APENDICE E

Estudio Jurisdiccional de Humedales

Noviembre 2010

Declaración de Impacto Ambiental – Preliminar

Planta de Generación de Energía Renovable y Recuperación de Recursos

BARRIO CAMBALACHE DE ARECIBO

EnergyAnswers Arecibo

Wetland Jurisdictional Determination Study

Preliminary Environmental Impact Statement

Renewable Power Generation and Resources Recovery Facility

CAMBALACHE - ARECIBO

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1 EXECUTIVE SUMMARY

Energy Answers International has retained the services of CSA Group, Inc. / CSA Architects & Engineers (CSA) to conduct a Jurisdictional Wetland Determination Study (the Study) in a property totaling **78.95 acres** (**81.30 cuerdas**) in Cambalache Ward of the Municipality of Arecibo. A Renewable Power Generation and Resources Recovery Facility project (The Project) is been proposed at the site and is designed to (i) process approximately 2,100 tons per day (TPD) of process refuse fuel (PRF), (ii) shred MSW into PRF, (iii) combust PRF, and (iv) generate approximately 80 MW of electricity. In addition, a section of the adjacent Old Central Cambalache Sugar Mill property owned by the Puerto Rico Land Authority was also surveyed in order to determinate the presence of jurisdictional wetlands. This area is being proposed to install a power line that would connect the Project to the Central Cambalache sub station and enter the main electrical grid. For the raw water, required for the proposed project, the line alignment will run adjacent to highways PR-2, PR-6681 and PR-681, until connect to the El Vigía pump station of the Department of Natural and Environmental Resources, locate at Islote ward. Appendix 1 shows the location of the Project area, power and raw water force lines alignment on an aerial photograph.

The Study was conducted by Biol. José A. Salguero-Faría and technician Melvin Morales; both from CSA visited the site on March 3 and 5, 2010 and conducted a complete site reconnaissance in order to assess the potential presence of areas that may be considered as Jurisdictional Wetlands. The Central Cambalache site was visited by Biol. María L. Rivera, also from CSA, and technician Melvin Morales on August 30 and September 3, 2010. On September 3, 2010 the offsite area for the raw water force line alignment was also visit for wetlands inspection. Pursuant to section 404 of the Clean Water Act, any actions which may impact jurisdictional wetlands (those that comply with the three criteria of hydric soils, hydric vegetation and hydrology, as described in the U.S. Army Corps of Engineers' 1987 Wetland Delineation Manual) or water bodies considered as U.S Waters must be consulted with the USACE through a Joint Permit.

The proposed site demonstrates typical condition of abandoned industrial areas in which herbaceous plant species, mostly grasses and vines, the semi woody invasive shrub *Mimosa pigra* and *Ricinus communis* dominate the landscape. Woody species are present as small

clusters throughout the property, especially along the southern and western borders of the site and along the Rio Grande de Arecibo River and other man-made abandoned canals (ditches). Offsite areas, considered for power interconnection and raw water force line alignment, were also evaluated for jurisdictional wetlands. The Old Central Cambalache site, proposed for power interconnection alignment, presents a cover of herbaceous flora, with the Guinea grass as dominant species. Alongside raw water force line alignment, the vegetation is typical of urban and impacted areas at the highways PR-2 and PR-681. All the ground alongside the highway PR-2 is cover of common herbs and shrubs with some exotic trees, as tall albizia (*Albizia procera*) and Indian almond (*Terminalia catappa*). At PR-681 mangrove trees can be seen behind herbs and shrubs at canal shore. Also, other mangrove associated vegetation, as inland leatherfern (*Acrosticum danaeifolium*), can be observed inside the channel along the east side of highway PR-681.

The National Wetland Inventory prepared by the U.S. Fish and Wildlife Service (NWI) identifies a series of wetlands within the property and offsite areas which are described as palustrine forested patches and evergreen shrublands (see Appendix 2 for the NWI map of the area) and are classified as follows:

- ***PSS3C*** – Palustrine broad leaved evergreen scrub-shrub seasonally flooded. These are identified as forming a fringe in the Eastern border of the Río Grande de Arecibo and the western edge of project property.
- ***PEM1A*** – Palustrine emergent persistent temporarily flooded. The NWI indicates that these are located throughout the most of project and Old Central Cambalache property.
- ***PFO3A***- Palustrine broad leaved evergreen forest temporarily flooded. The NWI identifies this wetland in the center of project property and at Old Central Cambalache property.
- ***SS3A*** –Broad leaved evergreen scrub-shrub temporarily flooded. This wetland is associated to PEM1A and has been identified in the NWI throughout most of project and Old Central Cambalache property.
- ***E1UBL*** – Estuarine subtidal unconsolidated bottom. This classification refers to the Río Grande de Arecibo section that runs within the study area.

- ***E2FO3M*** – Estuarine intertidal broad-leaved evergreen forest irregularly exposed. The NWI identifies this wetland at a section of PR-681 road, around the Arecibo Nautical Club property.

During the field site inspection of 18 borings (pits) to a depth of 18 inches it was concluded that the areas identified in the NWI as wetlands do not meet the three criteria to be classified as jurisdictional wetland (please refer to Appendix 3). On the other hand, the property contains approximately 2.42 acres of U.S. Waters which includes approximately 1,191.1 linear meters of unused canals (1.48 acres) and 0.94 acres of an overflow area where the canals interconnect. The canals and overflow drain into the Río Grande de Arecibo through a short canal on the north central border of the property and are assumed that the U.S. Army Corps of Engineers would considered them as Waters of U.S. These canals were part of the water system associated to the manufacturing process and of the stormwater discharge management.

2 INTRODUCTION

Energy Answers International has retained the services of CSA Group, Inc. / CSA Architects & Engineers (CSA) to conduct a Jurisdictional Wetland Determination Study (the Study) in a property totaling **78.95 acres** (**81.30 cuerdas**) in Cambalache Ward of the Municipality of Arecibo. A Renewable Power Generation and Resources Recovery Facility project (The Project) is been proposed at the site and is designed to (i) process approximately 2,100 tons per day (TPD) of process refuse fuel (PRF), (ii) shred MSW into PRF, (iii) combust PRF, and (iv) generate approximately 80 MW of electricity. In addition, a section of the adjacent Old Central Cambalache Sugar Mill property owned by the Puerto Rico Land Authority was also surveyed in order to determinate the presence of jurisdictional wetlands. This area is being proposed to install a power line that would connect the Project to the Central Cambalache sub station and enter the main electrical grid. For the raw water, required for the proposed project, the line alignment will run adjacent to highways PR-2, PR-6681 and PR-681, until connect to the El Vigía pump station of the Department of Natural and Environmental Resources, locate at Islote ward. Appendices 1 and 2 show the location of the Project area and the offsite facilities associated to proposed project on topographic map and an aerial photograph, respectively.

2.1 Property (Site) Description

The Project site is located in the north coast of Puerto Rico in the Cambalache Ward in the Municipality of Arecibo. The property comprises of approximately **78.95 acres** (**81.30 cuerdas)**. The main access to the property is through State Road PR-2, which can be accessed by State Road PR-22 or by State Road PR-10. The property is located in 18°27'32.73"N 066°42'11.71"W; and part of the property was used in the past as a Paper mill.

According to the Puerto Rico Planning Board (PRPB) Zoning Map for the Municipality of Arecibo the Property has been designated as Residential District 0 ("Residencial Cero*", R-0,* by its Spanish acronym) and as Limited Heavy Industrial District ('Industrial Pesado Limitado*", IL-2,* by its Spanish acronym). According to Puerto Rico Zoning Regulation # 4 (December 2008), an R-0 district is now included in the new UR District (Terrenos Urbanizables), except those that have been developed or that given their particular characteristics are not apt for urban development (agricultural lands, lands with important natural resources, etc.). The UR district

has been established to control urban expansion or growth, optimize the use of infrastructure, and identified land classified as Urbanizable Land (Suelos Urbanizables). An IL-2 district is set for heavy industrial facilities either developed or to be developed that require a special location due to their uses which include elaboration, fabrication, treatment, processing, and refinement of products.

The proposed site demonstrates typical condition of abandoned industrial areas in which herbaceous plant species, mostly grasses and vines, the semi woody invasive shrub *Mimosa pigra* and *Ricinus communis* dominate the landscape. Woody species are present as small clusters throughout the property, especially along the southern and western borders of the site and along the Rio Grande de Arecibo River and other man-made abandoned canals (ditches). Offsite areas, considered for power interconnection and raw water force line alignment, were also evaluated for jurisdictional wetlands. The Old Central Cambalache site, proposed for power interconnection alignment, presents a cover of herbaceous flora, with the Guinea grass as dominant species. Alongside raw water force line alignment, the vegetation is typical of urban and impacted areas at the highways PR-2 and PR-681. All the ground alongside the highway PR-2 is cover of common herbs and shrubs with some exotic trees, as tall albizia (*Albizia procera*) and Indian almond (*Terminalia catappa*). At PR-681 mangrove trees can be seen behind herbs and shrubs at canal shore. Also, other mangrove associated vegetation, as inland leatherfern (*Acrosticum danaeifolium*), can be observed inside the channel along the east side of highway PR-681.

2.2 PURPOSE OF THE STUDY

The purpose of this study was to identify, delineate and estimate the jurisdictional wetland areas within the proposed site for the Renewable Power Generation and Resources Recovery Facility and the offsite areas. Wetlands are a subset of Waters of the United States and are defined as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (USACE, 1987). The Section 404 of the Clean Water Act authorizes the Secretary of the U.S. Army to regulate discharges of dredged or fill material into Waters of the United States. Under this definition and current regulation, three (3) criteria must be met to declare an area as a wetland. These criteria are hydrophytic vegetation (wetland vegetation), wetland hydrology and hydric soils. In addition, the USACE has the authority to permit work and the placement of structures in Navigable Waters of the U.S. under Section 9 and 10 of the Rivers & Harbors Act. This study was mainly based on the National Wetland Inventory Map (NWI) of the Fish & Wildlife Service (FWS) for the Municipality of Arecibo and field visits.

3 METHODOLOGY

A four-step approach was used for the JD in the study area and off sites. These steps include gathering available data, performing preliminary field visits, performing determination field visits and analysis of the data collected. The approach followed the Routine Determination of an onsite inspection method described in the Corps of Engineers Wetland Delineation Manual (1987) for areas greater than five acres.

The first step of the study was a screening level analysis to identify those areas within the potential impact zone of the Project that comprises jurisdictional wetlands under Section 404 of the Clean Water Act. The screening analysis was performed using a Geographic Information System (GIS) loaded with the following data for the region:

- Soil series
- Hydrology
- Topography
- Flood zones
- National Wetland Inventory (NWI)

The data gathered provided specific and relevant information on the possible location of wetland sites.

The second step of the study was a series of preliminary site visits to the wetland areas identified during the first step. During these visits, the data gathered was validated. These visits also provided a better understanding of the wetland conditions and locations in order to develop a fieldwork plan for the site. During these preliminary visits, wetlands included in the NWI were identified as potential jurisdictional wetlands.

The third step of the study included the determination field visits to map the jurisdictional wetlands/U.S. Waters within the Project and the off-site section of the Old Central Cambalache property. Each delineation visit consisted of sample collection and description of the site's hydrology, soils, and dominant vegetation around representative sample locations. The following tasks were carried out during this step:

- Establishment of the sampling areas.
- Visual inspection of the site and identification of landscape features.

- Identification of plant communities at the area, using the 1987 Revision to the National List of Plant Species (Region C) that occurs in Wetlands (USACE 1987) . Samples of plant species were collected for further identification based on, Liogier (1988), Acevedo-Rodríguez (2003), Más and García-Molinari (2006), Liogier and Martorell (1999), Acevedo-Rodriguez and Strong, and Little and Wadsworth (1989).
- Selection of a representative area within each plant community to dig a soil pit.
- Identification of dominant plant species from the various strata within a 30-feet radius of the soil pit.
- Soil classification using Munsell Soil Charts (Gretag/Macbeth, 1994).
- Description of the hydrology description around and within the soil pit. Hydrologic conditions were supported using the hydrographic, flood, and topography data for the area, and visual observations.
- Photographic documentation of the site, soil pits, and vegetation.
- Collection of soil and plant samples for future reference.
- Writing the Data Forms for Routine Wetland Determination.
- Global Positioning System (GPS) documentation of sampling points, using an e-*Trex-Legend C Garmin* unit, which operates using the Puerto Rico and U.S. Virgin Island NAD 83 coordinate system.
- Wetland delineation.

