ANNEX G

HAZARDOUS, TOXIC AND RADIOACTIVE WASTE

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G.1 K05 Reservoir, Kissimmee Central & Paradise Run Wetlands Investigations to Date

ADM 38-46

MEMORANDUM

TO: Blair LittleJohn, Director, Real Estate Division, REC, Water Resource Management

FROM: Robert Kukleski, Sr. Environmental Engineer, REC, Water Resource Management RK

DATE: January 13, 2000

SUBJECT: Phase I Environmental Assessment
Collier (Tract No. 105-024); Peeples (Tract No. 105-022);
Comprehensive Review Study of the Central and Southern
Florida Project (Restudy); Glades County

Pursuant to the request of Barry Present, an inspection of the Collier and Peeples properties was conducted on October 25, 1999. An additional inspection was conducted on November 8, 1999 to ascertain the location of an abandoned cattle-dipping vat with respect to the proposed acquisition area. The attendees were John Austin Collier (representing the property owner), Robert Taylor, Dames & Moore (representing the District), Knox McKee and Robert Kukleski.

The subject parcels are proposed for District acquisition in fee title as part of the Restudy project. The conceptual design for the specific parcels, at this juncture, is to form a component of an approximate 20,000-acre Regional Water Retention Reservoir. The conceptual design also includes a provision for a component of the reservoir to function as a Stormwater Treatment Area (similar in design to those associated with the Everglades Projection Project.)

Construction is tentatively scheduled for 2011. The projected land use will be preceded by continued interim agricultural activities, consistent with the current land use. The purpose of the current assessment was to identify the presence of on-site environmental concerns as well as potential off-site contaminant sources that could adversely impact the subject parcel. Based upon these initial observations, recommendations are included for required corrective actions.

The Collier parcel, Tract No. 105-024, encompasses approximately 895.14 acres located in Sections 7, 8, 17 and 18, Township 38 South, Range 34 East, Glades County. The Peeples parcel, Tract No. 105-022, consists of approximately 560.184 acres located in Sections 5 and 8, Township 38 South, Range 34 East, Glades County. The subject parcels are situated to the south and west of the channelized Kissimmee River (Canal C-38) and in proximity to the previously

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acquired Prescott and Matthews properties. Vehicular access to the proposed acquisition area is controlled via fencing and locked gates.

The accessible portions of the subject property were traversed via a tractor. The property was relatively wet at the time of inspection. The proposed acquisition area appears to consist of former floodplain prior to the channelization of the Kissimmee River. The subject parcels are undeveloped and utilized primarily for cattle grazing. The land use has been consistent for at least the previous 40 years. Mr. Collier indicated that there has also been limited harvesting of sod. No pesticides and herbicides have been employed in the sod harvesting. Mr. Collier also indicated that limited fertilizer application has been associated with sod cultivation as well as to improve pasture. An approximate 40-acre area located in the southeast quadrant of the Collier parcel had also been previously cultivated in tomatoes according to Mr. Collier.

This land use was limited to one (1)-growing season (in approximately 1962). There is no evidence (mix and load areas, pump stations, etc.) of this former land use. Typically, this method of cultivation required little or no infrastructure. An area was cultivated in truck crops (tomatoes, peppers, watermelons, etc.) for a short duration and then abandoned for use as pasture. Based upon the limited duration of the tomato farming and the timeframe of the activity, this previous land use does not constitute a significant environmental concern.

There is no evidence of buildings, cabins, cattle pens or pump stations located in the proposed acquisition area. There is no evidence of significant solid waste accumulation (construction debris, scrap metal, assorted trash, etc.) No petroleum storage tanks or 55-gallon drums were observed. No surface anomalies, which would suggest the presence of illicitly buried material, were identified. The overall impression is that of a well managed cattle grazing operation.

Based upon historical recollection by Mr. Collier's aunt (Juanell Peeples, owner of Tract No. 105-022,) a subsequent re-inspection was conducted to identify potential cattle dipping vat site located in an upland portion of Section 5. The presence of a vat was confirmed and identified by subsequent survey to be within the proposed acquisition area. The vat is situated in the southwestern portion of Section 5 and is in close proximity (approximately 50-75 feet) to the western boundary of Tract No. 105-022.

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The structure remains from the historical use of the property for cattle grazing. The vat is a remnant of the eradication program that was used to treat the cattle fever tick infestation that devastated that industry in the early 1900's. Cows, and other livestock, were periodically dipped in an arsenic solution to interrupt the life cycle of the tick. In addition to the arsenic, other treatment solutions were employed, including the use of DDT and toxaphene. Approximately 3,500 dipping vats were constructed and operated in Florida as part of the Federal/State Program between 1910 and 1958. Based upon previous characterization efforts at cattle-dipping vat sites, the likelihood of detecting residual concentrations of these materials in soil and/or groundwater is extremely high.

A legislative mandate (Section 376.306, F.S.) enacted in 1997 releases private property owners from responsibility for remediation of cattle dipping vat sites. Sections 253.02S and 259.041, F.S. were also amended in 1997 to prohibit the previous practice of excluding cattle dipping vat sites from District acquisitions. **Based upon these requirements, it would appear inappropriate to require the owner(s) of the Collier and Peeples parcels to retain responsibility for assessment/remediation of the site or to exclude the vat site from the current acquisition. However, the presence of the cattle-dipping vat constitutes significant environmental impairment due to potential soil and/or groundwater contamination resulting from the use of the dipping reagents at the site.**

It is recommended that the characterization phase of the remedial strategy for cattle dipping vat sites that was developed in conjunction with the Florida Department of Environmental Protection (DEP) be implemented at this location. This strategy has been successfully implemented at 15 District sites. The initial investigation will delineate the extent of the contaminated area and will evaluate remedial measures (with associated costs.) The degree of remedial effort would be consistent with projected future land use (Water Retention Reservoir/STA.) The cost associated with the characterization phase is estimated at approximately $56,000. The cost of the subsequent remedial effort is dependent upon the results of the characterization work.

Discussions with Blair LittleJohn indicate that potential funding for the required correction actions at this location is dissimilar than for those sites assorted with the Kissimmee Restoration Project, and will require a modified or new operating

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agreement with the U.S. Corps of Engineers (USACOE). Mr. LittleJohn indicated that the proposed operating agreement would allow the District to recover costs from the USACOE to effect the required agreement/remedial work in order to certify to the USACOE that the property is suitable for the intended use.

It is suggested that the implementation of the above-described correction actions be held in abeyance until the funding issues with the USACOE are resolved. The current and proposed interim land use does not trigger an immediate requirement to remediate the vat site. There is limited human site contact associated with the current cattle grazing operation. The proposed construction schedule (tentatively set for 2011) allows sufficient time to remediate this location subsequent to resolution of funding issues. Please note that this determination is based upon the current interim land use. If this land use is significantly modified which would result in more extensive site contract, the postponement of remedial effort may require additional evaluation.

The adjoining areas were examined to determine if any off-site contaminant sources, with potential to impact the proposed acquisition area, were readily identifiable. The adjacent areas were similarly used for cattle grazing. No significant off-site contaminant sources were noted.

Based upon site inspection and currently available information, environmental liability associated with the proposed District acquisition of the Collier and Peebles parcels is limited to an abandoned cattle dipping vat site. The presence of this vat requires assessment/remedial effort consistent with the projected land use. Upon notification from the Real Estate Division of resolution of funding issues with the USACOE, a completed work order detailing the recommended sampling investigation will be prepared. It is recommended that the interim use of the property (prior to the construction of the Water Retention Reservoir) be conducted

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under the auspices of applicable guidelines and criteria for District-owned land to prevent any subsequent environmental degradation.

If you have questions, or require additional information, please contact me at extension 2265.

RK/mem

c: Jim Strotman
Wanda Caffie-Simpson
Barry Present
Fred Davis
Tom McCracken
Jim Bridgeman
Jim Strahan
Eva Shea
Max Day
Abe Cooper
Holly Young
Knox McKee

Kukleski, Robert

From: Kukleski, Robert

Sent: Thursday, June 14, 2007 11:16 AM

To: Leckler, Kurt; Bridgeman, James; Coughlin, Steve; Helfferich, William; Clements, Ruth; Shugar, Kim

Cc: Korf, Scott; McMillan, Clayton; Taylor, Robert; Stringer, Andrea; Schwetje, Toby; Cooper, Abner; Walter, Holly

Subject: Cattle Dipping Vat Site; Former Peeples Property (Tract No. KR 105-022); Glades County

Attachments: DOC070614.pdf

Kurt/Clayton/Toby/Scott:

Thank you for the information regarding the cattle dipping vat identified during the recent inspection.

Ruth/Steve /Bill:

The cattle dipping vat in question was originally identified in the Phase I Environmental Assessment of the Collier (Tract No. 105-024) and Peeples (Tract No. 105-022) properties that was completed in January, 2000 (copy attached to these e-mail). As detailed in the attached memorandum, it was recommended that the cattle dipping vat be addressed in a consistent manner with the remedial strategy that had been developed for these locations. This remedial strategy (which was developed in conjunction with the Florida Department of Environmental Protection in the mid-1990's) has been implemented at approximately 20 former cattle dipping vat sites that the District has acquired, and initially consists of a characterization phase. This characterization phase defines the extent of the impacted area, and evaluates the alternative remedial measures. At the time of this Phase I Environmental Assessment, the cost of the characterization phase was projected at approximately $56,000 (with the cost of the subsequent remedial effort to be determined by the characterization phase).

At that juncture (again, as detailed in the attached memorandum), Blair LittleJohn had indicated that the potential funding for the Project that the Peeples property was acquired for was dissimilar to the Kissimmee Restoration Project in that the District would not likely recover costs for the corrective actions associated with the cattle dipping vat. Because of this, Blair had requested that any characterization/remedial efforts for the vat location be held in abeyance pending a modified operating agreement with the US Army Corps of Engineers that would allow the District to recover costs for this effort.

The remote location of this vat, coupled with the limited human contact associated with the interim use of the property (cattle grazing) and the proposed construction schedule for the Project (tentatively scheduled for 2011 at that juncture), supported this conclusion. **To date, I have received no additional direction to proceed with the corrective actions at the cattle dipping vat site located on the former Peeples property. If the circumstances have been modified and the Project construction schedule and/or interim land use mandates that the required corrective actions should be initiated at this time, I will proceed with the characterization phase at your collective direction.**

Please call me at extension 3337 with questions.

From: Leckler, Kurt
Sent: Wednesday, June 13, 2007 9:53 AM
To: Bridgeman, James; Kukleski, Robert; Stringer, Andrea; Taylor, Robert
Cc: Korf, Scott; McMillan, Clayton
Subject: FW: dipping vat

The information you were looking for appears below. The link doesn't work; you'll have to enter the Parcel ID into the Glades County Property Appraiser's website yourself.

Clayton, thank you for fulfilling this request.

Kurt

From: McMillan, Clayton
Sent: Tuesday, June 12, 2007 4:03 PM
To: Leckler, Kurt
Subject: RE: dipping vat

Parcel ID – A05-38-34-A00-0010-0000
Former owner – Juanell Peeples

For reference,
http://qpublic.net/cgi-bin/glades_alsearch.cgi

Clayton McMillan
Hydrogeologist
Water Use Regulation Division
South Florida Water Management District
205 N. Parrott Ave., Ste. 201
Okeechobee, FL 34972
Office (863) 462-5260 Ext. 3034
Cell (561) 628-5274
Fax (863) 462-5269

From: Leckler, Kurt
Sent: Tuesday, June 12, 2007 3:40 PM
To: McMillan, Clayton
Subject: FW: dipping vat

Clayton, I need a favor. Down at the bottom of this string, there is a lat/long location provided by Toby Schwetje. Might you be able to zoom there on GIS, turn on the property appraiser's parcel boundaries for Glades County (are they there yet?), and find a parcel ID number and former owner of the property on which this dipping vat is located?

Thanks,

Kurt

From: Bridgeman, James
Sent: Tuesday, June 12, 2007 1:44 PM
To: Leckler, Kurt
Cc: Stringer, Andrea
Subject: RE: dipping vat

Kurt..Can you help us locate the property ie..name of former owner, county etc.?

James Bridgeman
Land Stewardship Division
Land Acquisition & Land Management Department
The Everglades Restoration Resource Area
561-682-6284 (direct)
561-248-0517 (cell)
561-682-2935 (fax)

From: Leckler, Kurt
Sent: Tuesday, June 12, 2007 1:14 PM
To: Bridgeman, James
Subject: FW: dipping vat

Jim, might you know who in Land Management could find this information to be of value?

Kurt

From: Schwetje, Toby
Sent: Monday, June 11, 2007 4:27 PM
To: Korf, Scott
Cc: Guerrero, Krista; Leckler, Kurt
Subject: dipping vat

I did a sit visit of 22-00038-W. Mr. Stratton said there was a cattle dipping vat located just east of his property **on property purchased by the district**. N 27 degrees 11.993' W 80 degrees 57.243'

DRAFT

PHASE I/II
ENVIRONMENTAL SITE ASSESSMENT
FOR

PEARCE PROPERTIES
STATE ROAD 78, BUCKHEAD RIDGE
GLADES COUNTY, FLORIDA

Prepared For:

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
3932 RCA Boulevard, Suite 3210, Palm Beach Gardens, Florida

Prepared By:

Environmental Consulting & Technology, Inc.

6300 NE First Avenue, Suite 100, Fort Lauderdale, Florida 33334

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EXECUTIVE SUMMARY

Environmental Consulting & Technology, Inc. (ECT) was retained by the South Florida Water Management District to conduct a Phase I/Phase II Environmental Site Assessment (ESA) of an approximately 4,700-acre property, consisting of three non-contiguous parcels, referred to as the Pearce property. The parcels are located on the northern side of Sate Road 78, near Buckhead Ridge, in northeast Glades County, Florida. Ownership of the parcels is shown in the following table.

Tract No.	Owner(s)	Acreage
MD 100-004	Sixty Nine Ranch Inc.	734.46
MD 100-006	Sixty Nine Ranch Inc.	567.97
MD 100-007	J.F. Ranch Inc.	605.47
MD 100-008	J.F. Ranch Inc.	1,374.78
MD 100-009	Pearce, John F. & Idell T	40.75
MD 100-010	Pearce, John F and Idell Trustees	189.75
MD 100-012	Pearce, John F. & Idell Trustee	283.97
MD 100-014	Indian Prairie Groves Inc.	922.7

The property's present use is a combination of pasture (approximately 4,500 acres) and citrus grove (approximately 220 acres). Of the 220-acres of citrus grove, approximately 180 acres were recently plowed and cleared of trees, while 40 acres remain active. According to Mr. Ricou Hartman, the owner's representative, tomato farming occurred in a portion of tracts MD 100-004, MD 100-007, MD 100-008 and MD 100-014 until 1947 (approximately 1,900 acres). The remaining portions of the property have been used historically for citrus farming and cattle ranching. Citrus has been cultivated on portions of the property since circa 1993, prior to which the land was used for pasture/cattle ranching. Based upon ECT's conversations with Mr. Hartman, a portion of the property was used to test the viability of Bahia grass cultivation for commercial production; however, no soil amendments were applied. The current property owners have owned the property since the 1940s and were knowledgeable of historical agricultural operations. The analytical suite was selected based upon ECT's historical experience with agricultural operations, as well as site specific knowledge from Mr. Hartman.

ECT understands that the proposed use of the subject site is as a storm water treatment area (STA) as part of the Lake Okeechobee Watershed Project. This project was conducted in accordance with ECT's proposal to Mr. Robert Kukleski, Lead Environmental Engineer of the South Florida Water Management District (District), dated December 5, 2005.

The purpose of the Phase I Environmental Site Assessment was to evaluate whether current or historical activities on or near the subject property may have resulted in contamination by hazardous substance or wastes, also known as a "Recognized Environmental Condition" in general accordance with the ASTM E1527. The Phase II Assessment was conducted to evaluate potential impacts to the soil, sediment and groundwater resulting from a release of petroleum products or hazardous materials/waste including pesticide/herbicide and soil amendments handling and use. Soil, sediment and groundwater analytical results from the Phase II investigation were reviewed to evaluate the necessity for and estimated costs of corrective actions. In evaluating the results from the Phase II sampling activities, ECT considered the future use of the site as a surface water impoundment structure.

The subject site is located within the Lake Okeechobee Watershed. The objectives of these projects are 1) to improve water quality in tributaries and discharges to Lake Okeechobee, 2) to increase storage capacity for watershed runoff and lake water, and 3) to enhance and restore wetlands in the watershed. The greater Lake Okeechobee Watershed project is one of the components of CERP. The CERP is designed to provide multiple regional benefits in South Florida, including a more healthy range of water levels in Lake Okeechobee, with fewer extreme high and low conditions. Regional reservoir-assisted storm water treatment areas, storage reservoirs, and tributary sediment control projects are proposed for the Lake Okeechobee Watershed.

Based upon observations and information obtained in the Phase I Environmental Site Assessment of the Pearce property, areas of environmental concern identified include:

- Cultivated Areas
- Canal Sediments
- Seven (7) Pump Stations
- Two (2) Cattle Pens
- Four (4) Pole Barns

- Equipment Boneyard
- Two (2) Burn Areas

A soil, sediment and groundwater investigation to further evaluate the property for the presence or absence of contamination associated with the aforementioned areas was performed during the Phase II investigation. The investigation included intrusive activities including the installation of groundwater monitoring wells, completion of soil borings and collection of sediment grab samples.

Soil and groundwater analytical results from the Phase II investigation were reviewed to evaluate the necessity for and estimated costs of corrective actions. Based upon areas of concern identified during the Phase II ESA, an ecological risk assessment was performed.

DDE has been identified as chemicals of potential ecological concern (COPECs). The presence of DDE is not considered to preclude the use of the property except in the context of the levels within the areas designated as TCASB-23, TCASB-25, TCASB-26, TCASB-27, TCASB-28, TCASB-30, TCASB-37 and TCASB-38, which is estimated to encompass approximately 400 acres.

Outside of these areas and the identified point sources on the Pearce Property, little to no potential adverse ecological effects would be predicted, and as such, would not preclude the use of the property as a water retention reservoir or other water control structure. All applications of paraquat and chlordane should cease immediately.

It is recommended that the potential adverse effects on aquatic organisms due to DDE be addressed through soil inversion within areas TCASB-23, TCASB-25, TCASB-26, TCASB-27, TCASB-28, TCASB-30, TCASB-37 and TCASB-38 of the Pearce property. The cost for soil inversion for the 400-acre area is estimated to be $330,000.

The Pearce property cannot, at this time, be unqualifiedly identified as a potential water retention reservoir because of the presence of DDE in areas TCASB-23, TCASB-25, TCASB-26, TCASB-27, TCASB-28, TCASB-30, TCASB-37 and TCASB-38.

On the basis of the information obtained from the Phase II ESA, ECT recommends the implementation of corrective action activities be conducted, at point sources and areas TCASB-23, TCASB-25, TCASB-26, TCASB-27, TCASB-28, TCASB-30, TCASB-37 and TCASB-38, as provided in Sections 8 and 9 of this report. The estimated cost to implement the investigation and corrective action activities is $566,753.60. It is ECT's opinion that the investigation and correction activities can be completed within a one to two year period.

At the request of the SFWMD, ECT evaluated the recommended corrective actions, as they would relate to two proposed future land uses. The first land use would be the property's continued agricultural use, or conversion to residential or industrial land uses and the second would consist of the property's proposed future land use as a surface water impoundment.

The costs associated with the proposed future land use as an agricultural, residential or industrial property were calculated based upon the contaminants of concern, identified on the property, at concentrations, which exceed the FDEP Soil Cleanup Target Levels [SCTLs (Chapter 62-777, FAC)]. On this basis the corrective action cost associated with the agricultural, residential or industrial land use assumption would be $207,753.60. Corrective action costs associated with the land use for surface water impoundment are anticipated to be $359,000.00.

Notwithstanding the corrective actions described in Section 8.0, there are no other identified regional environmental conditions that would inhibit the property from being utilized for its projected land use as a water storage impoundment structure.

1.0 INTRODUCTION

1.1 PURPOSE

1.1.1 PHASE I ENVIRONMENTAL SITE ASSESSMENT

The purpose of ECT's Phase I Environmental Site Assessment was to evaluate environmental concerns or issues that may be associated with the aforementioned property. Such environmental concerns or issues are subsequently referred to in this report as a "Recognized Environmental Condition" in general accordance with the ASTM Standard E1527. A Recognized Environmental Condition is 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, groundwater or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include *de minimis* conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies."

1.1.2 PHASE II ENVIRONMENTAL SITE ASSESSMENT

The purpose of the Phase II Environmental Site Assessment is to further evaluate areas of potential environmental concern that may be associated with present or past land use by performing limited soil, sediment and groundwater sampling to evaluate for buried debris. The Phase II assessment was conducted in conjunction with the Phase I to expedite completion of the site assessment. Phase II activities included the collection of soil, sediment, and groundwater samples from areas of potential concern identified during the Phase I ESA, laboratory analysis of collected samples, and evaluation of collected data.

1.2 SCOPE OF WORK

The Phase I ESA included a site reconnaissance of the property, a review of federal and state environmental databases and related agency information for the site and surrounding properties, interviews with owner representatives and regulatory agency contacts, historical aerial photograph review, a review of published geologic information, and

other related items. This information was used to evaluate existing or potential environmental impairment at the site due to current or past land use. The Phase I scope of work included the following items:

- Conduct field inspections of the subject property to identify hazardous or toxic materials used or stored on site; and identify stressed vegetation or areas of disturbance that may indicate areas of past on-site disposal;
- Interview current tenants or managers having knowledge of current and/or past operations or construction activities;
- Review available aerial photographs to evaluate current and historical land use for the site and adjacent properties;
- Inspect chemical storage areas/equipment storage areas and chemical mix and load areas, discharge and disposal areas, including obvious evidence of stained soils resulting from aboveground storage tanks (ASTs) or petroleum discharges;
- Review commercially available environmental databases;
- Observations of regional land use within ¼ mile of the properties, including readily visible conditions posing significant environmental concerns to the subject site;
- Review of chemical inventory list as available;
- Review appropriate environmental agency information pertaining to the site (if available in a timely manner).
- Review of annual horticultural plans, if available; and
- Conducting interviews with agency representatives, including but not limited to, the Environmental Protection Agency, US Fish and Wildlife Services, Florida Department of Agriculture and Consumer Services, Institute of Food and Agricultural Services.

The Phase II ESA included subsurface investigations of areas of potential concern identified in the Phase I ESA. The Phase II scope of work included the following items:

- Evaluate soil, sediment and groundwater for the presence of contaminants originating from on- and off-site sources;
- Develop budgetary cost estimates associated with site remediation based on results of the investigation; and
- Bifurcate remediation costs based upon potential future land use.

2.0 PHASE I ESA

2.1 SITE CONDITIONS

The subject property consists of three (3) non-contiguous parcels that total approximately 4,700 acres and lies in the northeastern section of Glades County. The property is approximately bound by Lake Okeechobee to the southeast, the Kissimmee River to the northeast, and the Indian Prairie Canal to the southwest. The subject property consists of eight (8) legal entities, collectively referenced as the Pearce property in this report. The following table summarizes the property owners and corresponding tracts.

Tract No.	Owner(s)	Acreage
MD 100-004	Sixty Nine Ranch Inc.	734.46
MD 100-006	Sixty Nine Ranch Inc.	567.97
MD 100-007	J.F. Ranch Inc.	605.47
MD 100-008	J.F. Ranch Inc.	1,374.78
MD 100-009	Pearce, John F. & Idell T	40.75
MD 100-010	Pearce, John F and Idell Trustees	189.75
MD 100-012	Pearce, John F. & Idell Trustee	283.97
MD 100-014	Indian Prairie Groves Inc.	922.7

The property's present use is a combination of pasture and citrus grove. Approximately 4,500 acres are comprised of pasture land and 220 acres are cultivated in citrus. Of the 220 acres of citrus, approximately 180 acres were recently plowed and cleared of trees and 40 acres remain active. According to Mr. Ricou Hartman, the owner's representative, tomato farming occurred in a portion of tracts MD 100-004, MD 100-007, MD 100-008 and MD 100-014 until 1947 (approximately 1,900 acres), which are currently used for pasture. The remaining portions of the property have been used historically for citrus farming and cattle ranching. Mr. Hartman indicated that citrus cultivation has occurred for approximately 12 years, prior to which the land was used for cattle ranching/pasture. In addition, Mr. Hartman indicated that a portion of the property was used to test the viability of Bahia grass cultivation for commercial production; however, no soil amendments were applied. The current property owners have owned the property since the 1940s and were knowledgeable of historical agricultural operations. The analytical suite was selected based upon ECT's historical experience with agricultural operations, as

well as site specific knowledge from Mr. Hartman. Supplemental information was sought from IFAS and other knowledgeable sources. In addition, ECT was provided with a Phase I ESA, prepared by Nodarse, dated June 2005 and a Phase I/II ESA, prepared by URS/Dames & Moore, dated June 2000. ECT understands that the property is proposed for use as a surface water impoundment structure. Figure 2-1 is a regional location map. Figure 2-2 is a site vicinity map and Figure 2-3 is a land use map. Photographs of the subject site are included as Appendix A.

2.1.1 OPERATIONAL AREAS

The approximately 4,700-acre parcel consists of three non-contiguous parcels, referred to as the Pearce property, and lies in northern Glades County, adjacent to the Okeechobee County line. The site's present use is a combination of citrus grove and cattle ranching. No dedicated agrochemical mix/load areas or cattle dip vats were observed on the property. Review of FDEP's Cattle Dipping Vat database for Glades, Highlands and Okeechobee Counties (Appendix B), which lists known cattle dip vats based upon old records from the State Livestock Board, indicated a dip vat under a "Pearce" in 1932 in Highlands County. According to Mr. Hartman, there are no and never have been cattle dipping vats located on the subject parcels and this reference is to someone not associated with the current property owners. Operational areas, located within the cultivated areas of the property, included the following.

2.1.1.1 <u>Canal Sediments</u>

To evaluate the effect of storm water runoff, which could transport agrochemicals to sediments in the canals on the property, ECT proposed to collect a total of twenty-six (26) sediment samples. Twenty of these samples were located in the pasture and former tomato cultivated areas for analysis for agrochemicals and six (6) of the samples were located in the citrus grove area and submitted for analyses for copper only. Sixteen (16) sediment samples, including the six (6) copper only samples, were collected from the western parcel; eight (8) sediment samples were collected from the northern parcel and two (2) sediment samples were collected from the eastern parcel.

2.1.1.2 Pump Stations

Based upon ECTs review, seven (7) pump stations were located across the property. The pump stations were designated PS-1 through PS-7.

Pump stations #1 through #5 were located on the western parcel. Pump stations #1 through #5 generally consisted of a concrete pad with secondary containment, housing an approximately 500-gallon AST. Tanks with less than 550-gallon capacity are not required to meet the storage tank requirements of Chapter 62-761, Florida Administrative Code. Pump station #1 was located in the southern end of the citrus grove at the northern end of the western parcel. The approximate dimensions of the secondary containment structure were 8 ft by 14 ft. Pump station #2 was located north of pump station #1 in the citrus grove. The approximate dimensions of the secondary containment structure and area of potential concern was 14 ft by 10 ft. Pump station #4 was located on the western side of the northern parcel. The AST is located within a concrete block structure, with metal sides and a roof. The approximate dimensions of the structure were 8 ft by 6 ft. Pump station #5 was located in the approximate center of the former citrus grove, located on the western side of the western parcel. The pump station, including the secondary containment, the well head and associated piping have the approximate dimensions of 6 ft by 30 ft. Figure 2-5.1 illustrates the locations of the pump stations on the western Pearce property.

Pump stations #6 and #7 were located on the northern parcel. Neither of these pump stations are operable and consist of remnants and rusted components of former pump station facilities. The abandoned equipment referenced as pump station #6 is located south of dilapidated pole barn #2 and adjacent to a small stream. The rusted equipment included the pump assembly and wood trusses. The abandoned equipment referenced as pump station #7 is located immediately east of cattle pen #2 in the center of the northern parcel. The abandoned equipment includes a rusted AST resting on bare ground, wood, a 55-gallon drum, a crank casing and barbed wire. The area of potential concern is approximately 40 by 20 ft. Figure 2-5.2 illustrates the locations of the pump stations on the northern Pearce property.

2.1.1.3 Cattle Pens

Two cattle pens, designated as cattle pen #1 and cattle pen #2, consisting of fenced compounds and wooden structures were located on the Pearce property. Cattle pen #1 was located near the southwestern boundary of the western parcel and appeared to be operable; cattle pen #2 was centrally located on the northern parcel. The fenced compounds associated with cattle pen #2 appeared to be in good condition; however, the metal roof was collapsed. The approximate dimensions of the area of potential concern for cattle pen #1 were 72 ft by 35 ft. The approximate dimensions of the area of concern for cattle pen #2 were 150 ft by 70 ft. Figure 2-6.1 illustrates the location of cattle pen #1 and 2-6.2 illustrates the location of cattle pen #2.

2.1.1.4 Pole Barns

During the site inspection, four (4) pole barns, designated pole barn #1 through pole barn #4, were observed across the parcels. Pole barns #1, #3 and #4 were located on the western parcel and pole barn #2 was located on the northern parcel.

Pole barns #1 and #3 were located on the southern end of the western parcel and pole barn #4 is centrally located on the western parcel. Pole barn #1 consisted of a horse barn and an approximately 500-gallon skid-mounted vehicular diesel aboveground storage tank (AST). The AST was located inside the horse barn, under cover, on a concrete pad. Pole barn #1 consisted of concrete and dirt floors, with a small covered area at the front of the barn. The approximate dimensions of the non-concrete covered floor area of pole barn #1 were 30 ft by 25 ft. Pole barn #3 consisted of a 4-bay wood frame structure with a metal roof and metal siding at both ends. All four bays are open on both sides with dirt floors. The approximate dimensions of pole barn #3 were 48 ft by 32 ft. Pole barn #4 consisted of a metal frame structure with a dilapidated metal roof and metal siding on both ends. This pole barn appeared to be the operations center for the operating citrus grove. A small enclosed storage area was located at the northern end of the pole barn, while the southern end consisted of two (2) open bays. During the time of the inspection, an approximately 1,500-gallon mobile diesel AST was located approximately 50 ft east of pole barn #4. Petroleum odors and a small area of staining (6 ft by 6 ft) were noted adjacent to the fuel dispenser on the AST.

The approximate dimensions of pole barn #4 were 46 ft by 24 ft. Figure 2-7.1 illustrates the locations of the pole barns on the western parcel.

Pole barn #2 was located on the southwestern portion of the northern parcel. Pole barn #2 was dilapidated with no roof or siding present. Rusted and torn sheets of metal were observed on the ground in the vicinity of the pole barn. The wooden frame was still intact and had a dirt floor. The approximate dimensions of pole barn #2 were 20 ft by 50 ft. Figure 2-7.2 illustrates the location of pole barn #2 on the northern parcel.

2.1.1.5 Equipment Boneyard

An equipment boneyard was located in the southwestern corner of the western parcel. The equipment boneyard was located west of pole barns #1 and #3 and just west of cattle pen #1. The equipment boneyard consisted of a dilapidated pole barn with a dirt floor with abandoned farm equipment. The boneyard was approximately 84 ft by 24 ft. The boneyard was delineated by stressed vegetation, within which abandoned farm equipment is located. Two (2) elevated water tank ASTs were located on the southern end of the equipment boneyard; a small dilapidated empty mobile AST was located south of the elevated water ASTs and one large rusted AST was located on the northern side of the boneyard structure. Figure 2-8 illustrates the location of the equipment boneyard.

2.1.1.6 Burn Areas

Two (2) burn areas were centrally located on the western parcel, just east of pole barn #4, designated burn area #1 and burn area #2. The burn areas were characterized by burn residue and evidence of burnt/charred wood. The clearing in which burn area #1 occupied was approximately 20 ft by 50 ft; burn area #2 was approximately 14 ft by 24 ft. Figure 2-9 illustrates the burn area. The location of the burn areas was also notable as the former location of a large pole barn (2002 aerial photograph).

2.1.1.7 Solid Waste Areas

Areas of solid waste were observed on the western and northern parcels. Solid waste was associated with pole barn #4 and the equipment boneyard on the western parcel. The

solid waste at the equipment boneyard included an abandoned horse trailer, large equipment tires, abandoned vehicles, windblown metal sheeting and debris, fabric rolls, wood, plastic 55-gallon drums, corrugated metal piping, and a small cement mixer. ECT estimates two (2) truckloads of solid waste at the equipment boneyard, excluding the horse trailer, pole barn structure and abandoned vehicles. Solid waste associated with pole barn #4 included 5-gallon pails, 55-gallon plastic drums, tires, wood and metal debris, an abandoned mobile AST and a large mound of foam packing material. ECT estimates three (3) truckloads of solid waste in the area of pole barn #4. Figure 2-10.1 illustrates the areas of solid waste on the western parcel.

