

# Contamination Screening Evaluation Report

State Road 869 / SW 10<sup>th</sup> Street Connector

Project Development and Environment (PD&E) Study

SW 10<sup>th</sup> Street from Florida's Turnpike / Sawgrass  
Expressway to I-95 (SR 869/Sawgrass Expressway MP 21.077  
to MP 21.835 and SW 10<sup>th</sup> Street MP 0.00 to 1.427)

ETDM No.: 14291 / FAP No.: TBD

Financial Project ID No. 439891-1-22-02

Broward County, Florida



Prepared for:  
FDOT District Four  
3400 W. Commercial Blvd.  
Ft. Lauderdale, FL 33309

December 2018

*The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. §327 and a Memorandum of Understanding dated December 14, 2016 and executed by the Federal Highway Administration and FDOT.*

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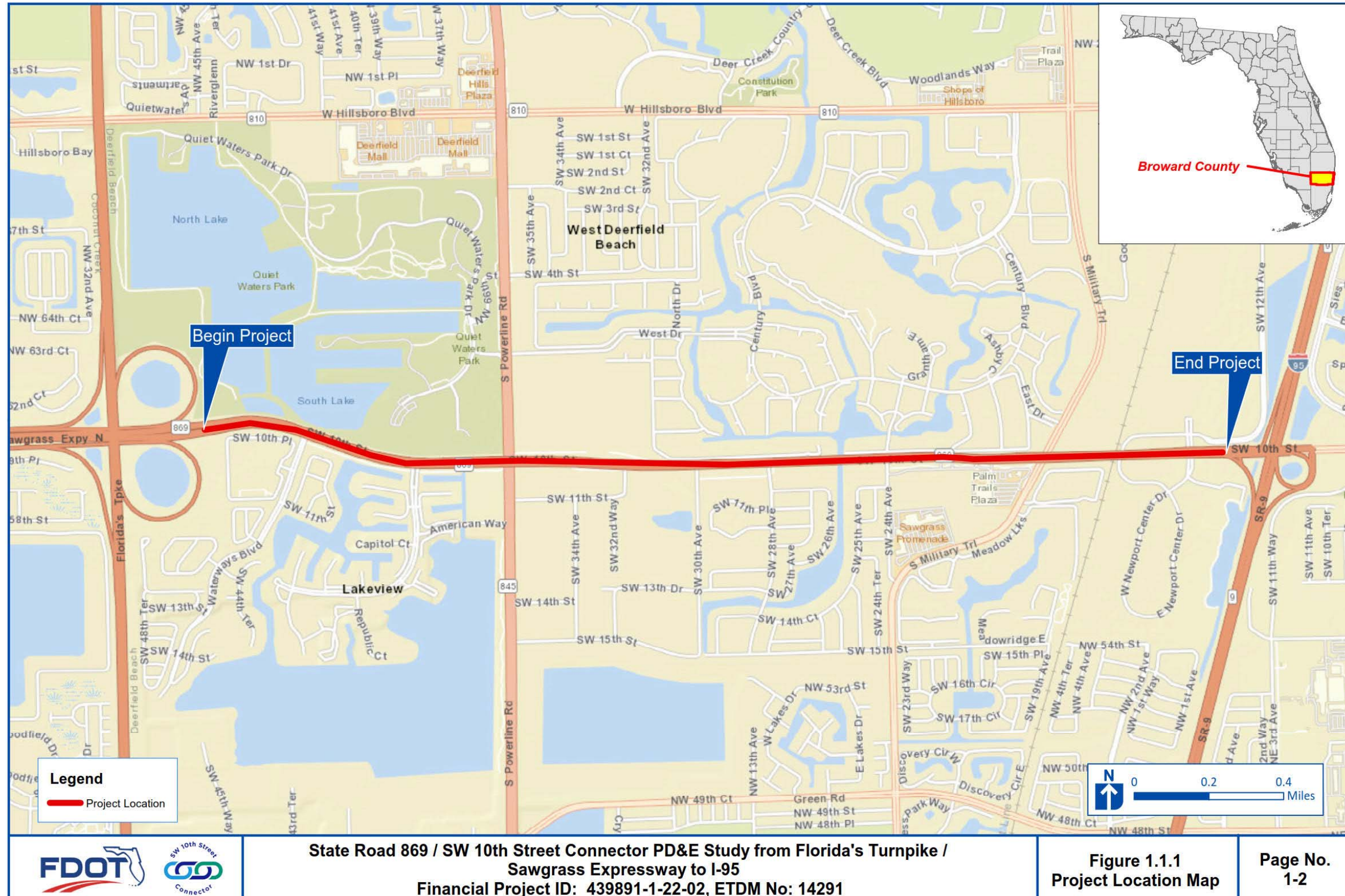
## 1.0 Introduction

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In accordance with the Florida Department of Transportation (FDOT) Project Development and Environment (PD&E) Manual Volume 2, Chapter 20 (revised June 14, 2017), this *Contamination Screening Evaluation* was conducted for the proposed widening of SR 869/SW 10<sup>th</sup> Street. The project is located in the City of Deerfield Beach, Broward County, Florida. See *Location Map - Figure 1.1.1*. The project was screened through the Efficient Transportation Decision Making (ETDM) Environmental Screening Tool (EST) for the portion of the project from Powerline Road to Military Trail and the programming screen was published December 9, 2016 (ETDM #14291 - <https://etdmpub.fl.a-etat.org/est/>). The portion of the project from west of the Florida's Turnpike to Powerline Road was screened through ETDM EST and was published March 25, 2017 (ETDM #14280).

The purpose of this report is to present the findings of the contamination screening evaluation. This report identifies and evaluates known or potential contamination sites, presents recommendations concerning these problems, and discusses possible project impacts or impacts to the proposed project.





## 2.0 Project Description

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The FDOT is evaluating alternatives to improve SR 869 (SW 10th Street) from Sawgrass Expressway / Florida's Turnpike to west of I-95, a distance of approximately 3.0 miles. The project is located in Broward County, Florida and is contained within the municipality of Deerfield Beach. *Figure 1.1.1* shows the limits of the SW 10th Street Connector PD&E Study.

SW 10th Street currently consists of six lanes (three in each direction) from Florida's Turnpike to SR 845 (Powerline Road), four lanes (two in each direction) from Powerline Road to east of Military Trail, and five lanes (two westbound and three eastbound) from west of Military Trail to I-95. This segment of SW 10th Street is functionally classified as a Divided Urban Principal Arterial and has posted speed limits of 45 miles per hour from Florida's Turnpike to Military Trail, and 40 miles per hour from Military Trail to I-95. The access management classification from Florida's Turnpike to Powerline Road is Class 1. East of Powerline Road, the access management classification is Class 3.

SW 10th Street is an east-west Principal Arterial that connects three limited access facilities: Florida's Turnpike, Sawgrass Expressway, and I-95. SW 10th Street is part of the state's Strategic Intermodal System (SIS) and the National Highway System (NHS). SW 10th Street from Florida's Turnpike to I-95 is a missing link in the existing and planned regional express lanes system network. This study is proposing to add additional lanes in the corridor for the purpose of closing this gap and providing a continuous link in the managed lanes network that will be separate from the local SW 10th Street facility. In addition, SW 10th Street is designated as an evacuation route.

The proposed improvements are intended to reduce the amount of traffic on local SW 10th Street by allowing vehicles to bypass the area by utilizing the managed lane facility. The ability to provide relief for local traffic is a component of the improved connectivity between the three limited access facilities by providing dual systems (Local Access and Limited Access) within the SW 10th Street right-of-way. Because SW 10th Street is impacted by three major limited access facilities, local traffic relief is necessary before future improvements to the three limited access facilities are implemented. Improvements are planned for the



interchange at the Sawgrass Expressway / Florida's Turnpike to the west and I-95 at SW 10th Street interchange to the east. Public involvement will be essential in this PD&E Study due to the residential developments and local businesses along SW 10th Street, as well as in the surrounding areas, as this segment is a missing link in the south Florida managed lanes network.

A Community Oversight Advisory Team (COAT) was formed by the Broward Metropolitan Planning Organization (MPO) and worked to obtain consensus on the future of the SW 10th Street corridor. Public involvement efforts are ongoing with the Broward MPO as a partner, continuing their efforts that began with the establishment of the COAT. Public involvement initiatives, including working directly with the COAT, as well as expanded and full representation from the City of Deerfield, City of Parkland, City of Coral Springs, the Broward MPO, the FDOT and members of the public, will be performed during the PD&E Study.

## 3.0 Purpose and Need

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### 3.1 Purpose and Objectives

The purpose of this project is to increase capacity and eliminate various existing operational and safety deficiencies along SR 869/SW 10th Street between the Sawgrass Expressway and Military Trail while also providing improved connectivity of the regional transportation network.

### 3.2 Need for the Project

The primary need for this project is based on capacity/operational deficiencies for local traffic and regional connector traffic, system linkage and safety issues, with secondary considerations for the needs of modal interrelationships, transportation demand, social demands and economic development, and emergency response / evacuation for local traffic and the adjacent communities, as well as regional traffic. The primary and secondary needs for the project are discussed in further detail below.

#### 3.2.1 Project Status

The SW 10<sup>th</sup> Street Connector project is in the Broward MPO jurisdiction. The Broward MPO Transportation Improvement Program (TIP) Fiscal Year 2018 – 2022 includes funding for the SW 10<sup>th</sup> Street Connector from Powerline Road to West of Military Trail Project for Preliminary Engineering and Right-of-Way. Construction funding is included in years beyond 2022. The Broward MPO 2035 Long Range Transportation Plan (LRTP) also includes the SW 10<sup>th</sup> Street Connector from Powerline Road to Military Trail widening project in the 2035 Cost Feasible Roadway Projects. The FDOT State Transportation Improvement Program (STIP) 2017 includes funding for Preliminary Engineering and Right-of-Way in years 2018 and 2019, respectively. Funding for a Design-Build method of delivery is included in years beyond 2021. The FDOT SIS Adopted Five Year Plan includes funding for the SW 10<sup>th</sup> Street Connector from Powerline Road to West of Military Trail Project for Preliminary Engineering and Right-of-Way. The Construction is included in the FDOT SIS Adopted Second Five-Year Plan with funding shown in 2025. This funding is anticipated to be advanced into fiscal year 2023.

The TIP, STIP, and LRTP are consistent in respect to total funding and time frame. However, the TIP, STIP, and LRTP have different physical project limits than the proposed PD&E Study. The original planning documents included SW 10<sup>th</sup> Street from Powerline Road to Military Trail whereas, this PD&E Study, for the purpose of environmental impact evaluations, extends the limits along SW 10<sup>th</sup> Street from the Sawgrass Expressway / Florida's Turnpike to I-95 in order to provide independent utility and a more logical termini for the project. The TIP, STIP, and LRTP are in the process of being updated.

### 3.2.2 System Linkage

SW 10th Street is part of the state's SIS and the NHS. The SIS is an intermodal network of transportation facilities that seamlessly flows from one mode to the next with the goal of providing the highest degree of mobility for people and goods traveling throughout Florida. The SIS is an integral piece of Florida's goal to enhance economic competitiveness and quality of life for its citizens and visitors. The NHS is a network of strategic highways within the United States, including the Interstate Highway System and other roads serving major airports, ports, rail or truck terminals, railway stations, pipeline terminals and other strategic transport facilities. Thus, SW 10th Street is an important facility in the transportation network.

SW 10th Street provides the opportunity for commuters and local residents to connect to three major limited access facilities: Florida's Turnpike, Sawgrass Expressway, and I-95. The ability to provide relief for local traffic is a component of the improved connectivity between the three limited access facilities by providing dual systems (Local Access and Limited Access) within the SR 10th Street right-of-way. Because SW 10th Street is impacted by three major limited access facilities, local traffic relief is necessary before future improvements to the three limited access facilities are implemented. These facilities are also on the regional freight network as identified in the March 2010 South Florida Regional Freight Plan (project #269). Florida's Turnpike provides limited access north-south connectivity from Miami-Dade County to Orlando and connects to I-75 northwest of Orlando. The Sawgrass Expressway provides limited access connectivity from the I-75/I-595 Interchange, to the Florida's Turnpike at the SW 10th Street Interchange. I-95 is the

primary north-south interstate facility that links all major cities along the Atlantic Seaboard.

SW 10<sup>th</sup> Street from Florida's Turnpike to I-95 is a Principal Arterial facility serving local residential communities, commercial properties and commuters alike. This section of roadway has also been considered the missing link in the existing and planned regional express lane network. This project seeks to improve this linkage by reducing congestion and completing the express lane network while reducing operational and safety deficiencies for the local users. The project will consider implementing limited access and express lanes along SW 10<sup>th</sup> Street in the project area.

