm Beach County Solid Waste Authority and 619315. According to the Habitat Management Guidelines for the Wood Stork in the Southeast Region, written by John C. Ogden, storks

feed primarily on small fish between 1-8 inches in length. Successful foraging sites are those where the water is between 2-15 inches deep. Suitable foraging habitat and prey as outlined above are located within Tributaries A and B, along the shallower littoral areas of Tributaries C, D, and E and may be located within the adjacent similarly situated 88,852.33 acres of wetlands. Fish between 1 and 8 inches long were observed within Tributaries A and B during the site visit conducted on 19 June 2018, and fish 1-2 inches long were observed within the project area's wetland on the 19 October 2017 site visit.

Tributaries A, B, C, D and E are located within the Consultation Area of the Everglade Snail Kite and contain suitable foraging habitat for the species. During the 19 June 2018 site visit, the exotic apple snail egg casings (*Pomacea maculata*) were observed on the culverts and attached to littoral vegetation at the edges of the Tributaries. This indicates a potential food source for the Everglade snail kite along the tributaries and potentially within the 848.63 acres of adjacent wetlands.

By letter dated 1 August 2017, the U.S. Fish and Wildlife Service (Service) provided a written description of eastern indigo snake habitat in south Florida to include pine flatwoods, tropical hammocks, and the edges of freshwater marshes, which are located adjacent to the project area, Tributaries A, B, and C, and the 88,852.33 acres of adjacent wetlands. Additionally the upper parts of the berms and levees surrounding the tributaries are prime gopher tortoise habitat, which is also an indicator of eastern indigo snake habitat.

In addition, to the listed species above a variety of non-listed species utilize the aquatic ecosystems within the project area, non-jurisdictional conveyance, Tributaries A, B, C, D, and E and the 88,852.33 acres of similarly situated wetlands to as foraging and nesting habitat. These species include aquatic plants, fish, invertebrates, amphibians, wading birds, raptors, and other avian species, and reptiles such as snakes and alligators.

Considering the high potential for development in the area and existing water quality issues within the watershed, specifically along the flow path from the project area to the TNW, the functions of the wetlands in the project area play an important role relating to downstream water quality. Based on the biological, chemical, and physical functions described above, this office has concluded that a Significant Nexus exists between this relevant reach, its similarly situated adjacent wetlands and the downstream TNW.

## D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

     Provide estimates for jurisdictional waters in the review area (check all that apply):
     - ☐ Tributary waters: linear feet width (ft).
     - ☐ Other non-wetland waters: acres.
       Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   - ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   - ☐ Tributary waters: linear feet width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

[8]See Footnote # 3.

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
☒ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: **1.04** acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.**[9]
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

**E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):**[10]
☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

**Identify water body and summarize rationale supporting determination:** .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .
☐ Wetlands: acres.

**F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):**
☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
☐ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).

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[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

**SECTION IV: DATA SOURCES.**

**A. SUPPORTING DATA. Data reviewed for JD (check all that apply -** checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☐ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: .
☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☒ Data sheets prepared by the Corps: Jerilyn Ashworth in Attachment 4.
☐ Corps navigable waters' study: .
☒ U.S. Geological Survey Hydrologic Atlas: See Attachment 1. Hydrologic Unit Code (HUC) 12, 030902010100, for Corbett Wildlife Management Area 170 square miles/ 108,660 acres.
☐ USGS NHD data.
☒ USGS 8 and 12 digit HUC maps.
☐ U.S. Geological Survey map(s). Cite scale & quad name: .
☒ USDA Natural Resources Conservation Service Soil Survey. Citation:Riviera fine sand, depressional, 0-1 percent slopes, All NRCS soil maps located in Attachment 3.
☒ National wetlands inventory map(s). Cite name: Attachment 1, Figure 6 contains a figure with the Nationsl Wetland Inventory Map. Project area is located within Palustrine Emergent Layer of the National Wetland Inventory. Class: Scrub-shrub; Subclass Broadleaf deciduous, seasonally flooded and partially drained.
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date):Google Earth and University of Florida Historical Aerial Imagery, Attachment 1.
or ☒ Other (Name & Date): Site visit photos in Attachment 4 from 19 Ocotber 2017 and 11 January 2018..
☒ Previous determination(s). File no. and date of response letter: Preliminary Jurisdictional determination dated 14 February 2018.
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☒ Other information (please specify): U.S. Department of Agriculture, NRCS, National Water and Climate Center Rainfall Data, WETS Tables were downloaded for West Palm Beach International Airport, Period Of Record from 1938-2018. Using the data as downloaded from the WETS table, two Direct Antecedent Rainfall Evaluation Method (DAREM) Analyses were conducted for each site visit, (19 October 2017 and 11 January 2018), to determine if the climatic conditions during the site visits were completed during a period of normal, above normal or below normal rainfall. The DAREM analysis for the West Palm Beach International Airport Station showed that rainfall was normal during both site visits. See Attachment 5 for the DAREM analyses and WETS tables.

**B. ADDITIONAL COMMENTS TO SUPPORT JD:**

The Corps completed two site visits to the project review area at the request of the applicant. The first site visit was completed on 19 October 2017 during the height of the wet season and a second site visit was completed on 11 January 2018, during the dry season. All delineations were completed in accordance with the 1987 Wetland Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region, Version 2.0, November 2010. The Regional Supplements to the Corps of Engineers Wetland Delineation Manual (hereafter called the Corps Manual). The Corps Manual provides technical guidance and procedures, from a national perspective, for identifying and delineating wetlands that may be subject to regulatory jurisdiction under Section 404 of the Clean Water Act (33 U.S.C. 1344) or Section 10 of the Rivers and Harbors Act (33 U.S.C. 403). According to the Corps Manual, identification of wetlands is based on a three-factor approach involving indicators of hydrophytic vegetation, hydric soil, and wetland hydrology.

The initial site visit to determine the extent of wetlands on site was completed on 19 October 2017. The site was accessed from the 70th Street North, and Corps personnel walked from the southern edge north, about one third of the site. Standing water was observed throughout the site as shown in Attachment 4. Frogs and small fish were also observed within the water on site. There were also water marks noted on the slash pine and melaleuca trees. Only the southern portion of the site was accessible due to high water levels, approximately 18 + inches. One higher elevation area was observed at the southwest corner of the site, located 15 feet north of the southern edge of the property and

approximately 30 feet east of the west boundary. It was the only observable dry area within the site and had the most disturbed vegetation (exotic/invasive), thus Data Point 1 was recorded. The plot size of the data point was 15 feet to the south and 30 feet from the soil plug on the north, west and east sides.

At Data Point 1, all three factors were evaluated, hydrology, hydrophytic vegetation, and hydric soils, using the Corps Manual and Atlantic and Gulf Coastal Plain Region, Version 2.0 data sheets. Wetland hydrology indicators are used in combination with indicators of hydric soil and hydrophytic vegetation to determine whether an area is a wetland under the Corps Manual. Indicators of hydrophytic vegetation and hydric soil generally reflect a site's medium- to long-term wetness history. They provide readily observable evidence that episodes of inundation or soil saturation lasting more than a few days during the growing season have occurred repeatedly over a period of years and that the timing, duration, and frequency of wet conditions have been sufficient to produce a characteristic wetland plant community and hydric soil morphology. If hydrology has not been altered, vegetation and soils provide strong evidence that wetland hydrology is present (National Research Council 1995). Wetland hydrology indicators provide evidence that the site has a continuing wetland hydrologic regime and that hydric soils and hydrophytic vegetation are not relicts of a past hydrologic regime. Wetland hydrology indicators confirm that an episode of inundation or soil saturation occurred recently, but may provide little additional information about the timing, duration, or frequency of such events (National Research Council 1995). In order for an area to qualify as having wetland hydrology, one primary indicator or two secondary indicators must be present and recorded. The hydrology at the data point 1 included four primary indicators of hydrology: (1) Surface Water, A1; (2) High Water Table, A2; (3) Saturation, A3; and (4) Water-Stained Leaves, B9. The site also contained two secondary indicators of hydrology: (1) Geomorphic Position, D2 and (2) FAC-Neutral Test, D5. Since this data point surpassed the required one primary or two secondary hydrologic indicators, the data point was considered to have wetland hydrology.

The Corps Manual defines hydrophytic vegetation as the community of macrophytes that occurs in areas where inundation or soil saturation is either permanent or of sufficient frequency and duration to influence plant occurrence. The manual uses a plant-community approach to evaluate vegetation. Hydrophytic vegetation decisions are based on the assemblage of plant species growing on a site, rather than the presence or absence of particular indicator species. Hydrophytic vegetation is present when the plant community is dominated by species that require or can tolerate prolonged inundation or soil saturation during the growing season. All plants species, have been divided into one of five categories containing a wetland indicator status: obligate (OBL), facultative wet (FACW), facultative (FAC), facultative upland (FACU), and upland (UPL). The most recent update to the National Wetland Plant List was completed in 2016 and used for the delineation of the project area.

Data point 1 used the Dominance Test to qualify the vegetation on site as hydrophytic. The "50/20 rule" was used to determine the dominant species across all the strata observed. Three dominant species were recorded for the data point, two of the species have a FAC wetland indicator status, and one species is FACW. Since more than half (100% on data sheet 1) of the dominant plant species were rated as OBL, FACW, or FAC, the dominance test for vegetation has been fulfilled. Therefore the Corps determined that this data point contained hydrophytic vegetation.

The National Technical Committee for Hydric Soils (NTCHS) defines a hydric soil as a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (USDA Soil Conservation Service 1994). Most hydric soils exhibit characteristic morphologies that result from repeated periods of saturation or inundation that last more than a few days. Saturation or inundation, when combined with microbial activity in the soil, causes the depletion of oxygen. This anaerobiosis promotes certain biogeochemical processes, such as the accumulation of organic matter and the reduction, translocation, or accumulation of iron and other reducible elements. These processes result in distinctive characteristics that persist in the soil during both wet and dry periods, making them particularly useful for identifying hydric soils in the field (USDA Natural Resources Conservation Service 2010). Hydric soil indicators are formed predominantly by the accumulation or loss of iron, manganese, sulfur, or carbon compounds in a saturated and anaerobic environment. If one or more hydric soil indicators are present, then the soil is considered hydric. The soil plug from data point 1 qualified has hydric because three hydric soil indicators were recorded: (1) Strip Matrix, S6; (2) Polyvalue Below Surface, S8; and (3) Thin Dark Surface, S9.

Data Point 1 contained all three factors, wetland hydrology, hydrophytic vegetation, and hydric soil, therefore it was considered to be a wetland. Initially, after the 19 October 2017 site visit, the Corps determined the entire site to be a wetland. Using reasonable scientific judgement, since a majority of the site was inaccessible due to high water levels, the Corps reasoned that if this area highest in elevation, qualified as a wetland, then the remainder of the lower elevations with higher qualify facultative wet and obligate vegetation on the site would also qualify as wetlands. A preliminary jurisdictional determination was issued on 20 October 2017. The applicant did not sign the preliminary JD and requested that another site visit be conducted during the dry season, when the site was not flooded.

A second site visit was conducted on 11 January 2018. Two additional data points were recorded. Data point 2 was taken in an area with a canopy dominated by earleaf Acacia (Acacia auriculiformis) and did not contain an understory of swamp fern (Blechnum serrulatum). The plot was measured to have only a 20-foot diameter, due to the location of earleaf acacia. This deviates from the Corps Manual, which requires a 30-foot radius. At Data Point 2, the Corps observed and recorded three primary indicators of hydrology: (1) High Water Table, A2; (2) Water Marks, B1; and (3) Water-Stained Leave, B9. A water table was observed within 12 inches of the soil surface. Water marks were observed on the base of the trees within the plot sampled and water-stained leaves were photographed using the Corps Manual for comparison (Attachment 4). The site also contained two secondary indicators of hydrology: (1) Geomorphic Position, D2 and (2) FAC-Neutral Test, D5. Since this data point surpassed the required one primary or two secondary hydrologic indicators, the data point was considered to have wetland hydrology. Data point 2 used the Dominance Test to qualify the vegetation on site as hydrophytic. The "50/20 rule" was used to determine the dominant species across all the strata observed. Six dominant species were recorded for the data point, two of the species have a FAC wetland indicator status, two were FACW, and two species were UPL. Since more than half (66.7% on data sheet

2) of the dominant plant species were rated as OBL, FACW, or FAC, the dominance test for vegetation has been fulfilled. Therefore the Corps determined that this data point contained hydrophytic vegetation.

Data point 2 did not have soils that were considered hydric. The top two soil horizons had a loamy/clay texture because they passed the "bounce test" as outlined in the Corps Manual. Since only a 12-inch soil plug was sampled, due to water refusal, it cannot be determined if the soil would have passed the hydric soil indicator for A-11, Depleted below Dark Surface. The thickness requirement for the depleted layer in the A-11 hydric soil description is 6 inches, and the documented 3rd horizon was only four inches thick, ending at 12 inches. Therefore, a 0.06 acre area was removed from the review area and deemed upland, because a hydric soil indicator was not present within the described soil profile.

A third data point was taken, just to the north of Data Point 2, in an area dominated by a canopy of Melaleuca with an understory of cocoplum and swamp fern. The plot size for Data Point 3, was the standard 30-foot radius as required by the Corps Manual. The Corps observed and recorded two primary indicators of hydrology: Water Marks, B1 and Water-Stained Leave, B9 and three secondary indicators of hydrology: (1) Dry-season Water Table, C2; (2) Geomorphic Position, D2; and (3) FAC-Neutral test, D5. A water table was observed 14-inches from the soil surface. In order to qualify for a dry season water table, water must be observed within the soil pit 24 inches from the soil surface. Water-stained leaves and water marks were photographed observed on the base of the trees within the plot sampled, see Attachment 4. Since this data point surpassed the required one primary or two secondary hydrologic indicators, the data point was considered to have wetland hydrology. Data point 3 used the Dominance Test to qualify the vegetation on site as hydrophytic. The "50/20 rule" was used to determine the dominant species across all the strata observed. Seven dominant species were recorded for the data point, three of the species have a FAC wetland indicator status, three were FACW, and one species was UPL. Since more than half (85.7% on Data Sheet 3) of the dominant plant species were rated as OBL, FACW, or FAC, the dominance test for vegetation has been fulfilled. Therefore the Corps determined that this data point contained hydrophytic vegetation. The soil plug from data point 3 qualified has hydric because one hydric soil indicators was recorded: Strip Matrix, S6. Therefore since Data Point 3 contained all three factors, wetland hydrology, hydrophytic vegetation, and hydric soil, it was documented as a wetland.

No additional data points were sampled because the Corps determined that data points 1 and 3 were representative of the remaining habitat on site. Therefore the Corps is claiming that the site contains 1.04 acres of jurisdictional wetlands. The remaining 0.11 acres contains a 0.05 acre section of roadway within the delineated property boundaries and the 0.06 acre section of uplands as described above. The data sheets and site visit photos are located in Attachment 4 of this Approved Jurisdictional Determination.

Based on the biological, chemical, and physical functions described above, this office has concluded that a Significant Nexus exists between the relevant reach tributary and its adjacent wetlands, including the project area wetlands, to the downstream TNW and therefore the project area wetlands are subject to regulation under Section 404 of the Clean Water Act.

References:

National Research Council. 1995. *Wetlands: Characteristics and boundaries*. Washington, DC: National Academy Press.

U.S. Army Corps of Engineers, 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)*. ERDC/EL TR-10-20. Vicksburg, MS: U.S. Army Engineer Research and Development Center. (http://www.saj.usace.army mil/Missions/Regulatory/Source-Book/)

USDA Natural Resources Conservation Service. 1994. *National food security act manual, third edition* (as amended). Washington, DC. (http://www.nrcs.usda.gov/programs/compliance/index html)

USDA Natural Resources Conservation Service. 2010. *Field indicators of hydric soils in the United States, Version 7.0*. ed. L. M. Vasilas, G. W. Hurt, and C. V. Noble. Washington, DC: USDA NRCS in cooperation with the National Technical Committee for Hydric Soils. (http://soils.usda.gov/use/hydric/)

# ATTACHMENT 1

**Approved Jurisdictional Determination**

Application: SAJ-2017-02731

## Supporting Maps and Figures

# Project: Schwartz Single Family Home
# SAJ-2017-02731

Property Appraiser Parcel Boundaries, 1.15 acres

**Figure 1**. Using the Palm Beach County Property Appraiser website mapping feature, a screen shot was taken of the parcel's boundaries and a layer was created in google earth to establish the property boundaries for the approved jurisdictional determination. According to property appraiser, the parcel is a total of 1.15 acres in size. The approved jurisdictional determination outlines the boundaries of the wetlands located within the parcel boundaries. The yellow polygon will be used to delineate the boundaries of wetlands on site and the red outline is for the property boundaries. A portion of the road is located within the property boundaries and is not included in the final wetland calculation.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

Review Area

**Figure 2.** The red line shows the property boundaries as depicted by the Palm Beach County Property Appraiser's office. The purple polygon is 0.05 acres and includes a portion of the road, which is included in the property boundaries. A second upland area, 0.06 acres, was identified during the 11 January 2018 site visit, since it did not contain hydric soils due to the high loamy content of the soil sampled, and that only a 12-inch plug was obtained due to water refusal (water table at 12-inches). The remainder of the property was deemed to be wetlands. Data point 1 was taken during a site visit on 19 October 2017. Data points 2 and 3 were taken on 11 January 2018 on a second site visit requested by the applicant when the site "dried out". All of the data points sampled on site had a visible water table within the soil plug pit, contained indicators of wetland hydrology and hydrophytic vegetation. However data point 2, was the only one that did not have any hydric soil indicators. Therefore the Corps is claiming 1.04 acres of jurisdictional wetlands on site.

