



# Golden Environmental Corp.

Consulting Division

144 Calle Zirconia Urb. Los Prados Sur Dorado PR 00646

## JURISDICTIONAL DETERMINATION DORADO OFFICE PARK

JOSE EFRON AVENUE  
HUIGUILLAR WARD  
DORADO, PUERTO RICO

### SUBMITTED TO:

US ARMY CORPS OF ENGINEERS  
ANTILLES REGULATORY SECTION  
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## **1. INTRODUCTION**

Sociedad Especial Efrón Dorado, S.E. through its consulting engineer José E. Martínez is proposing the development of a 22 cuerdas parcel of land for the construction of an Office Park that consists of seven buildings, parking lots and accessory structures. The proposed parcel is located at Jose Efrón Avenue, south of State Road PR 693, on the Municipality of Dorado. (see Appendix 1. Location on Topographic Map).

The developer requested Golden Environmental Corp. to perform a Jurisdictional Determination for the above referenced parcel as recommended by the US Corps of Engineers (COE) on the letter dated May 4<sup>th</sup>, 2004.

## **2. SITE DESCRIPTION**

Currently, the land is abandoned. Surrounding the parcel there are several residential and commercial developments as the area is within the zone of urban expansion. The parcel abutting to the west was developed for residential purposes several years ago, to the south lays a remnant abutting road PR 6693 to the north lays "Quintas de Dorado" residential development and to the east a vacant lot. The parcel is covered mainly of herbaceous vegetation (mostly *Panicum maximum*) to the southern part and a few trees to the northeastern areas (mostly *Acrocomia media*).

The parcel topography is generally flat with contour lines from 6 to 8 meters above mean sea level (MSL) and the mean inundation level within a 100 years flood is 6.00 meters above MSL. Historically, the parcel has been used for cattle grazing.

## **3. METHODOLOGY**

### **a. Base Line Data**

Following the steps set forth in the U.S. Corps of Engineers Wetlands Delineation Manual (1987) essential baseline data was gathered for the referenced parcel. The following available data was compiled and analyzed:

- i. U.S.G.S. Topographical Quadrangle (Dorado Municipality)

- ii. U.S. Fish and Wildlife Service National Wetlands Inventory Maps (GIS).
- iii. U.S.G.S. Soil Survey Maps (GIS).
- iv. U.S.G.S. Hydric Soils of Puerto Rico.
- v. Flood Maps (FIRMS G.I.S.)
- vi. Historical and recent aerial photographs.
- vii. Hydrologic Study for the Prado Alto Development.

**b. Field Data Gathering Design**

Based on the information encountered during the baseline data analysis we decided to perform an Onsite Inspection and designed a field data gathering design as follows:

- i. The study area was analyzed based on the gathered data and several walk through sessions.
- ii. Establishment of a baseline (aprox. 1,140 feet) running parallel to the southern property line.
- iii. Establishment of three (3) transects perpendicular to the baseline running north into the property. Transects started at 183, 549 and 915 feet respectively from the southern property line.
- iv. A minimum of 4 plots were established along each transect at a maximum distance of 100 feet from each other, even if the up land area was reached. A total of 20 plots were examined. All plots were marked and numbered with a stake and flagging tape. At each plot a 30 feet radius was established if trees were present otherwise a 10 feet radius was established for the identification of shrubs and herbs. The percent of dominant species that were classified as OBL, FACW, of FAC was further determined and documented. In addition, a soil pit 16 inches deep was dig and observed in the center of every established plot regardless of the recorded vegetation. Finally, any indication of wetland hydrology was noted on the plot log.
- v. Once all plots were observed for the three wetland indicators, the compiled data was analyzed by itself and compared with the baseline data for a final wetland determination. The wetland boundaries were then plotted

on the development drawings for the COE's review and approval.

(see Appendix 4.,4b. Sampling Plots)

#### **4. BASELINE DATA**

##### **a. Topographical Quadrangle (TQ)**

The U.S.G.S Topographic Quadrangle for the Municipality of Dorado shows the elevation contours for the parcel as lines within 2 to 6 meters above mean sea level (MSL). It doesn't show any marsh or wetland symbols for the area. In terms of water bodies the TQ shows that a man made channel was dig running north to south into the property and then west out of the property. This channel used to run west all the way to the "Río la Plata". Now, a sanitary line coming out of "Quintas de Dorado" development diverts the waters south of road 6693. It seems that those channels used to serve water for agricultural endeavors and as drainage. No other significant features can be observed on the TQ.

(see Appendix 1. Topographic Map)

##### **b. U.S. Fish and Wildlife National Wetland Inventory (NWI)**

(see Appendix 5. NWI Map)

The NWI depicts a portion of the parcel (mostly at elevations lower than 7 meters above MSL) as part a of a Palustrine System (P\_EM1\_A\_) and (P\_EM1\_F) that includes all nontidal wetlands dominated by trees, shrubs, emergents, mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean derived salts is below 0.5 ppt. Wetlands lacking such vegetation are also included if they exhibit all of the following characteristics:

1. are less than 8 hectares ( 20 acres );
2. do not have an active wave-formed or bedrock shoreline feature;
3. have at low water a depth less than 2 meters ( 6.6 feet )in the deepest part of the basin;
4. have a salinity due to ocean-derived salts of less than 0.5 ppt.

All water bodies visible on the aerial photography that are less than 8 hectares (20 acres) in size are considered to be in the Palustrine System unless depth information is available, or unless an active wave-formed or bedrock shoreline feature is visible.

[EM] Emergent - Characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants.