### 3.2.3 Capacity

A need exists to improve local and regional traffic operations along SW 10<sup>th</sup> Street corridor. Traffic volumes along SW 10<sup>th</sup> Street between the Sawgrass Expressway / Florida's Turnpike and I-95 have consistently increased over the past 15 years and are expected to continue to grow over the next 20 years. During the five-year period from 2010 to 2015, Average Annual Daily Traffic (AADT) on SW 10<sup>th</sup> Street was as follows:

- Sawgrass Expressway / Florida's Turnpike to Powerline Road experienced an AADT of 51,333 vehicles per day (vpd) with a high of 56,500 vpd.
- Powerline Road to Military Trail increased from 40,500 vpd to a high of 46,500 vpd.
- Military Trail to I-95 experienced an AADT ranging from 49,500 vpd to 54,500 vpd.

The existing traffic on SW 10<sup>th</sup> Street between Powerline Road and I-95 exceeds the current capacity of a four-lane arterial roadway which can accommodate approximately 40,000 vpd. The capacity of SW 10<sup>th</sup> Street from Sawgrass Expressway / Florida's Turnpike to Powerline Road is 60,000 vpd. With the anticipated growth and the combination of local traffic and those travelers going from one limited access facility to the next, this segment is expected to reach capacity by 2040 or sooner.

Additionally, the following intersections fall below acceptable Level of Service (LOS D or better) targets during at least one peak hour in the existing conditions:

- SW 10<sup>th</sup> Street at Military Trail operates at LOS F in both the AM and PM peak.
- SW 10<sup>th</sup> Street at Newport Center Drive operates at LOS B in AM and LOS F in PM.

These conditions are existing concerns and are projected to worsen in the future if no action is taken. Even with an assumed 10 percent travel time savings or reduction in delay from possible traffic signal optimization, the peak hour operations are not anticipated to operate at an acceptable LOS (LOS D or better).

### 3.2.4 Transportation Demand

The SW 10th Street Connector PD&E Study is currently included in the Broward MPO LRTP and TIP. The SW 10th Street Connector PD&E Study will be advanced to move forward in coordination with the I-95 from SW 10th Street to Hillsboro Boulevard PD&E Study (FM# 436964-1) to the east as well as the Sawgrass Expressway widening and interchange PD&E Study (FM# 435763-1) to the west. Additionally, the 2045 SIS Multi-Modal Unfunded Needs Plan listed adding capacity to this segment of SW 10th Street as a needed improvement.

### 3.2.5 Legislation

At this time, there is no legislation mandating the implementation of this project.

### 3.2.6 Social Demand and Economic Development

Social and economic demands on the SW 10th Street corridor will continue to increase as population and employment increase in Broward County, and the greater south Florida region. The University of Florida Bureau of Economic and Business Research (BEBR) high end estimate predicts Broward County's population will grow to 2.3 million by 2040, an increase of 34 percent from the year 2011. This regional population growth will increase travel demands on the SW 10th Street corridor. Due to the built-out nature of the local



area surrounding the SW 10th Street corridor, the growth will occur in the region as a whole, necessitating connections between the limited access facilities.

Multiple residential developments and businesses are located along the SW 10th Street corridor; therefore, this project will consider livability issues as well as vehicular movement. Capacity improvements to SW 10th Street have previously not advanced to design / construction since MPO and FDOT priorities did not adequately address local concerns during previous assessments of this corridor. However, the Broward MPO Board directed its staff to reach out to communities along the corridor and initiate a consensus building effort to evaluate the best way to accommodate the long-term traffic demands as well as the local community considerations. As part of this consensus-building effort, a group of concerned individuals, known as the Community Oversight Advisory Team (COAT), was assembled to represent the communities along the corridor, as well as throughout the greater north Broward County area, to identify the long-term opportunities and vision for the corridor. The COAT developed recommendations for the corridor to be considered by the Department in evaluating the improvements in a PD&E Study.

### **3.2.7 Modal Interrelationships**

Sidewalks are located along SW 10th Street's eastbound and westbound lanes from Military Trail to I-95; however, from Waterways Boulevard to Military Trail, sidewalks are only present in the eastbound direction. The City of Deerfield Beach Comprehensive Plan identifies SW 10th Street as a Community Bus Route, although no local bus route is identified in the Broward 2040 LRTP. Bicycle facilities are not designated along SW 10th Street; however, existing five-foot paved shoulders, which serve as undesignated bicycle lanes, are present in both directions. The Broward MPO assigned a LOS F to the bicycle, pedestrian, and transit services along SW 10th Street. The proposed improvements will provide future accommodations for bicyclist and pedestrians, and transit modes.

### **3.2.8 Traffic Safety**

A need exists to resolve safety issues within the project limits along SR-869/SW 10th Street. From 2009 to 2014 there were 269 crashes in this corridor. Of these, 163 were rear-end

crashes which are common in heavily congested facilities. This project seeks to reduce congestion thus mitigating existing crash patterns, and to enhance safety through the addition of improved bike / pedestrian features along the local system.

The project is anticipated to improve emergency evacuation and response capabilities by enhancing capacity and connectivity and to major arterials designated on the state evacuation route. SW 10th Street, Florida's Turnpike, Sawgrass Expressway and I-95 serve as part of the emergency evacuation route network designated by the Florida Division of Emergency Management and by Broward County. SW 10th Street moves traffic from the east to I-95, Florida's Turnpike, and the Sawgrass Expressway. Improved travel times would also result in improved emergency response for local residents and for transport to regional facilities. Broward County Fire and Rescue Station 66 is located at 590 S. Powerline Road, approximately 0.3 miles to the north of the alignment.

### **3.2.9 Roadway Deficiencies**

Currently, SW 10th Street provides FDOT standard width travel and turn lanes. However, as previously mentioned, sidewalk is limited to the south side of SW 10th Street from Waterway's Boulevard to Military Trail. Sidewalk is present along SW 10th Street eastbound and westbound from Military Trail to I-95. Bicycle facilities are not designated along SW 10th Street, although existing 5-foot paved shoulders, which serve as undesignated bicycle lanes, are present in both directions. No other known roadway deficiencies along the corridor.

## 4.0 Project Alternatives

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### 4.1 No Action Alternative

The No Action Alternative, as its name implies, retains the existing roadway characteristics. Under this scenario, the existing SW 10<sup>th</sup> Street corridor would not be improved and conditions would continue to deteriorate. The No Action Alternative has certain advantages and disadvantages.

The advantages of the No Action Alternative include:

- No expenditure of public funds;
- No disruption or temporary impacts (air, noise, vibration, travel patterns) due to construction activities; and
- No right-of-way acquisitions.

The disadvantages of the No Action Alternative include:

- Does not meet the projects purpose and need;
- Increased vehicular congestion and delay, which leads to increased travel costs;
- Increased safety concerns;
- Increased emergency response and evacuation time; and
- Decreased air quality.

### 4.2 Build Alternatives

#### 4.2.1 Typical Sections

This project proposes placing two roadway facilities within the SW 10th Street Corridor. One facility proposed is a four-lane managed lanes roadway to provide a limited access connection from the Florida's Turnpike / Sawgrass Interchange to I-95. The other facility is a four-lane, divided, local roadway with bicycle lanes and sidewalks. During the Tier 1 analysis, two alignments were evaluated: one alignment, the North Alignment Alternative, places the managed lane facility on the north side of the right-of-way with the local roadway lanes on the south side of the right-of-way; the other alignment, the Center Alignment Alternative, locates the managed lanes in the center of the right-of-way with the local lanes

operating on either side of the managed lanes as a one-way frontage road system. Each alignment alternative remains, for the most part, within the existing right-of-way footprint with the exception of small strips and slivers of right-of-way needed from the south side of the corridor. Each of the alignments consist of the following elements:

- Four 12-foot managed lanes, two in each direction separated by a median barrier wall with 8 to 12-foot inside and outside shoulders. This facility would be physically separated from the local lanes;
- A large portion of the managed lanes facility was envisioned to be a below-grade, or depressed, section of roadway with intermittent covers to provide landscape opportunities;
- Four 11-foot local travel lanes separated by a 15.5-foot median;
- Bicycle lanes and sidewalk;

Based on feedback received at numerous community meetings and the Alternatives Public Workshop held on April 24, 2018, the Northern Alignment Alternative will be carried through to the next level of analysis. Also, based on feedback, additional alternatives with reduced or minimized depressed sections and hybrid alternatives will be developed and evaluated in Tier 2. However, each new alternative will be based on the North Alignment concept with the managed lanes facility placed in the northern portion of the existing right-of-way and the local SW 10th Street lanes located in the southern portion of the corridor. Tier 2 Alternatives will be evaluated within the same right-of-way footprint but have differing profiles for the managed lanes facility. The local SW 10th Street profile will remain at-grade.

Proposed typical sections can be found in *Appendix A* and conceptual plans can be found in *Appendix B*.

## 5.0 Methodology

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### 5.1 Data Collection

A preliminary evaluation of SW 10th Street between South Military Trail and Florida's Turnpike (SR 91) in Deerfield Beach, Broward County, Florida, was conducted to determine potential contamination from properties or operations located within the vicinity of the project. This evaluation consisted of the following tasks:

#### 5.1.1 Property Ownership and Land Use

Property ownership information was reviewed from the Broward County Property Appraiser's website ([www.bcpa.net](http://www.bcpa.net)). Existing land use within the study area was determined through the interpretation of 1" = 100' scale aerial photography, review of land cover GIS data obtained from the South Florida Water Management District (SFWMD), and based on field reconnaissance of the project corridor.

#### 5.1.2 Regulatory Agency Records Review

A review of information generated by GeoSearch, which includes a search of the following forty-nine (49) Federal, seventeen (17) State databases, and five (5) Broward County databases within a ½ -mile of the project corridor:

##### Federal

- Aerometric Information Retrieval System /Air Facility Subsystem (AIRSAFS)
- Alternative Fueling Stations (ALTFUELS)
- Brownfields Management System (BF)
- Biennial Reporting System (BRS)
- CERCLIS Liens (SFLIENS)
- Clandestine Drug Laboratory Locations (CDL)
- Delisted National Priorities List (DNPL)
- EPA Docket Data (DOCKETS)
- Department of Defense Sites (DOD)
- Emergency Response Notification System (ERNSFL)
- Enforcement and Compliance History Information (ECHOR04)
- Facility Registry System (FRSFL)
- Federal Engineering/Institutional Control Sites (EC)



- FEMA Owned Storage Tanks (FEMAUST)
- Former Military Nuke Missile Sites (NMS)
- Formerly Used Defense Sites (FUDES)
- Formerly Utilized Sites Remedial Action Program
- Hazardous Materials Incident Reporting System (HMIRSR04)
- Historical Gas Stations (HISTPST)
- Integrated Compliance Information System (ICIS)
- Integrated Compliance Information System Drycleaners (ICISCLEANERS)
- Integrated Compliance Information System National Pollutant Discharge Elimination System (ICISNPDES)
- Land Use Control Information System (LUCIS)
- Material Licensing Tracking System (MLTS)
- Mine Safety and Health Administration Master Index File (MSHA)
- Mineral Resource Data System (MRDS)
- No Longer Regulated RCRA Corrective Action Facilities (NLRRCRAC)
- No Longer Regulated RCRA Non-CORRACTS Facilities (NLRRCRAT)
- National Pollutant Discharge Elimination System (NPDESR04)
- National Priorities List (NPL)
- Open Dump Inventory (ODI)
- PCB Activity Database System (PADS)
- Permit Compliance System (PCSR04)
- Proposed National Priorities List (PNPL)
- RCRA – Corrective Action Facilities (RCRAC)
- RCRA – Generator Facilities (RCRAGR04)
- RCRA – Non-Generator Facilities (RCRANGR04)
- RCRA Sites with Controls (RCRASC)
- RCRA – Subject to Corrective Action Facilities (RCRASUBC)
- RCRA – Treatment, Storage, & Disposal Facilities (RCRAT)
- Record of Decision System (RODS)
- Section Seven Tracking System (SSTS)
- Superfund Enterprise Management System (SEMS)
- SEMS Archived Site Inventory (SEMSARCH)
- SEMS Lien On Property (SEMSLIENS)
- Surface Mining Control and Reclamation Act Sites (SMRCA)
- Toxics Release Inventory (TRI)
- Toxic Substance Control Act Inventory (TSCA)
- Uranium Mill Tailings Radiation Control Act Sites (USUMTRCA)

State

- Brownfield Areas (BF)
- Brownfield Site Rehabilitation Agreement Sites (BSRA)
- Cattle Dip Vats (CDV)
- Dry Cleaners (CLEANERS)
- Drycleaning Solvent Program Cleanup Sites (CLEANUP)
- Engineering and Institutional Control Sites (ECIC)
- Florida Department of Environmental Protection Cleanup Sites (DEPCLEANUP)
- Ground Water Contamination Areas (GWCA)
- Historical Dry Cleaners (HISTCLEANERS)
- National Pollutant Discharge Elimination System (NPDES)
- Solid Waste Facilities (SWF)
- Spills Listing (SPILLS)
- State Hazardous Waste Facilities (SHWS)
- Registered Leaking Storage Tanks (LUAST)
- Registered Storage Tanks (UAST)
- Underground Injection Control Wells (UIC)
- Voluntary Cleanup Sites (VCP)

Broward County

- Hazardous Material Sites (BCHM)
- Notice of Violations (BCNOV)
- Storage Tanks (BCST)
- Contaminated Sites (BCBF)
- Solid Waste Landfills (BCSWF)

### 5.1.3 Search Engines and Other Database Resources

A search of the online resources provided by the Florida Department of Environmental Protection (FDEP), the United States Environmental Protection Agency (EPA) and Broward County was completed. The EPA Envirofacts system supplies information on hazardous waste and National Priority List (NPL, Superfund) sites, and the FDEP OCULUS resource provides online viewing of site-specific contamination files.

