

# **PHASE I and PHASE II ENVIRONMENTAL SITE ASSESSMENT**

**Lake Hicpochee  
A. Duda & Sons, Inc.  
Property  
(Tract KC100-017)  
Section 17 and the N  
1/2 of NE 1/4 of the NE  
1/4 of Section 20  
Township 42S,  
Range 32E, Glades  
County, Florida**



## **Lake Hicpochee Hydrologic Enhancement Project**

**Prepared for:**

**South Florida Water Management District  
DuPuis Reserve Area Office  
23500 SW Kanner Highway  
Canal Point, Florida 33438**



**January 21, 2014**



**Prepared by:  
Tetra Tech  
759 South Federal Highway  
Stuart, FL 34994**

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ENVIRONMENTAL SITE ASSESSMENT**

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Tract KC100-017  
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## EXECUTIVE SUMMARY

This report presents the results of the Phase I and Phase II Environmental Site Assessment (ESA) conducted by Tetra Tech (Tt) of the A. Duda & Sons, Inc. (Duda) Property. This 638-acre tract (Tract KC100-017) is located approximately 3.5 miles southwest of the City of Moore Haven, adjacent to and west of the C-19 Canal, and approximately one half mile south of U.S. Highway 27 on Section 17 and the N ½ of the NE ¼ of the NE ¼ of Section 20, Township 42S, Range 32E, Glades County, Florida. It was prepared for the sole use of the South Florida Water Management District (District) pursuant to Work Order No. 08 under Contract No. 4600002400, and the express limitations provided in Section 1.3 of this document. The subject property is proposed to be utilized as a component of the Lake Hicpochee Hydrologic Enhancement Project.

The entire Tract KC100-017 638-acre Duda property for inclusion in the Lake Hicpochee Hydrologic Enhancement Project appears to be under sugar cane cultivation, with the exception of Grid 1 and Grid 5, where corn stubble was observed. According to the Glades County Property Appraiser web site this property is identified as Parcels A17-42-32-A00-0020-0000, and A20-42-32-A00-002A-0000. The parcels carry the Use Code of SGR/CN (M). Figure 1 provides a site vicinity map. Figure 2 provides a map of the area evaluated, and Figure 3 provides a sample location map.

The objective for the Phase I ESA is to identify, to the extent feasible pursuant to the scope of work described herein, recognized environmental conditions (RECs) associated with the subject property.

*Recognized environmental conditions are defined as the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, ground water, or surface water of the property (ASTM, 2005).*

Based upon our Phase I ESA findings, the following areas of potential concern were further evaluated during the Phase II ESA:

- It appears that the entire property is under sugar cane cultivation; the potential concern is residual agricultural chemicals.
- Canals on property could have received residual agricultural chemicals via run-off.
- A diesel powered pump station is located in the southeastern corner of the property; the potential concern is released petroleum products.

The objective of this Phase II ESA was to further evaluate RECs that may be associated with present or past land use by collecting limited environmental samples for laboratory analyses. The Phase II ESA was conducted in conjunction with the Phase I ESA to expedite completion of the assessment. During the Phase II ESA, samples were collected from each of the areas listed above and were analyzed based on the historical, present, and future land use and potential RECs that may have impacted the site.

The Phase II ESA findings indicate that there is no evidence of environmental impairment from residual agricultural chemicals on the property based on the following:

- No exceedances of Organochlorine Pesticides SCTLs, SQAGs, GCTLs, or Fresh Water Surface Water Criteria were found in the Phase II ESA samples.
- Chlorinated Herbicides and Carbamates were not detected in the Phase II ESA samples.
- The one Atrazine result from the split soil sample of Grid-16 was not replicated in the Grid-16 soil sample, nor was Atrazine detected in any of other 20 soil/sediment samples above a SCTL or SQAG. Therefore, this result is considered a false positive.
- Arsenic was found in 2 of the 21 soil/sediment samples exceeding the Chapter 62-777, F.A.C. Residential Direct Exposure SCTL. However, these arsenic concentrations are below the 9.8 mg/kg arsenic TEC of the SQAGs. Therefore, these reported concentrations will not have an impact on the purposed future land use of the property.
- Barium was found above the SQAG TEC in 3 of the 21 soil/sediment samples. However, these three samples are well below the barium PEC of 60 mg/Kg and the 1,600 mg/Kg Leachability based on Groundwater Criteria SCTL of Chapter 62-777, F.A.C. Therefore, barium is not considered a probable effect.
- Copper was detected in all 41 sugar cane soil (composite and discrete samples) and sediment samples ranging from 2.3 mg/Kg to 22 mg/Kg. The copper concentrations are below the 32 mg/kg copper TEC of the SQAGs for Florida Inland Waters. In addition, the USFWS has developed potential risk to trustee species for Copper for soil/sediments and none of the copper results from the soil and sediment sampling during this Phase II ESA approached this threshold value of 85 mg/Kg.

- No other exceedances of metal SCTLs, SQAGs, GCTLs, or Fresh Water Surface Water Criteria were found in the Phase II ESA samples.
- In addition, the Phase II ESA findings indicate that there is no evidence of environmental impairment in soils and groundwater from the potential point source at the Irrigation Pump Station on the property.

The results of the Phase II ESA indicated that the Lake Hicpochee Duda property (Tract KC100-017) is suitable for the District's future intended land use as a hydrologic restoration project of this property. There is no evidence of environmental impairment from residual agricultural chemicals on the property and additional environmental assessment is not recommended. Significant corrective action is not recommended. There is a very small amount of solid waste, estimated at a couple of cubic yards, in the 2-acre wetland area in the northeast corner of the property. It is assumed that this inconsequential amount of solid waste will be removed when the Brazilian pepper is cleared.



## **1.0 INTRODUCTION**

This report presents the results of the Phase I and Phase II Environmental Site Assessment (ESA) conducted by Tetra Tech of the approximately 638-acre A. Duda & Sons, Inc. (Duda) Property, Tract KC100-017. This tract is located approximately 3.5 miles southwest of the City of Moore Haven, adjacent to and west of the C-19 Canal and approximately one half mile south of U.S. Highway 27 in Section 17 and the N ½ of the NE ¼ of the NE ¼ of Section 20, Township 42 South, Range 32 East in Glades County, Florida. It was prepared for the sole use of the South Florida Water Management District (District) pursuant to Work Order No. 08 under Contract No. 4600002400, and the express limitations provided in Section 1.3 of this document. The subject property is proposed to be utilized as a component of the Lake Hicpochee Hydrologic Enhancement Project.

This portion of the Duda property is accessed at 3635 North U.S. Highway 27, Moore Haven, FL 33471. The entire Tract KC100-017 638-acre Duda property for inclusion in the Lake Hicpochee Hydrologic Enhancement Project appears to be under sugar cane cultivation with the exception of Grid 1 and Grid 5, where corn stubble was observed.

This report was prepared at the request of the District following our site reconnaissance visit conducted on March 19, 2013, April 11 and 12, 2013, and November 18, 2013. The purpose of the site reconnaissance visits was to gain sufficient information regarding the current and historical property land use(s) to develop a Phase I and Phase II ESA Scope of Work for the District. A copy of the aerial photograph for this property is included as Figure 2.

### **1.1 Purpose**

The objective for the Phase I ESA was to identify, to the extent feasible pursuant to the scope of work described herein, recognized environmental conditions associated with the subject property.

*Recognized environmental conditions are defined as the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, ground water, or surface water of the property (ASTM, 2005).*

The objective of the Phase II ESA is to further evaluate RECs that may be associated with present or past land use by collecting limited environmental samples for laboratory analyses. The Phase II ESA was conducted in conjunction with the Phase I ESA to

expedite completion of the assessment. Phase II ESA activities included the collection of environmental media samples including soil, sediment, surface water, and groundwater from selected locations for laboratory analyses of the constituents of interest associated with the area of potential concern, and to evaluate potential environmental impairments associated with the RECs identified under the Phase I ESA scope of work.

The ESA report organization includes the following sections:

- **Section 1 Introduction** – Provides the report background and a brief description of the property.
- **Section 2 Environmental Setting** – Describes the physical characteristics of the property and the surrounding area.
- **Section 3 Phase II Environmental Site Assessment** – Describes the Phase II sampling methodology and laboratory analytical methods.
- **Section 4 Lake Hicpochee Duda Property** – Presents the various details relating to this property, including:
  - *Section 4.1 Site Description and History*: Presents a brief site history based upon the records search and information from other government agencies.
  - *Section 4.2 Phase I ESA Site Reconnaissance*: Presents a description of the areas investigated and potential RECs identified during the Phase I ESA.
  - *Section 4.3 Regulatory Review*: Provides a summary of the Environmental Data Resources, Inc. (EDR) database review.
  - *Section 4.4 Phase I ESA Conclusions and Recommendations*: Provides a summary of the potential areas of concern that warranted further evaluation.
  - *Section 4.5 Phase II ESA Data Assessment and Analytical Results*: Presents the results and a discussion of the Phase II ESA observations and sampling results.
  - *Section 4.6 Evaluation of Site Restoration Costs*: Itemizes the estimated costs associated with the restoration of environmental impairments at the site.
- **Section 5 Laboratory Data Evaluation** – Summarizes the evaluation of the data quality and usability.
- **Section 6 Conclusions and Recommendations** – Summarizes the conclusions of the Phase I and II ESA and Tt's recommendations for the site.

- **Section 7 References** – Provides a list of references that were used for the preparation of this report.

## **1.2 Scope of Work**

The following subsections provide a brief summary of the scope of work for the Phase I and Phase II ESA.

### **1.2.1 Phase I Environmental Site Assessment**

The Phase I ESA consisted of the following activities:

- Conducted a site reconnaissance of the property and prepared notes including an inventory of potential RECs;
- Assessed historical aerial photographs and topographic maps of the site to determine historical land use activities and to identify areas where RECs may be found;
- Performed a database and environmental lien search through Environmental Data Resources, Inc. (EDR);
- Conducted a review of regulatory files; and
- Conducted an interview with Glades County officials that may have knowledge of past and present land use.