The fourth step of the study comprised the final analysis of the data gathered during the delineation visits, and the development of the maps and report. Final jurisdictional wetland determination was based on the combination of all the available evidence. Fieldwork on the proposed site was performed during March 2010. Additional fieldwork at Central Cambalache property was performed during August and September 2010. All sampling points were georeferenced using Global Positioning Systems which operates using Puerto Rico and U.S. Virgin Islands NAD 83 coordinate system.

4 DESCRIPTION OF THE AREA

The study area is located in the alluvial floodplain of the Rio Grande de Arecibo at Cambalache Ward in the Municipality of Arecibo. Most of the study area is dominated by a flat topography. According to Ewel & Whitmore (1973), the study area is located within the boundaries of the Subtropical Moist Forest (SMF) life zone. This life zone covers 58% of Puerto Rico. Most of the SMF area has been deforested at some point in time, primarily because the area encompasses good conditions for a wide variety of uses, especially agriculture and cattle grazing. Epiphytes are common, and could cover the branches and trunks of woody species. Grasses in both, natural and improved pastures, form the dominant landscapes in the SMF.

4.1 WETLAND HABITAT CLASSIFICATION (USFWS) AND VEGETATION INDICATORS

The US Fish and Wildlife Service (USFWS) Online Wetland Mapper[1] system identifies wetland systems included in the National Wetland Inventory (NWI) in the project area and vicinity. These areas include estuarine, forested (woody) and scrub-shrub wetlands within the Project site and utilities infrastructure alignments (See Appendix 5). The presence of most of these wetland systems was not confirmed during field visits on March 3-5, 2010 to the Project area; nor at the Old Central Cambalache property visited on August 30 and September 3, 2010. The only areas consistent with the NWI information are the estuarine wetland (E1UBL) which is confined to the Río Grande de Arecibo channel and is located outside the project area, and the estuarine intertidal (E2FO3M) which can be observed at northwest side of the PR-681 as well an inland area at northeast of the same highway. No other potential wetland areas were observed during the site visit. Following is a brief description and definition of the wetland classification and definitions observed in the RRF Site according to the USFWS:

- ***PSS3C*** – Palustrine broad leaved evergreen scrub-shrub seasonally flooded. These are identified as forming a fringe in the Eastern border of the Río Grande de Arecibo and the western edge of project property.

[1] http://wetlandsfws.er.usgs.gov/wtlnds/launch.html

- ***PEM1A*** – Palustrine emergent persistent temporarily flooded. The NWI indicates that these are located throughout the most of project property and Old Central Cambalache property.
- ***PEM1C*** – Palustrine emergent persistent seasonally flooded. The NWI indicates that this wetland is located at the southeast of the highway PR-681 and east of the PR-6681.
- ***PFO3A***- Palustrine broad leaved evergreen forest temporarily flooded. The NWI identifies this wetland in the center of project property and at Old Central Cambalache property.
- ***SS3A*** –Broad leaved evergreen scrub-shrub temporarily flooded. This wetland is associated to PEM1A and has been identified in the NWI throughout most of project and Old Central Cambalache property.
- ***E1UBL*** – Estuarine subtidal unconsolidated bottom. This classification refers to the Río Grande de Arecibo section that runs within the study area.
- ***E2FO3M*** – Estuarine intertidal broad-leaved evergreen forest irregularly exposed. The NWI identifies this wetland at northwest side of the PR-681 and at the west side of Arecibo Nautical Club, as well an inland area at northeast of the same highway.

Wetland habitats classifications were prepared through conventional photo-interpretation techniques using mid to high altitude aerial photographs during the 1970's (Tiner, 1999). Some of the classifications of NWI map may vary due to the changes that have taken place during the last years such as earth movements, industrial activities, illegal dumping, residential developments and other (see Appendix 5).

Wetland Vegetation was classified using the National List of Wetland Vegetation, Region C of 1988. The Regional Indicators express the estimated probability (likelihood) of a species occurring in wetlands versus non-wetlands in the region. Regional Indicators reflect the unanimous agreement of the Regional Interagency Review Panel. For the wetland analysis we use the indicators categories as described on Table 1 above.

Table 1: Indicator Categories used for the Wetland Plant Analysis.

Indicator Code	Wetland Type	Comment
OBL	Obligate Wetland	Occurs almost always (estimated probability 99%) under natural conditions in wetlands.
FACW	Facultative Wetland	Usually occurs in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands.
FAC	Facultative	Equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%).
FACU	Facultative Upland	Usually occurs in non-wetlands (estimated probability 67%-99%), but occasionally found on wetlands (estimated probability 1%-33%).
UPL	Obligate Upland	Occurs in wetlands in another region, but occurs almost always (estimated probability 99%) under natural conditions in non-wetlands in the regions specified. If a species does not occur in wetlands in any region, it is not on the National List.
NA	No agreement	The regional panel was not able to reach a unanimous decision on this species.
NI	No indicator	Insufficient information was available to determine an indicator status.
NO	No occurrence	The species does not occur in that region.

4.2 BACKGROUND FLORA AND FAUNA AT THE PROJECT SITE

As part of the environmental studies undertaken as part of the preparation of an Environmental Impact Statement the flora and fauna of project area was studied by CSA Group (2010). Below is a summary of the results from that Terrestrial Flora and Fauna study.

The proposed site demonstrates typical condition of abandoned industrial areas in which herbaceous plant species, mostly grasses and vines, the semi woody invasive shrub *Mimosa pigra* and *Ricinus communis* dominate the landscape. Woody species are present as small clusters throughout the property, especially along the southern and western borders of the site and along the Rio Grande de Arecibo River and other man-made abandoned ditches. In total 159 plant species were identified at project site, the Old Central Cambalache property and lands where raw water force line will pass through. All plants are common species of widespread distribution in the island, which are associated to abandoned fields near large rivers and coastal

floodplains, and none are considered as critical elements, threatened or endangered. A complete list of the plant species is included in the full Flora and Fauna report.

The fauna of the site is also composed of common species with wide distribution in the island of Puerto Rico. Fifty seven (57) species have been recorded in the area of which 45 are birds. Among the most common bird species in the study area are the Bananaquit (*Coereba flaveola*), Greater Antillean Grackle (*Quiscalus niger*), Rock Pigeon (*Columba livia*), Common Ground-dove (*Columbina passerina*), Mockingbird (*Mimus polyglottos*), Gray Kingbird (*Tyrannus dominicensis*), Smooth-billed Ani (*Crotophaga ani*), Black-faced Grassquit (*Tiaris bicolor*) and Orange-cheeked Waxbill (*Estrilda melpoda*). Other vertebrate groups include two (2) mammals, ten (10) amphibians and reptiles. Among these found are the small Indian mongoose (*Herpestes auropunctatus*), and several species of tree frogs (*Eleutherodactylus* spp.) and anoline lizards (*Anolis* spp.). None of these species are of any special concern to the Department of Natural and Environmental Resources and the U.S. Fish and Wildlife Service.

4.3 GEOLOGY AND SOILS DESCRIPTION

According to Briggs (1968) the dominant geological formation in the Project area correspond to alluvial deposits (Qa), composed of sand, gravel, silt and clay gradually stratified with depths up to 230 feet (70 meters). There are also presence of swamp deposits (Qs) composed of clay, sandy clay and silty clay forming a narrow band from north to south along the middle of project property. Qs are high in organic matter with colors that range from black to gray and bluish-gray, and present depths up to 10 feet (3 meters).

The Old Central Cambalache property also presents floodplain alluvium (Qa) as the dominant geological formation. The proposed route for the raw water force line alignment in addition of pass through floodplain alluvium, will go across swamp deposits containig clay, sandy clay and silty clay (Qs) and swamp deposits containing peat and peaty muck (Qsp). Appendix 3 shows the geological map for the area.

According to the "Soil Survey of Arecibo Area of Northern Puerto Rico" (U.S. Soil Conservation Service, 1968) and the Web Soil Survey website (http://websoilsurvey.nrcs.usda.gov/app/) soils at the Project area are the Toa silty clay loam and Coloso silty clay which belong to the, Toa, Bajura, Reilly, Coloso and Viví and Vega Baja Soil

Association. These soils are deep, somewhat well drained to somewhat poorly drained, nearly level associated to alluvial floodplains. Appendix 4 shows the soils of the Project area. A brief description of each soil type and its cultivation capability is mentioned below:

To - Toa Silty Clay Loam. This soil is deep, nearly level and well drained. It is associated to flood plains. Surface and subsurface layers are dark brown consisting of silty clay loam up to 16 inches deep. Subsoils are mottled, brown silty clay up to 15 inches deep and usually do not present mottles giving it a smooth appearance. The capability unit for this soil is I, which includes soils that are suitable for cultivation.

To Colors: Ap- 0-8 inches (10YR 3/3), A12 – 8-18 inches (10 YR 3/3).

Cn – Coloso Silty Clay. This nearly level soil is typically found on flood plains. The surface layer is brown consisting of firm silty clay to approximately 7 inches and the subsoil is brown and firm but may contain mottled clay in the up to 15 inches deep. Its capability unit is IIw which includes soils that have a moderate limitation that reduce the choice of plants or that require moderate conservation practices. Historical uses include sugarcane and pasture.

Cn Colors: Ap- 0-7 inches (10YR 4/3), B2 – 7-15 inches (10 YR 4/3) mottles (10YR 4/1 and 10YR 5/8)

Based on the *Hydric Soils of the Caribbean*, (2001), both of these soils are classified as hydric. But it must be clear that not all areas having hydric soils will qualify as wetlands. Only when hydryc soils support hydrophytic vegetation and the area has indicators of wetland hydrology, may the soil be referred to as a "wetland" soil (USACE, 1987).

These two soils types are present at the Old Central Cambalache property, but the proposed route for the interconnection to the Puerto Rico Electric Power Authority Transmission Grid will be across Coloso silty clay soils only. The raw water force line alignment will go across Coloso silty clay, Bajura clay (Ba), and Caracoles loam (CcE- and CcD) soils. A brief description of Ba and Cc soil types and their cultivation capability are mentioned below:

Ba – Bajura Clay. This soil is deep, nearly level, and poorly drained. It is on flood plains. Typically, the surface layer is very dark grayish brown, very firm clay about 7 inches thick. The subsoil is mottled, black, very firm clay 8 inches thick. Included with this soil in mapping are

small areas of Coloso soils and some wet spots. The permeability of this Bajura soil is slow, and the available water capacity is high. Runoff is slow. Natural fertility and organic matter content are high. This soil is well suited for pangolagrass and stargrass. The capability subclass is IIIw.

Ba Colors: Ap – 0-7 inches (10YR 3/2), B2 – 7 to 15 inches (10YR 2/1) and (10YR 3/4). C1g – 15 to 37 inches (10YR 2/1) (10YR 3/4) (10YR 3/4) clay

CcD– Caracoles Loam 5 to 20 percent slopes. This soil is very shallow, sloping or moderately steep, and well drained. Typically, the surface layer is 6 inches of very dark grayish brown loam over semiconsolidated, calcareous sandstone. The permeability of this Caracoles soil is moderately rapid. The available water capacity is low. Runoff is medium. The depth to rock and the low available water capacity make this soil poorly suited for farming. The capability subclass is VIs.

CcE– Caracoles Loam 20 to 40 percent slopes. This soli is very shallow, steep, and well drained. Typically, the surface layer is 6 inches of very dark grayish brown loam over semiconsolidated, calcareous sandstone. The permeability of this Caracoles soil is moderately rapid and the available water capacity is low. Runoff is rapid. Slope, the depth to rock, and the low available water capacity make this soil poorly suited for farming. The capability subclass is VIIs.

Cc Colors: Ap – 0 to 6 inches (10YR 3/2) loam, R to 6 inches semiconsolidated calcareous sandstone.

4.4 FLOOD ZONES AND HYDROLOGY

According to the applicable Flood Insurance Rate Maps (FIRMs) produced by the Federal Emergency Management Agency under the National Flood Insurance Program and adopted by the Puerto Rico Planning Board (PRPB), the Project site lies within the floodway of the Río Grande de Arecibo in Zone AE (see Appendix 6). Zone AE is the flood insurance rate zone with flood base elevations corresponding to the 100-year flood and are determined in Flood Insurance Studies (FIS) by detailed methods. A segment of the proposed raw water force line along road PR-681 lies adjacent, but outside, to a zone delimited as a Coastal Barrier. This coastal barrier is

delimited to the west by Road PR-681. The proposed raw water force line is proposed to run along the opposite side of PR-681.