#### 5.1.4 Historical Aerial Photograph Review

A review of historical aerial photographs, in digital format, of the project area dated 1940, 1953, 1961, 1969, 1976, 1980, 1995, 1999, 2005, 2006, 2007, and 2015 were provided by GeoSearch (*Appendix C*).

#### 5.1.5 City Directory Information

A review of historical city directories for three (3) major thoroughfares within the project area dated 1992, 1995, 2000, 2006, 2007, 2011, and 2016. These roadways included: SW 10<sup>th</sup> Street, Military Trail, and Powerline Road. The city directories were provided by GeoSearch in digital format (*Appendix C*).

#### 5.1.6 Field Review

Visual reconnaissance of the corridor was conducted on September 15, 2017 and July 9, 2018 to identify sites or areas with indications of past or present contaminant storage, use, generation, or disposal. Potential sites were visually reviewed to the extent of available access for evidence of possible contaminant presence.

### 5.2 Potential Impact Determination

The contamination rating system is divided into four degrees of risk: No, Low, Medium and High. This system expresses the degree of concern for potential contamination problems. Known problems may not necessarily present a high cause for concern if the regulatory agencies are aware of the situation and actions, where necessary, are either complete or are underway, and these actions will not have an adverse impact on the proposed project.

The rating can also change based on changes in design, construction activities, construction methods, right-of-way needs, or other factors when the project progresses from design to construction. Where anticipated involvement with right-of-way acquisition exists, the District Contamination Impact Coordinator (DCIC) should inform and coordinate further related activities with the Project Manager (PM), the assigned right-of-way agent and/or Office of General Counsel as appropriate. If construction involvement is anticipated, further delineation during final design, remediation or a Modified Special Provision (MSP) may be needed.

### 5.2.1 No Risk

A review of available information on the property and a review of the conceptual or design plans indicates there is no potential contamination impact to the project. It is possible that contaminants had been handled on the property. However, findings from the contamination screening evaluation or sampling and testing results indicate that contamination impacts are not expected.

### 5.2.2 Low Risk

A review of available information indicates that former or current activities on the property have an ongoing contamination issue, has a hazardous waste generator identification (ID) number, or handles hazardous materials in some capacity. However, based on the review of conceptual or design plans and/or findings from the contamination screening evaluation or sampling and testing results, it is not likely that there would be any contamination impacts to the project.

### 5.2.3 Medium Risk

After a review of conceptual or design plans and findings from a contamination screening evaluation or sampling and testing results, a potential contamination impact to the project has been identified. If there is insufficient information (such as regulatory records or site historical documents) to make a determination as to the potential for contamination impact, and there is reasonable suspicion that contamination may exist, the property should be rated at least as a “Medium”. Properties used historically as gasoline stations and which have not been evaluated or assessed by regulatory agencies, sites with abandoned in place underground petroleum storage tanks or currently operating gasoline stations should receive this rating.

### 5.2.4 High Risk

After a review of all available information and conceptual or design plans, there is appropriate analytical data that shows contamination will substantially impact construction activities, have implications to right-of-way acquisition or have other potential transfer of contamination related liability to the FDOT. A recommendation for each site with a rating of medium or high should include a listing of the analytical parameters of

concern and media (e.g., soil, groundwater), a discussion of potential involvement with right-of-way acquisition and/or construction and if the site is anticipated to warrant additional (Level II or III) assessment.



## 6.0 Land Uses

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Historical land uses were observed from a series of documents including aerial photographs, topographical maps, and city directories provided by GeoSearch (*Appendix C*). No Fire Insurance Maps were available in association with the study area. The following is a discussion of the historical use of the project corridor.

### 6.1 Previous Land Use

#### Pre-1980

The project corridor was primarily undeveloped until the 1970s. The earliest uses of the project area were associated with vacant land and residential use. By the mid-1970s, the Hillsboro Pines Golf Course and Century Village, a multi-family residential development was under construction north of SW 10th Street. A large cleared area was observed south of SW 10th Street in the 1976 aerial photograph. Several industrial use/warehouse properties were identified in the western portion of the project corridor during this time. Residential development continued through 1980 and SW 10th Street was widened between Interstate 95 and Powerline Road. No city directories and/or fire insurance maps were available during this time.

#### 1980s-1990s

Most of the initial urban development of the area occurred in the early 1990s. By 1995, the entire area was developed for urban use. Most of the corridor was associated with multi-family residential use with some light industrial use in the western portion of the project corridor. Commercial retail was identified in the eastern section of the project corridor at the intersection with Military Trail in the late 1990s.

#### 2000-present

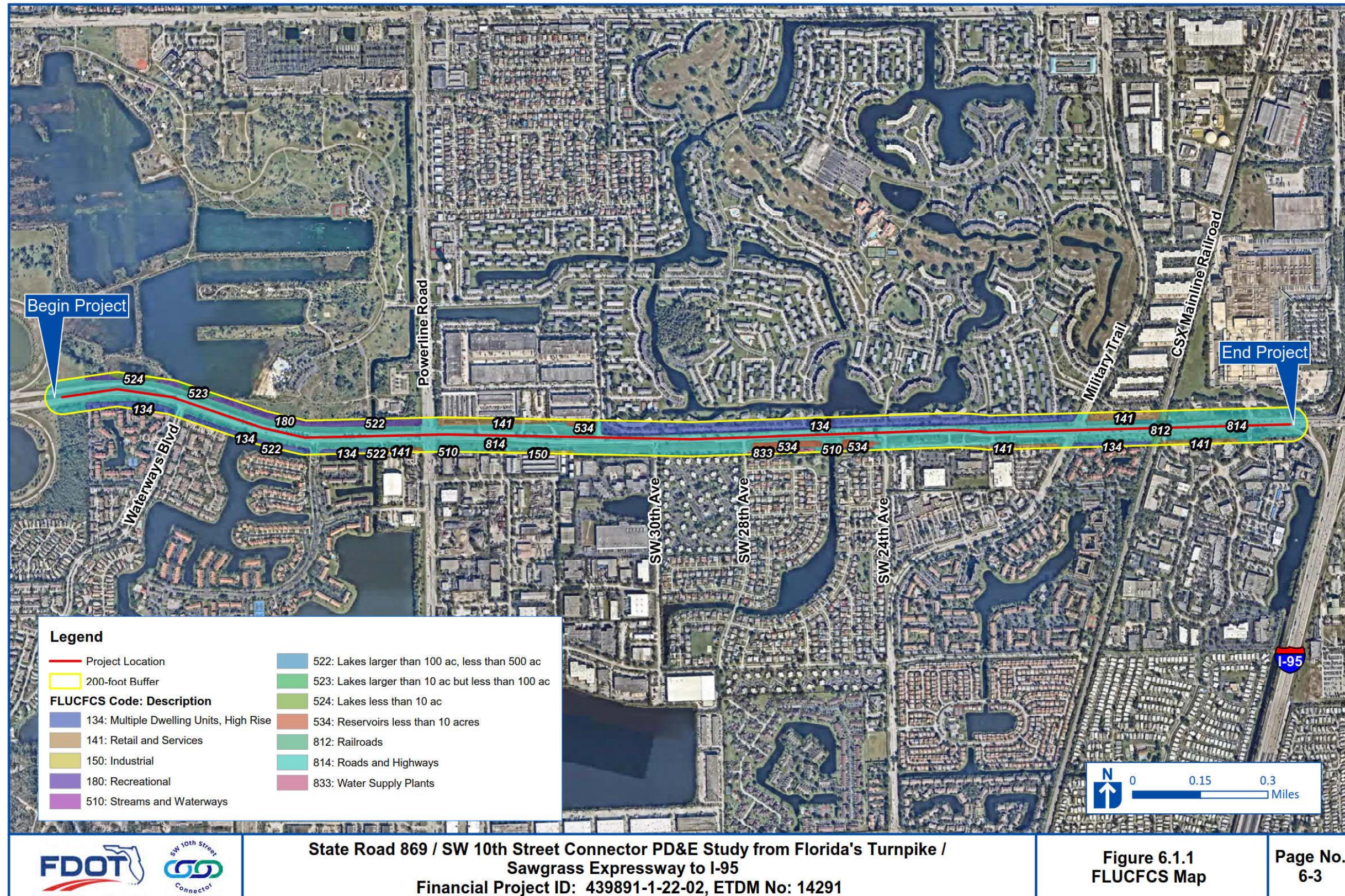
Three (3) gasoline fueling stations began operation on or adjacent to the project corridor around 2000 based on historical city directories. These gas stations were situated at the following addresses: 1201 South Military Trail, 1011 Powerline Road, and 900 SW 10th Street. Additional warehouses were constructed in the early 2000s near the northwestern

section of the project corridor adjacent to Powerline Road.

## 6.2 Existing Land Use

Existing land use within the study area was determined through the interpretation of 1" = 100' scale aerial photography, review of land cover GIS data obtained from the SFWMD and based on field reconnaissance of the project corridor that was conducted on September 15, 2017 and July 9, 2018. Existing land use was mapped based on the Florida Land Use, Cover and Forms Classification System (FLUCFCS) (FDOT, 1999) for the project area and is depicted in *Figure 6.1.1*.





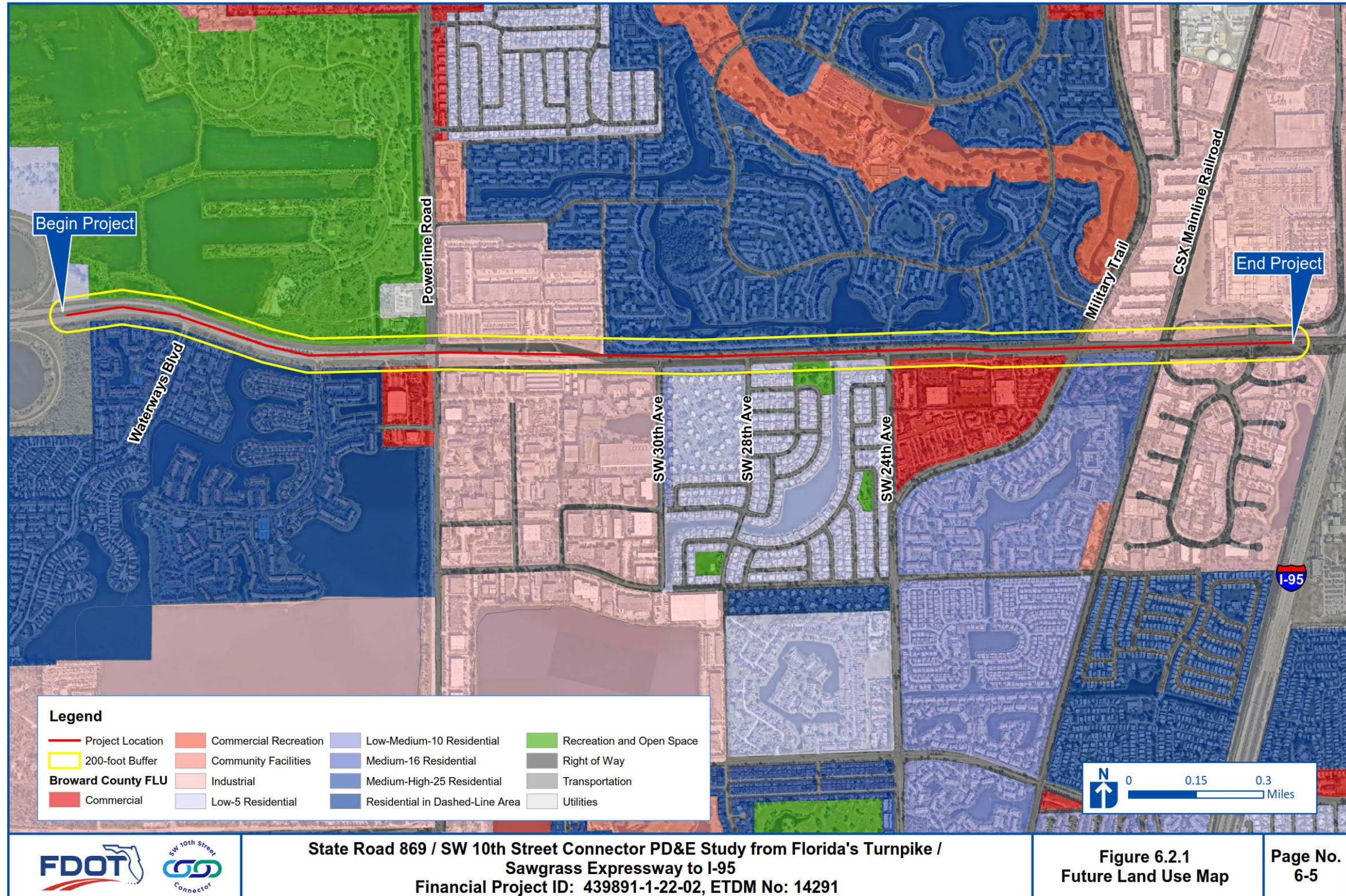


The existing land use can be generally characterized by existing roadways, open land adjacent to roadway within right-of-way, retail and services, and multiple high-density units. In addition, Quiet Waters Park is located at the northwest corner of SW 10th Street and Powerline Road. This area includes numerous natural and recreational resources including walking and biking trails, camping grounds, basketball courts, campground, Splash Adventure water park, and cable water skiing.