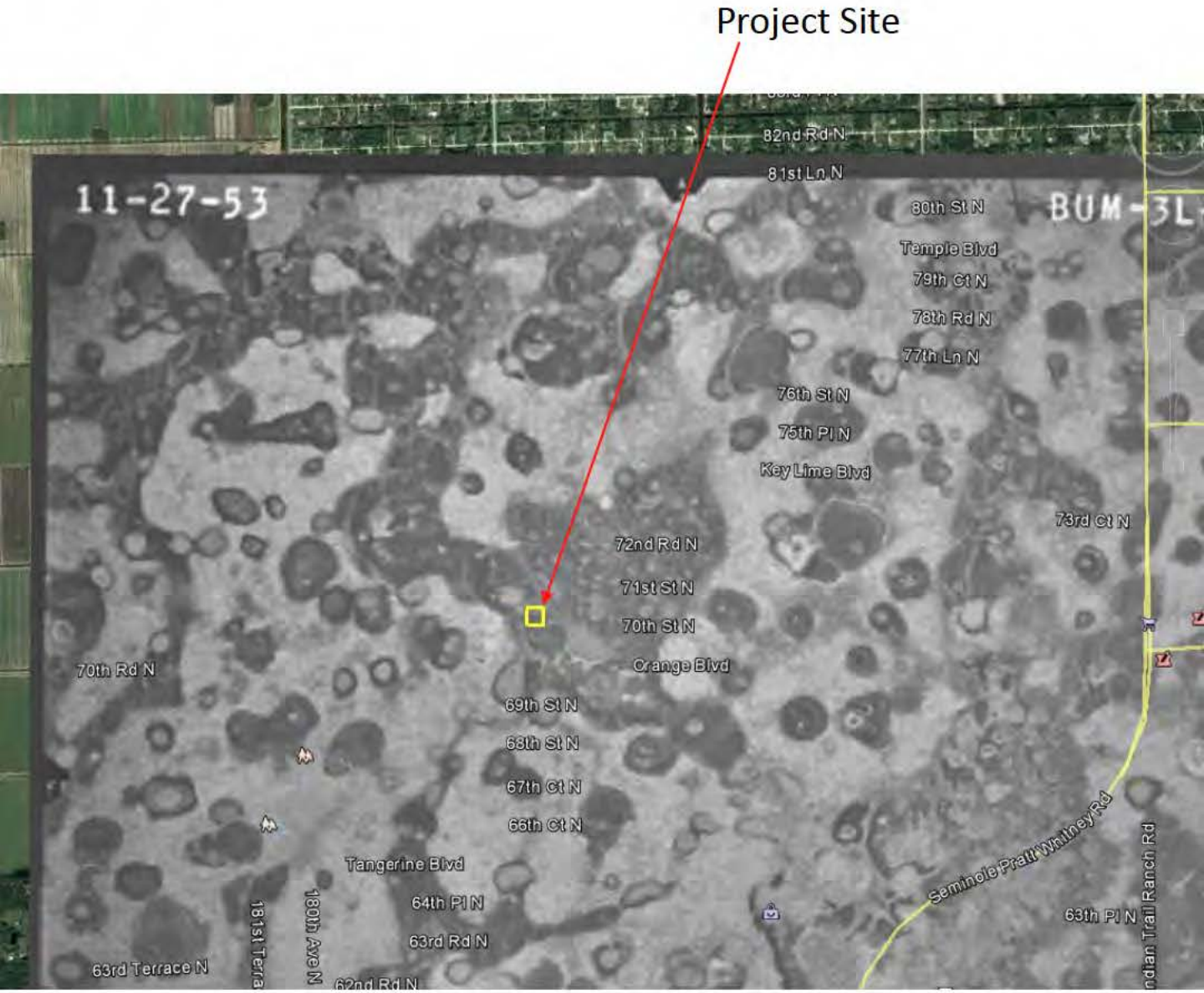



**Figure 3.** The 1953 imagery from the University of Florida historical image was imported and created a layer in Google Earth. The project site was highlighted through Google Earth to show the historic conditions for the site. Historically the project site was located in a slough, part of a contiguous wetland system. (http://cms.uflib.ufl.edu/maps/collections)

# Project: Schwartz Single Family Home
# SAJ-2017-02731

Historical Aerial Imagery



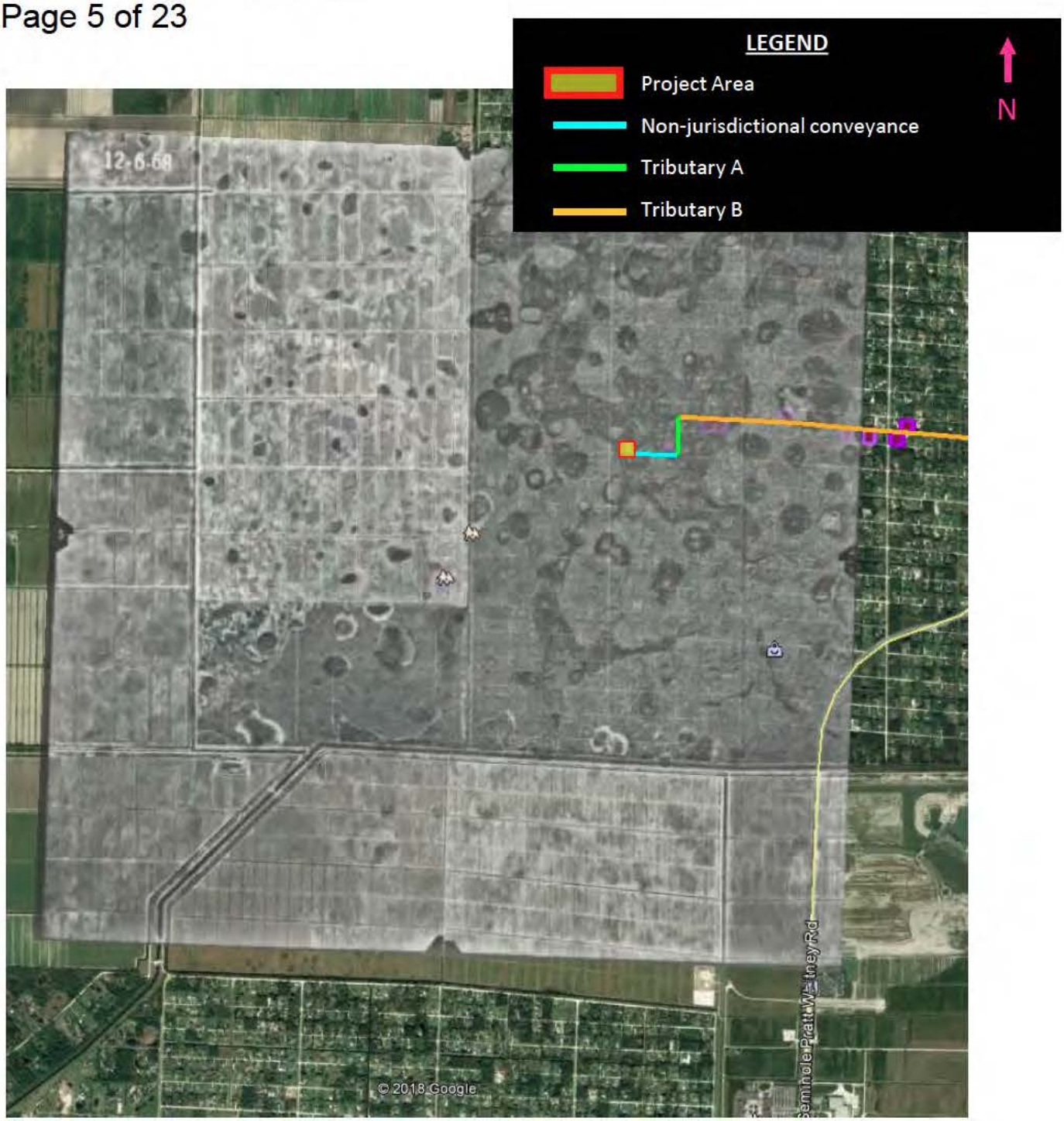



**Figure 4.** Historical imagery taken on December 6, 1968 shows that the project area was located in the same slough as the 1953 aerial image. The figure is zoomed out to show how the layer was applied in google earth, representing the accuracy of the location, in relation to the M-canal and L-8 Canal and adjacent canals and roadways. (http://cms.uflib.ufl.edu/maps/collections)

# Project: Schwartz Single Family Home
# SAJ-2017-02731

Historical Aerial Imagery



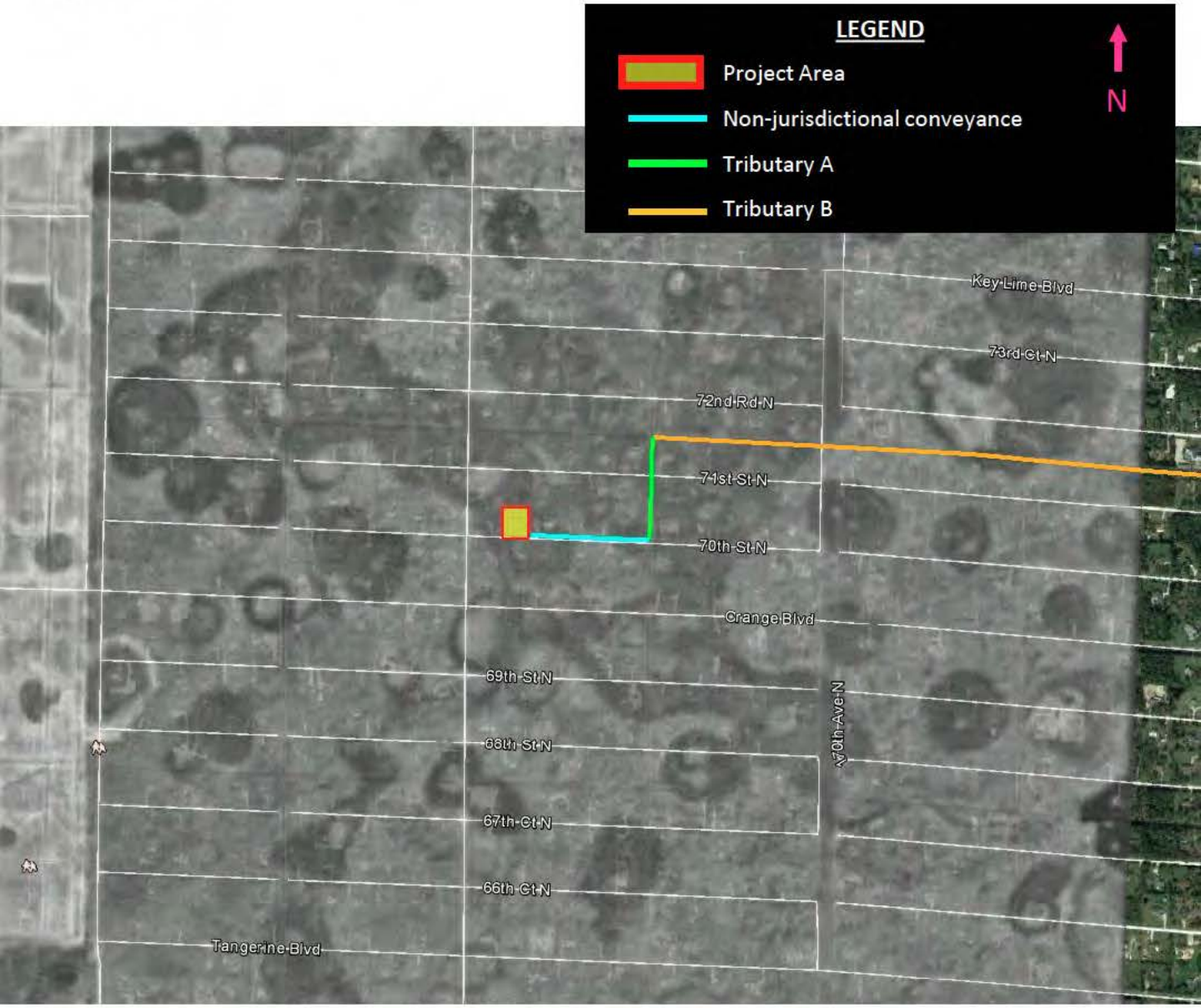



**Figure 5.** Zoomed in view of the 1968 historical image. (http://cms.uflib.ufl.edu/maps/collections)

# Project: Schwartz Single Family Home
# SAJ-2017-02731

National Wetland Inventory Map



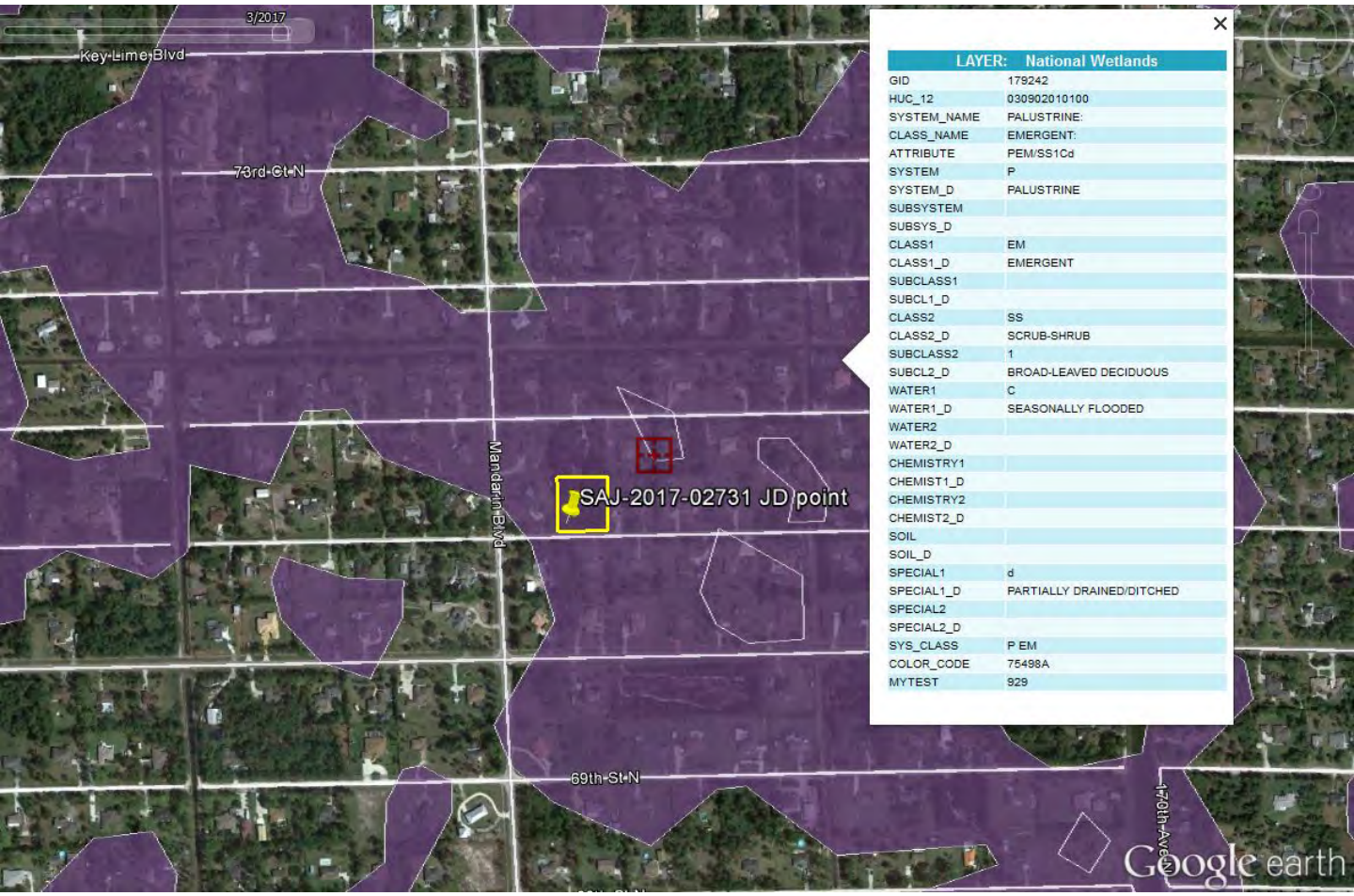



**Figure 6.** Project Location within Palustrine Emergent Layer of the National Wetland Inventory. Class: Scrub-shrub; Subclass Broadleaf deciduous, seasonally flooded and partially drained.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

## Dual Flow Paths, Gravity Flow vs. Pumping Flow Paths



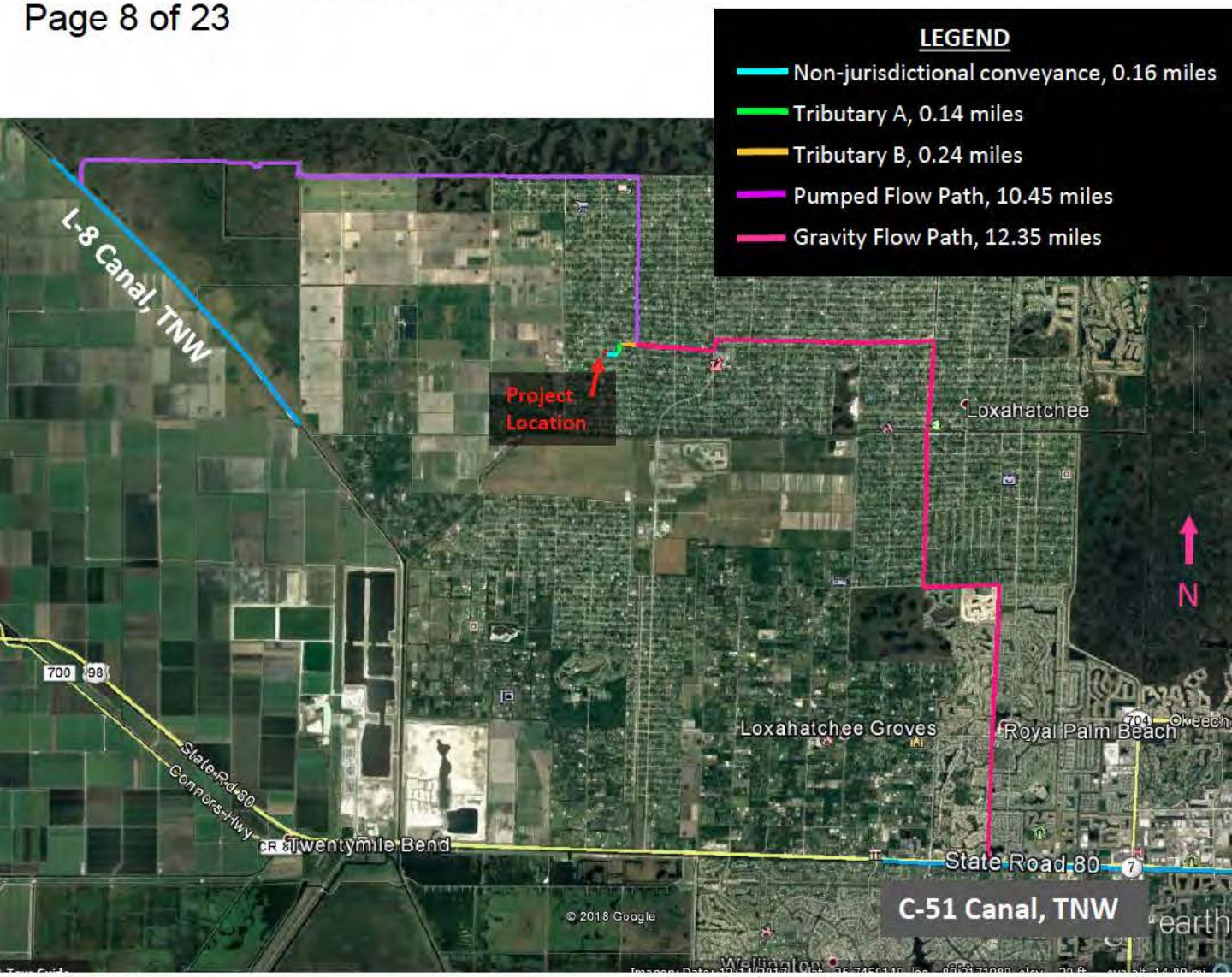



**Figure 7.** Project review area is located within the Indian Trail Improvement District (ITID), which has two different flow paths to TNWs. Attachment 2, shows that ITID controls the movement of water through Loxahatchee and the entire ITID. There are two different flow paths for the water to move from the project review area. The first condition is under gravity flow, water will flow from the non-jurisdictional conveyance into three separate tributaries and discharge into the C&SF C-51 Canal. The second flow path is under pumped conditions, water flow from the project review area into the non-jurisdictional conveyance into five tributaries and ultimately discharge into the C&SF L-8 Canal. The purple line represents the flow path under pumped conditions and the pink line represents the flow path under gravity flow conditions.

