

**ENVIRONMENTAL EVALUATION
OF A 845.1 ACRE AREA
PROPOSED FOR INCLUSION
IN THE MIAMI-DADE COUNTY
URBAN DEVELOPMENT BOUNDARY
SECTIONS 30 & 31, TOWNSHIP 54 SOUTH, RANGE 39 EAST
MIAMI-DADE, FLORIDA**

Submitted to:

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Submitted by:

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May 6, 2015

INTRODUCTION:

Carney Environmental Consulting Services Inc. (Carney) was contracted by Limonar Development and Wonderly Holdings (Client) to evaluate the environmental resources that may be associated with an area of unincorporated Miami-Dade County being proposed for inclusion in the Urban Development Boundary (UDB). The area of interest (AOI) lies within Sections 30 and 31, Township 54 South, Range 39 East and is depicted in Figure 1.

To comprehensively address the environmental features and condition of the AOI, Carney: a) reviewed a series of historic aerial photographs of the property (and its surroundings) to establish a history of the site over time; b) performed a site visit to make the field observations necessary to evaluate any ecological/wetland value and function of the parcel as it existed at the time of the site visit; c) reviewed previous wetland functional evaluations applied to recent permitting within the project area; d) reviewed and evaluated USGS groundwater elevation data applicable to the area of concern; e) applied topographic data provided by Miami-Dade County to understand the area's elevation and slope; f) reviewed, evaluated and utilized a variety of agency GIS shapefiles that further describe some of the salient environmental features of the area.

SITE DESCRIPTION

The subject property is approximately 845.1 acres and situated in Sections 30 and 31, Township 54 South, Range 39 East, Miami-Dade County, Florida (approximately 25°41'42.57" North Latitude and 80°28'15.13" West Longitude). The majority of the AOI has been in continuous agricultural use since the middle 1970s. The County's West Wellfield (WWF) (which is within the AOI) was added and brought into operation in early 2000.

When viewing the historic aeriels of the site, it is clear that the land surrounding this area has been undergoing change over the past several decades. The AOI has experienced a slow hydrologic decline due to its compartmentalization by the construction of Tamiami Trail and Bird Drive Canal to the north, dense residential development to the east, Krome Avenue and L31N to the west, and Kendall Drive (and its more recent development) to the south. The addition of the WWF operations in 2000 has likely furthered this degradation to some degree. It is clearly evident in the historic aeriels that a slow but continued expansion of woody plant species is occurring – being predominated by exotic pest plant species. While it is acknowledged that many of these woody plants occur in wetlands, their increased presence and densities are indicative of reduced hydrology and hydroperiod. This is discussed in further detail below.

FIELD INVESTIGATION AND FILE RESEARCH

Carney has visited the AOI on a number of occasions providing assistance to the Client for earlier project or permitting efforts. Most recently, a cursory biological field investigation was conducted on April 24, 2015 to ascertain the presence of possible remaining wetland resources and to make a determination of their current condition. This information was reviewed in concert with file information obtained from Miami-Dade County, the South Florida Water Management District, or other agencies and is discussed below.

COVER TYPE

The Florida Land Use, Cover, and Forms Classification System (FLUCCS) is typically used to

describe the cover types. Using FLUCCS codes, the project site is currently constituted of four land use types: #214 Row Crops (85.5%), #619 Exotic Wetland Hardwood (9.7%), #833 Water Supply Plant (3.8%) and #241 Tree Nursery (1.0%). See Figure 2.

MIAMI-DADE COUNTY COMPREHENSIVE MASTER PLAN

The CDMP current Land Use Plan Map indicates that the subject property is comprised of two County land use categories: Agriculture (806 acres) and Institutions, Utilities and Communications [the West Wellfield] (39 acres). See Figure 3.

FLOODPLAINS

The Flood Insurance Rate Map (FIRM) depicts the subject property as lying in three flood zone types: AE (3%), AH (96%), and X (1%). See Figure 4. AE and AH have a 1% chance for annual flooding. For zone X, the flood risk is reduced (<0.2%) but not removed.

SOIL SURVEY

The Miami-Dade County Soil Survey described the project area's soils as Biscayne gravelly marl, drained; Chekika very gravelly loam; Dania muck, depressional, and Demory Rock outcrop complex. See Figure 5. All are considered hydric soils and wetland indicators.

Chekika very gravelly loam (#23), makes up the majority (90.2%) of the project site See Figure 5. The water table in areas of Chekika soil is within the limestone bedrock. It is at a depth of 12 to 36 inches in most years. All areas have been rock-plowed and used for vegetable crops at some time in the past. Irrigation is needed during dry periods. The farmer currently working this site reports that his fields require more irrigation than when he first arrived at the site 15 years ago.

Dania muck depressional (#14) is the second most abundant (9.3%). Traditionally, Dania soil usually is ponded nearly throughout the year. The water table is within 10 inches of the surface for the rest of the year. Most areas support native vegetation, which consists of sawgrass and cattail. Melaleuca trees have invaded some areas. It is ponded for 9 to 12 months in most years. Typically, the surface layer is black muck about 15 inches thick. Soft, porous limestone bedrock is at a depth of about 15 inches. This soil type is in the Sawgrass Marsh ecological plant community.

Demory Rock outcrop complex (#28) comprises a small component of the project area (0.4%) and is limited to the extreme eastern boundary along SW 167 Avenue. The water table is below the surface for the majority of the year.

Biscayne gravelly marl, drained (#2) is the smallest soil component at 0.1%. The water table is below the surface the majority of the years, but can be ponded under extreme conditions. This soil type is usually the result of rock-plowing Biscayne-Rock outcrop complex.

AERIAL PHOTOGRAPHY

A review of aerials from the 1950s to 2014 indicate that the property has long been hydrologically isolated and in agricultural use. Based upon the chronology of the photographs over successive years, development and perturbation of surrounding areas has been continuous. The aerial photos revealed that over time the remaining unfarmed areas exhibit signs of obvious exotic pest plant

species encroachment to a point where today its overstory is predominated by melaleuca (*Melaleuca quinquenervia*), Australian pine (*Casuarina spp.*), Brazilian pepper (*Schinus terebinthifolius*), and Napier grass (*Pennisetum purpureum*).

WETLAND AND OTHER VEGETATION OBSERVED

Hydrophytic (and other) vegetation was observed on the property; however, the exotic pest vegetation described above provided the preponderance of the overstory at each of the non-farmed locations visited. Some wetland ground cover and small trees and shrubs were observed but were sparsely distributed within some of these remnant features. The most common were: bishopwood (*Bischofia javanica*), castor bean (*Ricinus communis*), primrose willow (*Ludwigia octovalvis*), papaya (*Carica papaya*), sewer vine (*Paederia cruddasiana*), Virginia creeper (*Parthenocissus quinquefolia*), saltbush (*Baccharis halimifolia*), sawgrass (*Cladium jamaicense*), leather fern (*Acrostichum danaeifolium*), marsh fern (*Thelypteris kunthii*), myrsine (*Myrsine cubana*), swamp bay (*Persea palustris*), and Florida trema (*Trema micranthum*). Many of the swamp bay were exhibiting the effects of laurel wilt disease.

At the time of the site visit, the farmed areas were: i) being disked in preparation for the fallowing period, ii) still had remnant crops (e.g., tomatoes, squash, beans), or iii) were already fallow with plants such as pigweed (*Amaranthus sp.*), ragweed (*Ambrosia artemisiifolia*), Spanish needles (*Bidens alba*), and other weedy types.

The area within the West Wellfield fence harbors the well infrastructure and is lightly landscaped with a maintained lawn.