Solid waste on the northern parcel, located at pole barn #2, pump station #6 and pump station #7, may be properly characterized as scrap metal and abandoned vehicles. Solid waste at pole barn #2 included an abandoned truck and a small track-mounted tractor. ECT estimates an equivalency of two (2) truckloads of solid waste for removal of the abandoned vehicles in the area of pole barn #2. Solid waste at pump station #6 included rusted remnants of the pump station (pump assembly and pump housing). ECT estimates one (1) truckload of solid waste in the area of pump station #6. Solid waste at pump station #7 included a rusted AST, a 55-gallon drum, metal crank casing and rolls of barbed wire. ECT estimates one (1) truckload of solid waste in the area of pump station #7. Figure 2-10.2 illustrates the areas of solid waste on the northern parcel.

2.2 ADJACENT & SURROUNDING PROPERTIES

ECT identified adjacent and abutting properties through review of property plat maps and aerial photographs. Based upon this review, abutting and adjacent properties include agricultural lands which are located to the north, south, east and west. Lake Okeechobee is located southeast of the subject property. A small community, known as Buckhead Ridge, is located proximal to the properties along SW 78 and the Brighton Seminole Indian Reservation is located west of the site. The Brighton Seminole Indian Reservation consists of 36,000-acres and is used for sugar cane farming, citrus cultivation and cattle ranching.

2.3 HISTORICAL AERIAL PHOTOGRAPHS

The property lies within Township 38S, Range 34E and Sections 10, 15, 22, 30, 31, 32 and 33 and Township 39S, Range 34E and Sections 5, 6 and 8. Review of the available historical aerial photographs from 1962, 1968, 1999 and 2002 illustrate the land use from 1962 to the present as primarily agricultural, including pasture and citrus. The land use at the site generally reflects that of the adjacent and neighboring properties. Review of the 2002 aerial photograph indicated a large structure in the area of pole barn #4 which is no longer present. According to Mr. Hartman, this was a former hay barn which was destroyed by the hurricanes. No chemical or petroleum products were stored here and no vehicle maintenance activities were performed at this barn. No additional point sources of concern were noted beyond those identified in this site investigation. A summary of each aerial photograph is provided in Table 2-1. A portion of the 2002 aerial photograph, illustrating the hay barn, is attached as Appendix C.

2.4 REGULATORY INQUIRIES

ECT conducted several agency file reviews to obtain potentially pertinent information regarding this facility. The information obtained through these reviews is summarized in this section.

2.4.1 PROPERTY APPRAISERS OFFICE

On January 11, 2006, ECT personnel contacted Ms. Carmen Whitney with the Glades County Property Appraisers Office, regarding property records for the subject site (Appendix D). Ms. Whitney referred ECT to the Glades County Property Appraisers website (www.qpublic.net\glades). Subsequent to the database search, ECT identified nine (9) entries pertaining to the subject property "Pearce, John F." According to the property records, these properties are recorded as citrus and pasture. Mr. Larry R. Luckey, the Glades County Property Appraiser, was asked if he was aware of any environmental issues pertaining to the subject site. Mr. Luckey stated that he was unaware of any environmental issues that would preclude the sites inclusion into the CERP.

2.4.2 FDEP, SOUTH DISTRICT

ECT spoke with Ms. Kelly Kramer on January 11, 2006. ECT supplied Ms. Kramer with the site location and indicated the property boundaries, which she used to query her system of compliance and outstanding issues. This query of the system turned up no entries, thus she had no indication of information that would preclude the inclusion of these properties into the CERP.

Review of FDEP's online storage tank database (Appendix E) indicated two (2) 1,000-gallon vehicular diesel ASTs for the J.F. Ranch, Inc. parcel. According to the database, the tanks have been removed. One (2) 2,000-gallon vehicular diesel AST is listed for the Pearce Ranch property. No concerns are indicated for the subject site from the presence of these tanks.

2.4.3 FORMERLY USED DEFENSE (FUD) SITES

ECT contacted the Army Corp of Engineers in Jacksonville (January 11, 2005) and spoke with Mr. Michael Ornella, Chief of Inter-Agency Services Division, in the executive offices, who indicated there are no known FUD sites in Glades County. Review of the FUDs database, last updated March 11, 2005, indicated that there are 691 listed FUD sites in Florida, however, none of these are located in Glades County.

2.4.4 COUNTY LANDFILL RECORDS

ECT contacted the Glades County Landfill Department to confirm whether they had any records of historical or active landfills in the vicinity of the subject site. According to Ms. Olga O'Dell (January 11, 2005), who has been with the department for 20 years, the landfill is located on SR 78 west, near LaBelle. She was not aware of any historical landfill in the northern part of the county or of any regulated active landfills in the vicinity of the site. However, she recommended that ECT confirm the location of the landfills in Okeechobee County, since Buckhead Ridge was in the vicinity of the County Line. Two landfills are located in Okeechobee County, however based upon the distances from the subject site, no concerns are anticipated.

2.4.5 INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES, MARTIN COUNTY EXTENSION

ECT contacted the IFAS extension for Glades County in Moore Haven (January 11, 2006). The IFAS representative was familiar with the Pearce property and has lived in the area for approximately 30 years. While they were unable to provide and specific details regarding site activities, they were not aware of any issues that were within the public domain which would preclude the inclusion of the property in the CERP.

2.5 FAMILIAR PERSON INQUIRY

People familiar with past site operations may provide information as to materials or chemicals, which were used and/or potentially discharged, on the property. Interviews with such knowledgeable persons can reveal which portions of the property would require environmental sampling and can indicate the specific type of laboratory analyses that may be appropriate. The current property representative/owners have owned/operated the subject property since the 1940s and therefore were able to provide specific information regarding historical operations. ECT also contacted the Glades County Property Appraiser's Office and IFAS extension for Glades County, as discussed in Sections 2.4.1 and 2.4.5, above. No concerns were indicated for the Pearce property.

2.5.1 LANDOWNERS

The analytical suites selected for this project were based upon ECT's discussions of chemical usage with Mr. Hartman and ECT's knowledge of citrus and cattle ranching chemical application. The use of portions of the property for historical tomato farming required analysis for organochlorine pesticides.

3.0 APPLICABLE REGULATORY STANDARDS

3.1 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

Applicable or Relevant and Appropriate Requirements (ARARs) include those provisions of the Florida Administrative Code (FAC), which are relevant to the assessment, and remediation of environmental concerns identified during this site investigation. These requirements include provisions for the proper handling and disposal of solid and hazardous waste, proper management and storage of petroleum in underground and aboveground tanks, and procedures for proper assessment and remediation of petroleum and non-petroleum contaminants. A summary of various, applicable chapters and sections of Florida Administration Code is provided in the following.

3.1.1 SOLID WASTE MANAGEMENT FACILITIES-CHAPTER 62-701, FAC

The main objectives of this chapter are listed following:

- To establish standards for the construction, operation, and closure of solid waste management facilities to minimize their threat to public health and the environment;
- To provide for the safe handing, storage, transportation, disposal or beneficial use of ash residue from the combustion of solid waste to regulate the production and use of compost made from solid waste;
- To establish a comprehensive program for the proper management and recycling of used oil; to regulate waste tire storage, collection, transport, processing, recycling, reuse and disposal;
- To establish procedures for disbursement of recycling and education grants, small county grants, waste tire grants, litter control and prevention grants, and small county landfill closure grants to local governments for recycling and solid waste education;
- To provide a uniform procedure by which certain persons in this state who handle, purchase, receive, recover, sell or are end users of recovered materials shall be certified by and report to the Department and register with and report to certain local governments; and

- To implement the provisions of the Florida Solid Waste Management regulations.

Solid Waste-Unless authorized by the Department permit or site certification in effect on January 5, 1993, no solid waste shall be stored or disposed of by being placed:

1) In an area where geological formations or other subsurface features will not provide support for the solid waste;
2) In any area where the absence of geological formations or subsurface features would allow for the unimpeded discharge of waste or leachate to ground or surface water;
3) Within 500 feet of an existing or approved potable water well unless disposal takes place at the facility for which a complete permit application was filed or which was originally permitted before the potable water well was in existence;
4) In a dewatered pit unless the pit is lined and permanent leachate containment and special design techniques are used to ensure the integrity of the liner;
5) In an area subject to frequent and periodic flooding unless flood protection measures are in place;
6) In any natural or artificial body of water including groundwater; or
7) Within 200 feet of any natural or artificial body of water, including wetlands within the jurisdiction of the Department, except bodies of water contained completely within the property boundaries of the disposal site, which do not discharge from the site to surface waters.

Note: These provisions represent the pertinent sections of Chapter 62-701, FAC, and it is not intended to be a complete summary of the regulation.

3.1.2 PETROLEUM STORAGE TANK SYSTEMS-CHAPTER 62-761, FAC.

Except for aboveground mineral acid storage tank systems, the purpose of this chapter is to provide standards for the registration, construction, installation, operation, maintenance, repair, closure and disposal of storage tank systems that store regulated substances and to minimize the occurrence and environmental risks of releases and discharges. This chapter provides standards for underground storage tank systems having individual storage tank capacities greater than 110 gallons, and aboveground storage tank systems having individual storage tank capacities greater than 550 gallons.

3.1.3 PETROLEUM CONTAMINATED SITE-CHAPTER 62-770, FAC

The clean-up criteria contained in Chapter 62-770, FAC, apply to cleanup of a site contaminated with petroleum or petroleum products. The cleanup criteria does not apply to: (1) petroleum or petroleum products contaminated with significant quantities of other substances; (2) any refined derivatives or by-products of crude oil, natural gas, or other naturally occurring hydrocarbons, except those defined as petroleum product in Section 376.301, FS; or (3) any discharge of petroleum or petroleum products of less than 25 gallons onto a pervious surface, as long as the discharge is removed and properly treated or properly disposed, or otherwise remediated, so that no contamination from the discharge remains on site.

Cleanup target levels for petroleum products' chemical of concern found in groundwater shall be the applicable State water quality standards, except where site-specific, alternative cleanup target levels have been established. In addition, where groundwater contaminated with petroleum or petroleum products' chemicals of concern is discharging into surface water or when available information indicates that it may discharge in the future, the cleanup target levels are also based on the surface water standards. Cleanup target levels for petroleum products' chemicals of concern found in soil, or alternative cleanup target levels are enforceable under this chapter and apply only in the rehabilitation of a site contaminated with petroleum or petroleum products.

3.1.4 GROUNDWATER PERMITTING AND MONITORING REQUIREMENTS - CHAPTER 62-522, FAC

The criteria outlined in Chapter 62-522, FAC apply to direct and indirect discharges into groundwater which causes a violation in the water quality standards and criteria for receiving groundwater as established in Chapter 62-520, FAC, except with a zone of discharge established by rule or permit pursuant to this Chapter. Dimensions for zones of discharges for Class G-II groundwater, permit and monitoring requirements and exceptions and groundwater corrective action criteria are described in Chapters 62-522.500 through 62-522.700, FAC.

3.1.5 CLEANUP CRITERIA-CHAPTERS 62-785 AND 62-777, FAC

These chapters are established for the purpose of protecting the public health and the environment under actual circumstances of exposure and for determining, on a site-specific basis, the rehabilitation program tasks that comprise a site rehabilitation program and the levels at which a rehabilitation program task and site rehabilitation program may be deemed completed. Risk based corrective action principles are incorporated, to the maximum extent feasible, to achieve protection of human health and safety and the environment in a cost-effective manner. These chapters provide both default cleanup target levels and a process for the derivation of site-specific alternative cleanup target levels that are protective of human health and safety and the environment. Chapter 62-777, FAC was recently amended and the applicable soil and groundwater cleanup target levels have been incorporated into this document.

3.1.6 APPLICABLE CRITERIA

Applicable State of Florida water quality standards for surface water pursuant to Chapter 62-302, FAC and groundwater pursuant to Chapters 62-520 and 62-550, FAC were utilized as cleanup target levels for each contaminant found in groundwater except where alternative cleanup target levels have been established. Where contaminated groundwater was observed or reported to discharge to surface water or when available information indicates that it may discharge to the surface water in the future, the cleanup target levels for the contaminant were based on the surface water standards and criteria. State water quality standards were applied as follows:

- Cleanup target levels for each contaminant found in groundwater shall be the applicable state water quality standards. Where such standards do not exist, the cleanup target levels for department shall consider the following, as appropriate, in establishing the applicable minimum criteria: calculations using a lifetime cancer risk level of 1.0E-6; a hazard index of 1 or less; the best achievable detection limit; the naturally occurring background concentration; or nuisance, organoleptic and aesthetic considerations.
- Where surface waters are exposed to contaminated groundwater, the cleanup target levels for the contaminants shall be based on the lesser of the groundwater or surface water standards as established by department rule. The point of

measuring compliance with the surface water standards shall be in the groundwater immediately adjacent to the surface water body.

- The department may set alternative cleanup target levels based upon the person responsible for site rehabilitation demonstrating, using site-specific modeling and risk assessment studies, that human health, public safety, and the environment are protected to the same degree as provided above. Where a state water quality standard is applicable, a deviation may not result in the application of cleanup target levels more stringent than the standard. In determining whether it is appropriate to establish alternative cleanup target levels at a site, the department must consider the effectiveness of source removal that has been completed at the site and the practical likelihood of the use of low yield or poor quality groundwater, the use of groundwater near marine surface water bodies, the current and projected use of the affected groundwater in the vicinity of the site, or the use of groundwater in the immediate vicinity of the contaminated area, where it has been demonstrated that the groundwater contamination is not migrating away from such localized source, provided human health, public safety, and the environment are protected.

3.1.7 CLEAN SOIL/SEDIMENT CRITERIA

Based upon projected future land use, sediment quality criteria as stipulated in the document entitled Development and Evaluation of Numerical Sediment Quality Assessment Guidelines (SQAGs) for Florida Inland Waters, dated January 2003, were applied. The SQAG provides a range of sediment concentrations that are associated with adverse effects on aquatic organisms. The first value is the threshold effect concentration (TEC), which is the lower of the two limits, and the second value is the probable effect concentration (PEC). The TEC represents the upper limit of the range of sediment contaminant concentrations dominated by no effect data entries (i.e., the minimal effects range). Within the TEC, concentrations of sediment-associated contaminants are not considered to represent significant hazards to aquatic organisms. The PEC defines the lower limit of the range of contaminant concentrations that are usually or always associated with adverse biological effects. Within the PEC, concentrations of sediment-associated contaminants are considered to represent significant and immediate hazards to aquatic organisms.

If sediment quality criteria were not available, the most conservative soil cleanup target levels (SCTLs) were applied. The FDEP lists two types of SCTLs; those based on direct

exposure (human health) and those based on leachability (protection of the groundwater). There are two sets of Direct Exposure SCTLs, based on different land use assumptions. The first set (direct exposure I) includes values calculated for a residential scenario; the second set (direct exposure II) includes values calculated for an industrial scenario. For this assessment, residential values were applied if no SQAG was available. There are three sets of SCTLs: (1) leachability based on groundwater criteria (2) leachability based on freshwater and marine surface water criteria, and (3) groundwater of low yield/poor quality criteria, which are derived (back-calculated) from the groundwater cleanup target levels (based on one of the previously mentioned three water quality criteria). This means that soil with concentrations at or below the appropriate leachability based concentration should not leach at concentrations exceeding the corresponding groundwater standards. To qualify for an NFA without conditions, the Constituents of Concern (COCs) detected in soil samples from the vadose zone must meet both the Direct Exposure cleanup levels for a residential scenario and the leachability cleanup levels based on the default groundwater cleanup levels. In most cases, sediment quality criteria, if available, were applied.

4.0 REGULATORY REVIEW

4.1 FEDERAL AND STATE REGULATORY AGENCIES

ECT investigated the following federal and State of Florida regulatory databases through Environmental Data Resources (EDR) electronic search capabilities, to evaluate whether the subject property or adjacent sites within an approximate 1.0-mile radius were listed. The complete report is provided in Appendix F.

4.1.1 ENVIRONMENTAL DATABASES REVIEW

ECT reviewed information gathered from environmental databases through Environmental Data Resources, Inc. (EDR), to evaluate if activities on or near the site could threaten the environmental quality of the subject property. EDR reviews databases compiled by Federal, State, and local governmental agencies. The complete list of databases reviewed is provided in their report, included as Appendix F. It should be noted that this information is reported as ECT received it from EDR. It is not possible for ECT to verify the accuracy or completeness of information contained in these databases. However, the use of, and reliance upon this information is a generally accepted practice in the conduct of environmental due diligence investigations. The databases searched and the information obtained is summarized below.

- U.S. EPA National Priorities List ("Federal Superfund") (November 2, 2005)
- U.S. EPA CERCLIS List (October 21, 2005)
- RCRA Resource Conservation and Recovery Act Index System List (RCRIS) (October 27, 2005)
- U.S. EPA FINDS Report (Facility Index System) (August 29, 2005)
- FDEP, Solid Waste Facility List (GMS-80), (November 14, 2005)
- FDEP AST List (STI-02) (December 1, 2005)
- FDEP UST List (STI-02) (December 1, 2005)
- FDEP LUST List (PCT-01) (December 1, 2005)
- ERNS Emergency Response Notification System (January 27, 2005)

4.1.1.1 Federal NPL List

The EPA's National Priorities List (NPL) of uncontrolled or abandoned hazardous waste sites was reviewed for sites within one mile of the subject property. To appear on the

NPL, sites must have met or surpassed a predetermined hazard ranking system score, been chosen as a state's top priority site, or pose a significant health or environmental threat. The database searches did not identify any NPL sites within the study area.

4.1.1.2 Federal CERCLIS List

The EPA's Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) listings were reviewed to determine if sites within one mile of the subject property are listed for investigation. The CERCLIS database identifies hazardous waste sites that require investigation and possible remedial action to mitigate potential negative impacts on human health or the environment. The database search did not identify any CERCLIS sites within the search area.

4.1.1.3 Federal RCRA List

The current RCRA Notifiers List was reviewed to determine if any RCRA treatment, storage, or disposal sites (TSDs) are within 0.75-mile radius of the subject property. The database search did not identify RCRA TSD facilities within the search area.

The RCRA-regulated hazardous waste generator notifier's list was reviewed to determine if any RCRA generator facilities are located adjacent to the subject property. The database search did not identify any RCRA small or large quantity hazardous waste generator facilities within the search area.

4.1.1.4 USEPA FINDS List

The EPA maintains the Facility Index System (FINDS). The FINDS is a compilation of sites which EPA has investigated, reviewed or has been made aware of in connection with its various regulatory programs.

These regulatory programs include hazardous waste, water enforcement and permits, underground injection control, drinking water, as well as pesticides and toxic substances. The database search did not identify and FINDS facilities within the search area.

4.1.1.5 Emergency Response Notification System (ERNS)

The EPA maintains the Emergency Response Notification System (ERNS), which is a list of reported CERCLA hazardous substance releases or spills in quantities greater than the reportable quantity, as maintained at the National Response Center. Based on our review of the ERNS database, there were no ERNS incidences identified on the subject property.

4.1.1.6 FDEP Florida Hazardous Waste Sites (SITES) List

The Florida Hazardous Waste Sites (SITES) inventory, which details sites scheduled for investigation or remediation, was reviewed to determine if SITES are within a 1.25-mile radius of the subject property. The database search did not identify any SITES facilities located within the search area.

4.1.1.7 FDEP Solid Waste Disposal Facilities/Landfill Sites

The Florida Department of Environmental Protection (FDEP) inventory of solid waste facilities and landfill sites (SWFLS) were reviewed to determine if SWF/LS are in the vicinity of the subject property. The database search did not identify any SWF/LS sites within the search area.

4.1.1.8 FDEP AST/UST and Leaking UST Sites (LUST) Listing (STI-02)

The FDEP maintains a LUST/UST/AST List (STI-02), which is a listing of facilities with underground storage tanks (UST's), aboveground storage tanks (ASTs) and leaking underground storage tanks (LUST). The database search identified one (1) LUST site, Circle K #7313, within the search area. Based upon the distance of this facility from the subject properties (>1.0-mile) no concerns are anticipated for the subject site.

4.1.1.9 Orphan Sites

ECT reviewed the EDR-supplied Orphan List Sites, which are sites that have not been geocoded based on lack of sufficient data regarding their exact location. The subject site was listed in the orphan summary as Pearce Ranch and JF Ranch, Inc. for operation of aboveground storage tanks. The EDR Report is included as Appendix F.

4.2 PHASE I ESA CONCLUSIONS & RECOMMENDATIONS

The purpose of the Phase I Environmental Site Assessment was to evaluate whether current or historical activities on or near the subject property may have resulted in contamination by hazardous substance or wastes, also known as a "Recognized Environmental Condition" in general accordance with the ASTM E1527.

Based upon review of the regulatory database provided by EDR, no sites were listed abutting or adjacent to the facility, which present a potential concern from offsite contaminant migration onto the subject property.

Based upon observations and information obtained in the Phase I Environmental Site Assessment of the Pearce property, areas of environmental concern identified include:

- Cultivated Areas
- Canal Sediments
- Seven (7) Pump Stations
- Two (2) Cattle Pens
- Four (4) Pole Barns
- Equipment Boneyard
- Two (2) Burn Areas

Based upon the results of the Phase I ESA, a soil, sediment and groundwater investigation to further evaluate the property for the presence or absence of contamination associated with the aforementioned areas was proposed.

5.0 ENVIRONMENTAL SETTING

5.1 COMPREHENSIVE EVERGLADES RESTORATION PLAN

The Comprehensive Everglades Restoration Plan (CERP) is a federal/state undertaking to restore and preserve South Florida's natural ecosystems, while enhancing water supplies and flood controls. The CERP involves a review of the region's water management system known as the Central & Southern Florida, or C&SF, Project. Approximately 1,800 miles of canals and levees, primary water control structures, pumping stations, navigational locks and impounded water storage areas make up the C&SF Project. The purposes of the project include: flood control, water supply, water and the preservation of fish and wildlife, recreation, navigation and the prevention of saltwater intrusion.

For decades the project has performed its authorized function well. However, this huge man made system has had unintended effects on the natural environment including the Everglades, Lake Okeechobee, the coastal estuaries and Florida Bay. The CERP, formerly known as the C&SF Restudy, was commissioned to look at the environmental consequences of the original construction and to find alternatives to restore/protect some of the natural ecological systems. The US Army Corps of Engineers and the District are leading this effort.

Both the problems with declining ecosystem health and the solutions to Everglades' restoration can be framed by four interrelated factors: quantity, quality, timing, and distribution of water. The principal goal of restoration is to deliver the right amount of water, of the right quality, to the right places, and at the right time. The natural environment will respond to these hydrologic improvements.

The Comprehensive Plan will provide for ecosystem restoration. First and foremost, the goal of the Comprehensive Plan is to restore, protect, and preserve the south Florida ecosystem. The focus of the Plan has been to restore the defining ecological features of the original Everglades and other parts of south Florida.

5.1.1 LAKE OKEECHOBEE

Lake Okeechobee is a large (1,730 km2) freshwater lake located at the center of the interconnected south Florida aquatic ecosystem. The lake is shallow (average depth <3 m), originated about 6,000 years ago during oceanic recession, and under natural conditions probably was slightly eutrophic and had vast marshes to the west and south. The southern marsh was contiguous with the Florida Everglades, which received water as a broad sheet flow from the lake during periods of high rainfall (Gleason 1984). Modern-day Lake Okeechobee differs in size, range of water depths, and connections with other parts of the regional ecosystem. (Havens et al. 1996). Construction of the Herbert Hoover Dike in the early to mid-1900s reduced the size of the lake's open-water zone by nearly 30%, resulted in a considerable reduction in average water levels, and produced a new littoral zone within the dike that is only a fraction of size of the natural one.

The lake also has been impacted in recent decades by excessive inputs of nutrients from agricultural activities in the watershed (Flaig and Havens 1995). These nutrients have exerted the most dramatic impacts on the open-water region, where large algal blooms have occurred, along with accumulation of soft organic mud bottom sediments, which cause the lake water to become highly turbid when they are re-suspended during windy periods (Maceina and Soballe 1990). Lake Okeechobee has a drainage basin containing approximately 2.8 million acres, or 4,400 square miles. Figure 5-1 illustrates the Lake Okeechobee drainage basin.

During the last century, agricultural and urban development in the watershed and the construction of the Central and South Florida Project for flood control have caused excessive nutrient inputs. Total phosphorus loading to the Lake is approximately 600 metric tons per year. It is anticipated that the CERP, along with other local and regional restoration efforts, will improve hydrologic conditions in the lake, and that this will lead to improvements in the ecological attributes of the system.

5.1.2 WATERSHED PROJECTS

The objectives of these projects are 1) to improve water quality in tributaries and discharges to Lake Okeechobee, 2) to increase storage capacity for watershed runoff and lake water, and 3) to enhance and restore wetlands in the watershed. The greater Lake Okeechobee Watershed project, one of the components of CERP, has a monitoring network that will provide a long-term record of streamflow and water quality data, and will allow evaluation of multiple restoration activities in the Lake Okeechobee watershed.

The Lake Okeechobee Watershed Project includes four separable elements including North of Lake Okeechobee Storage Reservoir, Taylor Creek/Nubbin Slough Storage and Treatment Area, Lake Okeechobee Watershed Water Quality Treatment Facilities, and Lake Okeechobee Tributary Sediment Dredging. The Pearce properties are located in the Lake Okeechobee watershed (Figure 5.2).

Watershed projects occurring within the Lake Okeechobee Watershed Management Area address the issue of reducing phosphorus loading to the Lake at the parcel, sub-basin, or regional scales. The parcel, sub-basin, and regional treatment levels are directly linked, and all relate to the goal of rehabilitating the tributary and Lake ecosystem. The types of Watershed projects include cause-effect experimental research, observational studies, modeling, and feasibility and assessment studies with the majority of the activities being actual phosphorus reduction implementation projects. All of the work directly supports the Lake Okeechobee Protection Program (LOPP) or the Comprehensive Everglades Restoration Program (CERP).

The CERP is designed to provide multiple regional benefits in South Florida, including a more healthy range of water levels in Lake Okeechobee, with fewer extreme high and low conditions. Regional reservoir-assisted storm water treatment areas, storage reservoirs, and tributary sediment control projects are proposed for the Lake Okeechobee Watershed. The LOPP outside of CERP is also encouraging the development of regional treatment facilities through such programs as the Phosphorus Source Control Grant Program and the Lake Okeechobee Regional Public-Private Partnership Phosphorus Reduction Program.

5.2 SURFACE WATER CHARACTERISTICS

5.2.1 SITE TOPOGRAPHY/PHYSIOGRAPHY

Review of the United States Geological Survey 7.5 minute series, “Okeechobee NW and Okeechobee SW” Quadrangle maps provided by National Geographic Digital Topo Maps, indicated that the subject site has an elevation of approximately between 17 and 20 feet above mean sea level. Gentle slopes occupied by streambeds and wetlands are present. Many of the properties in the site vicinity are used for agricultural purposes, although large areas northwest of the property encompass portions of the Kissimmee

River Flood Plain. Elevations data are referenced to the National Geodetic Vertical Datum of 1927. Figure 5-3 is a topographic map of the site illustrating property boundaries.

5.2.2 STORM WATER DRAINAGE AND DISCHARGES

Storm water drainage and discharges are anticipated to occur by infiltration and drainage ditches and canals that transact to the subject parcels.

5.2.3 SURFACE WATER BODIES

Based on the 7.5-Minute USGS Okeechobee NW and SW Quadrangle Maps and field observations, numerous unnamed levees, drainage and irrigation canals are present at the site and in the site vicinity. The subject property is approximately bound by the L-59 levee to the north and west, Indian Prairie Canal and L-48 levee to the southeast, adjacent to Lake Okeechobee. The Kissimmee River and Lake Okeechobee are the major surface water features.

5.2.4 GEOLOGIC FORMATIONS AND WATER-BEARING CHARACTERISTICS

The main water-bearing rocks underlying Glades counties include consolidated and unconsolidated strata ranging in age from Eocene to Recent. Rocks of middle Miocene age and older yield water by natural flow, but the shallower, younger sediments yield water to wells in which the water levels normally are below the land surface. The sediments form part of the southern flank of the regional Ocala uplift, the crest of which is in northern and north-central Florida. The beds conform to the regional uplift in a subdued manner and dip gently to the south. The general sequence of geologic formations underlying Glades County is shown in the Table 5-1. Rocks deposited before the middle Miocene Epoch are composed almost entirely of limestone, formed by the accumulation and cementation of shell fragments and by chemical precipitation of calcium carbonate in a marine environment. Younger materials are chiefly clastics, deposited as an aggregate of sand, silt and clay with shelly material scattered throughout.

The surface sediments in Glades are of Pleistocene and Recent age. Subsurface beds composed of impermeable clay and marl form a major part of the middle Miocene. A limestone section occurs at the top of the Tampa Formation and continues downward through Oligocene, Eocene, and Paleocene rocks.

5.3 SUBSURFACE GEOLOGICAL CHARACTERIZATION

5.3.1 GEOLOGY

Glades County is located in the central part of southern Florida and is bordered on the east by the western shore of Lake Okeechobee to the north by Highland County, and to the south by Hendry County. The subject site lies northeast of Lake Okeechobee.

Three general physiographic units are included in Glades and Hendry counties and are classified with respect to land-surface altitude, surface-mantling material and types of vegetation. The general units listed by Parker and Cooke (1944) are the Everglades, the Sandy Flatlands and the Big Cypress Swamp, Davis (1943) subdivided the Sandy Flatlands and used the designation Western Flatlands for the area west of Lake Okeechobee. Also, he specifically designated the area in northeastern Glades County as the Istokpoga-Indian Prairie Basin. This unit extends northwestward into Highlands County, and encompasses the subject site.

The Sandy Flatlands is the largest physiographic unit in Glades County. It includes all but the area east of Lake Hicpochee. The Sandy Flatlands extends north-ward into Highlands County, westward to the Gulf of Mexico and southward into Collier County. A minor subdivision in northeastern Glades County is the southward extension of the Istokpoga-Indian Prairie Basin.

The sands were deposited as marine terraces during late Pleistocene time, when sea level fluctuated from more than 70 feet to less than 25 feet above sea level.

The surface altitude in the Sandy Flatlands ranges from about 10 feet to more than 70 feet above mean sea level. The highest sandy surfaces, which are in western Glades County

and north of Fisheating Creek, were deposited by the Penholoway sea of Pleistocene time, which stood 42 feet to more than 70 feet above present sea level.

5.3.2 LAKE ISTOKPOGA-INDIAN PRAIRIE DRAINAGE BASIN

The area between Lake Istokpoga and the northwest shore of Lake Okeechobee is identified as the Lake Istokpoga-Indian Prairie Basin. Lake Istokpoga is a major source of water to the growers within the basin, including the Seminole Tribe of Florida. The Brighton Reservation is located northwest of Lake Okeechobee within the Lake Istokpoga-Indian Prairie Basin. The Reservation was established in 1938 and has a population of about 500. The Reservation covers almost 36,000 acres, which is primarily agricultural, including improved pasture, citrus, sugarcane and aquaculture. The Lake Istokpoga-Indian Prairie Basin has historically experienced water shortages. The Seminole Tribe of Florida, the State of Florida and the District executed a Water Rights Compact in 1987. The Compact establishes, among other things, the Tribe's water entitlement for the Brighton Reservation. A subsequent Agreement (Number C-4121) was executed in early 1990s and further defines the Tribe's water rights.

Several water shortages in the mid-1980s made the region aware that Lake Istokpoga was at or near its limit on available water for use. Studies and resulting corrective actions were taken in the late 1980s and 1990s to remediate the immediate availability concerns, but water use restrictions on additional surface water use have remained in place. In addition, the District has entered into a water rights compact with the Seminole Tribe to ensure the Tribe's estimated historic entitlement/allotment of water. To address water resource issues in the Lake Istokpoga-Indian Prairie Basin, the plan evaluated surface water supply availability and management options.

5.4 SOILS

Four soil types have been identified on the site as defined in the U.S. Department of Agriculture (USDA) Soil Survey of Glades County, Florida. The soil types include Hallendale fine sand, Pople fine sand and Boca fine sand. The soil descriptions are as follows:

- **Hallandale fine sand** - This poorly drained soil is on low, broad flats and on cabbage palm hammocks. Individual areas are irregular in shape. They range

from 5 to 50-acres in size. Slopes are smooth, are slightly convex or concave and range from 0 to 2 percent. Typically, the surface layer is very dark gray fine sand about 4 inches thick. The subsurface layer is dark gray fine sand to a depth of about 9 inches. The subsoil is brown fine sand to a depth of about 19 inches. The underlying material to a depth of 80 inches or more is limestone. Included in mapping are small areas of Boca, Ft. Drum, Malabar, Pineda, and Pople soils. Boca soils are moderately deep over limestone. Ft. Drum, Malabar, Pineda, and Pople soils are very deep. The seasonal high water table is at a depth of 6 to 18 inches from June through September. Permeability is rapid. Available water capacity is very low. The natural vegetation consists of South Florida slash pine, cabbage palm, and live oak. The under-story vegetation consists of saw palmetto, waxmyrtle, chalk bluestem and panicums. This map unit is not suited to cultivated crops. Wetness is a severe limitation.