Two significant nexus determinations were completed, one for each flow path.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

Overview of Significant Nexus Connection to the TNW
Gravity Flow Conditions



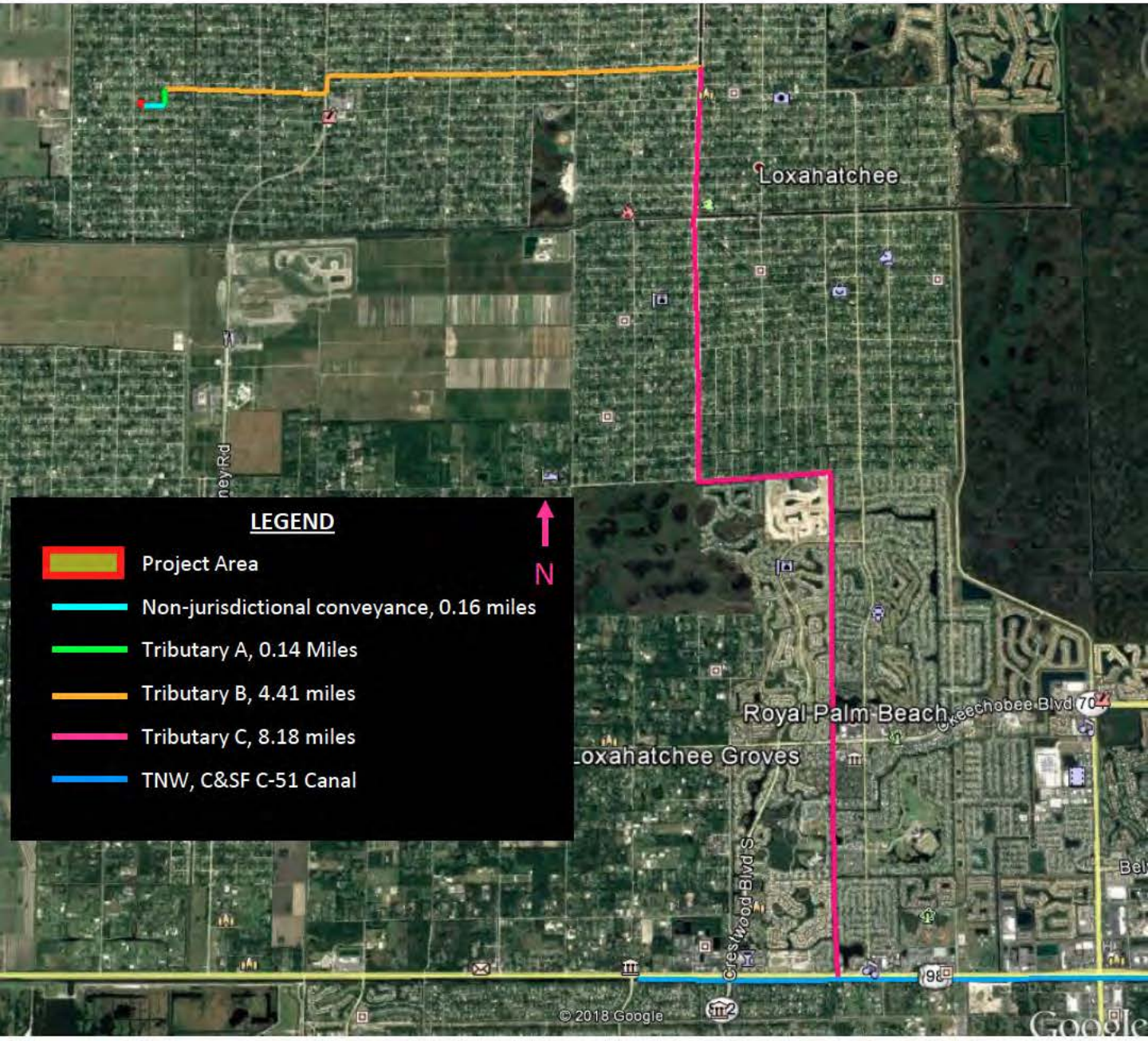



**Figure 8.** Shows an overview of the Gravity Flow Path with the non-jurisdictional conveyance and three tributaries, which ultimately discharges into the TNW, C-51 Canal.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

Watershed Relation to the Project Site and Tributaries
Gravity Flow

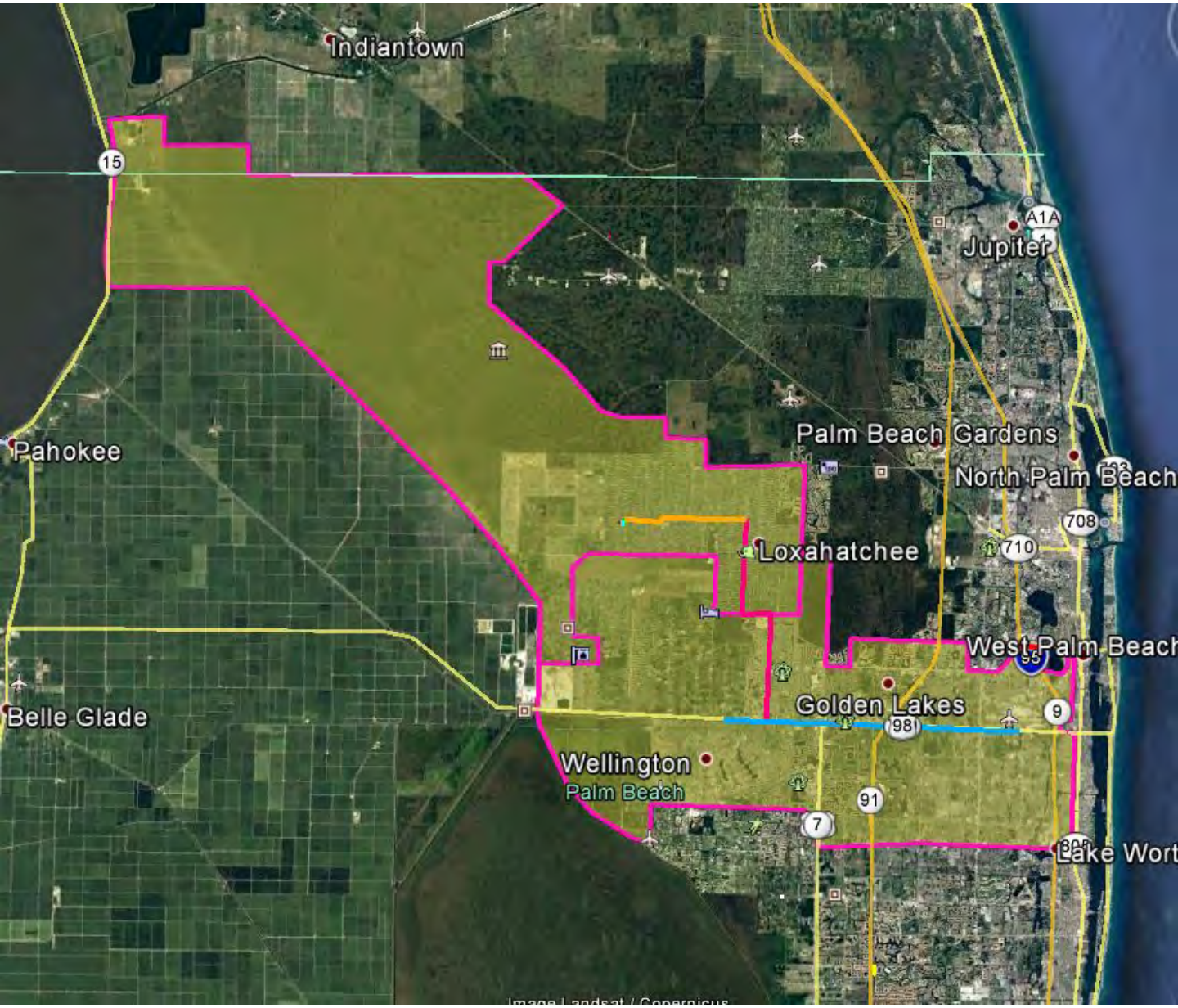




**Figure 9**. The gravity flow pathway includes two watersheds/ Hydrologic Unit Code (HUC) 12 areas: (1) HUC 12, 030902010100, for Corbett Wildlife Management Area; and (2) HUC 12, 030902060900, for the Lower West Palm Beach Canal, for a total watershed area of 307 square miles/ 196,538 acres.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

Drainage Basin in Relation to the Project Site and Tributaries
Gravity Flow



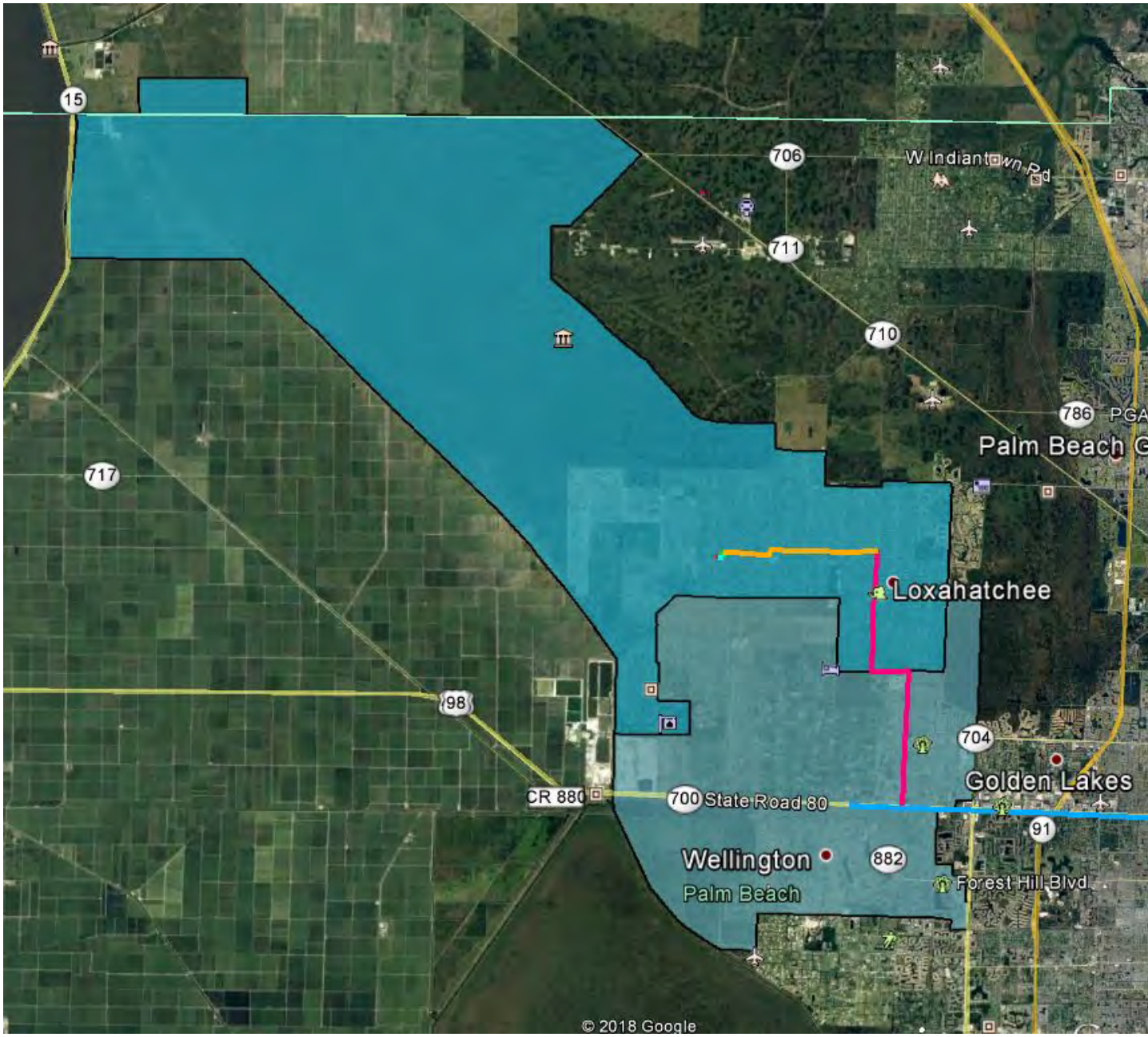



**Figure 10.** The Gravity flow pathway includes two South Florida Water Management District (SFWMD) drainage basins, the L-8 and C-51 W, for a total of 241 square miles/154,307 acres.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

Flow Lines in Relation to the Project Site and Tributaries
Gravity Flow Path

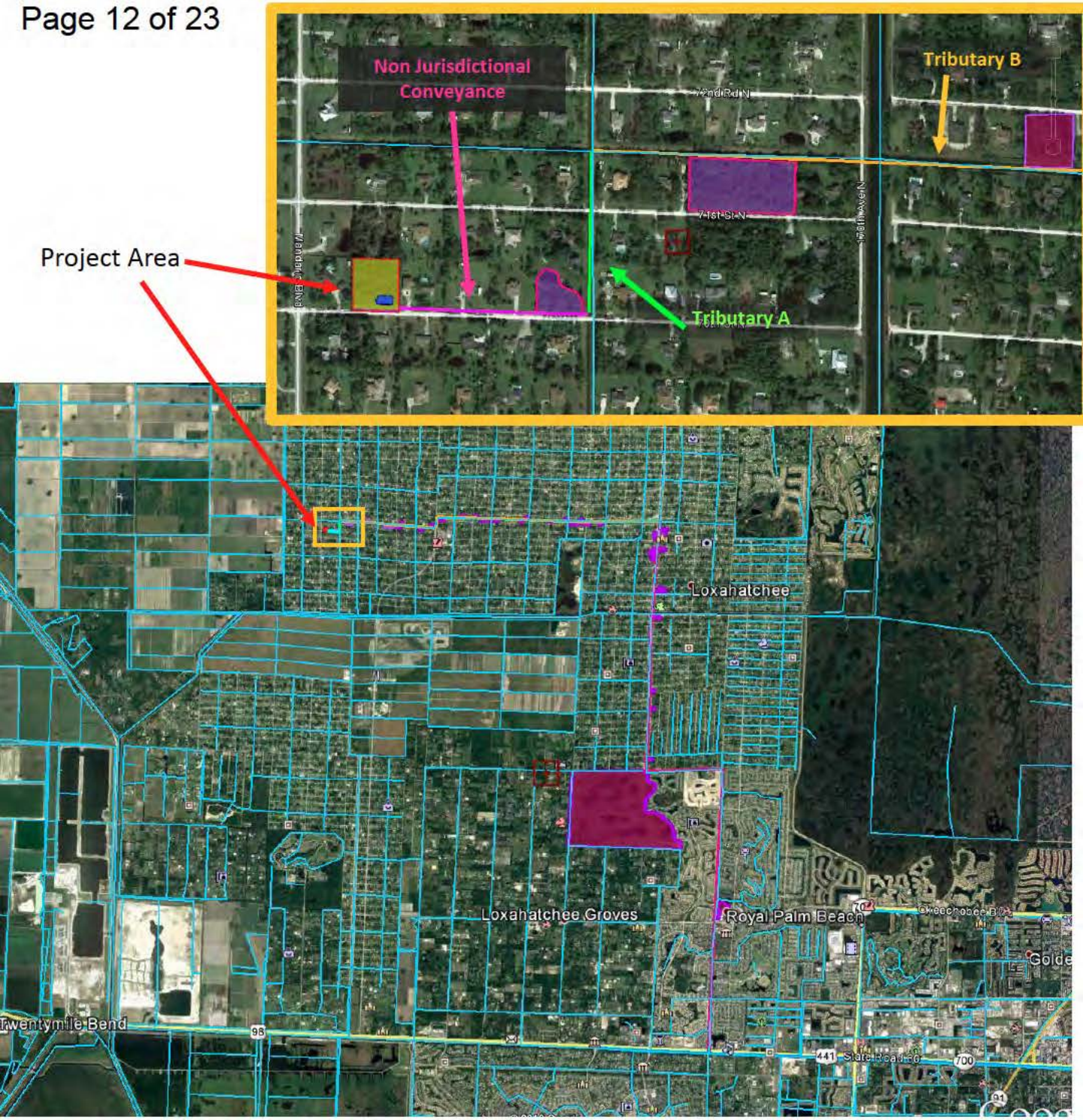




**Figure 11.** Project review area with adjacent similarly situated wetlands and Tributaries A, B, and C in relation to the flow lines for the area, as depicted in the Resource at Risk Layers in Google Earth.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

Connection from Non jurisdictional Conveyance to Tributary A

**Figure 12**. Shows the 4 culverted driveways within the non-jurisdictional conveyance and the 5th culvert discharging water from the non-jurisdictional conveyance to Tributary A. Photos taken 19 June 2018.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

Tributary A

Looking North- Tributary A

Two photos show examples of the apple snail egg casings (*Pomacea maculata*) observed within Tributaries A and B

**Figure 13.** The photos in this figure were taken of Tributary A, an un-named north-south Canal within ITID. All photos were taken standing at the red star looking north. Water was observed flowing north, and was confirmed by adjacent resident to the east. Additionally, photos were taken of the apple snail egg casing that were scattered along the littoral shelves/banks of the canal sides and culverts, within Tributaries A, B, and C.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

Tributary B

Vegetation laid down, evidence of flow direction lines

Photo to the left shows Tributary B crossing the L Canal and continuing East.

**Figure 14.** Photos taken of Tributary B on 19 June 2018, looking east standing approximately 200 feet west of 170th Avenue North on the north bank of the Canal (red star on map). Water was observed flowing east. Photo also shows vegetation matted down as evidence of prolonged period of easterly flow direction. Fish and Exotic apple snail egg casings were also observed within the Canal.

Photo to the left shows water marks along the banks of the canal and erosion as evidence of previously higher water levels.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

Similarly Situated Wetlands Adjacent to Non-jurisdictional conveyance and Tributaries A, B, C



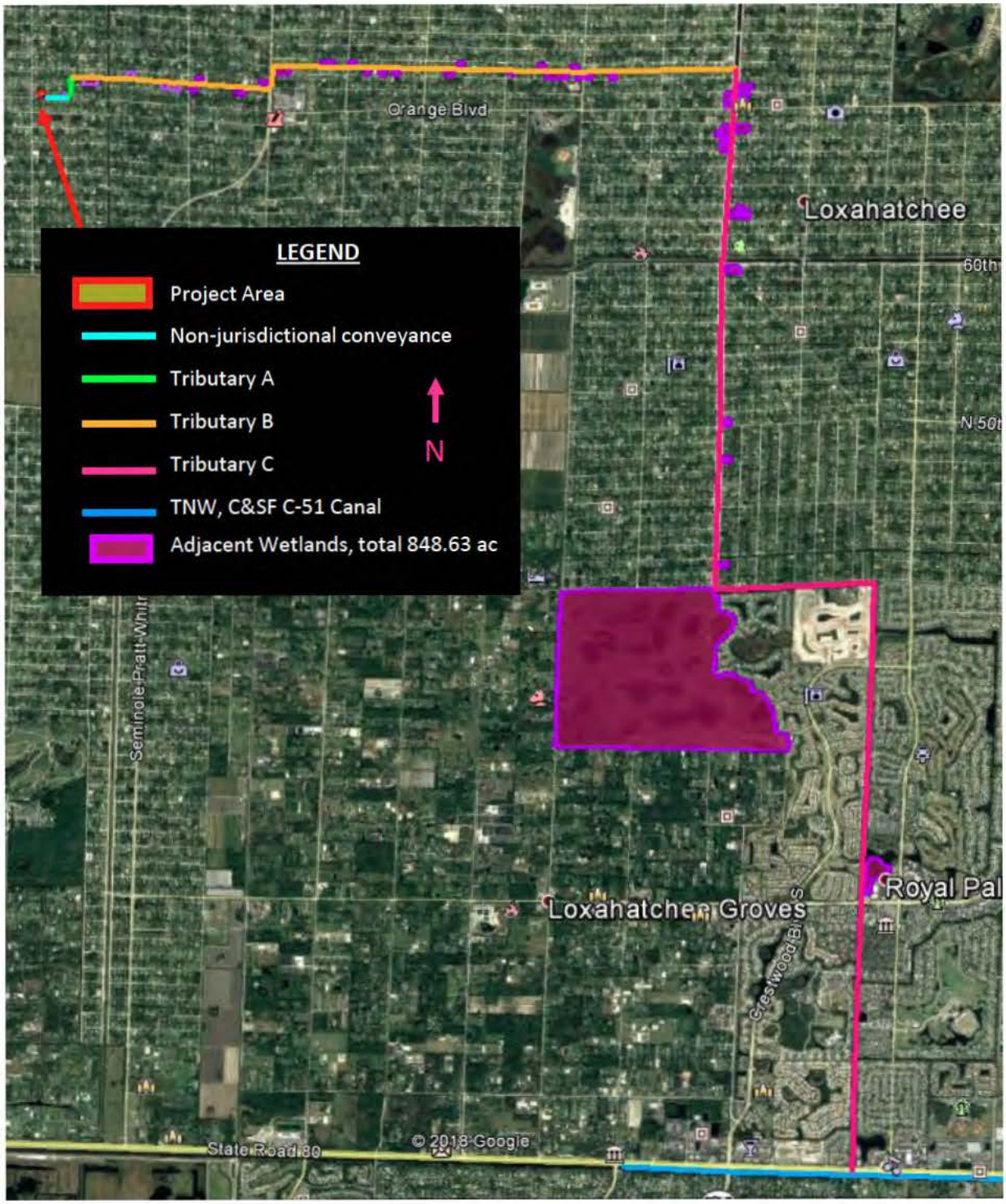



**Figure 15.** This figure provides an overview to the locations of the 37 wetland mapped adjacent to the non-jurisdictional conveyance and Tributaries A, B and C; a total of 848.63 acres.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