LISTED PROTECTED SPECIES, OTHER WILDLIFE/ENVIRONMENTAL FEATURES

No Federally listed animal or plant species were noted during multiple site visits. Due to the site's location and the poor wading habitat offered, it is unlikely that State Listed wading bird species forage during the wet season. However, some of these birds are opportunistic and could follow the path of tractors plowing the field as fields are prepared each planting season. One State listed plant, *Phyla stoechadifolia*, was observed within some of the Exotic Wetland Hardwood features.

No Federal Critical Habitats were identified that fall within (or even near to) the AOI. However, the area lies within the consultation area for the Snail Kite (*Rostrhamus sociabilis*), the consultation and focus area for the Florida Bonneted Bat (*Eumops floridanus*), and three designated Core Foraging Areas for the Wood Stork (*Mycteria americana*).

COMPREHENSIVE EVERGLADES RESTORATION PLAN (CERP)

Figure 6 depicts CERP projects that lie contiguous with the proposed project. These are the Everglades National Park Seepage Management (specifically the Bird Drive Basin Recharge component) to the north and the West Miami-Dade Reuse at the northern terminus of the West Wellfield. It is understood from the South Florida Water Management District that the design and operation were determined to be "not feasible" and that these projects have been declared "not implementable."

OTHER SPECIAL AREA DESIGNATIONS

No Natural Forest Communities, Outstanding Florida Waters, Florida Aquatic Preserves, Wild and Scenic Rivers or Florida Class I or II Waters occur within the AOI.

TOPOGRAPHY

LIDAR (Laser Imaging, Detection and Ranging) topographic data was obtained from the County to understand the topography of the AOI and the surrounding basin. Figure 7 depicts the topography of the 3 land sections that extend from Kendall Drive north to the Bird Drive Canal. One can see that the farming has occurred in the areas of higher elevation and that the land slopes downward slightly as one progresses northward. This makes sense as historically the land at this location transitions from the former rockland marl marsh (and shorter period wetlands) to the ridge and slough system of Shark Valley Slough (a longer period wetland). As can be seen in this figure, the AOI resides almost entirely in relatively higher drier areas of this basin.

Figure 8 depicts the topography of the AOI alone minus the area of the West Wellfield (and its fill pad). With few exceptions the slope goes from a high near Kendall Drive to a low near the northwest. The average elevation for this data set was determined to be 6.5 feet NGVD. When compared to soil survey graphic provided above (Figure 5), you will note that the larger depressional areas correspond closely to the soil type shown as Dania muck depressional.

HYDROLOGIC INDICATORS

Indicators of hydrology were limited at the time of multiple site visits. While the soils were mucky at the land surface in scattered spot locations, it is not apparent if the AOI becomes inundated for a sufficient period to allow the establishment of aquatic prey base at any location within its boundaries. Water levels were reported by a farmer using the area to be the lowest he has experienced in 15 years; he stated that the water was 2 ½ to 3 feet below the land surface during the April 24, 2015 site visit. Changes in water levels are discussed in more detail below.

GROUNDWATER

To further understand the vegetation changes within the immediate basin and the AOI, Carney performed a cursory analysis on history groundwater data for the area. Data from a total of seven USGS wells were examined and comparisons made. See Figure 9 for the well locations. With few exceptions, the majority of these wells were installed in 1994 to establish the pre-existing groundwater conditions prior to the establishment of the West Wellfield. Data from 1994 to February 2000 (the approximate start date of the WWF) were compared at each of these wells. Based on these, it was determined that the groundwater level has dropped 0.52 feet on average from the 1994 levels. Figure 10 compares the stage duration curve of two such wells (G3556 and G3560) which are approximately 1.25 miles apart; both show the half a foot drop discussed. It does not seem probable that the WWF alone at its permitted 15 MGD could have caused this loss, but at each of the seven specified locations, the difference ranged from -0.48 to -0.56 feet and will have an effect on the remaining wetland quality. When these water levels are compared to those of the existing land surface (Figure 10), some elevations may prove to be too high to support functioning wetlands.

WEST WELLFIELD PERMIT FILE INFORMATION

According to the original SFWMD permit for the West Well Field (WWF), Figure 1 of that document delineates the drawdown contours of the current WWF configuration pumping at 40 MGD. See Attachment A. A DERM memo states that “the hydrologic changes which will occur within Bands 4 and 5 will result in the elimination of wetland functions associated with the presence of surface water. DERM staff estimates that the projected changes in the hydroperiod length and water depth in bands 3 and 2 will result in a 60% and 30% reduction in wetland function, respectively.” In their impact analyses, DERM determined that Bands 5 and 4 would have a 100% impact on the wetlands within their influence.

Subsequent to that document, the final Class IV Permit addresses a permit for the construction of the WWF configuration pumping at 15 MGD. See Attachment B. The permit addresses wetland mitigation and refers the reader to “Section 5 (“Mitigation of Unavoidable Impacts”, four sheets) of the M-DWASAD application which is made a part of this Class IV permit...” See Attachment C. That document describes areas with the contours identified as “bands” of impacted lands. “Band 3 was the area expected to experience groundwater drawdown in excess of 0.6 foot. Band 2 was the area expected to experience groundwater drawdown between 0.6 foot and 0.3 foot. Band 1 was the area lying between the 0.3 foot and 0.1 foot contours. Oddly the DERM analyses calculated that the wetland impact within Band 3 would be zero (0) (*This would represent the area closest to the wellheads and seems counterintuitive; it is not explained how a zero impact was derived – it is presumed that all farmland within the influence of the well was treated as non-jurisdictional wetland for this project. Previous analysis by DERM indicated impacts at 100% for this drawdown category*). Band 2 and Band 1 were lumped together and determined to have identical wetland impacts of 30%. The geographic limits of each of these bands were not available in the file material currently on hand. But it is clear, that based on the WWF information generated by DERM staff, wetland impacts to the area surrounding the WWF are inevitable.

CURSORY WETLAND FUNCTIONAL ASSESSMENT OVERVIEW

A Class IV Permit that was issued in 2012 (Permit #CLIV 20110003 – on file with the Department) that acknowledged the relatively degraded quality of the three wetland types identified for that project. The WATER (Wetland Assessment Technique for Environmental Review) Scores were as follows: Napier grass = 0.23; Brazilian pepper = 0.25; and Sawgrass/Muhly grass = 0.50. Uniform Mitigation Assessment Method (UMAM) Score were not calculated for this permit application, however, experience has shown that these two scoring methods tend to be nearly equivalent. Such low scores are undoubtedly connected to the hydrologic perturbation described above.

SUMMARY

Based upon the information derived from the literature and the field visit, it has been determined that remaining wetland features comprising the AOI do not provide a high structure and function for a naturally occurring wetland, either forested or herbaceous. The presence of melaleuca, an exotic pest plant species (and others) that form dense stands, tends to limit the value of the wetland, particularly from the standpoint of wildlife use. It appears that the surrounding land use and perhaps the WWF have also resulted in a regionalized impact to former wetland hydrology. A significant portion of wetland impacts near to the WWF has been previously accounted for and

mitigated by the WWF permits. The compartmentalization of the area by roads, highways, rock mining, and other activities limits interconnectedness with regard to surface hydrology and wetland wildlife movement. Based on the conditions described, any remaining wetland fragments will continue to decline in structure (as more exotic pests overtake) and in function (as the wetland hydroperiod diminishes or disappears).