Arecibo has one main perennial river, Rio Grande de Arecibo (RGA) which is the major source of water for the region as well as for the San Juan Metropolitan. At the Project site the RGA runs along the western border of property. In addition, property includes approximately 1,191.1 linear meters of unused canals that drain into the RGA through a short canal on the north central border of property and are assumed that the U.S. Army Corps of Engineers would considered them as Waters of U.S. These canals were part of the water system associated to the manufacturing process and of the stormwater discharge management of the paper mill. Appendix 5 presents the location of these canals as well as the RGA.

4.5 CLIMATE

The temperatures in the area of Municipality of Arecibo vary through the year to the east region in Puerto Rico. The National Oceanic and Atmospheric Administration (NOAA) divides the Island in climatic provinces according to similar climatologic characteristics. According to NOAA, the Municipality of Arecibo is located in the Northern Climatic Province. Reference data was obtained from meteorological substation *Arecibo 3 ESE* (station 660410 at 10 feet above mean sea level) and it presents normal values from 1071 to 2000.

Temperatures for the northern region vary little through the year with an average of 78.0° Fahrenheit. It fluctuates from an average of 72.8° Fahrenheit during February to an average of 93.0° Fahrenheit during the months of June and September (NOAA, 2000).

Average rainfall in Arecibo is 51.02 inches per year. October is usually the wettest month with an average rainfall of 6.12 inches while March is the driest with an average of 2.66 inches.

The wind patterns in the Project area responds to the Trade Winds that move from East to West. Trade Winds originate from high pressure systems in the vicinity of the Azores Islands off the western coast of Africa. These are constant, and are affected by the tides and terrain conditions causing the acceleration and canalization of the winds. The period in which the field work was conducted was characterized by partly cloudy skies and temperatures near 85°F, with winds from east between 10 to 20 mph.

5 RESULTS AND DISCUSSION

During March 3-5, 2010, eleven (11) sampling points (borings) were performed within the study area, plus seven (7) on August 30 and September 3 at the Old Central Cambalache property. At specific sites the study area met the three criteria (hydrophytic vegetation, hydric soil and hydrology) required by the USACE to declare an area as wetland. Borings (soil pits) were performed as necessary or required. All tasks previously described during the different steps of methodology were conducted in accordance with the 1987 Corps of Engineers Wetlands Delineation Manual (1987 USACE Manual). Evidence shows that changes that have occurred in the area appeared not to be recent (within the last 5 years). This also was demonstrated on the historical photographs analyzed for the area that date between 1936 through 1990. According to the 1987 USACE Manual and site visits, the Project site is not considered and does not qualify as an atypical situation or Problem area for JDs. This also applies to the adjacent area of the Old Central Cambalache and highways were the raw water line will run.

No inland jurisdictional wetlands were found within the selected study parcel and at the Old Central Cambalache parcel. In most of the sampling borings performed upland plant species dominated above 50 percent with the exception of sampling points RGA B #2 and CC#5 (refer to Appendix 7 for the location of the sampling points) and no hydrological indicators were observed in all 18 sampling points. Hydric soils were present in all pits as expected according to the local soils maps.

The area does include approximately 2.42 acres of U.S. Waters which includes approximately 1,191.1 linear meters of unused canals (1.48 acres) and 0.94 acres of an overflow area were the canals interconnect. The canals and overflow area drain into the Río Grande de Arecibo through a short canal on the north central border of property and are assumed that the U.S. Army Corps of Engineers would considered them as Waters of U.S. . These canals were part of the water system associated to the manufacturing process and of the stormwater discharge management of the former Paper Mill. For specific location of jurisdictional areas refer to Appendix 8.

5.1 WETLANDS PLANTS OBSERVED AT PROJECT SITE

Though hydrophytic plants were not dominant in most sampling points, several species were among the most frequently found species. As Table 2 shows *Panicum maximum* (FAC-) was

identified in all 11 sampling points and was clearly the dominant species through the Project site. The vines *Ipomoea setifera* and *I. tiliacea* and the shrub *Mimosa pigra* were observed in six of the sampling points. In total, twenty one (21) plant species were observed at the sampling plots of the study area. Plant species included on the data forms are listed in Table 2. Data forms with the vegetation results for each sampling points were included on Appendix 10.

Table 2: Plant species observed at the Arecibo RRF sampling plots.

	Species	Stratum	Indicators	Frequency
1	*Panicum maximun*	Herbaceous	FACU-	11
2	*Ipomea setifera*	Vine	FACW	6
3	*Ipomea tiliacea*	Vine	---	5
4	*Mimosa pigra*	Shrub	FACW+	5
5	*Commelina erecta*	Herbaceous	FAC	4
6	*Cissus verticillata*	Vine	---	5
7	*Ipomoea alba*	Vine	FACW	4
8	*Spathodea campanulata*	Tree	---	3
9	*Cestrum diurnum*	Shrub	---	2
10	*Ricinus communis*	Shrub	UPL	1
11	*Pennisetum purpureum*	Herbaceous	FAC	1
12	*Brachiaria purpurascens*	Herbaceous	FACW	1
13	*Paspalum conjugatum*	Herbaceous	FAC	1
14	*Paspalum fasciculatum*	Herbaceous	---	1
15	*Mikania cordifolia*	Vine	---	1
16	*Albizia procera*	Tree	---	1
17	*Cynodon nlemfuensis*	Herbaceous	---	1
18	*Solanum torvum*	Shrub	---	1
19	*Melothria pendula*	Vine	FACW	1
20	*Gynerium sagittatum*	Herb	FACW	1
21	*Momordica charantia*	Vine	---	1

5.2 WETLANDS PLANTS OBSERVED AT OLD CENTRAL CAMBALACHE AREA

Though hydrophytic plants were not dominant in most sampling points, several species were among the most frequently found species. As Table 3 shows, *Panicum maximum* (FAC-) was identified in all 7 sampling points and was clearly the dominant species through the Old Central Cambalache site. The herbaceous *Paspalum virgatum* was observed in five of the sampling

points, follow by *Commelina erecta*, observed in four sampling points. One Obligated (OBL) species, *Ludwigia* sp., was observed at three of the sampling points. In total, fifteen (15) plant species were observed at the sampling plots of the Old Central Cambalache area. Plant species included on the data forms are listed in Table 3. Data forms with the vegetation results for each sampling points were included on Appendix 10.

Table 3: Plant species observed at the Old Central Cambalache sampling plots.

	Species	Stratum	Indicators	Frequency
1	*Panicum maximum (Urochloa maxima)*	Herb	FACU-	7
2	*Paspalum virgatum*	Herb	FACW-	5
3	*Commelina erecta*	Herb	FAC	4
4	*Ludwigia sp.*	Herb	OBL	3
5	*Neptunia plena*	Herb	FACW	3
6	*Paspalum fasciculatum*	Herb	---	2
7	*Melochia pyramidata*	Herb	FAC-	2
8	*Sesbania sericea*	Shrub	FACW	2
9	*Sorghum halapense*	Herb	FAC	2
10	*Ipomea tiliacea*	Vine	---	1
11	*Paspalum conjugatum*	Herb	FAC	1
12	*Cyperus odoratus*	Herb	FACW+	1
13	*Mimosa pudica*	Herb	FAC	1
14	*Senna bicapsularis*	Shrub	FAC	1
15	*Urena lobata*	Shrub	FAC	1

Table 4 provides a complete overview of the sampling point results, also included within the table is the location of each sampling point. A copy of all data forms used in the wetland identification process can be found in Appendix 10.

Table 4: Sample Points Coordinates and Results Summary

Sampling Point	Hydrophytic Vegetation	Hydrology Present	Hydric-Soils	Results	Coordinates	
					X	Y
A-1	-	-	+	Non Wetland	18°27'33.84"N	66°42'25.02"W
A-2	-	-	+	Non Wetland	18°27'37.50"N	66°42'20.04"W
B-1	-	-	+	Non Wetland	18°27'33.36"N	66°42'23.22"W
B-2	+	-	+	Non Wetland	18°27'34.98"N	66°42'16.14"W
C-1	-	-	+	Non Wetland	18°27'25.86"N	66°42'15.36"W
D-1	-	-	+	Non Wetland	18°27'40.02"N	66°42'8.94"W
Storage Area	-	-	+	Non Wetland	18°27'34.02"N	66°42'8.46"W
Pond #1	-	-	+	Non Wetland	18°27'32.58"N	66°42'16.14"W
Pond #2	-	-	+	Non Wetland	18°27'35.76"N	66°42'18.49"W
Pond #3	-	-	+	Non Wetland	18°27'30.42"N	66°42'16.92"W
Pond #4	-	-	+	Non Wetland	18°27'33.36"N	66°42'19.44"W
CC-1	-	-	+	Non Wetland	18°27'30.01"N	66°41'56.77"W
CC-2	-	-	+	Non Wetland	18°27'29.28"N	66°41'55.96"W
CC-3	-	-	+	Non Wetland	18°27'28.29"N	66°41'55.68"W
CC-4	-	-	+	Non Wetland	18°27'26.04"N	66°41'54.61"W
CC-5	+	-	+	Non Wetland	18°27'26.62"N	66°41'59.67"W
CC-6	+	-	+	Non Wetland	18°27'27.98"N	66°42'1.27"W
CC-7	+	-	+	Non Wetland	18°27'28.32"N	66°42'3.33"W

6 CONCLUSION

The results show that a total of approximately **2.42 acres** (**9,793.39 m^2**) of inland jurisdictional wetlands were delineated within the selected study parcel. This acreage consists of a series of man-made canals that are found in the property and small wetland area at a corner of these man-made canals. At the Old Central Cambalache parcel non wetlands areas were confirmed as identified in the NWI as wetlands. The sampling points do not meet the three criteria to be classified as jurisdictional wetland. Also the raw water line will not run over wetlands areas. This line will pass over a jurisdictional wetland (the stormwater discharge channel) via the existing bridge. The wetlands identified by the NWI near the highways will not be affected by the alignment of the raw water line.

This JD concludes that the delineated wetlands areas within the studied property should be considered as Waters of the U.S. and under the jurisdiction of the U.S. Army Corps of Engineers, by virtue of Section 404 of the Clean Water Act (CWA) of 1972, as amended. Jurisdiction of the canals was informally consulted with the USACE Antilles Regulatory Division during a meeting on March 16, 2010. The jurisdictional areas within the property limit are limited to the abandoned canals that drain into the Río Grande de Arecibo during heavy rain events.

The information presented in the data forms; the Jurisdictional Wetland Delineation Plan and the photographic documentation support the conclusions for this JD. The analysis within this JD should be useful for future design and construction phases of proposed activities in order to avoid, minimize, and mitigate impacts on jurisdictional areas within the studied area.

This JD follows the Public Notice, dated October 12, 2001, for the minimum information necessary to begin processing requests for the verification of Jurisdictional Determinations (JDs) in Puerto Rico and the U. S. Virgin Islands under the USACE Antilles Regulatory Section. Furthermore this conclusion was also based on the CWA and RHA Jurisdiction following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell v. United States 13.

Based on the USACE policy, the agency will assert jurisdiction over those wetlands (including adjacent) that have a continuous surface connection to such tributaries (e.g., they are not separated by uplands, a berm, dike, or similar features). After the evaluation of this JD study, the USACE will have the final say in the jurisdictional determination and boundaries.

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8 TECHNICAL TEAM - CSA Group, Inc.