### **1.2.2 Phase II Environmental Site Assessment**

The Phase II ESA consisted of the following activities:

- Preparation of a site specific Health and Safety Plan;
- Determination of the presence or absence of RECs by the evaluation of environmental media samples collected from selected site locations. Phase II sampling activities included:
  - Collection of surface soil, sediment, and surface water, and groundwater samples from the cultivated areas on the property;
  - Collection of soil and groundwater samples adjacent to the diesel powered irrigation pump observed in the southeastern corner of the Property;
  - Collection of Quality Assurance / Quality Control (QA / QC) samples; and
  - Laboratory analysis of collected samples from environmental media;
- Data review, analysis, and interpretation, and
- Preparation of the Phase I/II ESA Report.

## **1.3 Limiting Conditions and Methodology Used**

It's scope of services for this project was limited to the following tasks:

- Review of historical land use and aerial photographs and topographic maps based upon readily available records and documents;

- Regulatory agency database search;
- Site reconnaissance and select interviews;
- Limited Phase II investigation; and
- Data analysis and report preparation.

The above tasks were accomplished in accordance with the procedures described in our technical proposal, dated April 16, 2013. It reviewed information that was reasonably obtainable and practically reviewable, as described herein. This report is prepared for the sole use of the District pursuant to Work Order No. 08 under Contract No. 4600002400. The scope of work and the findings should not be considered suitable for other potential users and any use by other parties shall be at their sole risk.

The scope of this ESA was limited to visual observations made during the March 19, 2013, April 11 and 12, 2013, site reconnaissances, select interviews with knowledgeable public agency personnel, and reviews of readily available reports, literature and listings. Additional site information, which was not available at the time of this report, may result in modification of the information presented herein. Additionally, our SOW for this ESA did not include a complete title/deed or past ownership searches, or a formal wetlands evaluation.

This report was prepared in general accordance with the current Environmental Risk Assessment Protocol developed in conjunction with the US Fish and Wildlife Service (USFWS), and approved by the Florida Department of Environmental Protection (FDEP), *Protocol for Assessment, Remediation, and Post-Remediation Monitoring for Environmental Contamination on Everglades Restoration Projects (March 2008)* for a Phase I ESA and ASTM E-1527-05, which require review into the presence or potential presence of hazardous materials on the subject property. Such a review cannot be expected to reveal all hazardous materials or environmental conditions that might be present at the site. It is therefore recognized that the possibility exists that some hazardous materials exist or waste disposal has occurred on the site that may not have been detected, because it is beyond the scope of the study.

In order to conduct the ESAs for this report, It relied upon the readily available information, as discussed in the report and unless explicitly included in our scope of work included no verification of the accuracy or completeness of documentation or data or possible withholding of information by the interviewees, agencies, or other parties. (Please also refer to the Environmental Data Resources, Inc. disclaimer, Appendix A).

## **2.0 ENVIRONMENTAL SETTING**

This section presents a summary of the environmental setting where the Duda Property for inclusion in the Lake Hicpochee Hydrologic Enhancement Project is located.

### **2.1 Lake Hicpochee Hydrologic Enhancement Project**

The Coastal Watershed Program promotes a watershed approach to protecting Lake Okeechobee and the Caloosahatchee and St. Lucie Rivers and Estuaries. Protection plans include a combination of both water quality and water storage initiatives.

The Lake Hicpochee Hydrologic Enhancement Project will provide shallow water storage with incidental habitat restoration and water quality treatment on the northern portion of Lake Hicpochee. To restore the lake closer to historical conditions, the project will redirect or capture excess surface waters from the C-19 Canal, which discharges directly into the Caloosahatchee River, and divert it as sheetflow onto the northern portion of Lake Hicpochee.

### **2.2 Site Topography/Physiography**

The 1971 United States Geological Survey (USGS), 7.5 minutes series, Lake Hicpochee, Fla topographic quadrangle map of the Duda property generally shows elevations of 15 feet above mean sea level (msl) and 16 ft above msl on the sand road that runs north-south through the center of the property. The elevations are referenced to the National Geodetic Vertical Datum of 1927 (NGVD).

This property lies in southern Glades County, approximately 4 miles west of Lake Okeechobee. According to Brooks, this area of Glades County is in the Southwestern Flatwoods District, which is a province of Miocene and Pliocene sedimentary rocks and sediments. The Quaternary deposits are thin or nonexistent. Brooks further described the area as the “Caloosahatchee Valley” an ancient river valley backfilled with sand and shell deposits of Plio-Pleistocene age. The terraced land is largely covered by wet prairie and flatwoods (Brooks, 1981).

### **2.3 Surface Water and Wetlands**

Surrounding surface water bodies include the adjacent C-19 Canal to the east, Lake Hicpochee and the Caloosahatchee River to the south. The site contains irrigation canals running north-south and east-west approximately 40-acres on center.

A wetland map produced from the interactive mapping tool on the U.S. Fish and Wildlife Service’s website (<http://www.fws.gov/wetlands/Data/Mapper.html>) indicates a small area of freshwater forested/shrub wetlands in the northeastern corner of the

property. In addition, there is a small freshwater pond in the southwest corner of the property. Classifications of surrounding properties to the south included freshwater forested/shrub wetlands, freshwater emergent wetlands, freshwater ponds, lakes, and riverine environments. The wetland map for the Duda Property is presented in Appendix B.

## **2.4 Regional Geologic Setting**

The USGS lists three surface geologic units for Glades County: Holocene sediments covering 0.4% of the county; undifferentiated sediments (Pleistocene/Holocene age) with 29% county coverage; and shelly sediments of Plio-Pleistocene age covering 70% of the county at the surface. Since the site is 1.7 miles northeast of an active shell rock mine it is assumed that the site falls in the later unit.

The following is quoted verbatim from the *USGS, Geologic units in Glades County, Florida, 2012*. "Molluskbearing sediments of southern Florida contain some of the most abundant and diverse fossil faunas in the world. The origin of these accumulations of fossil mollusks is imprecisely known (Allmon, 1992). The shell beds have attracted much attention due to the abundance and preservation of the fossils but the biostratigraphy and lithostratigraphy of the units has not been well defined (Scott, 1992). Scott and Wingard (1995) discussed the problems associated with biostratigraphy and lithostratigraphy of the Plio-Pleistocene in southern Florida. These "formations" are biostratigraphic units. The "formations" previously recognized within the latest Tertiary-Quaternary section of southern Florida include the latest Pliocene - early Pleistocene Caloosahatchee Formation, the early Pleistocene Bermont formation (informal) and the late Pleistocene Fort Thompson Formation. This section consists of fossiliferous sands and carbonates. The identification of these units is problematic unless the significant molluscan species are recognized. Often exposures are not extensive enough to facilitate the collection of representative faunal samples to properly discern the biostratigraphic identification of the formation. In an attempt to alleviate the inherent problems in the biostratigraphic recognition of lithostratigraphic units, Scott (1992) suggested grouping the latest Pliocene through late Pleistocene Caloosahatchee, Bermont and Fort Thompson Formations into a single lithostratigraphic entity, the Okeechobee formation (informal). In mapping the shelly sands and carbonates, a generalized grouping as Tertiary-Quaternary shell units (TQsu) was utilized. This is equivalent to the informal Okeechobee formation. The distribution of the Caloosahatchee and Fort Thompson Formation are shown on previous geologic maps by Cooke (1945), Vernon and Puri (1964) and Brooks (1982). The Nashua Formation occurs within the Pliocene - Pleistocene in northern Florida. However, it

crops out or is near the surface is an area too small to be shown on a map of this scale. Lithologically these sediments are complex, varying from unconsolidated, variably calcareous and fossiliferous quartz sands to well indurated, sandy, fossiliferous limestones (both marine and freshwater). Clayey sands and sandy clays are present. These sediments form part of the surficial aquifer system.”

#### **2.4.1 Local Site-Specific Geology**

Three temporary groundwater monitoring wells were installed in the sugar cane area of the site, with a fourth well adjacent to the irrigation pump station in the southeast corner of Section 17. The temporary groundwater monitoring wells were installed via the direct push drilling method, to a maximum depth of 12 feet below land surface (bls) while performing the Phase II ESA. The upper four feet of the near surface geology consisted of dark brown fine grained sand with less than 10% shell fragments. At five feet bls tan medium grained well sorted sand was found. At 8 feet bls shells (>75%) and fine sand were encountered to the 12 feet bls.

#### **2.5 Regional Hydrogeology**

Regionally, this area is underlain by two principle aquifers; the surficial aquifer system or water table and the Floridan aquifer system. In addition, an intermediate aquifer is also present in some parts of this region, which is found within the Hawthorn Group of formations.

The surficial aquifer system is unconfined and found in the sand, shell, and silt deposits above the Hawthorn group. It may include deposits that are part of the Ft. Thompson, Caloosahatchee, and Tamiami Formations. These units extend to a depth of nearly 100 feet. Below the surficial aquifer system an intermediate aquifer may be present. This aquifer appears to include units in both the Peace River Formation and the Arcadia Formation, which compose the Hawthorn Group in Glades County. Regionally, the Hawthorn Group acts as a confining unit that separates the surficial and intermediate aquifer systems from the lower artesian zones within the Floridan aquifer system. The Floridan aquifer system includes the entire limestone sequence including the Suwannee, Ocala, and Avon Park Limestones. Generally in this area the Floridan aquifer system provides water of poorer, non-potable quality.

#### **2.5.1 Site-Specific Hydrogeology**

It installed four shallow temporary monitor wells to collect groundwater samples. These wells indicated that the water table was present at a depth of approximately two

to two feet bls in the sugar cane cultivated area of the Duda Property during November 2013.

## **2.6 Soil Survey**

The United States Department of Agriculture (USDA), Soil Conservation Service Survey of Glades County, Florida indicates that the majority of the soil on the Duda property is mapped as Basinger fine sand (approximately 82%), Valkaria fine sand (10%) adjacent to the C-19 Canal, and Pineda fine sand (8%) in the southwest corner of the site. The soil survey map for the Duda Property is presented in Appendix C.