- **Pople fine sand** - This poorly drained soil is on low flats and on cabbage palm hammocks. Individual areas are irregular in shape. They range from 10 to more than 100 acres in size. Slopes are smooth, are slightly concave or convex, and range from 0 to 2 percent. Typically, the surface layer is dark gray fine sand about 8 inches thick. The subsurface layer is light gray fine sand to a depth of about 15 inches. The subsoil extends to a depth of 38 inches. It is light brownish yellow fine sand in the upper part, white loamy fine sand that has calcareous material intermixed in the next part, and light gray fine sandy loam in the lower part. The substratum extends to a depth of 80 inches. It is light gray fine sand and loamy fine sand in the upper part, gray loamy sand and fine sand in the next part, and light gray fine sand and loamy fine sand mixed with shell fragments in the lower part. The seasonal high water table is at a depth of 6 to 18 inches from June through September. Permeability is moderately slow or slow. Available water capacity is moderate. Most areas of this map unit support native vegetation consisting of cabbage palm, live oak, saw palmetto, wax-myrtle, pineland threeawn, and various bluestems. Some areas have been cleared for improved pasture.

- **Boca fine sand** – This poorly drained soil is in areas of cabbage palm flatwoods adjacent to sloughs, depressions, and drainage ways. Individual areas are irregular in shape. They range from 10 to more than 75 acres in size. Slopes are smooth and are slightly convex or concave. They are 0 to 1 percent. Typically, the surface layer is dark gray fine sand about 4 inches thick. The subsurface layer is light gray fine sand to a depth of 21 inches. The subsoil extends to a depth of 34 inches. It is brown fine sand in the upper part and light brownish gray fine sandy loam and sandy loam mixed with marl and shell in the lower part. The underlying material to a depth of 80 inches is fractured limestone. The seasonal high water table is at a depth of 6 to 18 inches from June through February. Permeability is moderate. Available water capacity is low. Most areas of this map unit still support natural vegetation consisting of scattered areas of pine and cabbage palm and an understory of saw palmetto, chalky bluestem, creeping bluestem, lopsided Indiangrass, and pineland threeawn. A few small areas have been cleared for improved pasture and the

production of sugarcane. This map unit is poorly suited to cultivated crops. Wetness is a limitation.

5.5 RADON POTENTIAL

Existing information on radon soil gas and indoor radon studies strongly suggest the terrain overlying uranium occurrences have the highest probability of producing severe radon levels in indoor air (Makofske, 1987). In Florida, reclaimed phosphate mining areas and unmined phosphate lands have been recognized as areas for potential radon problems. The locations of phosphate districts are restricted to central and north Florida. Therefore, the potential for elevated radon occurrence in St. Lucie County, as a result of the use of uranium-enriched construction materials or due to soil off gassing, is considered low (Campbell, K., 1986). In addition, according to the Environmental Protection Agency (EPA), the EPA action level is 4.0 picocuries per liter (pCi/L) although radon levels less than this can still pose a risk. The subject site has been designated as EPA Radon Zone 3 (<2 pCi/L). (Figure 5-4)

5.6 RECORDED OIL AND GAS EXPLORATION, ACTIVE AND ABANDONED WELLS, PIPELINES, REFINERIES, STORAGE AND DISTRIBUTION OPERATIONS

There is one major oil producing area in South Florida, known as the Sunniland Trend. Of the 14 Sunniland Trend oilfields, ten are active, one is temporarily shut-in, and three are plugged and abandoned (Lloyd, 1989). Based on the effective porosity of the trend and its stratigraphic profile, it has been postulated that only short-range horizontal migration for commercial petroleum accumulation is likely, and that future oil and gas exploration will achieve the most success within and immediately adjacent to the Sunniland Trend (Applegate, 1984). There are no known oilfields within ten miles of the subject site.

6.0 PHASE II SAMPLING ASSESSMENT

Based upon observations and information obtained in the Phase I Environmental Site Assessment of the Pearce property, areas of environmental concern identified include:

- Cultivated Areas
- Canal Sediments
- Seven (7) Pump Stations
- Two (2) Cattle Pens
- Four (4) Pole Barns
- Equipment Boneyard
- Two (2) Burn Areas

The following sections summarize the results of ECT's Phase II assessment activities, discussed per area investigated. This analysis was performed according to the protocol presented in ECT's proposal dated December 5, 2005. The proposal included specific investigative methodologies for the collection and analysis of field data, proposed sample locations, a general schedule of field activities, and methods used to collect and analyze field samples. A discussion of constituents of concern, and general investigative methodologies and procedures is provided following. ECT's conclusions and recommendations for additional assessment or corrective actions are provided in Sections 7 and 8.

The sampling activities were conducted on three main area types. The first includes the cultivated areas, for which composite sample were collected in 50-acre sub-parcels. The second includes point sources, such as the microjet irrigation system and agrochemical mix/load area. The third area type involves canal sediments. Photographs of the subject site are included as Appendix A.

6.1 CONSTITUENTS OF CONCERN (COCs)

The primary concerns associated with the subject site stem from agrochemical applications and fueling operations. The potential for impacts to soil, sediment and groundwater was assessed by evaluating specific constituents of concern, based on the initial questionnaire

completed by the land manager, review of application records, interviews with persons knowledgeable of typical agricultural practices in this geographic area, and a screening of the agrochemicals based on toxicity and persistence. The constituents of concern primarily include pesticides, herbicides, metals, and petroleum hydrocarbons.

Soil and groundwater samples collected from the property were analyzed for contamination using analytical methods that were selected for each area. The selection of analytical methods is based upon information obtained from the questionnaire completed by the land manager, general knowledge of regional agricultural practices, and visual observations at the site. The analytical methods per area for soil and groundwater samples are included in Table 6-1.

6.2 PHASE II ESA ACTIVITIES

Eight (8) areas of the site were subject to soil, sediment and/or groundwater investigation. A summary of these areas are discussed as follows:

- **Cultivated Area**

  Citrus Cultivated Area
  Ten samples were composited equally into a single sample, which represents a 50-acre sub parcel. A total of six (6) composite samples were submitted for laboratory analysis in the citrus grove area for EPA Methods 8081, 8141, 8151, 8-RCRA metals, copper, paraquat and TOC. In addition, 5-acre discrete samples were collected and submitted for analysis for copper only, for a total of 60 samples.

  Two (2) monitoring wells were installed in the citrus cultivated area.

  Former Tomato Cultivated Area
  Ten samples were composited equally into a single sample, which represents a 50-acre sub parcel. A total of thirty-eight (38) composite samples were submitted for laboratory analysis. Two (2) monitoring wells were installed in the former tomato cultivated area. Based upon the historical use of the property, the samples were analyzed by EPA Methods 8081, 8-RCRA metals and TOC.

  Two (2) monitoring wells were installed in the former tomato cultivated area.

Pastureland
Ten samples were composited equally into a single sample, which represents a 50-acre sub parcel. A total of sixteen (16) composite samples were submitted for laboratory analysis. Two (2) monitoring wells were installed in the cultivated area. Based upon the historical use of the property, the samples were analyzed by EPA Methods 8081, 8141 (atrazine), 8-RCRA metals and TOC.

Two (2) monitoring wells were installed in the pasture area.

These remaining areas constitute point source locations associated with historical operational activities.

- **Canal Sediments**
  Total number of soil borings: 26

  Twenty (20) samples were submitted for EPA Method 8081 and 8 RCRA metals; Six (6) samples were submitted for copper only.

  Total number of temporary monitoring wells: 0

- **Pump Stations**

  Pump Station #1
  Total number of soil borings: 1
  Total number of temporary monitoring wells: 1

  Pump Station #2
  Total number of soil borings: 1
  Total number of temporary monitoring wells: 1

  Pump Station #3
  Total number of soil borings: 1
  Total number of temporary monitoring wells: 1

  Pump Station #4
  Total number of soil borings: 1
  Total number of temporary monitoring wells: 1

  Pump Station #5
  Total number of soil borings: 1
  Total number of temporary monitoring wells: 1

  Pump Station #6
  Total number of soil borings: 1
  Total number of temporary monitoring wells: 1

Pump Station #7
Total number of soil borings: 1
Total number of temporary monitoring wells: 1

- **Cattle Pens**

Cattle Pen #1
Total number of soil borings: 5
Total number of temporary monitoring wells: 1

Cattle Pen #2
Total number of soil borings: 5
Total number of temporary monitoring wells: 1

- **Pole Barns**

Pole Barn #1
Total number of soil borings: 6
Total number of temporary monitoring wells: 1

Pole Barn #2
Total number of soil borings: 6
Total number of temporary monitoring wells: 1

Pole Barn #3
Total number of soil borings: 6
Total number of temporary monitoring wells: 1

Pole Barn #4
Total number of soil borings: 2
Total number of temporary monitoring wells: 1

- **Equipment Boneyard**
Total number of soil borings: 4
Total number of temporary monitoring wells: 1

- **Burn Areas**

Burn Area #1
Total number of soil borings: 2
Total number of temporary monitoring wells: 1

Burn Area #2
Total number of soil borings: 2
Total number of temporary monitoring wells: 1

The following sections summarize the sample collection activities performed at each of the areas. The results from the analytical testing are presented in Section 7.0 of this report.

6.2.1 CULTIVATED AREAS

The primary objective for the collection and chemical analysis of soil samples from the grove area was to evaluate the average concentrations of residual agrochemical constituents, specifically pesticides, plant nutrients, and soil amendments. On this basis, identified soil contaminants would represent non-point source contamination.

ECT collected soil samples from 0-6 inches (in) below land surface (bls) in five-acre increments, as illustrated in Figures 6-1.1 through 6-1.4. Locations were predetermined and pre-programmed, and the field teams sampled locations using global positioning satellite (GPS) equipment. GPS coordinates are included as Appendix G. Ten samples were composited equally into a single sample, which represents a 50-acre sub-parcel. A total of sixty (60) composite samples were submitted for laboratory analysis: six (6) samples were collected from the citrus cultivated area, designated CCASB-1 through CCASB-6; thirty-eight (38) samples were collected from the former tomato crop areas, designated TCASB-1 through TCASB-38; and sixteen (16) samples were collected from the pasture areas, designated SCASB-1 through SCASB-16. In addition, 5-acre discrete samples were collected from the citrus grove area and submitted for laboratory analysis for copper only. Discrete copper samples were designated CCASB1-1 through CCASB1-10, CCASB2-1 through CCASB2-10, CCASB3-1 through CCASB3-10, CCASB4-1 through CCASB4-10, CCASB5-1 through CCASB5-10 and CCASB6-1 through CCASB6-10. A map indicating the soil sampling procedure for this site, including the nomenclature assigned to each 50-acre sub-parcel is presented in Figures 6-1.5 through 6-1.8.

A total of six (6) monitoring wells were installed in the cultivated areas to evaluate cultivated area groundwater quality, designated CCAMW-1 and CCAMW-2 (citrus cultivated area), TCAMW-1 and TCAMW-2 (former tomato cultivated area) and SCAMW-1 and SCAMW-2 (pasture/cattle area). Figure 6-2 illustrates the cultivated area monitoring well locations.

6.2.2 CANAL/SEDIMENT SAMPLING

To evaluate the effect of storm water runoff, which could transport agrochemicals to sediments in the perimeter canals, ECT sampled a total of twenty-six (26) locations on the property. Twenty of the sediment samples were collected in the pasture/former tomato cultivated area, designated as SED-1 through SED-20, and submitted for laboratory analysis by EPA Method 8081 and 8 RCRA metals. The remaining six samples, designated CSED-1 through CSED-6, were collected from the citrus grove area and submitted for laboratory analysis for copper only. Sediment sample locations are shown in Figure 6-3.

6.2.3 PUMP STATIONS

ECT installed one (1) soil boring from land surface to the water table (approximately 4.5 ft bls) in each of the seven (7) pump station locations. The soil samples were designated PSSB-1 through PSSB-7.

The soils were screened to the water table using a toxic vapor analyzer fitted with a flame ionization detector (TVA/FID). The soil sample exhibiting the highest TVA readings (if any) from each boring was submitted for laboratory analysis.

ECT sampled groundwater by installing one (1) temporary groundwater monitoring well in each of the seven (7) pump station locations. The temporary wells were designated PS-1 MW through PS-7 MW. The locations of the soil and groundwater samples are summarized in Figures 6-4.1 through 6-4.7 for pump stations 1 through 7, respectively.

6.2.4 CATTLE PENS

ECT installed five (5) soil borings from land surface to six inches in the vicinity of each of the two (2) cattle pen areas, designated CP1SB-1 through CP1SB-5 and CP2SB-1 through CP2SB-5. ECT sampled groundwater by installing one (1) temporary groundwater monitoring well in each cattle pen area. Temporary monitoring wells were designated CP-1 MW and CP-2 MW. The locations of the soil and groundwater samples are summarized in Figures 6-5.1 and 6-5.2.

6.2.5 POLE BARNS

ECT installed a total of six (6) soil borings in each of the four pole barn locations. Five (5) of the soil samples were collected from land surface to six inches, and submitted for laboratory analysis for agrochemicals. The remaining boring was installed to the water table, screened with a TVA/FID, and the sample with the highest TVA field screening reading was analyzed for petroleum constituents. Agrochemical soil samples were designed as PB1SB-1 through PB1SB-5, PB2SB-1 through PB2SB-5, PB3SB-1 through PB3SB-5 and PB4SB-1 through PB4SB-5. The petroleum soil samples were designated PB1PETSB through PB4PETSB. ECT sampled groundwater at pole barns #1 through #3 by installing one temporary monitoring well to target both agrochemical and petroleum constituents. Due to the presence of a mobile AST as pole barn #4, two (2) temporary groundwater monitoring wells were installed in this location; one monitoring well was installed to target agrochemical constituents while the second well targeted petroleum constituents. Temporary monitoring wells were designated PB-1 MW through PB-3 MW for pole barns #1 through #3. The petroleum well at pole barn #4 was designated as PB-4 MW (PET), and the agrochemical well was designated as PB-4 MW. The locations of the soil and groundwater samples are summarized in Figures 6-6.1 through 6-6.4.

6.2.6 EQUIPMENT BONEYARD

ECT installed four (4) soil borings from land surface to six inches in the vicinity of the equipment boneyard, designated BYSB-1 through BYSB-4. ECT sampled groundwater by installing one (1) temporary groundwater monitoring well in the equipment boneyard area. The temporary monitoring well was designated BY- MW. The locations of the soil and groundwater samples are summarized in Figure 6-7.

6.2.7 BURN AREAS

ECT installed two (2) soil borings from land surface to six inches in the vicinity of each of the two (2) burn areas, designated BA1SB-1 and BA1SB-2 and BA2SB-1 and BA2SB-2. ECT sampled groundwater by installing one (1) temporary groundwater monitoring well in each burn area. The burn areas were also the location of a former pole barn, as noted in the 2002 aerial photograph. Temporary monitoring wells were designated BA-1 MW and BA-2

MW. The locations of the soil and groundwater samples are summarized in Figures 6-8.1 and 6-8.2.

6.3 INVESTIGATIVE METHODOLOGIES

6.3.1. SOIL BORING INSTALLATION

6.3.1.1 Cultivated Area

Soil borings were collected in the cultivated area with a stainless steel trowel, marked 6 inches from the tip to allow sample collection to an exact depth. Care was taken to ensure that a soil column of uniform diameter was collected such that the sample was representative of average concentration of soil throughout the entire 6 inches, rather than weighting the sample with more soil from the top or from the bottom. The samples were collected into stainless steel bowls, mixed thoroughly and then placed in pre-cleaned containers for transport to the laboratory and placed on ice.

6.3.1.2. Petroleum Point Sources

Soil samples were collected from the top six (6) inches of the soil profile in the point source areas where petroleum impacts were noted, if any. The samples were collected with a stainless steel trowel, marked 6 inches from the tip to allow sample collection to an exact depth. Care was taken to ensure that a soil column of uniform diameter was collected such that the sample was representative of average concentration of soil throughout the entire 6 inches, rather than weighting the sample with more soil from the top or from the bottom. If no impacts were observed visually, soils were screened with the TVA, and the sample exhibiting the highest detection was submitted for analysis.

Soil borings to the water table were advanced using a rotary drill rig equipped with a standard split spoon sampler. The split spoon sampler consists of two carbon steel half cylinders (spoons) that fit together to form a two-inch diameter tube, approximately 2 feet in length. The cylindrical arrangement was maintained by retaining head and bit rings that thread to either end of the spoon assembly. Samples were collected by driving the spoon through the soil profile with a falling 140-pound hammer attached to the drill rods. The spoons were advanced to the water table in two-foot increments. The samples were collected

by removing the split spoon from the boring and retrieving the soil from the barrel by unscrewing the bit and head rings and splitting the assembly. Approximately 8 ounces of soil was placed in a 16-ounce open-mouth jar, the jar was covered with aluminum foil, and the sample was allowed to equilibrate for approximately 5 minutes. This procedure was repeated to create a second soil sample from the same horizon. The soils were screened using a toxic vapor analyzer fitted with a flame ionization detector (TVA/FID). The first sample was screened using the standard TVA tip, and the second using a carbon tip. The response from the carbon tip was subtracted from the response from the standard tip in order to correct for methane.

6.3.1.3 Agrochemical Point Sources

Soil borings were collected from the top six (6) inches of the soil profile in the point source areas where agrochemicals were stored, mixed, or burned. The samples were collected with a stainless steel trowel, marked 6 inches from the tip to allow sample collection to an exact depth. Care was taken to ensure that a soil column of uniform diameter was collected such that the sample was representative of average concentration of soil throughout the entire 6 inches, rather than weighting the sample with more soil from the top or from the bottom. The samples were collected into stainless steel bowls, mixed thoroughly and then placed in pre-cleaned containers for transport to the laboratory and placed on ice.

6.3.2 GROUNDWATER MONITORING WELL INSTALLATION

Temporary monitoring wells were installed by a State of Florida licensed driller (Williams Earth Science, Inc.) in general accordance with the FDEP monitoring well construction guidelines. Monitoring wells were installed using a rotary drill utilizing the hollow-stem auger method. This type of auger consists of a hollow steel stem or shaft with a continuous, spiraled steel flight, welded onto the exterior side of the stem, connected to an auger bit, which when rotating, transports cuttings to the surface. This method is best suited in soils that have a tendency to collapse when disturbed.

The monitoring wells were installed inside of the hollow-stem augers. A wooden bottom plug or pilot bit assembly was fastened onto the bottom of the augers to keep sediments

and/or water out of the interior of the augers during the drilling phase. Following the advancement of the augers to the desired depth, the monitoring well installation was accomplished by inserting the well assembly into the hollow stem auger and removing the bottom plug from the terminal end of the auger. As the sand pack material was introduced into the top of the hollow stem assembly, the augers were slowly extracted allowing the sand pack to fill the annular space of the borehole. The sand pack that consisted of a 6/20 grade silica sand extended from the bottom of the well to the ground surface. Monitoring wells were finished with PVC casing to approximately three (3) ft above grade with well caps. This feature was added to each well, based upon their remote location, to facilitate subsequent identification for sampling purposes. A generic monitoring well completion diagram is provided in Figure 6-9. Typically, the top of the well screen was placed at a depth two feet above the water table.

All well construction materials and drilling equipment were steam cleaned prior to and immediately after installation at each monitoring well. A detailed geologic log during drilling of the well borings and well construction data was recorded for each monitoring well. Following monitoring well completion, each well was developed by the driller until sediment free. Pumping times and rates were recorded for each well development event. Temporary wells were removed after sampling and the borehole was backfilled with native soil cuttings that were generated during installation.

6.4 SAMPLING PROCEDURES

Samples were collected at various locations adjacent to the property and included soil and groundwater samples. All samples were collected in accordance with the Florida Department of Environmental Protection Standard Operating Procedure (DEP SOP), when applicable. Sample collection procedures are summarized below.

6.4.1 GROUNDWATER SAMPLE COLLECTION

Groundwater sampling was conducted in accordance with the DEP SOP 001/01, FS 2200 Groundwater Sampling, when applicable.

In general, prior to sample collection, ECT purged the well using a peristaltic pump until at least three (3) rounds of consecutive stabilization parameters (temperature, pH and specific conductance) were collected and dissolved oxygen was no greater than 20% of saturation at field temperature and turbidity was no greater than 20 NTU, or five (5) well volumes were purged, whichever occurred first.

At the completion of purging activities, groundwater samples were collected using a peristaltic pump. Volatile organics were collected using polypropylene tubing with a Teflon tip. The pump was used to collect a sufficient amount of water for sample collection within the tubing and turned off. Using one hand to cover the outlet of the tubing to prevent backflow into the well, the sampler removed the drop tubing from the well and the flow was reversed on the peristaltic pump to discharge the water from the inlet side of the tubing into the sample vials. Extractable organics were collected using an organic trap configuration, which creates a vacuum seal within the sample container reducing the potential for volatilization prior to reaching the pump head.

6.5 SAMPLE CUSTODY, LABORATORY PROCEDURES AND ANALYSES

All sample transmittal forms were placed in waterproof bags and sealed in transport containers with the samples. Chain-of-custody seals were applied after the containers (coolers) were secured. All shipping bills from common carriers were kept with the forms. All samples that were submitted to a laboratory were accompanied by a sample transmittal or chain-of-custody record.

6.6 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

Quality assurance procedures utilized during this assessment included compliance with the FDEP SOP for Laboratory Operation and Sample Collection Activities. Specific quality assurance protocols and procedures for the analytical methodologies performed during this assessment were in accordance with FDEP SOP for laboratory analysis. Twenty percent of the soil samples were split for quality assurance/quality control (QA/QC) measures. Ten percent of the QA/QC samples were submitted to the primary laboratory as duplicate samples, whereas the remaining ten percent were submitted to a second laboratory. This

procedure is in reference to the September 19, 2002 memorandum by Mr. Robert Kukleski and Mr. Robert Taylor of the District's Land Acquisition Support Division.

7.0 PHASE II DATA ASSESSMENT & DISCUSSION OF RESULTS

7.1 SURFICIAL GEOLOGY

The geology at the project site was characterized by installing soil borings and collecting soil samples at the property. A total of twenty-three (23) soil borings were installed and completed as monitoring wells CCAMW-1, CCAMW-2, TCAMW-1, TCAMW-2, SCAMW-1 and SCAMW-2 (cultivated areas), CP-1 MW AND CP-2 MW (cattle pens), BA-1 MW and BA-2 MW (burn areas), BY-1 MW (equipment boneyard), PB-1 MW, PB-2 MW, PB-3 MW, PB-4 MW and PB-4 MW (PET), and PS-1 MW, PS-2 MW, PS-3 MW, PS-4 MW, PS-5 MW, PS-6 MW and PS-7 MW (pump stations). Based upon the soil samples collected during the installation of the soil borings/monitoring wells, the surficial geology at the site is composed of Pleistocene undifferentiated deposits. The soil boring/monitoring wells were completed to 12 feet below land surface (ft bls).

The surficial horizon consisted of fine brown sand which transitioned to dark and light brown sand to 6 ft bls. Below 6 ft, the brown sand had shell fragment inclusions which becomes increasingly silty and clayey with depth. At approximately 12 ft bls, a green silty clayey sand horizon was encountered to the termination depth of the boring. Complete lithological logs are attached as Appendix H.

7.2 ANALYTICAL RESULTS

The following sections summarize the results of ECT's Phase II assessment activities. Complete laboratory analytical results are included as Appendix I. The data has been presented, both in text format, and tabular format, as follows:

	Positive Detections	Regulatory Exceedances
Cultivated Area Soils	Table 7-1 & 7-2	Table 7-3
Cultivated Area Groundwater	Table 7-4	N/A
Canal Sediments	Table 7-6	Table 7-8
Pump Station Soils	Table 7-7	Table 7-8
Pump Station Groundwater	Table 7-4	Table 7-5
Cattle Pen Soils	Table 7-6	Table 7-8
Cattle Pen Groundwater	Table 7-4	Table 7-5
Pole Barn Soils	Table 7-6	Table 7-8

	Positive Detections	Regulatory Exceedances
Pole Barn Groundwater	Table 7-4	Table 7-5
Boneyard Soils	Table 7-6	Table 7-8
Boneyard Groundwater	Table 7-4	Table 7-5
Burn Area Soils	Table 7-6	Table 7-8
Burn Area Groundwater	Table 7-4	Table 7-5

For the purposes of this report, the analytical data has been analyzed based on the following assumptions:

- The intended use of the property is flooding.
- The primary ecotoxicological screening benchmarks against which the soil and sediment data are compared for the protection of sediment-dwelling organisms are:

  (1) The FDEP sediment quality assessment guidelines (SQAG) threshold effect concentration (TEC); and,
  (2) The FDEP SQAG for probable effects concentration (PEC).

- The primary ecotoxicological screening benchmark against which soil and sediment data are compared for issues pertaining to human health is the lowest of the State of Florida's soil cleanup target levels (SCTLs). Direct exposure effect levels were considered in the screening level ecological risk assessment (ERA, Appendix J) but are not considered here, given the intended use of the property.

- The primary ecotoxicological screening benchmark against which groundwater data is compared are the State of Florida's groundwater cleanup target levels (GCTLs).

- A detected analyte was evaluated as an analyte of interest using the following two criteria:

  (1) If the maximum concentration or 95% upper confidence limit for the mean chemical concentration was less than the ecotoxicological benchmark, then the chemical was not selected as a chemical of potential ecological concern (COPEC).

  (2) If the maximum concentration of a chemical exceeded the ecotoxicological screening benchmark, then the chemical was considered a COPEC.

  If an analyte met neither of the two criteria, it was considered not to be a COPEC; if an analyte met either or both of the above two criteria, it was considered a COPEC.

Conclusions and recommendations for additional assessment or corrective actions are provided in Section 8.0.

7.2.1 PASTURE & CITRUS/FORMER TOMATO CULTIVATED AREAS

7.2.1.1 Pasture & Citrus/Former Tomato Cultivated Area Soil Results

Fifty-nine (59) composite soil samples were collected from the sod cultivated areas at the Pearce Ranch property (Figures 6-1.5 through 6-5.8) as follows: 5 samples in the citrus cultivated area (220 acres), 16 samples in the sod/cattle cultivated area (approximately 2,600 acres, sampled at a 30% frequency), and 38 former tomato cultivated area samples (1,900 acres). Figure 7-1 illustrates the cultivated area results of potential concern. Twenty-four (24) analytes were detected (the sum of alpha- and gamma-chlordane is considered one analyte, total chlordane), excluding total organic carbon (Table 7-1). The maximum detected concentrations of 5 of these analytes (arsenic, lead, delta-BHC, gamma-BHC, and 4,4'-DDT) are below a 62-777, F.A.C. or SQAG thresholds. Additionally, 5 analytes nominally exceeded the 62-777 surface water leachability standard but no SQAG thresholds (chromium, silver, dieldrin, endrin, and heptachlor epoxide). Eight (8) analytes had no SQAGs developed by MacDonald (2,4-DB, endosulfan I, endosulfan sulfate, endrin aldehyde, endrin ketone, heptachlor, MCPA, and selenium).

No SQAG for selenium was available, however, USFWS requested the use of a value of 1 mg/kg for use in the Southern Golden Gates project (USFWS, 2004) to screen for potential reproductive effects on aquatic feeding avian receptors. Four (4) samples in the northern parcel exceeded this value (TCASB-36 = 1.5 mg/kg; TCASB-37 = 1.1 mg/kg; TCASB-38 = 2.3 mg/kg; SCASB-16 = 1.1 mg/kg). The sitewide 95% UCL for selenium was equal to 0.51 mg/kg. The low sitewide concentration combined with screening-level risk modeling indicate that selenium risk is likely to be *de minimis* for all aquatic-feeding wildlife at the site (see Appendix J).

The lack of available toxicity reference values (e.g., SQAGs protective of sediment-dwelling organisms or aquatic-dependent wildlife) for 2,4-DB, endosulfan I, endosulfan sulfate, endrin aldehyde, endrin ketone, heptachlor, and MCPA is not expected to affect risk management decisions for the following reasons:

- The chemicals were detected a low frequency and do not represent widespread contamination (i.e. endosulfan I, endosulfan sulfate, endrin aldehyde and heptachlor were all detected in 5% or less of the sitewide samples);

- The chemicals are closely related to chemicals for which toxicity reference values (TRVs) are available (e.g., dieldrin is a suitable surrogate for endrin) for which no risk was predicted at similar concentrations.

The chemicals are suspected to be of low toxicity to birds relative to the other organic chemicals analyzed (i.e. 2,4-DB and MCPA). EXTOXNET reports that 2,4-DB is practically non-toxic to birds with an LD50 value greater than 5,000 mg/kg. Similarly, EXTOXNET reports that MCPA is of low toxicity to birds with LD50 values equal to 350 mg/kg (see Appendix J for reference information). No other toxicological data are available for birds.

Therefore, the following six analytes were considered analytes of interest:

- Barium
- Copper
- Mercury
- 4,4’-DDD
- 4,4’-DDE
- Total Chlordane

Following is a summary of detections for these analytes.

Analyte	TEC	PEC	SCTL			# Detects	# Detections Above		
			Res.	Ind.	Lowest		TEC	PEC	SCTL
Barium (mg/kg)	20	60	120	60	60	59/59	5/59	0/59	0/59
Copper (mg/kg)	32	150 85[1]	150	89,000	150	50/50	6/50	0/50	0/50
Mercury (mg/kg)	0.18	1.1	3.4	26	0.01[2]	52/59	0/59	0/59	50/59
4,4'-DDD (µg/kg)	4.9	28	4,200	22,000	10[2]	27/59	5/59	1/59	2/59
4,4'-DDE (µg/kg)	3.2	31	2,900	15,000	40[2]	36/59	15/59	3/59	1/59
Chlordane (µg/kg)	3.2	18	2,800	14,000	3[2]	27/59	13/59	1/59	13/59

[1] Interim Value for protection of *Snail kite*

[2] Leachability based on freshwater surface criteria (lowest SCTL).

A brief discussion of each analyte of interest follows.

7.2.1.1.1 Barium

Barium was detected in five samples sitewide at concentrations greater than the TEC but was not detected in any sample at a concentration greater than the PEC. Four of the five detections greater than the TEC are located within the tomato fields in the northern parcel with the remaining sample being collected in the sod and cattle area in the southern parcel.

The sitewide 95% UCL barium concentration equaled 11.1 mg/kg and was lower than the TEC SQAG. The 95% UCL indicates that while risk cannot be conclusively ruled out for several localized areas of the site, no significant risk is predicted for future populations of aquatic receptors that may inhabit the site following flooding.

7.2.1.1.2 Copper

Copper was detected in six samples within the citrus groves at concentrations that exceeded the TEC (32 mg/kg) but all detections of copper were below the interim screening value for protection of the Everglades Snail Kite (85 mg/kg) and the PEC (150 mg/kg). The maximum detected concentration (57 mg/kg) was located in tract 3 of the

citrus grove. One sample exceeded the TEC in tract 2, two samples exceeded in tract 3 and 4 samples exceeded the TEC in tract 4. No exceedances of the copper TEC were noted in either tracts 1 or 5.

Since no copper data were collected elsewhere on-site, the 95% UCL concentration of the citrus grove area only was calculated. The data were determined to be lognormal and the 95% UCL was equal to 17.4 mg/kg and below the TEC. The 95% UCL indicates that while toxicity cannot be conclusively ruled out for some localized areas within the citrus grove, no significant risk is predicted for future populations of aquatic receptors that may inhabit the site following flooding.

7.2.1.1.3 Mercury

None of the 59 samples' mercury concentrations exceeded the PEC or TEC. However, all 50 of 59 samples exceeded the SCTL for the protection of surface water (the lowest applicable SCTL given the intended use of the property). Mercury detections above the surface water SCTL are a recognized regional occurrence and are generally unrelated to site activities. The ASTM Phase I/II ESA scope of work utilized for pre property acquisition is not adequate to address regional impacts of mercury. A significantly more comprehensive investigation would be required. In an effort to evaluate ecological risk, the SFWMD and USFWS have agreed to adopt the SQAG TEC and SQAG PEC for CERP project areas. The Phase I/II ESA indicated there were no SQAG TEC or PEC exceedances at this property for mercury. According to the 2002 Everglades Consolidation Report, the SFWMD and FDEP have formed an informal partnership with the Federal government, other Florida agencies and the private sector to evaluate the presence of mercury in the Everglades (the South Florida Mercury Science Program). ECT recommends that the mercury data contained in this report be made available to the South Florida Mercury Science Program.

7.2.1.1.4 4,4'-DDD

The pesticide 4,4'-DDD was detected in five samples at concentrations greater than the TEC (4.9 ug/kg) in the northern parcel. The maximum detected concentration (66 ug/kg) was in sample TCASB-25 and was the only sample at the site that exceeded the PEC.

Exceedances of PECs indicate a potential for toxicity to localized areas of benthic invertebrates. If the exceedances are widespread, potentially significant effects to benthic invertebrate populations may become an issue. However, only one sample exceeds the PEC and significant widespread risks to aquatic receptors are not expected from 4,4'-DDD.