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María L. Rivera - Wildlife Biologist

Melvin Morales - Field Technician

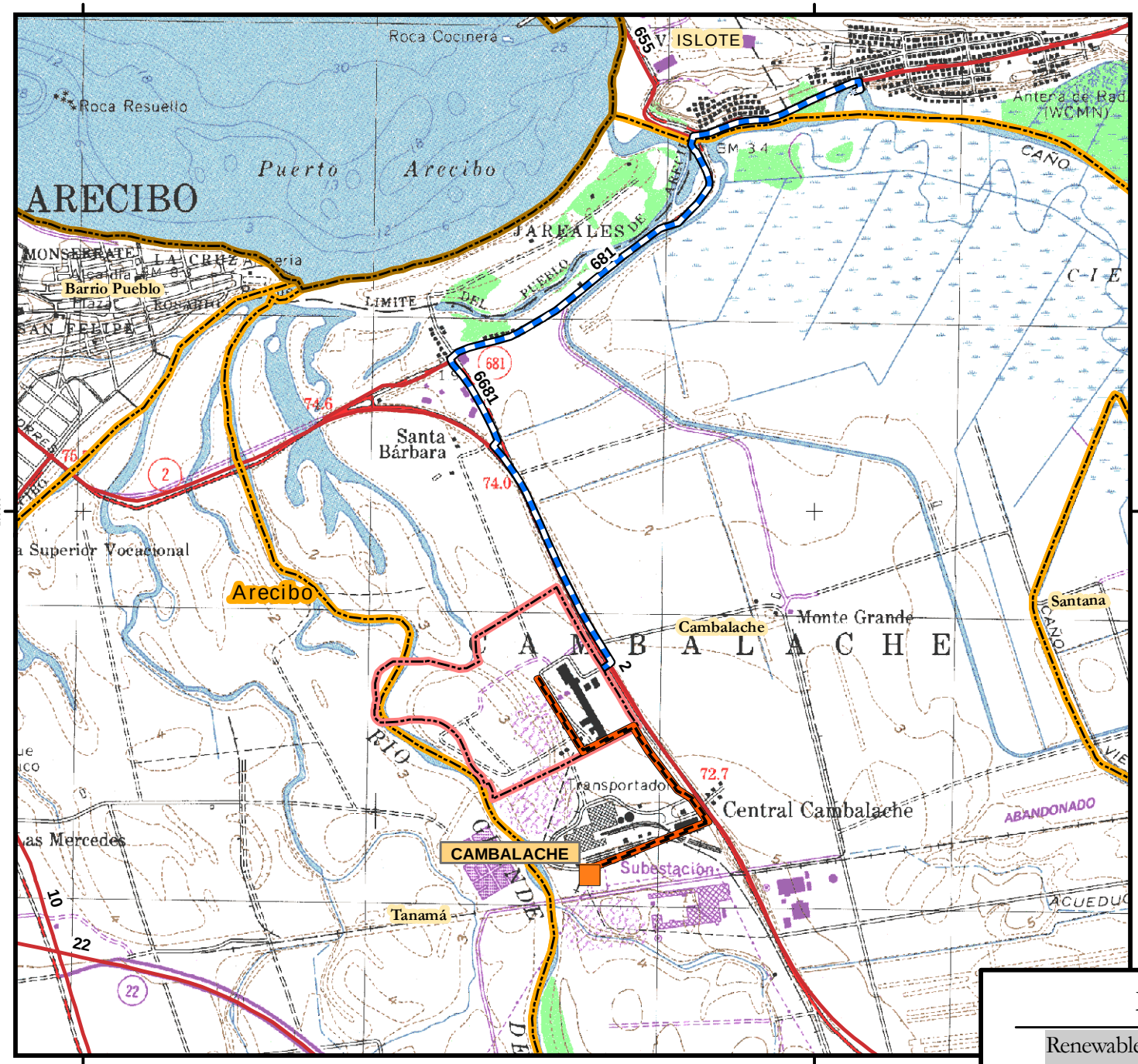
Revisions & Consultants:

Brenda Guzmán - Environmental Discipline Manager & Technical Reviewer

Lionel Vega - Project Environmental Technical Leader & Technical Reviewer

APPENDICES

APPENDIX 1: LOCATION MAP



Legend:

- Substation[1]
- Power Interconnection Alignment
- Raw Water Force Line Alignment
- Road[2]
- Project Limit
- Municipal Limit[1]
- Ward Limit[1]

Source:
1. Information provided by Puerto Rico Planning Board.
2. Puerto Rico Highway and Transportation Authority (ACT by it acronym in Spanish), June 2006
3. Topographic Map of the United States Geological Survey. Arecibo Quadrangle fotorevised in 1982. Original map scale is 1:20000

Coordinate System: State Plane NAD83 Puerto Rico & Virgin Islands FIPS 5200 (Meters)

CSA Group

Location Map

Renewable Power Generation and Resources Recovery Facility

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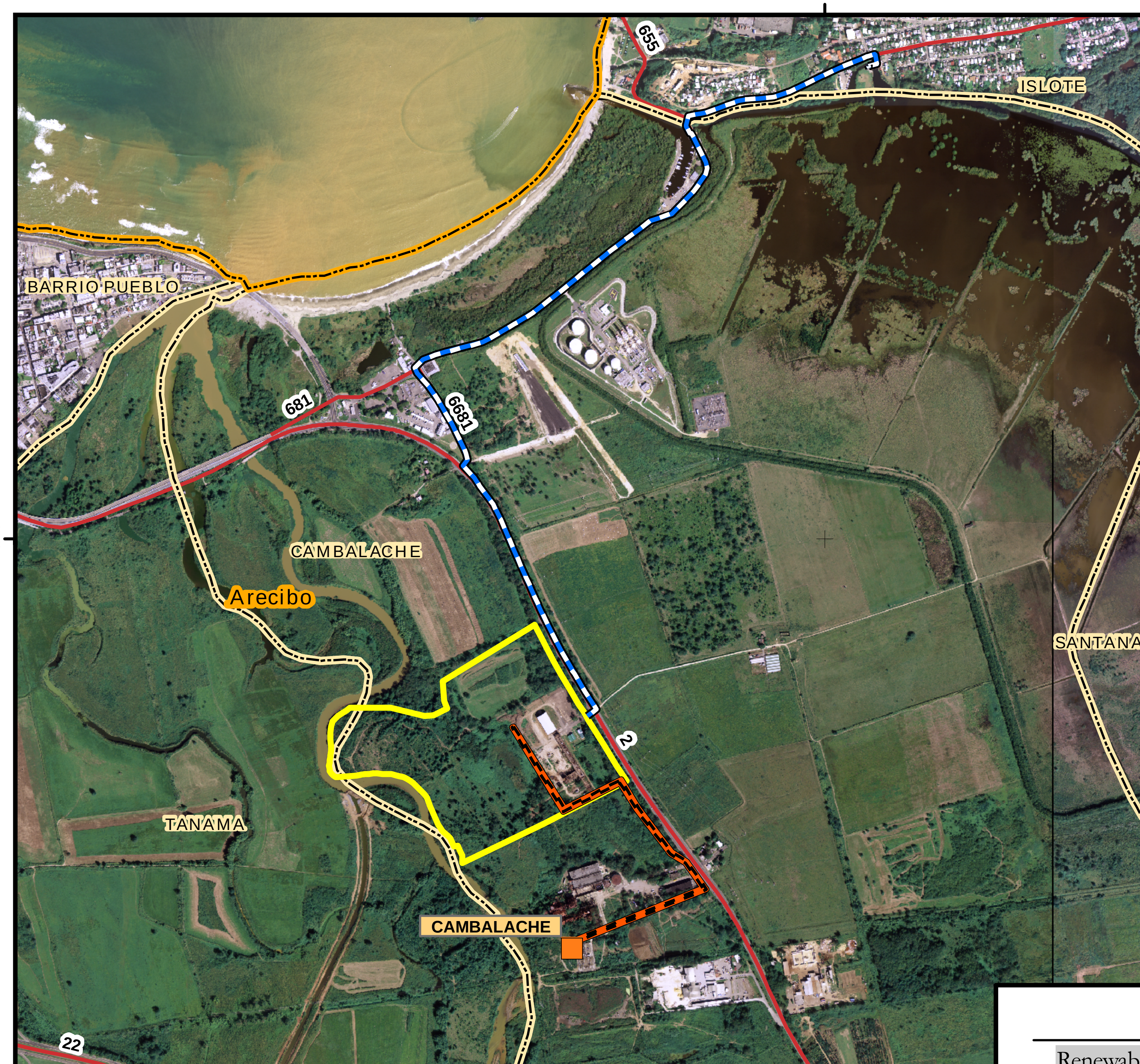
APPENDIX 2: AEREAL PHOTOGRAPH



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Scale: 1:18,000

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Legend:
- Substation[1]
- Power Interconnection Alignment
- Raw Water Force Line Alignment
- Roads[2]
- Project Limit
- Municipal Limit[1]
- Ward Limit[1]

Source:
1. Information provided by Puerto Rico Planning Board
2. Puerto Rico Highway and Transportation Authority (ACT by it acronym in Spanish), June 2006
3. Ortho images provided by U.S. Corps of Engineers, November 2006 – February 2007
Coordinate System: State Plane NAD83 Puerto Rico & Virgin Islands FIPS 5200 (Meters)

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Aerial Photograph

Renewable Power Generation and Resources Recovery Facility

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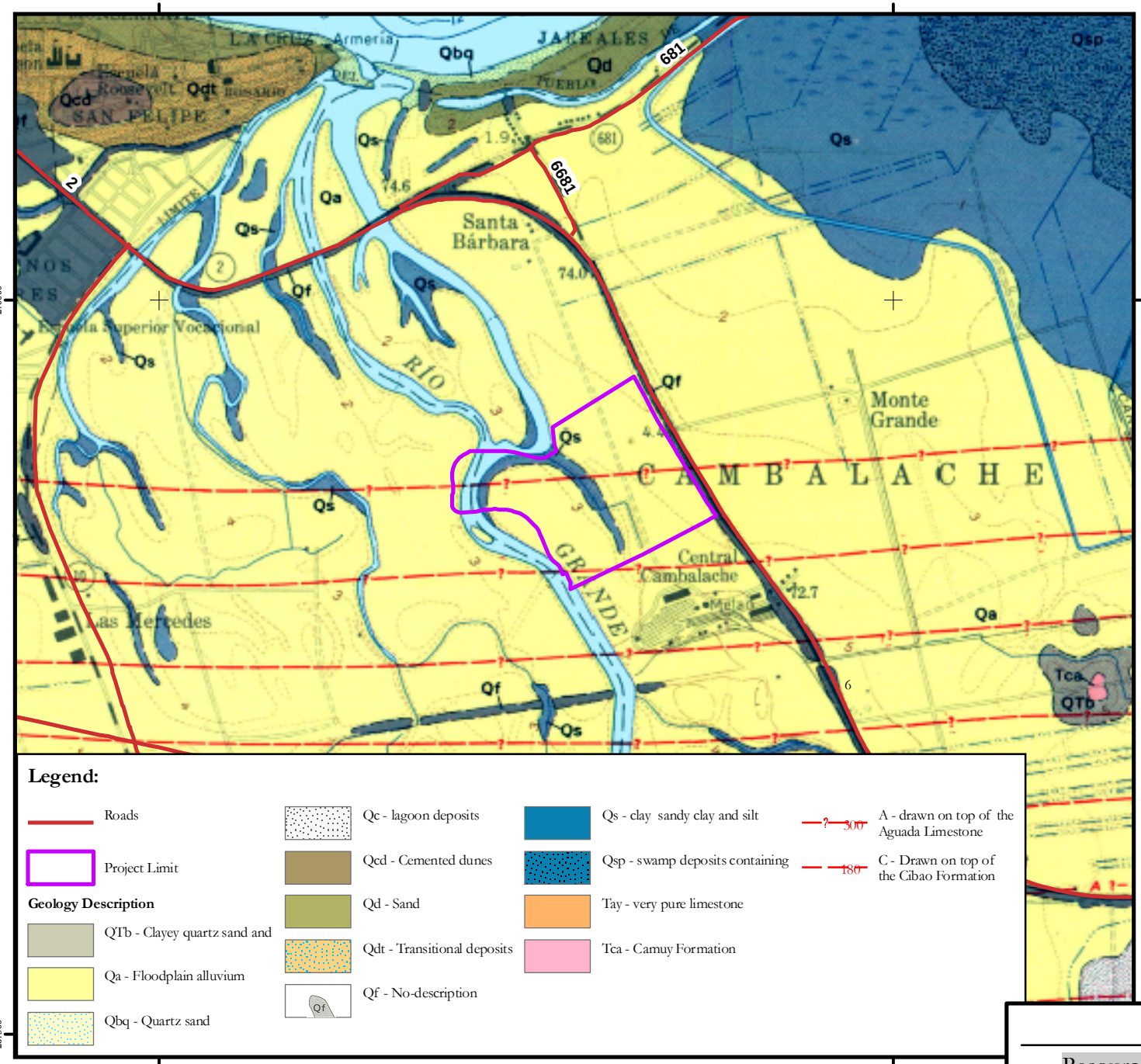
APPENDIX 3: GEOLOGICAL MAP