Similarly Situated Wetlands Adjacent to Non-jurisdictional conveyance and Tributaries A, B, and C

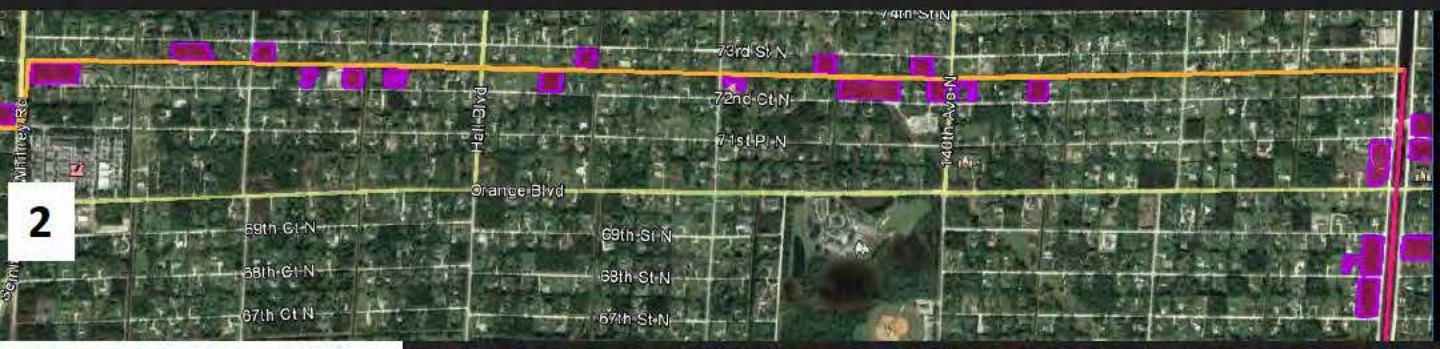
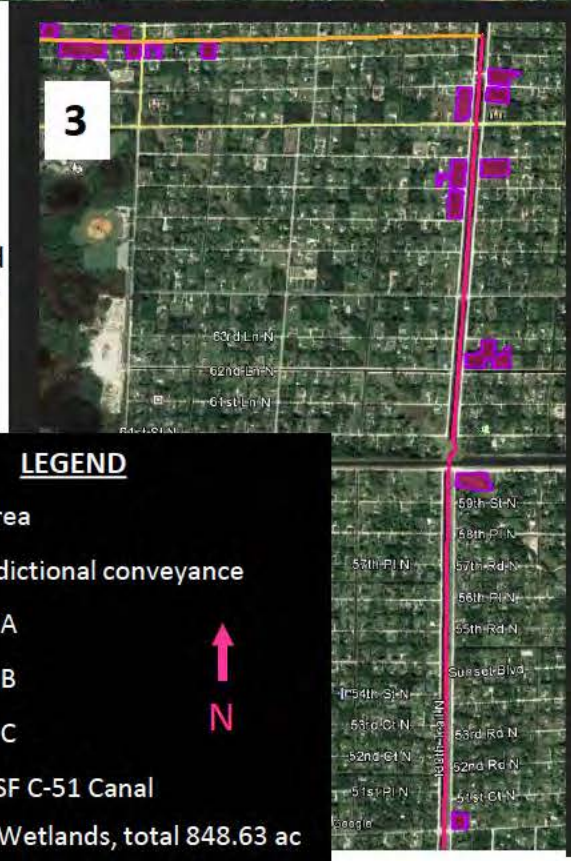
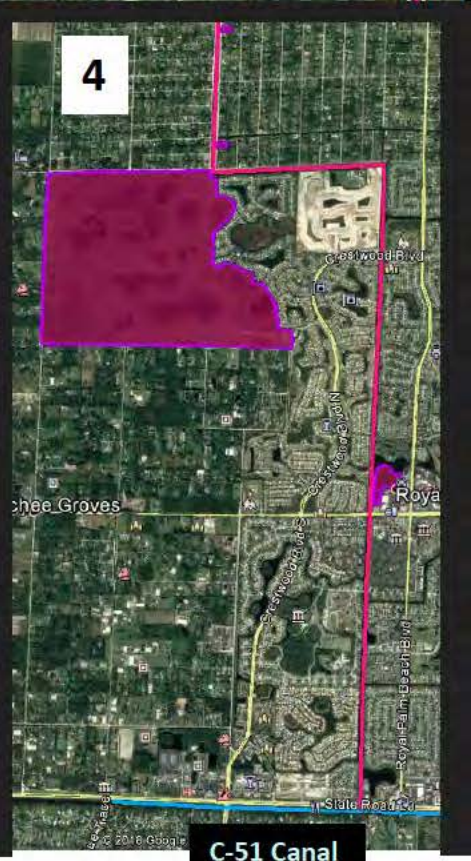



**Figure 16.** These four maps provide a zoomed in view of the 37 similarly situated wetlands documented adjacent and directly abutting the non-jurisdictional conveyance and Tributaries A, B, and C. They are numbered from 1-4 starting at the project area and ending at the TNW, C-51 Canal.




**LEGEND**

- Project Area
- Non-jurisdictional conveyance
- Tributary A
- Tributary B
- Tributary C
- TNW, C&SF C-51 Canal
- Adjacent Wetlands, total 848.63 ac

N

# Project: Schwartz Single Family Home
# SAJ-2017-02731

Overview of Significant Nexus Connection to the TNW
Pumping Flow Conditions

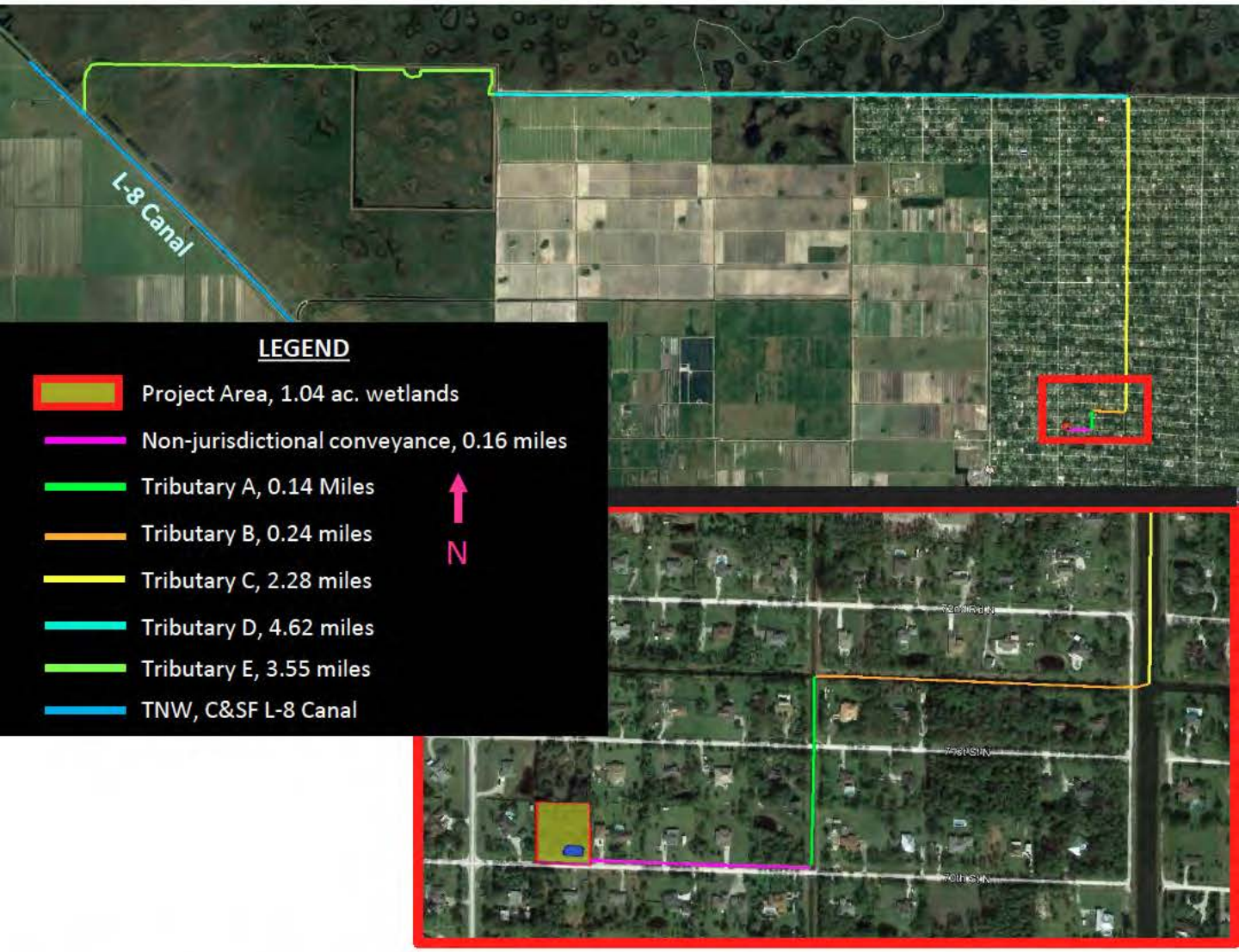
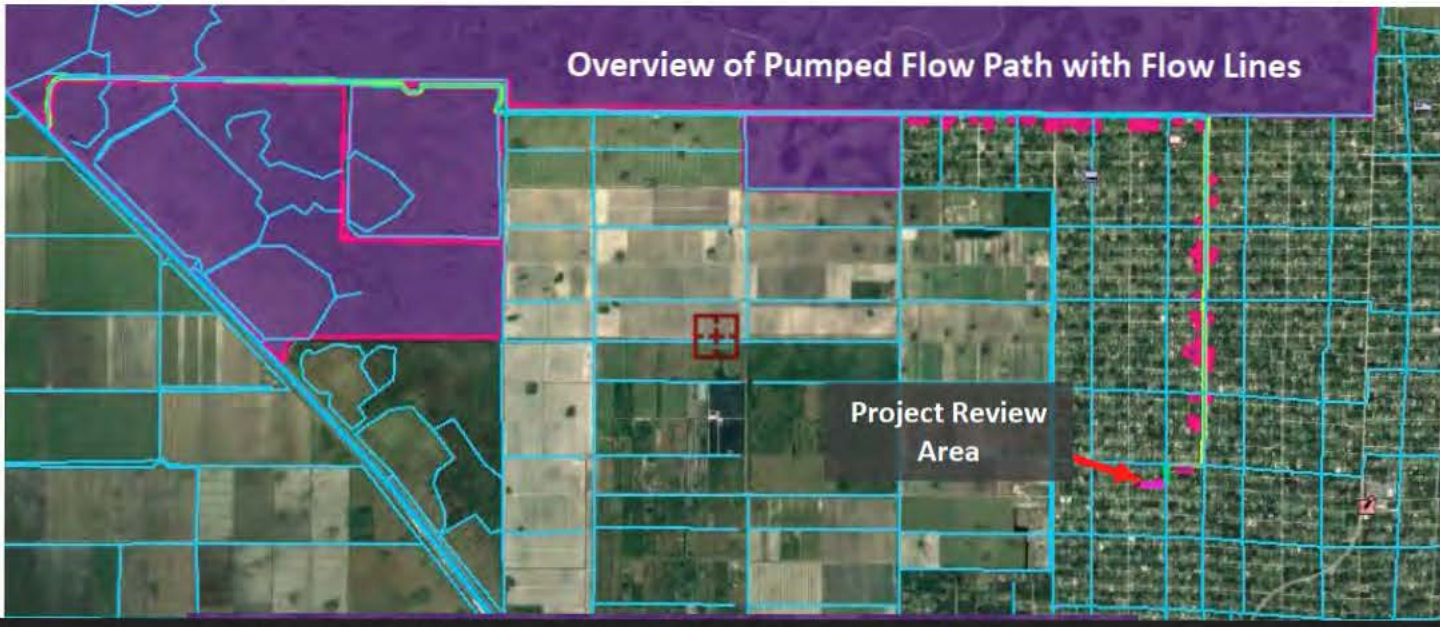




**Figure 17.** Shows an overview of the Flow Path under pumping conditions with the non-jurisdictional conveyance and five tributaries, which ultimately discharges into the TNW, L-8 Canal.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

Flow Lines and Water Flow Direction under Pumping Conditions






Zoomed in View of Pumped Flow Path with Flow Lines

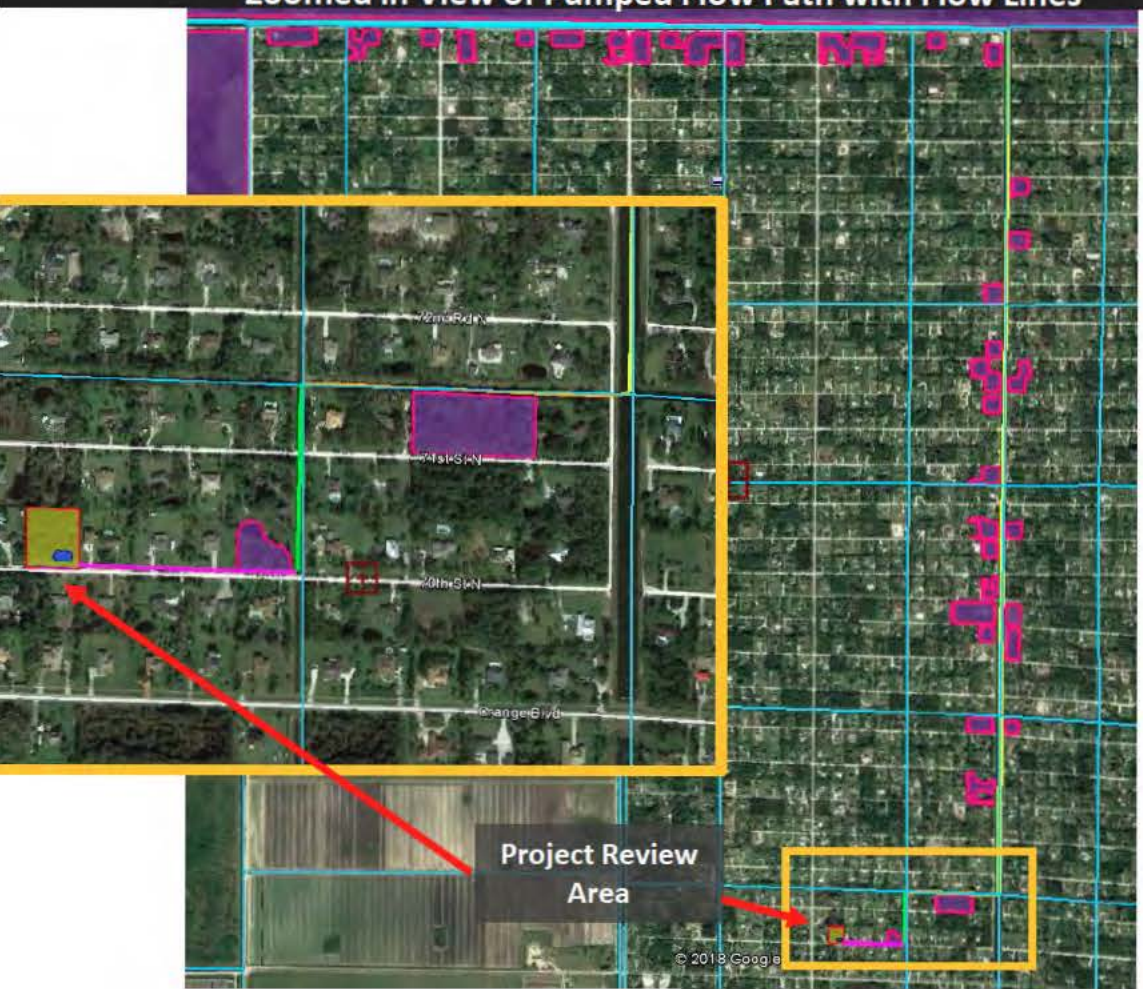



**Figure 18.** Project review area with similarly situated adjacent wetlands and Tributaries A, B, C, D, and E in relation to the flow lines for the area, as depicted in the Resource at Risk Layers in Google Earth.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

Hydrologic Unit Code (HUC) 12: 030902010100
Corbett Wildlife Management Area, 170 square miles/ 108,660 acres

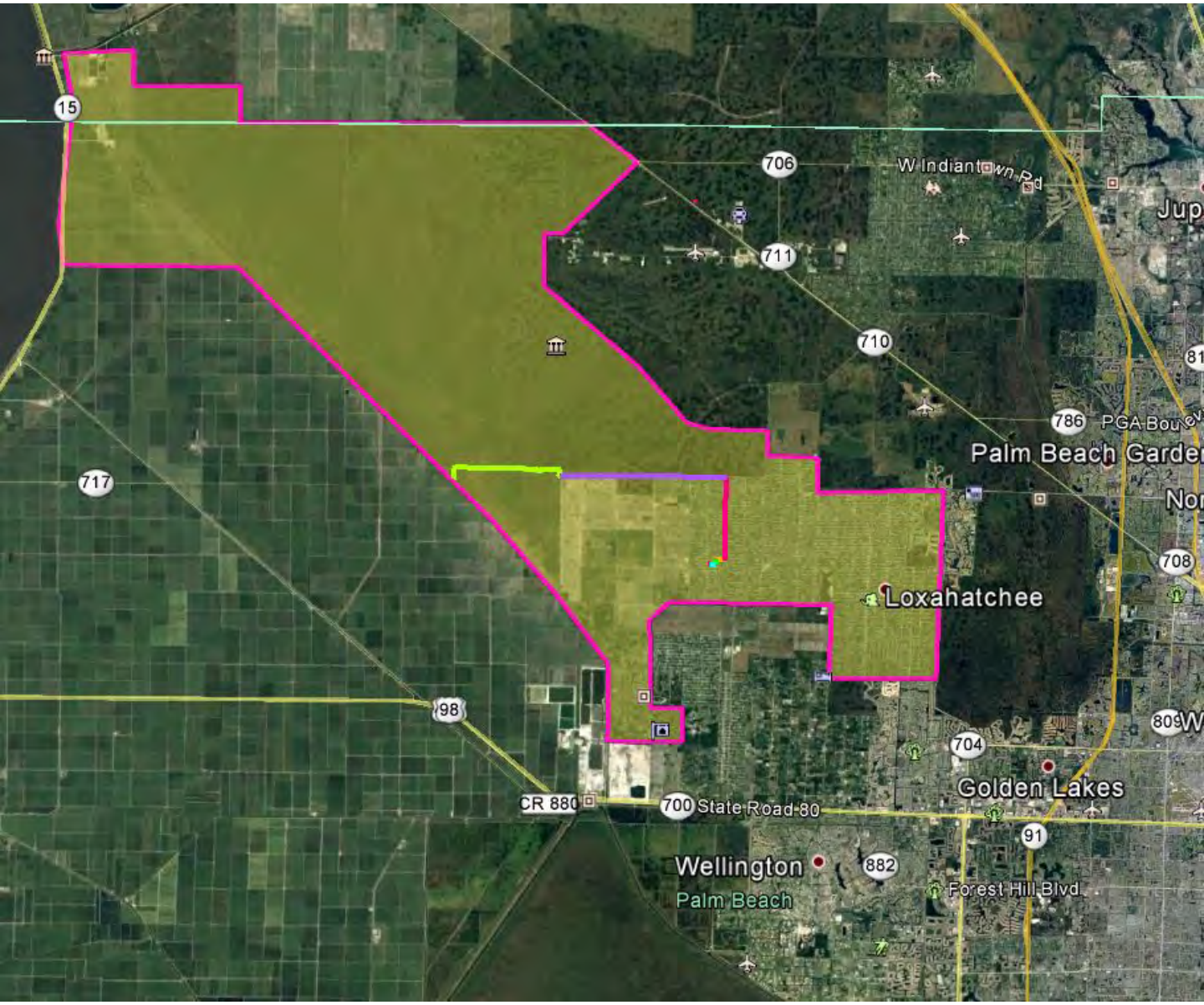




**Figure 19**. The pumping flow within the watershed/ Hydrologic Unit Code (HUC) 12, 030902010100, for Corbett Wildlife Management Area, total of 170 square miles/ 108,660 acres.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