From a sitewide perspective, the 95% UCL concentration for 4,4'-DDD was equal to 7.77 ug/kg based on a non-parametric distribution of the data. This indicates that while risk cannot be conclusively ruled out for the site, 4,4'-DDD does not appear to be present at concentrations that would be expected to cause widespread significant risk to future populations of benthic invertebrates. Some localized toxicity may be expected in the area of sample TCASB-25 without remediation. This area will be remediated through soil inversion since it is collocated with 4,4'-DDE as discussed in the next section. Since all of the concentrations greater than the TEC are located within the northern-most parcel, no risk is predicted within either of the remaining two parcels.

7.2.1.1.5 4,4'-DDE

The isomer 4,4'-DDE was detected in 15 samples at concentrations greater than the TEC (3.2 ug/kg). Of the 15 samples with 4,4'-DDE greater than the TEC, 14 were located within the northern parcel and one was located in the western parcel. Within the northern parcel, three samples had concentrations that were also greater than the PEC (TCASB-25, TCASB-30 and TCASB-38). The maximum concentration (79 ug/kg) was detected in sample TCASB-30.

From a sitewide perspective, the 95% UCL concentration for 4,4'-DDE was equal to 12.4 ug/kg based on a non-parametric distribution of the data, which is greater than the TEC. This indicates that while risk cannot be conclusively ruled out for the site, 4,4'-DDE does not appear to be present at concentrations that would be expected to cause widespread significant risk to future populations of benthic invertebrates. Reductions in aquatic receptor populations may be expected at sample locations TCASB-25 and TCASB-30.

Since no 4,4'-DDE samples in the southern parcel showed detections greater than either the TEC or PEC, no risk is predicted in that parcel.

Since HQs greater than 1 were calculated for multiple receptors both sitewide and within the northern parcel, preliminary remediation goals (PRGs) that estimate concentrations at which all NOAEL HQs are less than or equal to one were calculated. Separate PRGs are provided for the entire site and the northern parcel due to the importance of TOC on bioaccumulation in organic chemicals. Since the soils in the northern parcel appear to be somewhat more organic than those found in the remainder of the site, 4,4'-DDE may be less bioavailable in that area versus the rest of the site. If sitewide exposures are assumed, a 95% UCL concentration equal to 8.44 ug/kg (assuming 2.71% TOC) would be protective of all species. If only exposures within the northern parcel are assumed, a 95% UCL concentration equal to 12.0 ug/kg (assuming 3.85% TOC) could be considered to be protective of all species. Seven (7) samples within the northern parcel exceed both PRGs with two additional samples that exceed the sitewide PRG only.

These results indicate that while significant widespread risks to aquatic-feeding wildlife are not expected at the site, several areas within the northern parcel had 4,4'-DDE concentrations at which unacceptable risk cannot be ruled out. Removal of the soils at the three sample locations representing the highest 4,4'-DDE concentrations may result in a reduction of both the sitewide and northern parcel 95% UCL concentrations to below their respective PRGs. To approximate this removal, the 4,4'-DDE concentrations in samples TCASB-25, TCASB-30 and TCASB-38 were set equal to the ½ the minimum method detection limit (MDL) to approximate non-detected concentrations (i.e. 0.055 ug/kg). This assumes that surface soils with elevated 4,4'-DDE concentrations were placed below the bioturbation zones in those areas and that 4,4'-DDE is not present in subsurface soils in those areas. The sitewide 95% UCL following removal would then equal 5.73 ug/kg while the 95% UCL for the northern parcel would equal 11.4 ug/kg. Removal of these three samples from the dataset may result in the reduction of upper-bound area-wide 4,4'-DDE concentrations below levels of concern both sitewide and within the northern parcel.

Although the screening level risk assessment has indicated as little as 150 acres will require remediation, as a conservative measure, 400 acres will be remediated. The criterion was a PRG of 12 for determining the acreage to be remediated. ECT proposes capping by soil inversion in 50-acre areas TCASB-23, TCASB-25, TCASB-26, TCASB-27, TCASB-28, TCASB-30, TCASB-37 and TCASB-38 for 4,4'-DDE, as discussed in Section 8.0 of this report.

7.2.1.1.6 Total Chlordane

Alpha-chlordane was detected above its TEC (3.2 ug/kg) in 10 samples. All of the samples with alpha-chlordane detections greater than the TEC were located in the northern parcel. Similarly, the four (4) gamma-chlordane samples detected above the TEC (3.2 ug/kg) were also detected in the northern parcel. In all cases where the gamma-chlordane concentration was greater than the TEC, the alpha-chlordane concentration in the same sample was also greater than the TEC. In only one sample (TCASB-30) did the sum of the gamma and alpha-chlordane concentrations exceed chlordane PEC (18 ug/kg).

The sitewide 95% UCL of alpha-chlordane (3.5 ug/kg) and gamma-chlordane (2.1 ug/kg), both based on non-parametric distributions were also calculated. Only the alpha-chlordane concentration was slightly greater than the TEC. This indicates that while unacceptable risk cannot be conclusively ruled out for the site, alpha-chlordane and gamma-chlordane do not appear to be present at concentrations that would be expected to cause widespread significant risk to future populations of aquatic receptors.

The remediation goals developed for the Picayune Strand property for chlordane were 100 ug/kg. The TOC levels on this property generally exceed those detected at Picayune Strand. The 100 ug/kg threshold should be protective of threatened and endangered species on this property.

7.2.1.2 Pasture & Citrus/Former Tomato Cultivated Area Groundwater Results

Two temporary monitor wells were installed in the sod cultivated area and two sod cultivated area background groundwater samples were collected and analyzed for the same parameters as

for soils in the cultivated area. Fifteen analytes were detected (Table 7-4). All detected analytes were below GCTLs. *No groundwater assessment or remediation is proposed in this area.*

7.2.2 CANAL SEDIMENT SAMPLING

In an effort to evaluate the potential impact to sediments, ECT collected 20 sediment samples from the areas where impacts would most likely be detected. Six additional sediment samples for copper only were collected in the citrus cultivated area. Fifteen (15) analytes were detected, excluding total organic carbon (Table 7-6). The maximum detected concentration of ten (10) of these analytes (arsenic, barium, chromium, copper, lead, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, chlordane, and heptachlor) are below a threshold level of concern based on the SQAGs. Additionally, 2 analytes nominally exceeded the 62-777 surface water leachability standard but no SQAG thresholds (silver and dieldrin). The four detections of aldrin, when compared to the SQAG for dieldrin (a structurally similar compound), suggest no risk predicted at similar concentrations. Therefore, the following two analytes were considered analytes of interest:

- Mercury
- Selenium

7.2.2.1 <u>Mercury</u>

None of the 20 samples' mercury concentrations exceeded the TEC. Eleven (11) of the 20 samples, however, exceeded the SCTL for the protection of surface water, the lowest applicable SCTL given the intended use of the property. Mercury detections above the surface water SCTL are a recognized regional occurrence and are generally unrelated to site activities. The ASTM Phase I/II ESA scope of work utilized for pre property acquisition is not adequate to address regional impacts of mercury. A significantly more comprehensive investigation would be required. In an effort to evaluate ecological risk the SFWMD and USFWS have agreed to adopt the SQAG TEC and SQAG PEC for CERP project areas. The phase I/II ESA indicated there were no SQAG TEC or PEC exceedances at this property for mercury. According to the 2002 Everglades

Consolidation Report, the SFWMD and FDEP have formed an informal partnership with the Federal government, other Florida agencies and the private sector to evaluate the presence of mercury in the Everglades (the South Florida Mercury Science Program). ECT recommends that the mercury data contained in this report be made available to the South Florida Mercury Science Program.

7.2.2.2 Selenium

No SQAG for selenium was available, however, USFWS requested the use of a value of 1 mg/kg for use in the Southern Golden Gates project to screen for potential reproductive effects on aquatic feeding avian receptors. One sample out of 20 exceeded this value (SED-12 = 1.2 mg/kg). The low sitewide concentration indicates that selenium risk is likely to be *de minimis* for all aquatic-feeding wildlife at the site

7.2.3 PUMP STATIONS

ECT evaluated the potential for impacts to the soil and groundwater in the vicinity of each of the seven (7) pump stations by installing between one and three soil borings and installing one (1) groundwater monitoring well at each location. Surficial soil samples (0-6 inches) were collected from 0-6 inches bls and then at 2 ft intervals to the water table. A summary of TVA field screening results is provided below.

Summary of TVA Results

Location	Sample Interval		
	0-6 inches	6 inches -2 ft bls	2-4 ft bls
Pump Stations			
PSSB-1	9.56	8.75	6.93
PSSB-2	5.18	4.72	1.29
PSSB-3	4,824.6	812.8	32.58
PSSB-4	4.11	2.08	1.95
PSSB-5	2.69	2.54	0.95
PSSB-6	6.62	4.20	1.09
PSSB-7	614.8	312.7	15.28

Source: ECT, 2006

All results are parts per million
ft bls – Feet below land surface

7.2.3.1 Pump Station #1

7.2.3.1.1 Pump Station #1 Soil Results

Table 7-7 lists the single analyte (TRPH) that was detected in a concentration greater than the laboratory method detection limits. The TRPH detection was below the SCTL.

Given that petroleum constituents were not detected in excess of the SQAG or SCTL and given the intended use of the property, ECT does not propose further assessment or remediation of soils in this area.

7.2.3.1.2 Pump Station #1 Groundwater Results

Table 7-4 lists those analytes that were detected in concentrations greater than the analytical method detection limits. The lone detection (TRPH) is below the applicable GCTL.

No groundwater assessment or remediation is proposed in this area.

7.2.3.2 Pump Station #2

7.2.3.2.1 Pump Station #2 Soil Results

Table 7-7 lists the single analyte (TRPH) that was detected in a concentration greater than the laboratory method detection limits. The TRPH detection was below the SCTL.

Given that petroleum constituents were not detected in excess of the SQAG or SCTL, and given the intended use of the property, ECT does not propose further assessment or remediation of soils in this area.

7.2.3.2.2 Pump Station #2 Groundwater Results

Table 7-4 lists those analytes that were detected in concentrations greater than the analytical method detection limits. The lone detection (TRPH) is below the applicable GCTL.

No groundwater assessment or remediation is proposed in this area.

7.2.3.3 Pump Station #3

7.2.3.3.1 Pump Station #3 Soil Results

Table 7-7 lists the analytes that were detected in concentrations greater than the laboratory method detection limits. The pump station sample location with chemicals of potential concern is illustrated in Figure 7-2.1. The samples present in concentrations greater than the SQAG or SCTL are summarized in Table 7-8. PSSB-3 exceeds the residential SCTL for TRPH and the SQAG TEC for pyrene.

Since this is considered a point source and the SQAG TEC is exceeded, ECT proposes removal of the top two feet of soil in this area as discussed in Section 8 of this report.

7.2.3.3.2 Pump Station #3 Groundwater Results

Table 7-4 lists those analytes that were detected in concentrations greater than the analytical method detection limits. The lone detection (TRPH) is below the applicable GCTL.

No groundwater assessment or remediation is proposed in this area.

7.2.3.4 Pump Station #4

7.2.3.4.1 Pump Station #4 Soil Results

Table 7-7 lists the single analyte (TRPH) that was detected in a concentration greater than the laboratory method detection limits. The TRPH detection was below the SCTL.

Given that petroleum constituents were not detected in excess of the SQAG or SCTL, and given the intended use of the property, ECT does not propose further assessment or remediation of soils in this area.

7.2.3.4.2 Pump Station #4 Groundwater Results

Table 7-4 lists those analytes that were detected in concentrations greater than the analytical method detection limits. The lone detection (TRPH) is below the applicable GCTL.

No groundwater assessment or remediation is proposed in this area.

7.2.3.5 Pump Station #5

7.2.3.5.1 Pump Station #5 Soil Results

Table 7-7 lists the single analyte (TRPH) that was detected in a concentration greater than the laboratory method detection limits. The TRPH detection was below the SCTL.

Given that petroleum constituents were not detected in excess of the SQAG or SCTL, and given the intended use of the property, ECT does not propose further assessment or remediation of soils in this area.

7.2.3.5.2 Pump Station #5 Groundwater Results

Table 7-4 lists those analytes that were detected in concentrations greater than the analytical method detection limits. The lone detection (TRPH) is below the applicable GCTL.

No groundwater assessment or remediation is proposed in this area.

7.2.3.6 Pump Station #6

7.2.3.6.1 Pump Station #6 Soil Results

Table 7-7 lists the single analyte (TRPH) that was detected in a concentration greater than the laboratory method detection limits. The pump station sample location with chemicals of potential concern is illustrated in Figure 7-2.2. The TRPH detection was below the SCTL.

Given the detection of dieldrin in the groundwater (see next section), ECT proposes source removal of the top two feet of soil in this area as discussed in Section 8 of this report.

7.2.3.6.2 Pump Station #6 Groundwater Results

Table 7-4 lists those analytes that were detected in concentrations greater than the analytical method detection limits. Table 7-5 lists those analytes that were detected in concentrations greater than the GCTLs. Dieldrin exceeded the GCTL.

ECT proposes to collect a groundwater sample after soil source removal to confirm that the slight exceedance of dieldrin has been remediated.

7.2.3.7 Pump Station #7

7.2.3.7.1 Pump Station #7 Soil Results

Table 7-7 lists the analytes that were detected in concentrations greater than the laboratory method detection limits. The pump station sample location with chemicals of potential concern is illustrated in Figure 7-2.3. The samples present in concentrations greater than the SQAG or SCTL are summarized in Table 7-8. PSSB-7 exceeds the residential SCTL for TRPH, the SQAG TEC for phenanthrene and indeno(1,2,3-cd)pyrene, and the SQAG PEC for acenaphthylene, benzo(a)anthracene, dibenzo(a,h)anthracene, anthracene, chrysene, benzo(b)fluoranthene, fluorene, benzo(a)pyrene, and pyrene.

Since this is considered a point source and the SQAG TEC and/or PEC is exceeded for multiple constituents, ECT proposes removal of the top two feet of soil in this area as discussed in Section 8 of this report.

7.2.3.7.2 Pump Station #7 Groundwater Results

No positive detections of petroleum analytes were observed at this location.

No groundwater assessment or remediation is proposed in this area.

7.2.4 CATTLE PENS

ECT evaluated the potential for impacts to the soil by installing 5 (5) soil borings and installing one (1) groundwater monitoring well in each of the cattle pen working areas.

7.2.4.1 Cattle Pen #1

7.2.4.1.1 Cattle Pen #1 Soil Results

Soil sampling consisted of five (5) soil borings (CP1SB-1 through CP1SB-5). Table 7-6 lists those analytes that were detected in concentrations greater than the analytical method

detection limit. The samples present in concentrations greater than the SQAG or SCTL are summarized in Table 7-8. The cattle pen sample location with chemicals of potential concern is illustrated in Figure 7-3.1. Arsenic is the only analyte that exceeded the residential SCTL (CP1SB-1, CP1SB-2, CP1SB-4 and CP1SB-5). Dieldrin (CP1SB-1 through CP1SB-4) is the only analyte that had exceedances of the groundwater or surface water leachability SCTL only.

Since this is considered a point source and a groundwater exceedance for arsenic was detected, ECT proposes removal of the top two feet of soil in this area as discussed in Section 8 of this report.

7.2.4.1.2 Cattle Pen #1 Groundwater Results

Temporary monitoring well CP-1 MW was installed to evaluate groundwater quality in this location. Table 7-4 lists those analytes that were detected in concentrations greater than the analytical method detection limits. Table 7-5 lists those analytes that were detected in concentrations greater than the GCTLs. Arsenic exceeded the GCTL.

ECT proposes to collect a groundwater sample after soil source removal to confirm that the exceedance of arsenic has been remediated.

7.2.4.2 Cattle Pen #2

7.2.4.2.1 Cattle Pen #2 Soil Results

Soil sampling consisted of five (5) soil borings (CP2SB-1 through CP2SB-5). Table 7-6 lists those analytes that were detected in concentrations greater than the analytical method detection limit. The samples present in concentrations greater than the SQAG or SCTL are summarized in Table 7-8. The cattle pen sample location with chemicals of potential concern is illustrated in Figure 7-3.2. Arsenic (CP2SB-2, CP2SB-3, and CP2SB-5) and toxaphene (CP2SB-2) exceeded the residential SCTL (CP2SB-5 also had a toxaphene SQAG PEC exceedance; however, it did not exceed the residential SCTL). Lindane (CP2SB-2) exceeded the SQAG TEC. The following analytes had exceedances of only the groundwater or surface water leachability SCTL: coumaphos (CP2SB-5), endosulfan

sulfate (CP2SB-2), and endrin ketone (CP2SB-3).

Since this is considered a point source and a groundwater exceedance for arsenic was detected, the SQAG TEC and PEC were exceeded for toxaphene and the SQAG TEC was exceeded for lindane, ECT proposes removal of the top two feet of soil in this area as discussed in Section 8 of this report.

7.2.4.2.2 Cattle Pen #2 Groundwater Results

Temporary monitoring well CP-2 MW was installed to evaluate groundwater quality in this location. Table 7-4 lists those analytes that were detected in concentrations greater than the analytical method detection limits. Table 7-5 lists those analytes that were detected in concentrations greater than the GCTLs. Arsenic exceeded the GCTL.

ECT proposes to collect a groundwater sample after soil source removal to confirm that the exceedance of arsenic has been remediated.

7.2.5 POLE BARNS

ECT evaluated the potential for agrochemical impacts to the soil by installing five (5) soil borings in each of the four pole barn areas.

ECT evaluated the potential for petroleum impacts to the soil and groundwater in the vicinity of each of the four (4) pole barns by installing between one soil boring and installing one (1) groundwater monitoring well. Surficial soil samples (0-6 inches) were collected from 0-6 inches bls and then at 2 ft intervals to the water table. A summary of TVA field screening results is provided below.

Summary of TVA Results

Location	Sample Interval		
	0-6 inches	6 inches -2 ft bls	2-4 ft bls
Pole Barns (PET)			
PB1PETSB	10.65	9.54	4.46
PB2PETSB	8.75	5.51	4.77
PB3PETSB	6.42	6.84	2.61
PB4PETSB	9,254.8	1,265.7	45.62

Source: ECT, 2006

7.2.5.1 Pole Barn #1

7.2.5.1.1 Pole Barn #1 Soil Results

Soil sampling consisted of five (5) soil borings (PB1SB-1 through PB1SB-5) for agrochemicals and one sample (PB1PETSB) for petroleum compounds. Table 7-6 lists those agrochemical analytes that were detected in concentrations greater than the analytical method detection limit. Table 7-7 lists those petroleum analytes that were detected in concentrations greater than the analytical method detection limit. The samples present in concentrations greater than the SQAG or SCTL are summarized in Table 7-8. The pole barn sample location with chemicals of potential concern is illustrated in Figure 7-4.1. Arsenic is the only analyte that exceeded the residential SCTL (PB1SB-2 and PB1SB-4). The following analytes exceeded the SQAG TEC: 4,4'-DDE (PB1SB-2 and PB1SB-4), 4,4'-DDT (PB1SB-4), acenaphthylene (PB1PETSB), and anthracene (PB1PETSB). The following analytes had exceedances of only the groundwater or surface water leachability SCTL: chromium (PB1SB-4), mercury (PB1SB-1 and PB1SB-4), silver (PB1SB-1, PB1SB-2, and PB1SB-4), coumaphos (PB1SB-2), dieldrin (PB1SB-2), endrin ketone (PB1SB-2 and PB1SB-4), heptachlor epoxide (PB1SB-1 and PB1SB-2) pentachlorophenol, (PB1SB-3), and indeno(1,2,3-cd)pyrene (PB1PETSB).

Since this is considered a point source and the SQAG TEC is exceeded for multiple constituents, ECT proposes removal of the top two feet of soil in this area as discussed in Section 8 of this report.

7.2.5.1.2 Pole Barn #1 Groundwater Results

Temporary monitoring well PB-1 MW was installed to evaluate groundwater quality in this location. Table 7-4 lists those analytes that were detected in concentrations greater than the analytical method detection limits. Table 7-5 lists those analytes that were detected in concentrations greater than the GCTLs. Dieldrin slightly exceeded the GCTL.

ECT proposes to collect a groundwater sample after soil source removal to confirm that the slight exceedance of dieldrin has been remediated.

7.2.5.2 Pole Barn #2

7.2.5.2.1 Pole Barn #2 Soil Results

Soil sampling consisted of five (5) soil borings (PB2SB-1 through PB2SB-5) for agrochemicals and one sample (PB2PETSB) for petroleum compounds. Table 7-6 lists those agrochemical analytes that were detected in concentrations greater than the analytical method detection limit. Table 7-7 lists those petroleum analytes that were detected in concentrations greater than the analytical method detection limit. The samples present in concentrations greater than the SQAG or SCTL are summarized in Table 7-8. The pole barn sample location with chemicals of potential concern is illustrated in Figure 7-4.2. No analytes exceeded the residential SCTL or SQAG TEC.

The following analytes had exceedances of only the groundwater or surface water leachability SCTL: chromium (PB2SB-4), mercury (PB2SB-1 and PB2SB-4), silver (PB2SB-1, PB2SB-2, and PB2SB-5), aldrin (PB2SB-3 andPB2SB-5), heptachlor epoxide (PB2SB-1, PB2SB-3, and PB2SB-4) and indeno(1,2,3-cd)pyrene (PB2PETSB).

Since this is considered a point source and the leachability SCTL is exceeded for multiple constituents, ECT proposes removal of the top two feet of soil in this area as discussed in Section 8 of this report.

7.2.5.2.2 Pole Barn #2 Groundwater Results

Temporary monitoring well PB-2 MW was installed to evaluate groundwater quality in this location. Table 7-4 lists those analytes that were detected in concentrations greater than the analytical method detection limits. Table 7-5 lists those analytes that were detected in concentrations greater than the GCTLs. Arsenic and MCPA exceeded the GCTL.

ECT proposes to conduct 6 months of groundwater monitoring after soil source removal.

7.2.5.3 Pole Barn #3

7.2.5.3.1 Pole Barn #3 Soil Results

Soil sampling consisted of five (5) soil borings (PB3SB-1 through PB3SB-5) for agrochemicals and one sample (PB3PETSB) for petroleum compounds. Table 7-6 lists those agrochemical analytes that were detected in concentrations greater than the analytical method detection limit. Table 7-7 lists those petroleum analytes that were detected in concentrations greater than the analytical method detection limit. The samples present in concentrations greater than the SQAG or SCTL are summarized in Table 7-8. The pole barn sample location with chemicals of potential concern is illustrated in Figure 7-4.3. Arsenic is the only analyte that exceeded the residential SCTL (PB3SB-1, PB3SB-2, and PB3SB-5). No analytes exceeded the SQAG TEC.

The following analytes had exceedances of only the groundwater or surface water leachability SCTL: chromium (PB3SB-1), mercury (PB3SB-5), silver (PB3SB-2, and PB3SB-3), aldrin (PB3SB-3 and PB3SB-4), endosulfan sulfate (PB3SB-1), fensulfothion (PB3SB-1), and heptachlor epoxide (PB3SB-2).

Since this is considered a point source and the surface water SCTL is exceeded for multiple constituents, ECT proposes removal of the top two feet of soil in this area as discussed in Section 8 of this report.

7.2.5.3.2 Pole Barn #3 Groundwater Results

Temporary monitoring well PB-3 MW was installed to evaluate groundwater quality in this location. Table 7-4 lists those analytes that were detected in concentrations greater than the analytical method detection limits. Table 7-5 lists those analytes that were detected in concentrations greater than the GCTLs. Dieldrin slightly exceeded the GCTL.

ECT proposes to collect a groundwater sample after soil source removal to confirm that the slight exceedance of dieldrin has been remediated.

7.2.5.4 Pole Barn #4

7.2.5.4.1 Pole Barn #4 Soil Results

Soil sampling consisted of five (5) soil borings (PB4SB-1 through PB4SB-5) for agrochemicals and one sample (PB4PETSB) for petroleum compounds. Table 7-6 lists those agrochemical analytes that were detected in concentrations greater than the analytical method detection limit. Table 7-7 lists those petroleum analytes that were detected in concentrations greater than the analytical method detection limit. The samples present in concentrations greater than the SQAG or SCTL are summarized in Table 7-8. The pole barn sample location with chemicals of potential concern is illustrated in Figure 7-4.4. Arsenic (PB4SB-1), copper (PB4SB-4), and TRPH (PB4PETSB) exceeded the residential SCTL. The following analytes exceeded the SQAG TEC: fluoranthene (PB4PETSB), copper (PB4SB-1 through PB4SB-5), and selenium (PB4SB-1 and PB4SB-3). The following analytes exceeded the SQAG PEC: acenaphthene (PB4PETSB), fluorene (PB4PETSB), phenanthrene (PB4PETSB), pyrene (PB4PETSB), and copper (PB4SB-4). The following analytes had exceedances of only the groundwater or surface water leachability SCTL: chromium (PB4SB-1 through PB4SB-5), mercury (PB4SB-2 and PB4SB-5), silver (PB4SB-2 and PB4SB-3), dieldrin (PB4SB-1), heptachlor epoxide (PB4SB-3), 1-methylnaphthalene (PB4PETSB), 2-methylnaphthalene (PB4PETSB), and total xylenes (PB4PETSB).

Since this is considered a point source and the SQAG TEC and/or PEC is exceeded for multiple constituents, ECT proposes removal of the top two feet of soil in this area as discussed in Section 8 of this report.

7.2.5.4.2 Pole Barn #4 Groundwater Results

Temporary monitoring wells PB-4 MW and PB-4 MW (PET) were installed to evaluate groundwater quality in this location. Table 7-4 lists those analytes that were detected in concentrations greater than the analytical method detection limits. Table 7-5 lists those analytes that were detected in concentrations greater than the GCTLs. Dieldrin slightly exceeded the GCTL.

ECT proposes to collect a groundwater sample after soil source removal to confirm that the slight exceedance of dieldrin has been remediated.

7.2.6 EQUIPMENT BONEYARD

ECT evaluated the potential for impacts to the soil by installing four (4) soil borings and installing one (1) groundwater monitoring well in the equipment boneyard area.

7.2.6.1 Soil Results

Soil sampling consisted of four soil borings (BYSB-1 through BYSB-4). Table 7-6 lists those analytes that were detected in concentrations greater than the analytical method detection limit. The samples present in concentrations greater than the SQAG or SCTL are summarized in Table 7-8. The equipment boneyard sample location with chemicals of potential concern is illustrated in Figure 7-5. Arsenic is the only analyte that exceeded the residential SCTL (BYSB-1 and BYSB-4). Endrin ketone (BYSB-1) is the only analyte that exceeded the SQAG TEC. The following analytes had exceedances of only the groundwater or surface water leachability SCTL: mercury (BYSB-1), selenium (BYSB-1), silver (BYSB-1 and BYSB-4), aldrin (BYSB-1), dieldrin (BYSB-2, BYSB-3, and BYSB-4), and heptachlor epoxide (BYSB-2).

Since this is considered a point source and the SQAG TEC is exceeded for endrin ketone, ECT proposes removal of the top two feet of soil in this area as discussed in Section 8 of this report.

7.2.6.2 Groundwater Results

Temporary monitoring well BY-1 MW was installed to evaluate groundwater quality in this location. Table 7-4 lists those analytes that were detected in concentrations greater than the analytical method detection limits. Table 7-5 lists those analytes that were detected in concentrations greater than GCTLs. All analytes detected were below the GCTLs, with the exception of dieldrin.

ECT proposes to collect a groundwater sample after soil source removal to confirm that the slight exceedance of dieldrin has been remediated.

7.2.7 BURN AREAS

ECT evaluated the potential for impact to the soil and groundwater in each of two burn areas by installing two (2) soil borings, and one (1) groundwater monitor well in each area. Both burn areas were located adjacent to Pole Barn 4. Figures 7-6.1 and 7-6.2 illustrate the results of potential concern for burn area 1 and burn area 2, respectively.

7.2.7.1 Burn Area #1

7.2.7.1.1 Burn Area #1 Soil Results

Soil sampling consisted of two soil borings (BA1SB-1 and BA1SB-2). Table 7-6 lists those analytes that were detected in concentrations greater than the analytical method detection limit. The samples present in concentrations greater than the SQAG or SCTL are summarized in Table 7-8. The residential SCTL and SQAG TEC were exceeded for arsenic in both samples. The following analytes had exceedances of only the groundwater or surface water leachability SCTL: chromium (BA1SB-1 and BA1SB-2), mercury (BA1SB-1), silver (BA1SB-1), aldrin (BA1SB-2), and dieldrin (BA1SB-1).

Since this is considered a point source and the SQAG TEC is exceeded for arsenic and the leachability SCTL is exceeded for multiple constituents, ECT proposes removal of the top two feet of soil in this area as discussed in Section 8 of this report.

7.2.7.1.2 Burn Area #1 Groundwater Results

Temporary monitor well BA-1 MW was installed to evaluate the potential for groundwater impacts in this area. Table 7-4 lists those analytes that were detected in concentrations greater than the analytical method detection limit. The concentrations of all detected constituents were below GCTLs.

No further groundwater assessment or remediation is proposed in this area.

7.2.7.2 Burn Area #2

7.2.7.2.1 Burn Area #2 Soil Results

Soil sampling consisted of two soil borings (BA2SB-1 and BA2SB-2). Table 7-6 lists those analytes that were detected in concentrations greater than the analytical method detection limit. The samples present in concentrations greater than the SQAG or SCTL are summarized in Table 7-8. The SQAG TEC was exceeded for copper in both samples, although the 85 mg/kg interim screening value for the protection of the snail kite was not exceeded. The following analytes had exceedances of only the groundwater or surface water leachability SCTL: and dieldrin (BA2SB-1 and BA2SB-2) and heptachlor epoxide (BA2SB-1).

Given the groundwater exceedance of arsenic (see next section), ECT proposes source removal of the top two feet of soil in this area as discussed in Section 8 of this report.

7.2.7.2.2 Burn Area #2 Groundwater Results

Temporary monitor well BA-2 MW was installed to evaluate the potential for groundwater impacts in this area. Table 7-5 lists those analytes that were detected in concentrations greater than GCTLs. All analytes detected were below the GCTLs, with the exception of arsenic.

ECT proposes to collect a groundwater sample after soil source removal to confirm that the slight exceedance of dieldrin has been remediated.

7.3 SPLIT AND DUPLICATE SAMPLE CORRELATION

Duplicate and split sampling results are summarized in Table 7-9 and 7-10, respectively. Based upon ECT's review of the data, there is generally a strong agreement between the split data obtained from STL and ELAB.

7.4 PHASE II ESA CONCLUSIONS & RECOMMENDATIONS

The phase II assessment was conducted to evaluate potential impacts to the soil and groundwater resulting from a release of petroleum products or hazardous materials/waste including pesticide/herbicide and soil amendments handling and use.

Soil and groundwater analytical results from the Phase II investigation were reviewed to evaluate the necessity for and estimated costs of corrective actions.

Based upon the results of the Phase II ESA, areas requiring corrective actions were identified as follows:

- Cultivated Area Soils
- Pump Stations #3, #6 & #7
- Cattle Pens #1 & #2
- Pole Barns #1, #2, #3 & #4
- Equipment Boneyard
- Burn Areas #1 & #2

8.0 REMEDIAL COSTS

Environmental Consulting & Technology, Inc. (ECT) was retained by the South Florida Water Management District to conduct a Phase I/Phase II Environmental Site Assessment (ESA) of approximately 4,700-acre property, consisting of three non-contiguous parcels, referred to as the Pearce property. The parcels are located on the northern side of Sate Road 78, near Buckhead Ridge, in northeast Glades County, Florida. The property's present use is a combination of pasture and citrus grove. According to Mr. Ricou Hartman, the owner's representative, tomato farming occurred in a portion of tracts MD 100-004, MD 100-007, MD 100-008 and MD 100-014 until 1947. The remaining portions of the property have been used historically for citrus farming and cattle ranching. Based upon ECT's conversations with Mr. Hartman, a portion of the property was used to test the viability of Bahia grass cultivation for commercial production; however, no soil amendments were applied. This project was conducted in accordance with ECT's proposal to Mr. Robert Kukleski, Lead Environmental Engineer of the South Florida Water Management District (District), dated December 5, 2005.

The purpose of the Phase I Environmental Site Assessment was to evaluate whether current or historical activities on or near the subject property may have resulted in contamination by hazardous substance or wastes, also known as a "Recognized Environmental Condition" in general accordance with the ASTM E1527. The Phase II Assessment was conducted to evaluate potential impacts to the soil, groundwater and sediments resulting from a release of petroleum products or hazardous materials/waste including pesticide/herbicide and soil amendments handling and use. Soil, groundwater and sediment analytical results from the Phase II investigation were reviewed to evaluate the necessity for and estimated costs of corrective actions.

In evaluating the results from the Phase II sampling activities, ECT considered the future use of the site as a water retention reservoir.