(1) Persistent - Dominated by species that normally remain standing at least until the beginning of the next growing season. This subclass is found only in the Estuarine and Palustrine systems.

[A] Temporarily Flooded - Surface water is present for brief periods during growing season, but the water table usually lies well below the soil surface. Plants that grow both in uplands and wetlands may be characteristic of this water regime.

[F] Semipermanently Flooded - Surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land's surface.

**c. U.S.G.S. Soil Survey Maps (SS)**

(see Appendix 6. USGS Soil Survey Map)

The soil survey map for the parcel includes mostly one type of soil "Almirante clay sandy loam". This soil type is not included in the list of hydric soils of Puerto Rico as revised December 15<sup>th</sup>, 1995.

The Almirante series consists of very deep, well drained, moderately permeable soils on coastal plains and valleys. They formed in clayey sediments of mixed origin. Near the type location, the mean annual precipitation is 65 inches and the mean annual temperature is 78 degrees F. Slopes range from 2 to 12 percent.

**TAXONOMIC CLASS:** Very-fine, kaolinitic, isohyperthermic Plinthic Hapludox

**TYPICAL PEDON:** Almirante clay--Pangolagrass (Colors are for moist soil unless otherwise stated.)

**Ap**--0 to 7 inches; dark yellowish brown (10YR 4/4) clay; weak fine subangular blocky structure; friable; slightly sticky, slightly plastic; common fine roots; common quartz sand grains; common fine dark brown (10YR 3/3) concretions; very strongly acid; clear smooth boundary. (6 to 10 inches thick)

**Bt**--7 to 25 inches; strong brown (7.5YR 5/6) clay; weak medium subangular blocky structure; firm; slightly sticky, slightly plastic; common fine roots; few faint clay films on ped faces; few fine pores; common quartz sand grains; few fine dark concretions; common black (10YR 2/1) stains on surfaces of peds; very strongly acid; clear smooth boundary. (12 to 20 inches thick)

**Btv1**--25 to 40 inches; brownish yellow (10YR 6/8) clay; moderate medium subangular blocky structure; firm, sticky, plastic; few faint clay films on ped faces; few fine dark brown (10YR 3/3) concretions and dark stains; few fine quartz sand grains; about 8 percent, by volume, plinthite; common medium distinct dark red (10R 3/6) masses of iron accumulation; very strongly acid; gradual smooth boundary.

**Btv2**--40 to 60 inches; about 33 percent dark red (10R 3/6), 33 percent brownish yellow (10YR 6/8) and 34 percent light gray 5Y 7/1) clay; weak medium subangular blocky structure; firm; sticky, plastic; few faint clay films on ped faces; few quartz sand grains; about 15 percent, by volume, plinthite; the areas in shades of red and yellow are masses of iron accumulation and the areas in shades of gray are iron depletions; very strongly acid.

**TYPE LOCATION:** San Juan SCD, Puerto Rico; approximately 40 feet north of kilometer marker 0.6 on highway 694 in the township of Dorado.

**RANGE IN CHARACTERISTICS:** Solum thickness is more than 60 inches. Depth to non-indurated plinthite ranges from 20 to 40 inches. Reaction ranges from extremely acid to strongly acid throughout.

The A or Ap horizon has hue of 5YR to 10YR, value of 3 or 4, and chroma of 2 to 4. Texture is sandy clay loam, sandy clay, or clay.

The Bt horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. Texture is clay.

The upper part of the Btv horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. Redoximorphic accumulations in shades of yellow or red range from few to common. Plinthite ranges from 5 to 20 percent, by volume. Texture is clay.

The lower part of the Btv horizon has no dominant color and is multicolored in shades of brown, red, yellow, and gray. Plinthite ranges from 5 to 20 percent, by volume. Texture is clay.

**COMPETING SERIES:** There are no other known series in the same family.

**GEOGRAPHIC SETTING:** Almirante soils are in coastal plains and in valleys between the limestone hills (haystacks or mogotes). Slopes range from 2 to 12 percent. They formed in fine textured sediments of mixed origin. These are known locally as coastal plains clays or tertiary clays. The climate is humid tropical. The average annual precipitation ranges from 60 to 70 inches and the average annual temperature ranges from 77 to 79 degrees F.

**DRAINAGE AND PERMEABILITY:** Well drained; moderate permeability.

**USE AND VEGETATION:** Most areas are used for the production of sugarcane, food crops, pineapple and grasses. The vegetation consists of native and introduced species.

**DISTRIBUTION AND EXTENT:** Humid coastal plains of Puerto Rico. The series is of moderate extent.

**d. Flood Maps (FM)**

The flooding map for the area includes part of the property as subject to flooding on 100 years events at a level of 6 meters m.s.l. (see Apendix 7. Flooding Zones Map)

**e. Historical and recent aerial photographs.**

- i. A 1971 PR Highway Authority (ACT) aerial photograph shows that area was completely deforested and covered by pastures. The small channel that crosses trough the property is still visible.
- ii. A 1981 PR Highway Authority (ACT) aerial photograph shows that area was still completely deforested and covered by pastures. The small channel that crosses trough the property is less visible and mostly limited to the southwestern part of the property.

- iii. The most recent aerial photograph taken January 28, 2004 by the Highway Authority (ACT) shows that there are no visible channels and there’s emerging vegetation. It also shows the extent on the sanitary duct coming out of Quintas de Dorado development towards road 6693. This promontory limits the natural flow of superficial water towards the “Caño” that serves Río la Plata. The small wetland area within the property is clearly visible.