### 6.3 Future Land Use

Future land use was determined based on a review of Broward County Future Land Use (FLU) GIS data (*Figure 6.2.1*). The project study area is built out. Thus, future land use is consistent with existing land uses. The following future land uses within the 200-foot study area are: commercial, industrial, low-5 residential, low-medium-10 residential, medium-16 residential, recreation and open space, residential in dashed-line area, right-of-way, and transportation. Residential in dashed-line area includes parcels for which there is a total number of dwelling units permitted within the area.







## 7.0 Hydrological Features

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### 7.1 Ground Water

The United States Geologic Survey (USGS) Ground Water Atlas of the United States (<http://pubs.usgs.gov/ha/ha730/>) provided information on the aquifers of the upland portions of the proposed project area. Two (2) principle hydrogeologic units are present within the project corridor located in northern Broward County. These hydrogeologic units include the following: the Biscayne aquifer system and the Upper Floridan Aquifer.

The Biscayne Aquifer in Broward County is comprised of both highly permeable limestone and less-permeable sandstone. In general, the entire aquifer is sandier in its northern and eastern parts, and contains more limestone and calcareous sandstone to the south and west. The Biscayne aquifer grades northward and westward into sandy deposits that are part of the surficial aquifer system. Most of the geologic formations comprising the aquifer are of Pleistocene age but, locally, Pliocene rocks also are included in the aquifer.

Near the study area for SW 10th Street, the aquifer is greater than 200 feet thick. The aquifer supplies most potable water needs to the overlying area. Water in the Biscayne aquifer is under unconfined, or water-table conditions and the water table fluctuates in direct and rapid response to variations in precipitation. A sequence of low-permeability, largely clayey deposits about 1,000 feet thick separates the Biscayne aquifer from the underlying Floridan aquifer system. This hydrostratigraphic unit is referred to as the intermediate confining unit. Regardless of the composition of the intermediate confining unit, it restricts the movement of groundwater between the Biscayne and the Upper Floridan aquifer. The Upper Floridan aquifer in the project corridor includes parts or all of the Suwannee Limestone (Oligocene), Ocala Limestone (Upper Eocene), and upper section of the Avon Park Formation (Middle Eocene). The Upper Floridan is approximately 1,200 feet thick near the project corridor. The thickness of the Upper and Lower Floridan aquifers is approximately 2,800 feet. The Upper Floridan contains water with high concentrations of dissolved solids based on proximity to the ocean and composition of rock formations.

The topography is relatively flat along the entire project corridor. Based on the available documentation, the regional groundwater flow direction prior to anthropogenic influences was southeastward. However, the actual flow direction has been altered by the series of stormwater retention areas and/or drainage canals used for flood management that extend throughout the project area. The water levels in these water bodies are artificially maintained by pump stations, flood gates, and other water management structures. The localized flow direction will be primarily based on the water levels of adjacent canals, as these features act as recharge and discharge areas depending on the artificial water levels set by the managing agency (i.e. SFWMD, Broward County Water Control District No. 2).

## 7.2 Surface Water

Surface water drainage within the upland portions of the project area occurs via storm drains and sewer systems maintained by the SFWMD. The SFWMD holds the primary authority over water management along the 1.5-mile corridor. The project area is situated within the Broward County Water Control District Number 2, a special drainage district within Broward County. This drainage district is bordered by the Hillsboro Canal to the north, Interstate 95 to the east, Sample Road (SR 834) to the south, and the Florida Turnpike to the west.

The project area lies within the Hillsboro Canal basin. The basin encompasses a 40-square mile area of northeastern Broward County. The Hillsboro Canal hydraulically connects Lake Okeechobee to the Atlantic Ocean via an extensive network of drainage canals. The majority of the inflow to the Hillsboro Canal is from canals in Palm Beach County, specifically within the Lake Worth Drainage District (LWDD). Maps of drainage basins, water control districts, and other drainage maps are included in *Appendix D*.

The USGS West Dixie Bend (FL) 7.5-minute quadrangle map (*Figure 7.1.1*). shows the land elevations along the project corridor ranging from approximately 16 to 21 feet based on the National Geodetic Vertical Datum (NGVD) of 1929. Topographic relief along the right-of-way is low. The most recent topographic map from 1983 indicated significant sections of the right-of-way were undeveloped. The majority of the development along the

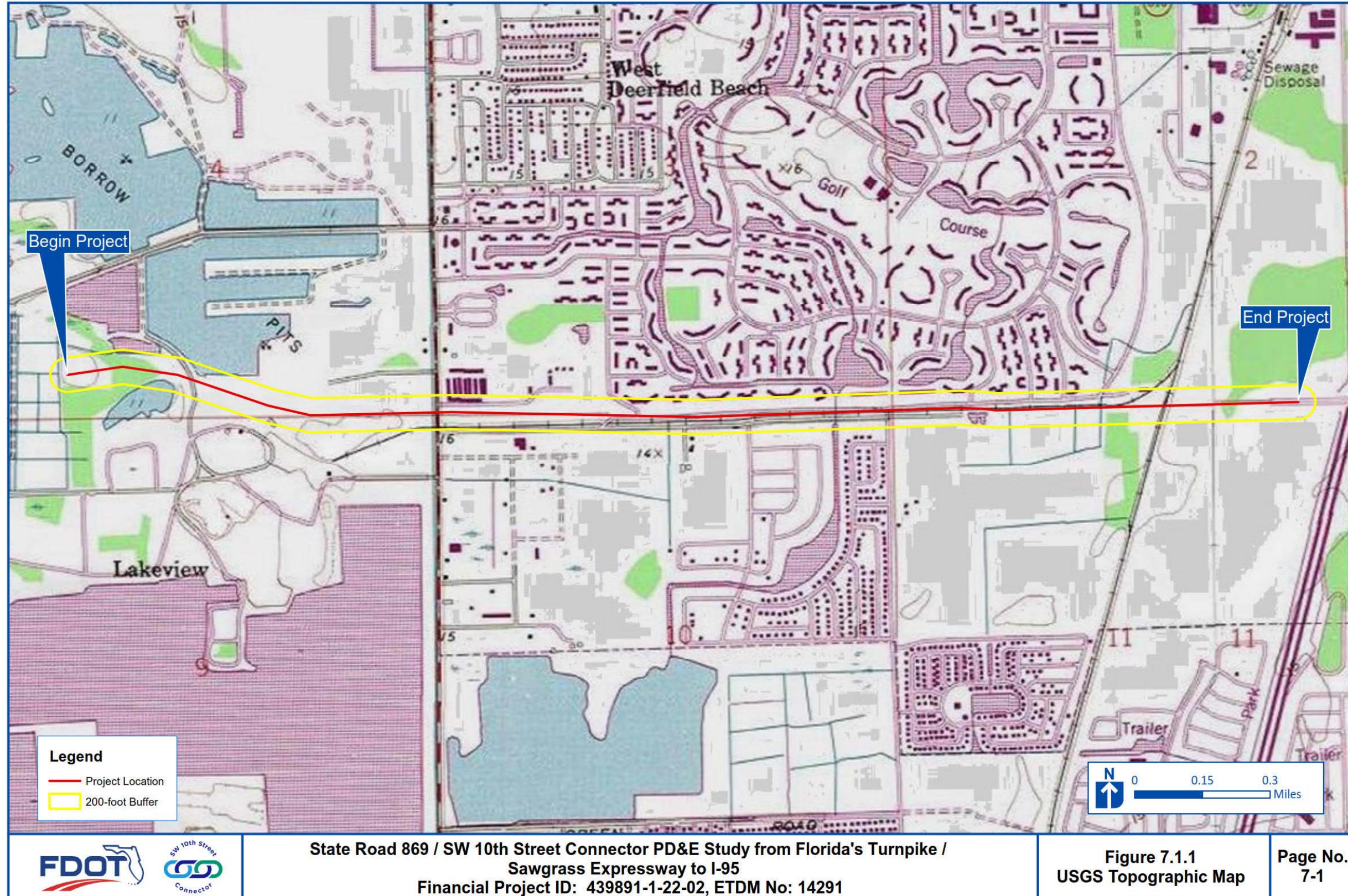




SR 869 corridor at that time was associated with residential development in northern Broward County.









### 7.3 Wells

A summary of wells within a 0.25-mile radius of the study area was provided in the GeoSearch Water Well Report, dated June 5, 2018. This report indicated nine (9) wells were identified within the aforementioned radial distance from the Water Wells Database, managed by the USGS<sup>1</sup> and FDEP. Seven (7) additional wells were situated between 0.25-mile and 0.5-mile radial distance from the corridor. Based on significant distance of these wells, no additional discussion was prepared. The *Table 7.1* summarizes the information within the Water Well Report. This document is included in its entirety within *Appendix C*.

TABLE 7.1: WELLS WITHIN ¼-MILE RADIUS OF PROJECT CORRIDOR						
Map ID	Site ID	Site Name	Distance from Corridor	Relative Location	Date Installed	Well Depth (FT)
1	1018749	G-2702	222	Due east of SW 28 <sup>th</sup> Ave	1/1/1980	38
1	1018750	G-2721	222		1/1/1980	175
1	1018747	G-2986	106		2/16/2010	1340
2	01018773	G-2355A	992	Due west of southbound FL Turnpike exit ramp	04/01/1983	53.6
2	01018772	G-2355	992		04/01/1983	96.4
3	DEERFLD17	NA	997	Due west of railroad	Not Reported	180
3	AAL5150	NA	1,008		Not Reported	Not Reported
3	01018762	G-2704	1,019		01/01/1980	40
4	01018767	G-2723	1,214	Due west of railroad	01/01/1980	180

Two (2) wells, Site ID AAL5150 and DEERFLD17, are considered large community public supply wells with a capacity of at least 150,000 gallons per day (GPD). These wells were

<sup>1</sup> United States Geological Survey

situated north of SW 10<sup>th</sup> Street and due west of the railroad situated in the eastern section of the project corridor. These wells are associated with the Deerfield Beach west wellfield area. The eastern section of the project corridor is situated within each of the three (3) wellfield protection zones as defined in Chapter 27, Article XIII of the Broward County Code (*Appendix E*). The presence of these zones provides a series of safeguards to preclude potential impacts to ground water from facilities that handle, generate, and/or store hazardous waste. No septic systems and/or drain fields were identified within the project corridor.