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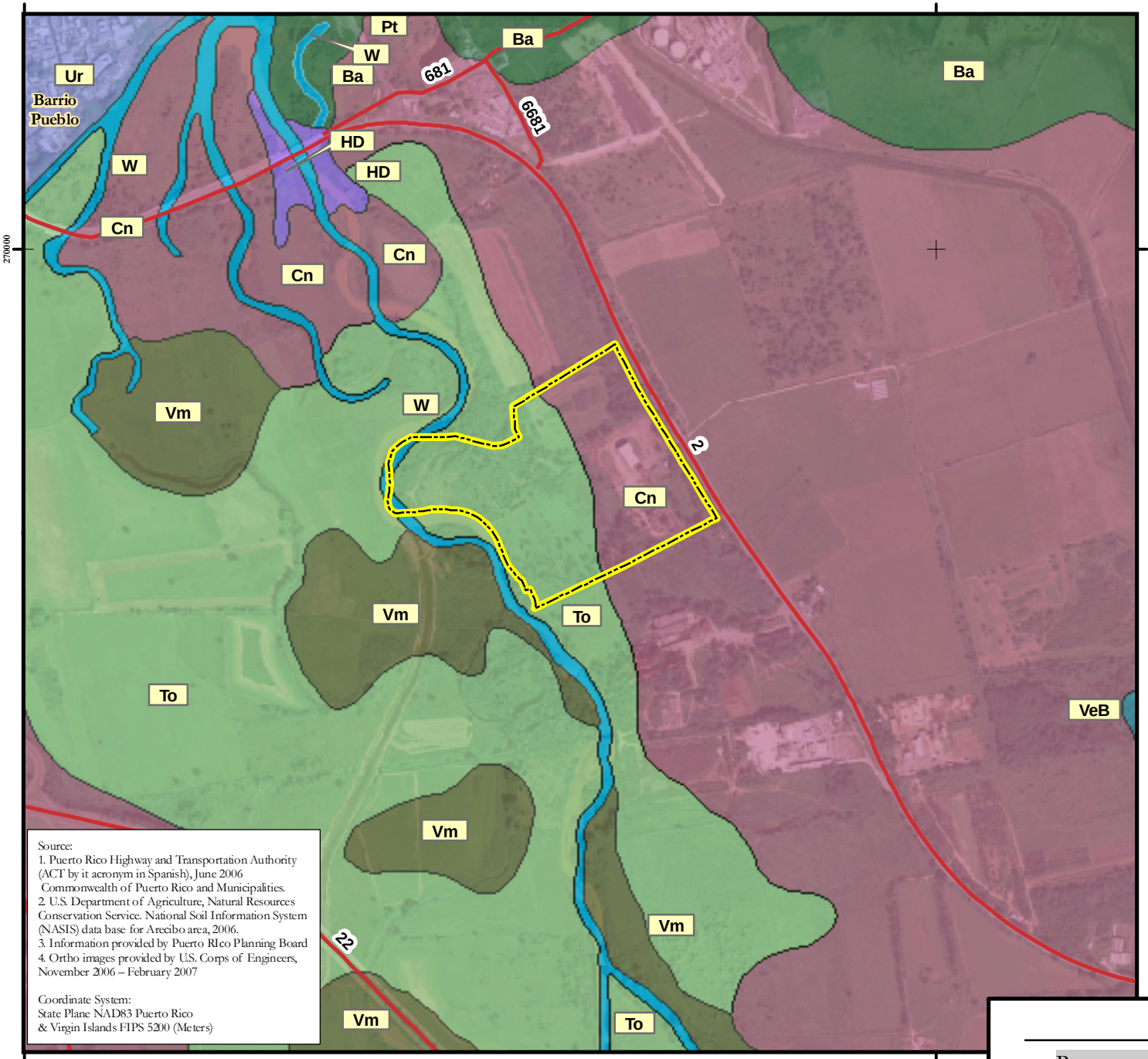
Geology Map

Resource Recovery Facility Arecibo, PR

APPENDIX 4: SOIL MAP



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Scale: 1:16,000

0 150 300 600 Meters

Legend:

Roads[1]

Project Limit

Soils[2]

Type, Description

- Ba, Bajura clay
- Cn, Coloso silty clay
- HD, Hydraquents, frequently flooded
- To, Toa silty clay loam
- Ur, Urban land
- VeB, Vega Baja clay, 2 to 5 percent slopes
- Vm, Viví loam
- W, Water

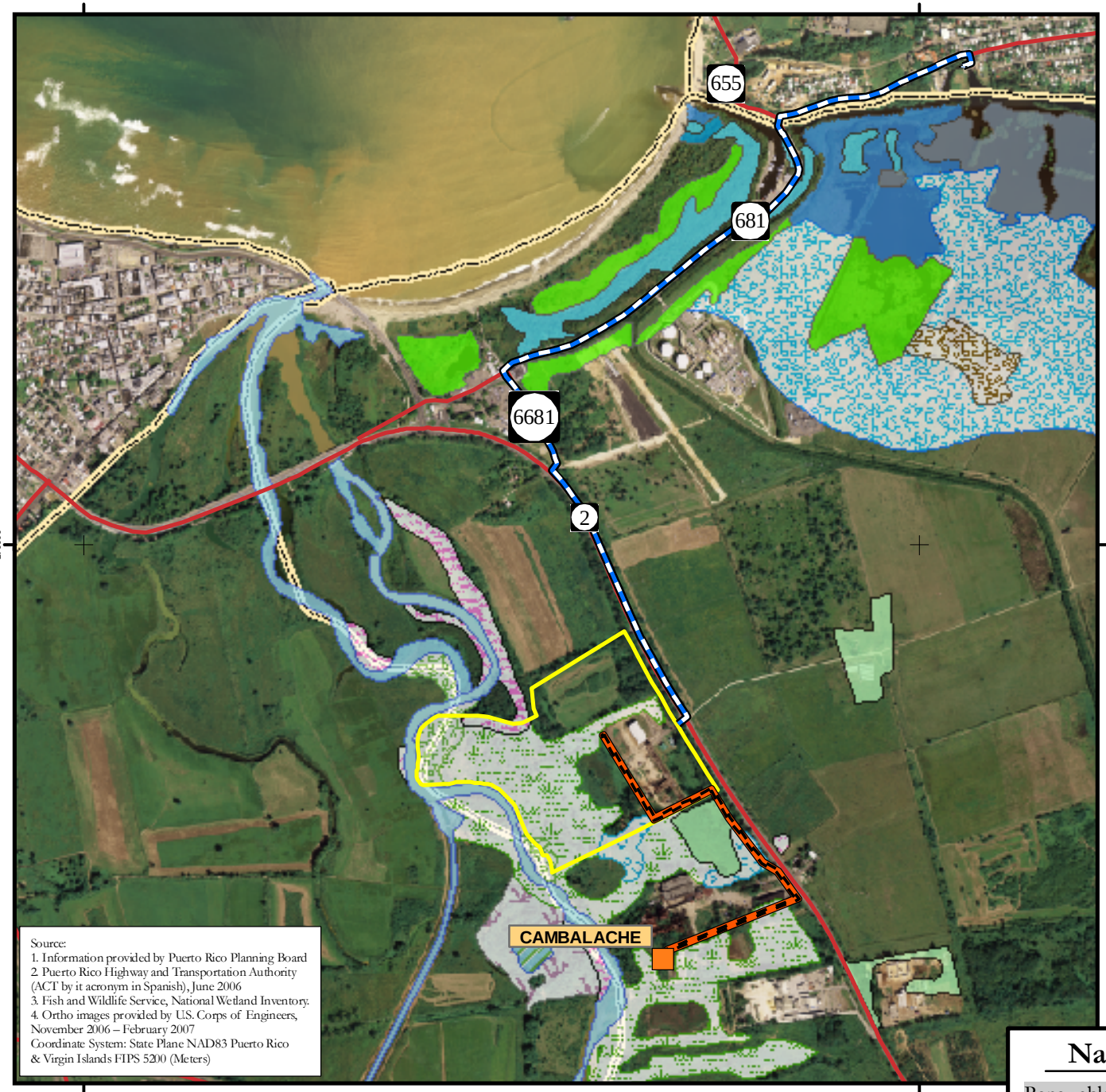
Source:
1. Puerto Rico Highway and Transportation Authority (ACT by it acronym in Spanish), June 2006 Commonwealth of Puerto Rico and Municipalities.
2. U.S. Department of Agriculture, Natural Resources Conservation Service. National Soil Information System (NASIS) data base for Arecibo area, 2006.
3. Information provided by Puerto RIco Planning Board
4. Ortho images provided by U.S. Corps of Engineers, November 2006 – February 2007

Coordinate System:
State Plane NAD83 Puerto Rico
& Virgin Islands FIPS 5200 (Meters)

Soils Map

Resource Recovery Facility Arecibo, PR

APPENDIX 5: NATIONAL WETLAND INVENTORY AND HYDROGRAPHY



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Scale: 1:18,000

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Legend:

- Substation[1]
- Power Interconnection Alignment
- Raw Water Force Line Alignment
- Roads[2]
- Project Limit

Wetlands[2]

- E1AB6Lh - Estuarine, subtidal, aquatic bed, unknown surface, subtidal, diked/impounded
- E2EM1M - Estuarine, intertidal, emergent, persistent, irregularly exposed
- E2EM1P - Estuarine, intertidal, emergent, persistent, irregularly flooded
- E2FO3M - Estuarine, intertidal, forested, broad leaved evergreen, irregularly exposed
- PEM1C - Palustrine, emergent, persistent, seasonally flooded
- PEM1Cd - Palustrine, emergent, persistent, seasonally flooded, partially drained/ditched
- PSS3/EM1A - Palustrine, scrub-shrub, broad-leaved evergreen / Emergent, persistent, temporarily flooded
- E1UBL - Estuarine, subtidal, unconsolidated bottom, subtidal
- PEM1/SS3A - Palustrine, emergent, persistent / Scrub-shrub, broad leaved evergreen, temporarily flooded
- PEM1A - Palustrine, emergent, persistent, temporarily flooded
- PFO3A - Palustrine, forested, broad-leaved evergreen, temporarily flooded
- PFO3C - Palustrine, forested, broad-leaved evergreen, seasonally flooded
- PSS3/EM1A - Palustrine, scrub-shrub, broad-leaved evergreen / Emergent, persistent, temporarily flooded
- PSS3C - Palustrine, scrub-shrub, broad-leaved evergreen, seasonallly flooded
- PUBHh - Palustrine, unconsolidated bottom, permanently flooded, diked/impounded

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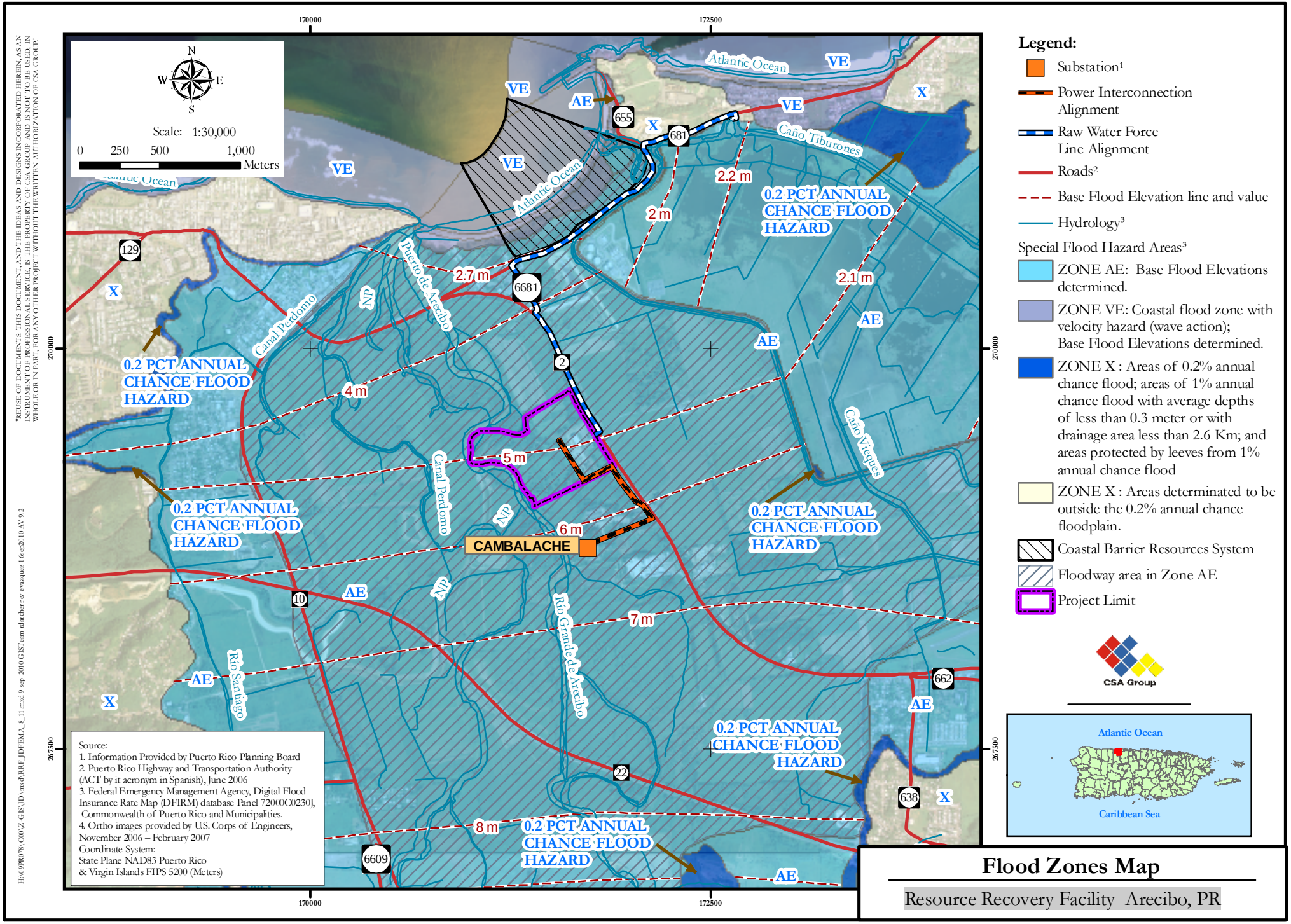
Source:
1. Information provided by Puerto Rico Planning Board
2. Puerto Rico Highway and Transportation Authority (ACT by it acronym in Spanish), June 2006
3. Fish and Wildlife Service, National Wetland Inventory.
4. Ortho images provided by U.S. Corps of Engineers, November 2006 – February 2007
Coordinate System: State Plane NAD83 Puerto Rico & Virgin Islands FIPS 5200 (Meters)