Attachments

FIGURES

Figure 1. Project Location Relative to Existing UDB

 Proposed UDB Expansion Area

 Urban Development Boundary



0 1,000 2,000 4,000 6,000
Feet

Figure 2. Existing Land Use (FLUUCS Codes)

- 214 - Row Crops - 722.6 Acres
- 241 - Tree Nursery - 8.6 Acres
- 619 - Exotic Wetland Hardwood - 81.7 Acres
- 833 - Water Supply Plant - 32.2 Acres

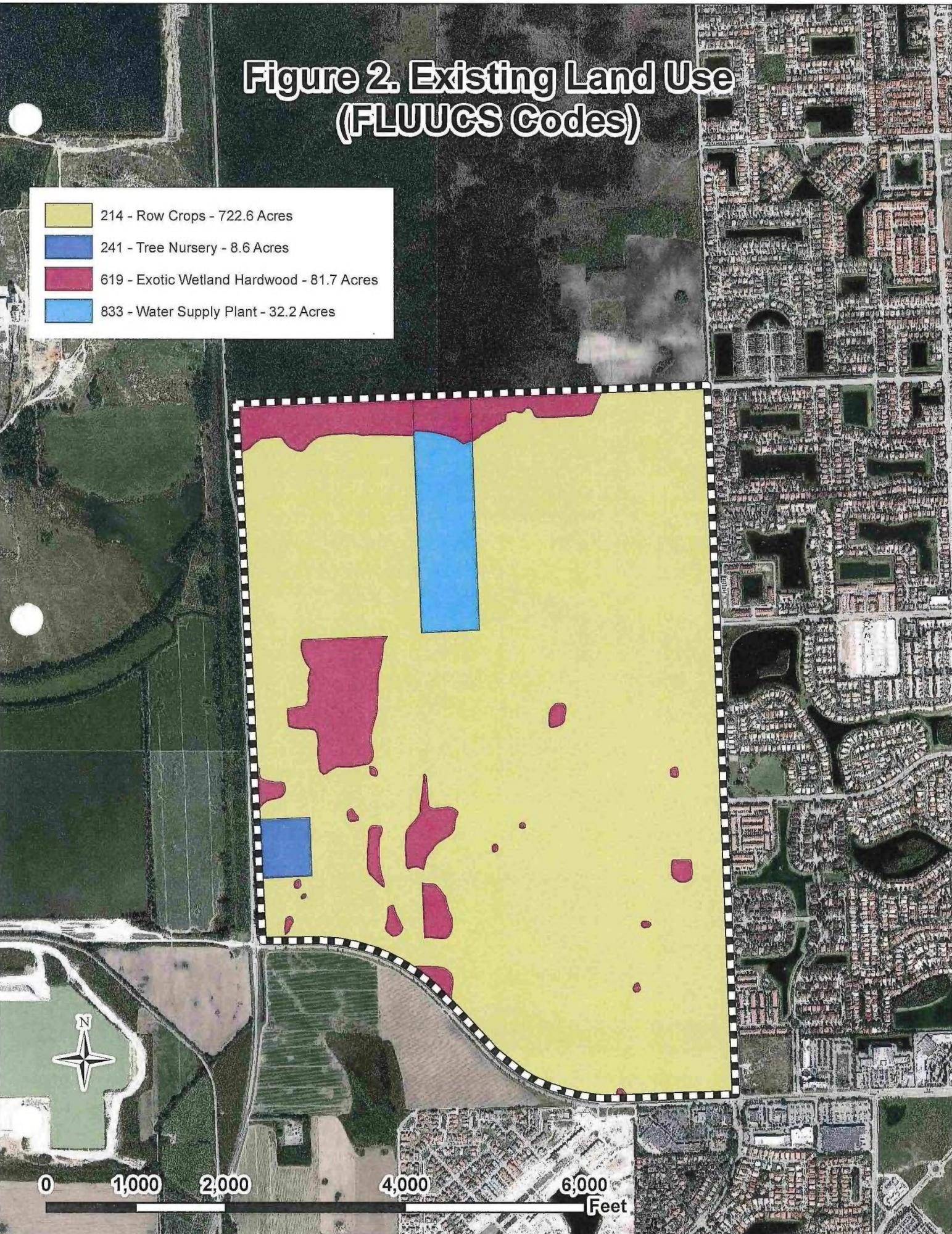


Figure 3. CDMP Land Use Designation

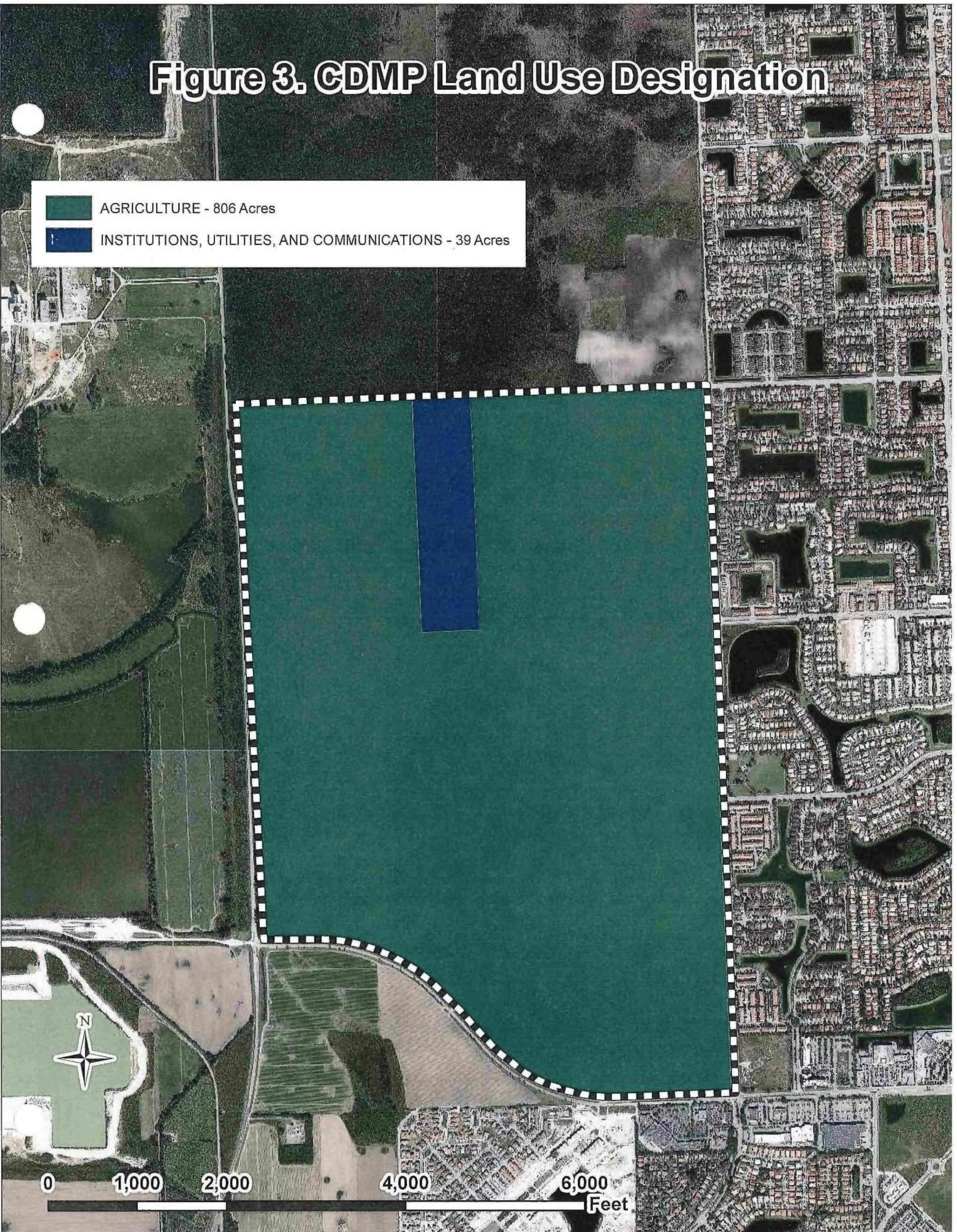


Figure 4. FEMA Floodplain Designations