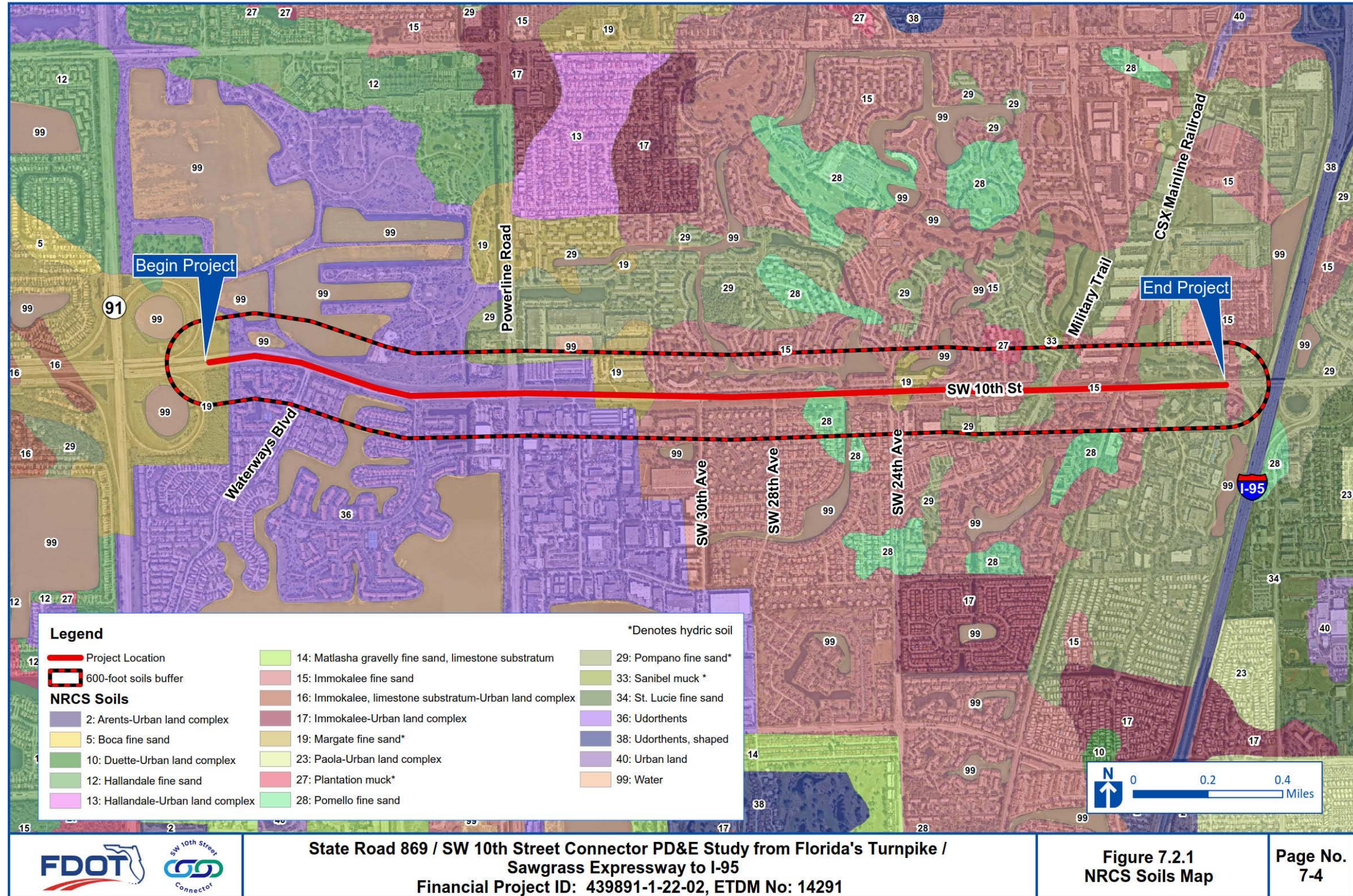
#### 7.4 Soils

Based on a review of the US Department of Agriculture (USDA)/Natural Resources and Conservation Service (NRCS) Soil Survey for Broward County, there are seven (7) soil types within 600 feet of the proposed improvements. In general, the soils found within this area are derived from sandy marine sediments with a variety of drainage characteristics. Per the Hydric Soils of Florida Handbook, Fourth Edition (Florida Association of Environmental Soil Scientists, 2007), Margate fine sand, Plantation muck, Pompano fine sand, and Sanibel muck are hydric soils. **Table 7.2** includes a summary of the soil types found in the study area (see NRCS Soils Map - *Figure 7.2.1*).

**TABLE 7.2: SOILS WITHIN 600-FEET OF PROPOSED IMPROVEMENTS**

Mapped Unit ID	Name	Soils Texture	Drainage Class	Layer Depth	Bedrock Depth	Groundwater Depth
15	Immokalee fine sand	Fine sand	Poorly drained	Surface: 0-6" Subsurface: 6-40" Subsoil: 40-80"	>80 inches	10 to 40"
19	Margate fine sand	Fine sand, decomposed limestone fragments	Poorly drained	Surface: 0-8 in Subsurface: 8-16 " Subsoil: 16-32"	>32 inches	20 to 40"
27	Plantation muck	Muck on surface over sandy mineral material	Very poorly drained	Muck: 0-10" Mineral surface: 10-16" Sand layer: 16-35"	>35 inches	10 "or less for 2-6 months and 20" or less for remainder of the year
28	Pomello fine sand	Fine sand	Moderately well drained	Surface: 0-5 in Subsurface: 5-33" Subsoil: 33-80"	>80 inches	24 to 40" for 2-4 months and 40-60" for remainder of the year
29	Pompano fine sand	Fine sand	Poorly drained	Surface: 0-7" Subsurface: 7-50 " Subsoil: 50-80"	>80 inches	10" or less for 2-6 months and 30" or less for remainder of the year
33	Sanibel muck	Muck at surface then fine sand	Very poorly drained	Muck: 0-9" Mineral surface: 9-10" Sand: 10-60"	>60 inches	Less than 10" for 6-12 months
36	Udorthents	Shell rock, sand, loamy carbonatic material	Well drained to excessively drained	Homogeneous: 0- 57"	>57 inches	20-50"







## 8.0 Project Impacts

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This section describes the potential contamination associated with each of the sites near the proposed project. *Figure 8.1.1* shows the locations of the potential contamination sites, while *Table 8.1* provides a summary of the sites' contamination concerns and risk evaluation ratings. Approximate distances from the potential contamination site to the proposed right-of-way are also given. Relevant documentation of potential contaminant information was available for the twenty-two (22) of the twenty-three (23) sites, and copies of these files are included in *Appendix F*. Site reconnaissance photographs are included in *Appendix G*.



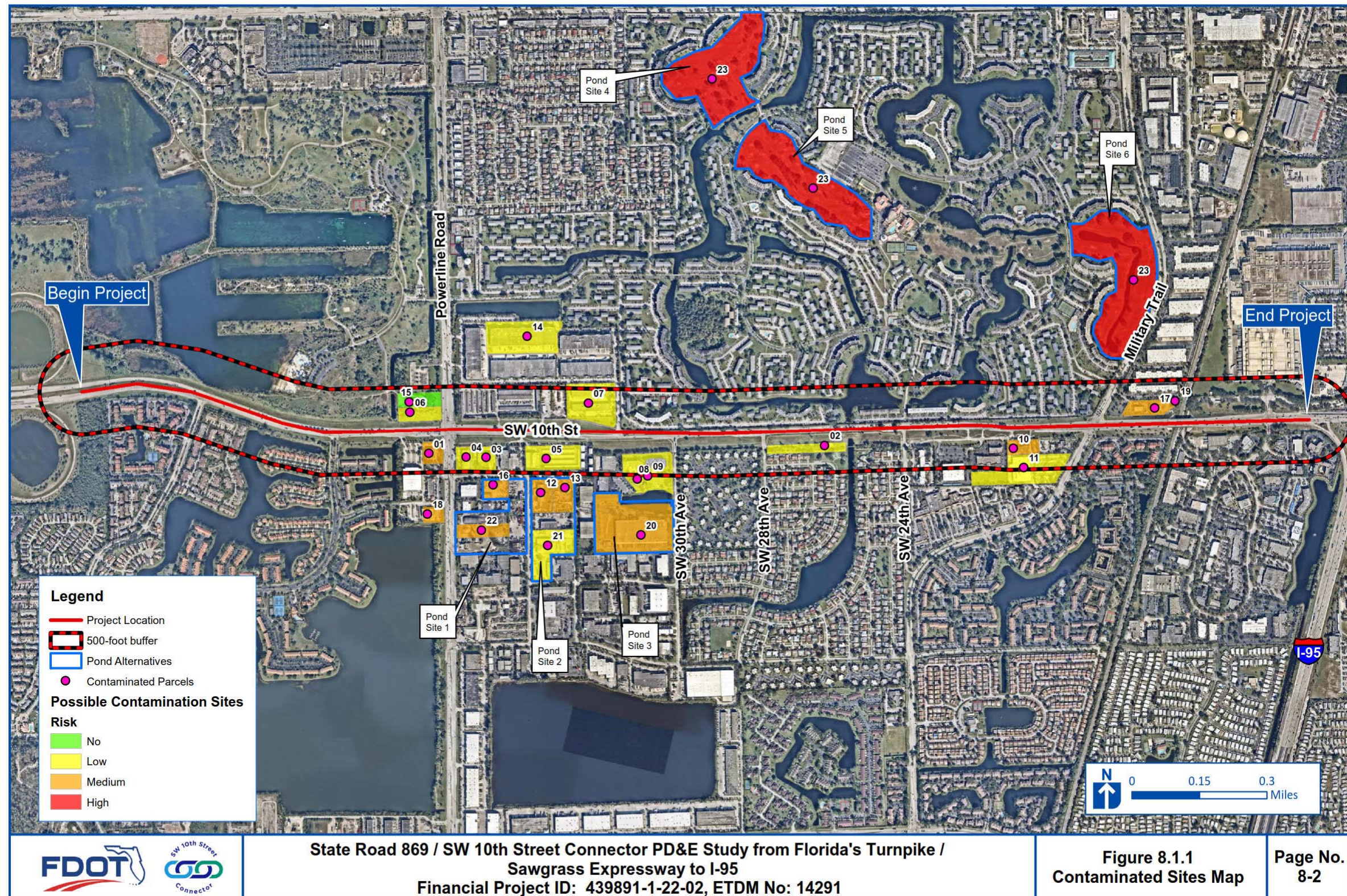




TABLE 8.1. POTENTIAL CONTAMINATED SITES SUMMARY

Site No.	Site No. per GeoSearch Radius Report	Facility Name	Location/ Address	County	Facility ID	Distance from ROW	Potential Concern(s)	Site History and Potential Contamination Parameters	Risk Evaluation Rating
01	05	Shell – First Coast Energy #1836	1011 S. Powerline Road, Deerfield Beach, FL	Broward	9800891 2049BCBF 03329BCST	Southwest adjacent	Operational USTs – Gas Station	This facility is an active retail station that contains four 10,000-gallon unleaded gas USTs and one 8,000-gallon vehicular diesel UST. The USTs were reportedly installed in 1998, and remain in service. The facility reported a petroleum discharge in March 2015. Cleanup activities for the discharge have since been completed, and the facility received a Site Rehabilitation Completion Order (SRCO) from the FDEP in September 2017. An inspection completed in October 2017 indicated full compliance of the storage tank system. There were no other releases, discharges, and/or major compliance issues identified in association with this facility. The facility remains an operational gas station and is associated with a Medium risk.	Medium
02	06	City of Deerfield Beach – Well FA-2	2450 SW 10 <sup>th</sup> Street, Deerfield Beach, FL	Broward	9812649 13247BCST	South adjacent	Operational Storage Tank	This facility currently contains one 1,000-gallon emergency generator diesel fuel aboveground storage tank (AST), which was observed during field reconnaissance. The tank was staged on a concrete pad and did not appear to be within secondary containment. The AST was reportedly installed in April 2011 with double-walled construction. There were no releases, discharges and/or major compliance issues identified in association with this facility. The most recent compliance inspection, dated September 2016, found the facility to be in compliance and the AST in good condition. The facility remains an operational storage tank site and is associated with a Low risk.	Low
03	07	Home Aide Diagnostics, Inc. (Formerly Konica Graphic Imaging Intl. Inc.)	1072 S. Powerline Road, Deerfield Beach, FL	Broward	FLR00007669 5	South adjacent	Hazardous waste (CESQG)	This facility was identified as a RCRA Conditionally Exempt Small Quantity Generator (CESQG). The CESQG designation indicates that this facility generates less than 100 kilograms per month (kg/mg) of hazardous waste. Waste types documented for this facility include ignitable waste (D001) and corrosive waste (D002). Additional documentation regarding this facility was not identified. There were no violations, releases, or corrective action enforcements identified in association with this facility. This facility currently operates as a wholesale medical supplier with truck loading bays observed in the field and is associated with a Low risk.	Low
04	08	Med-Care Pharmacy Inc. / Dana Medical Properties	1052 S. Powerline Road, Deerfield Beach, FL	Broward	9100756 02169BCST	South adjacent	Former UST Operational AST	This facility historically contained one 550-gallon emergency generator diesel fuel UST. The UST was reportedly removed in 1998 and replaced with the existing 1,000-gallon emergency generator diesel fuel AST, which remains in operation. There were no releases, discharges and/or major compliance issues identified in association with this facility. The most recent compliance inspection, dated September 2016, found the facility to be in compliance and the AST in good condition. This facility currently operates as a pharmacy and is associated with a Low risk.	Low
05	10	Public Storage (Formerly Farmer & Irwin Corp.)	3301 SW 11 <sup>th</sup> Street, Deerfield Beach, FL	Broward	8838386	South adjacent	Former fuel USTs	This facility historically contained one 3,000-gallon unleaded gas UST and one 1,000-gallon vehicular diesel UST, which were reportedly installed in 1973 and removed in 1992. There were no releases, discharges and/or major compliance issues identified in association with this facility. However, no documentation regarding tank closure or assessment was identified in the database review. This site has been redeveloped into a self-storage business, which was observed in the field. As such, this facility was assigned a Low risk.	Low
06	11	Quiet Waters Park	401 South Powerline Road, Deerfield Beach, FL 33442	Broward	98074	North adjacent	Yard Waste/ Debris	A portion of the park was authorized as a Disaster Debris Management Site (DDMS). This facility would receive yard waste during a designated disaster. This authorization is provided annually from the FDEP. The latest authorization was issued on March 28, 2018 and is associated with a Low risk.	Low