***Basinger Fine sands*** – This poorly drained soil is on low flats and in sloughs and poorly defined drainageways. Slopes are smooth and are slightly convex or concave. They are 0 to 1 percent. Typically, the surface layer is gray fine sand about 6 inches thick. The subsurface layer is light gray fine sand to a depth of about 32 inches. The subsoil is dark brown fine sand to a depth of about 40 inches. The substratum extends to a depth of 80 inches. It is dark brown fine sand in the upper part, grayish brown fine sand that has dark brown streaks in the next part, and grayish brown fine sand in the lower part (USDA, 2000).

***Valkaria fine sand*** – This very poorly drained soil is in areas of the low flatwoods, in sloughs, and in poorly defined drainageways. Typically, the surface layer is very dark gray fine sand about 4 inches thick. The subsurface layer is light gray fine sand to a depth of about 13 inches. The subsoil is fine sand and extends to a depth of 38 inches. It is brownish yellow in the upper part and very pale brown in the lower part. The substratum to a depth of 80 inches is light brownish gray fine sand (USDA, 2000).

***Pineda fine sand*** – This poorly drained soil is on broad, low flats and in large drainageways in areas of flatwoods. Typically, the surface layer is gray fine sand about 4 inches thick. The subsurface layer is light gray fine sand to a depth of about 11 inches. The upper subsoil is very pale brown fine sand to a depth of about 22 inches. A depleted layer of light gray fine sand extends to a depth of about 32 inches. The lower subsoil extends to a depth of 47 inches. It is grayish brown fine sandy loam in the upper part and gray loamy fine sand in the lower part. The substratum to a depth of 80 inches is stratified light gray fine sand mixed with shell fragments (USDA, 2000).

## **2.7 Radon Gas Potential**

According to the United States Environmental Protection Agency's (USEPA's) website (<http://www.epa.gov/radon/zonemap/florida.htm>), this site is located in a Zone 3 area,



which indicates that a Less Potential (less than 2 pCi/L) for radon gas exists. The Radon Gas Potential Map for this site is presented in Appendix D.

## **2.8 Oil and Gas Exploration**

According to the Florida Geological Survey Oil & Gas Index Map Oil for Glades County, three Oil & Gas exploration wells are present in the county although considered dry holes; however, none were reported within the immediate vicinity of the subject site (FGS, 1988). The Oil & Gas Index Maps for the site is presented in Appendix E.

### **3.0 LAKE HICPOCHEE DUDA PROPERTY**

The Duda Property (Tract KC100-017) for inclusion in the Lake Hicpochee Hydrologic Enhancement Project consists of 638 acres located approximately 3.5 miles southwest of the City of Moore Haven, Glades County, Florida. The subject tract is located 1.5 miles west of the intersection of U.S. Highway 27 and State Road 78 and ½ mile south of U.S. 27/SR 78. According to the Glades County Property Appraiser's web site, the property is owned by TIITF/State of Florida and is identified as PCNs A17-42-32-A00-0020-0000 and A20-42-32-A00-002A-0000. Copies of the property information obtained from Glades County Property Appraiser are provided in Appendix F.

#### **3.1 Current Property Conditions**

The Duda property consists of approximately 638-acres of cultivated sugar cane. During the Phase I ESA site reconnaissances on March 19, 2013, April 11 and 12, 2013, the following features were observed:

- It appears that the entire property is under sugar cane cultivation; the potential concern is residual agricultural chemicals.
- Canals on property could have received residual agricultural chemicals via run-off.
- A diesel powered pump station is located in the southeastern corner of the property; the potential concern is released petroleum products.

Figure 2 depicts the location of each these features. Site photographs are provided in Appendix G.

#### **3.2 Adjacent and Surrounding Properties**

The subject tract is located approximately 3.5 miles southwest of Moore Haven, and ½ mile south of U.S. 27/SR 78, west and adjacent to the C-19 Canal. Currently, the adjacent properties are rural and are primarily agricultural to the north, east, and west with natural lands to the south (Lake Hicpochee lake bottom wetlands). At the time of the Phase I ESA, the area east of the subject tract is the C-19 Canal and farmland further east. To the south of the site is the Lake Hicpochee TIITF lake bottom wetland. North and west of the site are agricultural lands.

The agricultural lands north and west of the site are owned by A. Duda & Sons, Inc. Information relating to the properties east and south of the subject tract were obtained from the Glades County Property Appraiser's web site. TIITF/State of Florida lands are to the south. East of the site, across the C-19 Canal are properties owned by the C Perry Family, LLC.

### **3.3 Aerial Photographs Review**

Tt obtained historical aerial photographs through EDR for the following years: 1952, 1969, 1978, 1983, 1999, 2005, 2006, 2007, and 2010. The following paragraphs describe site conditions as observed on the aforementioned photographs:

**1952 Aerial** – The subject parcel appears as pasture (cattle trails are evident on the western half of the site). The land to the east and south still appear as wetlands. The C-19 Canal is not present. North-south and east-west drainage ditches in 80-acre rectangles are evident on the site.

**1969 Aerial** – In this photograph, site still appears as improved pasture with smaller drainage ditches installed in 40-acre fields. The small isolated wetland area in the northeast corner of the site appears as a pond with a corral or vise. The C-19 Canal is completed. Agricultural activity is visible on the property east of the site.

**1978 Aerial** – The property appears to be under sugar cane cultivation. The site now contains irrigation canals running north-south and east-west approximately 40-acres on center. The former small “boneyard” area is evident in the northeast corner of the site. The pond with a corral or vise is no longer present and it appears as if a small structure/trailer is present were the pond was formerly located.

**1983 Aerial** – The property and the surrounding area appear the same as in the 1978 aerial photograph.

**1999 through 2010 Aerials** – These aerial photographs appear the same as in the 1983 aerial photographs. However, the small structure/trailer is absent and trees are visible in this small wetland area.

### **3.4 Topographic Map Review**

Tt obtained and reviewed the 1971 topographic map from EDR of the subject site. A more recent topographic map of the site was not available. A copy of the topographic map obtained from EDR is provided in Appendix A.

**1971 Topographic Map, Lake Hicpochee, Series 7.5', Scale 1:24,000** – The 1971 topographic map shows approximately 100 percent of the site as farm lands with five or six small wetland areas. Drainage ditches are shown running north-south and east-west in approximately 80-acre rectangles. No structures are shown on the property, and only one sand farm road is shown. The C-19 Canal is visible with a 17 ft bench mark on the canal’s east levee. In addition, a landing strip is shown adjacent to the C-19 Canal’s east levee, northeast of the site. The 15 ft contour line as shown on the 1971

topographic map runs northeast to the southwest through the western portion of the property.

### **3.5 Interview with Persons Knowledgeable about the Site**

Tt spoke with Mr. Pete Coultas, P.E., A. Duda & Sons, Inc. Manager of Agricultural Engineering at the site on November 18, 2013, and Mr. Coultas provided the following:

- 2006 Phase I ESA for the entire 4,176-acre A. Duda & Sons, Inc. Moore Haven farm prepared by URS Corporation
- 2006 Test Borings prepared by Ardaman & Associates
- 2008 Prudential Loan Documentation – Moore Haven Irrigation and Drainage Report and Environmental Questionnaire for 3,400-acres of the Duda Moore Haven farm
- 2010 Release of Canal Reservation
- 2010 Wetland Determination Aerial by Polston Engineering for the proposed mining operation on Duda farm property west of the site
- 2011 DEP Jurisdictional Wetlands Determination for a proposed mining operation on Duda farm property west of the site
- 2011 Diesel Spill Information for an irrigation pump located on the Duda Moore Haven farm, but approximately two (2) miles west of the site
- 2012 Soil and Groundwater Assessment Report prepared by Steamline Environmental and submitted to the DEP's Bureau of Mining and Minerals Regulation
- 2012 Response to DEP Comments on the Soil and Groundwater Assessment Report prepared by Steamline Environmental and submitted to the DEP's Bureau of Mining and Minerals Regulation
- 2013 A list of agrochemicals used on the Duda Moore Haven farm from 1980 through 2013
- The Duda Moore Haven farm permit list

In addition, Mr. Coultas completed a Phase I ESA Questionnaire that Tt sent via email on November 15, 2013. The above referenced documents are provided in Appendix H on a compact disk (CD). The following paragraphs provide a synopsis of the information.

The 2006 Phase I ESAs concluded that the 4,176-acre A. Duda & Sons, Inc. Moore Haven farm was utilized for the production of sugar cane and only one environmental concern was identified, the maintenance yard area located at 3635 U.S. Highway 27, Moore Haven, FL. The report concluded:

*“URS identified one area of environmental concern on the subject property. The maintenance yard area utilizes and stores petroleum products in various containers including two 10,000 gallon diesel ASTs. Additionally, the maintenance facility utilizes a parts washer and stores regulated pesticides and herbicides. No indications of significant releases or spills of any of these products were observed. Previous environmental investigations (1990) identified surficial soil impacts in associated with a spill at the active diesel ASTs. Further soil analysis found regulatory impacted surficial soils had been excavated and the soil was transported off site for thermal treatment.”*

The maintenance yard area is located approximately 1/2 mile north of the northern boundary of the 638-acre parcel and based on the information provided above this maintenance yard area should not have an impact on the site.

The test borings prepared by Ardaman & Associates and Universal Engineering Sciences were located approximately one mile west of the 638-acre parcel for a proposed mining operation on the Duda farm property. The boring logs reported the vadose zone soil as fine to silty fine sands. Occasionally rock was encountered at 6 feet bls. The water table was reported between 2 and 4 feet bls. Clay was reported in some of the deeper borings at 38 and 70 feet bls.