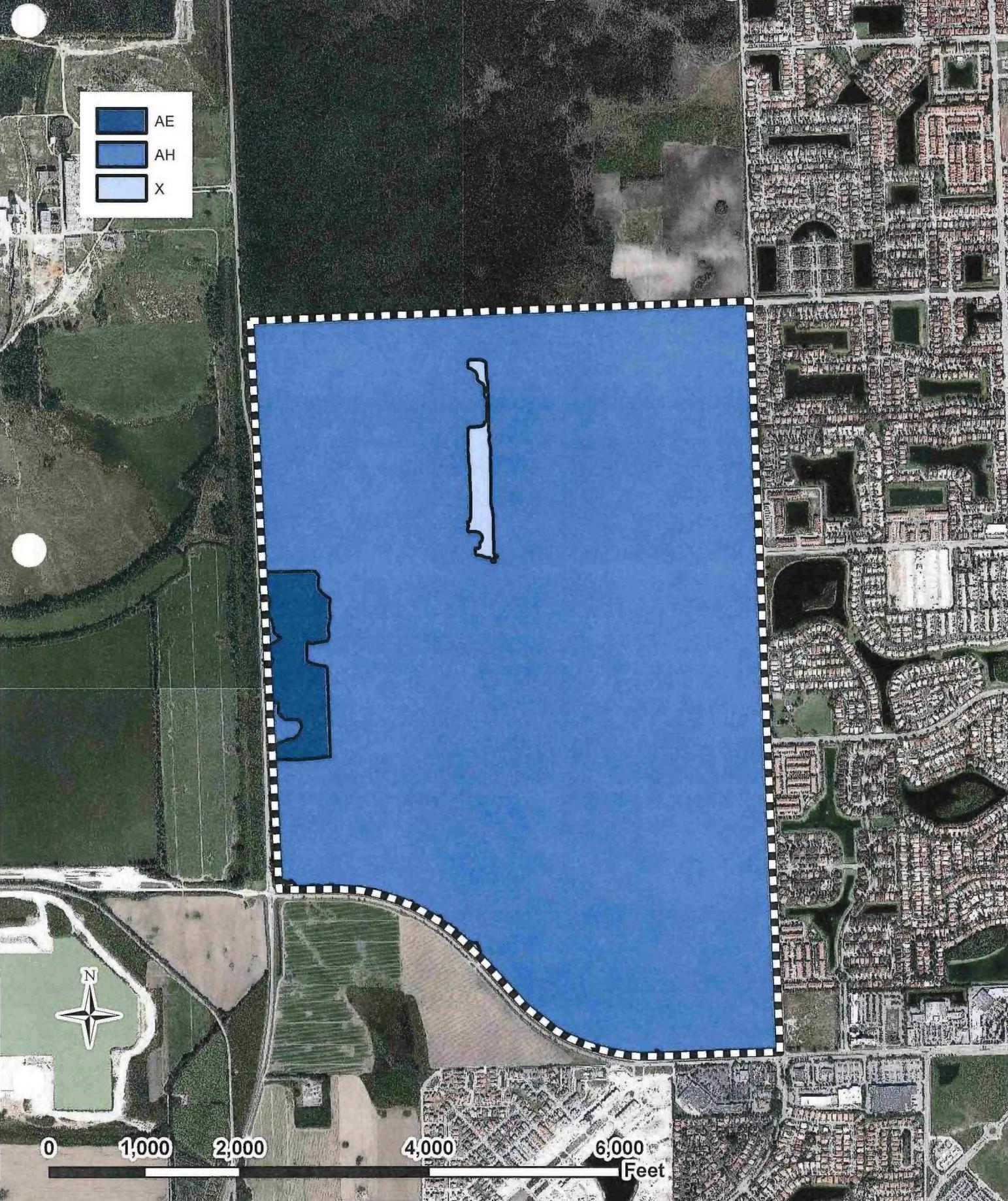


Figure 5. County Soil Survey

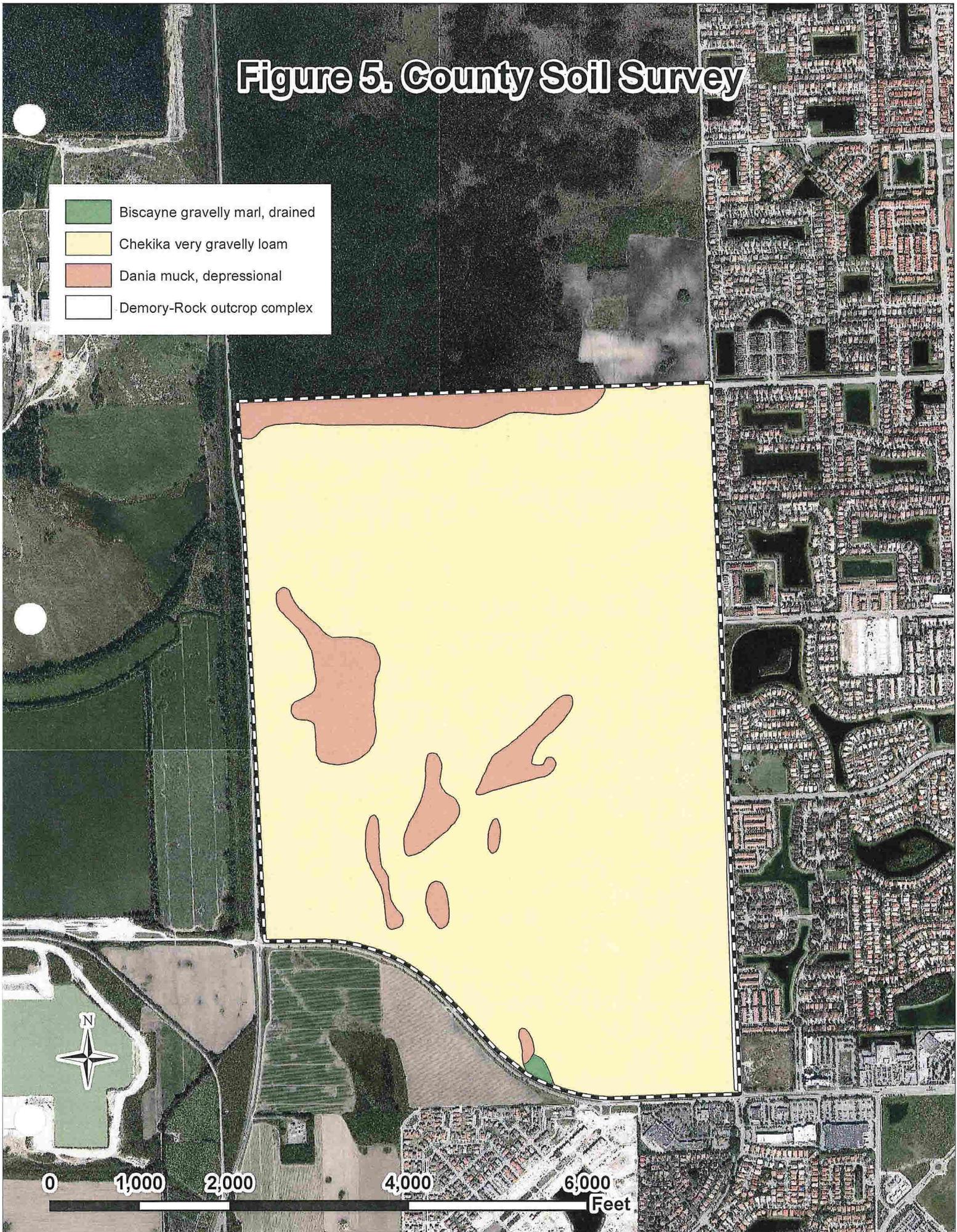


Figure 6. Proposed CERP Projects

-  EVERGLADES NATIONAL PARK SEEPAGE MANAGEMENT
-  WEST MIAMI-DADE REUSE



Figure 7. Topography of 3 Related Sections