**5. FIELD GATHERED DATA**

- a. As designed, 3 transects were established with 4,5 and 11 plots respectively for a total of 20 plots. The following table resumes the information gathered on the plots (see appendix 9. Data Forms):

<b>Plot #</b>	<b>Hydrophytic vegetation</b>	<b>Wetland hydrology</b>	<b>Hydric soils</b>
1a	NO	YES	NO
1b	NO	NO	NO
1c	NO	NO	NO
1d	YES	NO	NO
2a	YES	NO	NO
2b	NO	NO	NO
2c	NO	NO	NO
2d	YES	NO	NO
2e	NO	NO	NO
<b>3a</b>	<b>YES</b>	<b>YES</b>	<b>YES</b>
3b	NO	NO	NO
3c	NO	NO	NO
3d	NO	NO	NO
3e	NO	NO	NO
3f	YES	NO	NO
3g	YES	NO	NO
3h	YES	NO	NO
3i	YES	NO	NO
3j	NO	NO	NO
3k	NO	NO	NO

## **6. CONCLUSION**

As shown on the historical and recent aerial photographs, the project area has suffered several hydrological changes during the last 25 years. It isn't clear if wetland vegetation existed prior to the hydrology changes. Anyhow, the construction of State Road 6693 and the construction of the sewer line from Quintas de Dorado has limited the natural flow of water out of the property. This situation has formed wet conditions on the southern part of the property.

Although the mapped soil for the project area is not included in the list of hydric soils for Puerto Rico, a small area within the property (Aproximately .920 acres) has been inundated for a period long enough as to effectively maintain wetland vegetation and hydrology (plot 3a). The rest of the parcel to be developed fails to meet the required wetland indicators and is considered upland. The delineated wetland area is linked to the segment of the parcel with topography below the 2.0 meters above m.s.l line.

Appendix 8.,8b. "Determined Wetland Area" shows the extent of the existing wetland area.

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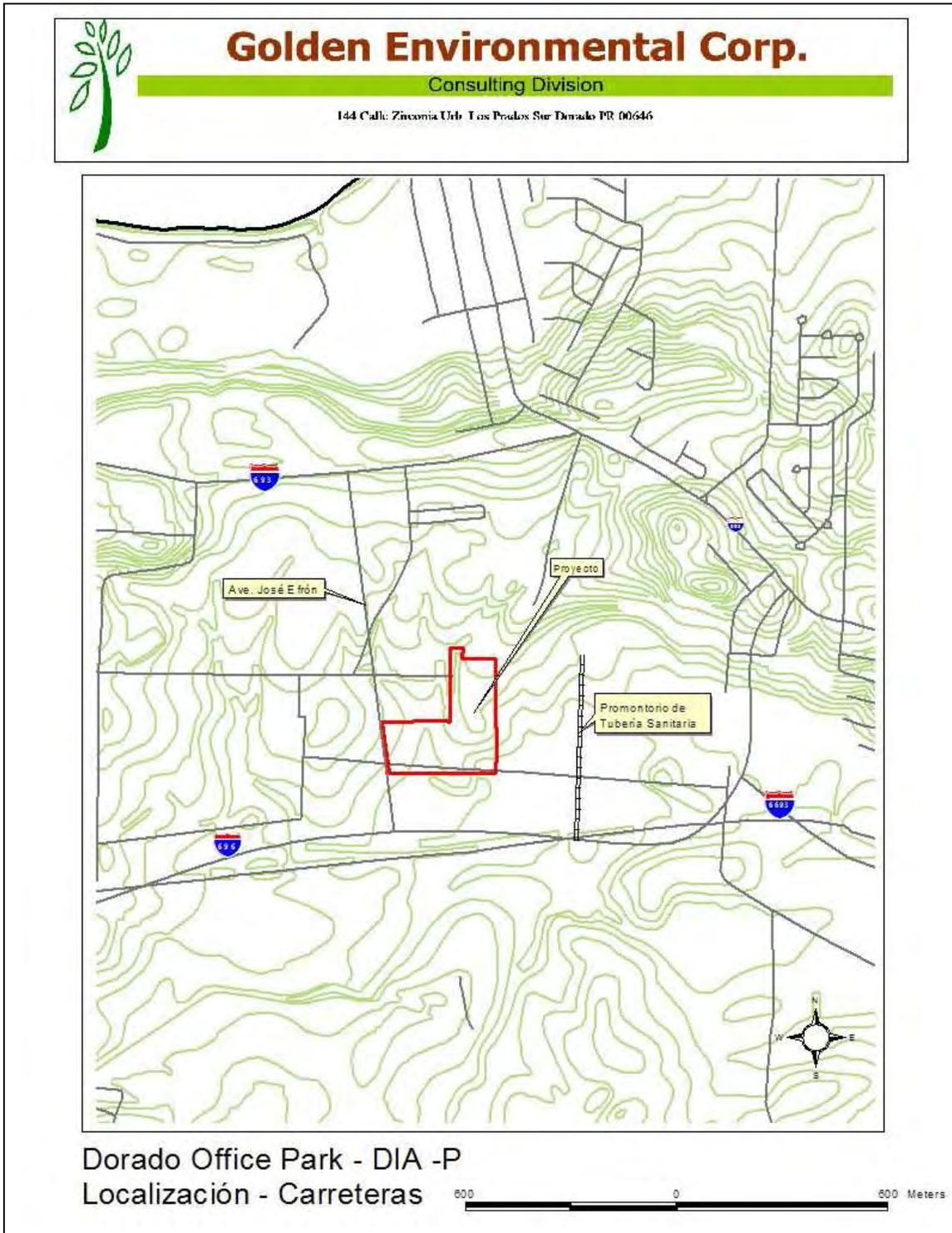
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USDA, NRCS. 2003 **Field Indicators of Hydric Soils in the Unites States**, Version 5.01. G.W. Hurt, P.M. Whited, and R.F. Pringle (eds). USDA, NRCS in Cooperation with the National Technical Committee for Hydric Soils, Fort Worth, TX.