8.1 PHASE II ESA INVESTIGATION BASED CONCLUSIONS

Based upon observations and information obtained in the Phase I/II Environmental Site Assessment of the Pearce Ranch property, the following areas were investigated but do not warrant further investigation or remediation:

- **Canal Sediments**
  ECT does not propose any further assessment or remediation of the canal sediments around the property.

- **Pump Station #1**
  ECT does not propose any further assessment or remediation of this pump station area.

- **Pump Station #2**
  ECT does not propose any further assessment or remediation of this pump station area.

- **Pump Station #4**
  ECT does not propose any further assessment or remediation of this pump station area.

- **Pump Station #5**
  ECT does not propose any further assessment or remediation of this pump station area.

Based upon the results of the Phase II ESA, the following areas require further assessment or remediation:

- **Cultivated Area**
  Soil Inversion
  Cultivated samples, TCASB-23, TCASB-25, TCASB-26, TCASB-27, TCASB-28, TCASB-30, TCASB-37 and TCASB-38, representative of four-hundred (400) acres indicated DDE concentrations problematic for species such as the Bald Eagle, Little Blue Heron, Great Blue Heron and Osprey. As a conservative measure, 400-acres will be remediated although the screening level risk assessment has indicated as little as 150-acres may be sufficient. The cleanup level will be based upon the preliminary remediation goal (PRG) of 12.0 µg/kg, as discussed in the screening level risk assessment. These grids represent the highest concentrations of DDE detected within the composite samples of the cultivated area. With these 400 acres remediated, the 95% UCL of the mean (for the site and the tomato field areas) will result in hazard quotients below 1.0 for the threatened and endangered species modeled. Figure 8-1 illustrates the area of remediation for the cultivated area.

Soil within this 400 acre area will be inverted to a depth of 36 inches using a soil inversion process. Prior to inversion, samples will be collected at 18 to 24 inches and 30-36" below grade to demonstrate that these horizons are free from DDE impacts. It is assumed that the DDE will be reduced to the detection limit after soil inversion. Approximately 800 samples will be collected in this analysis.

Confirmation soil samples will be collected after the soil inversion process to ensure that the DDE is non detectable or at a concentration that will not result in a hazard quotient above 1 for any trustee, threatened or endangered species Confirmation sampling below 6 inches is not proposed. This will entail collection of approximately 800 soil samples from 0 to 6-inches. These soil locations will be recorded for future reference with a GPS. This represents approximately 2 samples per acre.

The soil inversion will be accomplished with the use of a Disc Plow, which is designed to invert soil in this fashion, as documented in the Soil Inversion Pilot Test, conducted by ECT in September 2003 at the Prudential Property. The pilot test was performed to evaluate the viability of soil inversion as a remedial approach for properties impacted by agrochemicals. It will be necessary to degrub the area, prior to plowing, to prevent large tree roots, trees and grass from interfering with the plowing process.

Twelve (12) "point source" areas of recognized environmental conditions reported concentrations of compounds above the FDEP SQAG screening criteria. The following areas will require additional assessment and remediation:

- **<u>Pump Station #3</u>**
  One soil sample, PSSB-3, exhibited exceedances of the SQAG TEC for pyrene and the residential SCTL for total petroleum hydrocarbons (TPH) related to petroleum constituents. Since this is considered a point source, ECT proposes removal of the top 24 inches of soil in the stained area. This translates to 11 yd^3 of soil. The dimensions for soil excavation will be 14 ft x 10 ft x 2 ft. No groundwater assessment or remediation activities are proposed for this area. Figure 8-2.1 illustrates the extent of soil remediation in the vicinity of pump station #3.

- **<u>Pump Station #6</u>**
  Based upon the groundwater exceedance for dieldrin at this location, ECT proposes to remove 7.4 yd^3 of soil. The dimensions for soil excavation will be 10 ft x 10 ft x 2 ft. Following the soil excavation, a confirmatory groundwater sample will be collected for dieldrin. It is anticipated that the soil removal will result in a dieldrin concentration below the groundwater cleanup target level. No additional groundwater assessment or remediation activities are proposed for this area. Figure 8-2.2 illustrates the extent of remediation in the area of pump station #6.

- **Pump Station #7**
  One soil sample, PSSB-7, exhibited exceedances of a SQAG TEC and PEC or SCTL for multiple petroleum constituents. The residential SCTL was exceeded for TPH. Since this is considered a point source, ECT proposes removal of the top 24 inches of soil in the stained area. This translates to 60 yd^3 of soil. The dimensions for soil excavation will be 40 ft x 20 ft x 2 ft. No groundwater assessment or remediation activities are proposed for this area. Figure 8-2.3 illustrates the extent of soil remediation in this area.

- **Cattle Pen #1**
  Based upon the groundwater exceedance for arsenic at this location, ECT proposes to remove 7.4 yd^3 of soil. The dimensions for soil excavation will be 10 ft x 10 ft x 2 ft. Following the soil excavation, a confirmatory groundwater sample will be collected for arsenic. It is anticipated that the soil removal will result in an arsenic concentration below the groundwater cleanup target level. No additional groundwater assessment or remediation activities are proposed for this area. Figure 8-3-1 illustrates the extent of remediation in the area of cattle pen #1.

- **Cattle Pen #2**
  Two samples CP2SB-2 and CP2SB-5 exhibited detections of toxaphene above the SQAG TEC and PEC, CP2SB-2 exhibited a lindane concentration greater than the SQAG TEC and other constituents exceeding the leachability SCTL. Since this is considered a point source and the SQAG TEC was exceeded for arsenic, and arsenic was detected in the groundwater above the groundwater cleanup target level, ECT proposes to remove the top 24 inches over the cattle pen area. This translates to 778 yd^3. The overall dimensions will be 70 ft x 150 ft x 2 ft. The groundwater will be resampled for arsenic after the soil removal. Six months of groundwater monitoring are proposed. No remediation activities are proposed for this area other than the soil removal. Figure 8-3.2 illustrates the extent of remediation in the area of cattle pen #2.

- **Pole Barn #1**
  Three soil samples, PB1SB-2, PB1SB-3 and PB1SB-4, exceeded the SQAG TEC for DDE and DDT and the SCTL for pentachlorophenol. Other agrochemicals were also detected exceeding the leachability SCTL. Soil sample PB1PETSB exceeded the SQAG TEC for several petroleum constituents. Since this is considered a point source and numerous SQAGs and SCTLs were exceeded, ECT proposes to remove the top 24 in. The dimensions will be 35 ft x 20 ft x 2 ft in the area of PB1SB-2, PB1SB-3 and PB1SB-4 and 10 ft x 5 ft x 2 ft in the area of PB1PETSB. This translates to a total of 56 yd^3. A groundwater sample will be collected after the excavation work to confirm that the slight exceedance of dieldrin has been remediated. No additional groundwater assessment or remediation activities are proposed for this area. Figure 8-4.1 illustrates the extent of remediation in the area of pole barn #1.

- **Pole Barn #2**
  One soil sample exceeded the SCTL for the petroleum constituent indeno(1,2,3-cd) pyrene in sample PB2PETSB. Agrochemicals were also detected exceeding the various leachability SCTLs. Since this is considered a point source and numerous SCTLs were exceeded, ECT proposes to remove the top 24 in of soil in this area. This translates to 74 yd^3. The overall dimensions will be 20 ft x 50 ft x 2 ft. The groundwater will be resampled for MCPA and arsenic after the soil removal. Six months of groundwater monitoring are proposed. No remediation activities are proposed for this area other than the soil removal. Figure 8-4.2 illustrates the extent of remediation in the area of pole barn #2.

- **Pole Barn #3**
  Due to a groundwater exceedance for dieldrin and surficial soil staining, ECT proposes to remove the top 24 inches of soil in this area. The dimensions will be 48 feet by 30 ft by 2 ft. This translates to 107 yd^3. A groundwater sample will be collected after the excavation work to confirm that the slight exceedance for dieldrin has been remediated. No further groundwater assessment or remediation activities are proposed for this area. Figure 8-4.3 illustrates the extent of remediation at pole barn #3.

- **Pole Barn #4**
  Four (4) soil samples, PB4-SB1, PB4-SB-2, PB4-SB4 and PB4-SB-5, exceeded the SQAG TEC and/or PEC and the SCTL for petroleum constituents and copper. Other agrochemicals were also detected exceeding the leachability SCTL. Since this is considered a point source and SQAGs and numerous SCTLs were exceeded, ECT proposes to remove the top 24 in of soil in this area the pole barn area and diesel tank area. This translates to 91 yd^3. The overall dimensions will be 46 ft x 24 ft x 2 ft and 6 ft x 6 ft x 2ft. A groundwater sample will be collected after the excavation work to confirm that the slight exceedance for dieldrin has been remediated. No additional groundwater assessment or remediation activities are proposed for this area. Figure 8-4.4 illustrates the extent of remediation at pole barn #4.

- **Equipment Boneyard**
  One sample BYSB-1 exceeded the SQAG TEC for endrin ketone. Other agrochemicals exceeded their leachabilty SCTL's. Dieldrin was also detected in the groundwater above the groundwater cleanup target level. Since this is considered a point source and the SQAG TEC was exceeded for endrin ketone, ECT proposes to remove the top 24 inches over the equipment boneyard area. This translates to 149 yd^3. The overall dimensions will be 84 ft x 24 ft x 2 ft. A groundwater sample will be collected after the excavation work to confirm that the slight exceedance of dieldrin has been remediated. No further groundwater assessment or remediation activities are proposed for this area. Figure 8-5 illustrates the extent of remediation in the equipment boneyard.

- **Burn Area #1**
  Two samples BA1SB-1 and BA1SB-2 exhibited detections of arsenic above the SQAG TEC and other constituents exceeding the leachability SCTL. Since this is considered a point source and the SQAG TEC was exceeded for arsenic, ECT proposes to remove the top 24 inches over the entire burn area. This translates to 74 yd^3. The overall dimensions will be 50 ft x 20 ft x 2 ft. No groundwater assessment or remediation activities are proposed for this area. Figure 8-6.1 illustrates the extent of remediation in burn area #1.

- **Burn Area #2**
  Based upon the groundwater exceedance for arsenic at this location, ECT proposes to remove 7.4 yd^3 of soil .The dimensions for soil excavation will be 10 ft x 10 ft x 2 ft. Following the soil excavation, a confirmatory groundwater sample will be collected for arsenic. It is anticipated that the soil removal will result in an arsenic concentration below the groundwater cleanup target level. No further groundwater assessment or remediation activities are proposed for this area. Figure 8-6.2 illustrates the extent of remediation in burn area #2.

8.2 RECOMMENDATIONS & REMEDIATION COSTS

Based upon the Phase I and Phase II Assessment Activities, ECT recommends the following:

- **Cultivated Area**
  Soil Inversion
  ECT recommends the use of soil inversion technology to bury the 0 to 6-inch horizon to a depth of 36 inches below grade, for the 400-acre area, designated as TCASB-23, TCASB-25, TCASB-26, TCASB-27, TCASB-28, TCASB-30, TCASB-37 and TCASB-38. The burial depth will be based upon the DDE concentrations in these grids. As a conservative measure, 400 acres will be remediated although the screening level risk assessment has indicated as little as 150 acres may be sufficient. It is assumed that the cost of the purchase of a plow will be approximately $50,000.00 and this cost will be distributed over 10 separate projects at $5,000 per project. It is assumed that the District will provide the tractor and the horsepower requirement will be at least 400 h.p. A $1,000.00 mobilization is included for the tractor. No cost is assumed for the de-grubbing of the 400 acre area, but it is ECT's understanding that some de-grubbing on some parcels may be performed as part of the project construction in any event. It is assumed that the hourly labor cost for the plow/tractor operator will be $50.00 per hour and that the total onsite time to plow 400 acres will be 400 hours. The plow manufacturer indicated that the plow could process 3 to 4 acres of land per hour so the 400 hours with mobilization and setup should be conservative. It is assumed that the de-grubbing will be performed as a separate event prior to plowing by the District. ECT will provide pre and post sampling for DDE to verify the efficacy of

the inversion process. The cost for implementation will be approximately $330,000.00. Table 8-1 summarizes the estimated costs for soil inversion.

- **Pump Station #3**
  Removal of 14.3 tons (11.0 yd^3) of petroleum impacted soil. The cost will be approximately $5,992.00 and includes mobilization, excavation, transportation, disposal, backfilling, laboratory and consulting costs. These costs are detailed on Table 8-2.

- **Pump Station #6**
  Removal of 10 tons (7.4 yd^3) of impacted soil. A temporary monitoring well will also be installed and the groundwater will be collected and analyzed for method 8081 (targeting dieldrin). The cost will be approximately $5,112.20 and includes mobilization, excavation, transportation, disposal, backfilling, laboratory, drilling and consulting costs. These costs are detailed on Table 8-3.

- **Pump Station #7**
  Removal of 78 tons (60.0 yd^3) of petroleum impacted soil. The cost will be approximately $9,376.00 and includes mobilization, excavation, transportation, disposal, backfilling, laboratory and consulting costs. These costs are detailed on Table 8-4.

- **Cattle Pen #1**
  Removal of 10 tons (7.4 yd^3) of impacted soil. A temporary monitoring well will also be installed and the groundwater will be collected and analyzed for arsenic. The cost will be approximately $5,112.20 and includes mobilization, excavation, transportation, disposal, backfilling, laboratory, drilling and consulting costs. These costs are detailed on Table 8-5.

- **Cattle Pen #2**
  Removal of 1,011 tons (778 yd^3) of pesticide impacted soil. Additionally, three permanent monitoring wells will be installed and monitored for arsenic for a six month period (2 quarters). It is assumed that the soil remediation will reduce the groundwater arsenic impacts sufficiently that the arsenic levels will meet the groundwater cleanup target levels within a 6 month period The cost will be approximately $79,692.00 and includes mobilization, excavation, transportation, disposal, backfilling, laboratory, drilling and consulting costs. These costs are detailed on Table 8-6.

- **Pole Barn #1**
  Removal of 73 tons (56.0 yd^3) of pesticide and petroleum impacted soil. The cost will be approximately $11,276.00 and includes mobilization, excavation, transportation, disposal, backfilling, laboratory and consulting costs. These costs are detailed on Table 8-7.

- **Pole Barn #2**
  Removal of 96 tons (74 yd^3) of petroleum impacted soil. The cost will be approximately $15,622.00 and includes mobilization, excavation, transportation, disposal, backfilling, laboratory and consulting costs. These costs are detailed on Table 8-8.

- **Pole Barn #3**
  Removal of 139 tons (107 yd^3) of pesticide impacted soil. The cost will be approximately $15,833.00 and includes mobilization, excavation, transportation, disposal, backfilling, laboratory and consulting costs. These costs are detailed on Table 8-9.

- **Pole Barn #4**
  Removal of 118 tons (91 yd^3) of petroleum impacted soil. The cost will be approximately $14,391.00 and includes mobilization, excavation, transportation, disposal, backfilling, laboratory and consulting costs. These costs are detailed on Table 8-10.

- **Equipment Boneyard**
  Removal of 194 tons (149 yd^3) of pesticide impacted soil. A temporary monitoring well will also be installed and the groundwater will be collected and analyzed for method 8081 (targeting dieldrin). The cost will be approximately $20,613.00 and includes mobilization, excavation, transportation, disposal, backfilling, laboratory and consulting costs. These costs are detailed on Table 8-11.

- **Burn Area #1**
  Removal of 96 tons (74 yd^3) of arsenic impacted soil. The cost will be approximately $11,622.00 and includes mobilization, excavation, transportation, disposal, backfilling, laboratory and consulting costs. These costs are detailed on Table 8-12.

- **Burn Area #2**
  Removal of 10 tons (7.4 yd^3) of impacted soil. A temporary monitoring well will also be installed and the groundwater will be collected and analyzed for arsenic. The cost will be approximately $5,112.20 and includes mobilization, excavation, transportation, disposal, backfilling, laboratory, drilling and consulting costs. These costs are detailed on Table 8-13.

- **BMP**
  Based on a 3-year interim use period, ECT estimates the cost for preparation and implementation of a site specific BMP, in accordance with the Mutual Land Stewardship Program, to be $23,000.00.

ECT estimates the cost to prepare a BMP, with periodic site monitoring, at $5,000, in accordance with the Mutual Land Stewardship Program. The cost for three years of monitoring, which will include periodic inspections and sampling of soils for select petroleum and pesticide compounds will be $6,000 per year for a period of 3 years. As part of the BMP, solid waste accumulation should be restricted to prevent the likelihood of new point sources. Table 8-14 details the costs for the BMP.

- **Septic Tank Removal**
  ECT estimates the cost to abandon the onsite existing septic tank to be $1,000.00.

- **Solid Waste**
  Removal of eight (8) truckloads (160 yd^3) of solid waste. The cost will be approximately $8,000.00 and includes mobilization, transportation and disposal costs.

- **Asbestos Survey**
  Prior to demolition of the existing residential homes on the property, an asbestos demolition survey should be conducted in accordance with the requirements of the National Emission Standard for Hazardous Air Pollutants (NESHAP). The cost for the service is estimated to be $5,000.00.

Table 8-15 summarizes the total cost to address the point source on the property. These costs assume the following:

- The work will be conducted during the year 2006
- The areas of impact will be consistent with the Phase II investigation
- All disposal is non-hazardous; and
- All work will be coordinated in a single project.

ECT has not provided costs for building demolition or the removal of any farm machinery.

Upon completion of the above-mentioned corrective actions, the property is recommended for its proposed final land use for water storage reservoir(s). No environmental conditions were identified that would inhibit the property from being utilized for its projected land use.

At the request of the SFWMD, ECT evaluated the recommended corrective actions, as they would relate to two proposed future land uses. The first land use would be the property's continued agricultural use, or conversion to residential or industrial land uses and the second would consist of the property's proposed future land use as a surface water impoundment structure.

The costs associated with the proposed future land use as an agricultural, residential or industrial property were calculated based upon the contaminants of concern identified on the property at concentrations, which exceed the FDEP Residential and Industrial Soil Cleanup Target Levels (SCTLs) (Chapter 62-777, F.A.C.).

The costs for the reservoir land use scenario were calculated based upon the contaminants of concern identified at concentrations which exceed the Sediment Quality Assessment Guidelines Threshold Effects Concentration (MacDonald *et al*., 2003) but below the FDEP Residential and Industrial SCTLs. The corrective measure costs associated with each proposed land use are summarized on the following table.

CORRECTIVE ACTION COST BY LAND USE

Recognized Environmental Condition	Approximate Remedial Cost	Ag, Residential & Industrial Land Use	Water Storage, Impoundment, STA Use
Cultivated Area	$330,000.00		X
Pump Station #3	$5,992.00	X	
Pump Station #6	$5,112.20	X	
Pump Station #7	$9,376.00	X	
Cattle Pen #1	$5,112.20	X	
Cattle Pen #2	$79,692.00	X	
Pole Barn #1	$11,276.00	X	
Pole Barn #2	$15,622.00	X	
Pole Barn #3	$15,833.00	X	
Pole Barn #4	$14,391.00	X	
Equipment Boneyard	$20,613.00	X	
Burn Area #1	$11,622.00	X	
Burn Area #2	$5,112.20	X	
BMP	$23,000		X
Septic Tank Closure	$1,000.00		X
Solid Waste	$8,000.00	X	
ACM Survey	$5,000.00		X
Total Remedial Cost		$207,753.60	$359,000.00

9.0 CONCLUSIONS

Based upon observations and information obtained in the Phase I/II Environmental Site Assessment of the Pearce Ranch property, areas of environmental concern identified include:

- Cultivated Areas
- Canal Sediments
- Seven (7) Pump Stations
- Two (2) Cattle Pens
- Four (4) Pole Barns
- Equipment Boneyard
- Two (2) Burn Areas

Soil and groundwater analytical results from the Phase II investigation were reviewed to evaluate the necessity for and estimated costs of corrective actions. Based upon areas of concern identified during the Phase II ESA, an ecological risk assessment was performed. Some areas of the property were no longer subject to corrective actions based upon the results of the risk assessment. The Pearce Ranch property cannot, at this time, be unqualifiedly identified as a potential surface water impoundment because of the presence of DDE in areas TCASB-23, TCASB-25, TCASB-26, TCASB-27, TCASB-28, TCASB-30, TCASB-37 and TCASB-38 which represents 400 acres.

Point source impacts have been identified and addressed within the body of this report. Based on the data collected from the agricultural areas, remediation will be required on 400 acres in the former tomato field area for DDE impacts. Following the remediation of these areas and the identified point sources, no significant ecological risks are anticipated for the Pearce Ranch property if the area was converted to a surface water impoundment structure. All applications of paraquat and chlordane should cease immediately.

It is the ECT's understanding that the interim land use will consist of continued cattle ranching and citrus cultivation for a period of approximately 3 years. Based on the interim time frame, a site specific Agriculture Best Management Plan (BMP), in accordance with the Mutual Land Stewardship Program, is recommended for the site. The site operation should also comply with established industries, Department of Agriculture and Consumer

Services (DACS) Institute of Food and Agriculture Services (IFAS) BMP, as well as the Fish and Wildlife Service (FWS) protocols. Upon completion of the corrective actions described in Section 8.0, the property is recommended for its proposed final land use.

10.0 REFERENCES

All references to regulatory records, public documents, and published references are listed as document references. These documents were judged not to be significant to support findings of conditions imposing or threatening an environmental impairment, liability, or restriction to the subject property.

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Florida Administrative Code (FAC) Chapter 62-777, Table V, Natural Attenuation Default Source Concentrations.

Florida Administrative Code (FAC) Chapter 62-777, Selected Soil Cleanup Target Levels.

Florida Administrative Code (FAC) Chapter 62-785 - Brownsfields Soil Cleanup Goals.

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USGS. 1970. Okeechobee NW and Okeechobee SW, 7.5-Minute Series Topographical Map

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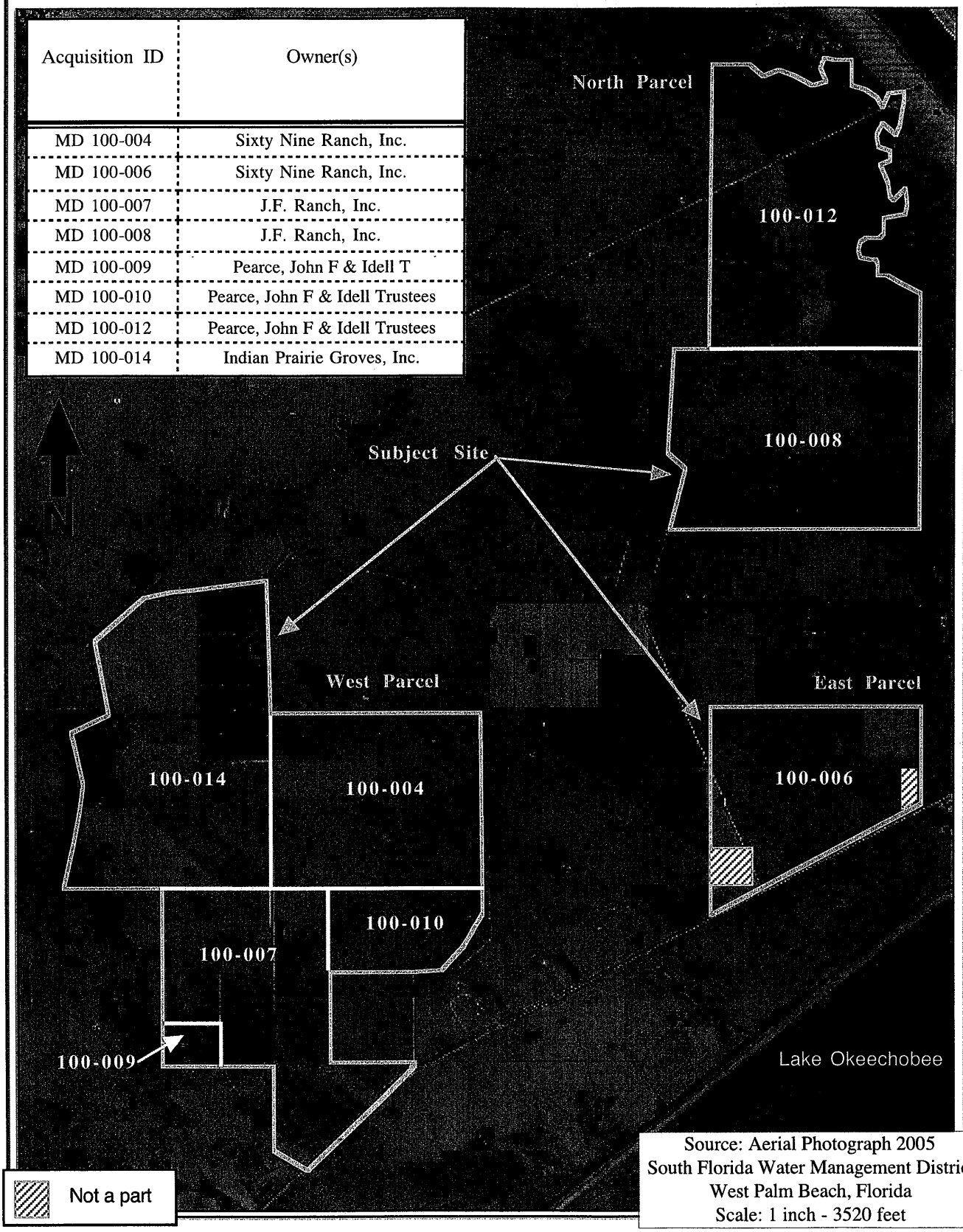
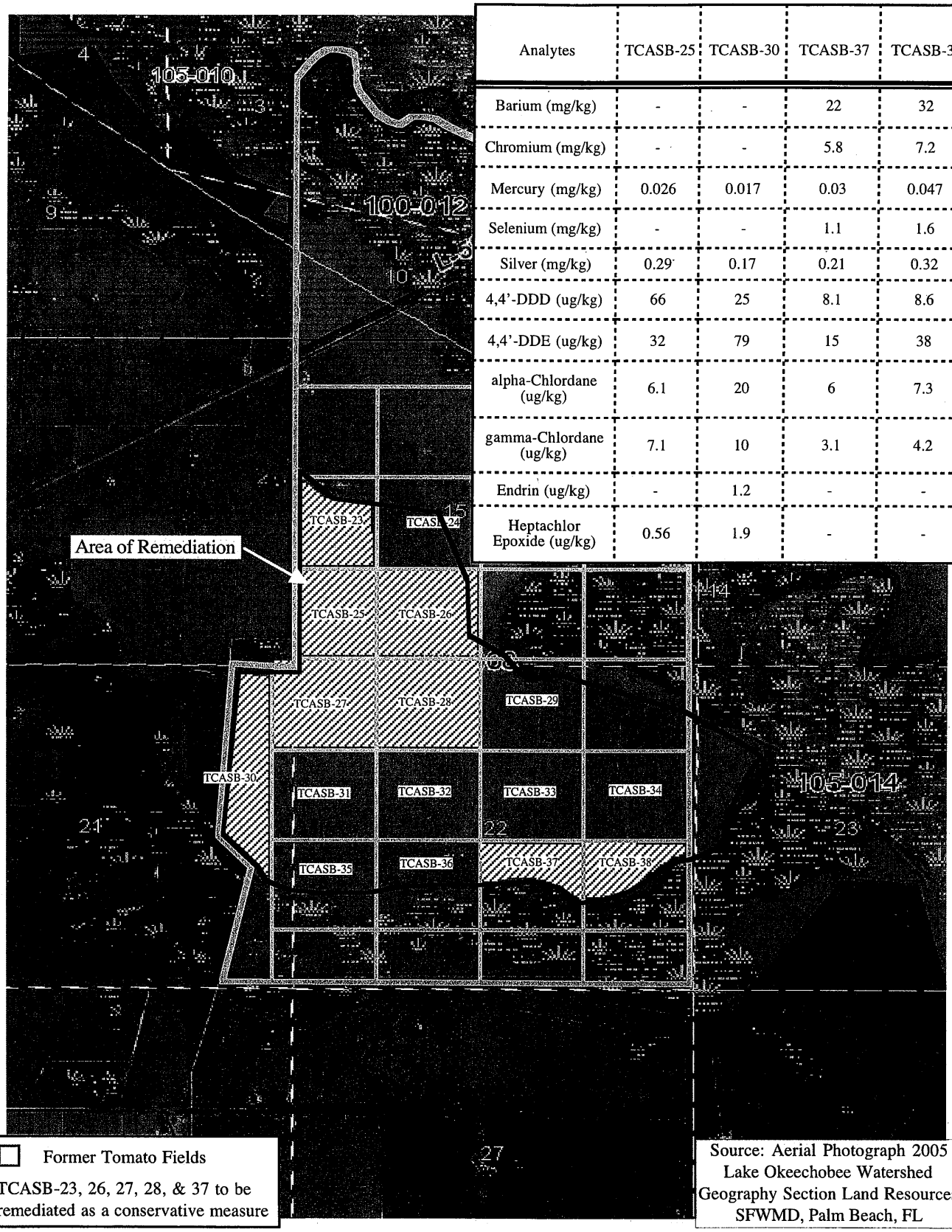


Acquisition ID	Owner(s)
MD 100-004	Sixty Nine Ranch, Inc.
MD 100-006	Sixty Nine Ranch, Inc.
MD 100-007	J.F. Ranch, Inc.
MD 100-008	J.F. Ranch, Inc.
MD 100-009	Pearce, John F & Idell T
MD 100-010	Pearce, John F & Idell Trustees
MD 100-012	Pearce, John F & Idell Trustees
MD 100-014	Indian Prairie Groves, Inc.

FIGURE 2-2
SITE VICINITY MAP
PEARCE PROPERTIES, SR 78, BUCKHEAD RIDGE
GLADES COUNTY, FLORIDA
Source: ECT 2006

ECT
Environmental Consulting & Technology, Inc.



Analytes	TCASB-25	TCASB-30	TCASB-37	TCASB-38
Barium (mg/kg)	-	-	22	32
Chromium (mg/kg)	-	-	5.8	7.2
Mercury (mg/kg)	0.026	0.017	0.03	0.047
Selenium (mg/kg)	-	-	1.1	1.6
Silver (mg/kg)	0.29	0.17	0.21	0.32
4,4'-DDD (ug/kg)	66	25	8.1	8.6
4,4'-DDE (ug/kg)	32	79	15	38
alpha-Chlordane (ug/kg)	6.1	20	6	7.3
gamma-Chlordane (ug/kg)	7.1	10	3.1	4.2
Endrin (ug/kg)	-	1.2	-	-
Heptachlor Epoxide (ug/kg)	0.56	1.9	-	-

FIGURE 8-1
CULTIVATED AREA EXTENT OF REMEDIATION
PEARCE PROPERTIES, SR 78, BUCKHEAD RIDGE
GLADES COUNTY, FLORIDA
Source: ECT 2006

ECT
Environmental Consulting & Technology, Inc.