The Environmental Questionnaire accompanying a Prudential Loan Document provided the following information:

- One drainage pump located on the SE corner of the property (assumed to be the pump in the SE corner of the 638-acre parcel) is used when the river stage is too high. Normally natural or gravity drainage is adequate.
- Current operations ongoing for the past 30+ years. Tenants grew vegetables on small acreage for several years. Prior to Duda purchasing the property (in 1974), there was cattle grazing and horse operations on-site.
- A Consent Agreement was issued by the SFWMD for failure to submit a pump re-calibration report. The fine was paid and the re-calibration report was submitted to the SFWMD.

The Release of Canal Reservation by the Board of Trustees of the Internal Improvement Trust Fund (TIITF) of the State of Florida in favor of A. Duda & Sons, Inc., which removes the TIITF encumbrances on Duda's real property.

On May 19, 2011, Duda received DEP Jurisdictional Wetlands Determination for a proposed mining operation on their property west of the site.

The February 1, 2012, Soil and Groundwater Assessment Report prepared by Steamline Environmental and submitted to the DEP's Bureau of Mining and Minerals Regulation for a portion of the Duda Moore Haven farm, approximately one mile west of the site provided laboratory analytical results for two composited soil samples. The report stated that the soil samples were analyzed for "a wide range of contaminants typical of an agricultural setting." The laboratory analytical results for these two composited soil samples were non-detect for Organochlorine and Organophosphorus Pesticides, Chlorinated Herbicides, and mercury. Barium was found at 0.83 mg/kg and 1.5 mg/kg, well below the Threshold Effect Concentration (TEC) of 20 mg/kg. Chromium was non-detect in one sample (0.13 U mg/kg) and 0.51 I mg/kg in the other sample, which is well below the 43 mg/kg chromium TEC. Copper was non-detect in one sample (0.1 U mg/kg) and 2.2 mg/kg in the other sample, which is below the 32 mg/kg copper TEC. Zinc was found at 0.12 I mg/kg and 2.4 mg/kg, both results are well below the 120 mg/kg zinc TEC. The other metals analyzed (arsenic, cadmium, lead, nickel, and silver) were not detected by the laboratory.

In addition, uranium was found in groundwater from one monitor well above the Maximum Contaminant Level (MCL) of 30 µg/L at a concentration of 120 µg/L.

The diesel spill information for an irrigation pump located on the Duda Moore Haven farm approximately two (2) miles west of the site is not a concern due to the distance.

The following table is a list of agrochemicals (and other chemicals) used on the Duda Moore Haven farm; please note this covers the entire 4,000+ acre farm:

<b>A. Duda &amp; Sons, Inc. Moore Haven Chemicals 1980 - 2013</b>	
2, 4-D AMINE 4	GLYSTAR PLUS
AATREX NINE-0	GOJO ORIGINAL FORMULA HAND CLEANER
ACETYLENE	GRAMOXONE EXTRA
ACTIVATE PLUS	GRAMOXONE SUPER
AD 100	GROUNDDED
AG ROOTS FE	GROUP A-B-C COVER ELECTRODES
AGRI-DEX	GUTHION 2L
AGRSOLUTIONS CORNERSTONE PLUS HERBICIDE	GYSOM
ALL CLIMATE 5W20	HEADLINE
AMMONIUM NITRATE	HEADLINE AMP
AMMONIUM SULFATE SPGR	HERBIMAX
AMMONIUM SULFATE STANDARD	HYDRATE PLUS (CROP OIL)
APSA 80	IH HY TRAN FLUID B-6
AQUA STAR	INTERLOCK
ARMOR ALL MULTI-PURPOSE CLEANER	KINETIC
ARMOR ALL PROTECTANT	KRESTO EF
ASANA XL	LATRON CS-7

**A. Duda & Sons, Inc. Moore Haven Chemicals 1980 - 2013**

ASTRO	LEAD ACID BATTERY
ASULAM	LI-700
ASULAM 3.3	LOGIC
ASULAM 4F	MAG-SLAG
ASULOX	MALATHION 5EC
ATF FA	MILLET, BROWN TOP
ATRAZINE 4F	MOCAP 20%g
ATRAZINE 4L	NALCOTROL
ATRAZINE 90 DF	NUTRI-PHITE MAGNUM
ATRAZINE 90 DG	N-VIROSOL
ATRAZINE 90 WDG	ORTHENE TT&O
AVAST SRP	OXIDATE
BANVEL	OXYGEN, COMPRESSED
BANVEL + 2,4-D	PENDANT 3.3 EC
BATTERY TERMINAL PROTECTOR	PENNANT MAGNUM
BESIEGE	POLADO L
BIG RED CHEMICAL CLEANER	POWERLOCK
B'LASTER PENETRATING CATALYST	PRIME OIL
BLAZON BLUE	PROLIFIC
BOND	PRO-MATE ACCURACY
BORAX	PROWL
BRAKE FLUID DOT 4	PROWL 3.3 EC
BRAKE FLUID GRC DOT 3	PROWL H2O
BRAKLEEN	PROZAP ZINC PHOSPHIDE PELLETS
BRASH	QUADRI
BROWN TOP MILET	QUEST
BUCTRIL	R-134A
BUFFER PS	RAMIK RAT-BAIT GREEN
CALCIUM SILICATE SLAG	REMEDY ULTRA
CALLISTO	REWARD
CARAM BA	RI DALL-ZINC
CARBON DIOXIDE	RODEO
CASE/IH HY-TRAN PLUS	ROUNDUP ORIGINAL
CHAMP GLASS CLEANER	ROUNDUP ORIGINAL MAX
CHEVRON DELO 400 MOTOR OIL	ROUNDUP POWER MAX
CHEVRON DELO GEAR LUBRICANT	ROUNDUP ULTRA
CHEVRON DIESEL FUEL NO. 2	ROUNDUP ULTRA MAX
CHEVRON DURA-LITH GREASE EP 2	ROUNDUP WEATHERMAX
CHEVRON LS DIESEL 2	RUSTOLEUM SPECIALTY COATING
CHEVRON MACHINE OIL AW	SA 77 ADDITIVE
CHEVRON ULTRA-DUTY GREASE 2	SANDEA
CHICKEN MANURE	SEMPRA

**A. Duda & Sons, Inc. Moore Haven Chemicals 1980 - 2013**

COHERE	SENCOR 75 TURF
CORNERSTONE	SENCOR DF
CORNERSTONE PLUS	SOBMERGE
CORRAL POLY	SONAR SRP
CREDIT	STM-5 (SULFUR, MANGANESE, SULFATE MIX)
CROP OIL CONCENTRATE	STRIKE ZONE DC
CUTTER INSECT REPELLENT	STRIKE ZONE DF
DEFOAMER (RIVERSIDE)	STRIKE ZONE WDG
DIAMOND R TRX PLUS	SUL-15 PLUS
DIAZINON AG500 CC	SULFATE OF AMMONIA
DIQUAT	SULFUR 90%
DOLIRON	SUN WET
DOLOMITIC LIMESTONE	SURE-TREX
DROP ZONE DC	TALSTAR EZ GRANULATE
DROVAR II	TECHMANGAM
DYNE-AMIC	TERRAMARK SPI HIGH CONCENTRATE
ENFORCER INSTANT DKNOCKDOWN	THIMET 20G LOCK N LOAD
ENVOKE	TOM CAT
EPSOTOP	TOUCHDOWN
EVIK 80W	TOUCHDOWN HITECH
EVIK DF	TOUCHDOWN IQ
FAST BREAK	TRX PLUS DIAMOND R
FLEET CHARGE ANTIFREEZE & COOLANT	UNISON
FLOOR DRY, CELATOM	VOLIAM XPRESS
FOAM BUSTER	VSULOX HERBICIDE
FOAMINATOR DRY	WD-40
FRACTION	WEEDAR 64
FRANCHISE	WEDESTROY AM-40 AMINE SALT
FURADAN 4F	WEED-RHAP A-4D
GARLON 3A	WHITE POLISHIBNG COMPOUND T-241 WAX
GARLON 4	WIND BREAK



The following table lists the permits held by the A. Duda & Sons, Inc. Moore Haven farm:

<b>Location</b>	<b>Permit #</b>	<b>Permit Type</b>	<b>Comments</b>
Main Farm	22-00062-S	Surface Water	
Main Farm	22-00062-R	Right-of-Way	
Main Farm	22-00062-W	Water Use	
Main Farm – South	22-00222-S	Surface Water	Permit maintained by U.S. Sugar Corporation
Main Farm – South	22-00222-W	Water Use	Permit maintained by U.S. Sugar Corporation

The Tt Phase I ESA Environmental Questionnaire completed by Mr. Coultas on November 20, 2013, provided the following information:

- During sugar cane production various row crops, i.e., corn, melons, or beans may have been rotated in on a seasonal basis, with sugar being the predominate crop.
- Cattle grazing preceded sugar cane production. However, cattle dipping vats (CDVs) were not present. Based on review of historical aerial photographs a corral, or vise, may have been located in the northeast corner of the property.
- The property was purchased by A. Duda & Sons, Inc. from Alberto and Rosario Vadia in 1974. Cattle grazing was the prior land use.
- A drainage pump station is located at the SE corner of Section 17, which includes an adjacent, parallel culvert. Various water control structures (i.e. culverts) are located throughout the property, which are typically located at the intersection of a farm road and a ditch or canal.
- There are no groundwater supply wells on the property. Water for agrochemical mixing is obtained from the surface water system.
- The farm operation utilizes the Florida Department of Agriculture and Consumer Services (FDACS) Row Crop Best Management Plan (BMP) and has a Notice of Intent on file with FDACS. A copy of this BMP manual is available through their website.
- A list of chemicals used was hand delivered to Tetra Tech and SFWMD personnel on November 18, 2013.
- Material safety data sheets (MSDS) are available online through the chemical manufacturer's websites.
- Agrochemicals are not stored on the property.

- There are no fixed locations for mixing agrochemicals.
- Pesticides are only applied when wind speeds are less than 10 mph.
- The required records for pesticide applications, including date, time, location of treatment, target site, crop, total area, brand name, EPA Registration number, total amount, and method of application are recorded by a certified applicator.
- The empty chemical containers are disposed in accordance with the label instructions. Typically, triple-rinsed and burned on-site. No fixed burn locations.
- Sludge application has ever been conducted on the property.
- Farm equipment maintenance occurs off-site.