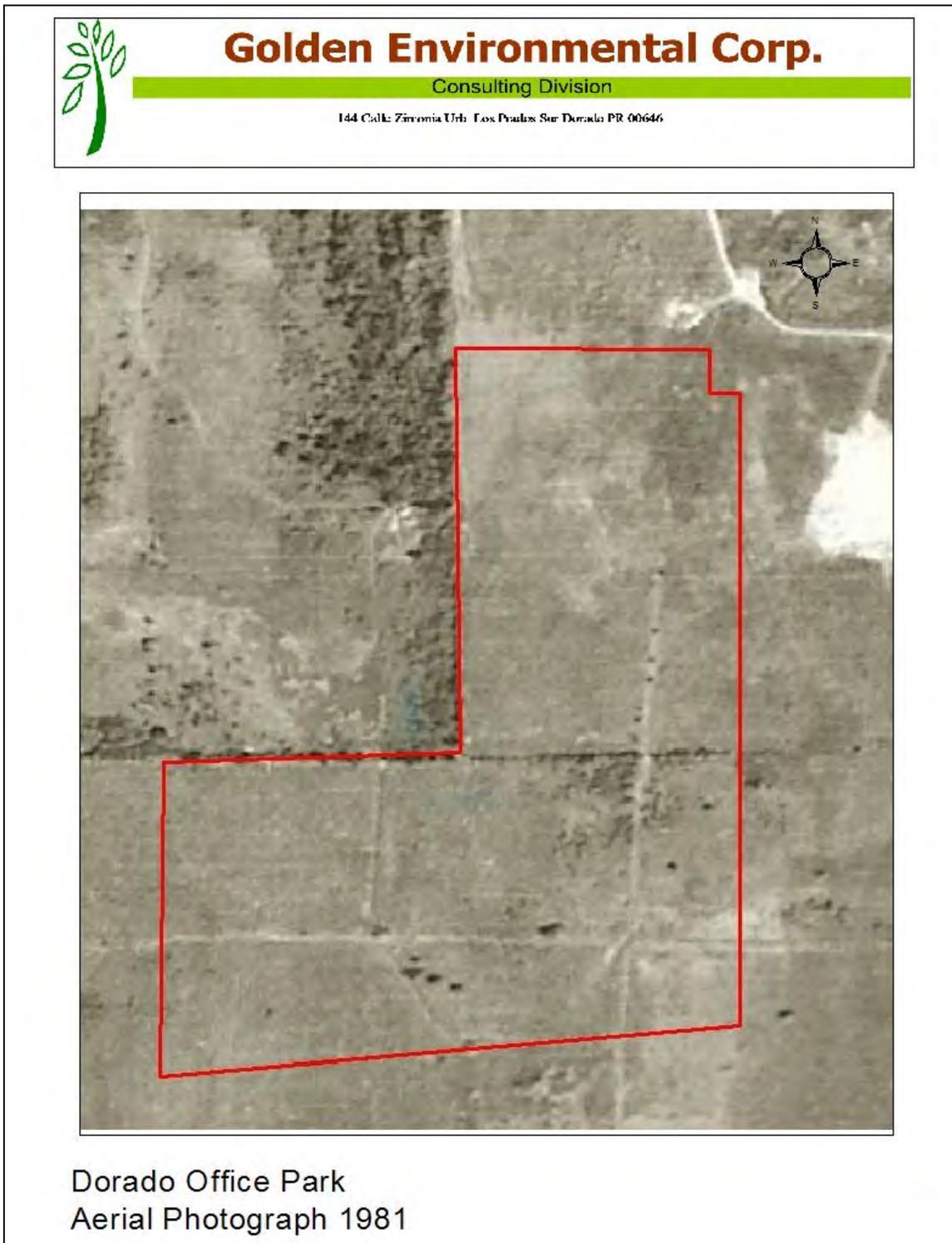
Appendix 1. Topographic Map



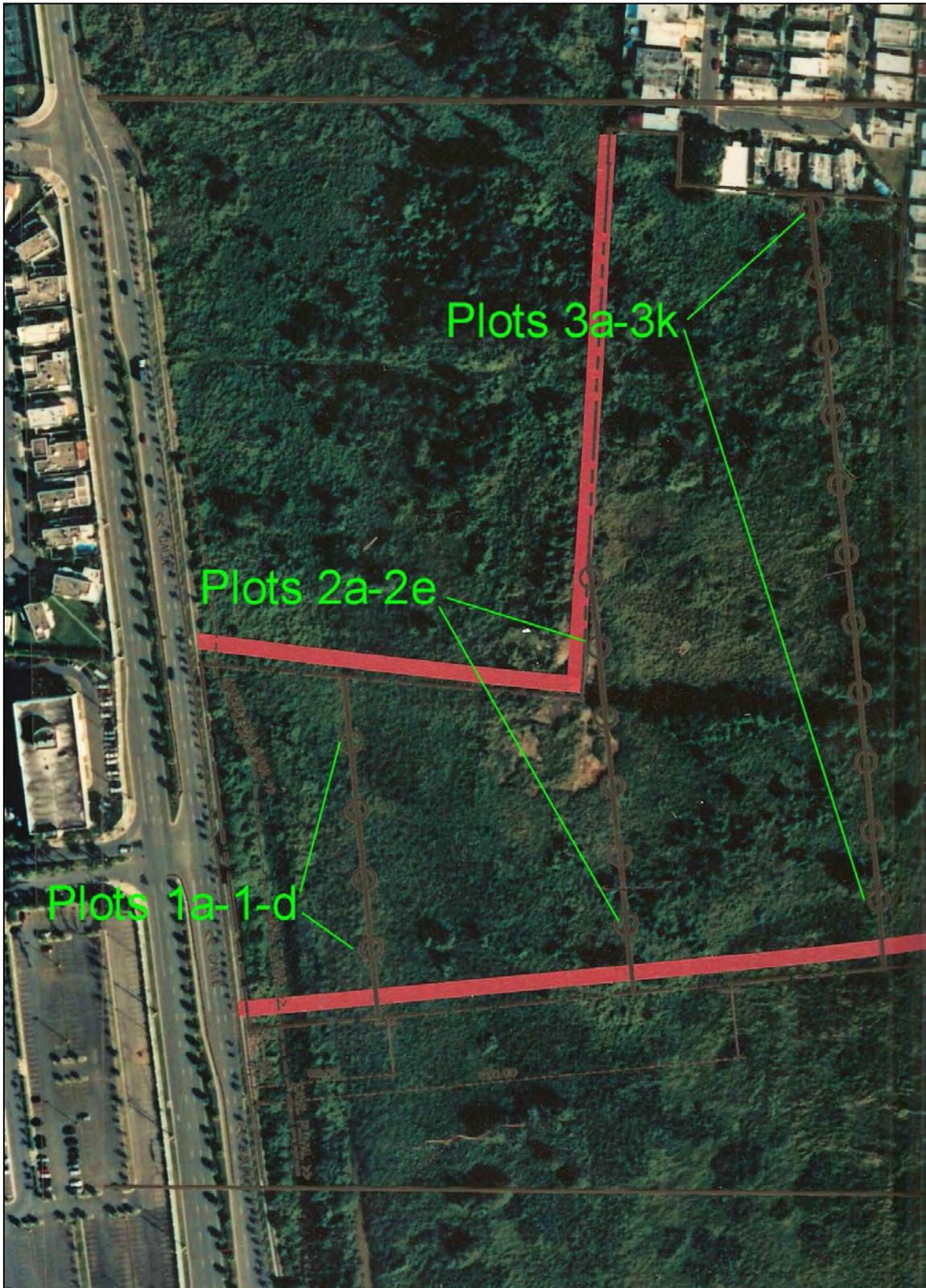