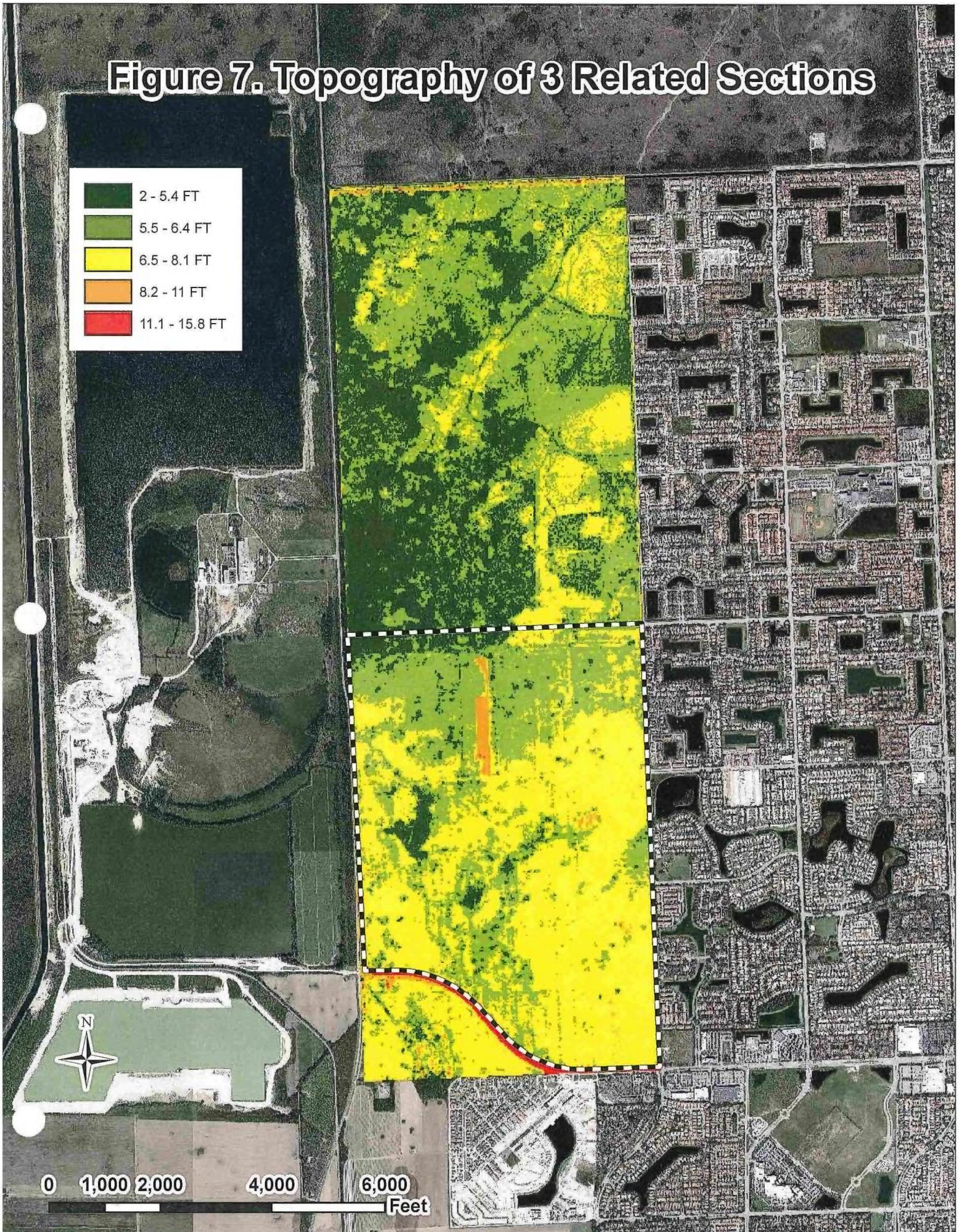


Figure 8. Topography of Project Area

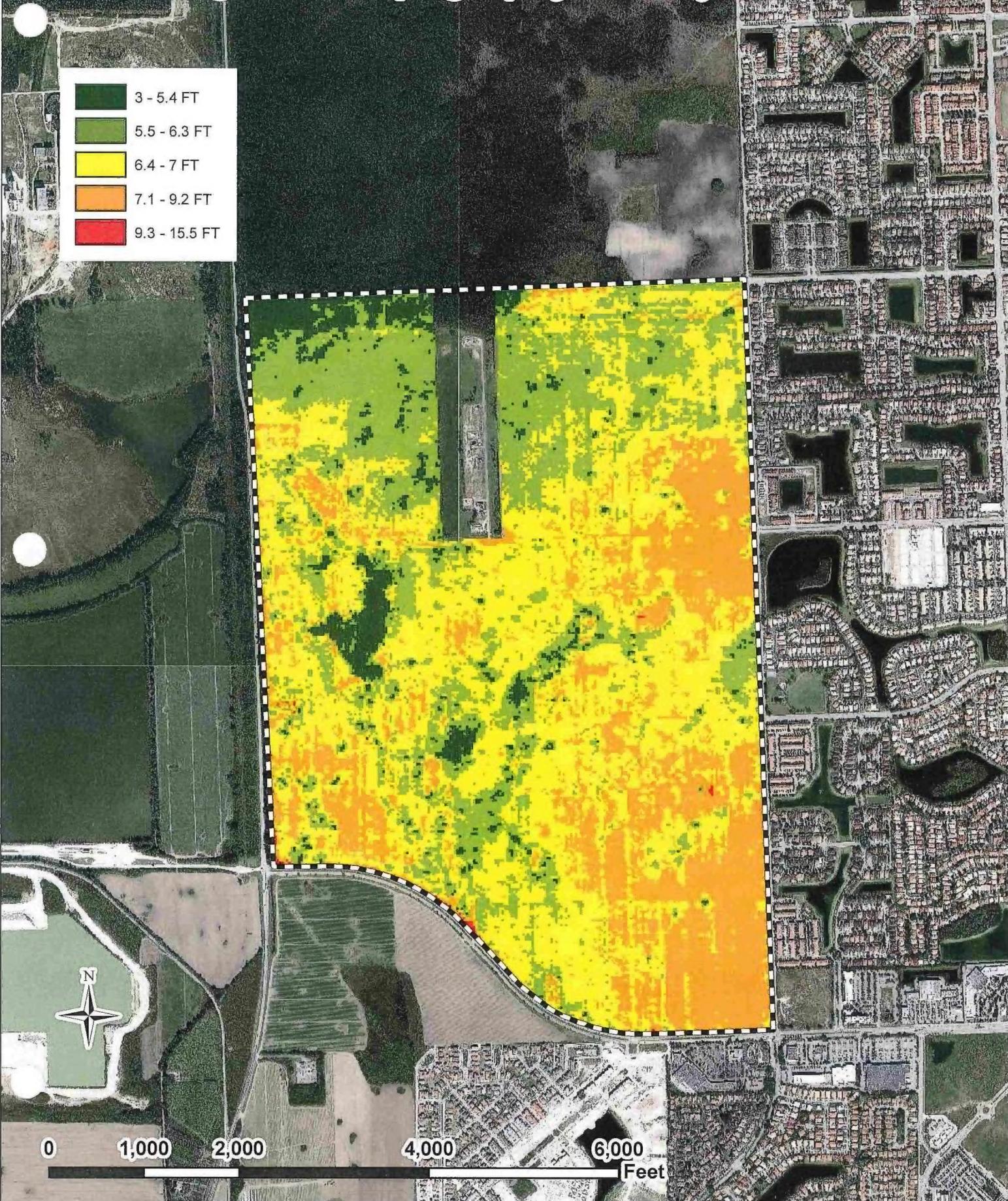


Figure 9. USGS Groundwater Observation Wells

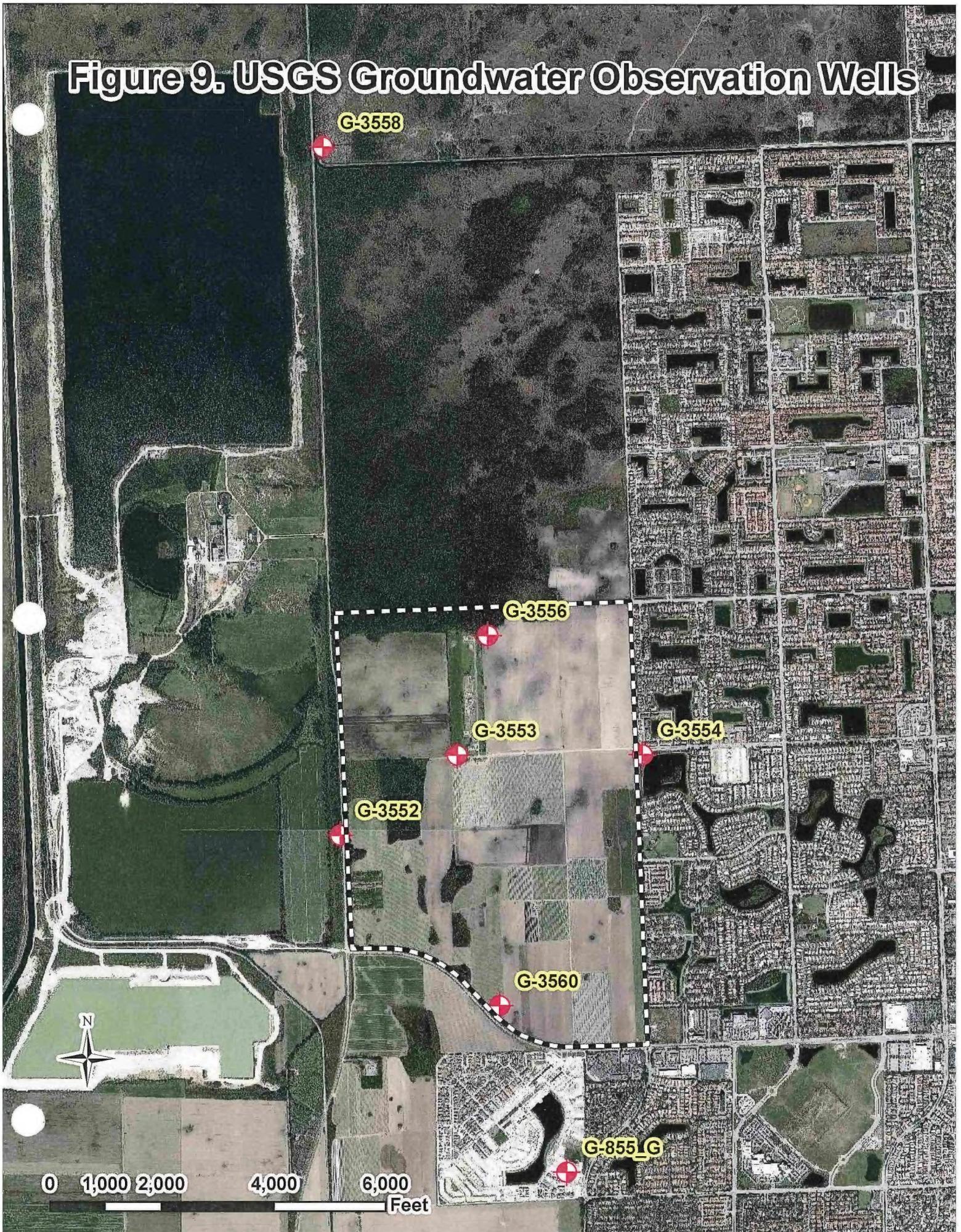
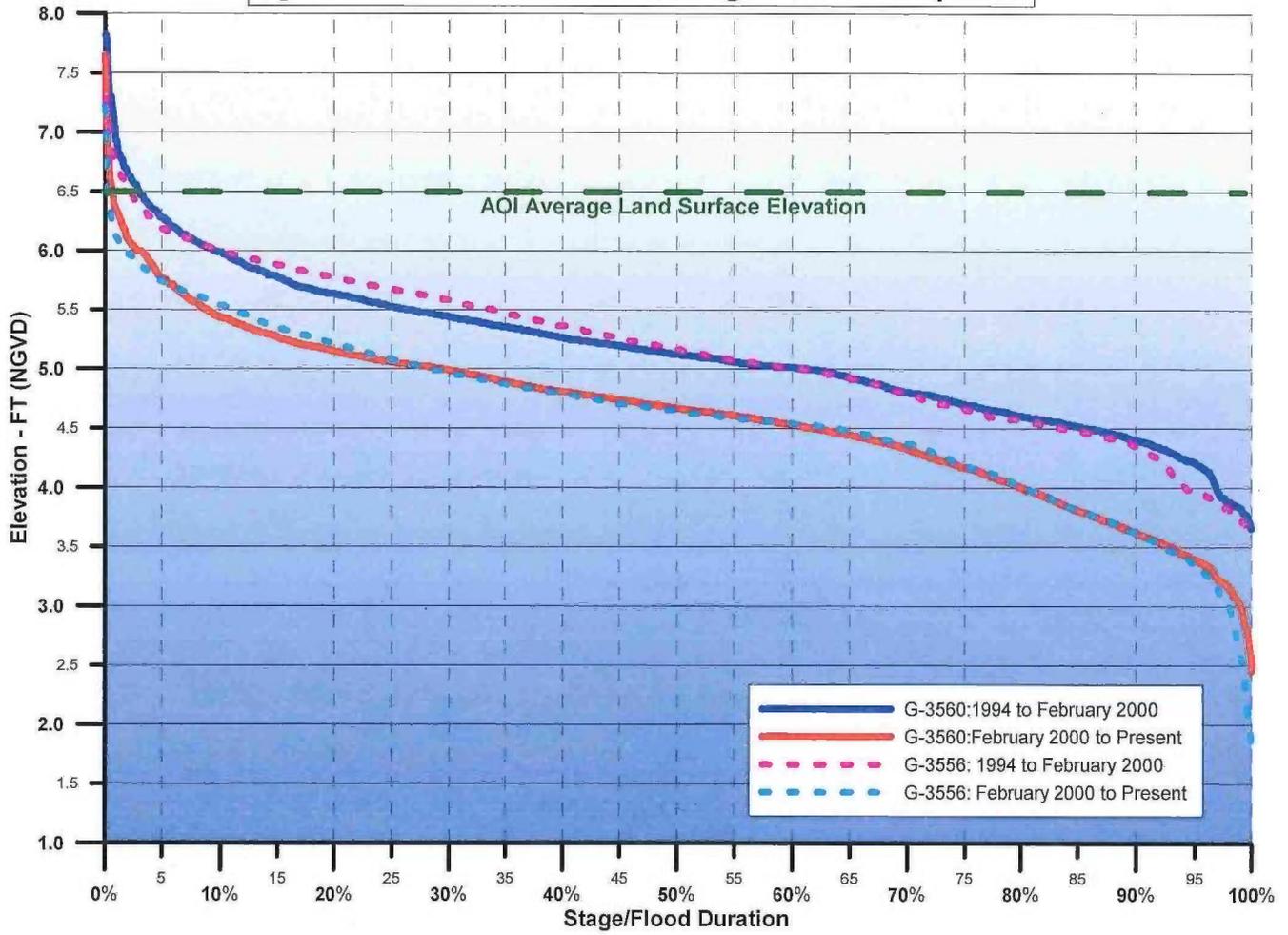