TABLE 8.1. POTENTIAL CONTAMINATED SITES SUMMARY

Site No.	Site No. per GeoSearch Radius Report	Facility Name	Location/ Address	County	Facility ID	Distance from ROW	Potential Concern(s)	Site History and Potential Contamination Parameters	Risk Evaluation Rating
07	12	Devcon	3165 SW 10 <sup>th</sup> Street, Deerfield Beach, FL	Broward	FLTMP9103109	North adjacent	Hazardous waste (CESQG)	This facility was identified as a RCRA Conditionally Exempt Small Quantity Generator. The CESQG designation indicates that this facility generates less than 100 kg per month of hazardous waste. Additional documentation regarding this facility was not identified. There were no violations, releases, or corrective action enforcements identified in association with this facility. This facility is associated with a Low risk.	Low
08	13A	Ryan Inc. Eastern Shop	1071 SW 30 <sup>th</sup> Avenue, Deerfield Beach, FL	Broward	FLD982139628	300 ft. south	Various	This facility was originally classified as a RCRA Small Quantity Generator (SQG) in May 1990. The SQG designation indicates that this facility generates 100-1000 kg per month of hazardous waste. Waste types documented for this facility include ignitable waste (D001) and spent halogenated solvents (F002 and F004). The facility appears to have been closed since November 2011, and the facility is no longer an active RCRA generator. There were no violations, releases, or corrective action enforcements identified in association with this facility. The facility currently operates as a Solatube Dealer, installing residential daylighting and solar-powered attic ventilation, and is associated with a Low risk.	Low
09	13B	United Wholesale	1027 SW 30 <sup>th</sup> Avenue, Deerfield Beach, FL	Broward	FLR000033134	300 ft. south	Various	This facility was originally classified as a RCRA Small Quantity Generator 1997. However, the facility was designated as closed in 1998, and is no longer classified as a RCRA generator. The SQG designation indicates that this facility generates 100-1000 kg per month of hazardous waste. Waste types documented for this facility include expired pharmaceutical products including reactives, flammables and poisons. There were no violations, releases, or corrective action enforcements identified in association with this facility. This facility is associated with a Low risk.	Low
10	14A	Brothers Dry Cleaning Inc. / One Price Dry Cleaner	1141-1145 S. Military Trail, Deerfield Beach, FL	Broward	9800676 FLR000063537	120 ft. south	Drycleaner	This facility is a former drycleaner that previously contained one AST containing dry-cleaning solvent. The AST has reportedly been removed with no supporting documentation. The facility is listed as closed. The facility was previously classified as a RCRA Small Quantity Generator (SQG), associated with ignitable wastes (D001) and tetrachloroethylene (D039), a dry-cleaning solvent. The facility was recategorized as a non-generator in 2011. There were no violations, releases, or corrective action enforcements identified in association with this facility. The facility current remains vacant. Based on field reconnaissance, it was unable to determine if this facility was a drop-off only facility or if dry cleaning took place at this facility. This facility is associated with a Medium risk.	Medium
11	14B	Wal-Mart Neighborhood Market #3104 / Global Media Group, Inc.	1101 & 1121 S. Military Trail, Deerfield Beach, FL	Broward	FLR000198986 97406	220 ft. south	Various	The Wal-Mart Neighborhood Market #3104 facility is listed as a RCRA CESQG, in association with a variety of waste categories related to the existing retail supermarket operations. The CESQG designation indicates that this facility generates less than 100 kg per month of hazardous waste. There were no violations, releases, or corrective action enforcements identified in association with this facility.  The Global Media Group, Inc. facility was identified in the Solid Waste Facilities database as an inactive waste tire collector, with no reported violations. This facility is associated with a Low risk.	Low

TABLE 8.1. POTENTIAL CONTAMINATED SITES SUMMARY

Site No.	Site No. per GeoSearch Radius Report	Facility Name	Location/ Address	County	Facility ID	Distance from ROW	Potential Concern(s)	Site History and Potential Contamination Parameters	Risk Evaluation Rating
12	15	City of Deerfield Beach	Turner Envirollogic Area, Deerfield Beach, FL	Broward	BF060501000	1000 ft. south	Brownfield Area (see Site 16 below for additional details)	This site is a potential pond site and was declared a Brownfield Area under the City of Deerfield Beach Resolution Number 2005-179, dated October 18, 2005. The area designation alone does not represent a significant contamination concern. However, the area largely coincides with the East Coast Asphalt Corp. facility, discussed further below and is associated with a Medium risk.	Medium
13	16	East Coast Asphalt Corporation	3300 SW 11 <sup>th</sup> Street, Deerfield Beach, FL	Broward	8944925 00954BCST 0762BCBF 31481	1000 ft. south	Documented petroleum impacts onsite (soil and groundwater)	This facility is a potential pond site that historically contained five (5) ASTs (vehicular diesel, miscellaneous petroleum, hazardous substance) ranging from 4,000-25,000 gallons. The ASTs have reportedly been removed from the site. The presence of storage tanks was not confirmed during site reconnaissance. The facility reported a petroleum discharge in August 1989 upon the discovery of diesel contamination. Immediately after discovery, a portion of the contaminated area was excavated. A Remedial Action Plan (RAP) was approved in 1991, and remedial activities occurred from 1991 until being discontinued in 1995. The facility was deemed eligible for cleanup funding under the State-funded Petroleum Cleanup Participation Program (PCPP) in 1997 with a cleanup priority score of 25. The most recent site assessment report, dated May 2000, indicated the presence of petroleum contamination in soil and groundwater at the site. The approximate limits of the contaminant impacts appear to lie largely within the site boundaries, with groundwater flow depicted to the southeast, away from the project study area right-of-way. The facility received notification of funding availability for assessment activities in October 2017. Requests for Site Access Agreements were requested in December 2017 and January 2018. No Limited Contamination Assessment Report (LCAR) has been submitted as of May 2018. At this time, the full assessment and cleanup of petroleum impacts have yet to be completed. The facility was listed in the Broward County contaminated sites database and was identified in association with the Turner Envirollogic Area brownfield, discussed above. Based on the ongoing site assessment activities at this facility, it was designated with a Medium risk.	Medium
14	18A	Dana Classic Fragrances, Inc.	720 S. Powerline Road, Deerfield Beach, FL	Broward	FLT08007948 6 FLR00015277 7	450 ft. north	Various	Four (4) facilities were listed in this multi-tenant warehouse property (Site 18; folio no. <a href="#">484203230010</a> ) situated at the northeastern intersection of SW 10 <sup>th</sup> Street and South Powerline Road.  Two facilities were reported at 720 South Powerline Road. The Dana Classic Fragrances Inc. facility was listed as an active RCRA CESQG. Waste types documented for this facility include cosmetics, beauty supplies and perfumes. There were no major violations, releases, or corrective action enforcements identified in association with this facility. This designation is associated with a Low risk evaluation.	Low
15	19	Deerfield Quarry	Deerfield Beach, FL	Broward	10240603	Within the 500ft. buffer	None	This facility was listed under the Mineral Resource Data System (MRDS) database in the GeoSearch Radius Report. The facility was identified as a crushed stone producer. There were no releases, discharges, and/or major compliance issues identified in association with this facility. This facility is now part of Quiet Waters Park and is adjacent to the Park's maintenance facility.	No

TABLE 8.1. POTENTIAL CONTAMINATED SITES SUMMARY

Site No.	Site No. per GeoSearch Radius Report	Facility Name	Location/ Address	County	Facility ID	Distance from ROW	Potential Concern(s)	Site History and Potential Contamination Parameters	Risk Evaluation Rating
16	23	Man-Con Inc. / Stan Freitag Equipment Rental, Inc.	3460 SW 11 <sup>th</sup> Street, Deerfield Beach, FL	Broward	9401000 01022BCST 54871	400 ft. south	Operational AST, Former solid waste facility	<p>The Man-Con Inc. facility is a potential pond site and currently contains one 1,000-gallon vehicular diesel AST, which was reportedly installed in 1994 and remains in operation. During field reconnaissance, could not confirm presence or absence of AST due to facility being gated and access was limited. There were no releases, discharges and/or major compliance issues identified in association with this facility. The most recent compliance inspection, dated July 2016, found the facility to be in compliance and the AST in good condition. The AST was not identified during site reconnaissance. The facility remains an operational storage tank site and is associated with a Medium risk.</p> <p>The Stan Freitag Equipment Rental, Inc. facility was identified as a waste processing facility, specifically a Material Recovery Facility – Class I &amp; III. The facility was listed in the Solid Waste Facilities database in the GeoSearch Radius Report. According to the Radius Report and FDEP Map Direct database, the facility was given a No Further Action status in July 2010. There were no releases, discharges and/or major compliance issues identified in association with this facility. No additional documentation was available for review.</p>	Medium
17	24	Cen-Deer Management Inc. / Nanaks Landscaping / Trolley Tours	998 S. Military Trail, Deerfield Beach, FL	Broward	8840464 13642BCST 2768ABCBF	North adjacent	Various	<p>The Cen-Deer Management Inc. facility historically contained four 888-gallon USTs (leaded gas, unleaded gas, vehicular diesel), which were reportedly removed from the site in 1986. The facility reported a petroleum discharge in October 1985. Cleanup activities for the discharge have since been completed, and the facility received a Site Rehabilitation Completion Order (SRCO) from the FDEP in November 2011. There were no other releases, discharges and/or major compliance issues identified in association with this facility.</p> <p>The Trolley Tours facility was listed as a Broward County contaminated site in association with the documented cleanup activities which occurred at the Cen-Deer Management Inc. facility, discussed above.</p> <p>The Nanaks Landscaping facility is an active lawn care service provider. The facility currently maintains a Hazardous Material Management license with Broward County in association with petroleum products, solvents, rags, fluorescent tubes, and pesticides. The facility also contains two 300-gallon vehicular diesel ASTs and one 250-gallon emergency generator diesel AST, which were confirmed during field reconnaissance. There have been no discharges associated with this facility. The most recent compliance inspection, dated March 2017, found the facility to be in compliance. No storage tanks were observed during site reconnaissance. The facility remains an operational storage tank site and is associated with a Medium risk.</p>	Medium