L-8 Drainage Basin, 166 square miles/ 106,286 acres



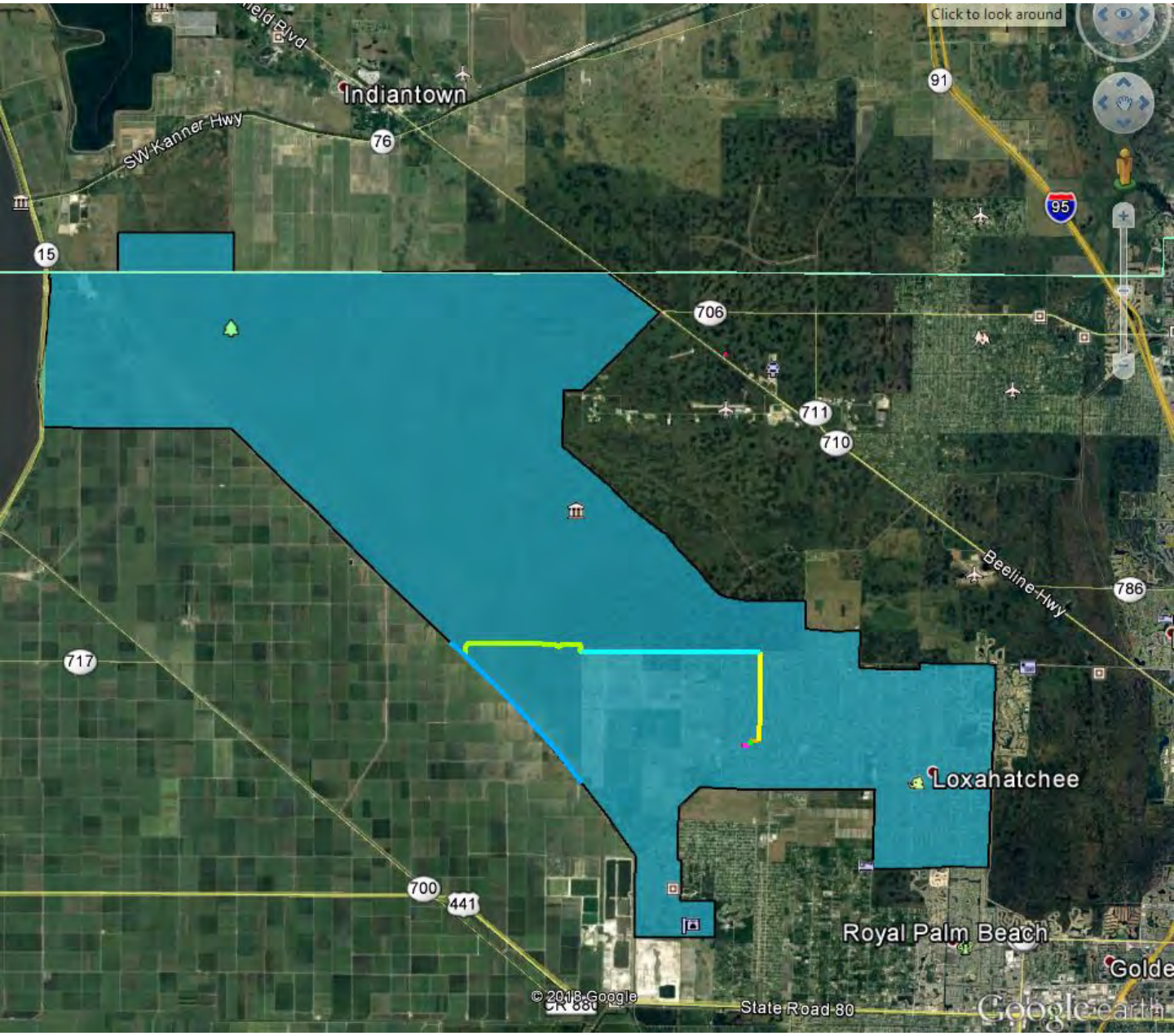



**Figure 20.** The Pumping flow direction from the project site, to non-jurisdictional conveyance, and five Tributaries to the TNW, within the SFWMD L-8 Drainage Basin, 166 square miles/ 106,286 acres.

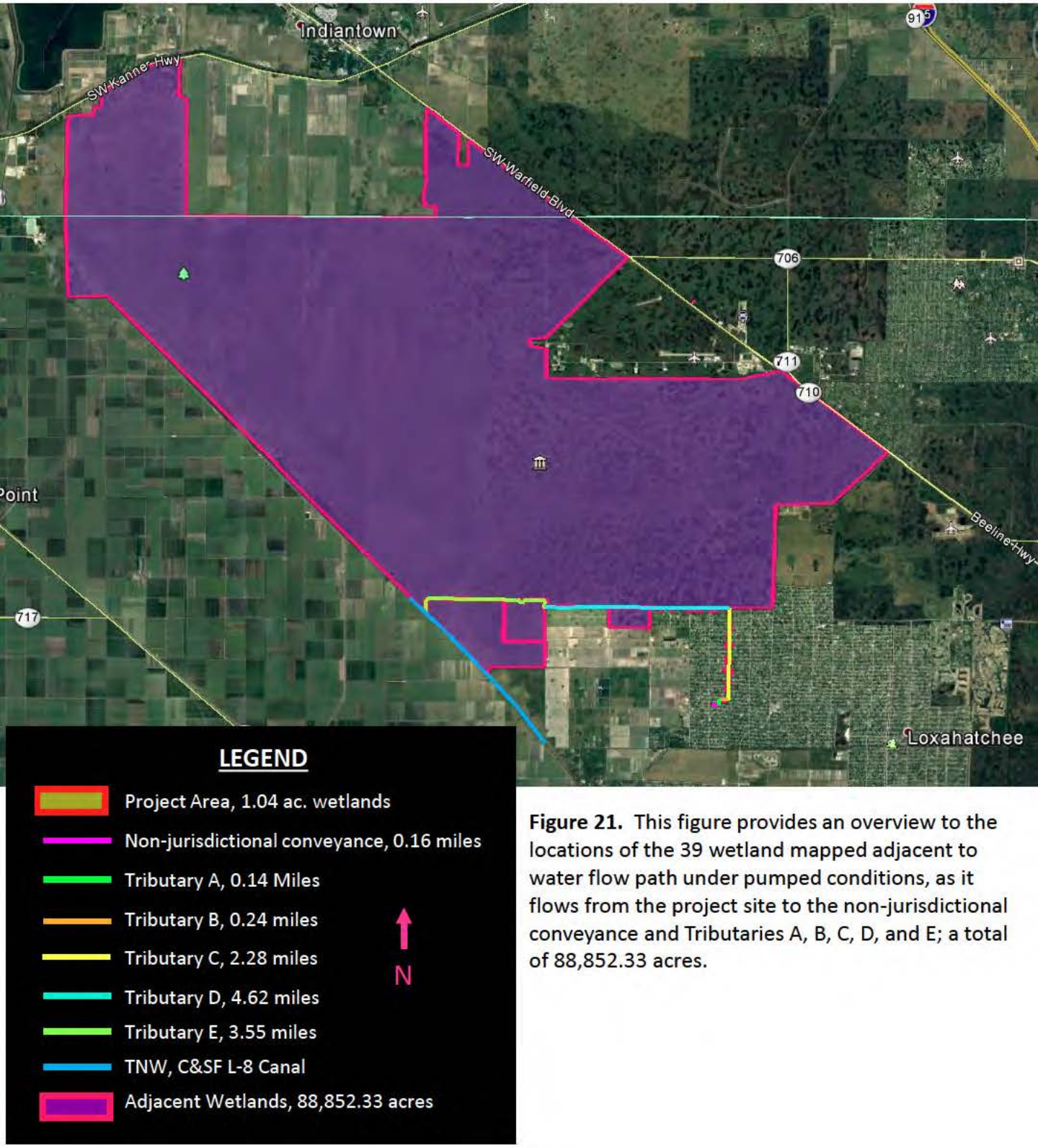



**Figure 21.** This figure provides an overview to the locations of the 39 wetland mapped adjacent to water flow path under pumped conditions, as it flows from the project site to the non-jurisdictional conveyance and Tributaries A, B, C, D, and E; a total of 88,852.33 acres.

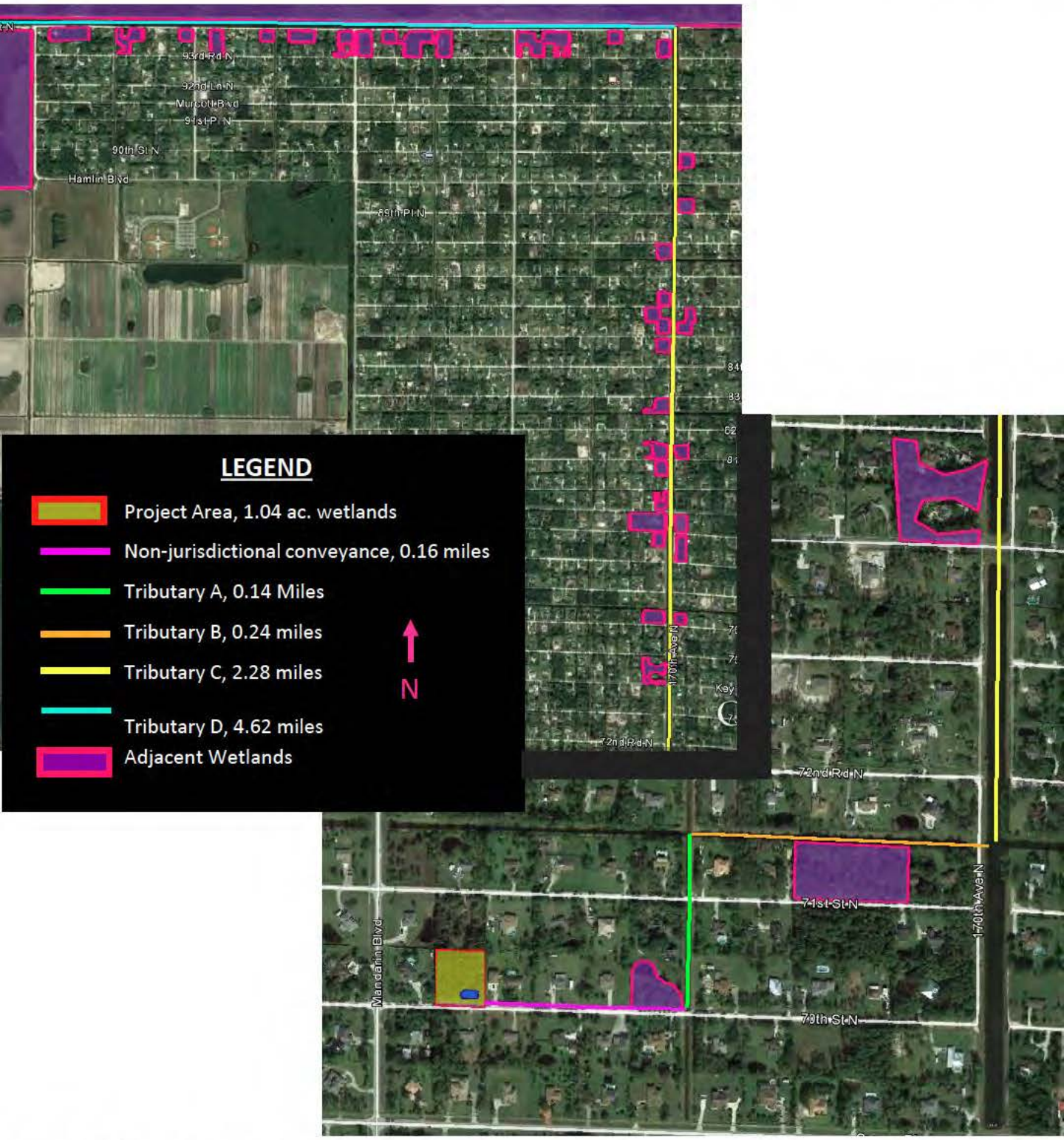



**Figure 22.** This figure provides an zoomed in view of smaller adjacent similarly situated wetlands, along the pumped flow path located adjacent to the non-jurisdictional conveyance, Tributary A, B, C and eastern section of Tributary D.

# ATTACHMENT 2

**Approved Jurisdictional Determination**

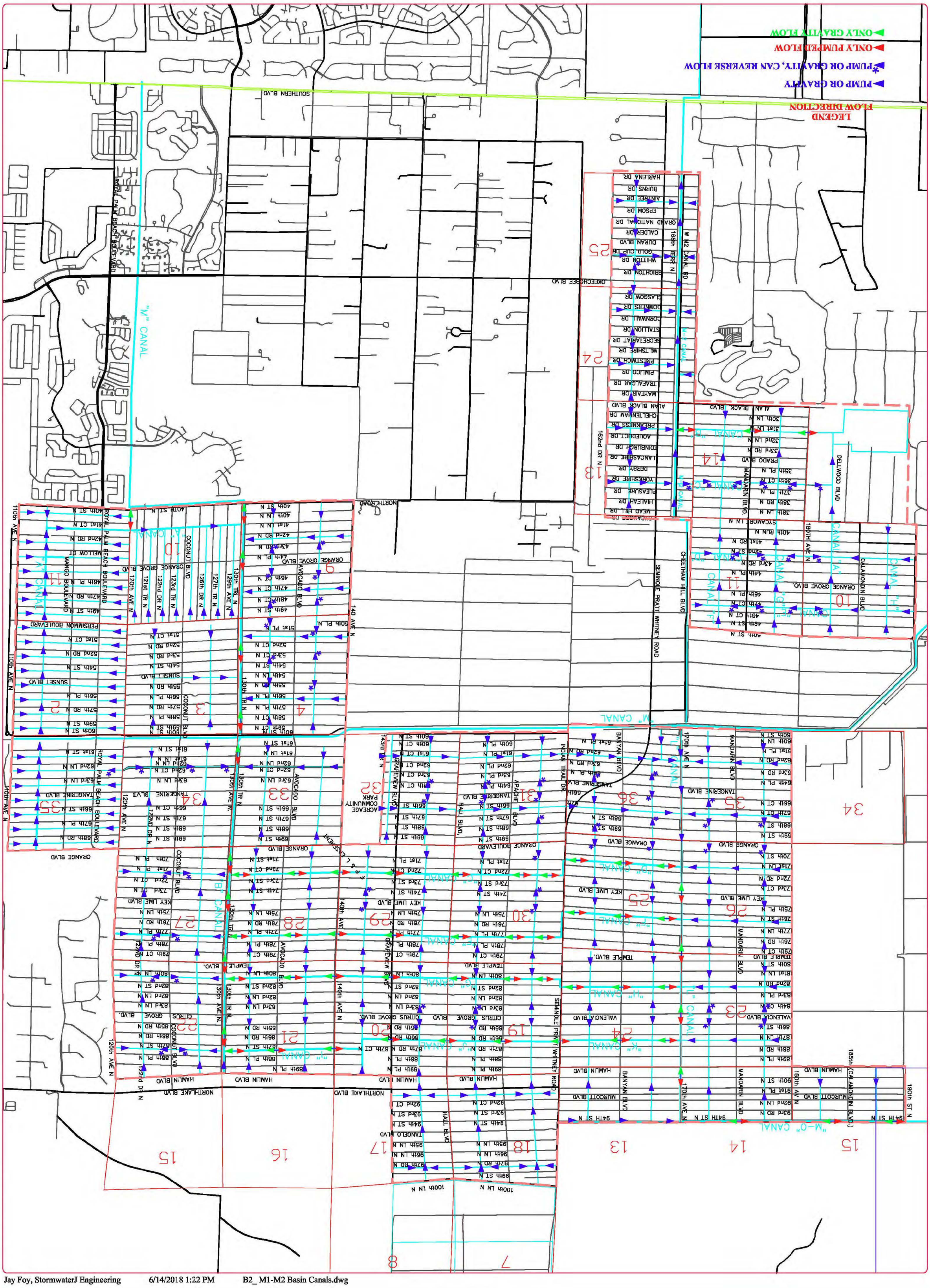
Application: SAJ-2017-02731

## Indian Trail Improvement District (ITID)

**(1) Stormwater Flow Direction Map &**

**(2) Roadside Swale Water Flow Connectivity Explanation from ITID Website:**

https://www.indiantrail.com/?SEC=E91F1128-E414-4FEA-AFCD-18B700A96154




# ITID June 2018 - Drainage Flow Direction

## M-1 & M-2 BASINS

| NO. | DATE | REMARKS | BY | NO. | DATE | REMARKS | BY |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

REVISIONS

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Jay G. Foy, P.E. License #70003

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Civil, Hydrologic & Hydraulic Engineers
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| | |
|---|---|
| PRINT DATE | 6/14/18 |
| SCALE | |
| JOB NO. | 91084.000 |

| | DATE |
|---|---|
| DRAWN | 6/14/18 |
| CHECKED (1) | JGF |
| CHECKED (2) | |
| PROJECT MANAGER | JGF |

SHEET NO. 1 / 1

Jay Foy, StormwaterJ Engineering 6/14/2018 1:22 PM B2_ M1-M2 Basin Canals.dwg

# Indian Trail Improvement District

Serving the public since 1957.





## Frequently Asked Questions

Looking for a quick answer to a quick question check here first. For more information check out the I Want To... and the Department sections.

### Index


- Distr ct Contact Info., Off ce Location & Hours of Operat on
- How often are the roads graded?
- What are the swales for?
- What can I do to make sure my swale drains properly?
- How often are the swales mowed?
- Are there plans to pave my road?
- Who owns the canal easement?
- Can I build in the easement?


**District Contact Info., Office Location & Hours of Operation**

Indian Trail Improvement District
13476 61st Street North
West Palm Beach, FL 33412

Phone: (561) 793-0874
Fax: (561) 793-3716

The Administrative Office is open Monday thru Thursday, 7:30 AM to 6:00 PM, except for holidays and weather emergencies. You can contact us on Friday's from 9:00 AM to 5:00 PM.

**How often are the roads graded?**

As a general rule:

- Main roads in the District are graded once a week.
- All other roads are graded every other week.

**What are the swales for?**

Swales located along roadways connect to drainage canals which connect to retaining areas leading to the overall regional system governed by the South Florida Water Management District.

In our area, many of the swales are constructed to enable water to drain to the nearest canal. When it rains, water run off from yards and roadways collects in the swales and slowly drains down the road to the nearest canal.

**What can I do to make sure my swale drains properly?**

As a resident of the District you can help improve the drainage in front of your property. Check regularly to make sure that your culvert pipe is not blocked or crushed. Keep your swale area clear of debris such as lawn debris, garbage, and other items which would cause the water to stop flowing.

**How often are the swales mowed?**

The District currently mows the swales twice per year. This is to prevent trees from growing in the swale area.

**Are there plans to pave my road?**

For a complete answer see the see the I Want To... Pave My Road section on the menu above.

**Who owns the canal easement?**

The property itself is owned by the adjacent property owner with a canal/mainteance easement granted to the District. The easement grants the District certain rights to access and/or improve the property for purposes described in the easement language.