Figure 10. Well G-3560 and G-3556 Stage Duration Comparison

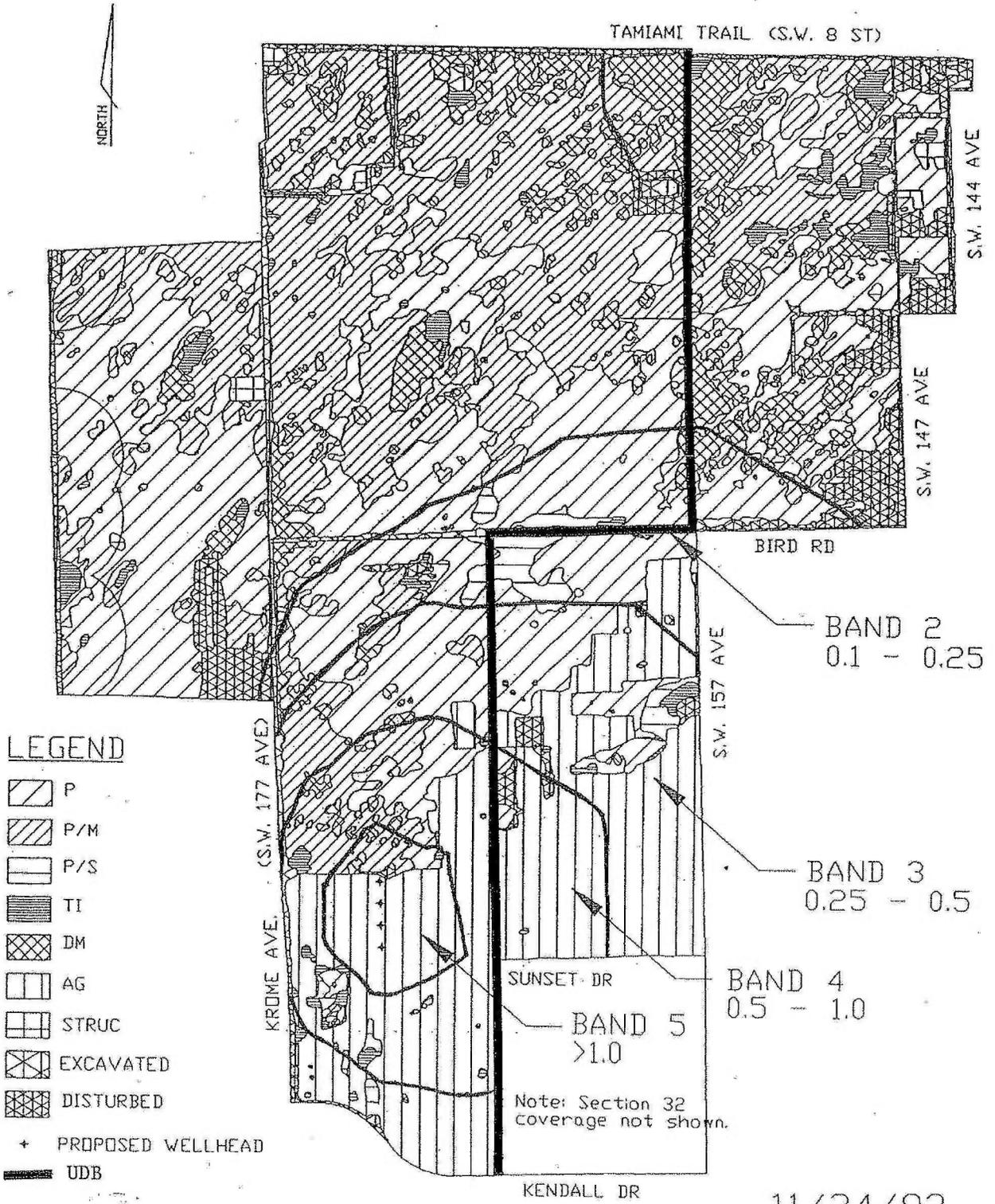


ATTACHMENT A

Depiction of Impacts Due to 40 MGD Drawdown
At The West Wellfield

FIGURE I

Bird Drive Everglades Basin Vegetation (1991) and Proposed West Wellfield 40 MGD Pumpage Phase 1 - No Connections



ATTACHMENT B

Depiction of Impacts Due to 15 MGD Drawdown
At The West Wellfield

West Wellfield Model Drawdown - 15 mgd

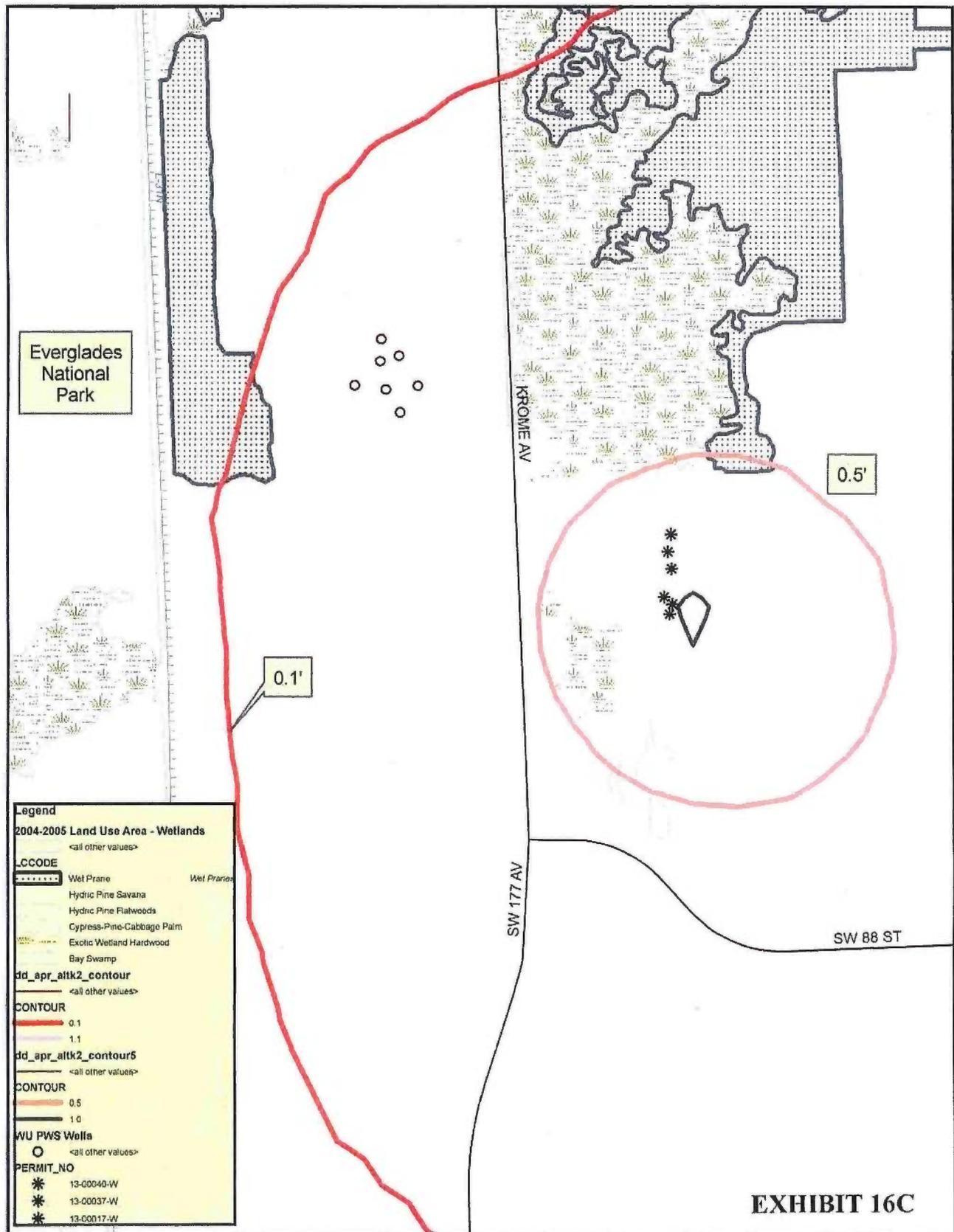


EXHIBIT 16C

ATTACHMENT C
Mitigation Plan For The 15 MGD Drawdown
At The West Wellfield

Section 5
Mitigation of Unavoidable Impacts

Section 5 Mitigation of Unavoidable Impacts

Special Area Management Plan

As large development interests began to apply for permits to fill and dredge portions of the BDEB in 1986 and 1987, the need for a comprehensive evaluation of the wetland benefits and functions of the basin became a priority for Dade County. In 1987, DERM was assigned the role of coordinating agency for a Special Area Management Plan (SAMP) for the BDEB. As defined by the 1980 Amendments to the Coastal Zone Management Act, a SAMP is "a ... geographic area within the coastal zone." Locally, this comprehensive planning procedure is being implemented by a SAMP Committee, comprised of government agencies associated with the protection of wetlands in Dade County, including the following:

- U.S. Army Corps of Engineers (COE)
- Environmental Protection Agency (EPA)
- U.S. Fish and Wildlife Service (FWS)
- Florida Department of Environmental Regulation (now the Florida Department of Environmental Protection, FDEP)
- Florida Game and Freshwater Fish Commission (FGFWFC)
- South Florida Water Management District (SFWMD)
- Dade County Department of Environmental Resources Management (DERM)
- Metro-Dade County Planning Department (DCPD)

The SAMP Committee identified alternative mitigation strategies to compensate for alteration or elimination of wetland vegetation community types in the BDEB. DERM initially determined by using Habitat Evaluation Procedure (HEP) and other analyses that the creation of a combination of shallow permanent water and long hydroperiod wetlands onsite (within the BDEB) would compensate for the loss of wetlands within the Basin (Myers et. al., 1990). However, the siting of the proposed wellfield in the northeast alignment precluded the siting of mitigation areas within the BDEB. Preliminary estimates of groundwater drawdowns indicated that there would not be sufficient area with the appropriate hydrologic conditions within the BDEB to provide the required mitigation areas.

Subsequent SAMP planning focused on the concept of an offsite wetlands mitigation land bank. Nine large offsite areas were evaluated in terms of the potential for use for this purpose. These nine areas were then ranked by mitigation potential. The top six were then evaluated and conceptual mitigation plans and costs were generated. The six areas were the Frog Pond, the North C-111 Basin, the North Card Sound Basin, the Pennsuco Everglades, the Hole-in-the-Donut in Everglades National Park, and the East Everglades Purchase area (Myers et. al., 1990).

In August 1992, the Dade County Commissioners passed an ordinance which sets up the mechanism to formalize the Hole-in-the-Donut off-site mitigation plan. General mitigation guidelines were established in the Bird Drive Everglades Wetland Basin Plan (24-58.20), North Trail Wetland Basin Plan (Section 24-58.19) Ordinance (92-80), and other new sections of the Dade County Code (Section 24-58.21). The mitigation requirements of these plans currently apply to those areas within these basins which are within the Urban Development Boundary (UDB).

During the course of establishing mitigation procedures for wetland impacts within the UDB, procedures for mitigation of impacts to wetlands outside of the UDB were also established. The Bird Drive Everglades Wetland Basin Plan (24-58.20) allows for applicant development of proposals for mitigation of wetland impacts that are projected for areas outside of the UDB.

Unavoidable Impacts

As described in Section 4, unavoidable impacts anticipated as a result of development of the Phase I West Wellfield are related to projected groundwater drawdown, with associated effects on overlying wetlands. DERM modeling studies were based on a 1 in 10 year drought which was determined to be the best represented by the 1987 hydroyear. The average or steadystate scenario was used to evaluate the impact to the surrounding wetlands. The scenario included three wells extracting 15 MGD from the Biscayne Aquifer. Projected drawdown curves showing the limits of areas expected to experience 0.6 foot, 0.3 foot, and 0.1 foot groundwater drawdowns were developed.

These contours were overlain on a vegetation map of the basin, and areas within the contours were identified as "bands" of impacted lands. Band 3 was the area expected to experience groundwater drawdown in excess of 0.6 foot. Band 2 was the area expected to experience groundwater drawdown between 0.6 foot and 0.3 foot. Band 1 was the area lying between the 0.3 foot and 0.1 foot contours. On the basis of DERM's analysis, the wetland acreages predicted to be impacted by the wellfield are as follows:

Band No.	Wetlands Within the UDB (acres)	Wetlands Outside of the UDB (acres)
3	0	0
2	0	13
1	0	162
Total	0	175

Further, DERM predicted minor loss of wetland functions because of changes in hydroperiod length and water depth, with reduction in wetland functions estimated to range as high as 30 percent.

Mitigation Plan

On the basis of the estimated acreage of wetlands that are expected to be affected by wellfield operations, MDWASD and DERM developed a proposed mitigation plan for Phase I of the West Wellfield. On the basis of the referenced elements of the Dade County Code, MDWASD has the right to either participate in the Hole-in-the-Donut mitigation bank, or to propose an alternative mitigation plan that may include restoration and/or management of other wetlands such as the Model Lands. The proposed wellfield will not be operational for approximately two years. Either payment to the County's Freshwater Mitigation Trust Fund or development of an acceptable alternative mitigation plan must be completed prior to the impacts occurring. The two-year time period is incorporated into the mitigation alternatives outlined below.

Mitigation Alternative A

Under Alternative A, MDWASD proposes to continue to pursue the potential acquisition of former wetlands in South Dade County in need of restoration and management. MDWASD will work with other government agencies toward this objective. In the event that such an effort is successful, MDWASD will submit a detailed mitigation plan, for approval by DERM, for the restoration, management, and maintenance of 78.8 acres within the subject site. The total acres to be mitigated under this alternative is based on the following calculation:

Total acres	x	% Impact	x	Mitigation Ratio	=	Acres
175	x	0.30	x	1.5	=	78.8

(Total acres = acres of wetlands within drawdown bands 1 and 2 outside of the UDB, but likely to

likely to be impacted by the West Wellfield.)

MDWASD understands that this acreage may vary depending upon the mitigation ratio assigned by DERM to the site selected for restoration.

Mitigation Alternative B

In the event that MDWASD can not participate in a cooperative land acquisition effort in South Dade County within two years of issuance of the Class IV permit, Mitigation Alternative B will be implemented. Under this alternative, MDWASD will make a contribution of \$1,299,375 to the Dade County Freshwater Wetland Mitigation Trust Fund for the restoration of 78.8 acres of land in the Hole-in-the-Donut. The current estimate of MDWASD's required contribution under Alternative B was derived using assumptions provided under the Bird Drive Everglades Basin Ordinance and Mitigation Plan, and is summarized as follows:

Total acres	x	% Impact	x	Dollars/Acre	=	Total
175	x	0.30	x	\$24,750	=	\$1,299,375

(Total acres = acres of wetlands within drawdown bands 1 and 2 outside of the UDB, but likely to be impacted by the West Wellfield.)

The MDWASD has been advised by DERM that the per acre contribution amount may change in the future; if this occurs, the total contribution amount may vary from that provided above.

Mitigation Alternative C

Mitigation Alternatives A and B represent two exclusive options. It is recognized that substantial interest in implementing Alternative A exists, but that implementation of this alternative within the two-year time period allowed by the Class IV permit may be infeasible. Alternative C has been proposed to serve as an intermediate course of action that may provide the County with greater flexibility in implementation of mitigation of impacts related to this wellfield. If substantial progress is made within the next two years toward development of a legal and state-approved mitigation bank within South Dade County, and if MDWASD can provide documentation of its level of involvement and contribution toward development of that regional mitigation bank, DERM has indicated that it may consider this for credit toward implementation of Alternative A. Under this alternative, an alternative schedule for completion of mitigation of the West Wellfield impacts may be negotiable. If an alternative schedule is not negotiated within the two-year period, however, implementation of Alternative B will be necessary.