In addition, on November 18, 2013, Mr. Coultas informed Tt that the fields harvested of sugar cane (9 out of 16 of the 40-acre fields) received an application of two herbicides, Atrazine and Prowl, 14 days ago on November 4, 2013. The fields that received the recent herbicide application are 1, 5, 6, 9, 10, 12, 13, 15 and 16 as numbered on Figure 3. The remaining fields (2, 3, 4, 7, 8, 11, 14, and 17) of mature sugar cane were not harvested at the time of this Phase II ESA. In addition, Mr. Coultas also stated that the 20-acre field 17 was subleased to another sugar cane farmer, A. Duda & Sons, Inc. is not actively farming or managing field 17 (e.g., agrochemical application is by the tenant farmer).

### **3.6 Information Obtained from Local Agencies**

Tt made contact with, or spoke to the individual listed below. This individual is listed with the agency that he represents with his corresponding phone number. The information provided by this individual is summarized briefly in the following paragraph.

On December 3, 2013, Tt spoke to Mr. Regan Mathis (863.946.6025) a field appraiser with the Glades County Property Appraiser's office and he stated that he is very familiar with the area of interest and he does not have concerns on file or to his knowledge that would be significant to the site. According to Mr. Mathis as far as he can remember the property was always farmed in sugar cane with small occasional row crops.

#### **4.0 PHASE I ESA SITE RECONNAISSANCE**

On March 19, 2013, April 11 and 12, 2103, and November 18, 2013 Tt visited the subject site to obtain information with regard to the likelihood of identifying RECs, if any, associated with the property. This section summarizes the Phase I ESA site reconnaissance performed by Tt for the Duda Property.

#### **4.1 Hazardous Materials and Solid Wastes**

During the November 18, 2013, site reconnaissance Mr. Coultas pointed out a former solid waste area, or “boneyard” in the northeast corner of the property where miscellaneous farm equipment was stored. However, currently this area is vacant with two tree relic stumps the only items visible. Adjacent to the former “boneyard” is a wetland area overrun with Brazilian pepper. This area is approximately 250 feet by 350 feet, or 2-acres, and small amounts of trash was observed, mainly old bottles and cans, fabric, and one window type of air conditioning unit. Tt’s field geologist, Trevor Nobile, P.G., stated an unusual finding was the lack of plastic. The amount of solid waste in this area is estimated at a couple of cubic yards. Please see the photographs in Appendix G.

Hazardous materials were not observed.

#### **4.2 Polychlorinated Biphenyls**

Tt did not observe any materials that were suspected of containing polychlorinated biphenyls (PCBs) on-site during Phase I ESA activities.

#### **4.3 Disposal Sites**

Tt did not observe dumping at the subject site during the Phase I ESA, except as described above in Section 4.1.

#### **4.4 Aboveground and Underground Petroleum Storage Tanks**

One aboveground storage tank (AST) associated with the diesel powered pump located in the southeast corner of Section 17 was observed. This tank at the drainage pump is less than 550-gallons and therefore is not required to be registered. No presence of underground storage tanks (USTs) was observed.

#### **4.5 Abandoned Equipment and Debris**

During the site reconnaissance, Tt did not observe abandoned equipment or debris.

#### **4.6 Asbestos and Lead Paint**

Asbestos and lead paint surveys were not part of the scope of this Work Order. However, there are no on-site structures present.

#### **4.7 Groundwater Wells**

During the Phase I ESA site reconnaissance, Tt did not observe or note groundwater wells on the subject property.

#### **4.8 Livestock**

Tt did not observe livestock on the subject site during the Phase I ESA.

#### **4.9 Cattle Dipping Vats**

No Cattle Dipping Vats (CDVs) were observed by Tt on the subject site. Tt also reviewed information on known or recorded CDVs in Glades County from the FDEP's website and there are no known CDVs listed under Lake Hicpochee or Bronson.

([http://www.dep.state.fl.us/waste/quick\\_topics/publications/wc/cattlevats.pdf](http://www.dep.state.fl.us/waste/quick_topics/publications/wc/cattlevats.pdf))

#### **4.10 On-Site Structures**

Tt observed no structures (i.e., buildings, residences, pole barns, maintenance areas, etc.) on the subject property during Phase I ESA activities.

#### **4.11 Threatened and Endangered Species**

Please note that a Threatened and Endangered (T&E) Species survey was not part of our scope under the Work Order.

#### **4.12 Burn Areas**

No burn areas were observed during the site reconnaissances.

## 5.0 REGULATORY REVIEW

### 5.1 Regulatory Agency Database Search

This section of the report provides a compilation of the information found in Federal, State, and Local databases that were searched by EDR. Information contained in these reports is current as of the date the agency database was last updated (as noted in their report). However, due to the dynamic nature of environmental laws and data reporting, this information may change over time. A search of available environmental records was performed by EDR, and a final report was issued to Tt on October 28, 2013. Tt did not participate in the research or compilation of the records report.

The report provided to Tt by EDR includes a complete compilation of the database records that were searched and the date of the last update to each database searched by EDR. The Federal ASTM standard record search included a review of the following databases: NPL, Proposed NPL, Delisted NPL, CERCLIS, CERCLIS-NFRAP, CORRACTS, RCRA-TSDF, RCRA-LQG, RCRA-SQG, ERNS, HMIRS, US ENG CONTROLS, US INST CONTROL, DOD, FUDS, US BROWNFIELDS, CONSENT, ROD, UMTRA, ODI, TRIS, TSCA, FTTS, SSTS, LUCIS, DOT OPS, ICIS, HIST FTTS, US CDL, RADINFO, LIENS 2, PADS, MLTS, MINES, FINDS, and RAATS. The following State or Local databases were reviewed: SHWS, SWF / LF, LUST, UST, AST, FL Sites, SPILLS, ENG CONTROLS, INST CONTROL, VCP, DRY CLEANERS, PRIORITY CLEANERS, DEDB, BROWNSFIELDS, WASTEWATER, AIRS, TIER 2, and FL CDVs. The following Tribal records were searched: INDIAN RESERV, INDIAN LUST, and INDIAN UST. EDR proprietary records were searched for Manufactured Gas Plants. EDR also searched for Sanborn Fire Insurance Maps and City Directory listings for the subject site and the results indicated no coverage for this property.

The EDR report stated that there were no listings for the subject site/target property in any of the EDR's search of available ("reasonably ascertainable") government records either on the target property (EDR, 2013).

In addition, there were unmappable (orphan) sites that were not considered in the report analysis because of poor or inadequate address information. The orphan sites are summarized in the following paragraph.

**Orphan Site Summary** - The sites listed in this category were unmappable (orphan) because of poor or inadequate address information. According to the EDR Report, 38 sites were reported in the orphan category. After reviewing their address information these 38 sites are located beyond the ASTM search distance from the subject property, and therefore are not expected to have any impacts on the Property.

**Environmental Liens** – EDR conducted an environmental lien and activity and use limitations (AUL) search on the subject property and neither were found on the subject Property. A copy of the EDR Environmental Lien and AUL Search Report is provided in Appendix A.

## **5.2 Phase I ESA Conclusions and Recommendations**

The purpose of the Phase I ESA was to evaluate whether historical or current activities have resulted in RECs on or near the subject tract that warrant further evaluation under the Phase II ESA. Based upon our observations and the results of the regulatory database search, the following areas were further evaluated during the Phase II ESA:

- It appears that the entire property is under sugar cane cultivation; the potential concern is residual agricultural chemicals.
- Canals on property could have received residual agricultural chemicals via run-off.
- A diesel powered pump station is located in the southeastern corner of the property; the potential concern is released petroleum products.

## **6.0 PHASE II ENVIRONMENTAL SITE ASSESSMENT**

The section outlines the constituents of interest identified with the 638-acre Duda Property (Tract KC100-017) for inclusion in the Lake Hicpochee Hydrologic Enhancement Project, the media that were evaluated, and the sample collection methodology. The plan was developed based upon our discussions with District personnel and with consideration of the historical and current land use of the subject property.

### **6.1 Constituents of Interest**

The constituents of interest (COIs) that are commonly associated with properties found in rural, agricultural areas similar to the area where this tract is located include agrochemicals (i.e., pesticides, herbicides, carbamates) and metals (e.g., arsenic, copper, selenium, etc.).

During the Phase II ESA, the samples collected from the property were analyzed based on the historical, present, and future land use and potential RECs that may have impacted the site.

### **6.2 Soil, Sediment, Surface Water, and Groundwater Sampling**

Soil and sediment samples were collected from the property to evaluate the potential for impacts from historical (cattle grazing) or current activities (agriculture), or to establish baseline conditions for future land use. Groundwater and surface water samples were also collected from this property. The following subsections describe the overall rationale for each investigation technique.

Ecological guidance values were used as a basis for comparison of soil, sediment, surface water, and/or groundwater samples collected from the tract assessed. This distinction was made based on the fact that the intended future land use can be habitat for ecological receptors (e.g., shallow water storage). As such, soil and sediment samples were collected for comparison to the 2003 Sediment Quality Assessment Guidelines (SQAGs) for Florida Inland Waters as developed by MacDonald Environmental Sciences Ltd. for the FDEP. In addition, the Soil Cleanup Target Levels (SCTLs) as established in Chapter 62-777, F.A.C. were also used as comparison. These SCTLs were developed to protect human health by considering both direct human contact (i.e., direct exposure) and soil acting as a source for groundwater and/or surface water contamination (i.e., leachability). Similarly, groundwater and surface water samples were collected for comparison to Groundwater and Surface Water Cleanup Target Levels (GCTLs and

SWCTLs) and Natural Attenuation Default Criteria (NADCs) also established under Chapter 62-777, F.A.C. by FDEP.