Appendix 2. 1971 Aerial Photograph



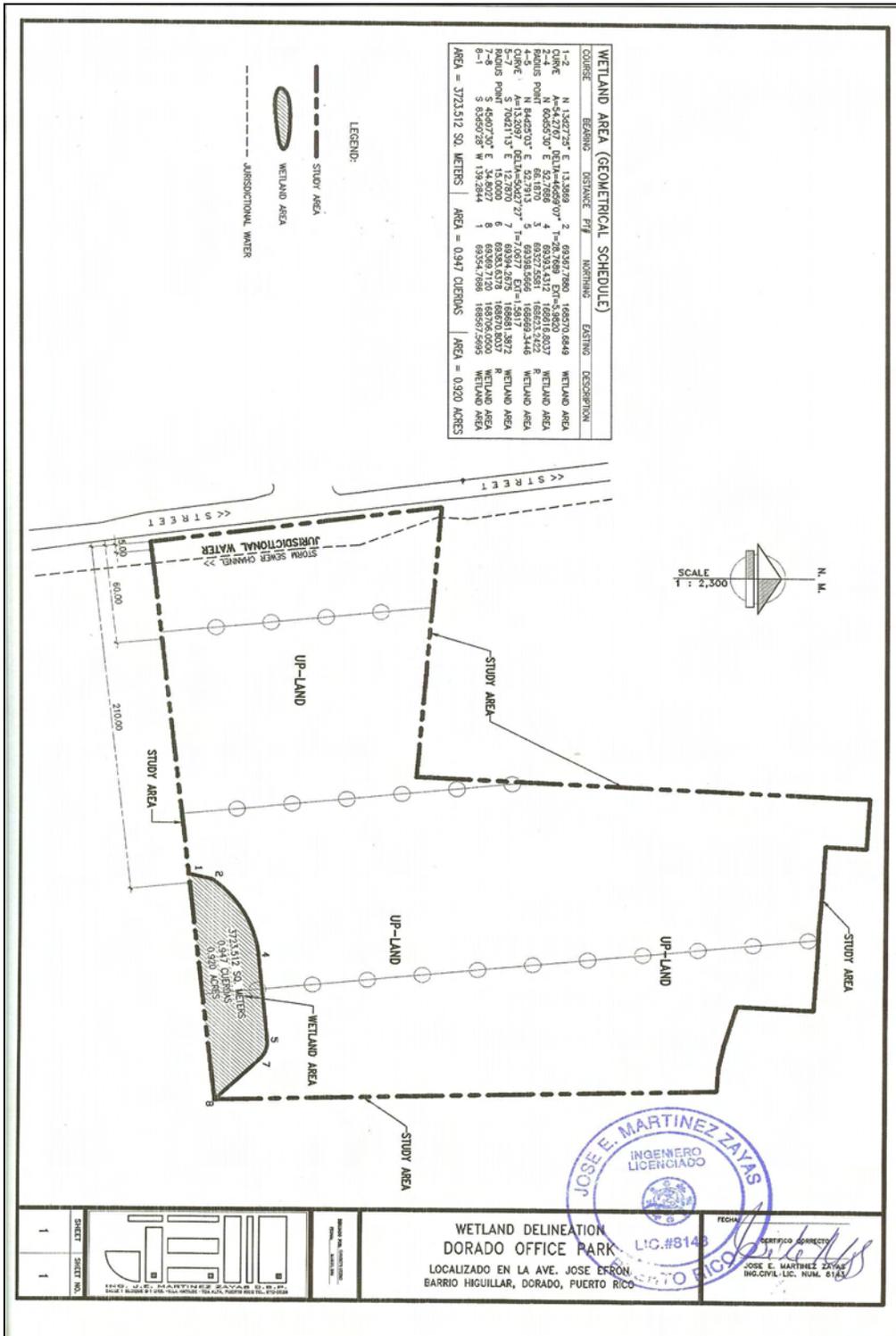
Appendix 3. 1981 Aerial Photograph