Analytes	PSSB-3
Pyrene (ug/kg)	310
TRPH (mg/kg)	9600

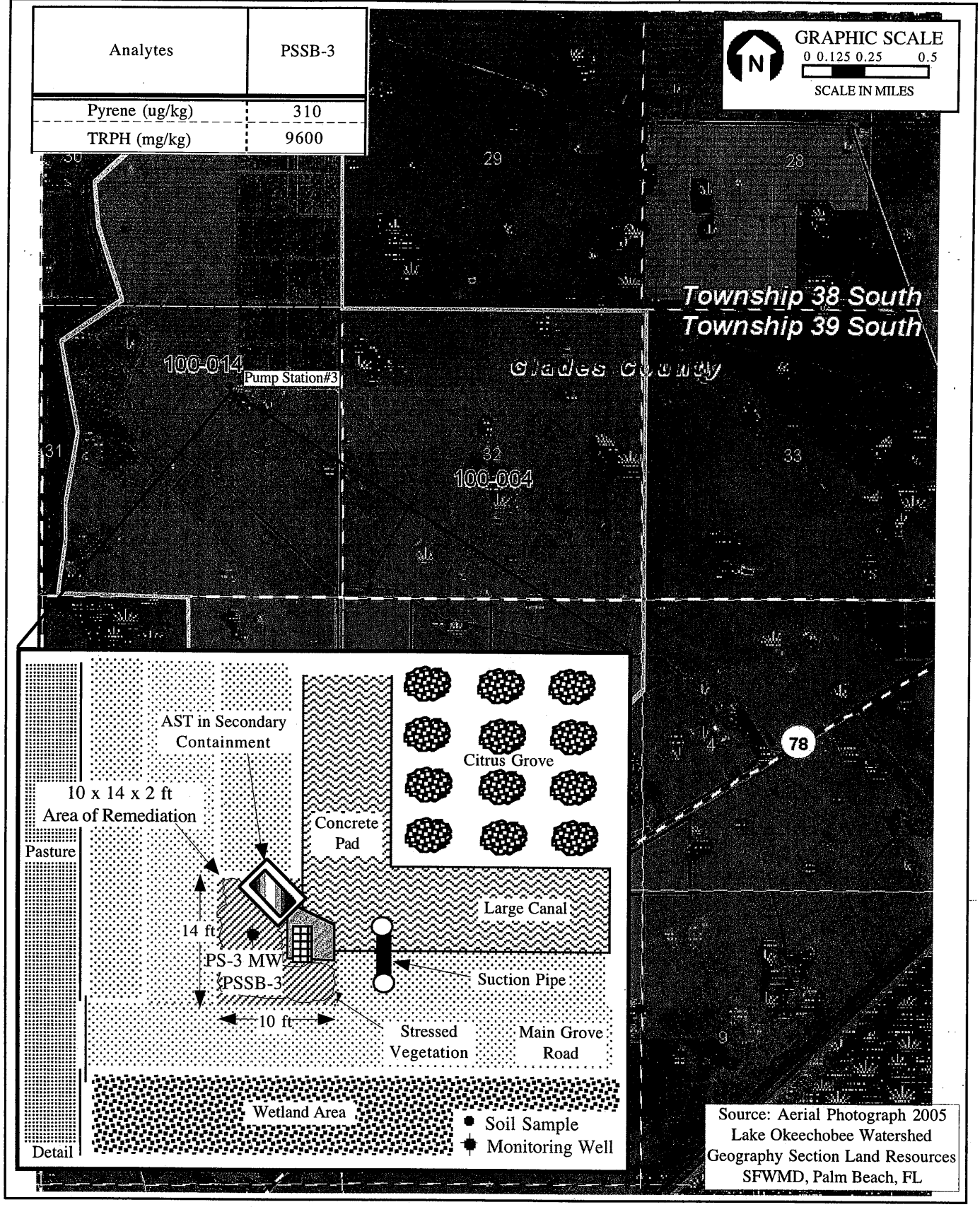
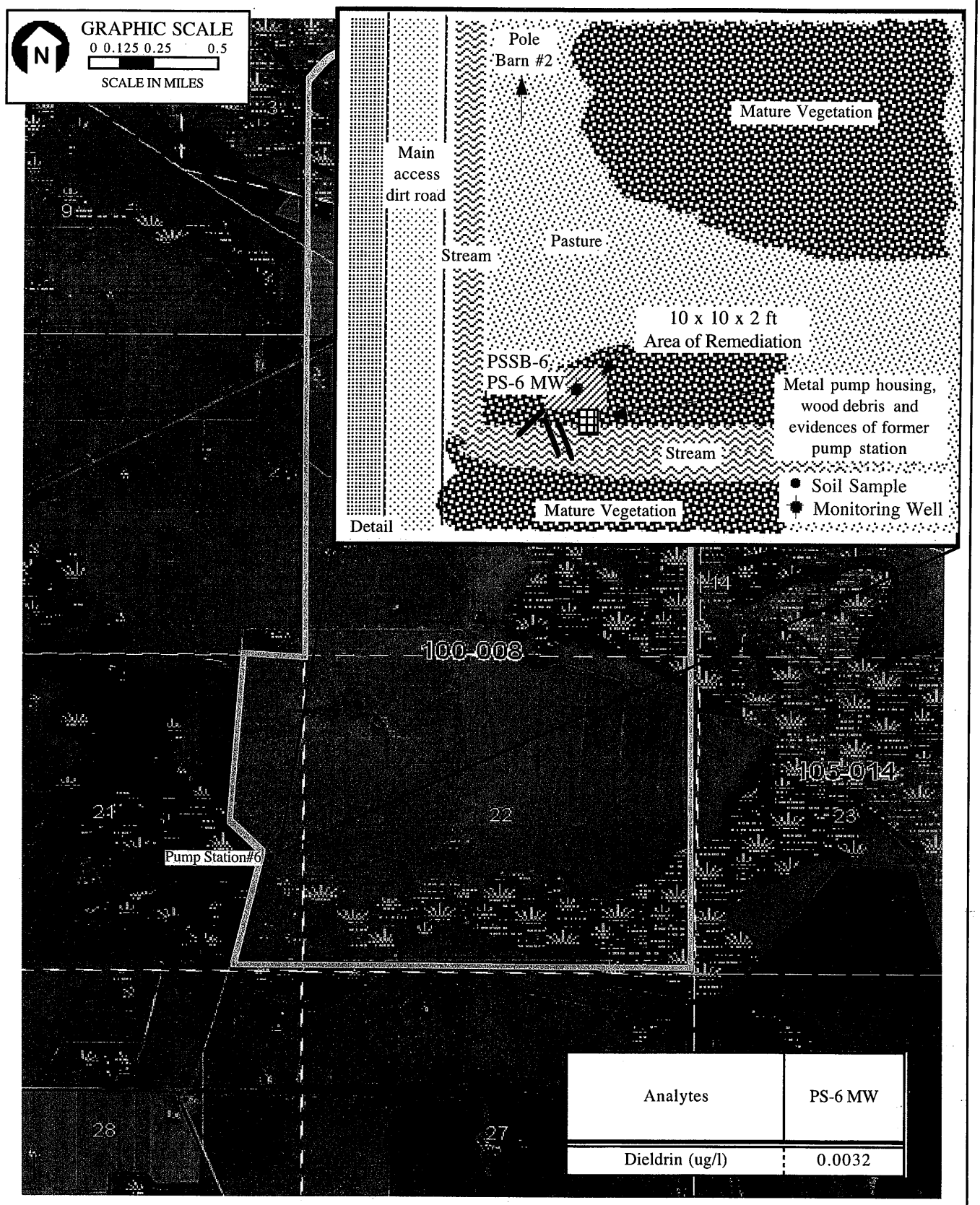


FIGURE 8-2.1
PUMP STATION #3 EXTENT OF REMEDIATION
PEARCE PROPERTIES, SR 78, BUCKHEAD RIDGE
GLADES COUNTY, FLORIDA
Source: ECT 2006

ECT
Environmental Consulting & Technology, Inc.



Analytes	PS-6 MW
Dieldrin (ug/l)	0.0032

FIGURE 8-2.2.
PUMP STATION #6 EXTENT OF REMEDIATION
PEARCE PROPERTIES, SR 78, BUCKHEAD RIDGE
GLADES COUNTY, FLORIDA
Source: ECT 2006

ECT
Environmental Consulting & Technology, Inc.

Analytes (ug/kg)	PSSB-7
Acenaphthylene	4600
Benzo(a)anthracene	19000
Dibenz(a,h)anthracene	3300
Anthracene	4400
Chrysene	22000
Benzo(b)fluoranthene	37000
Fluoranthene	24000
Phenanthrene	900
Indeno(1,2,3-cd)pyrene	13000
Benzo(a)pyrene	16000
Pyrene	33000
TRPH (mg/kg)	570

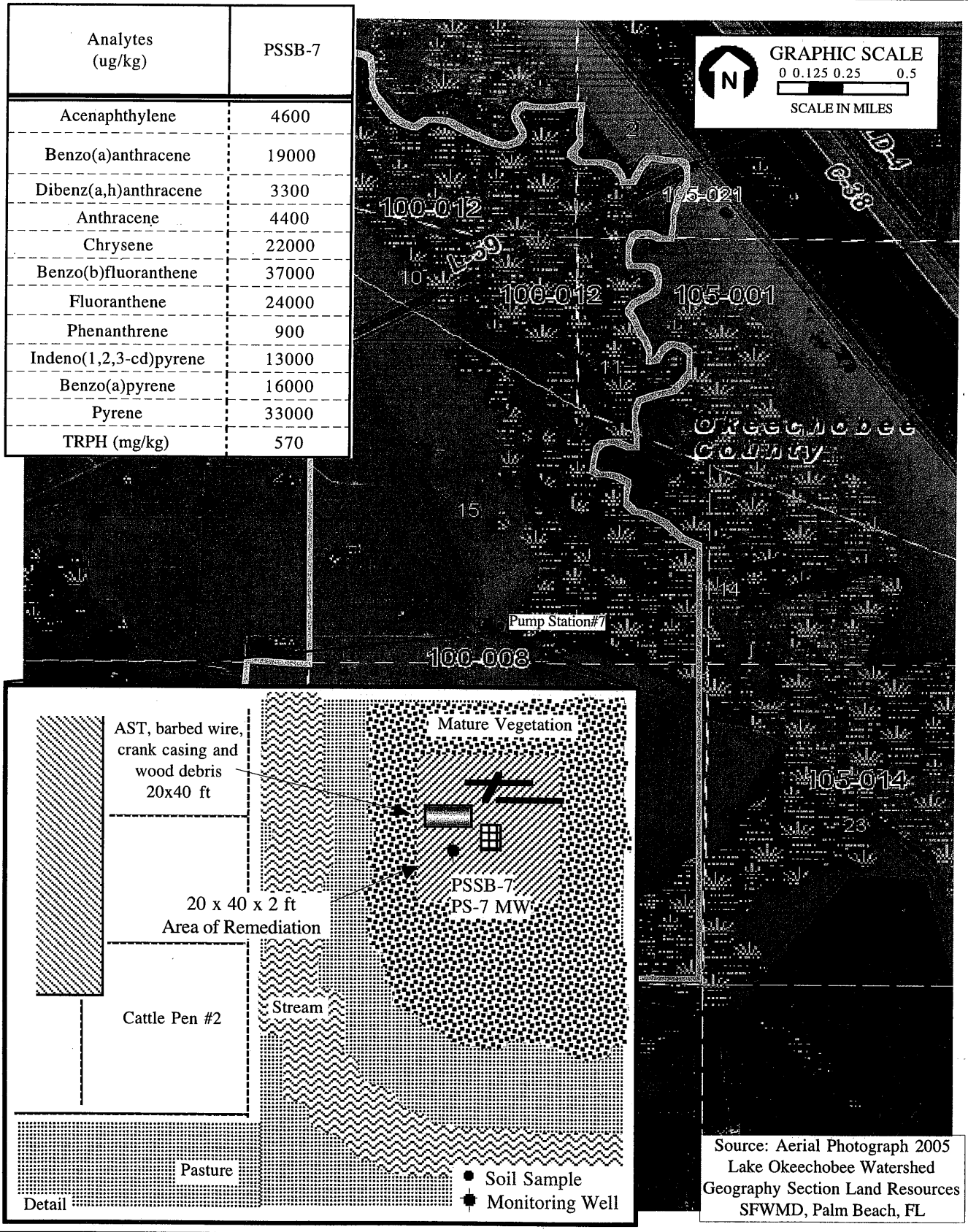
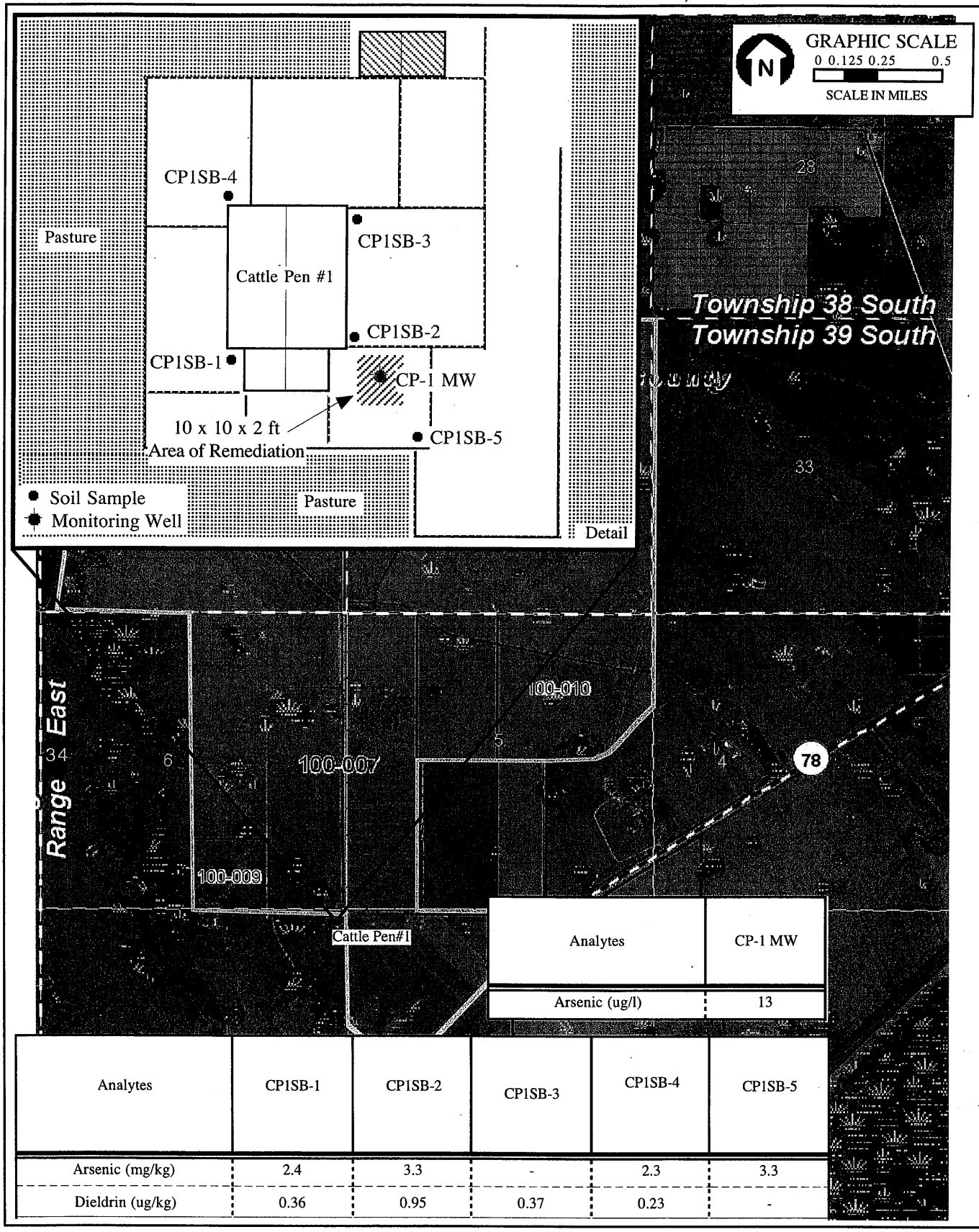


FIGURE 8-2.3
PUMP STATION #7 EXTENT OF REMEDIATION
PEARCE PROPERTIES, SR 78, BUCKHEAD RIDGE
GLADES COUNTY, FLORIDA
Source: ECT 2006

ECT
Environmental Consulting & Technology, Inc.



Analytes	CP-1 MW
Arsenic (ug/l)	13

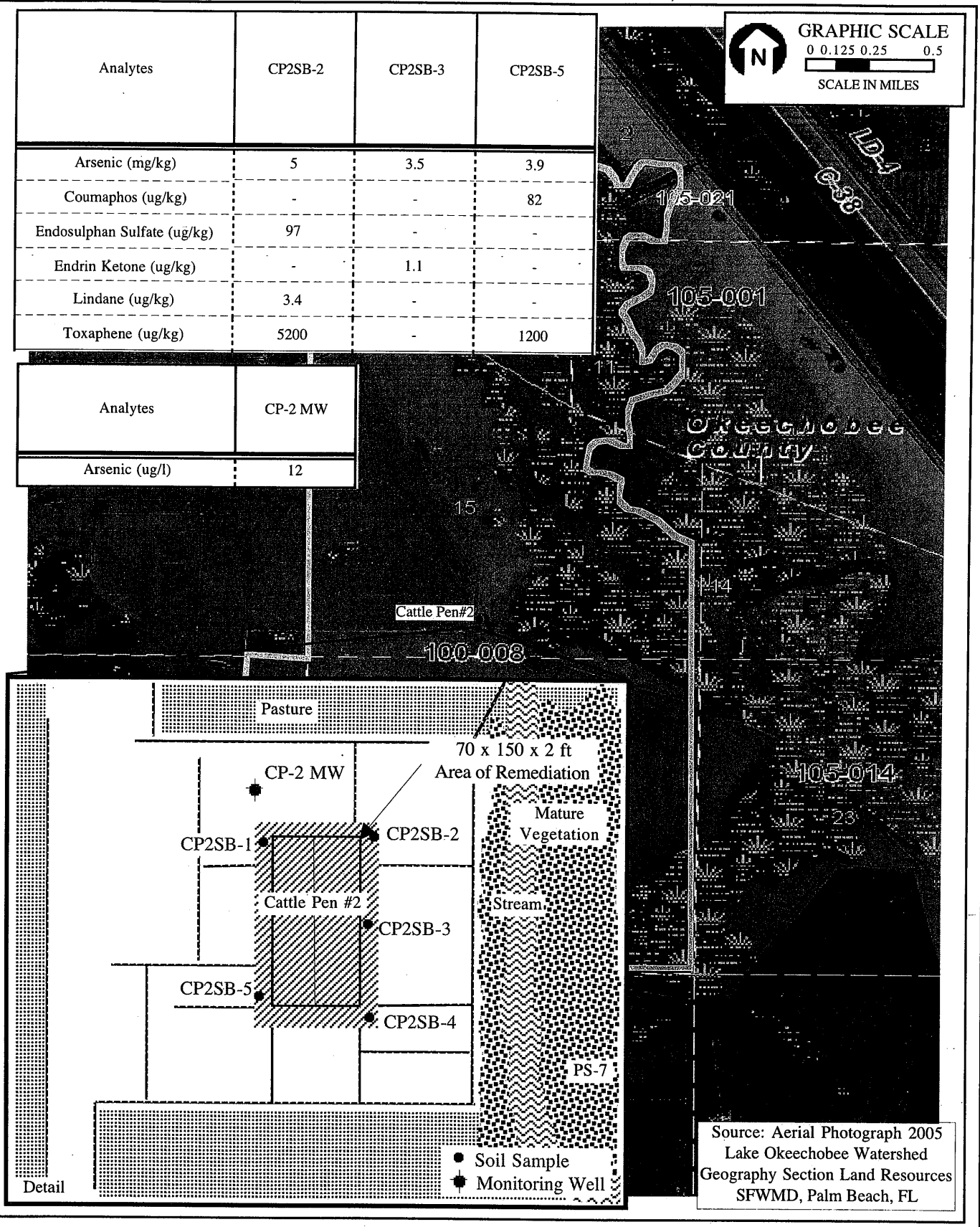
Analytes	CP1SB-1	CP1SB-2	CP1SB-3	CP1SB-4	CP1SB-5
Arsenic (mg/kg)	2.4	3.3	-	2.3	3.3
Dieldrin (ug/kg)	0.36	0.95	0.37	0.23	-

FIGURE 8-3.1
CATTLE PEN #1 EXTENT OF REMEDIATION
PEARCE PROPERTIES, SR 78, BUCKHEAD RIDGE
GLADES COUNTY, FLORIDA
Source: ECT 2006

ECT
Environmental Consulting & Technology, Inc.

Analytes	CP2SB-2	CP2SB-3	CP2SB-5
Arsenic (mg/kg)	5	3.5	3.9
Coumaphos (ug/kg)	-	-	82
Endosulphan Sulfate (ug/kg)	97	-	-
Endrin Ketone (ug/kg)	-	1.1	-
Lindane (ug/kg)	3.4	-	-
Toxaphene (ug/kg)	5200	-	1200

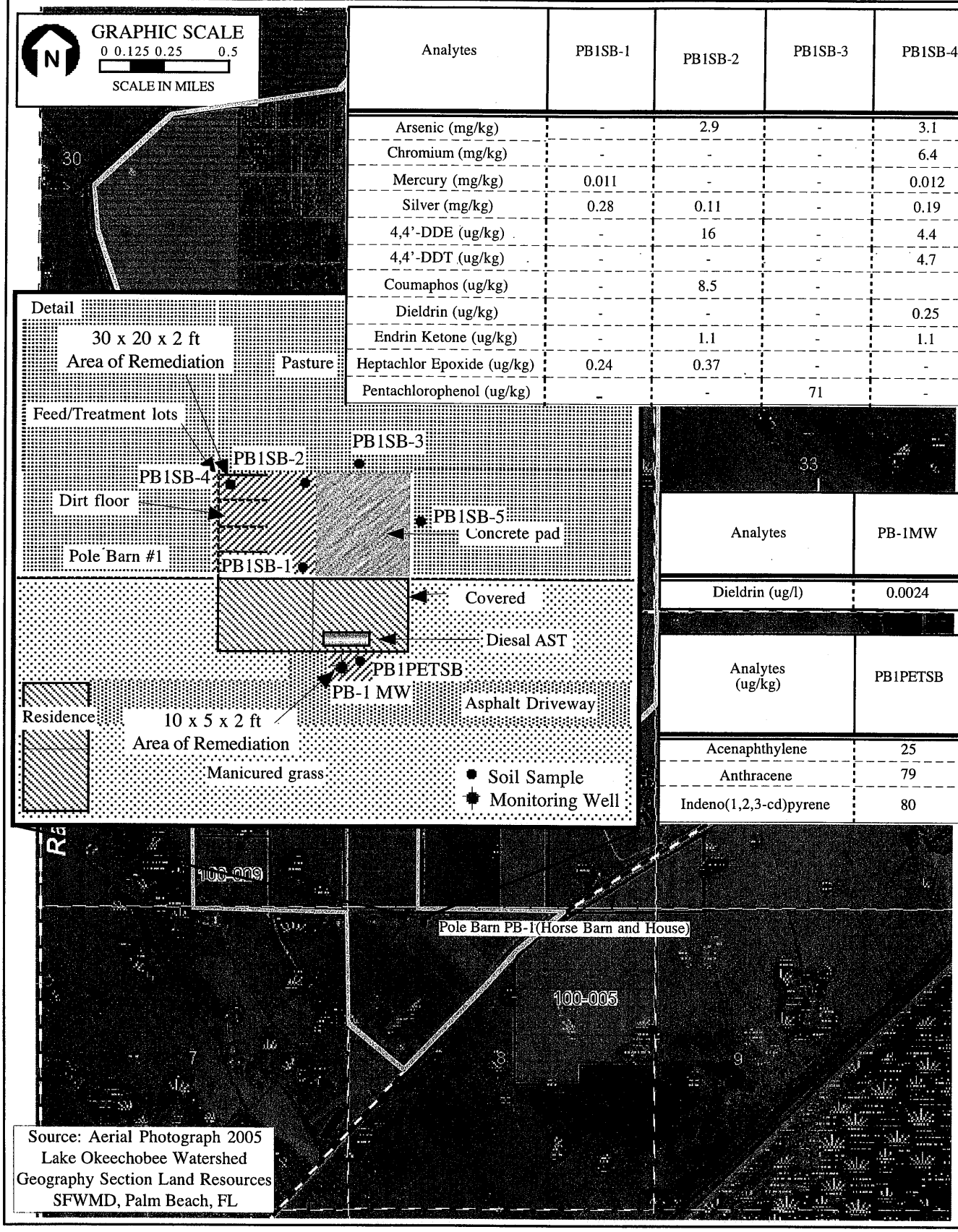
Analytes	CP-2 MW
Arsenic (ug/l)	12



Source: Aerial Photograph 2005
Lake Okeechobee Watershed
Geography Section Land Resources
SFWMD, Palm Beach, FL

FIGURE 8-3.2
CATTLE PEN #2 EXTENT OF REMEDIATION
PEARCE PROPERTIES, SR 78, BUCKHEAD RIDGE
GLADES COUNTY, FLORIDA
Source: ECT 2006

ECT
Environmental Consulting & Technology, Inc.



Analytes	PB1SB-1	PB1SB-2	PB1SB-3	PB1SB-4
Arsenic (mg/kg)	-	2.9	-	3.1
Chromium (mg/kg)	-	-	-	6.4
Mercury (mg/kg)	0.011	-	-	0.012
Silver (mg/kg)	0.28	0.11	-	0.19
4,4'-DDE (ug/kg)	-	16	-	4.4
4,4'-DDT (ug/kg)	-	-	-	4.7
Coumaphos (ug/kg)	-	8.5	-	
Dieldrin (ug/kg)	-	-	-	0.25
Endrin Ketone (ug/kg)	-	1.1	-	1.1
Heptachlor Epoxide (ug/kg)	0.24	0.37	-	-
Pentachlorophenol (ug/kg)	-	-	71	-

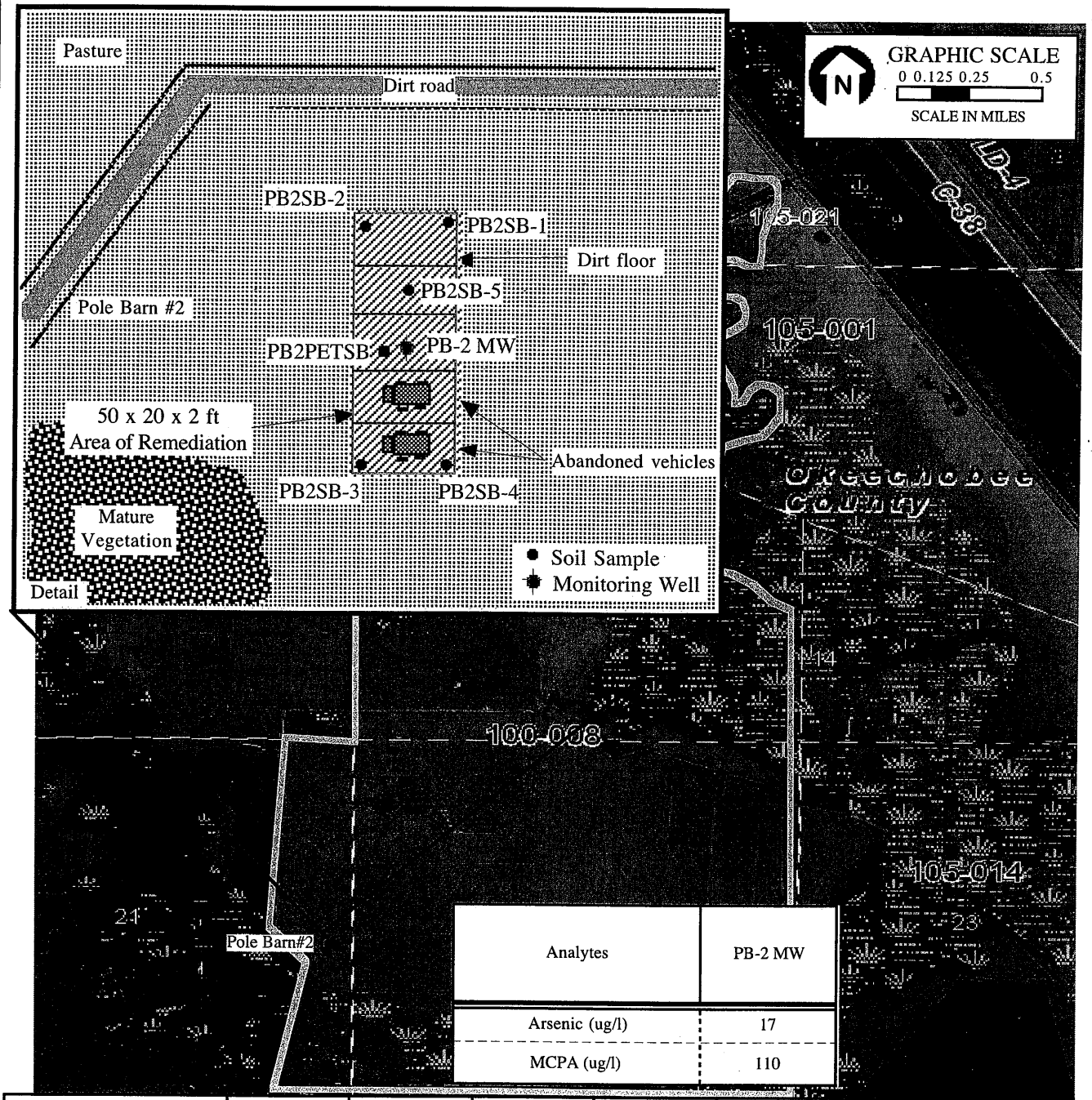
Analytes	PB-1MW
Dieldrin (ug/l)	0.0024

Analytes (ug/kg)	PB1PETSB
Acenaphthylene	25
Anthracene	79
Indeno(1,2,3-cd)pyrene	80

Source: Aerial Photograph 2005
Lake Okeechobee Watershed
Geography Section Land Resources
SFWMD, Palm Beach, FL

FIGURE 8-4.1
POLE BARN #1 EXTENT OF REMEDIATION
PEARCE PROPERTIES, SR 78, BUCKHEAD RIDGE
GLADES COUNTY, FLORIDA
Source: ECT 2006

ECT
Environmental Consulting & Technology, Inc.

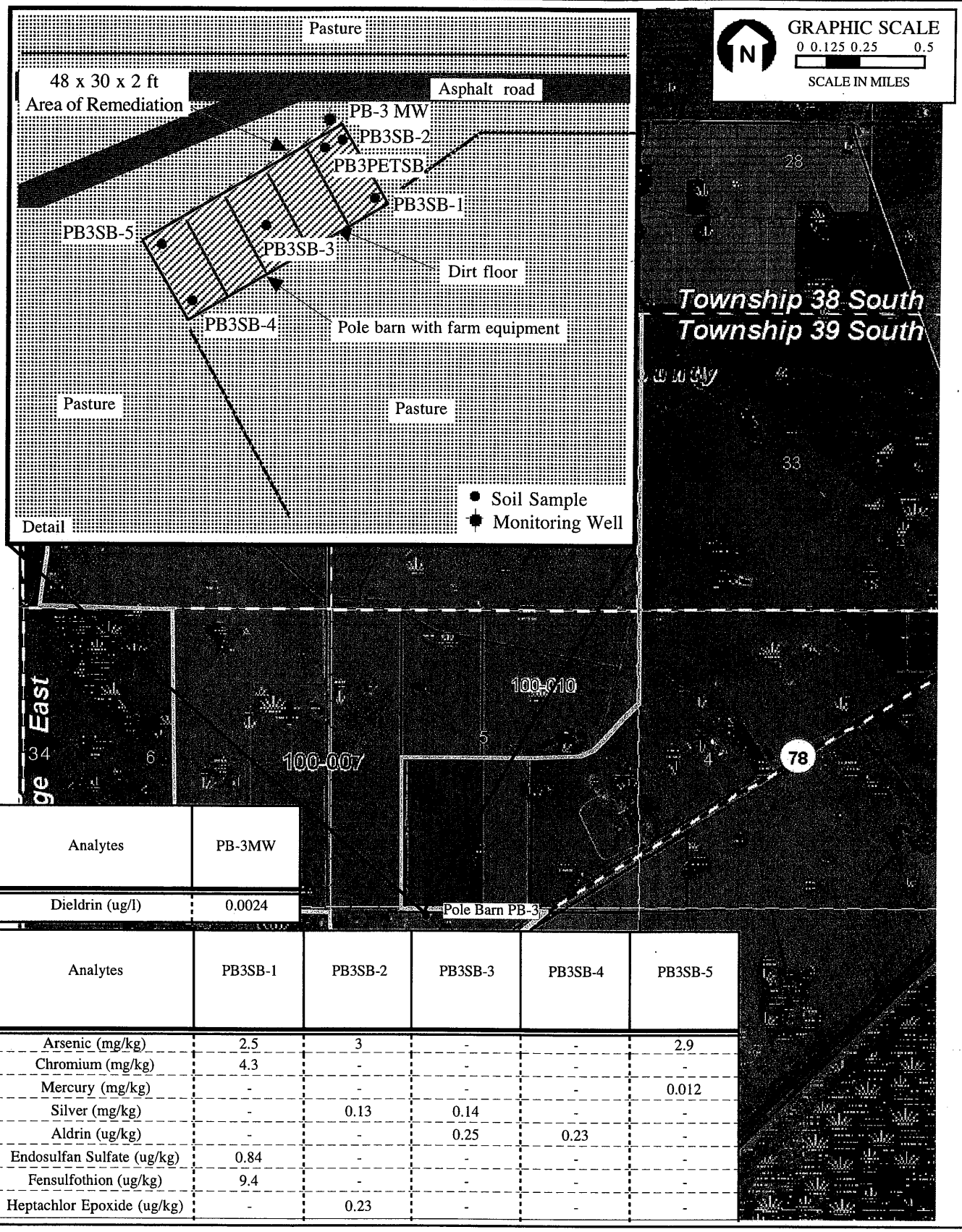


Analytes	PB-2 MW
Arsenic (ug/l)	17
MCPA (ug/l)	110

Analytes	PB2SB-1	PB2SB-2	PB2SB-3	PB2SB-4	PB2SB-5
Chromium (mg/kg)	-	-	-	4.4	-
Mercury (mg/kg)	-	0.012	-	0.018	-
Silver (mg/kg)	0.12	0.28	-	-	0.11
Aldrin (ug/kg)	-	-	0.72	-	0.29
Heptachlor Epoxide (ug/kg)	0.29	-	0.36	0.29	-

FIGURE 8-4.2
POLE BARN #2 EXTENT OF REMEDIATION
PROPERTIES, SR 78, BUCKHEAD RIDGE
GLADES COUNTY, FLORIDA
Source: ECT 2006

ECT
Environmental Consulting & Technology, Inc.