### **6.2.1 Surface Soil and Sediment Sampling**

Surface soil samples were collected from the Duda Property at the following locations:

- Cultivated Area of the Property (entire 638-acre area)

Surface soil samples were collected at depths between 0 and 0.5 feet bls. Prior to soil sample collection the area was cleared of debris and loose organic matter using a clean, decontaminated stainless steel spoon or stainless steel hand auger. The samples were collected using either a decontaminated stainless steel spoon or a decontaminated stainless steel hand auger. The collected soils were then placed into a decontaminated stainless steel bowl where they were thoroughly mixed (composited) using a clean, stainless steel spoon. Once the sample was placed in the bowl any remaining foreign material (e.g., leaves, rocks, debris, etc.) were removed. After mixing, the soil was placed into pre-cleaned glass or plastic sample jars provided by the laboratory. Once the sample jars were filled they were immediately placed in a sample-shipping cooler with wet ice until they were delivered to the laboratory for analysis. Table 1 lists the location coordinates for each of the soil samples collected.

For copper there were two samples, one composite sample from the 40-acre grid and a separate discrete sample from one of the 5-acre subgrids, which was maintained separately (i.e., not composited) and analyzed individually.

### **6.2.2 Surface Water**

Surface water was collected from the Lake Hicpochee Duda Property. The surface water samples were collected by direct grab placing the glassware inverted to 0.1 to 0.5 meters below the water's surface and then rotating the glassware to collect the sample. Table 1 lists the location coordinates for each of the three surface water samples collected. Figure 3 provides a sample location map.

### **6.2.3 Groundwater Sampling**

Groundwater samples were collected from each of four temporary monitor wells installed in the sugar cane area and adjacent to the irrigation pump station at the Lake Hicpochee Duda Property. The temporary wells were installed using a direct push drill rig. Each temporary well consisted of a 10-foot section of PVC screen. The well screen was inserted into the drilled boring and the annulus was backfilled with clean 20/30 filter sand to land surface. Each well was then developed by over-pumping the well with a peristaltic pump to remove fines and sediment from the well.



Following well development, each well was allowed to equilibrate for 24-hours before groundwater sampling was performed. The well screen was purged with a low flow peristaltic pump and a new section of polyethylene tubing. Field measurements (i.e., pH, conductivity, dissolved oxygen, specific conductance, temperature, and turbidity) were collected at timed intervals during purging to ensure that the water being produced had stabilized. Purge volumes and flow rates were recorded during purging. After stabilization of the field parameter measurement data, and in accordance with FDEP protocols, the sample was collected for analyses. The groundwater sample locations are listed on Table 1 and shown on Figure 3.

### **6.3 Sample Custody Documentation**

Chain of custody documentation was prepared and maintained throughout the sample collection and analytical process. This process consisted of assigning each sample a unique sample identifier, and documenting each sample with the name of the sampler, the date and time collected, and other pertinent data on a multi-part chain of custody (COC) form. This form stays with the sample from the time of collection through completion of the analyses and is then transferred to the analytical report. Each time the sample is transferred from one person or organization to another this transfer of control is documented on the sample custody form. The sample identifiers are traceable to the field logbook, which provide additional details regarding the sample collection process, location and circumstances (such as the purpose for its collection). This process is designed to mirror the legal evidentiary process and is implemented to ensure the quality and integrity of the sample results.

### **6.4 Quality Assurance/ Quality Control Data Collection**

Throughout the field sampling activities additional samples were collected for quality control purposes. Quality control samples included: sample equipment blanks, sample duplicates, and split samples. Equipment blanks were prepared by running de-ionized and distilled water over or through decontaminated field equipment and collecting the rinseate for analyses. These samples provide a measure of the equipment decontamination process and are collected to ensure that cross-contamination is not affecting the sample results. Sample duplicates were collected by preparing an equivalent amount from the original sample volume and sending it to the same laboratory for analyses. These samples provide a means of measuring the reproducibility of the laboratory results. Split samples were collected by preparing an equivalent split from the original sample volume and sending it to an independent (third-party)

laboratory for analyses. These samples provide a means of evaluating the reliability of the entire sample collection process.

It subcontracted to Millennium Laboratories, Inc. (NELAC Certification # E84899) located in Tampa, FL for the analyses of the primary samples including blanks and duplicates. Millennium subcontracted the Chlorinated Herbicides and Carbamates analyses to SunLabs, Inc. (NELAC Certification # E84809) in Tampa and the Total Organic Carbon analyses to Accutest Laboratories (NELAC Certification # E83510) in Orlando. Split samples were sent to an independent third-party laboratory, ALS Environmental Laboratories, Inc. (NELAC Certification # E82502) in Jacksonville, FL. ALS also subcontracted the Chlorinated Herbicides and Carbamates analyses to SunLabs, Inc.

## **6.5 Phase ESA II Data Assessment and Analytical Results**

This section presents the results of the samples that were collected for field and laboratory evaluation. Complete copies of the laboratory analytical reports summarized in this section are provided on a compact disk, which is attached as Appendix I.

### **6.5.1 Surface Soil Sampling, Soil Borings, and Sediment Sampling**

The following is a summary of the number of surface soil samples (0 to 0.5 ft bls) collected from the sugar cane area and the analytical methods for each sample. Figure 4 shows the soil sample locations on the Lake Hicpochee Duda Property.

- **Sugar Cane Cultivated Area** - The discrete soil subsamples were collected at random across each 5-acre subgrid in each 40-acre grid<sup>1</sup> in the sugar cane area. These discrete 5-acre soil subsamples were composed of five aliquots of similar volumes collected from a point located at the random sampling location, and from four additional points located approximately 5 feet from the center point in each of the cardinal directions. The sample was thoroughly homogenized in a stainless steel mixing bowl. These “close proximity composite samples” are intended to reduce the effects of small scale soil heterogeneity. The coordinates of

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<sup>1</sup> The *Protocol for Assessment, Remediation and Post-Remediation Monitoring for Environmental Contaminants on Everglades Restoration Projects*, March 14, 2008, Final Version, established between the U.S. Fish and Wildlife Service and the District calls for sampling on a scale of 50-acre grids (ten 5-acre subgrids per 50-acre grid). However, since this sugar cane farm was laid out in 40-acre fields it was deemed acceptable to use eight 5-acre subgrids.

each grid and sample location were collected using a hand held GPS. The eight composited soil samples were sent for analysis for the following constituents: Organochlorine Pesticides (Method 8081A), Organophosphorus Pesticides (Method 8270C), Chlorinated Herbicides (Method 8321), Carbamates (Method 8318), the Eight Resource Conservation and Recovery Act (RCRA) Metals, and Total Organic Carbon. For copper there were two samples, one composite sample from the 40-acre grid and a separate discrete sample from one of the 5-acre subgrids, which was maintained separately (i.e., not composited) and analyzed individually.

- **Canal Sediments** - There are six east-west canals and five north-south canals on the property. The sediments in the irrigation/drainage canals associated with the cultivated area within and around the site were characterized to evaluate the presence or absence of constituents which may become mobile or which might pose an ecological risk when these areas become ecological habits used for stormwater storage. A total of two sediment samples were collected from the irrigation/drainage canals. These samples were collected from the canal banks using a ponar dredge. The sample locations were randomly selected in the field. These sediment samples were analyzed for Organochlorine Pesticides (Method 8081A), Organophosphorus Pesticides (Method 8270C), Chlorinated Herbicides (Method 8321), Carbamates (Method 8318), Eight RCRA Metals, Copper, and Total Organic Carbon.
- **Irrigation Canal Pump Station SE Corner of the Property** - It performed four shallow hand augured borings around the perimeter of the pump station. Each boring extended to the depth of the water table ( $\approx$ 4 feet bls) and soil samples from each boring were screened in the field with an organic vapor analyzer (OVA) and visually screened for signs of discoloration. The soil sample with the highest OVA result was selected for laboratory analyses. The sample was analyzed for petroleum constituents using the following methods: Volatile Organic Compounds (Method 8260B), Semi-volatile Organic Compounds (Method 8270C), TRPH (FL-PRO), and the Eight RCRA Metals.

#### **6.5.1.1 Sugar Cane Soil and Canal Sediment Analytical Results**

Twenty-one surface soil and sediment samples (including duplicates and split samples) were collected from the Lake Hicpochee Duda Property and analyzed for pesticides, herbicides, the eight RCRA Metals and copper.

Dieldrin was detected on one split soil sample (Grid-16-Split) at a concentration of 0.00135 mg/Kg, which is below the Dieldrin Threshold Effect Concentration (TEC) SQAG for Florida Inland Waters of 0.0019 mg/Kg. No exceedances of Organochlorine Pesticides SCTLs or SQAGs were found in the 21 soil/sediment samples.

Atrazine was detected on one split soil sample (Grid-16-Split) at a concentration of 0.14 mg/Kg, which is above the Atrazine TEC SQAG of 0.0003 mg/Kg and the 0.06 mg/Kg Leachability based on Groundwater Criteria SCTL of Chapter 62-777, F.A.C. No other exceedances of Organophosphorus Pesticides SCTLs or SQAGs were found in the other 20 soil/sediment samples.

Chlorinated Herbicides were not detected in the 21 soil/sediment samples. Carbamates were not detected in the 21 soil/sediment samples.

Arsenic was detected in 20 of the 21 sugar cane soil samples with concentrations ranging from 0.52 mg/Kg to 3.1 mg/Kg. Arsenic was not detected in the two sediment samples. Only 2 of the 21 samples exceeded the Chapter 62-777, F.A.C. arsenic Residential Direct Exposure SCTL of 2.1 mg/Kg. However, the arsenic concentrations in the split sample from Grid-16 and the Grid-17 sample are below the 9.8 mg/kg arsenic TEC of the SQAGs for Florida Inland Waters.

Barium was found above the SQAG TEC of 20 mg/Kg in 3 of the 21 soil samples. The barium exceedance was from Grid-16, the split sample of Grid-16, and Grid-17 at concentrations of 21 mg/Kg, 21.3 mg/Kg, and 30 mg/Kg respectively. These three samples are well below the barium Probable Effect Concentration (PEC) of 60 mg/Kg and the 1,600 mg/Kg Leachability based on Groundwater Criteria SCTL of Chapter 62-777, F.A.C.