Appendix 4. Sampling Plots (Aerial Photograph 2004)



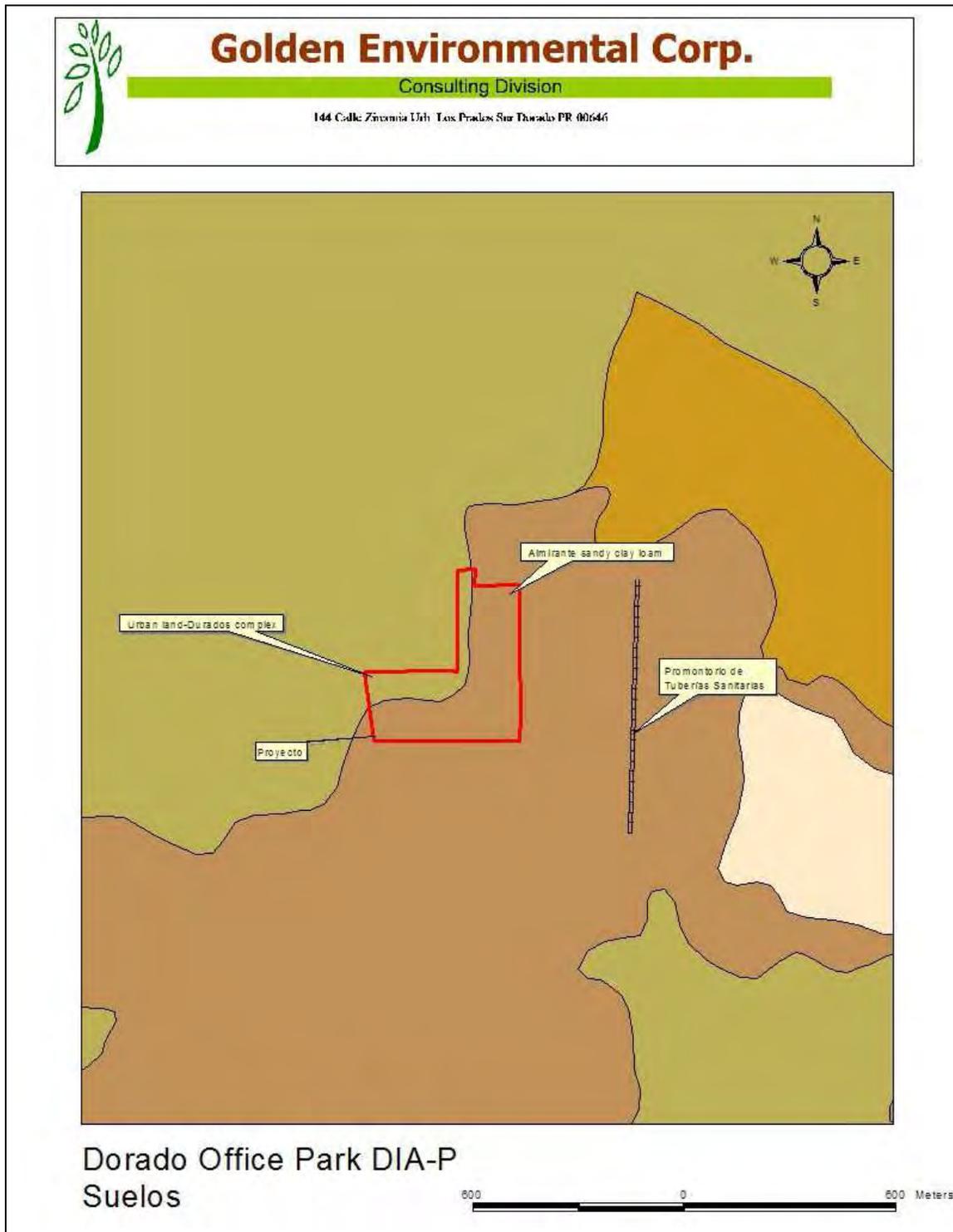
Appendix 4b. Sampling Plots (Geometric)