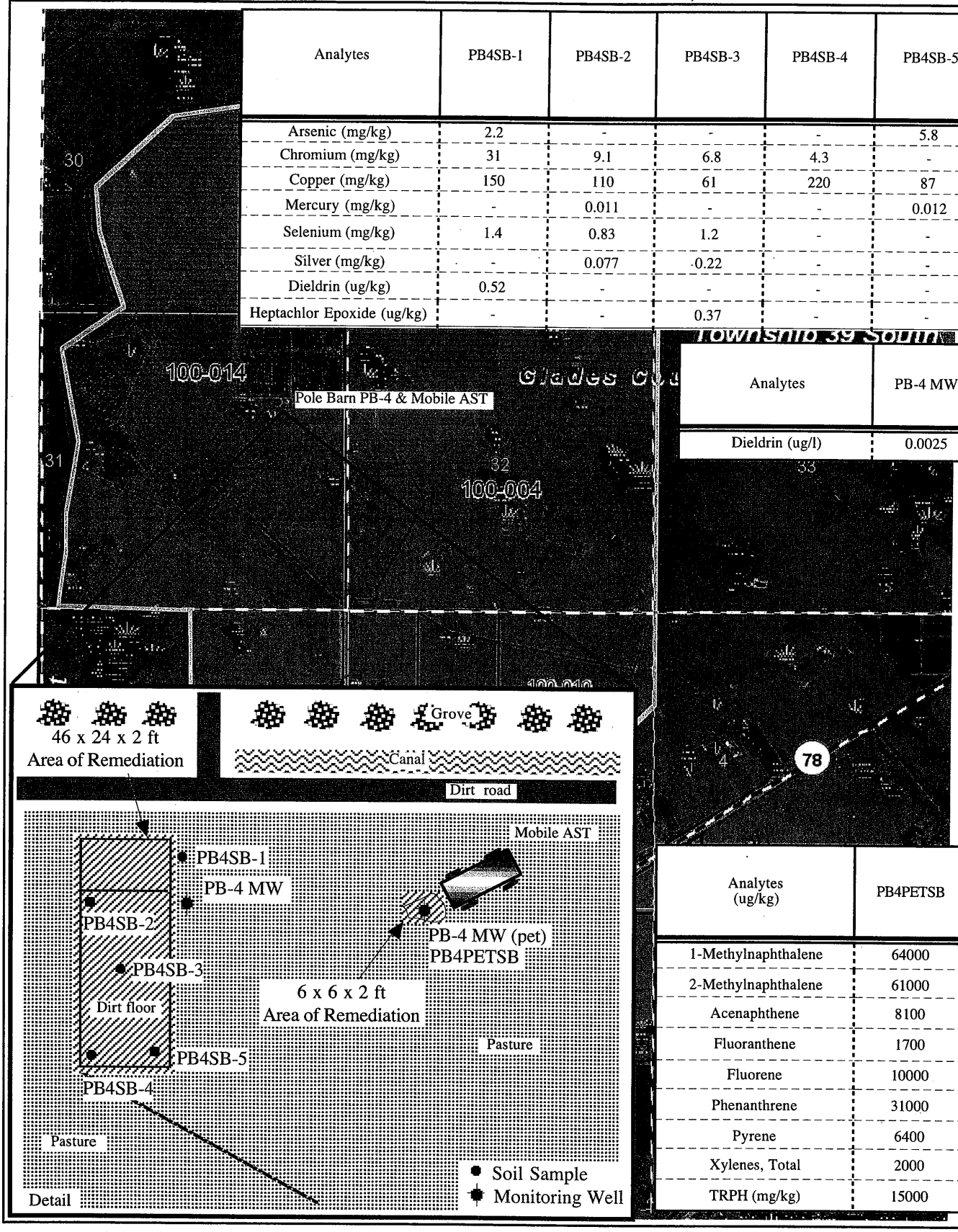


Analytes	PB-3MW
Dieldrin (ug/l)	0.0024

Analytes	PB3SB-1	PB3SB-2	PB3SB-3	PB3SB-4	PB3SB-5
Arsenic (mg/kg)	2.5	3	-	-	2.9
Chromium (mg/kg)	4.3	-	-	-	-
Mercury (mg/kg)	-	-	-	-	0.012
Silver (mg/kg)	-	0.13	0.14	-	-
Aldrin (ug/kg)	-	-	0.25	0.23	-
Endosulfan Sulfate (ug/kg)	0.84	-	-	-	-
Fensulfothion (ug/kg)	9.4	-	-	-	-
Heptachlor Epoxide (ug/kg)	-	0.23	-	-	-

FIGURE 8-4.3
POLE BARN #3 EXTENT OF REMEDIATION
PEARCE PROPERTIES, SR 78, BUCKHEAD RIDGE
GLADES COUNTY, FLORIDA
Source: ECT 2006

ECT
Environmental Consulting & Technology, Inc.



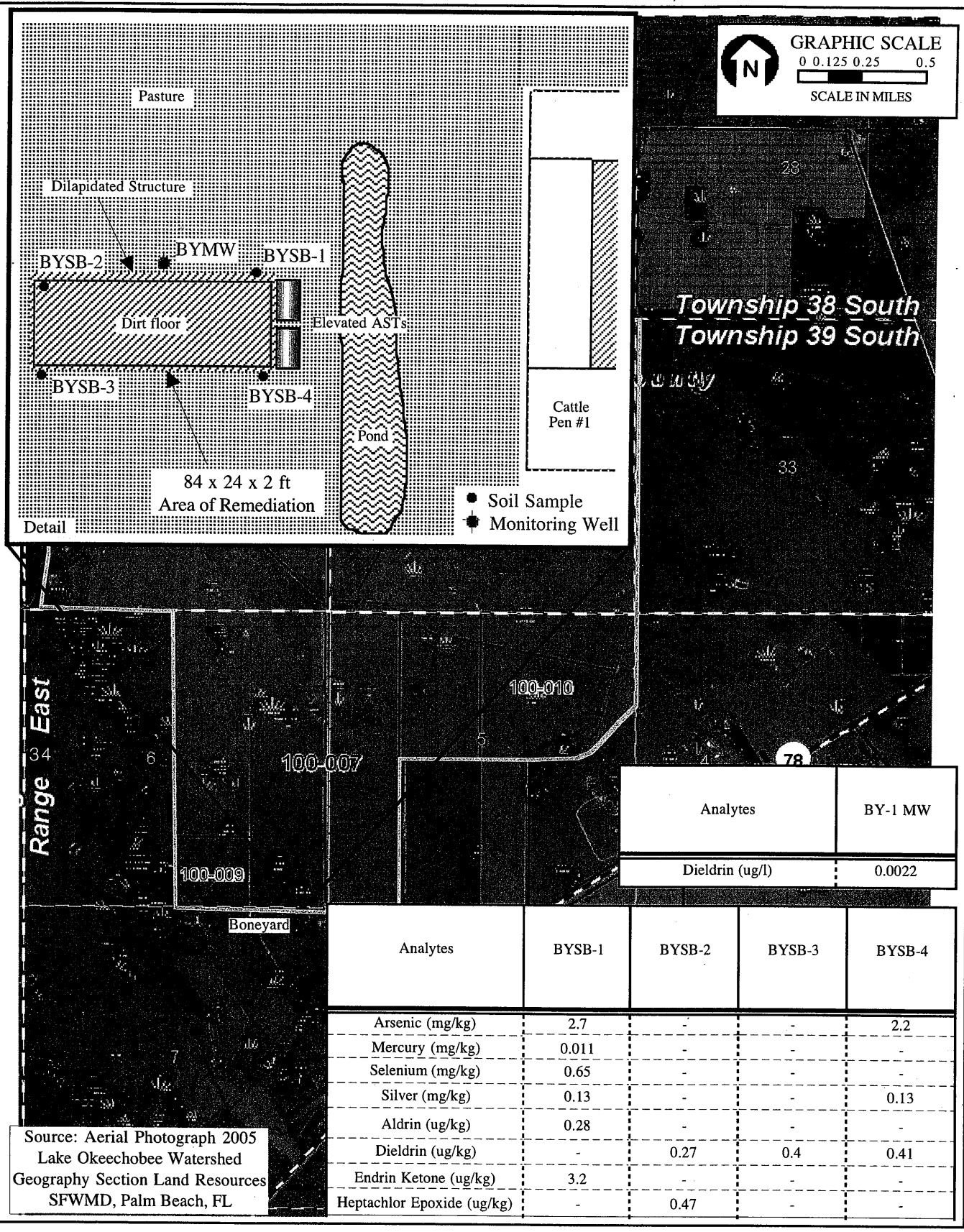
Analytes	PB4SB-1	PB4SB-2	PB4SB-3	PB4SB-4	PB4SB-5
Arsenic (mg/kg)	2.2	-	-	-	5.8
Chromium (mg/kg)	31	9.1	6.8	4.3	-
Copper (mg/kg)	150	110	61	220	87
Mercury (mg/kg)	-	0.011	-	-	0.012
Selenium (mg/kg)	1.4	0.83	1.2	-	-
Silver (mg/kg)	-	0.077	0.22	-	-
Dieldrin (ug/kg)	0.52	-	-	-	-
Heptachlor Epoxide (ug/kg)	-	-	0.37	-	-

Analytes	PB-4 MW
Dieldrin (ug/l)	0.0025

Analytes (ug/kg)	PB4PETSB
1-Methylnaphthalene	64000
2-Methylnaphthalene	61000
Acenaphthene	8100
Fluoranthene	1700
Fluorene	10000
Phenanthrene	31000
Pyrene	6400
Xylenes, Total	2000
TRPH (mg/kg)	15000

FIGURE 8-4.4
POLE BARN #4 EXTENT OF REMEDIATION
PEARCE PROPERTIES, SR 78, BUCKHEAD RIDGE
GLADES COUNTY, FLORIDA
Source: ECT 2006

ECT
Environmental Consulting & Technology, Inc.



Analytes	BY-1 MW
Dieldrin (ug/l)	0.0022

Analytes	BYSB-1	BYSB-2	BYSB-3	BYSB-4
Arsenic (mg/kg)	2.7	-	-	2.2
Mercury (mg/kg)	0.011	-	-	-
Selenium (mg/kg)	0.65	-	-	-
Silver (mg/kg)	0.13	-	-	0.13
Aldrin (ug/kg)	0.28	-	-	-
Dieldrin (ug/kg)	-	0.27	0.4	0.41
Endrin Ketone (ug/kg)	3.2	-	-	-
Heptachlor Epoxide (ug/kg)	-	0.47	-	-

FIGURE 8-5
BONEYARD EXTENT OF REMEDIATION
PEARCE PROPERTIES, SR 78, BUCKHEAD RIDGE
GLADES COUNTY, FLORIDA
Source: ECT 2006

ECT
Environmental Consulting & Technology, Inc.

Analytes	BA1SB-1	BA1SB-2
Arsenic (mg/kg)	16	9.4
Chromium (mg/kg)	8.4	5.2
Mercury (mg/kg)	0.012	-
Silver (mg/kg)	0.1	-
Aldrin (ug/kg)	-	0.35
Dieldrin (ug/kg)	0.39	-

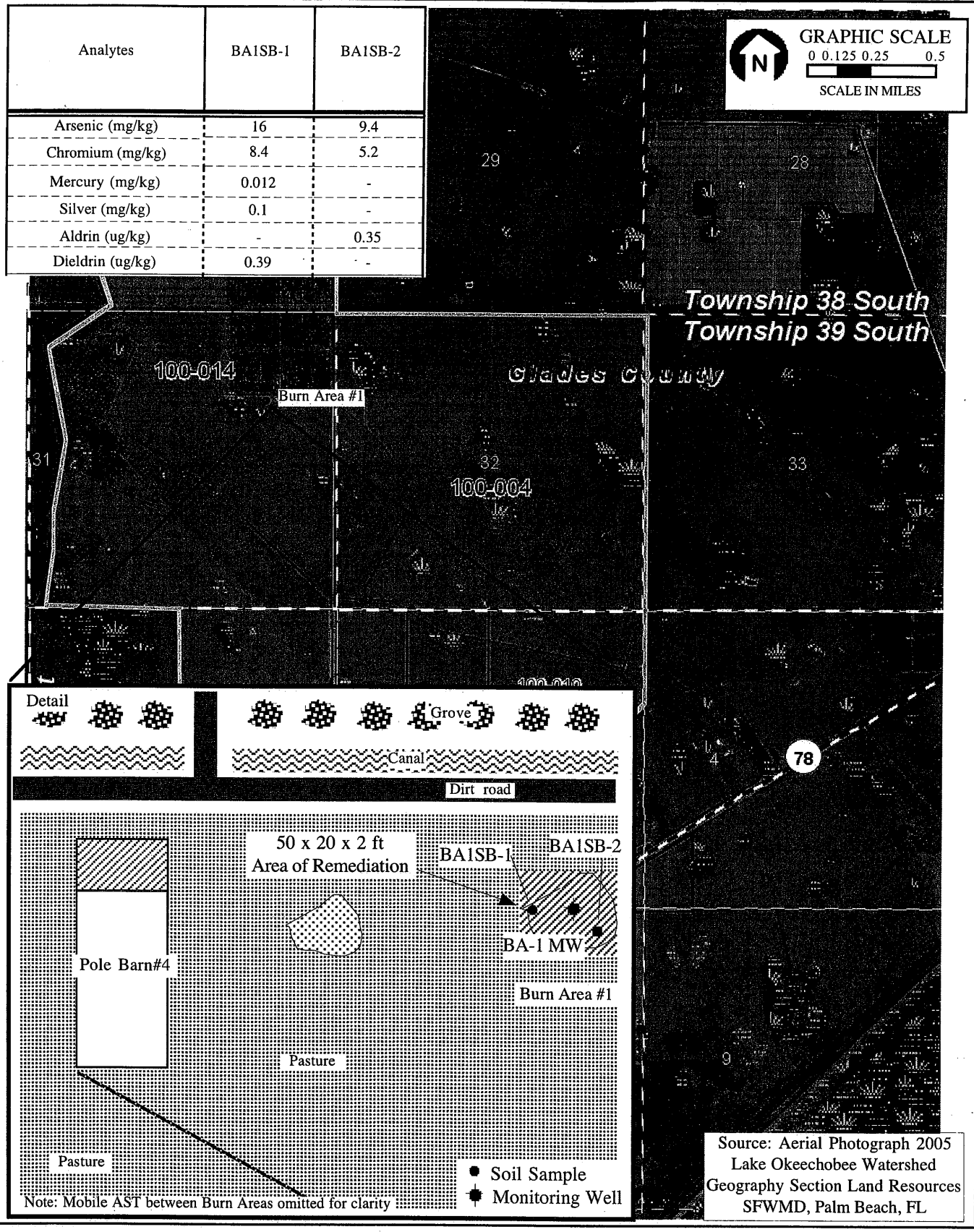
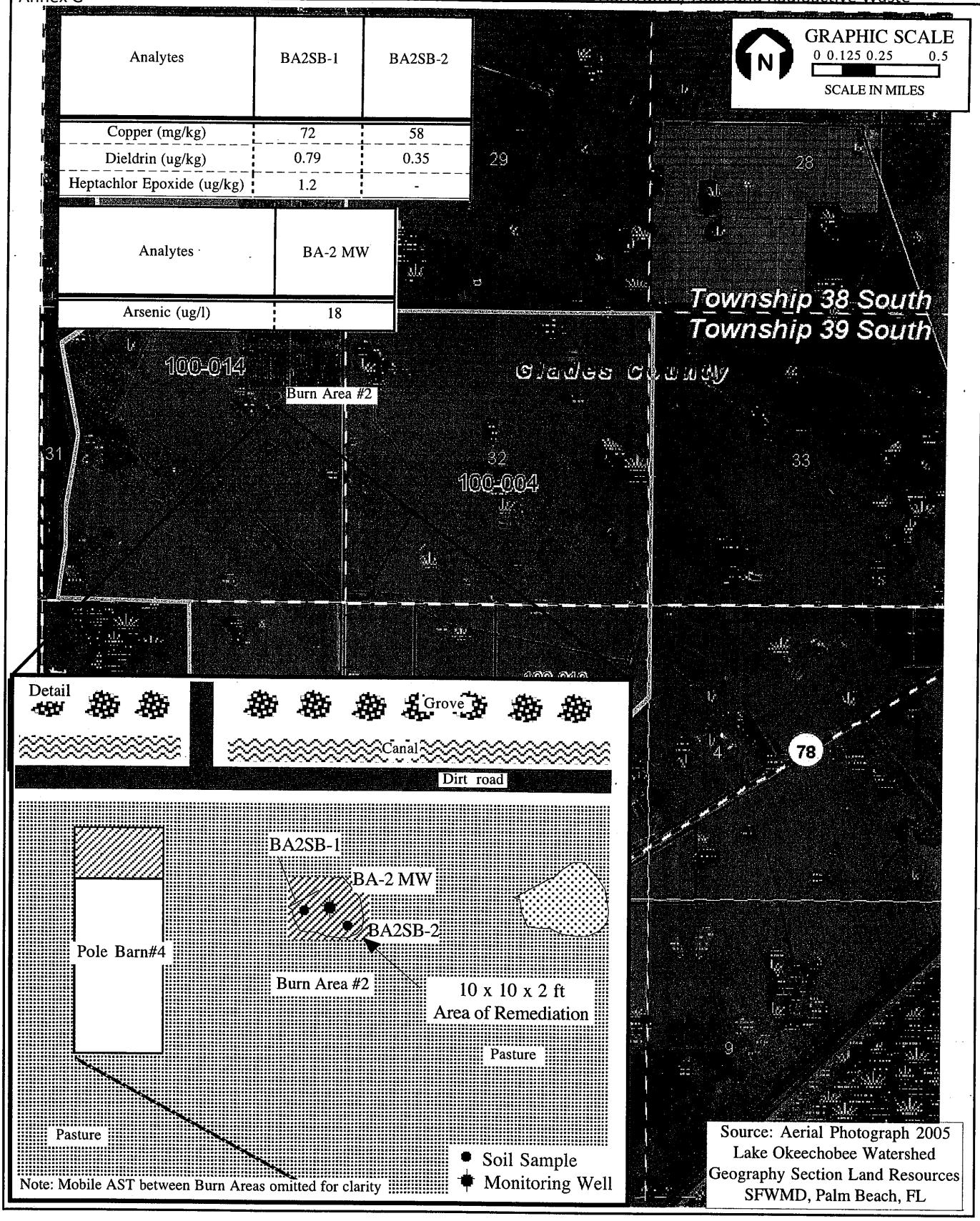


FIGURE 8-6.1
BURN AREA #1 EXTENT OF REMEDIATION
PEARCE PROPERTIES, SR 78, BUCKHEAD RIDGE
GLADES COUNTY, FLORIDA
Source: ECT 2006

ECT
Environmental Consulting & Technology, Inc.



Analytes	BA2SB-1	BA2SB-2
Copper (mg/kg)	72	58
Dieldrin (ug/kg)	0.79	0.35
Heptachlor Epoxide (ug/kg)	1.2	-

Analytes	BA-2 MW
Arsenic (ug/l)	18

FIGURE 8-6.2
BURN AREA #2 EXTENT OF REMEDIATION
PEARCE PROPERTIES, SR 78, BUCKHEAD RIDGE
GLADES COUNTY, FLORIDA
Source: ECT 2006

ECT
Environmental Consulting & Technology, Inc.

Preliminary Risk Assessment Report

Preliminary Risk Assessment
of the
Southern Prescott Estate
Okeechobee County, Florida

Submitted to:

South Florida Water Management District
Risk Management Division

June , 1989

AYRES ASSOCIATES

AYRES ASSOCIATES

June 21, 1989

Mr. James D. Smith
Loss Prevention Administrator
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, Florida 33416

RE: PRELIMINARY RISK ASSESSMENT OF SOUTH PRESCOTT ESTATE PROPERTY

Dear Jim:

Attached are five copies of the report of our findings from the Preliminary Risk Assessment of the South Prescott Estate Property located in Okeechobee County, Florida. The report contains the findings of our property research activities, aerial and vehicle on-site inspection, and photographs of the property.

Please do not hesitate to call if you have any questions concerning this report.

Sincerely,

Owen Ayres & Associates, Inc.

Scott R. Surovchak, P.G.
Project Hydrogeologist

Damann L. Anderson, P.E.
Regional Vice President

DLA/mk

Enclosures

Owen Ayres & Associates Inc
Engineers / Environmental Scientists / Photogrammetrists
3804 Coconut Palm Drive, Suite 220, Tampa, FL 33619, (813) 628-0742

PRELIMINARY RISK ASSESSMENT REPORT

SOUTH PRESCOTT ESTATE PROPERTY

OKEECHOBEE COUNTY, FLORIDA

Prepared for:

LOSS PREVENTION SECTION

DIVISION OF RISK MANAGEMENT

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

WEST PALM BEACH, FLORIDA

Prepared by:

AYRES ASSOCIATES
3804 COCONUT PALM DRIVE
TAMPA, FLORIDA
(813) 628-0742

AYRES ASSOCIATES

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A	SITE ASSESSMENT PHOTOGRAPHS
B	SOUTH FLORIDA WATER MANAGEMENT DISTRICT PRELIMINARY RISK ASSESSMENT REPORT QUESTIONNAIRE
C	TITLE SEARCH OF SOUTH PRESCOTT ESTATE LAND HOLDINGS
D	FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION GROUNDWATER POLLUTION SOURCE INVENTORY SYSTEM PRINTOUT
E	FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION UNDERGROUND STORAGE TANK REGISTRATION PROGRAM PRINTOUT
F	MATERIAL SAFETY DATA SHEET

EXECUTIVE SUMMARY

The 1,086 acre South Prescott Estate Property was visited on June 5, 1989 by Ayres Associates and South Florida Water Management District (SFWMD) personnel to conduct an on-site aerial and vehicle inspection of the property. Six areas or items which present a physical or environmental hazard were identified and inspected. The Prescott Estate legal heirs and the Okeechobee County Agriculture Extension Service were interviewed to determine the property ownership history and land use practice on and adjacent to the property. Representatives of the FDER and Okeechobee County were contacted to evaluate potential environmental liabilities associated with the estate and vicinity.

The results of this preliminary risk assessment indicate:

1) Five areas on the property contain items which present physical hazards and should be removed or designated as no trespass areas;

2) Soils in the cattle pen area may be contaminated by insecticide products applied to cattle during the de-worming and de-licing procedure.

Specific recommendations to remedy the identified hazards are described with this report.

1.0 INTRODUCTION

Under the "Save Our Rivers" land acquisition program, the South Florida Water Management District (SFWMD) has initiated a risk assessment procedure to obtain environmental impairment and/or liability information for selected properties prior to land acquisition. Ayres Associates was retained by the SFWMD to perform the preliminary risk assessment (PRA) for the South Prescott Estate Property. The purpose of the PRA was to:

1. Research the history of the property and surrounding area to determine the likelihood of the property being contaminated from activities conducted on-site or in the surrounding area.

2. Inspect the property for environmental and/or physical hazards which may represent potential future liability for the SFWMD upon property acquisition.

2.0 BACKGROUND

The SFWMD is planning to acquire the South Prescott Estate Property with monies from the "Save Our Rivers" program. A preliminary risk assessment was requested by Mr. James D. Smith, SFWMD Loss Prevention Administrator, to determine whether any environmental concerns or physical hazards might be associated with the property. An aerial and vehicular site inspection of the property was conducted on June 5, 1989 by Charles R. Walter, Staff Hydrogeologist, and Scott R. Surovchak, Project Hydrogeologist, of Ayres Associates. James D. Smith, Loss Prevention Adminstrator, and James R. Goodwin, Land Use Planner, both of SFWMD, accompanied Ayres Associates personnel during the aerial site reconnaissance of the property.

The site inspection of the South Prescott Estate property was divided into two phases, consisting of a helicopter reconnaissance of the total estate and a vehicular inspection of areas which warranted closer inspection.

The property boundary was inspected first by helicopter for points of access onto the property. Specific areas which required more in-depth inspection than could be accomplished within the time constraints of aerial reconnaissance were identified for subsequent vehicular inspections. The aerial inspection routes were based upon pre-flight review of 1986 aerial photographs. The aerial photographs used in this pre-flight review were 1" = 400" scale, obtained from the Okeechobee County tax appraiser office in Okeechobee, Florida. After the site inspection had been completed, various other individuals having unique knowledge of the South Prescott Estate property and/or the surrounding area were contacted and interviewed.

The preliminary risk assessment activities included the following:

- Review of 1986 aerial photographs of the South Prescott Estate property which were acquired from Sandy Williams (813-763-4422), Okeechobee Tax Appraiser Office.

- A helicopter reconnaissance of the South Prescott Estate property boundary and vehicular inspection of identifed areas of interest. Photographs of specific facilities or structures investigated during the field investigation are contained in Appendix A.

- Completion of the Preliminary Risk Assessment Report Questionnaire for the Risk Management Division of the SFWMD contained in Appendix B.

- Review of the title search conducted by Thomas Barber, Okeechobee Abstract Co. (813-763-3716), and contained here as Appendix C and summarized in Table 1.

- Discussion of the property's history and land use practices with the following persons:

  - Mike Shirey (813-467-2262), husband of Juanette Shirey (legal heir to the estate). Mr. Shirey also accompanied Ayres Associates on the vehicular inspection of the property.

  - James Prescott, Jr. (813-763-0124), legal heir to the estate and ranch manager.

  - Patrick Miller (813-763-6469), Director, Okeechobee Agriculture Extension Service.

  - Rudy Smith (407-686-8800), SFWMD Field Engineering Section.

  - Bob Kluckuski, (305-689-5800), Florida Department of Environmental Regulation (FDER), Southeast Region.

  - Larry Yoemen (813-467-0499), Okeechobee County Landfill Operator.

  - Tom Conely (813-763-3825), Prescott Estate attorney.

- Review of FDER Groundwater Pollution Source Inventory (GPSI) System files for evidence of environmental concerns. The printout of the GPSI search is included in Appendix D.

- Review of FDER Underground Storage Tank (UST) Registration Program files to compliment review of the above described GPSI system files. The printout of the UST registration program files is contained in Appendix E.

3.0 FINDINGS

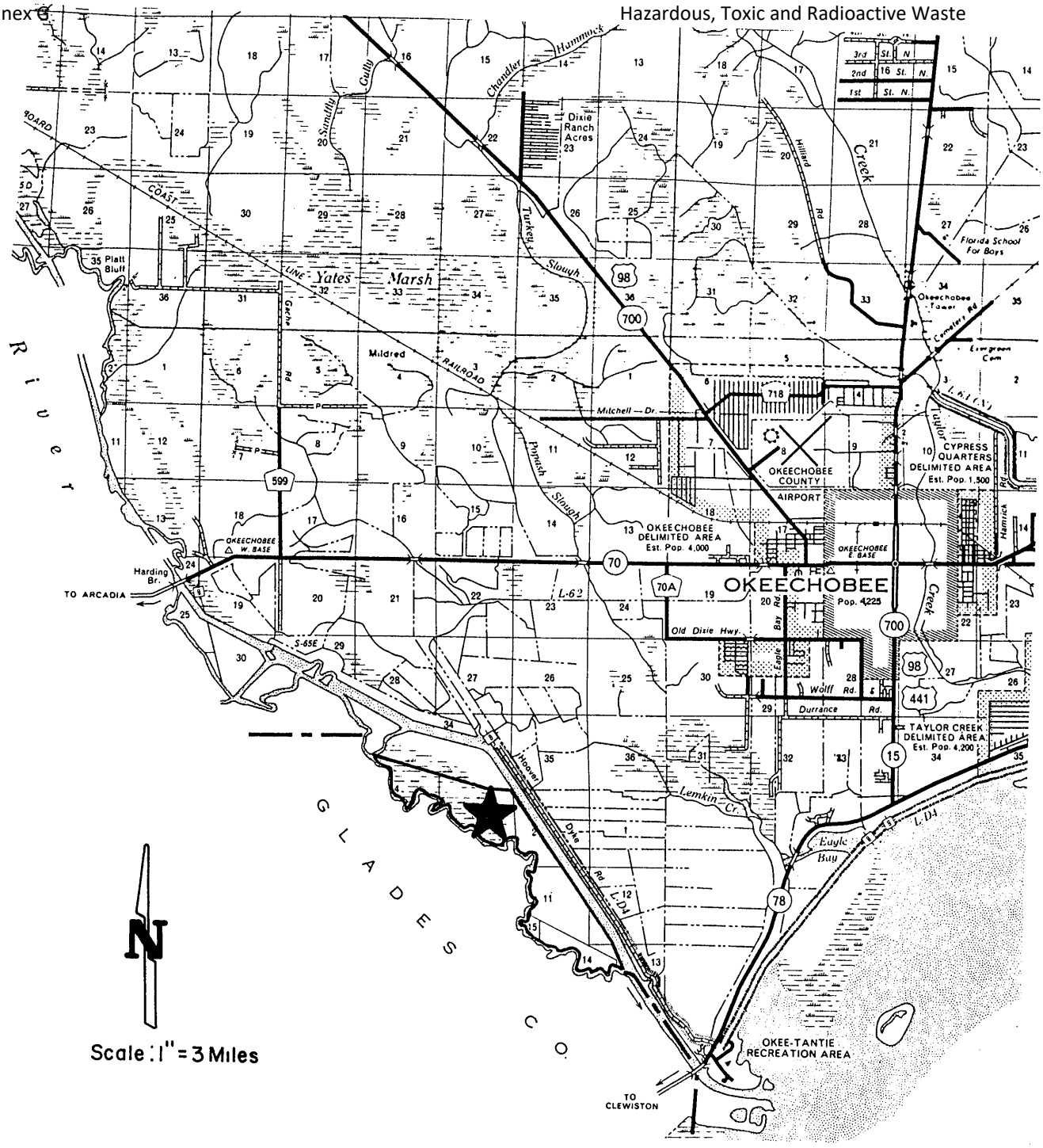
3.1 Location

The South Prescott Estate consists of approximately 1,086 acres of open range land devoted to livestock. The property is in Okeechobee County, Florida, Township 38 South, Range 34 East, Sections 2, 3, 4, 11, 14, 15. The general location of the property is depicted in Figure 1. Access to the property is from the southeast via a SFWMD maintained road, which intersects State Highway 78 west of the Kissimmee River Canal. The property is bordered on the west and south by the original channel of the Kissimmee River; on the east by Canal #38 (the present Kissimmee River), and associated easement property; and on the north by range land owned by Mr. Jerry Mathews.

3.2 Property History

According to James Prescott, Jr. and Mike Shirey, the South Prescott Estate was maintained as a cow/calf operation since the mid 1940's. Construction of Canal #38 during the early 1960's altered the landscape and eastern property boundary. The construction also left the dredged debris pile which is parallel and adjacent to the present Kissimmee River Canal and extends the length of the eastern property boundary. This ridge is elevated approximately twenty feet above the surrounding landscape. Shell material was borrowed from several locations on the ridge during 1985 through 1987 for use as fill or road material.

Mr. Prescott's and Mr. Shirey's descriptions of the property history were confirmed by Patrick Miller (813-763-6499), Director, Okeechobee Agriculture Extension Service. Outside of the land use practices mentioned above, the property has had no known development. The historical chain of ownership of the property is listed on Table 1.



★ PROJECT LOCATION

REF. FDOT GENERAL HIGHWAY MAP
OKEECHOBEE COUNTY, FLORIDA

PRESCOTT ESTATE
OKEECHOBEE COUNTY, FLORIDA

GENERAL LOCATION MAP

PROJECT No. 9947.30

AYRES ASSOCIATES | FIGURE 1

AYRES ASSOCIATES

Table 1. Chain of Ownership of the Present South Prescott Estate Property

Sections 2, 3, 4, 11, 13, 14, & 15, Township 38 South, Range 34 East
Okeechobee County, Florida
Prescott, James

	OWNER	FROM	TO	O.R.BOOK AND PAGE
1.	Trustees of the Internal Improvement Fund of the State of Florida		08/17/53	Book 58 Page 182
2.	R. R. Mims	08/17/53	11/23/54	Book 58 Page 182
3.	Alberta, Charles	11/23/54	01/14/63 09/03/64	Book 60 Page 311
4.	Central and Southern Florida Flood Control District	01/14/63		Book 67 Page 387
5.	James Prescott	09/03/61		Book 83 Page 3111

3.3 Observation and Discussion

Five structures or areas of concern were identified by the aerial and vehicular inspections as potential environmental or physical hazards. These areas are depicted on Figure 2 and their respective photographs are contained in Appendix A.

1. Shell Material Borrow Pits:

The borrow pits are located in the southern half of the property on the western flank of the ridge formed by deposition of the material dredged from the canal during construction. Shell material was excavated from the ridge and transported off-site for use as construction fill material or road base. The operation was conducted by a contractor, unrelated to the Prescott family, from 1985 until 1987 when the contractor was denied further access to the property. (See photos 1 and 2.) The location, extent, and depth of the excavations is shown in the photographs 1 and 2 contained in Appendix A.

A large front loader used in the excavation operation remains in one of the borrow pits. Mr. Shirey reported that this equipment is still owned by the contractor.

Several empty five-gallon plastic buckets (which previously contained lubricants) are scattered throughout the borrow pit area. The containers are empty and did not exhibit noticeable product odor. (See photo 3.)