Copper was detected in all 41 sugar cane soil (composite and discrete samples) and sediment samples ranging from 2.3 mg/Kg to 22 mg/Kg. The copper concentrations are below the 32 mg/kg copper TEC of the SQAGs for Florida Inland Waters. In addition, the USFWS has developed potential risk to trustee species for Copper for soil/sediments and none of the copper results from the soil and sediment sampling during this Phase II ESA approached this threshold value of 85 mg/Kg.

No other exceedances of metal SCTLs or SQAGs were found in the Phase II ESA soil/sediment samples.

Tables 2 and 3 present a summary of the positive results for the surface soil and sediment samples. Figures 4 and 5 depict the locations and the results.

The Phase II ESA findings indicate that there is no evidence of environmental impairment from residual agricultural chemicals in soils on the property. An optional Screening Level Ecological Risk Assessment (SLERA) was included in the scope of work. However, the absence of residual agricultural chemicals across the property and metal concentrations below SQAGs did not warrant the SLERA.

### 6.5.2 Groundwater Samples

Groundwater samples were collected for analyses from four temporary monitor wells installed within the Lake Hicpochee Duda Property. Figure 7 shows the sample locations on the Property. Temporary well points on this property were generally installed to a depth of 12 feet bls. Depth to water ranged from 1.57 feet bls in TW-2 to 4.32 feet bls in TW-1.

#### 6.5.2.1 Well Purging Data

Prior to conducting groundwater sampling on December 3, 2013, each well was gauged to determine its total depth, the depth to water, and the well volume was calculated. Each well was then purged using an approved low-flow sampling technique, a peristaltic pump. The purging and sampling was performed in accordance with the FDEP standard operating procedures (SOPs) (FDEP, 2008). The well purging data is presented in the following table. In general the wells met the FDEP’s criteria for stabilization prior to sample collection.

Lake Hicpochee Duda Property Summary of Temporary Well Purging Data								
Sample ID	Time	Temp. (°C)	Sp. Cond. (µS/cm)	DO (mg/l)	pH (SUs)	ORP (mV)	Turbidity (NTUs)	Odor/Color
TW-1	0950	25.42	732	0.32	7.04	29.2	2.2	Lt. Organic/ Very Lt. Yellow
	0953	25.43	732	0.32	7.04	26.5	1.6	Lt. Organic/ Very Lt. Yellow
	0956	25.41	733	0.32	7.04	25.4	4.6	Lt. Organic/ Very Lt. Yellow

Lake Hicpochee Duda Property Summary of Temporary Well Purging Data								
Sample ID	Time	Temp. (°C)	Sp. Cond. (µS/cm)	DO (mg/l)	pH (SUs)	ORP (mV)	Turbidity (NTUs)	Odor/Color
TW-2	1115	23.51	684	0.27	7.25	-93.8	28.2	Lt. Organic/ Very Lt. Yellow-Clear
	1118	23.52	684	0.27	7.25	-94.4	25.2	Lt. Organic/ Very Lt. Yellow-Clear
	1123	23.51	684	0.27	7.25	-94.8	26.1	Lt. Organic/ Very Lt. Yellow-Clear
TW-3	1235	24.28	859	0.63	7.21	-39.0	17.6	Lt. Organic/ Very Lt. Yellow-Clear
	1238	24.29	858	0.62	7.21	-40.0	19.4	Lt. Organic/ Very Lt. Yellow-Clear
	1241	24.28	857	0.61	7.21	-41.9	15.9	Lt. Organic/ Very Lt. Yellow-Clear
TW-4	1325	25.59	937	0.88	7.00	-154.0	18.4	Lt. Organic/ Very Lt. Yellow-Clear
	1328	25.60	937	0.87	6.99	-153.8	11.9	Lt. Organic/ Very Lt. Yellow-Clear
	1331	25.62	937	0.84	6.99	-153.9	12.9	Lt. Organic/ Very Lt. Yellow-Clear

### 6.5.2.2 Groundwater Sampling and Analytical Results

Four temporary monitor well were installed and groundwater samples were collected from the Lake Hicpochee Duda Property. Three groundwater samples, from temporary monitor wells installed in the sugar cane fields, were analyzed for Organochlorine Pesticides (Method 8081A), Organophosphorus Pesticides (Method 8270C), Chlorinated Herbicides (Method 8321), Carbamates (Method 8318), the Eight RCRA Metals, and Copper. The fourth temporary monitor well, installed in the soil boring with the highest OVA readings, next to the AST that is used to fuel the diesel powered irrigation pump was analyzed for petroleum constituents using the following methods: Volatile Organic Compounds (Method 8260B), Semi-volatile Organic Compounds (Method 8270C), TRPH (FL-PRO), and the Eight RCRA Metals.

The sample results reported positive detections for two metals (barium, and chromium). The detections were well below their respective GCTLs. The groundwater samples were

non-detect for Organochlorine Pesticides, Organophosphorus Pesticides, Chlorinated Herbicides, Carbamates, Volatile Organic Compounds, Semi-volatile Organic Compounds, and TRPH. Tables 6 and 10 present a summary of the positive results for the groundwater samples and Figures 7 and 9 depict the locations and the results.

### 6.5.3 Surface Water Samples

Surface water samples were collected for analyses from the Lake Hicpochee Duda Property. Figure 6 shows the sample locations on the Property.

#### 6.5.3.1 Surface Water Analytical Results

The three surface water samples were analyzed for Organochlorine Pesticides (Method 8081A), Organophosphorus Pesticides (Method 8270C), Chlorinated Herbicides (Method 8321), Carbamates (Method 8318), the Eight RCRA Metals, and Copper.

Lake Hicpochee TITF Property Summary of Surface Water Field Parameters							
Sample ID	Date	Time	Temp. (°C)	Sp. Cond. (µS/cm)	DO (mg/l)	pH (SUs)	ORP (mV)
SW-1	11/20/13	0930	26.80	872	3.64	7.63	140.4
SW-2	11/20/13	1035	24.30	832	4.32	8.06	136.5
SW-3	11/20/13	1135	21.86	609	0.66	7.07	105.1

The sample results reported positive detections for three metals (barium, lead, and copper). The barium detections were well below their respective Fresh Water Surface Water Criteria of Chapter 62-302, F.A.C.

Copper was found in the three surface water samples at concentrations ranging from 0.0082 mg/L to 0.015 mg/L. Lead was detected in one sample at a concentration of 0.0042 I mg/L. Please note that the current classification of surface waters at the site would be Class IV (Agricultural Water Supplies) and the corresponding water quality criteria is 0.5 mg/L for copper and 0.05 mg/L for lead, which are an order of magnitude higher than analytical results from this Phase II ESA sampling.

It is assumed future use classification of this property will be Class III surface waters (Fish Consumption: Recreation, Propagation and Maintenance of a Healthy, Well-

Balanced Population of Fish and Wildlife) The predominantly fresh water Class I (Potable Water Supplies) and III Surface Water Quality Criteria for copper and lead are hardness (as CaCO<sub>3</sub>) dependent.

In accordance with Rule 62-302.530, for metals criteria involving equations with hardness, the hardness shall be set at 25 mg/L if actual values are < 25 mg/L and set at 400 mg/L if actual hardness is > 400 mg/L. Hardness data was not collected with the surface water samples. However, hardness from Spillway S47D averaged 191.5 mg/L between May 2009 and October 2012 (source DBHYDRO). Spillway S47D is located at the southeast corner of Grid 17 in the C-19 Canal.

The formula for copper  $\leq e^{(0.8545[\ln H]-1.702)}$  was used, where:

e = The natural antilogarithm

lnH = The natural logarithm of total hardness expressed as 191.5 mg/L CaCO<sub>3</sub>

The fresh water Class I and III criteria for copper  $\leq 16.12$  ug/L at a hardness concentration of 191.5 mg/L.

The formula for lead is  $\leq e^{(1.273[\ln H]-4.705)}$

The fresh water Class III criteria for lead  $\leq 7.24$  ug/L at a hardness concentration of 191.5 mg/L.

Therefore, the copper and lead Phase II ESA detections were below their respective Fresh Water Surface Water Criteria of Chapter 62-302, F.A.C. for Class I and III waters.

The surface water samples were non-detect for Organochlorine Pesticides, Organophosphorus Pesticides, Chlorinated Herbicides, and Carbamates. Table 4 presents a summary of the positive results for the surface water samples and Figure 6 depicts the locations and the results. Table 5 presents the hardness calculations.

#### **6.5.4 Irrigation Canal Pump Station Soil and Groundwater Results**

It performed four shallow hand augured borings around the perimeter of the pump station. Each boring extended to the depth of the water table ( $\approx 4$  feet bls) and soil samples from each boring were screened in the field with an OVA and visually screened for signs of discoloration. Only one of the four soil borings exhibited OVA readings and the 4-ft soil sample from SB-1 was collected for laboratory analyses. Soil boring SB-1 is located approximately 5-ft west of the diesel AST. Table 8 summarizes the OVA results. In addition, temporary monitor well TW-1 was installed in SB-1. The soil sample and the



groundwater sample were analyzed for petroleum constituents and the Eight RCRA metals.

The soil sample results reported positive detections for five metals (arsenic, barium, chromium, lead, and mercury). However, no exceedances of the metal SCTLs or SQAGs were found. The petroleum constituents Toluene, m+p-Xylene, o-Xylene, and TRPH were detected in the soil sample from SB-1, albeit below the corresponding SCTLs. The only positive detection in the groundwater sample from TW-1 was barium at a concentration well below GCTL of Chapter 62-777, F.A.C. Volatile organics, semi-volatile organics, and TRPH were not detected in the groundwater sample from TW-1. Tables 9 and 10 summarize the positive results for the Irrigation Pump Station soil and groundwater samples and Figures 8 and 9 depict the locations and the results.