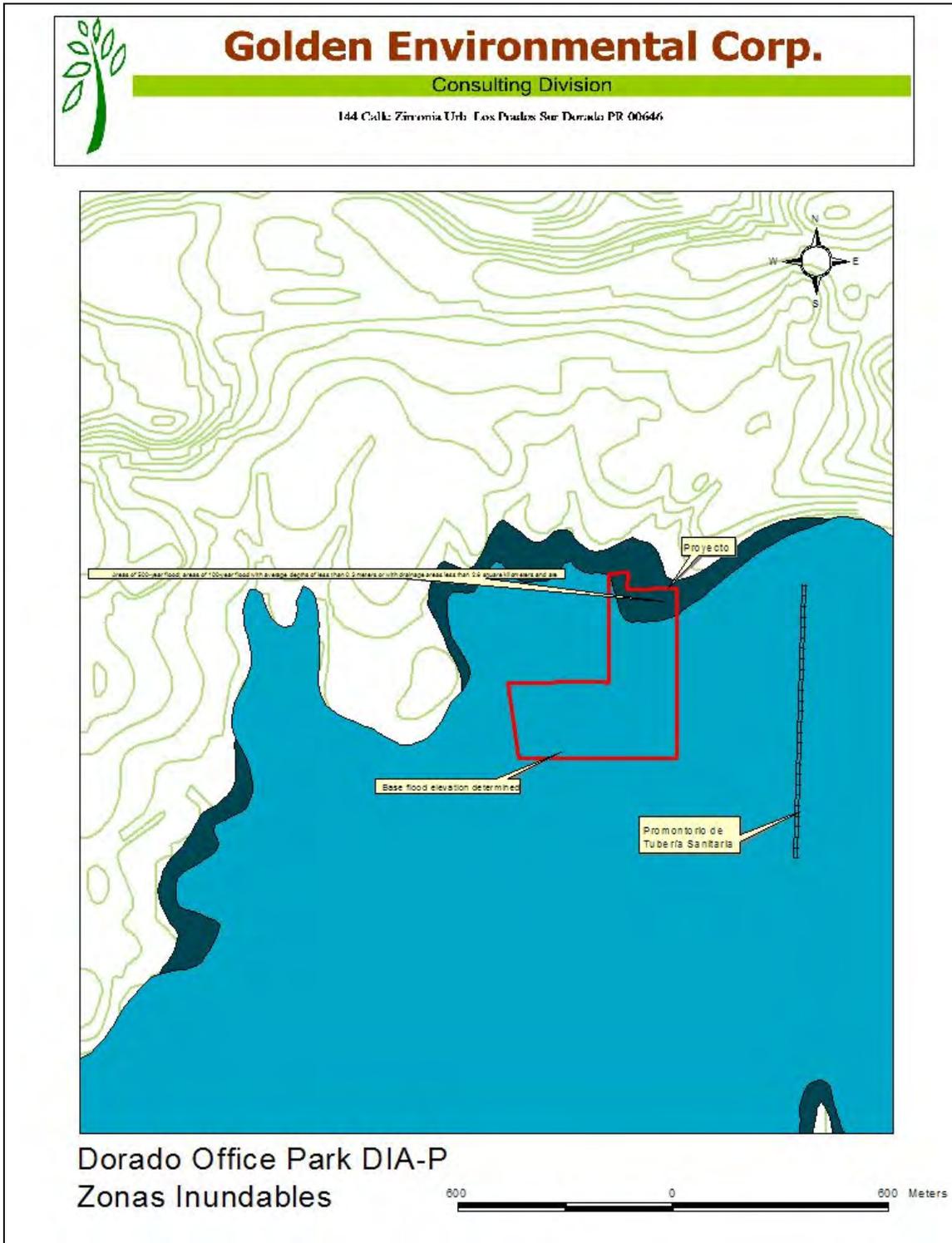
Appendix 5. NWI Map



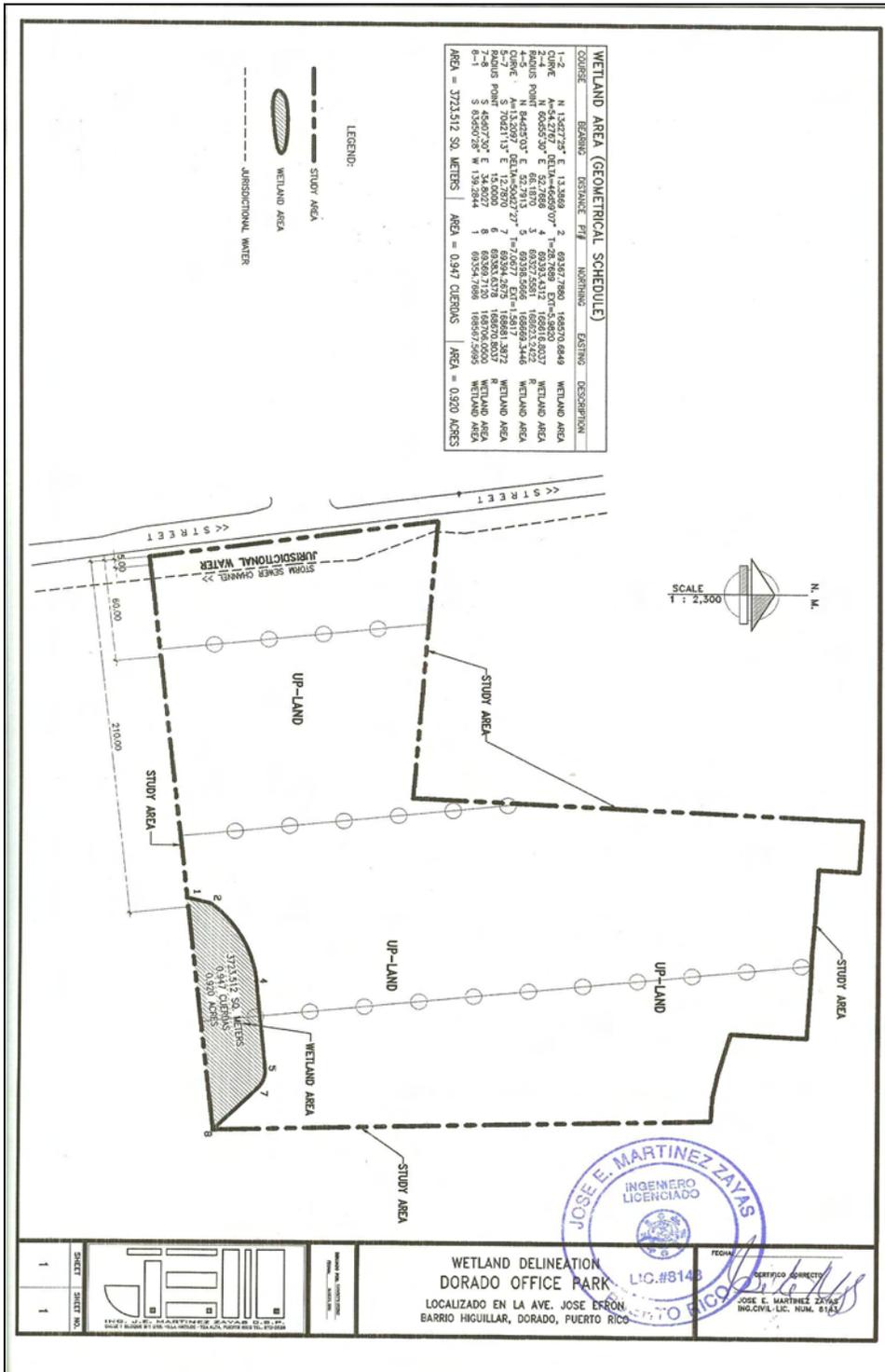
Appendix 6. USGS Soil Survey Map



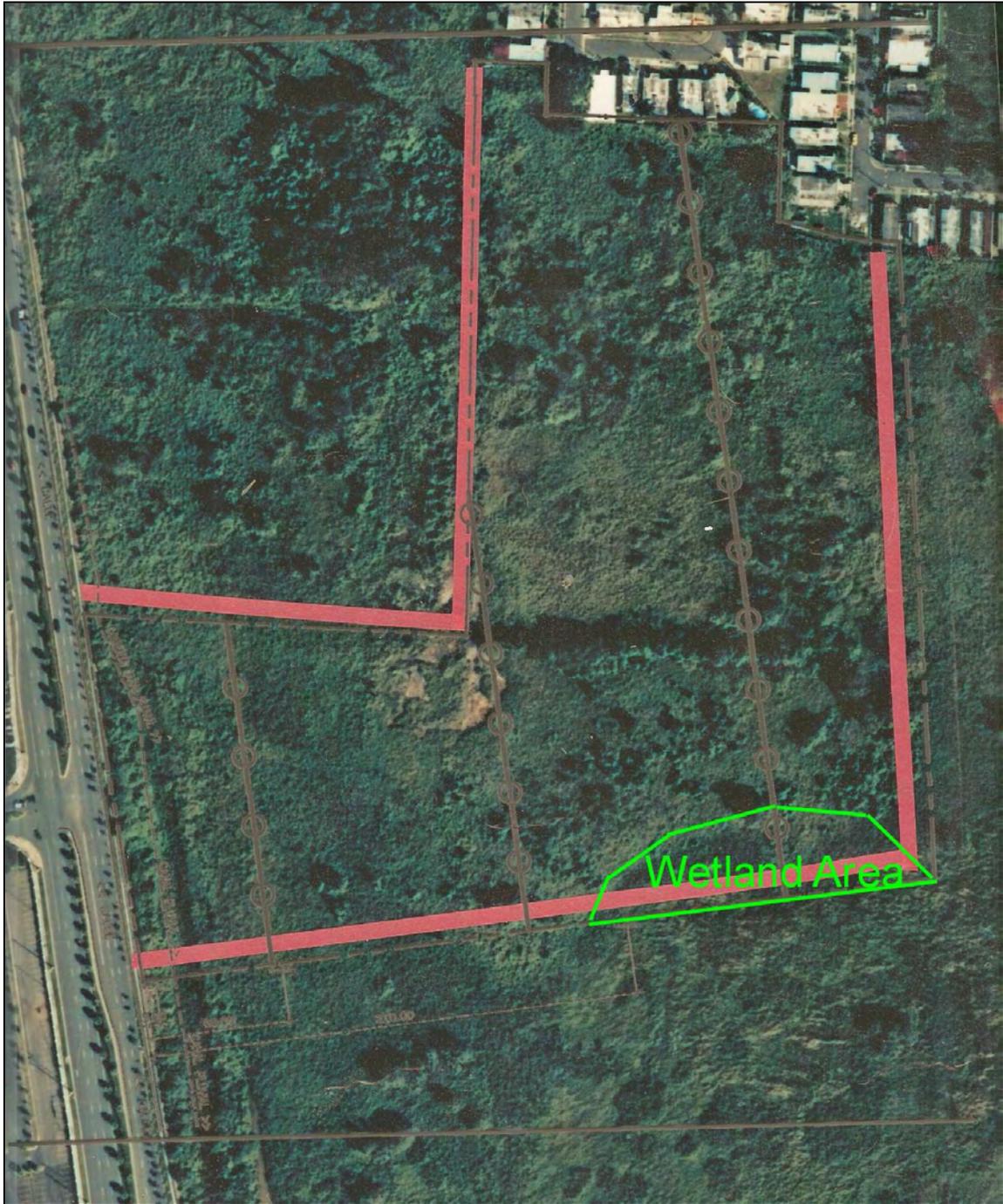
Appendix 7. Flooding Zones Map



Appendix 8. Determined Wetland Area



Appendix 8b. Determined Wetland Area (Aerial Photograph)



Appendix 9. Data Forms