**Can I build in the easement?**

The District does not allow the property owner to obstruct the easement. The reason for this requirement is to allow District personnel "unobstructed" access to conduct weed control spraying, mowing, and other canal maintenance activities. Locked gates, fences, disabled vehicles, ect. impede these activities, and therefor, raise the cost of providing maintenance. Some people believe that these canal easements are "public property", they are not. The only people allowed to utilize canal easement are the underlying property owner and the District staff. All others are trespassing.

Printer-friendly Vers on

**ADDRESS: 13476 61st Street North, West Palm Beach, FL 33412 PHONE: (561) 793 0874 E-MAIL: info@indiantrail.com Under Florida law, e-mail addresses are public records. If you do not want your e-mail address released in response to a public records request, do not send electronic mail to this entity. Instead, contact this office by phone or in writing.**

# ATTACHMENT 3

**Approved Jurisdictional Determination**

Application: SAJ-2017-02731

## NRCS Soil Survey Description and Maps

Soil Map—Palm Beach County Area, Florida
(SAJ-2017-02731)

Map Scale: 1:528 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 5 10 20 30

Feet: 0 25 50 100 150

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

- Area of Interest (AOI)

**Soils**

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

**Special Point Features**

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

**Water Features**

- Streams and Canals

**Transportation**

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**

- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Palm Beach County Area, Florida
Survey Area Data: Version 12, Sep 14, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 13, 2014—Dec 11, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| 37 | Riviera fine sand, depressional, 0 to 1 percent slopes | 1.2 | 100.0% |
| **Totals for Area of Interest** | | **1.2** | **100.0%** |

# Palm Beach County Area, Florida

## 37—Riviera fine sand, depressional, 0 to 1 percent slopes

### Map Unit Setting

*National map unit symbol:* 2tzwl
*Elevation:* 0 to 80 feet
*Mean annual precipitation:* 44 to 64 inches
*Mean annual air temperature:* 68 to 77 degrees F
*Frost-free period:* 280 to 365 days
*Farmland classification:* Farmland of local importance

### Map Unit Composition

*Riviera, depressional, and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Riviera, Depressional

#### Setting

*Landform:* Depressions on marine terraces
*Landform position (three-dimensional):* Tread, dip
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Sandy and loamy marine deposits

#### Typical profile

*A - 0 to 4 inches:* fine sand
*E - 4 to 36 inches:* fine sand
*Bt/E - 36 to 42 inches:* fine sandy loam
*Cg1 - 42 to 56 inches:* fine sand
*Cg2 - 56 to 80 inches:* fine sand

#### Properties and qualities

*Slope:* 0 to 1 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Very poorly drained
*Runoff class:* Negligible
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.60 to 2.00 in/hr)
*Depth to water table:* About 0 inches
*Frequency of flooding:* None
*Frequency of ponding:* Frequent
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Sodium adsorption ratio, maximum in profile:* 4.0
*Available water storage in profile:* Moderate (about 6.1 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7w

*Hydrologic Soil Group:* A/D
*Other vegetative classification:* Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
*Hydric soil rating:* Yes

**Minor Components**

**Chobee, depressional**
*Percent of map unit:* 7 percent
*Landform:* Depressions on marine terraces
*Landform position (three-dimensional):* Tread, dip
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Other vegetative classification:* Freshwater Marshes and Ponds (R156BY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G156BC345FL)
*Hydric soil rating:* Yes

**Wabasso**
*Percent of map unit:* 4 percent
*Landform:* Depressions on marine terraces
*Landform position (three-dimensional):* Tread, dip
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Other vegetative classification:* South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
*Hydric soil rating:* No

**Tequesta, depressional**
*Percent of map unit:* 4 percent
*Landform:* Depressions on marine terraces
*Landform position (three-dimensional):* Tread, dip
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Other vegetative classification:* Organic soils in depressions and on flood plains (G156AC645FL)
*Hydric soil rating:* Yes

# Data Source Information

Soil Survey Area: Palm Beach County Area, Florida
Survey Area Data: Version 12, Sep 14, 2016

Hydric Rating by Map Unit—Palm Beach County Area, Florida
(SAJ-2017-02731)

Map Scale: 1:528 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 5 10 20 30

Feet: 0 25 50 100 150

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

- Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

**Soil Rating Lines**

- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

**Soil Rating Points**

- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

**Water Features**

- Streams and Canals

**Transportation**

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**

- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Palm Beach County Area, Florida
Survey Area Data: Version 12, Sep 14, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 13, 2014—Dec 11, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Hydric Rating by Map Unit

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| 37 | Riviera fine sand, depressional, 0 to 1 percent slopes | 96 | 1.2 | 100.0% |
| **Totals for Area of Interest** | | | **1.2** | **100.0%** |

## Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

## Rating Options

*Aggregation Method:* Percent Present

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Lower

# ATTACHMENT 4

**Approved Jurisdictional Determination**

Application: SAJ-2017-02731

## Data Sheets and Site Photos
## 19 October 2017
## 11 January 2018
## 19 June 2018

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: 17437 70th Street North- SAJ-2017-02731 City/County: Loxahatchee/ PBC Sampling Date: 10/19/2017

Applicant/Owner: Michael Schwartz State: FL Sampling Point: 1

Investigator(s): J. Ashworth; T. Fraley; and C. Karvounis Section, Township, Range: S 26/ T42 South / R 40 East

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-1

Subregion (LRR or MLRA): LRR U Lat: 26.781548 Long: -80.318624 Datum: ____

Soil Map Unit Name: Riviera fine sand, depressional, 0-1 percent slopes NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes X | No ____ | **Is the Sampled Area within a Wetland?** **Yes** X **No** ____ |
| Hydric Soil Present? | Yes X | No ____ | |
| Wetland Hydrology Present? | Yes X | No ____ | |

Remarks:
The data point was taken on the only dry portion, highest elevation and greatest amount of non-native species of the site. Surface water was observed within 30 feet of the plug on all four sides. The data point contained 4 primary hydrologic indicators and two secondary hydrologic indicators; passed the dominance test for hydrophytic vegetation and contained 4 hydric soil indicators. Since the highest point of the site was deemed a wetland and the ther areas were submerged up to 18+ inches of water, it can be determined that the entire site is a wetland and the data point provides a representative sample for the other portions of the site.

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Vis ble on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T,U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes X | No ____ | Depth (inches): 1 |
| Water Table Present? | Yes X | No ____ | Depth (inches): 2 |
| Saturation Present? (includes capillary fringe) | Yes X | No ____ | Depth (inches): 0 |

**Wetland Hydrology Present?** **Yes** X **No** ____

Descr be Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Corps staff observed four primary indicators and two secondary indicators of wetland hydrology at the data point. Other hydrologic indicators were observed throughout the site, but not recorded on this sheet. The primary hydologic indicators observed at the data point include surface Water Present on the edges of the data point and got increasly deeper outside the data point area. Additionally inside the soil plug hole the water table was observed within 2 inches of the gound surface and saturation was present to the ground surface at 0 inches. Around the plug hole, USACE staff observed water stained leaves. The data point also qualified for geomorphic position since the area was depressional and concave. It also passed the Facultative (FAC) Neutral test where the dominant facultative wet (FACW) and obligate (OBL) vegetation observed were greater than the facultative upland (FACU) and upland (UPL). The site contained three dominant species, two of the species have a FAC wetland indicator status, and one species is FACW. Therefore since none of the dominant species are FACU or UPL. The remaining FAC Neutral Test: Dominant Vegetation included One FACW species, and two FAC species. Dropping the FAC species, the FACW> UPL and FACU species, therefore passing. Note: The base of the trees surrounding the data point were buttressed, which means it is a morphological adaptation to long periods of inundation. While this is not an approved hydrologic indicator for this region, it supports the information stated in the above text.

**VEGETATION (Five Strata)** – Use scientific names of plants. Sampling Point: 1

| Tree Stratum (Plot size: See notes) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Melaleuca quinquenervia* | 40 | Yes | FAC |
| 2. *Acacia auriculiformis* | 10 | No | UPL |
| 3. *Pinus elliottii* | 10 | No | FACW |
| 4. *Schinus terebinthifolia* | 5 | No | FAC |
| 5. | | | |
| 6. | | | |
| | 65 | =Total Cover | |
| 50% of total cover: 33 | | 20% of total cover: | 13 |

| Sapling Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | | =Total Cover | |
| 50% of total cover: | | 20% of total cover: | |

| Shrub Stratum (Plot size: see notes) | | | |
|---|---|---|---|
| 1. *Schinus terebinthifolia* | 30 | Yes | FAC |
| 2. *Myrsine cubana* | 5 | No | FAC |
| 3. *Sabal palmetto* | 5 | No | FAC |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 40 | =Total Cover | |
| 50% of total cover: 20 | | 20% of total cover: | 8 |

| Herb Stratum (Plot size: see notes) | | | |
|---|---|---|---|
| 1. *Lygodium microphyllum* | 90 | Yes | FACW |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 90 | =Total Cover | |
| 50% of total cover: 45 | | 20% of total cover: | 18 |

| Woody Vine Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | =Total Cover | |
| 50% of total cover: | | 20% of total cover: | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | |
| FACW species | | x 2 = | |
| FAC species | | x 3 = | |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | (A) | | (B) |

Prevalence Index = B/A =

**Hydrophytic Vegetation Indicators:**

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub -** Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody Vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)
The plot size for all 5 strata was 30 feet North, west, and east of the soil plug and 15 feet south due to habitat change

## SOIL

Sampling Point: 1

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-2 | 10YR 2/1 | 90 | 10YR 3/1 | 10 | D | M | Sandy | See notes |
| 2-6.5 | 10YR 3/1 | 80 | 10YR 4/1 | 10 | D | M | Sandy | Diffuse boundaries/ Faint contrast |
| | | | 10YR 2/1 | 10 | MS | M | | organic material concentrations |
| 6.5-15 | 10YR 6/1 | 90 | 10YR 7/1 | 10 | D | M | Sandy | diffuse boundaries/ faint contrast |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- X Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- X Polyvalue Below Surface (S8) **(LRR S, T, U)**
- X Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: Water

Depth (inches): 15

**Hydric Soil Present?** **Yes** X **No** ___

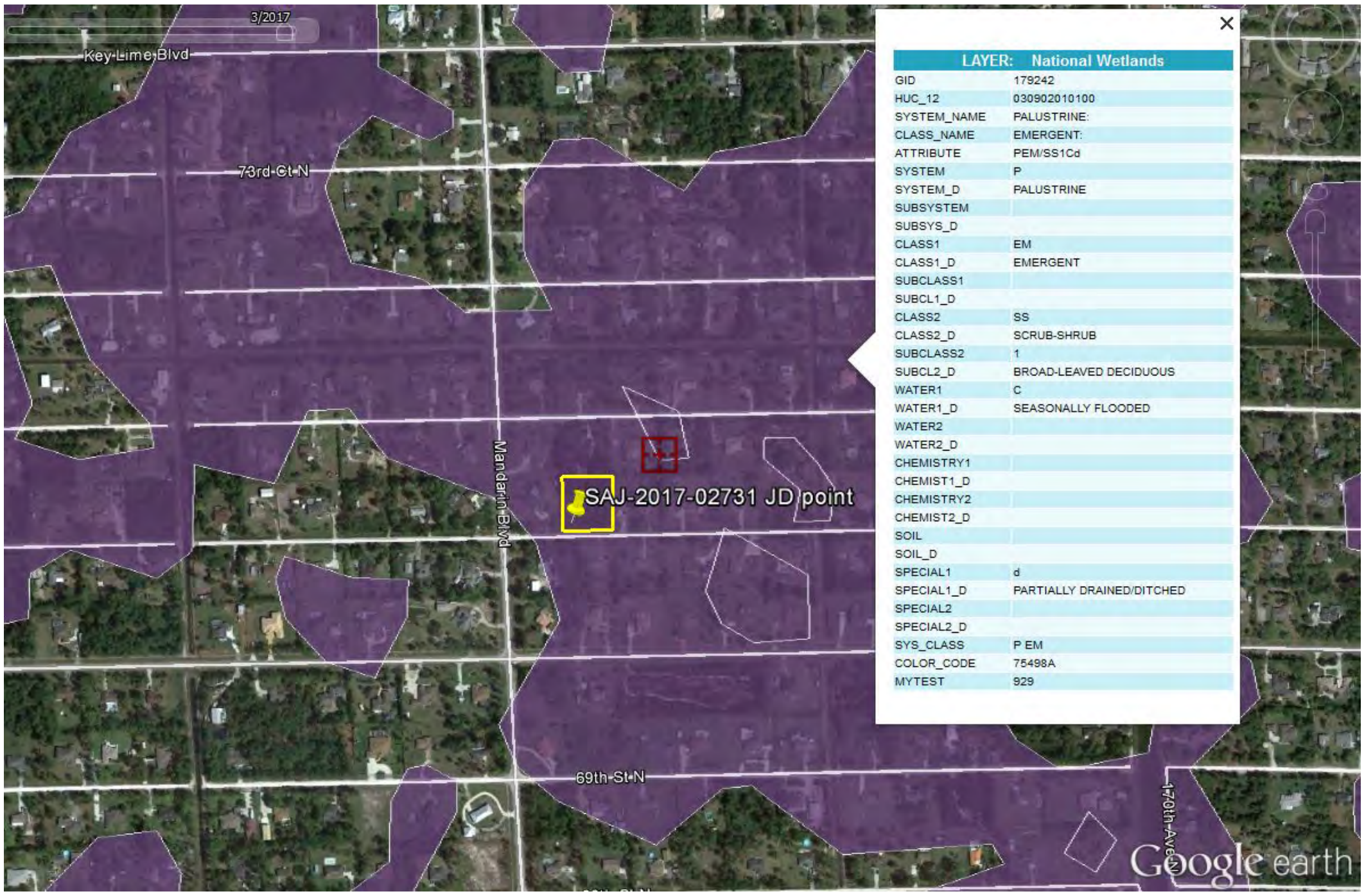
Remarks:

This data form is revised from Atlantic and Gulf Coastal Plain Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016. Soil Horizon 1: The matrix contained 90-95% Masked grains when viewed with a 10x hand lens. Looking at the horizon from the plug it appeared uniform. However, once a cross section was taken, there appeared to be a second, lighter color, that contained diffuse boundaries and had a Hue Value/Chroma of 10YR 3/1, which is faintly contrasting to the matrix value. Soil Horizon 2:
contained two other colors different from the matrix color. There were depleted areas that had diffuse boundaries and were faintly contrasting and darker concentrations of organic material. Horizon 3: High value low chroma soils. there were two colors that were faintly contrasting and hard to dicern the difference, but contained diffuse boundaries. See attached photos. Additional Notes: In the plug hole there was a visible water table within 2 inches of the soil surface.

# Michael Schwartz, SAJ-2017-02731

## October 19, 2017

Figure 1. Yellow polygon shows the field delineated boundaries of the parcel. Push pin shows the location of the data point 1.




| LAYER: | National Wetlands |
|---|---|
| GID | 179242 |
| HUC_12 | 030902010100 |
| SYSTEM_NAME | PALUSTRINE: |
| CLASS_NAME | EMERGENT: |
| ATTRIBUTE | PEM/SS1Cd |
| SYSTEM | P |
| SYSTEM_D | PALUSTRINE |
| SUBSYSTEM | |
| SUBSYS_D | |
| CLASS1 | EM |
| CLASS1_D | EMERGENT |
| SUBCLASS1 | |
| SUBCL1_D | |
| CLASS2 | SS |
| CLASS2_D | SCRUB-SHRUB |
| SUBCLASS2 | 1 |
| SUBCL2_D | BROAD-LEAVED DECIDUOUS |
| WATER1 | C |
| WATER1_D | SEASONALLY FLOODED |
| WATER2 | |
| WATER2_D | |
| CHEMISTRY1 | |
| CHEMIST1_D | |
| CHEMISTRY2 | |
| CHEMIST2_D | |
| SOIL | |
| SOIL_D | |
| SPECIAL1 | d |
| SPECIAL1_D | PARTIALLY DRAINED/DITCHED |
| SPECIAL2 | |
| SPECIAL2_D | |
| SYS_CLASS | P EM |
| COLOR_CODE | 75498A |
| MYTEST | 929 |

Figure 2. Shows the location of forested wetland from the National Wetland Inventory (purple)

**Michael Schwartz**
**SAJ-2017-02731**
Photos: October 19, 2017

Figure 4 (below): Shows the water 2 inches from the soil surface, qualifies as a high water table. Additionally, water stained leaves are also visible in this photo.

Figure 3 (above): Shows three soil horizons. Soil horizon 1 (0-2 inches), soil horizon 2 ( 2-6.5 inches), and soil horizon 3 (6.5-15 inches).

Figure 5 (above): Shows buttressing, the morphological adaptation of Melaleuca tree at the base as a result of long periods of inundation

Figure 6 (right): shows the standing water at varied depths in the interior of the site. Wildlife observed included frogs, birds, and insects.

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: 17437 70th Street North- SAJ-2017-02731 City/County: Loxahatchee/ PBC Sampling Date: 1/11/2018

Applicant/Owner: Michael Schwartz State: FL Sampling Point: 2

Investigator(s): J. Ashworth and T. Fraley Section, Township, Range: S26/ T 43S/ R 40E

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-1

Subregion (LRR or MLRA): LRR U Lat: 26.781585 Long: -80.318158 Datum: ____

Soil Map Unit Name: Riviera fine sand, depressional, 0-1 percent slopes NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes X | No ____ | **Is the Sampled Area within a Wetland?** **Yes** ____ **No** X |
| Hydric Soil Present? | Yes ____ | No X | |
| Wetland Hydrology Present? | Yes X | No ____ | |

Remarks:
The data point did not have hydric soils and therefore was not considered a wetland. Canopy of the area was dominated by earleaf accacia. This vegetation was used to determine the wetland upland line. This area was about 0.11 acres in size. A third data point was taken where there was no earleaf acacia and the soils were sandy in texture and qualified as hydric.

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- X High Water Table (A2)
- ____ Saturation (A3)
- X Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Vis ble on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T,U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes ____ | No ____ | Depth (inches): ____ |
| Water Table Present? | Yes X | No ____ | Depth (inches): 12 |
| Saturation Present? (includes capillary fringe) | Yes ____ | No ____ | Depth (inches): ____ |

**Wetland Hydrology Present?** **Yes** X **No** ____

Descr be Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Water marks were observed on the bases of the trees and there was a water table present at 12 inches from the soil surface. Water Stained leaves were also observed and photographed in comparison with the Corps Manual. See Attachment 4. The data point also passed the FAC Neutral test and qualified for Geomorphic position.