The primary hazard within this area is the potential for injury, related to the pit excavation faces or the abandoned front loader.

2. Cattle Pens:

The cattle pens are located approximately 500 feet south of the drainage canal and control structure near the center of the property as shown in Figure 1. The pens consist of a system of five-foot high, triple wooden fences designed to control and sort the cattle prior to loading for shipment to markets, or health and sanitation activities. The primary hazard of these pens, in general, is that of physical injury resulting from movement through or on the fencing of the pens. Unused fencing materials are stored in two piles west of the cattle pens.

Several hazards were noted within or adjacent to the pen area.

a. A large rectangular, yellow steel device approximately sixteen feet in length, with five foot high sides, and open on the top, and at both ends is situated at the center of the cattle pens. This equipment was referred to as the "worming stall" by Mr. Shirey and is shown in photo 5. It is designed to control and contain cattle during worming procedures and application of pesticides onto the skin of the cattle to control flies, lice, and other insects. (See photo 5.) Approximately fifty empty one-gallon plastic bottles were found scattered on the ground in the vicinity of the worming stall. The bottle labels carried the name of Atroban Delice Pour-On Insecticide as shown in photo 6 and listed the following chemical constituents:

1% Permethrin [(3-ph3noxyphenyl) metheyl (I) cis, trans-3-(2,2-dichloroethenyl)-2,2-dimethylcyclo-proprane-canooxylate].

99% Inert Ingredient -- Petroleum Hydrocarbons

Product contents, physical characteristics, and health and safety information is listed in the material safety data sheet (MSDS) supplied by the manufacturer and contained in Appendix F. According to this data, the product may present a health hazard through direct exposure by inhalation, ingestion, or dermal contact. The product is apparently relatively insoluble in water and volatile. The manufacturer's representative would not reveal the exact petroleum hydrocarbon, beyond "parrafinitic oil", utilized as the inert ingredient of the product. However, the physical data indicated the product's physical characteristics are similar to kerosene or xylene.

b. Two large pieces of farm machinery are located adjacent to the western fence of the pen system. One is a trailer mounted pesticide tank/sprayer shown in photo 7. This equipment was used to spray the cattle in the field. The type of insecticide used in this operation is unknown.

A bush hog (large grass mower) is parked beside the pesticide trailer.

3. Water Control Structures:

Two water control structures are located in the drainage canal which bisects the property and drains the land west of the present Kissimmee River canal. This canal also intersects the old river channel. The control structures regulate the flow of water between the smaller canal, the old river channel, and the present Kissimmee River canal. The smaller of the two structures is shown in photo 8. The drainage canal and structures are maintained by the SFWMD.

4. Abandoned House Trailer:

The single-wide trailer is located approximately 150 feet south of the drainage canal described above and adjacent to the small control structure in the canal. The trailer lies within a small hammock of hardwood trees and appeared to be abandoned at the time of the field inspection. Several household appliances and cabinets are scattered in the vicinity of the trailer. (See photos 9 and 10.)

The site of the trailer and associated debris is very near the boundary of the Prescott property. According to the Okeechobee County Property Appraiser, the western property boundary corresponds to the old Kissimmee River channel. However, the exact location of the old channel is not clearly defined near the abandoned trailer.

5. Abandoned Equipment in Northern Area of Property:

An abandoned farm tractor, bulldozer, and water pump are located in the northern half of the property, as depicted on the map in Figure 1. This equipment appeared to be inoperable at the time of the field inspection.

3.4 Regulatory Agency Information

The following regulatory agency information was gathered as part of this PRA.

1. Florida Department of Environmental Regulation's (FDER) Ground Water Pollution Source Inventory (GPSI) showed no record of ground water contamination events within a one mile radius of the property boundary.

2. The FDER Underground Tank Registration Program contains no recorded registrations of underground storage tanks initiated on the property.

3. According to Rudy Smith, Field Engineering Section, SFWMD, West Palm Beach, Florida, there were no notices of violations were issued to operations on or near the South Prescott Estate Property.

4.0 SUMMARY OF POTENTIAL HAZARDS

The following is a summary of the potential hazards discovered as part of the preliminary risk assessment of the South Prescott Estate Property.

1) The abandoned farm equipment and cattle worming stall in or adjacent to the cattle pens are physical and potentially environmental hazards. The chemicals used in this area are listed as toxic to some animals and may have contaminated the underlying soils.

2) The steep side walls of the pits, and the abandoned front end loader present physical hazards in the borrow pit excavation area. The improperly discarded lubrication containers indicate sloppy equipment maintenance and waste management practices during operation of the pits, but are not environmental hazards themselves.

3) The abandoned equipment in the northern portion of the property have been abandoned for several years and may be considered physical hazards.

4) The eastern most and larger control structure has handrails and visual notification posted on it. The smaller and western-most structure does not have posted warnings.

5) The abandoned house trailer has been vacant for several years and is in poor condition. The trailer and associated debris may present a physical hazard to personnel working nearby.

6) The western property line which follows the old channel of the Kissimmee River is not secured and can be easily accessed from the river or adjacent property. This should be addressed if the adjacent property is not purchased by the District.

5.0 RECOMMENDATIONS

Based on the information collected and evaluated during this preliminary risk assessment, the SFWMD should consider the following actions to limit liability at the South Prescott property.

1) Removal of all abandoned or stored machinery not claimed and removed by the present landowner. This would include the front-end loader, the abandoned tractor and bulldozer, and the stored insecticide tank/sprayer and bush hog. This would eliminate or reduce injury and damage liability associated with the property.

2) Removal of the abandoned house trailer and associated debris will eliminate the physical hazards in this area

3) The empty pesticide containers in the cattle pens should be collected and analyzed to determine if the soils were impacted by the de-licing operation. If the testing indicated contamination, all impacted soil should be removed or a risk assessment should be conducted to evaluate non-removal.

4) All empty lubricant containers should be removed from the excavation area and properly disposed.

5) The steep excavation faces of the borrow pits should be graded or warning signs posted to reduce the potential of falls and the consequent injury or damage to personnel and equipment.

6) Place warning signs on all fences surrounding the property and the cattle pens. All existing gates should be equipped with locks to restrict public access.

APPENDIX B

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

PRELIMINARY RISK ASSESSMENT REPORT

QUESTIONNAIRE

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

PRELIMINARY RISK ASSESSMENT REPORT

RISK MANAGEMENT DIVISION

I. GENERAL INFORMATION

A. NAME OF PROPERTY

Prescott Estate South, Okeechobee County

B. LEGAL DESCRIPTION OF PROPERTY

See the location subsection of the report's chain of ownership section (Appendix C).

C. GENERAL DESCRIPTION/USE OF PROPERTY

An approximate 1,086 acre commercial cow-calf beef operation using reclaimed dredge soil and native flood plain for pasture.

D. TOTAL ACREAGE OF LAND

An approximate 1,086 acres, based on SFWMD information.

E. TYPE(S) OF ACCESS OF PROPERTY

By means of a privately maintained unpaved road, off State Road 78. The road is in good condition. Other access is available through a gate on the northwestern property boundary.

F. TOTAL NUMBER OF FEET ADJACENT TO PUBLIC ROADS

There is no border common to public roads.

G. ADJACENT BODIES OF WATER

The old Kissimmee River channel forms the western property boundary. Canal #38 (the present Kissimmee River) is adjacent to the eastern boundary.

H. **BODIES OF WATER ON PROPERTY**

Hydrologically connected jurisdictional wetlands of the old Kissimmee River are located in the northern half of the South Prescott Estate. An unnamed east-west canal splits the property into northern and southern areas. The canal water elevation is controlled by a structure adjacent to the present Kissimmee River Canal (Canal #38).

I. **BUILDING STRUCTURES ON PROPERTY**

One single-wide trailer located near the drainage canal in the center of the property.

II. **PERIMETER PROTECTION**

A. **DOES PUBLIC HAVE OPEN ACCESS?** **NO**

B. **TYPES OF PERIMETER PROTECTION**

Five and four strand barbed wire.

1. **ACCESS GATES**

Two gates, one on State Road 78 and one allowing access to the Mathews property to the north.

2. **FENCING (TYPE/HEIGHT/LOCATION)**

Four and five strand barbed wire fence in good condition along Canal #38. Four strand barbed wire on the northern boundary. Western boundary at old river canal is unsecured.

3. **NATURAL BARRIERS (i.e. CANALS, TREES, ETC.)**

The property is bordered on the east by Canal #38 and on the west by the original Kissimmee River channel. The property is divided into a northern and southern area by an unnamed canal.

C. **TYPES OF WARNING SIGNS (SPECIFIC LANGUAGE/LOCATION)**

None noted on fence lines.

D. **TYPES OF SECURITY OF PREMISES**

Southern property boundary access gate is presently not locked. Off-site locked farm access gate on unpaved road near exit from State Road 78. Barbed wire fence is on the north, south, and east border.

III. PERIMETER PROTECTION

A. ANY OPEN/OBVIOUS ENVIRONMENTAL HAZARD? YES

The cattle loading area, empty de-licing agent containers were found.

B. ANY HIDDEN/OBSTRUCTED ENVIRONMENTAL HAZARD? NO

According to Florida Department of Environmental Underground tank registration files.

C. PAST USE OF PROPERTY

Agriculture: Cow-calf beef production, dredge spoil had been spread over the property during the construction of Canal 38.

D. ADJACENT PROPERTY OWNERS (SPECIFIC INTENDED USE AND LOCATIONS IN RELATION TO PROPERTY

The property to the west and north are similar cow-calf production ranched.

E. ANY TYPE OF RECREATIONAL ACTIVITIES ON PROPERTY? YES

Fishing and duck hunting along the Kissimmee River.

IV. ADDITIONAL INFORMATION

A. IS PROPERTY OR ANY OF THE ADJACENT PROPERTIES, ON A FEDERAL, STATE, OR LOCAL LIST OF HAZARDOUS WASTE SITES?

No, not according to the DER GPSI records.

B. ARE THERE GROUNDWATER WELLS ON PROPERTY?

No, not according to the current owner.

C. IS GROUNDWATER IN THE AREA USED AS DRINKING WATER?

Probably.

D. ARE THERE NOW, OR HAS THERE EVER BEEN ANY UNDERGROUND STORAGE TANKS ON THE PROPERTY?

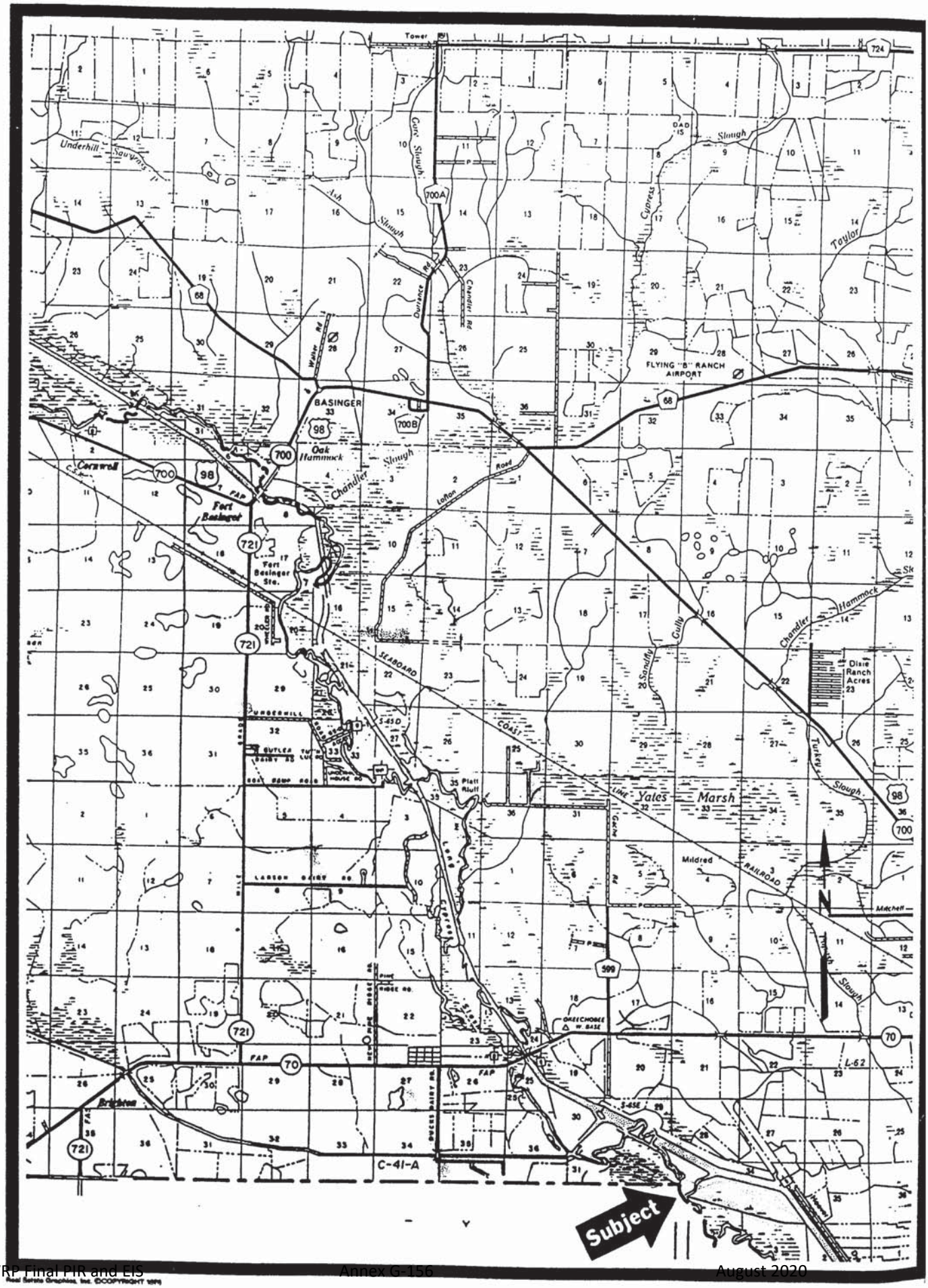
No, not according to DER records.

E. ARE THERE NOW, OR HAS THERE EVER BEEN ANY ABOVE GROUND STORAGE TANKS ON THE PROPERTY?

No, not according to the current property owner.

F. IS THE PROPERTY ADJACENT TO ANY FLOOD PLAIN, WETLAND, SENSITIVE ECOLOGICAL AREA?

Yes. A portion of the northern half of the property is within the flood plain of the Kissimmee River.


Tower Rd
Underhill
Sawyers
Ash Slough
Gurr Slough
700A
Durrence Rd
Chandler Rd
Cypress
Slough
Taylor
68
Water Rd
FLYING "B" RANCH AIRPORT
BASINGER
98
700B
Oak Hammock
Slough
Cornwell
700
Chandler
Lofton Road
FAP
Fort Basinger
721
Fort Basinger Sta.
Chandler Hammock
Sandfly Gully
SEABOARD COAST LINE RAILROAD
Dixie Ranch Acres
Turkey Slough
S-45D
Platt Bluff
Yates Marsh
Mildred
Machell
599
OKEECHOBEE W. BASE
70
L-62
S-45E
Brighton
C-41-A
Subject

MEMORANDUM

TO: Phil Hubbard, Director, Real Estate Division

FROM: James D. Smith, Loss Prevention Administrator JDS

DATE: April 6, 1990

SUBJECT: Environmental Risk Assessment of Joseph Farrish, Jeff Clemons, and Gerald Matthew's properties on the Kissimmee River.

On April 5, 1990, Messrs. James Goodwin, Steve Johnson and myself conducted a preliminary internal environmental risk assessment audit in compliance with our Save Our Rivers Land Acquisition Procedures.

All properties visually appear to be managed in better than average condition and showed no signs of environmental contamination. However, there were a few areas which will need to be addressed during the land acquisition phase. These items consist of the following:

Farrish Property

The Farrish property is a cattle/calf operation located in Pool C on the Kissimmee River. The property mostly consists of open range land pasture.

There were two (2) mobile trailers located on the property which were used to house Farrish employees. No environmental issues were noticed except for a septic system. Septic systems are typical in this type of operational facility and concerns of physical security protection of the system must be maintained.

There was also a horse stall and a barn. The barn was approximately 40 X 60 foot, constructed of corrugated metal roof/walls with a concrete floor. The barn is used to store equipment/supplies and to conduct routine maintenance. (No apparent environmental problems with existing facility).

Adjacent to the barn was an above ground diesel tank and an underground fuel tank. (The underground tank was locked and appeared to be gasoline, but this was not confirmed). Also, there were 55 gallon containers of hydraulic fluid between the tanks.

The surrounding area did not display any large signs of spillage. However, the underground tank will need to be addressed as a potential environmental issue. There were no monitoring wells adjacent to the tanks.

Farrish, Clemons, Matthew's
Page 2

Southeasterly from the barn was a small pit containing household refuge, small household appliances and other solid waste trash. This area is typical of this type of operation. However, the debris will need to be properly removed and the area cleaned up. (No apparent hazardous materials were noted from the visual inspection).

Adjacent to this trash pit were metal products such as old mowers, equipment parts, barbed wire and other fencing material. No environmental issues were noted.

In closing, the remaining property was range land pasture and no other environmental activities were noted.

Clemons Property

The Clemons property consisted of cattle/calf operations and consisted of mostly range land pasture property.

There were three (3) structures noted and inspected on the property. One structure was a house used to provide residence for Clemons' employee. The construction was not examined closely, but appeared to be of wood construction. There was a leaking liquid petroleum gas tank in which the odor was detected. This will need to be addressed immediately if we should purchase the property. The other two structures were a cattle pin and an open shed where a tractor and equipment were stored. No apparent environmental issues were noted.

Matthew Property

The Matthews property consists of cattle/calf operations and consisted mostly of open range land pasture.

We did not enter the property due to the negotiation of the property at this point and did not wish to jeopardize that procedure. However, we could view the area from our level in which only one structure was noted. The structure was inspected by Mr. Johnson the day before and he indicated it was an open shed type construction with no fuel tanks or other potential problems.

Comments

All properties inspected from an environmental contamination perspective, were considered to be better than most other properties purchased in past years.

Farrish, Clemons, Matthews
Page 3

In my opinion, I see no environmental reasons, except the items noted above, which you would be concerned with during the land acquisition process.

It also should be noted that the Lanier property was not inspected due to the redefining of the property acquisition.

If you have any questions, please do not hesitate to contact me.

JDS/nwm

Attachments

cc: Fred Davis
James Goodwin

M E M O R A N D U M

TO: Jim Smith, Loss Prevention Administrator, Risk Management Division

FROM: Philip B. Hubbard, Director, Real Estate Division

DATE: April 3, 1990

SUBJECT: Environmental Risk Assessment on S.O.R. Lands

We have an approved appraisal on Parcel 9571 Gerald Matthews, Paradise Run located on the Kissimmee River and containing 315.8 acres.

We are presently negotiating for acquisition of this parcel. An offer cannot be accepted until a Risk Assessment is completed.

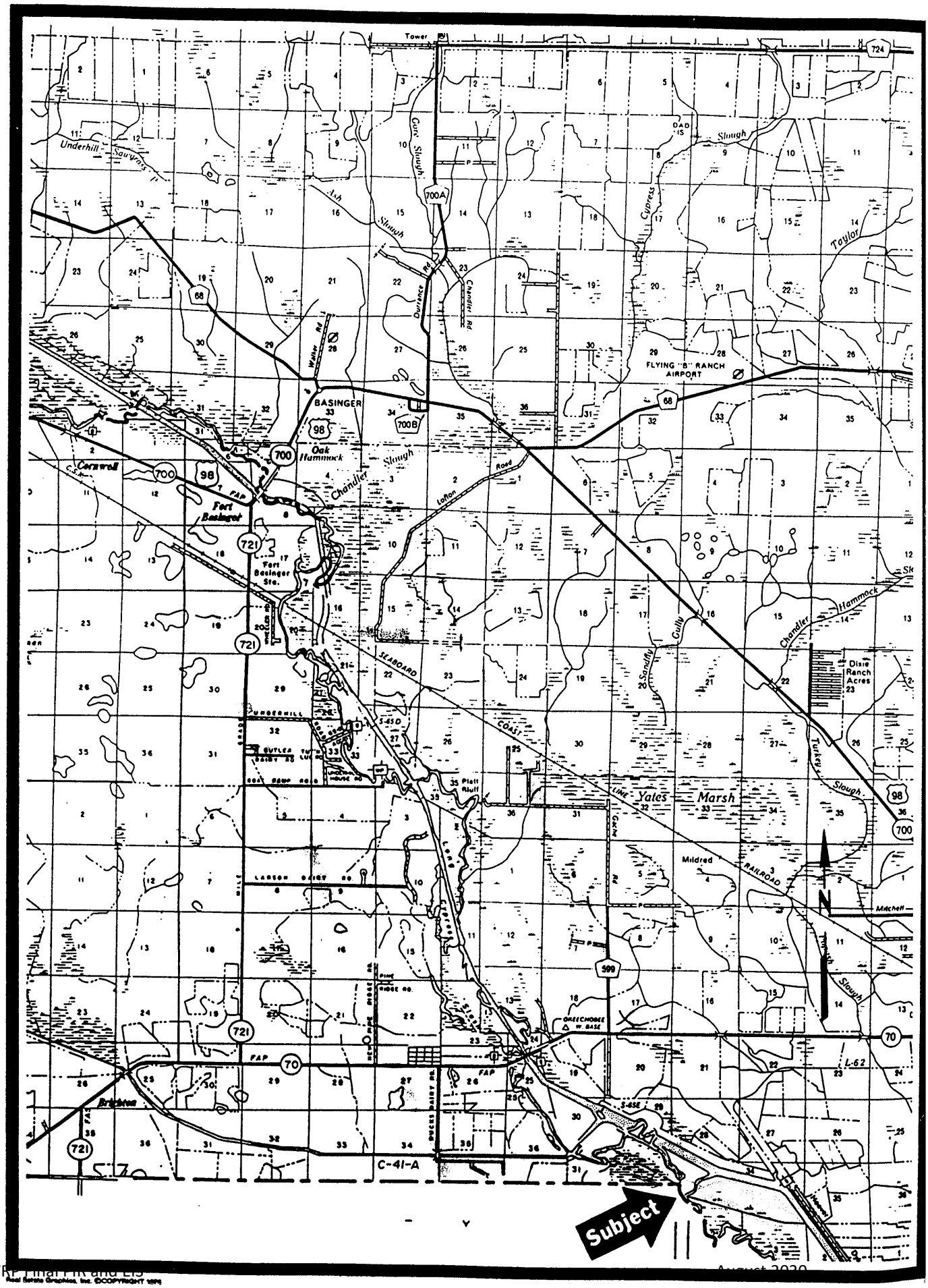
I have attached hereto the necessary documents to identify said parcel and the location.

Request you proceed soon as possible with this assessment. If the property is to be inspected by District Staff, please contact Jim Goodwin in the Save Our Rivers Division for assistance.

PBH/JES/rkg
Attachments

D. Summary of Salient Facts

Subject Property:	315.8± acres, vacant with agricultural improvements.
Location:	Subject property is located along the north side of the Highlands/Glades County line approximately 2.25 miles south of State Road 70 in an unincorporated area of Highlands//Okeechobee County, Florida.
Zoning:	AU, Agricultural, Highlands County, Florida. AC, Agricultural, Okeechobee County, Florida.
Access:	The subject property is accessible by a dedicated permanent easement from Rucks Dairy Road.
Highest & Best Use:	Agricultural Use
Estimate of Market Value:	
Flood Plain Zone:	Zone A - Special Flood Hazard Area
Comments:	The property is located approximately 8 1/2 miles west of the City of Okeechobee and approximately 43 miles southeast of Sebring. The area has been historically rural in character with agricultural and pastureland being the predominant land uses. Some residential developments as well as fish camps along the canal and rural ranchettes are also present in a limited quantity. j However, the future is expected to result in a continuation of the rural character of the area.


Tower Rd
Underhill
Sawyers
Ash Slough
Corn Slough
700A
Durrance Rd
Chandler Rd
Cypress
Slough
Taylor
68
Walker Rd
BASINGER
33
98
700B
FLYING "B" RANCH AIRPORT
Oak Hammock
Slough
Cornwell
700
Chandler
Lofton Road
Fort Basinger
721
Fort Basinger Sta.
Chandler Hammock
Sandfly Gully
SEABOARD COAST LINE RAILROAD
Dixie Ranch Acres
Turkey Slough
S-45D
Platt Bluff
Yates Marsh
Mildred
Mitchell
599
GREECHOBEE W. BASE
70
L-62
S-45E
Brighton
C-41-A
Subject

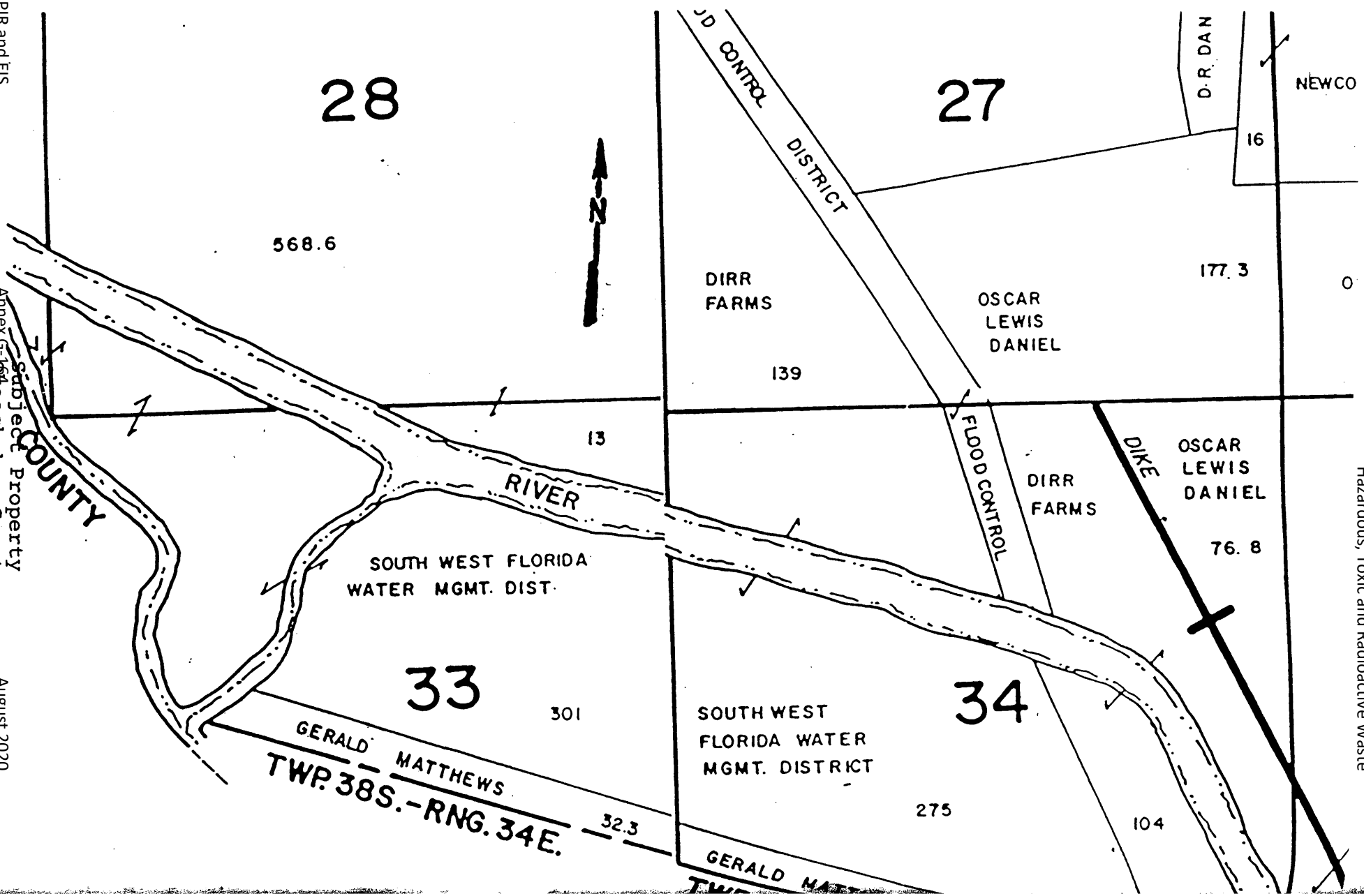
J. Property Description

The subject property is located in the southeast corner of Highlands County and southwesterly portion of Okeechobee County. It consists of 315.8± acres of improved pasture land which has some minor agricultural improvements.

The westerly 233.6± acres is located in Highlands County along the Glades County line. It is irregular in shape having a southerly boundary line along the north side of the Highlands-Glades County line of 6,937±', a meandering easterly boundary following the Old Kissimmee River of approximately 1,650', a northeasterly property line adjacent to a United States Corp. of Engineer construction easement of 2,970±', a northerly property line along the north line of Section 32, Township 37, Range 34 and a westerly property line of 1,412±'.

The easterly 82.2± acres has a narrow elongated shape and is located in Okeechobee County. It has a south boundary of 7,465', a northeasterly property line of 986±', a north property line of 6,758±' and a meandering northwesterly property line along the waters edge of Paradise Run and the Old Kissimmee River bed of approximately 600'. This parcel has a median depth of 500±'.

The land within the overall parcel is improved pasture land and is currently being used as pasture land. Mr. Matthews indicated that he currently is feeding 225-250 head of beef cattle from this tract of land and that it is typical of recent years. The land has a variable elevation averaging between 15' and 20' above sea level with the extremes being as low as 14±' and high as 24±'. No soil tests were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DIRR FARMS
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OSCAR LEWIS DANIEL
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RIVER
FLOOD CONTROL
DIRR FARMS
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OSCAR LEWIS DANIEL
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TWP. 38S.-RNG. 34E.
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SOUTH WEST FLORIDA WATER MGMT. DISTRICT
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275
104
GERALD MATT
COUNTY
Subject Property
Okeechobee County

provided and Highlands County has no soils maps for this area. However, the Okeechobee soil maps identify the area soils as being in the Manatee, Delray and Okeelanta groups. Historically, these soils have been poorly drained and somewhat inaccessible because of wetness. With the advent of water control structures, these areas have been protected from flooding and are now suitable for improved pasture and cultivated crops. If areas having these types of soils are subjected to designed drainage and water control they are well suited for truck and special crops.

The on-site inspection revealed a heavy grass ground cover with no evidence of significant wet areas. The property has only scattered tree coverage with some palms, willow, and other type of native trees. A rich soil composition is evident from the condition and density of the ground cover.

Agricultural improvements on the property include a 24.3' by 36.3' utility shed which has a pole support frame and metal exterior and roof. Attached to the north and south sides of the shed are 13.7' by 36.3' open extensions. Each has a metal roof but no floor or sides. The interior of the shed has a slab floor but no interior finish. There is a one room divider which divides the building into a small living quarters which includes a sink, stool and shower. The remaining room is a shop area. There are aluminum framed metal windows. Electrical power is supplied through a 100 amp breaker box by a portable generator. Other agricultural improvements include another 24' by 36' pole building which has a metal roof and a partial

metal siding, 4 two-inch wells (2 are controlled by windmills and 2 by the portable generator), 80±' by 100±' cow pen and some perimeter fencing. These improvements are not being assessed by either the Highlands or Okeechobee County Property Appraisers offices.

Access to the subjected property is provided over adjacent lands by a 60' permanent access easement granted in April of 1968. This easement extends from the terminus of Rucks Dairy Road to the subject property. This access is a graded sod/sand road extending along the south side of the Highlands/Glade County line to the property.

L. Zoning

The subject property has been zoned agricultural by both Highlands and Okeechobee Counties. The following is a brief description of the zoning districts.

The Highlands County zoning category is AU, Agricultural. This classification is for those areas presently and primarily agricultural. It does allow single family users on one acre.
The regulations in outlined form are as follows:

Minimum Lot Requirements:	1 acre 100' minimum road frontage
Maximum Lot Coverage:	15%
Height Restrictions:	2 stories 50 feet
Minimum Building Floor Area:	750 square feet Living Area
Minimum Yard Requirements:	Front 25' Side 25' Rear 25' Corner 15' side street

The Okeechobee AC, Agricultural zoning district is generally limited to conservation, agricultural and recreation uses. It is intended to serve three main purposes: (1) to preserve agriculture, (2) to protect marsh lands and, (3) to serve as a "holding classification" for land which may be used for more intensive uses in the future. Some of the acceptable uses under this zoning category are as follows:

Agricultural Uses
Roadside Stands
Utility Right-Of-Way
Camps/Parks, Etc.
Cemetery
Game Preserve
Boarding Stable
Churches

Uses allowed by special exception include:

Commercial Campgrounds
Airport
Landfills
Animal Hospitals
Drive-In Theaters
Prison

Prohibited uses include manufacturing, warehouse, junk yards, residential and institutional use and all uses not specifically listed as permitted.

Additional general requirements for this district include:

Minimum Yard Requirements:	Front - 50'
	Side/Rear - 35'
Maximum Lot Coverage:	None
Maximum Height:	None
Minimum Lot Requirements:	20 Acres