National Wetland Inventory Map

Renewable Power Generation and Resources Recovery Facility

APPENDIX 6: FEMA FLOOD ZONES MAP



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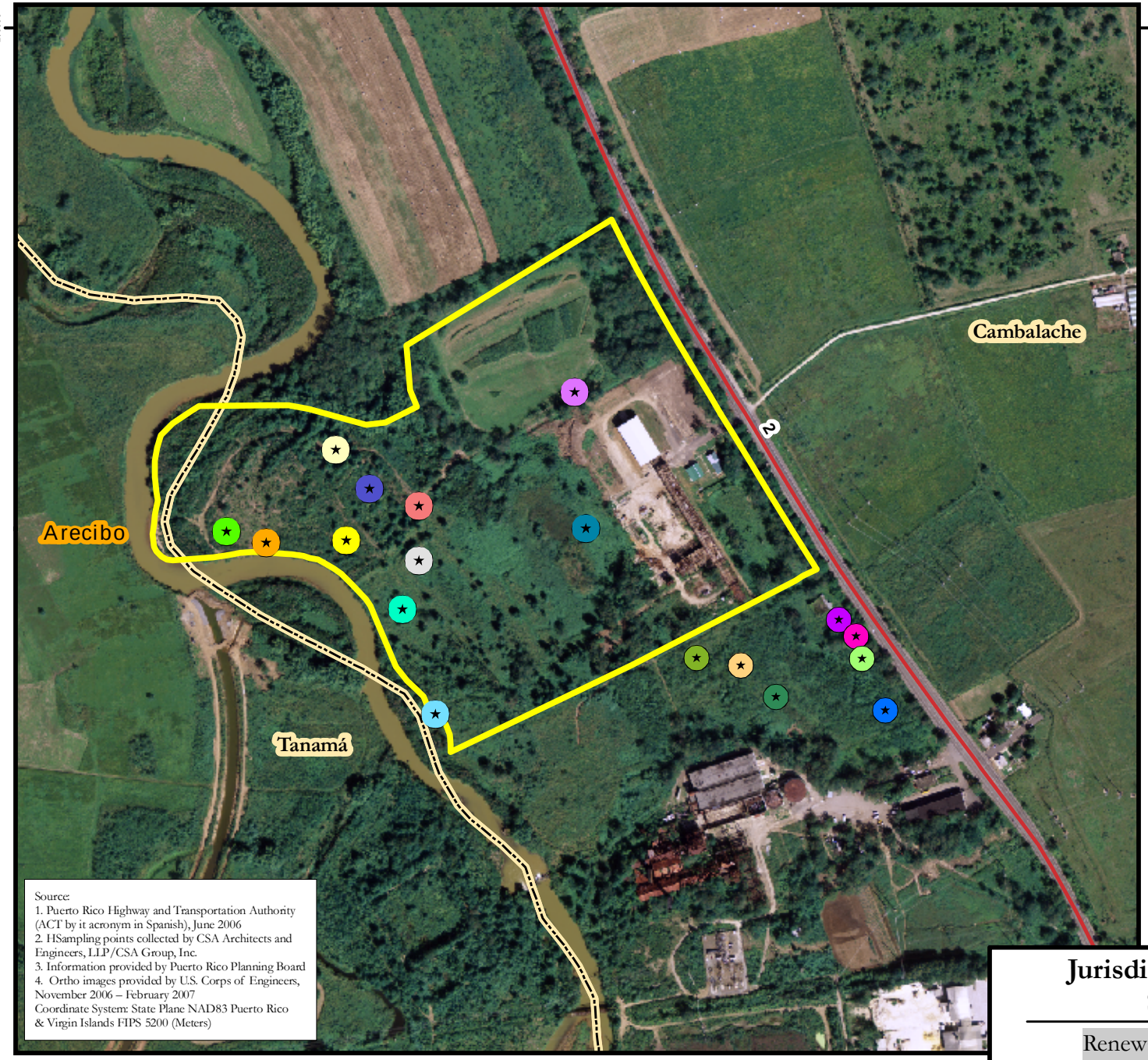
Flood Zones Map

Resource Recovery Facility Arecibo, PR

APPENDIX 7: SAMPLING POINT LOCATION



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Scale: 1:8,000

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Meters

Legend:

Sampling Points[2]

- OP A-1
- OP A-2
- OP B-1
- OP B-2
- OP C-1
- OP D-1
- OP Storage Area
- OP-Pond #1
- OP-Pond #2
- OP-Pond #3
- OP-Pond #4
- OP CC-1
- OP CC-2
- OP CC-3
- OP CC-4
- OP CC-5
- OP CC-6
- OP CC-7
- Roads[1]
- Project Limit

CSA Group

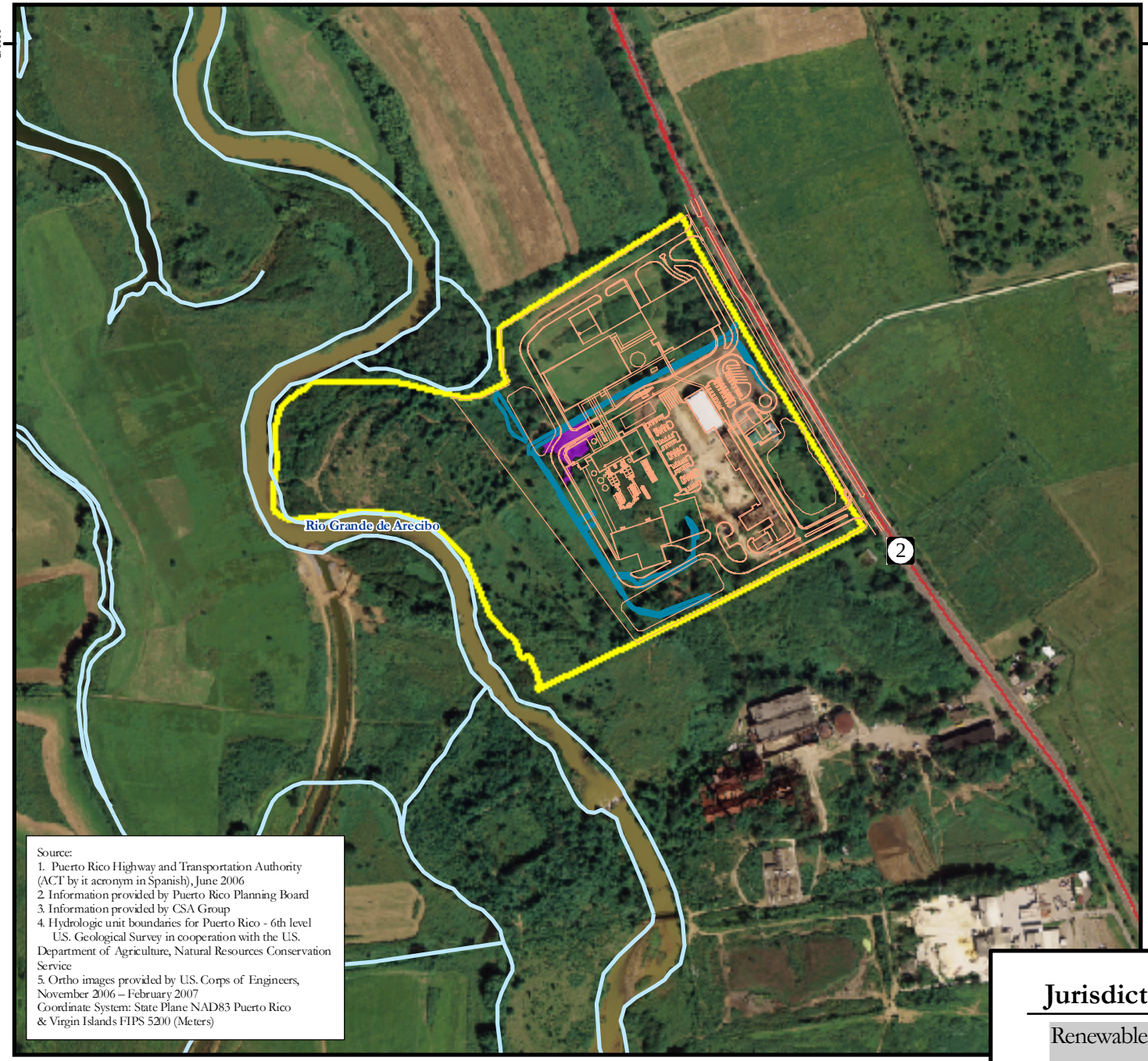
Source:
1. Puerto Rico Highway and Transportation Authority (ACT by it acronym in Spanish), June 2006
2. HSampling points collected by CSA Architects and Engineers, LLP/CSA Group, Inc.
3. Information provided by Puerto Rico Planning Board
4. Ortho images provided by U.S. Corps of Engineers, November 2006 – February 2007

Coordinate System: State Plane NAD83 Puerto Rico & Virgin Islands FIPS 5200 (Meters)

Jurisdictional Determination Sampling Points

Renewable Power Generation and Resources Recovery Facility

APPENDIX 8: JURISDICTIONAL DETERMINATION PLANS



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Scale: 1:9,000

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Legend:

- Site Plan
- Roads[1]
- Stream/River
- Canal[3]
- Canal Overflow[3]
- Project Limit

Source:
1. Puerto Rico Highway and Transportation Authority (ACT by it acronym in Spanish), June 2006
2. Information provided by Puerto Rico Planning Board
3. Information provided by CSA Group
4. Hydrologic unit boundaries for Puerto Rico - 6th level US. Geological Survey in cooperation with the U.S. Department of Agriculture, Natural Resources Conservation Service
5. Ortho images provided by U.S. Corps of Engineers, November 2006 – February 2007

Coordinate System: State Plane NAD83 Puerto Rico & Virgin Islands FIPS 5200 (Meters)

CSA Group

Jurisdictional Determination Plan

Renewable Power Generation and Resources Recovery Facility

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APPENDIX 9: PHOTOGRAPHIC LOG OF SAMPLING PLOT

Photographic Log 1:
Arecibo RRF
Arecibo, Puerto Rico

Description: Boring A-1 at upland area.

Photographic Log 2:
Arecibo RRF
Arecibo, Puerto Rico

Description: Boring A-2 at upland area.

Photographic Log 3:
Arecibo RRF
Arecibo, Puerto Rico

Description: Boring B-1 at upland area.

Photographic Log 4:
Arecibo RRF
Arecibo, Puerto Rico

Description: Boring B-2. In upland area.

Photographic Log 5:
Arecibo RRF
Arecibo, Puerto Rico

Description: Boring in Storage Area 1.

Photographic Log 6:
Arecibo RRF
Arecibo, Puerto Rico

Description: Boring Pond #1 in abandoned retention pond.