**VEGETATION (Five Strata)** – Use scientific names of plants. Sampling Point: 2

| Tree Stratum (Plot size: 20 ft diameter) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Acacia auriculiformis* | 40 | Yes | UPL |
| 2. *Melaleuca quinquenervia* | 10 | No | FAC |
| 3. *Pinus elliottii* | 10 | No | FACW |
| 4. *Schinus terebinthifolia* | 10 | No | FAC |
| 5. | | | |
| 6. | | | |
| | 70 | =Total Cover | |
| 50% of total cover: 35 | | 20% of total cover: | 14 |

| Sapling Stratum (Plot size: 20 ft diameter) | | | |
|---|---|---|---|
| 1. *Acacia auriculiformis* | 15 | Yes | UPL |
| 2. *Schinus terebinthifolia* | 15 | Yes | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 30 | =Total Cover | |
| 50% of total cover: 15 | | 20% of total cover: | 6 |

| Shrub Stratum (Plot size: 20 ft radius) | | | |
|---|---|---|---|
| 1. *Myrica cerifera* | 10 | Yes | FAC |
| 2. *Chrysobalanus icaco* | 20 | Yes | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 30 | =Total Cover | |
| 50% of total cover: 15 | | 20% of total cover: | 6 |

| Herb Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. *Lygodium microphyllum* | 10 | Yes | FACW |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 10 | =Total Cover | |
| 50% of total cover: 5 | | 20% of total cover: | 2 |

| Woody Vine Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | =Total Cover | |
| 50% of total cover: | | 20% of total cover: | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 40 | x 2 = | 80 |
| FAC species | 45 | x 3 = | 135 |
| FACU species | 0 | x 4 = | 0 |
| UPL species | 55 | x 5 = | 275 |
| Column Totals: | 140 (A) | | 490 (B) |

Prevalence Index = B/A = 3.50

**Hydrophytic Vegetation Indicators:**

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub -** Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody Vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)
used a 20-foot radius because a 30-foot radius would have been outside the acacia canopy

## SOIL

Sampling Point: 2

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-3.5 | 10YR 2/1 | 70 | 10YR 4/1 | 20 | D | M | Loamy/Clayey | 100% MS organics matrix |
| | | | 10YR 3/1 | 10 | D | M | | Diffuse boundaries between depletions |
| 3.5-8 | 10YR 3/1 | 70 | 10YR 2/1 | 20 | C | M | Loamy/Clayey | C: 100% masked |
| | | | 10YR 5/1 | 10 | D | M | | |
| 8-12 | 10YR 7/1 | 90 | 10YR 6/1 | 10 | D | M | Sandy | Diffuse boundaries/ faint contrast |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Organic Bodies (A6) **(LRR, P, T, U)**
___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___ Muck Presence (A8) **(LRR U)**
___ 1 cm Muck (A9) **(LRR P, T)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Coast Prairie Redox (A16) (**MLRA 150A)**
___ Sandy Mucky Mineral (S1) **(LRR O, S)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR P, S, T, U)**
___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
___ Thin Dark Surface (S9) **(LRR S, T, U)**
___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
___ Loamy Mucky Mineral (F1) **(LRR O)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) **(LRR U)**
___ Depleted Ochric (F11) **(MLRA 151)**
___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
___ Umbric Surface (F13) **(LRR P, T, U)**
___ Delta Ochric (F17) **(MLRA 151)**
___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

**Indicators for Problematic Hydric Soils[3]:**

___ 1 cm Muck (A9) **(LRR O)**
___ 2 cm Muck (A10) **(LRR S)**
___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
_?_ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: Water

Depth (inches): 12

**Hydric Soil Present?** **Yes** ___ **No** X

Remarks:

This data form is revised from Atlantic and Gulf Coastal Plain Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016. The soil did not qualify for a hydric soil because the upper texture of the soil, though appeared to be sand, passed the bounce test and did not break apart when bounced and it formed a ribbon. Therefore it was loamy/ Clay. In the bottom of the soil pit there was standing water. it was measured 12-inches from the soil surface.

## WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: 17437 70th Street North- SAJ-2017-02731 City/County: Loxahatchee/ PBC Sampling Date: 1/11/2018

Applicant/Owner: Michael Schwartz State: FL Sampling Point: 3

Investigator(s): J. Ashworth and T. Fraley Section, Township, Range: S26/ T 43S/ R 40E

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-1

Subregion (LRR or MLRA): LRR U Lat: 26.781719 Long: -80.318322 Datum: ____

Soil Map Unit Name: Riviera fine sand, depressional, 0-1 percent slopes NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes X | No ____ | **Is the Sampled Area within a Wetland?** **Yes** X **No** ____ |
| Hydric Soil Present? | Yes X | No ____ | |
| Wetland Hydrology Present? | Yes X | No ____ | |

Remarks:
This data point had a canopy dominated by Melaleuca with some earleaf acacia. The soils were more sandy and qualified for strip matrix, therefore the line between the two points was drawing where the meleleuca in the canopy outnumbered the earleaf acacia. Additionally, north of this plug, the elevation seemed to decrease and more obligate ground cover was observed.

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- X Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Vis ble on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- X Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T,U)**

**Field Observations:**

| | | | |
|---|---|---|---|
| Surface Water Present? | Yes ____ | No ____ | Depth (inches): ____ |
| Water Table Present? | Yes X | No ____ | Depth (inches): 14 |
| Saturation Present? (includes capillary fringe) | Yes ____ | No ____ | Depth (inches): ____ |

**Wetland Hydrology Present?** **Yes** X **No** ____

Descr be Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Water marks were observed on the bases of the trees and there was a water table present at 14 inches from the soil surface, which qualifies for the dry season water table (dry season water table is needed within 24 inches of the soil surface.) Water stained leaves were observed on the ground adjacent to the soil plug. The data point also passed the FAC Neutral test and qualified for Geomorphic position.

**VEGETATION (Five Strata)** – Use scientific names of plants. Sampling Point: 3

| Tree Stratum (Plot size: 30 ft diameter) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. *Melaleuca quinquenervia* | 60 | Yes | FAC |
| 2. *Acacia auriculiformis* | 35 | Yes | UPL |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 95 | =Total Cover | |
| 50% of total cover: 48 | | 20% of total cover: | 19 |

| Sapling Stratum (Plot size: 30 ft diameter) | | | |
|---|---|---|---|
| 1. *Melaleuca quinquenervia* | 15 | Yes | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 15 | =Total Cover | |
| 50% of total cover: 8 | | 20% of total cover: | 3 |

| Shrub Stratum (Plot size: 30 ft radius) | | | |
|---|---|---|---|
| 1. *Schinus terebinthifolia* | 20 | Yes | FAC |
| 2. *Chrysobalanus icaco* | 15 | Yes | FACW |
| 3. *Sabal palmetto* | 7 | No | FAC |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 42 | =Total Cover | |
| 50% of total cover: 21 | | 20% of total cover: | 9 |

| Herb Stratum (Plot size: 30 ft radius) | | | |
|---|---|---|---|
| 1. *Blechnum serrulatum* | 25 | Yes | FACW |
| 2. *Lygodium microphyllum* | 10 | Yes | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 35 | =Total Cover | |
| 50% of total cover: 18 | | 20% of total cover: | 7 |

| Woody Vine Stratum (Plot size: ) | | | |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | | =Total Cover | |
| 50% of total cover: | | 20% of total cover: | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 85.7% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | 0 |
| FACW species | 50 | x 2 = | 100 |
| FAC species | 102 | x 3 = | 306 |
| FACU species | 0 | x 4 = | 0 |
| UPL species | 35 | x 5 = | 175 |
| Column Totals: | 187 (A) | | 581 (B) |

Prevalence Index = B/A = 3.11

**Hydrophytic Vegetation Indicators:**

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub -** Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody Vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

## SOIL

Sampling Point: 3

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-3 | 10YR 4/1 | 75 | 10YR 2/1 | 20 | C | M | Sandy | MS 100% Concentrations/ sandy |
| | | | 10YR 5/1 | 5 | D | M | | Diffuse boundaries/ faint contrast |
| 3-12.5 | 10YR 3/1 | 60 | 10YR 2/1 | 25 | C | M | Sandy | MS 100% Concentrations/ sandy |
| | | | 10YR 5/1 | 15 | D | M | | Diffuse boundaries/ faint contrast |
| 12.5-14 | 10YR 6/1 | 80 | 10YR 7/1 | 20 | D | M | Sandy | Diffuse boundaries/ faint contrast |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- X Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: Water

Depth (inches): 14

**Hydric Soil Present?** **Yes** X **No** ___

Remarks:

This data form is revised from Atlantic and Gulf Coastal Plain Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016. The 2nd soil horizon had depleted areas great than 10% of the soil horizon that were faintly contrasting with diffuse boundaries. Since this started within six inches of the soil surface, the hydric soil inidcator for Stripped Maxtrix was met and therefore this is considered a hydric soil.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

Site Visit: January 11, 2018

Attendees:

- USACE- Jerilyn Ashworth and Trey Fraley;
- Applicants: Ashley and Michael Schwartz

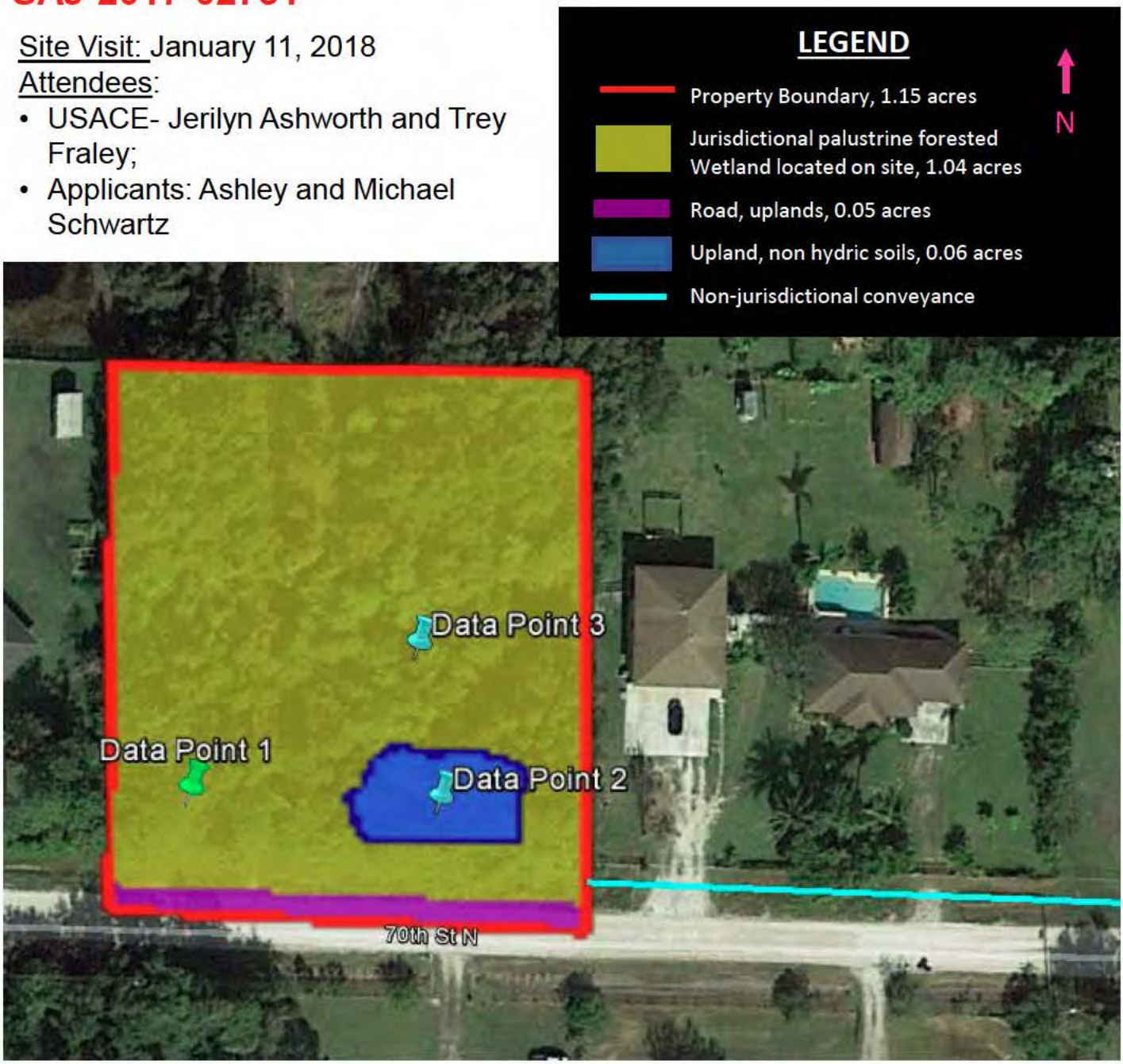



Figure shows the 1.04 acres of jurisdictional wetlands located within the 1.15 acre parcel. A 0.06 acre within the parcel boundaries was determined to be upland and there is a 0.05 ace section within the parcel boundaries, which is existing roadway according to Palm Beach County Property Appriaser's Office.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

**View of Site from 70th Street North**

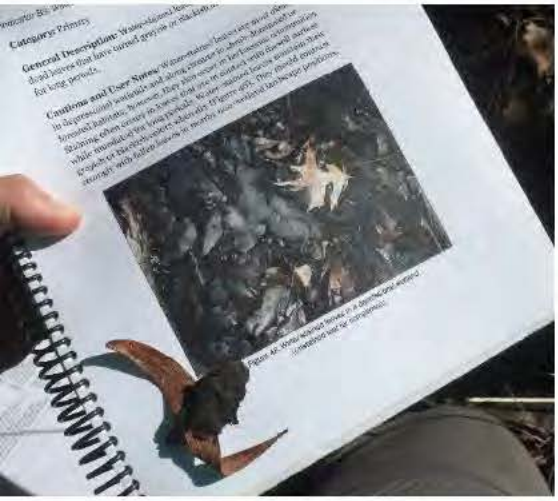
Site Visit Photos: January 11, 2018

# Project: Schwartz Single Family Home
# SAJ-2017-02731

**Indicators of Wetland Hydrology at Data Point 2**

Site Visit Photos: January 11, 2018

Two photos above show water marks on the base of the Melaleuca and earleaf acacia trees located within the plot for Data Points 2.



Water-Stained leaves were also observed and photographed in association with the Corps Manual.

Photo above shows water table observed at 12-inches from soil surface at Data Point 2.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

**Data Point 2- Soil Plug and 12-inch water Table**

Site Visit Photos: January 11, 2018

Top Photo: Plan view of the soil plug sampled. Only 12 inches of soil were sampled due to water refusal. Top two horizons were loamy/clay texture, and the 3rd horizon was sandy. Since only a 12 inch soil profile was obtained, it did not qualify for a hydric soil indicator, as the 3rd soil horizon did not meet the thickness requirement for A-11. See data sheet 2.

Photo Left: Another view of the water table observed at Data Point 2.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

**Indicators of Wetland Hydrology and Hydrophytic Vegetation at Data Point 3**

Site Visit Photos: January 11, 2018

Water Marks were observed at the base of the Melaleuca Trees (looking east).

Water Marks were observed at the base of the Melaleuca Trees (looking north).

Top Photo: Vegetation on site looking west.

Photo Left: show the water table located 14 inches from the soil surface.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

**Soil Plug at Data Point 3**

Site Visit Photos: January 11, 2018

Data point 3: Soil Profile overview.

# Project: Schwartz Single Family Home
# SAJ-2017-02731

**Photos of Project Area from 70th Street North**

Site Visit Photos: June 19, 2018

During a drive by of the project area during the June 19, 2018 site visit, hydrophytic vegetation and standing water were observed in the roadside swale located within the property boundaries. Additionally, standing water was observed on site as depicted in the two photos below. It also appeared that some Brazilian Pepper had been removed.

Top Photo: Looking west along 70th Street North

Standing water observed within the project area from the road

Top Photo and Photo to Left: Looking north along 70th Street north at project site

Michael Schwartz
SAJ-2017-02731
Proposed Site plan

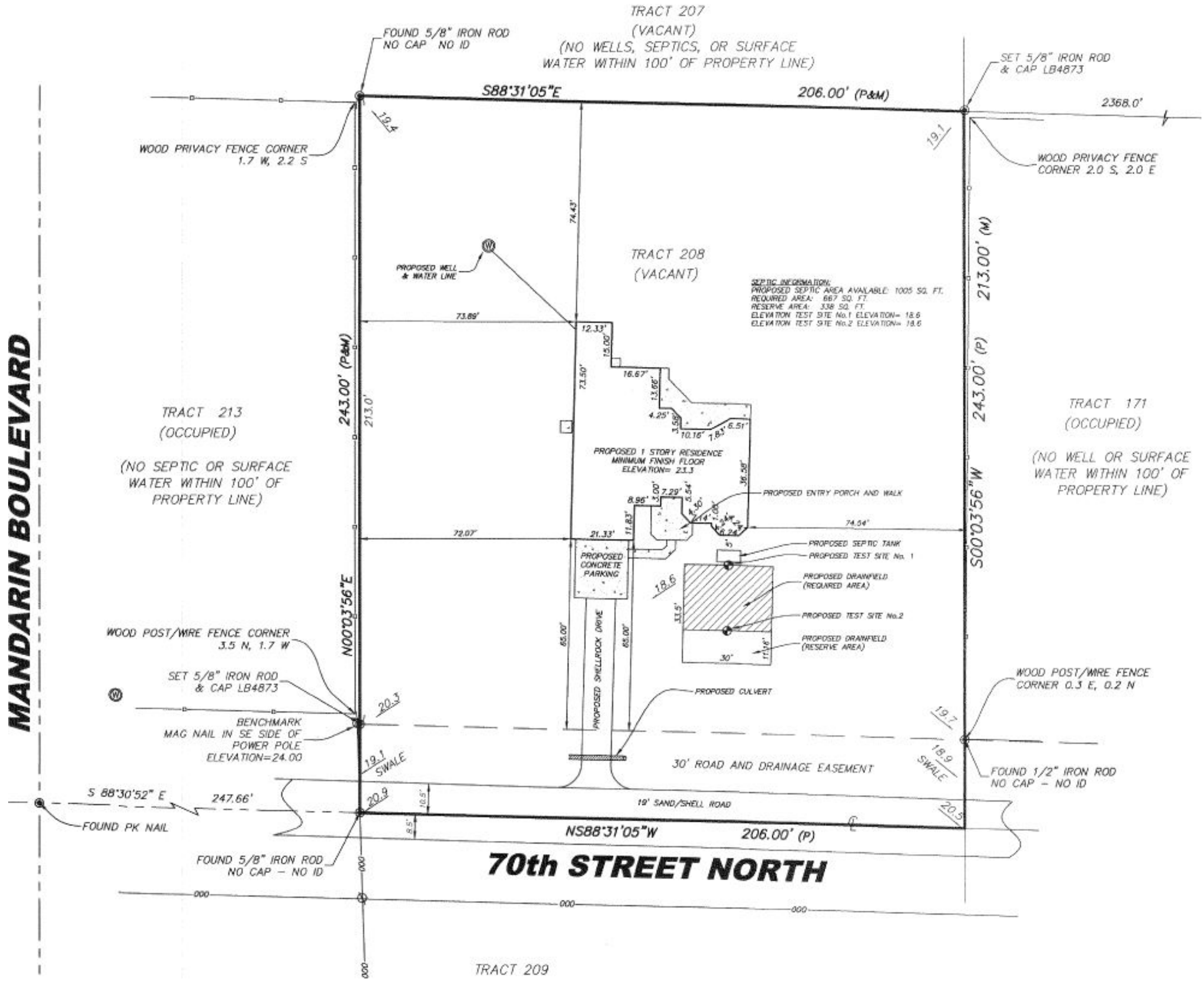



Figure 7. Proposed single family house site plan

# ATTACHMENT 5

**Approved Jurisdictional Determination**

Application: SAJ-2017-02731

## Direct Antecedent Rainfall Evaluation Method (DAREM) Analysis and WETS Tables

**Application Number: SAJ-2017-02731**
**Applicant: Ashley and Mike Schwartz**

## Direct Antecedent Rainfall Evaluation Method (DAREM)

DAREM Analysis, based on WETS - From the PBI station (closest Station to site)

**Site Visit completed October 20, 2017**

| Prior Month | Names | WETS 30 % (inches) | WETS 70th% (inches) | Rainfall Amount (inches) | Condition | Value | Weight | Score | Result |
|---|---|---|---|---|---|---|---|---|---|
| 3rd | July | 4.07 | 6.97 | 7.44 | Wet | 3 | 1 | 3 | |
| 2nd | August | 5.21 | 9 | 5.72 | Normal | 2 | 2 | 4 | |
| Most Recent | September | 5.97 | 9.9 | 5.78 | Dry | 1 | 3 | 3 | |
| Month Examined | October | | | | | Total | | 10 | NORMAL |

| | Rainfall Normality |
|---|---|
| | Result Range 6-9= Drier than Normal |
| | Result Range 10-14= Normal |
| | Result Range 15-18 = Wetter than Normal |