**TABLE 8.1. POTENTIAL CONTAMINATED SITES SUMMARY**

Site No.	Site No. per GeoSearch Radius Report	Facility Name	Location/ Address	County	Facility ID	Distance from ROW	Potential Concern(s)	Site History and Potential Contamination Parameters	Risk Evaluation Rating
18	26	Cache Cleaners	1151 S. Powerline Road, Deerfield Beach, FL	Broward	9814593	250 ft. west of Pond 1	Drycleaner	This facility was identified as a drycleaner, and currently contains one AST containing tetrachloroethylene (PCE) which was installed in 2015. During field reconnaissance, presence or absence of AST could not be confirmed. There were no releases, discharges and/or major compliance issues identified in association with this facility. Recent documentation suggests ongoing operation and dry-cleaning activities take place at this facility. The facility remains an operational storage tank site and is associated with a Medium risk.	Medium
19	27	Deerfield Beach City – Well #17	994 S. Military Trail, Deerfield Beach, FL	Broward	8622498	Within 500 ft. buffer	Former UST Operational AST	This facility historically contained one 600-gallon emergency generator diesel fuel UST. The UST was reportedly removed in 1987 and replaced with the existing 550-gallon emergency generator diesel fuel AST, which remains in operation and was confirmed onsite during field reconnaissance. The facility reported a petroleum discharge in October 1985. Cleanup activities for the discharge have since been completed, and the facility received a No Further Action status in March 2007. There were no other releases, discharges and/or major compliance issues identified in association with this facility. An AST in secondary containment was observed during site reconnaissance. The facility remains an operational gas station and was associated with a Medium risk.	Medium
20	29	Rexall Sundown, Inc.	1111 SW 30 <sup>th</sup> Avenue, Deerfield Beach, FL	Broward	9803298 03057BCST	800 ft. south	Operational Storage Tank	This facility is a potential pond site and currently contains one 1,000-gallon emergency generator diesel fuel AST, which was reportedly installed in February 1998. There were no releases, discharges and/or major compliance issues identified in association with this facility. The most recent compliance inspection, dated July 2017, found the facility to be in compliance and the AST in good condition. One AST was observed during site reconnaissance. The facility remains an operational gas station and was associated with a Medium risk.	Medium
21	30	Hanson Roof Tile	1340 SW 34 <sup>th</sup> Avenue, Deerfield Beach, FL	Broward	8627909 01033BCST FLD98417521 6	0.21 miles south	Storage tanks	This facility is a potential pond site that historically contained one 3,000-gallon vehicular diesel UST, which has reportedly been removed from the site. The facility reported a petroleum discharge in March 1990. The facility was issued a No Cleanup Required status from the FDEP, and cleanup activities were deemed complete in August 2007. The facility was identified as a RCRA CESQG, and currently maintains a Hazardous Materials license through Broward County in association with the active roofing manufacturing operations. The most recent compliance inspection, dated July 2016, found the facility to be in compliance. The inspection noted that the facility contained two 500-gallon used oil ASTs, stored within secondary containment, and an empty 500-gallon diesel fuel tank. No additional discharges, releases, or major compliance violations were reported for this facility. No storage tanks were observed during field reconnaissance. This facility is associated with a Low risk.	Low

TABLE 8.1. POTENTIAL CONTAMINATED SITES SUMMARY

Site No.	Site No. per GeoSearch Radius Report	Facility Name	Location/ Address	County	Facility ID	Distance from ROW	Potential Concern(s)	Site History and Potential Contamination Parameters	Risk Evaluation Rating
22	32	Hardrives Asphalt Company	1200 S. Powerline Road, Deerfield Beach, FL	Broward	8944976 01802BCST	850 ft. south	Operational ASTs	This facility is a potential pond site that manufactures asphalt for roadway repairs. Materials for asphalt production are stored onsite. The facility currently contains two 15,000-gallon "other non-regulated" ASTs, one 12,000-gallon fuel oil AST, and one 6,500-gallon vehicular diesel AST. The ASTs were reportedly installed between 1974 and 1986. There were no releases, discharges and/or major compliance issues identified in association with this facility. The most recent compliance inspection, dated September 2016, found the facility to be in compliance and the ASTs in good condition. ASTs were observed during field reconnaissance. The facility is a potential pond site that manufactures asphalt and stockpiles materials onsite and is associated with a Medium risk.	Medium
23	Site not listed in Radius Report	Century Village Golf Course	450 Century Boulevard. Deerfield Beach, FL	Broward	Site not listed in Radius Report	North adjacent	Pesticides Herbicides Arsenic	This site is a former golf course dating back to the early 1970's and operating as a golf course through April 2013. Broward County has issued Environmental Assessment and Remediation License numbers 1281,1282, and 1283 for five parcels on the golf course. A Site Assessment Report (SAR) dated November 20, 2017 was submitted to Broward County. Assessment activities described in the SAR indicate arsenic contamination in the groundwater and soils. Broward County required a SAR Addendum and has issued extensions for submitting this addendum. Quarterly monitoring reports have been submitted and based on the Fourth Quarter Monitoring Report dated March 7, 2018 arsenic continues to be detected in the groundwater, but concentrations when compared to assessments done in 2014 are stable or decreasing. The report indicated no additional groundwater monitoring. Broward County approved the no further monitoring but reserved the right to require additional assessment following submittal of the SAR addendum. The SAR Addendum was submitted on November 1, 2018 and documented organochlorinated pesticide parameters and arsenic that exceed their respective SCTLs. A Risk Evaluation was completed for the pesticides which recommended that a Restrictive Covenant be prepared to restrict the property to a passive recreational park. Additionally, groundwater impacts (arsenic) were identified that showed stable conditions through a year-long monitoring period. It was also noted that a Restrictive Covenant would be placed on the property to preclude the use of groundwater at the site. A Restrictive Covenant is being proposed as a way to manage the contaminants left in place. The property is a potential pond site that contains arsenic and pesticides at concentrations that exceed their respective cleanup target levels in soil and/or groundwater and is associated with a High risk.	High

\*GeoSearch Radius Report Sites 1-4, 9, 17, 22, and 28A-C are NPDES permits and therefore were not included in this table. GeoSearch Radius Report Sites 18B, 18C, 20, 21A, 21B, 25, 28A-C, and 31 are more than 500 feet from the project corridor and therefore were not included in this table.



## 8.1 Medium/High Risk Potential Sites – Roadway

The risk assessment conducted in accordance with FDOT PD&E Manual Volume 2, Chapter 20 identified ten (10) medium-risk facilities and one (1) high-risk site. The facilities were assigned a medium/high risk based on at least one of the following: operational gas station or dry-cleaning facility, former storage tanks without proper closure documentation, ongoing site assessment and/or remediation, and/or historical site use.

### *Site 01*

***Shell – First Coast Energy #1836***  
***1011 South Powerline Road***  
***Deerfield Beach, FL***  
***FDEP Facility ID: 9800891***

This facility is an active retail station that contains four 10,000-gallon unleaded gas USTs and one 8,000-gallon vehicular diesel UST. The USTs were reportedly installed in 1998 and remain in service. The facility reported a petroleum discharge in March 2015. Cleanup activities for the discharge have since been completed, and the facility received a Site Rehabilitation Completion Order (SRCO) from the FDEP in September 2017. An inspection completed in October 2017 indicated full compliance of the storage tank system. There were no other releases, discharges, and/or major compliance issues identified in association with this facility. The facility remains an operational gas station and was associated with a Medium risk.

### *Site 10*

***Brothers Drycleaning/One Price Dry Cleaner***  
***1141-1145 South Military Trail***  
***Deerfield Beach, FL***  
***FDEP Facility ID: 9800676/FLR00063537***

This facility is a former drycleaner that previously contained one AST containing dry-cleaning solvent. The AST has reportedly been removed with no supporting documentation. The facility is listed as closed. The facility was previously classified as a RCRA Small Quantity Generator (SQG), associated with ignitable wastes (D001) and tetrachloroethylene (D039), a dry-cleaning solvent. The facility was recategorized as a non-generator in 2011. There were no violations, releases, or corrective action enforcements identified in association with this facility. The facility current remains vacant. Based on field reconnaissance, it was

unable to determine if this facility was a drop-off only facility or if dry cleaning took place at this facility. Based on the potential for undocumented releases of chlorinated solvents, this facility is associated with a Medium risk.

***Site 12***  
***City of Deerfield Beach***  
***Turner Envirologic Area***  
***Deerfield Beach, FL***  
***BF060501000***

This site is a potential pond site and was declared a Brownfield Area under the City of Deerfield Beach Resolution Number 2005-179, dated October 18, 2005. The area designation alone does not represent a significant contamination concern. However, the area largely coincides with the East Coast Asphalt Corp. facility, discussed further below and is associated with a Medium risk.

***Site 13***  
***East Coast Asphalt Corporation***  
***3300 SW 11<sup>th</sup> Street***  
***Deerfield Beach, FL***  
***FDEP Facility ID: 8944925***

This facility is a potential pond site that historically contained five (5) ASTs (vehicular diesel, miscellaneous petroleum, hazardous substance) ranging from 4,000-25,000 gallons. The ASTs have reportedly been removed from the site. The presence of storage tanks was not confirmed during site reconnaissance. The facility reported a petroleum discharge in August 1989 upon the discovery of diesel contamination. Immediately after discovery, a portion of the contaminated area was excavated. A Remedial Action Plan (RAP) was approved in 1991, and remedial activities occurred from 1991 until being discontinued in 1995. The facility was deemed eligible for cleanup funding under the State-funded Petroleum Cleanup Participation Program (PCPP) in 1997 with a cleanup priority score of 25. The most recent site assessment report, dated May 2000, indicated the presence of petroleum contamination in soil and groundwater at the site. The approximate limits of the contaminant impacts appear to lie largely within the site boundaries, with groundwater flow depicted to the southeast, away from the project study area right-of-way. The facility received notification of funding availability for assessment activities in October 2017. Requests for Site Access Agreements

were requested in December 2017 and January 2018. No Limited Contamination Assessment Report (LCAR) has been submitted as of May 2018. At this time, the full assessment and cleanup of petroleum impacts have yet to be completed. The facility was listed in the Broward County contaminated sites database and was identified in association with the Turner Envirolgic Area brownfield, discussed above. Based on the ongoing site assessment activities at this facility, it was designated with a Medium risk.

**Site 16*****Man-Con Inc./ Stan Freitag Equipment Rental, Inc.******3460 SW 11<sup>th</sup> Street******Deerfield Beach, FL******FDEP Facility ID: 9401000***

The Man-Con Inc. facility is a potential pond site and currently contains one 1,000-gallon vehicular diesel AST, which was reportedly installed in 1994 and remains in operation. During field reconnaissance, could not confirm presence or absence of AST due to facility being gated and access was limited. There were no releases, discharges and/or major compliance issues identified in association with this facility. The most recent compliance inspection, dated July 2016, found the facility to be in compliance and the AST in good condition. The AST was not identified during site reconnaissance. The facility remains an operational storage tank site and is associated with a Medium risk.

The Stan Freitag Equipment Rental, Inc. facility was identified as a waste processing facility, specifically a Material Recovery Facility – Class I & III. The facility was listed in the Solid Waste Facilities database in the GeoSearch Radius Report. According to the Radius Report and FDEP Map Direct database, the facility was given a No Further Action status in July 2010. There were no releases, discharges and/or major compliance issues identified in association with this facility. No additional documentation was available for review.

**Site 17*****Cen-Deer Management, Inc./Nanaks Landscaping/Trolley Tours******998 S. Military Trail******Deerfield Beach, FL******FDEP Facility ID: 8840464/BCST13642/BCBF2768A***

The Cen-Deer Management Inc. facility historically contained four 888-gallon USTs (leaded gas, unleaded gas, vehicular diesel), which were reportedly removed from the site in 1986. The facility reported a petroleum discharge in October 1985. Cleanup activities for the discharge have since been completed, and the facility received a Site Rehabilitation Completion Order (SRCO) from the FDEP in November 2011. There were no other releases, discharges and/or major compliance issues identified in association with this facility.

The Trolley Tours facility was listed as a Broward County contaminated site in association with the documented cleanup activities which occurred at the Cen-Deer Management Inc. facility, discussed above.

The Nanaks Landscaping facility is an active lawn care service provider. The facility currently maintains a Hazardous Material Management license with Broward County in association with petroleum products, solvents, rags, fluorescent tubes, and pesticides. The facility also reportedly contains two 300-gallon vehicular diesel ASTs and one 250-gallon emergency generator diesel AST. There have been no discharges associated with this facility. The most recent compliance inspection, dated March 2017, found the facility to be in compliance. No storage tanks were observed during site reconnaissance. The facility remains an operational storage tank site and is associated with a Medium risk.

***Site 18***

***Cache Cleaners***

***1151 S. Powerline Road***

***Deerfield Beach, FL***

***FDEP Facility ID: 9814593***

This facility was identified as a drycleaner, and currently contains one AST containing tetrachloroethylene (PCE) which was installed in 2015. There were no releases, discharges and/or major compliance issues identified in association with this facility. Recent documentation suggests ongoing dry-cleaning operations at this facility. Though this site is not adjacent to SW 10<sup>th</sup> Street improvements, the site is approximately 345 feet west of pond alternative 1 evaluated in this study. The facility remains an operational storage tank site and is associated with a Medium risk.

**Site 19**

**Deerfield Beach City – Well #17**  
**994 S. Military Trail**  
**Deerfield Beach, FL**  
**FDEP Facility ID: 8622498**

This facility historically contained one 600-gallon emergency generator diesel fuel UST. The UST was reportedly removed in 1987 and replaced with the existing 550-gallon emergency generator diesel fuel AST, which remains in operation. The facility reported a petroleum discharge in October 1985. Cleanup activities for the discharge have since been completed, and the facility received a No Further Action status in March 2007. There were no other releases, discharges and/or major compliance issues identified in association with this facility. An AST in secondary containment was observed during site reconnaissance. The facility remains an operational gas station and was associated with a Medium risk.