Photographic Log 7:
Arecibo RRF
Arecibo, Puerto Rico

Description: Boring Pond #3 in abandoned retention pond.

Photographic Log 8:
Arecibo RRF
Arecibo, Puerto Rico

Description: Boring Pond #4 at abandoned retention pond.

Photographic Log 9:
Arecibo RRF
Arecibo, Puerto Rico

Description: Boring C-1 at upland area.

Photographic Log 10:
Arecibo RRF
Arecibo, Puerto Rico

Description: Boring CC-1 at upland area.

Photographic Log 11:
Arecibo RRF
Arecibo, Puerto Rico

Description: Boring CC-2 at upland area.

Photographic Log 12:
Arecibo RRF
Arecibo, Puerto Rico

Description: Boring CC-3 at upland area.

Photographic Log 13:
Arecibo RRF
Arecibo, Puerto Rico

Description: Boring CC-4 at upland area.

Photographic Log 14:
Arecibo RRF
Arecibo, Puerto Rico

Description: Boring CC-5 at upland area.

Photographic Log 15:
Arecibo RRF
Arecibo, Puerto Rico

Description: Boring CC-6 at upland area.

Photographic Log 16:
Arecibo RRF
Arecibo, Puerto Rico

Description: Boring CC-7 at upland area.

APPENDIX 10: DATA FORMS

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site:	Renewable Power Generation and Resources Recovery Facility	Date:	March 3, 2010
Applicant/Owner:	Energy Answers International	County:	Arecibo
Investigator:	José A. Salguero	State:	Puerto Rico

Do Normal Circumstances exist on the site?	☒	Yes	☐	No	Community ID: RGA
Is the site significantly disturbed (Atypical Situation)?	☐	Yes	☒	No	Transect ID: A
Is Area a Potential Problem Area? *(if needed, explain on reverse)*	☐	Yes	☒	No	Plot ID: DP# 1

9.1.1.1.1 VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Panicum maximun*	Herb	FACU-	8			
2	*Ipomoea tiliacea*	Vine	UPL	9			
3	*Ipomoea setifera*	Vine	FACW	10			
4	*Solanum torvum*	Shrub	UPL	11			
5	*Cestrum diurnum*	Shrub	UPL	12			
6	*Mimosa pigra*	Shrub	FACW+	13			
7	*Mikania cordifolia*	Vine	UPL	14			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): **20**
Percent

Remarks:

HYDROLOGY

☐ Recorded Data (describe in Remarks)
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No recorded data available

Field Observations:
- Depth of Surface Water: 0 (In.)
- Depth to Free Water in Pit: 0 (In.)
- Depth to Saturated Soil: 0 (In.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patters in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12”
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (explain in remarks)

Remarks

SOILS

Map Unit Name (Series and Phase): Toa Silty Clay Loam

Drainage Class: **9.1.1.1.1.1**

Taxonomy (Subgroup): Isohyperthermic Fluventic Hapludoll

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-1	A	10YR 4/2			Sandy
1-18	A	10YR 4/3			

Hydric Soil Indicators:

☐ Histosol	☐ Reducing Conditions	☒ High Organic Content in Surface Layer in Sandy Soils
☐ Histic Epipedon	☐ Gleyed or Low-Chroma Colors	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Concretions	☐ Listed on Local Hydric Soils List
☐ Aquatic Moisture Regime	☐ Organic Streaking in Sandy Soils	☐ Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☐	Yes	☒	No	Is this Sampling Point Within a Wetland?	☐ Yes	☒ No
Wetland Hydrology Present?	☐	Yes	☒	No			
Hydric Soils Present?	☒	Yes	☐	No			

Remarks: Sampling pit coordinates N 18°27.614 W 066°42.238

Form Content Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site:	Renewable Power Generation and Resources Recovery Facility	Date:	March 3, 2010
Applicant/Owner:	Energy Answers International	County:	Arecibo
Investigator:	José A. Salguero	State:	Puerto Rico

Do Normal Circumstances exist on the site?	☒	Yes	☐	No	Community ID:	RGA
Is the site significantly disturbed (Atypical Situation)?	☐	Yes	☒	No	Transect ID:	A
Is Area a Potential Problem Area? *(if needed, explain on reverse)*	☐	Yes	☒	No	Plot ID:	DP# 2

9.1.1.1.2 VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Panicum maximun*	Herb	FACU-	8			
2	*Mimosa pigra*	Shrub	FACW+	9			
3	*Commelina erecta*	Herb	FAC	10			
4	*Cissus verticillata*	Vine	UPL	11			
5	*Spathodea campanulata*	Tree	UPL	12			
6	*Melothria pendula*	Vine	FACW	13			
7	*Ipomoea alba*	Vine	FACW	14			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): **25**
Percent

Remarks:

HYDROLOGY

☐ Recorded Data (describe in Remarks)
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No recorded data available

Field Observations:
- Depth of Surface Water: 0 (In.)
- Depth to Free Water in Pit: 0 (In.)
- Depth to Saturated Soil: 0 (In.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patters in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12”
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (explain in remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Toa Silty Clay Loam

Drainage Class: Well drained **9.1.1.1.2.1**

Taxonomy (Subgroup): Isohyperthermic Fluventic Hapludoll

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-8	A	10YR 4/2			Sandy with organic content
8-18	A	10YR 4/3			Sandy

Hydric Soil Indicators:

☐ Histosol	☐ Reducing Conditions	☒ High Organic Content in Surface Layer in Sandy Soils
☐ Histic Epipedon	☐ Gleyed or Low-Chroma Colors	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Concretions	☐ Listed on Local Hydric Soils List
☐ Aquatic Moisture Regime	☐ Organic Streaking in Sandy Soils	☐ Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☐	Yes	☒	No	Is this Sampling Point Within a Wetland?	☐ Yes	☒ No
Wetland Hydrology Present?	☐	Yes	☒	No			
Hydric Soils Present?	☒	Yes	☐	No			

Remarks: Sampling pit coordinates N 18°27.625 W 066°42.334

Form Content Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site:	Renewable Power Generation and Resources Recovery Facility	Date:	March 3, 2010
Applicant/Owner:	Energy Answers International	County:	Arecibo
Investigator:	José A. Salguero	State:	Puerto Rico

Do Normal Circumstances exist on the site?	☒	Yes	☐	No	Community ID: RGA
Is the site significantly disturbed (Atypical Situation)?	☐	Yes	☒	No	Transect ID: B
Is Area a Potential Problem Area? *(if needed, explain on reverse)*	☐	Yes	☒	No	Plot ID: DP# 1

9.1.1.1.3 VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Panicum maximun*	Herb	FACU-	8			
2	*Ricinus communis*	Shrub	FAC	9			
3	*Spathodea campanulata*	Tree	UPL	10			
4	*Cestrum diurnum*	Shrub	UPL	11			
5	*Ipomoea alba*	Vine	FACW	12			
6				13			
7				14			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): **25**
Percent

Remarks:

HYDROLOGY

☐ Recorded Data (describe in Remarks)
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No recorded data available

Field Observations:
- Depth of Surface Water: 0 (In.)
- Depth to Free Water in Pit: 0 (In.)
- Depth to Saturated Soil: 0 (In.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patters in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12”
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (explain in remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Toa Silty Clay Loam

Drainage Class: Well drained **9.1.1.1.3.1**

Taxonomy (Subgroup): Isohyperthermic Fluventic Hapludoll

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-18	A	10YR 5/3			Sandy clay

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquatic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ Organic Streaking in Sandy Soils
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☒ Listed on National Hydric Soils List
- ☐ Listed on Local Hydric Soils List
- ☐ Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☐ Yes ☒ No

Wetland Hydrology Present? ☐ Yes ☒ No

Hydric Soils Present? ☒ Yes ☐ No

Is this Sampling Point Within a Wetland? ☐ Yes ☒ No

Remarks: Sampling pit coordinates N 18°27.556 W 066°42.324

Form Content Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site:	Renewable Power Generation and Resources Recovery Facility	Date:	March 3, 2010
Applicant/Owner:	Energy Answers International	County:	Arecibo
Investigator:	José A. Salguero	State:	Puerto Rico

Do Normal Circumstances exist on the site?	☒	Yes	☐	No	Community ID: RGA
Is the site significantly disturbed (Atypical Situation)?	☐	Yes	☒	No	Transect ID: B
Is Area a Potential Problem Area? *(if needed, explain on reverse)*	☐	Yes	☒	No	Plot ID: DP# 2

9.1.1.1.4 VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Gynerium sagittatum*	Herb	FACW	8			
2	*Commelina erecta*	Herb	FAC	9			
3	*Cissus verticillata*	Vine	UPL	10			
4	*Panicum maximun*	Herb	FACU-	11			
5	*Momordica charantia*	Vine	UPL	12			
6				13			
7				14			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): **75 Percent**

Remarks:

HYDROLOGY

☐ Recorded Data (describe in Remarks)
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No recorded data available

Field Observations:
- Depth of Surface Water: 0 (In.)
- Depth to Free Water in Pit: 0 (In.)
- Depth to Saturated Soil: 0 (In.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patters in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12”
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (explain in remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Toa Silty Clay Loam

Drainage Class: Well drained **9.1.1.1.4.1**

Taxonomy (Subgroup): Isohyperthermic Fluventic Hapludoll

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-12	Fill				Fill (limestone) with organic content
12-18	A	10YR 5/3			Sandy clay

Hydric Soil Indicators:

☐ Histosol	☐ Reducing Conditions	☐ High Organic Content in Surface Layer in Sandy Soils
☐ Histic Epipedon	☐ Gleyed or Low-Chroma Colors	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Concretions	☐ Listed on Local Hydric Soils List
☐ Aquatic Moisture Regime	☐ Organic Streaking in Sandy Soils	☐ Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☒	Yes	☐	No	Is this Sampling Point Within a Wetland?	☐	Yes
Wetland Hydrology Present?	☐	Yes	☒	No		☒	No
Hydric Soils Present?	☒	Yes	☐	No			

Remarks: Sampling pit coordinates N 18°27.583 W 066°42.269

Form Content Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site:	Renewable Power Generation and Resources Recovery Facility	Date:	March 3, 2010
Applicant/Owner:	Energy Answers International	County:	Arecibo
Investigator:	José A. Salguero	State:	Puerto Rico

Do Normal Circumstances exist on the site?	☒	Yes	☐	No	Community ID: RGA
Is the site significantly disturbed (Atypical Situation)?	☐	Yes	☒	No	Transect ID: C
Is Area a Potential Problem Area? *(if needed, explain on reverse)*	☐	Yes	☒	No	Plot ID: DP# 1

9.1.1.1.5 VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Panicum maximun*	Herb	FACU-	8			
2	*Pennisetum purpureum*	Herb	FAC	9			
3	*Ipomoea setifera*	Vine	FACW	10			
4	*Cissus verticillata*	Vine	UPL	11			
5	*Albizia procera*	Tree	UPL	12			
6	*Mimosa pigra*	Shrub	FACW+	13			
7				14			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): **20 Percent**

Remarks:

HYDROLOGY

☐ Recorded Data (describe in Remarks)
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No recorded data available

Field Observations:
- Depth of Surface Water: 0 (In.)
- Depth to Free Water in Pit: 0 (In.)
- Depth to Saturated Soil: 0 (In.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patters in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12”
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (explain in remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Toa Silty Clay Loam

Drainage Class: Well drained **9.1.1.1.5.1**

Taxonomy (Subgroup): Isohyperthermic Fluventic Hapludoll

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-1	A	10YR 4/2			Sandy
1-18	A	10YR 4/3			

Hydric Soil Indicators:

☐ Histosol	☐ Reducing Conditions	☒ High Organic Content in Surface Layer in Sandy Soils
☐ Histic Epipedon	☐ Gleyed or Low-Chroma Colors	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Concretions	☐ Listed on Local Hydric Soils List
☐ Aquatic Moisture Regime	☐ Organic Streaking in Sandy Soils	☐ Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☐	Yes	☒	No	Is this Sampling Point Within a Wetland?	☐ Yes	☒ No
Wetland Hydrology Present?	☐	Yes	☒	No			
Hydric Soils Present?	☒	Yes	☐	No			

Remarks: Sampling pit coordinates N 18°27.431 W 066°42.256; It is located approximately 10 meters from the Rio Grande de Arecibo.