**Site visit completed January 11, 2018**

| Prior Month | Names | WETS 30 % (inches) | WETS 70th% (inches) | Rainfall Amount (inches) | Condition | Value | Weight | Score | Result |
|---|---|---|---|---|---|---|---|---|---|
| 3rd | October | 2.9 | 6.48 | 15.02 | Wet | 3 | 1 | 3 | |
| 2nd | November | 2.29 | 5.49 | 2.69 | Normal | 2 | 2 | 4 | |
| Most Recent | December | 1.65 | 3.92 | 0.75 | Dry | 1 | 3 | 3 | |
| Month Examined | January | | | | | Total | | 10 | NORMAL |

WETS Tab e

| WETS Stat on WEST PALM BEACH NTERNAT ONAL AP, FL | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Requested years 1971 2017 | | | | | | | | |
| Month | Avg Max Temp | Avg M n Temp | Avg Mean Temp | Avg Prec p | 30% chance prec p ess than | 30% chance prec p more than | Avg number days prec p 0 10 or more | Avg Snowfa |
| Jan | 75 1 | 57 2 | 66 1 | 3 17 | 1 24 | 3 84 | 5 | 0 0 |
| Feb | 76 6 | 58 7 | 67 6 | 2 56 | 1 30 | 3 13 | 5 | 0 0 |
| Mar | 79 3 | 62 4 | 70 9 | 3 59 | 1 80 | 4 38 | 5 | 0 0 |
| Apr | 82 3 | 66 3 | 74 3 | 3 58 | 1 69 | 4 37 | 4 | 0 0 |
| May | 86 0 | 71 0 | 78 5 | 5 33 | 2 67 | 6 52 | 7 | 0 0 |
| Jun | 88 6 | 74 3 | 81 5 | 7 97 | 5 54 | 9 47 | 11 | 0 0 |
| Ju | 90 2 | 75 6 | 82 9 | 5 86 | 4 07 | 6 97 | 10 | 0 0 |
| Aug | 90 3 | 75 9 | 83 1 | 7 56 | 5 21 | 9 00 | 11 | 0 0 |
| Sep | 88 6 | 75 1 | 81 8 | 8 37 | 5 97 | 9 90 | 12 | 0 0 |
| Oct | 85 1 | 71 6 | 78 4 | 5 31 | 2 90 | 6 48 | 7 | 0 0 |
| Nov | 80 5 | 65 7 | 73 1 | 4 49 | 2 29 | 5 49 | 6 | 0 0 |
| Dec | 76 8 | 60 8 | 68 8 | 3 20 | 1 65 | 3 92 | 5 | 0 0 |
| Annua | | | | | 55 14 | 65 99 | | |
| Average | 83 3 | 67 9 | 75 6 | | | | | |
| Tota | | | | 60 99 | | | 86 | 0 0 |

| GROW NG SEASON DATES | | | |
|---|---|---|---|
| Years w th m ss ng data | 24 deg = 0 | 28 deg = 0 | 32 deg = 0 |
| Years w th no occurrence | 24 deg = 47 | 28 deg = 47 | 32 deg = 40 |
| Data years used | 24 deg = 47 | 28 deg = 47 | 32 deg = 47 |
| Probab ty | 24 F or h gher | 28 F or h gher | 32 F or h gher |
| 50 percent * | No occurrence | No occurrence | No occurrence |
| 70 percent * | No occurrence | No occurrence | No occurrence |
| * Percent chance of the grow ng season occurr ng between the Beg nn ng and End ng dates | | | |

| STATS TABLE tota prec p tat on ( nches) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Yr | Jan | Feb | Mar | Apr | May | Jun | Ju | Aug | Sep | Oct | Nov | Dec | Ann |
| 1938 | | | | | | | M7 64 | 1 87 | 7 47 | 3 50 | | 2 92 | 23 40 |
| 1939 | 0 33 | 0 49 | 0 90 | 1 84 | 6 51 | | | | | | | | 10 07 |
| 1940 | | | | | | | | | | 5 22 | 0 45 | 7 35 | 13 02 |
| 1941 | | 3 93 | 3 59 | 4 68 | 3 50 | 4 38 | 17 74 | 4 78 | 14 82 | 4 05 | 3 38 | 1 38 | 66 23 |
| 1942 | 2 91 | 2 55 | 4 79 | 18 26 | 7 84 | 14 62 | 2 54 | 4 81 | 5 70 | 5 61 | 0 95 | 2 26 | 72 84 |
| 1943 | 1 90 | 1 17 | 7 18 | 1 17 | 3 39 | 6 32 | 5 54 | 7 94 | 5 74 | 8 44 | 4 35 | 1 65 | 54 79 |
| 1944 | 0 89 | 0 32 | 4 19 | 2 38 | 2 32 | 2 45 | 6 31 | 10 22 | 3 37 | 10 59 | 0 33 | 0 85 | 44 22 |
| 1945 | 1 64 | 2 58 | 1 04 | 0 12 | 0 48 | 11 31 | 9 95 | 11 02 | 14 89 | 8 42 | 1 75 | 4 09 | 67 29 |
| 1946 | 1 24 | 1 71 | 2 11 | 0 50 | 14 10 | 9 08 | 5 39 | 7 86 | 9 67 | 4 27 | 5 70 | 2 98 | 64 61 |
| 1947 | 4 01 | 3 77 | 9 11 | 4 33 | 9 45 | 16 48 | M12 47 | 5 02 | 17 51 | 14 68 | 7 16 | 4 64 | 108 63 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1948 | 5.81 | 0.29 | 4.02 | 5.37 | 3.82 | 3.98 | 8.44 | 5.31 | 15.41 | 10.40 | 1.31 | 1.18 | 65.34 |
| 1949 | 0.64 | 0.79 | 0.35 | 3.50 | 5.00 | 6.54 | 4.74 | 10.16 | 9.54 | 2.56 | 2.25 | 8.73 | 54.80 |
| 1950 | 0.99 | 2.42 | 0.70 | 2.01 | 4.23 | 2.55 | 4.04 | 13.47 | 8.63 | 10.12 | 1.81 | 0.95 | 51.92 |
| 1951 | 0.33 | 2.59 | 0.70 | 4.90 | 6.05 | 6.34 | 7.97 | 3.05 | 6.90 | 12.62 | 0.67 | 0.71 | 52.83 |
| 1952 | 1.30 | 4.55 | 1.56 | 1.86 | 3.26 | 1.07 | 5.87 | 6.34 | 10.77 | 13.09 | 0.43 | 0.77 | 50.87 |
| 1953 | 3.67 | 1.38 | 1.51 | 4.29 | 2.87 | 8.16 | 7.72 | 11.86 | 11.66 | 12.05 | 4.53 | 1.45 | 71.15 |
| 1954 | 1.59 | 2.68 | 3.32 | 10.80 | 7.87 | 13.57 | 11.78 | 3.62 | 11.00 | 2.82 | 3.21 | 0.95 | 73.21 |
| 1955 | 1.34 | 2.09 | 2.05 | 1.97 | 2.27 | 6.93 | 3.39 | 2.16 | 4.28 | 2.30 | 0.74 | 7.79 | 37.31 |
| 1956 | 0.89 | 0.51 | 0.33 | 1.26 | 3.39 | 1.94 | 2.98 | 8.90 | 11.22 | 4.74 | 0.89 | 1.35 | 38.40 |
| 1957 | 6.38 | 6.41 | 2.49 | 8.36 | 3.87 | 7.87 | 7.00 | 9.02 | 4.92 | 2.94 | 0.76 | 2.91 | 62.93 |
| 1958 | 7.92 | 0.51 | 7.20 | 2.51 | 14.00 | 3.20 | 4.84 | 4.41 | 6.85 | 6.94 | 1.83 | 4.97 | 65.18 |
| 1959 | 1.56 | 1.03 | 4.71 | 3.43 | 2.92 | 13.63 | 6.28 | 5.03 | 6.92 | 15.29 | 6.09 | 1.75 | 68.64 |
| 1960 | 0.22 | 4.54 | 1.59 | 5.99 | 2.09 | 6.37 | 5.97 | 4.76 | 24.86 | 7.43 | 2.67 | 0.28 | 66.77 |
| 1961 | 3.17 | 0.42 | 3.57 | 2.28 | 5.09 | 2.65 | 1.22 | 6.39 | 3.01 | 6.52 | 2.86 | 0.58 | 37.76 |
| 1962 | 1.23 | 1.19 | 4.43 | 1.90 | 3.70 | 6.94 | 8.09 | 7.64 | 8.96 | 2.16 | 1.11 | 1.21 | 48.56 |
| 1963 | 1.05 | 3.01 | 1.68 | 0.20 | 6.69 | 2.92 | 1.62 | 4.06 | 10.39 | 13.81 | 3.02 | 4.86 | 53.31 |
| 1964 | 0.98 | 4.36 | 1.82 | 7.45 | 5.74 | 10.23 | 5.29 | 7.33 | 11.72 | 15.23 | 5.76 | 3.39 | 79.30 |
| 1965 | 1.70 | 4.14 | 1.15 | 0.51 | 1.38 | 8.80 | 11.27 | 2.41 | 3.84 | 18.74 | 2.57 | 1.75 | 58.26 |
| 1966 | 6.23 | 6.88 | 2.38 | 2.73 | 3.75 | 17.91 | 8.19 | 9.76 | 10.00 | 8.90 | 2.00 | 1.02 | 79.75 |
| 1967 | 3.18 | 3.01 | 2.49 | 0.04 | 0.39 | 11.39 | 4.88 | 6.65 | 6.91 | 10.00 | 1.37 | 1.23 | 51.54 |
| 1968 | 0.56 | 4.44 | 1.48 | 0.72 | 13.82 | 16.78 | 4.66 | 8.14 | 14.01 | 10.24 | 2.51 | 0.06 | 77.42 |
| 1969 | 3.59 | 1.67 | 5.53 | 0.73 | 8.32 | 12.25 | 7.43 | 7.75 | 14.56 | 13.47 | 3.29 | 1.16 | 79.75 |
| 1970 | 4.57 | 2.98 | 11.95 | 1.00 | 5.83 | 8.23 | 3.17 | 5.47 | 7.61 | 4.13 | 0.23 | 0.11 | 55.28 |
| 1971 | 0.82 | 1.08 | 0.55 | 1.27 | 5.04 | 9.03 | 5.13 | 4.38 | 6.24 | 5.13 | 10.77 | 1.87 | 51.31 |
| 1972 | 2.47 | 2.55 | 3.99 | 12.62 | 11.19 | 12.34 | 13.25 | 2.76 | 3.72 | 1.20 | 6.98 | 2.08 | 75.15 |
| 1973 | 2.62 | 2.71 | 2.28 | 1.45 | 4.13 | 7.53 | 7.74 | 7.51 | 7.59 | 6.97 | 2.06 | 2.15 | 54.74 |
| 1974 | 8.30 | 0.42 | 2.44 | 1.18 | 2.93 | 4.87 | 11.00 | 5.85 | 5.62 | 9.30 | 3.99 | 2.56 | 58.46 |
| 1975 | 0.47 | 0.68 | 0.85 | 0.57 | 6.23 | 7.18 | 5.67 | 2.49 | 11.58 | 5.60 | 1.81 | 1.27 | 44.40 |
| 1976 | 1.09 | 4.59 | 1.84 | 1.26 | 15.22 | 4.52 | 1.67 | 7.29 | 7.74 | 3.75 | 3.29 | 3.06 | 55.32 |
| 1977 | 3.49 | 1.11 | 0.53 | 1.65 | 14.80 | 4.03 | 2.19 | 8.03 | 13.21 | 2.01 | 5.84 | 7.37 | 64.26 |
| 1978 | 3.40 | 2.49 | 2.73 | 0.88 | 4.55 | 10.36 | 5.91 | 2.27 | 6.36 | 6.98 | 10.98 | 5.30 | 62.21 |
| 1979 | 3.06 | 0.80 | 1.06 | 8.71 | 5.09 | 6.34 | 1.89 | 3.08 | 19.63 | 4.78 | 4.08 | 2.66 | 61.18 |
| 1980 | 4.11 | 3.85 | 2.53 | 3.90 | 8.06 | 4.26 | 7.61 | 5.02 | 6.76 | 4.02 | 5.28 | 1.27 | 56.67 |
| 1981 | 0.43 | 4.22 | 2.49 | 0.43 | 5.12 | 4.58 | 3.72 | 10.33 | 9.30 | 2.10 | 4.52 | 2.50 | 49.74 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1982 | 1 29 | 2 31 | 16 78 | 7 67 | 6 90 | 10 37 | 2 57 | 5 72 | 6 03 | 4 83 | 14 63 | 1 52 | 80 62 |
| 1983 | 11 01 | 8 71 | 3 42 | 3 27 | 5 30 | 9 39 | 4 71 | 8 21 | 9 62 | 7 80 | 4 24 | 7 03 | 82 71 |
| 1984 | 1 36 | 4 49 | 5 06 | 5 99 | 8 44 | 5 84 | 7 34 | 6 39 | 8 69 | 1 67 | 14 39 | 0 13 | 69 79 |
| 1985 | 0 84 | 0 53 | 3 49 | 3 35 | 4 63 | 4 84 | 10 77 | 5 38 | 9 38 | 2 89 | 0 54 | 1 35 | 47 99 |
| 1986 | 6 34 | 1 58 | 5 48 | 0 33 | 1 59 | 9 82 | 10 20 | 4 88 | 4 08 | 8 11 | 6 80 | 10 10 | 69 31 |
| 1987 | 1 17 | 1 20 | 7 75 | 2 61 | 5 63 | 6 60 | 4 42 | 1 73 | 11 90 | 4 78 | 9 43 | 1 47 | 58 69 |
| 1988 | 3 38 | 3 04 | 5 51 | 3 65 | 6 94 | 10 95 | 9 01 | 11 38 | 1 77 | 3 54 | 3 86 | 1 88 | 64 91 |
| 1989 | 0 97 | 1 00 | 2 58 | 6 04 | 0 78 | 4 96 | 3 52 | 5 83 | 4 05 | 5 84 | 1 15 | 1 94 | 38 66 |
| 1990 | 1 19 | 1 39 | 1 91 | 2 82 | 6 74 | 6 67 | 10 17 | 6 60 | 11 70 | 3 45 | 1 23 | 1 94 | 55 81 |
| 1991 | 10 43 | 4 36 | 3 36 | 9 54 | 8 94 | 7 45 | 7 16 | 7 34 | 6 44 | 7 58 | 2 32 | 4 44 | 79 36 |
| 1992 | 1 69 | 3 26 | 2 61 | 2 64 | 1 59 | 16 08 | 2 90 | 6 12 | 6 99 | 2 82 | 12 56 | 1 85 | 61 11 |
| 1993 | 8 05 | 2 06 | 11 06 | 2 52 | 2 22 | 2 89 | 5 41 | 4 78 | 5 74 | 11 99 | 5 78 | 0 82 | 63 32 |
| 1994 | 5 85 | 3 22 | 2 62 | 7 57 | 4 50 | 10 89 | 5 22 | 10 33 | 11 41 | 4 42 | 8 17 | 11 69 | 85 89 |
| 1995 | 3 85 | 1 12 | 2 37 | 3 91 | 0 83 | 7 79 | 6 86 | 20 12 | 7 54 | 11 49 | 1 49 | 1 60 | 68 97 |
| 1996 | 1 54 | 0 67 | 5 06 | 0 78 | 6 52 | 7 56 | 2 77 | 4 24 | 7 53 | 6 54 | 2 06 | 1 55 | 46 82 |
| 1997 | 4 24 | 4 45 | 3 39 | 4 66 | 3 34 | 11 75 | 3 29 | 10 60 | 6 85 | 0 56 | 3 98 | 5 02 | 62 13 |
| 1998 | 11 18 | 6 23 | 4 10 | 1 12 | 1 94 | 1 68 | 8 81 | 5 73 | 13 36 | 1 36 | 7 64 | 3 90 | 67 05 |
| 1999 | 6 73 | 1 90 | 0 55 | 0 67 | 1 99 | 13 62 | 1 70 | 12 08 | 5 04 | 15 56 | 1 44 | 1 45 | 62 73 |
| 2000 | 1 15 | 0 59 | 2 00 | 4 09 | 0 40 | 3 06 | 6 43 | 3 03 | 7 23 | 6 68 | 5 28 | 2 33 | 42 27 |
| 2001 | 1 18 | 0 37 | 7 85 | 0 26 | 2 37 | 9 38 | 8 38 | 9 23 | 17 02 | 6 11 | 1 78 | 3 36 | 67 29 |
| 2002 | 0 48 | 8 08 | 1 71 | 6 88 | 0 51 | 20 09 | 5 97 | 5 46 | 2 73 | 2 52 | 3 15 | 2 59 | 60 17 |
| 2003 | 1 28 | 0 63 | 7 09 | 3 76 | 12 07 | 9 12 | 2 99 | 10 51 | 6 10 | 1 06 | 6 89 | 4 25 | 65 75 |
| 2004 | 2 00 | 2 70 | 1 54 | 2 76 | 2 89 | 2 89 | 5 13 | 12 35 | 29 40 | 1 58 | 1 12 | 0 76 | 65 12 |
| 2005 | 1 33 | 2 01 | 6 05 | 1 63 | 7 48 | 11 83 | 2 98 | 8 29 | 8 29 | 5 05 | 5 79 | 2 70 | 63 43 |
| 2006 | 1 62 | 2 79 | 1 78 | 4 69 | 3 13 | 4 27 | 4 91 | 7 14 | 6 07 | 1 95 | 4 75 | 11 06 | 54 16 |
| 2007 | 0 37 | 1 22 | 0 36 | 2 77 | 3 18 | 14 85 | 7 92 | 9 68 | 7 13 | 13 17 | 1 48 | 1 67 | 63 80 |
| 2008 | 0 81 | 5 95 | 7 40 | 4 59 | 2 42 | 4 94 | 8 97 | 11 91 | 5 32 | 4 25 | 0 89 | 1 76 | 59 21 |
| 2009 | 0 11 | 0 14 | 1 47 | 2 42 | 15 69 | 8 65 | 3 95 | M6 22 | 7 48 | 1 91 | 3 65 | 7 38 | 59 07 |
| 2010 | 2 03 | 4 39 | 10 83 | 6 25 | 1 28 | 6 07 | 4 60 | 6 97 | 6 15 | 2 14 | 1 38 | 1 30 | 53 39 |
| 2011 | 1 76 | 0 89 | 1 49 | 0 30 | 1 19 | 3 19 | 6 75 | 11 98 | 8 22 | 9 89 | 1 33 | 0 90 | 47 89 |
| 2012 | 0 38 | 3 82 | 2 29 | 5 35 | 9 29 | 12 33 | 5 35 | 22 66 | 5 91 | 9 45 | 0 75 | 1 14 | 78 72 |
| 2013 | 0 79 | 2 40 | 0 97 | 5 12 | 15 67 | 12 73 | 5 84 | 4 10 | 9 10 | 1 14 | 2 78 | 4 34 | 64 98 |
| 2014 | 10 42 | 1 06 | 2 40 | 1 04 | 2 80 | 7 98 | 7 73 | 9 71 | 9 14 | 5 31 | 1 94 | 1 76 | 61 29 |
| 2015 | 1 05 | 2 05 | 1 04 | 8 05 | 1 56 | 4 02 | 6 04 | 7 08 | 8 42 | 0 91 | 3 06 | 7 34 | 50 62 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2016 | 9 90 | 2 66 | 2 42 | 1 46 | 4 95 | 4 52 | 1 59 | 6 70 | 8 04 | 4 37 | 1 00 | 3 47 | 51 08 |
| 2017 | 1 00 | 2 54 | 1 52 | 3 74 | 2 61 | 10 32 | 7 44 | 5 72 | 5 78 | 15 02 | 2 69 | 0 75 | 59 13 |
| 2018 | 4 42 | 0 18 | 0 80 | 7 31 | M7 82 | | | | | | | | 20 53 |

Notes Data m ss ng n any month have an "M" f ag A "T" nd cates a trace of prec p tat on

Data m ss ng for a days n a month or year s b ank

Creat on date 2016 07 22