**Site 20**

**Rexall Sundown, Inc.**  
**1111 SW 30<sup>th</sup> Avenue**  
**Deerfield Beach, FL**  
**FDEP Facility ID: 9803298/BCST03057**

This facility is a potential pond site and currently contains one 1,000-gallon emergency generator diesel fuel AST, which was reportedly installed in February 1998. There were no releases, discharges and/or major compliance issues identified in association with this facility. The most recent compliance inspection, dated July 2017, found the facility to be in compliance and the AST in good condition. One AST was observed during site reconnaissance. The facility remains an operational gas station and was associated with a Medium risk.

**Site 22**

**Hardrives Asphalt Company**  
**1200 South Powerline Road**  
**Deerfield Beach, FL**  
**FDEP Facility ID: 8944976**

This facility is a potential pond site that manufactures asphalt for roadway repairs. Materials for asphalt production are stored onsite. The facility currently contains two 15,000-gallon “other non-regulated” ASTs, one 12,000-gallon fuel oil AST, and one 6,500-gallon vehicular diesel AST. The ASTs were reportedly installed between 1974 and 1986. There

were no releases, discharges and/or major compliance issues identified in association with this facility. The most recent compliance inspection, dated September 2016, found the facility to be in compliance and the ASTs in good condition. ASTs were observed during field reconnaissance. The facility is a potential pond site that manufactures asphalt and stockpiles materials onsite and is associated with a Medium risk.

***Site 23***  
***Century Village Golf Course***  
***450 Century Boulevard***  
***Deerfield Beach, FL***

This site is a former golf course dating back to the early 1970's and operating as a golf course through April 2013. Broward County has issued Environmental Assessment and Remediation License numbers 1281,1282, and 1283 for five parcels on the golf course. A Site Assessment Report (SAR) dated November 20, 2017 was submitted to Broward County. Assessment activities described in the SAR indicate arsenic and organochlorinated pesticides contamination in the groundwater and soils. Broward County required a SAR Addendum and has issued extensions for submitting this addendum. Quarterly monitoring reports have been submitted and based on the Fourth Quarter Monitoring Report dated March 7, 2018 arsenic continues to be detected in the groundwater, but concentrations when compared to assessments done in 2014 are stable or decreasing. The report indicated no additional groundwater monitoring. Broward County approved the no further monitoring but reserved the right to require additional assessment following submittal of the SAR addendum. The SAR Addendum was submitted on November 1, 2018 and documented organochlorinated pesticide parameters and arsenic that exceed their respective SCTLs. A Risk Evaluation was completed for the pesticides which recommended that a Restrictive Covenant be prepared to restrict the property to a passive recreational park. Additionally, groundwater impacts (arsenic) were identified that showed stable conditions through a year-long monitoring period. It was also noted that a Restrictive Covenant would be placed on the property to preclude the use of groundwater at the site. A Restrictive Covenant is being proposed as a way to manage the contaminants left in place. The property is a potential pond site that contains arsenic and pesticides at concentrations that exceed their respective cleanup target levels in soil and/or groundwater and is associated with a High risk.

## 8.2 Stormwater Pond Site Screening

A stormwater pond screening analysis was conducted and the results are included in *Table 8.2*. Potential pond sites are included on *Figure 8.2.1*.

**TABLE 8.2: SUMMARY OF STORMWATER POND SCREENING**

Pond Number	Owner(s)	Acreage	FLUCFCS Description	Vegetative Description	FDOT Pond Site Ranking	Site No. /Risk
1*	Hardrives Industries Inc., Dernik LLC., A&J Storage Inc., R&G 34 AVE B Properties LLC., 3400 SW 11 ST LLC., Man-Con Inc.	12.82	Industrial (FLUCFCS 150)	N/A	4	16/Medium 22/Medium
2*	Entegra Roof Tile Inc., R&G 34 Avenue Properties LLC, Turner Envirollogic Inc., 2 for 2 LLC	12.07	Industrial (FLUCFCS 150)	N/A	1	12/Medium 36/Medium 21/Low
3	Rexall Sundown, Inc.	13.55	Industrial (FLUCFCS 150)	Majority of lot is developed; however northern portion contains part of a stormwater pond	4	20/Medium
4	Fairway Investors, LLC	19.26	Golf courses (FLUCFCS 182)	Fairways with no water features	1	23/High
5	Fairway Investors, LLC	19.18	Golf courses (FLUCFCS 182)	Fairways with no water features	1	23/High
6	Fairway Investors, LLC	22.78	Golf courses (FLUCFCS 182)	Fairways with existing stormwater ponds	1	23/High

\*Stormwater ponds 1 and 2 contain multiple parcels, some of which have separate owners.  
 FDOT Ranking – Pond sites were ranked with a score of 1-10 with 1 being the worst from a potential contamination perspective and 10 being best or no/limited contamination potential.  
 See Table 8.1 for details regarding Site No. and Ranking for Ponds 1, 2 and 3. See Section below for discussion of pond sites 4, 5 and 6.

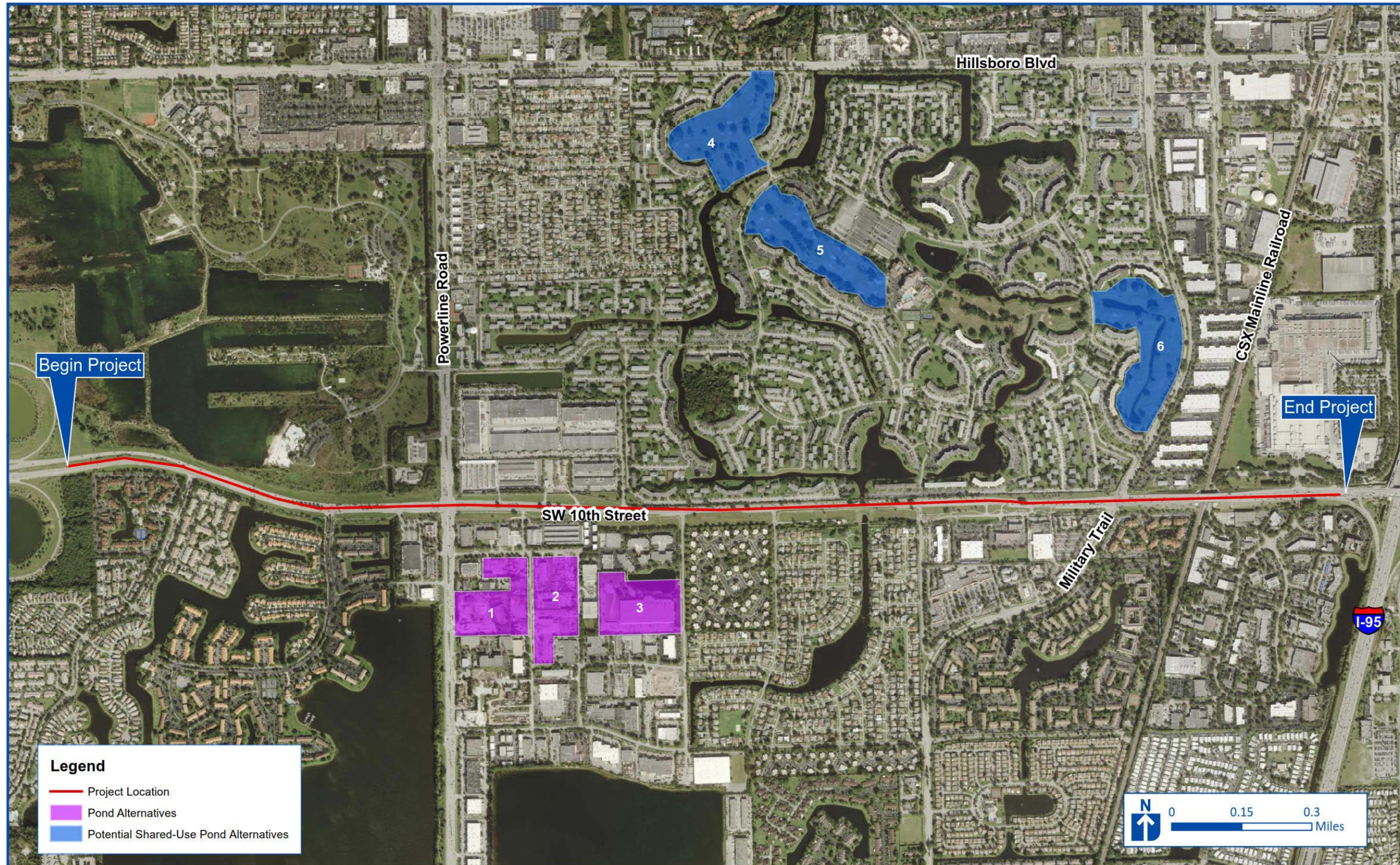


*Potential Pond Sites 4, 5 and 6*  
*Century Village Golf Club*  
*Deer Creek Golf Club*

Several of the potential pond sites due north of the project corridor are associated with the Century Village Golf Course and Deer Creek Golf Course (Former Hillsboro Pines Golf Course). Historical use of pesticides, herbicides, and fertilizers were used to maintain the golf course playing surfaces. The application of these compounds has resulted in arsenic and organochlorinated pesticides impacts to soil and groundwater. During a monitoring event, conducted in March 2018 by Edward G. Rahrig, P.G., LLC, arsenic was detected in 16 of 20 monitoring wells installed on the golf course at levels exceeding the State of Florida Groundwater Cleanup Target Level (GCTL). A SAR Addendum was completed November 1, 2018 that indicated that arsenic and organochlorinated pesticides were limited to the golf course property. A Risk Evaluation was completed for the pesticides which recommended that a Restrictive Covenant be prepared to restrict the property to a passive recreational park. Additionally, groundwater impacts (arsenic) were identified that showed stable conditions through a year-long monitoring period. It was also noted that a Restrictive Covenant would be placed on the property to preclude the use of groundwater at the site. A Restrictive Covenant is being proposed as a way to manage the contaminants left in place.

Stormwater ponds located throughout the golf course, which may be hydraulically connected to groundwater, are directed to the south, toward the project study area right-of-way, in some places directly crossing SW 10th Street through stormwater control structures. As such, the proposed use of these areas for stormwater ponds may be problematic relative to permitting and approval process from the appropriate regulatory agencies (i.e. Broward County EARS, FDEP, SFWMD), and is associated with a High risk.





**Legend**

- Project Location
- Pond Alternatives
- Potential Shared-Use Pond Alternatives

N  
0 0.15 0.3  
Miles



State Road 869 / SW 10th Street Connector PD&E Study from Florida's Turnpike /  
Sawgrass Expressway to I-95  
Financial Project ID: 439891-1-22-02, ETDM No: 14291

Figure 8.2.1  
Potential Stormwater Pond Map

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## 9.0 Conclusions and Recommendations

A total of twenty-three (23) potentially contaminated and/or known to be contaminated sites were identified along the project corridor with risk evaluation ratings ranging from No Risk to High Risk. Twenty-two (22) facilities were identified in the GeoSearch Radius Report (*Appendix C*). The remaining facility is the Century Village Golf Course pond site alternatives. A summary of the risk assessments for the proposed project is presented in *Table 9.1* below.

TABLE 9.1: SUMMARY OF POTENTIAL CONTAMINATION SITES RISK ASSESSMENTS	
Risk Assessment Category	Number of Sites
No	1
Low	11
Medium	10
High	1

For the North Alternative, right-of-way will be required from the following sites: (01) Shell – First Coast Energy – medium risk, (07) Devcon – low risk, and (17) Nanaks Landscaping – medium risk. The associated potential pond sites will require right-of-way from the following facilities: (12) City of Deerfield Beach – medium risk, (13) East Coast Asphalt Corporation – medium risk, (16) Man-Con Inc. - medium risk, (20) Rexall Sundown – medium risk, (21) Hanson Roof Tile – low risk, (22) Hardrives Asphalt Company – medium risk, and (23) Century Village Golf Course - high risk. The No-Build will have no contamination concerns. FDOT will schedule Level II sampling once right-of-way and pond locations are determined.

Level II Contamination Assessment investigations are recommended for any areas that have proposed dewatering or subsurface work activities (e.g. pole foundations, drainage features) occurring adjacent to or at any of these sites. If dewatering will be necessary during construction, a SFWMD Water Use Permit will be required. The contractor will be held responsible for ensuring compliance with any necessary dewatering permit(s). Any



dewatering operations in the vicinity of potentially contaminated areas shall be limited to low-flow and short-term. A dewatering plan may be necessary to avoid potential contamination plume exacerbation. All permits will be obtained in accordance with Federal, State, and local laws and regulations.



## 10.0 References

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Broward County, ENVIROS database, <https://dpep.broward.org/Enviros/>, accessed October 11, 2017.

Custom Soil Resource Report for Palm Beach County, Florida, USDA Natural Resources Conservation Service, Web Soil Survey, <http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>, accessed October 5, 2017.

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USGS Ground Water Atlas of the United States, <http://pubs.usgs.gov/ha/ha730/>, accessed October 9, 2017.

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