The Phase II ESA findings indicate that there is no evidence of environmental impairment in soils and groundwater from the potential point source at the Irrigation Pump Station on the property.

#### **6.5.5 Conclusions of the Phase II ESA**

Tetra Tech conducted a Phase II ESA of the approximately 638-acre tract of the A. Duda & Sons, Inc. Property in Glades County on behalf of the District. This assessment included sampling portions of the Property and was conducted to evaluate the suitability of the property for future use by the District.

The Phase II ESA findings indicate that there is no evidence of environmental impairment from residual agricultural chemicals on the property based on the following:

- No exceedances of Organochlorine Pesticides SCTLs, SQAGs, GCTLs, or Fresh Water Surface Water Criteria were found in the Phase II ESA samples.
- Chlorinated Herbicides and Carbamates were not detected in the Phase II ESA samples.
- The one Atrazine result from the split soil sample of Grid-16 was not replicated in the Grid-16 soil sample, nor was Atrazine detected in any of other 20 soil/sediment samples above a SCTL or SQAG. Therefore, this result is considered a false positive.
- Arsenic was found in 2 of the 21 soil/sediment samples exceeding the Chapter 62-777, F.A.C. Residential Direct Exposure SCTL. However, these arsenic concentrations are below the 9.8 mg/kg arsenic TEC of the SQAGs. Therefore,

these reported concentrations will not have an impact on the purposed future land use of the property.

- Barium was found above the SQAG TEC in 3 of the 21 soil/sediment samples. However, these three samples are well below the barium PEC of 60 mg/Kg and the 1,600 mg/Kg Leachability based on Groundwater Criteria SCTL of Chapter 62-777, F.A.C. Therefore, barium is not considered a probable effect.
- Copper was detected in all 41 sugar cane soil (composite and discrete samples) and sediment samples ranging from 2.3 mg/Kg to 22 mg/Kg. The copper concentrations are below the 32 mg/kg copper TEC of the SQAGs for Florida Inland Waters. In addition, the USFWS has developed potential risk to trustee species for Copper for soil/sediments and none of the copper results from the soil and sediment sampling during this Phase II ESA approached this threshold value of 85 mg/Kg.
- No other exceedances of metal SCTLs, SQAGs, GCTLs, or Fresh Water Surface Water Criteria were found in the Phase II ESA samples.
- In addition, the Phase II ESA findings indicate that there is no evidence of environmental impairment in soils and groundwater from the potential point source at the Irrigation Pump Station on the property.

The results of the Phase II ESA indicated that the Lake Hicpochee Duda property (Tract KC100-017) is suitable for the District's future intended land use as a hydrologic restoration project of this property. There is no evidence of environmental impairment from residual agricultural chemicals on the property and additional environmental assessment is not recommended. Significant corrective action is not recommended. There is a very small amount of solid waste, estimated at a couple of cubic yards, in the 2-acre wetland area in the northeast corner of the property. It is assumed that this inconsequential amount of solid waste will be removed when the Brazilian pepper is cleared.

## 7.0 LABORATORY DATA EVALUATION

The laboratory analytical reports consisted of packages prepared by the prime contract laboratory that performed the sample analysis, Millennium Laboratories, Inc. (Millennium) and data reports prepared by the laboratory that performed the split sample analysis, ALS Laboratories, Inc. (ALS). Both laboratories relied upon subcontractor laboratories to complete portions of their analyses. Millennium and ALS subcontracted portions of their work to other third-party laboratories, SunLabs, Inc. (NELAC certification #84809) located in Tampa, FL and Accutest Laboratories (NELAC certification #83510) located in Orlando, FL.

In general the packages prepared by Millennium and ALS included the results of method blanks, laboratory control spike results, matrix spike/matrix spike duplicates and other QA/QC results with each analytical report. Millennium and ALS also provided case narratives summarizing their QA/QC results, which are provided in Appendix I.

The method blanks and equipment blank results were below the laboratory reporting limits for each analyte with the exception of methylene chloride in an ALS split sample of SB-1-4. The methylene chloride was “V” flagged. The surrogate recoveries in general were within the recommended limits. Occasionally there was a surrogate recovery outside the laboratory’s defined limits, but other surrogates associated with the analyses were within the limits. That is the reason that multiple surrogates are required by the method. The laboratory control spikes, laboratory control spike duplicates, matrix spikes, and matrix spike duplicates were generally within the required criteria in this dataset for spike values, percent recovery, and relative percent difference. The following data flags were used on detected analytes:

- The “I” data qualifier was used for samples with a reported value between the laboratory’s method detection limit and the laboratory’s practical quantitation limit.
- The “U” data qualifier was used to indicate that the compound was analyzed for, but not detected. The value presented was the laboratory’s practical quantitation limit.

Taken as a whole, Tt concluded that the analytical data reports from the laboratories were of good quality and in compliance with the project objectives. Therefore, Tt concluded that the analytical results presented in these data packages met the objectives of this project. In addition, ADaPT files were also generated by the laboratories for electronic submittal to the District.

## **7.1 Split and Duplicate Sample Correlation**

As discussed previously, the duplicate samples consisted of aliquots from the same sample source analyzed by the same laboratory. The comparison of these sample results to one another measures the reproducibility and precision of the analytical laboratory. The split samples consisted of indistinguishable, sample aliquots from the same source that were analyzed independently by two different analytical laboratories. These samples measure the accuracy of the analytical results.

Relative percent differences (RPDs) were calculated where positive results were exhibited by sample pairs (including both duplicates and splits). In 100% of the calculations for metals, the RPD values were less than 50%, indicating good sample correlation. Conversely, 0% of the calculations for Atrazine, Dieldrin, Toluene, Xylenes, and TRPH were less than 50%. This was due to one laboratory detecting the compound and the other laboratory reporting non-detect. The Atrazine and Dieldrin splits were actually analyzed by the same subcontracted laboratory, SunLabs. Table 7 presents the RPD calculations for the positive results detected in duplicate or split samples.

## **8.0 CONCLUSIONS AND RECOMMENDATIONS**

### **8.1 Conclusions of the Phase I ESA**

The purpose of the Phase I ESA was to evaluate whether historical or current activities have resulted in RECs on or near the subject tract that warrant further evaluation under the Phase II ESA.

Based upon our observations the following areas were further evaluated during the Phase II ESA:

#### **Lake Hicpochee Duda Property (Tract KC100-017)**

- It appears that the entire property is under sugar cane cultivation; the potential concern is residual agricultural chemicals.
- Canals on property could have received residual agricultural chemicals via run-off.
- A diesel powered pump station is located in the southeastern corner of the property; the potential concern is released petroleum products.

### **8.2 Conclusions of the Phase II ESA Investigation**

Samples of relevant environmental media were collected to evaluate the potential RECs identified in the Phase I ESA during the Phase II ESA. The Lake Hicpochee Duda property (Tract KC100-017) revealed no evidence of contamination in need of corrective action. The Phase II ESA findings indicate that there is no evidence of environmental impairment from residual agricultural chemicals on the property based on the following:

- No exceedances of Organochlorine Pesticides SCTLs, SQAGs, GCTLs, or Fresh Water Surface Water Criteria were found in the Phase II ESA samples.
- Chlorinated Herbicides and Carbamates were not detected in the Phase II ESA samples.
- The one Atrazine result from the split soil sample of Grid-16 was not replicated in the Grid-16 soil sample, nor was Atrazine detected in any of other 20 soil/sediment samples above a SCTL or SQAG. Therefore, this result is considered a false positive.
- Arsenic was found in 2 of the 21 soil/sediment samples exceeding the Chapter 62-777, F.A.C. Residential Direct Exposure SCTL. However, these arsenic concentrations are below the 9.8 mg/kg arsenic TEC of the SQAGs. Therefore,

these reported concentrations will not have an impact on the purposed future land use of the property.

- Barium was found above the SQAG TEC in 3 of the 21 soil/sediment samples. However, these three samples are well below the barium PEC of 60 mg/Kg and the 1,600 mg/Kg Leachability based on Groundwater Criteria SCTL of Chapter 62-777, F.A.C. Therefore, barium is not considered a probable effect.
- Copper was detected in all 41 sugar cane soil (composite and discrete samples) and sediment samples ranging from 2.3 mg/Kg to 22 mg/Kg. The copper concentrations are below the 32 mg/kg copper TEC of the SQAGs for Florida Inland Waters. In addition, the USFWS has developed potential risk to trustee species for Copper for soil/sediments and none of the copper results from the soil and sediment sampling during this Phase II ESA approached this threshold value of 85 mg/Kg.
- No other exceedances of metal SCTLs, SQAGs, GCTLs, or Fresh Water Surface Water Criteria were found in the Phase II ESA samples.
- In addition, the Phase II ESA findings indicate that there is no evidence of environmental impairment in soils and groundwater from the potential point source at the Irrigation Pump Station on the property.

The results of the Phase II ESA indicated that the Lake Hicpochee Duda property (Tract KC100-017) is suitable for the District's future intended land use as a hydrologic restoration project of this property. There is no evidence of environmental impairment from residual agricultural chemicals on the property and additional environmental assessment is not recommended. Significant corrective action is not recommended. There is a very small amount of solid waste, estimated at a couple of cubic yards, in the 2-acre wetland area in the northeast corner of the property. It is assumed that this inconsequential amount of solid waste will be removed when the Brazilian pepper is cleared.

## 9.0 REFERENCES

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# **TABLES**



# FIGURES

**Appendix A**  
**EDR Report**

**Appendix B**  
**Wetlands Map**

**Appendix C**  
**Soil Survey Map**

**Appendix D**  
**Radon Gas Potential Map**

**Appendix E**  
**Oil & Gas Index Map**

**Appendix F**  
**Glades County Property Appraiser Site Information**

**Appendix G**  
**Site Photographs**



## **Appendix H**

### **A. Duda & Sons, Inc. Provided Documents**

**Appendix I**  
**Laboratory Analytical Reports (CD)**