Form Content Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site:	Renewable Power Generation and Resources Recovery Facility	Date:	March 5, 2010
Applicant/Owner:	Energy Answers International	County:	Arecibo
Investigator:	José A. Salguero	State:	Puerto Rico

Do Normal Circumstances exist on the site?	☒	Yes	☐	No	Community ID: RGA
Is the site significantly disturbed (Atypical Situation)?	☐	Yes	☒	No	Transect ID: D
Is Area a Potential Problem Area? *(if needed, explain on reverse)*	☐	Yes	☒	No	Plot ID: DP# 1

9.1.1.1.6 VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Cynodon nlemfuensis*	Herb	UPL	8			
2	*Paspalum conjugatum*	Herb	FAC	9			
3	*Panicum maximun*	Herb	FACU-	10			
4				11			
5				12			
6				13			
7				14			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): **0 Percent**

Remarks:

HYDROLOGY

☐ Recorded Data (describe in Remarks)
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No recorded data available

Field Observations:
- Depth of Surface Water: 0 (In.)
- Depth to Free Water in Pit: 0 (In.)
- Depth to Saturated Soil: 0 (In.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patters in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12”
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (explain in remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Coloso Silty Clay

Drainage Class: Poorly drained **9.1.1.1.6.1**

Taxonomy (Subgroup): Isohyperthermic Aeric Tropic Fluvaquent

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-6	A	10YR 4/3			Sandy silty clay with organic content
6-18	B	10YR 4/3	10YR 4/1 and 10YR 5/8	Common; subangular blocky structure	

Hydric Soil Indicators:

☐ Histosol	☐ Reducing Conditions	☐ High Organic Content in Surface Layer in Sandy Soils
☐ Histic Epipedon	☐ Gleyed or Low-Chroma Colors	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Concretions	☐ Listed on Local Hydric Soils List
☐ Aquatic Moisture Regime	☐ Organic Streaking in Sandy Soils	☐ Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☐	Yes	☒	No	Is this Sampling Point Within a Wetland?	☐ Yes	☒ No
Wetland Hydrology Present?	☐	Yes	☒	No			
Hydric Soils Present?	☒	Yes	☐	No			

Remarks: Sampling pit coordinates N 18°27.667 W 066°42.149. Pit is located approximately 40 feet from drainage canal that runs from east to west in center of project area.

Form Content Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site:	Renewable Power Generation and Resources Recovery Facility	Date:	March 5, 2010
Applicant/Owner:	Energy Answers International	County:	Arecibo
Investigator:	José A. Salguero	State:	Puerto Rico

Do Normal Circumstances exist on the site?	☒	Yes	☐	No	Community ID: RGA
Is the site significantly disturbed (Atypical Situation)?	☐	Yes	☒	No	Transect ID: Pond
Is Area a Potential Problem Area? *(if needed, explain on reverse)*	☐	Yes	☒	No	Plot ID: DP# 1

9.1.1.1.7 VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Panicum maximun*	Herb	FACU-	8			
2	*Ipomoea setifera*	Vine	FACW	9			
3	*Commelina erecta*	Herb	FAC	10			
4	*Mimosa pigra*	Shrub	FACW+	11			
5	*Brachiaria purpurascens*	Vine	FACW	12			
6				13			
7				14			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): **35**
Percent

Remarks:

HYDROLOGY

☐ Recorded Data (describe in Remarks)
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No recorded data available

Field Observations:
- Depth of Surface Water: 0 (In.)
- Depth to Free Water in Pit: 0 (In.)
- Depth to Saturated Soil: 0 (In.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patters in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12”
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (explain in remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Toa Silty Clay Loam

Drainage Class: Well drained **9.1.1.1.7.1**

Taxonomy (Subgroup): Isohyperthermic Fluventic Hapludoll

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-2	A	10YR 3/2			Sandy clay
2-18	A	10YR 4/6			

Hydric Soil Indicators:

☐ Histosol	☐ Reducing Conditions	☐ High Organic Content in Surface Layer in Sandy Soils
☐ Histic Epipedon	☐ Gleyed or Low-Chroma Colors	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Concretions	☐ Listed on Local Hydric Soils List
☐ Aquatic Moisture Regime	☐ Organic Streaking in Sandy Soils	☐ Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☐	Yes	☒	No	Is this Sampling Point Within a Wetland?	☐ Yes	☒ No
Wetland Hydrology Present?	☐	Yes	☒	No			
Hydric Soils Present?	☒	Yes	☐	No			

Remarks: Sampling pit coordinates N 18°27.543 W 066°42.269

Form Content Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site:	Renewable Power Generation and Resources Recovery Facility	Date:	March 5, 2010
Applicant/Owner:	Energy Answers International	County:	Arecibo
Investigator:	José A. Salguero	State:	Puerto Rico

Do Normal Circumstances exist on the site?	☒	Yes	☐	No	Community ID: RGA
Is the site significantly disturbed (Atypical Situation)?	☐	Yes	☒	No	Transect ID: Pond
Is Area a Potential Problem Area? *(if needed, explain on reverse)*	☐	Yes	☒	No	Plot ID: DP# 2

9.1.1.1.8 VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Panicum maximun*	Herb	FACU-	8			
2	*Ipomoea alba*	Vine	FACW	9			
3	*Ipomoea tiliacea*	Vine	UPL	10			
4	*Ipomoea setifera*	Vine	FACW	11			
5	*Cissus verticillata*	Vine	UPL	12			
6				13			
7				14			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): **40**
Percent

Remarks:

HYDROLOGY

☐ Recorded Data (describe in Remarks)
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No recorded data available

Field Observations:
- Depth of Surface Water: 0 (In.)
- Depth to Free Water in Pit: 0 (In.)
- Depth to Saturated Soil: 0 (In.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patters in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12”
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (explain in remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Toa Silty Clay Loam

Drainage Class: Well drained **9.1.1.1.8.1**

Taxonomy (Subgroup): Isohyperthermic Fluventic Hapludoll

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-18	A	10YR 4/3			Sandy clay

Hydric Soil Indicators:

☐ Histosol	☐ Reducing Conditions	☐ High Organic Content in Surface Layer in Sandy Soils
☐ Histic Epipedon	☐ Gleyed or Low-Chroma Colors	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Concretions	☐ Listed on Local Hydric Soils List
☐ Aquatic Moisture Regime	☐ Organic Streaking in Sandy Soils	☐ Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☐	Yes	☒	No	Is this Sampling Point Within a Wetland?	☐ Yes	☒ No
Wetland Hydrology Present?	☐	Yes	☒	No			
Hydric Soils Present?	☒	Yes	☐	No			

Remarks: Sampling pit coordinates N 18°27.760 W 066°42.490

Form Content Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site:	Renewable Power Generation and Resources Recovery Facility	Date:	March 5, 2010
Applicant/Owner:	Energy Answers International	County:	Arecibo
Investigator:	José A. Salguero	State:	Puerto Rico

Do Normal Circumstances exist on the site?	☒	Yes	☐	No	Community ID: RGA
Is the site significantly disturbed (Atypical Situation)?	☐	Yes	☒	No	Transect ID: Pond
Is Area a Potential Problem Area? *(if needed, explain on reverse)*	☐	Yes	☒	No	Plot ID: DP# 3

9.1.1.1.9 VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Panicum maximun*	Herb	FACU-	8			
2	*Ipomoea setifera*	Vine	FACW	9			
3	*Commelina erecta*	Herb	FAC	10			
4	*Mimosa pigra*	Shrub	FACW+	11			
5	*Brachiaria purpurascens*	Vine	FACW	12			
6				13			
7				14			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): **35**
Percent

Remarks:

HYDROLOGY

☐ Recorded Data (describe in Remarks)
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No recorded data available

Field Observations:
- Depth of Surface Water: 0 (In.)
- Depth to Free Water in Pit: 0 (In.)
- Depth to Saturated Soil: 0 (In.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patters in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12”
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (explain in remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Toa Silty Clay Loam

Drainage Class: Well drained **9.1.1.1.9.1**

Taxonomy (Subgroup): Isohyperthermic Fluventic Hapludoll

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-4	A	10YR 3/2			Sandy clay
4-18	A	10YR 4/6			

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquatic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ Organic Streaking in Sandy Soils
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☒ Listed on National Hydric Soils List
- ☐ Listed on Local Hydric Soils List
- ☐ Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☐ Yes ☒ No

Wetland Hydrology Present? ☐ Yes ☒ No

Hydric Soils Present? ☒ Yes ☐ No

Is this Sampling Point Within a Wetland? ☐ Yes ☒ No

Remarks: Sampling pit coordinates N 18°27.507 W 066°42.282

Form Content Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site:	Renewable Power Generation and Resources Recovery Facility	Date:	March 5, 2010
Applicant/Owner:	Energy Answers International	County:	Arecibo
Investigator:	José A. Salguero	State:	Puerto Rico

Do Normal Circumstances exist on the site?	☒	Yes	☐	No	Community ID: RGA
Is the site significantly disturbed (Atypical Situation)?	☐	Yes	☒	No	Transect ID: Pond
Is Area a Potential Problem Area? *(if needed, explain on reverse)*	☐	Yes	☒	No	Plot ID: DP# 4

9.1.1.1.10 VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Panicum maximun*	Herb	FACU-	8			
2	*Ipomoea alba*	Vine	FACW	9			
3	*Spathodea campanulata*	Tree	UPL	10			
4	*Ipomoea setifera*	Vine	FACW	11			
5	*Ipomoea tiliacea*	Vine	UPL	12			
6	*Cissus verticillata*	Vine	UPL	13			
7				14			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): **40 Percent**

Remarks:

HYDROLOGY

☐ Recorded Data (describe in Remarks)
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No recorded data available

Field Observations:
- Depth of Surface Water: 0 (In.)
- Depth to Free Water in Pit: 0 (In.)
- Depth to Saturated Soil: 0 (In.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patters in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12”
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (explain in remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Toa Silty Clay Loam

Drainage Class: Well drained **9.1.1.1.10.1**

Taxonomy (Subgroup): Isohyperthermic Fluventic Hapludoll

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-18	A	10YR 4/3			Sandy clay

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquatic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ Organic Streaking in Sandy Soils
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☒ Listed on National Hydric Soils List
- ☐ Listed on Local Hydric Soils List
- ☐ Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☐	Yes	☒	No	Is this Sampling Point Within a Wetland?	☐	Yes ☒ No
Wetland Hydrology Present?	☐	Yes	☒	No			
Hydric Soils Present?	☒	Yes	☐	No			

Remarks: Sampling pit coordinates N 18°27.557 W 066°42.326

Form Content Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site:	Renewable Power Generation and Resources Recovery Facility	Date:	March 5, 2010
Applicant/Owner:	Energy Answers International	County:	Arecibo
Investigator:	José A. Salguero	State:	Puerto Rico

Do Normal Circumstances exist on the site?	☒	Yes	☐	No	Community ID:	RGA
Is the site significantly disturbed (Atypical Situation)?	☐	Yes	☒	No	Transect ID:	Storage Area
Is Area a Potential Problem Area? *(if needed, explain on reverse)*	☐	Yes	☒	No	Plot ID:	DP# 1

9.1.1.1.11 VEGETATION

Dominant Plant Species		Stratum	Indicator	Dominant Plant Species		Stratum	Indicator
1	*Paspalum fasciculatum*	Herb	UPL	8			
2	*Ipomoea tiliacea*	Vine	UPL	9			
3	*Panicum maximun*	Herb	FACU-	10			
4				11			
5				12			
6				13			
7				14			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): **0 Percent**

Remarks:

HYDROLOGY

☐ Recorded Data (describe in Remarks)
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No recorded data available

Field Observations:
- Depth of Surface Water: 0 (In.)
- Depth to Free Water in Pit: 0 (In.)
- Depth to Saturated Soil: 0 (In.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patters in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12”
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (explain in remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Coloso Silty Clay

Drainage Class: Poorly drained **9.1.1.1.11.1**

Taxonomy (Subgroup): Isohyperthermic Aeric Tropic Fluvaquent

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-1.5	A	10YR 4/3			Sandy clay with organic content
1.5-18	A	10YR 5/6			

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquatic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ Organic Streaking in Sandy Soils
- ☒ High Organic Content in Surface Layer in Sandy Soils
- ☒ Listed on National Hydric Soils List
- ☐ Listed on Local Hydric Soils List
- ☐ Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☐	Yes	☒	No	Is this Sampling Point Within a Wetland? ☐ Yes ☒ No	
Wetland Hydrology Present?	☐	Yes	☒	No		
Hydric Soils Present?	☒	Yes	☐	No		

Remarks: Sampling pit coordinates N 18°27.567 W 066°42.141;

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DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site:	Renewable Power Generation and Resources Recovery Facility	Date:	30-August-2010
Applicant/Owner:	Energy Answers International	County:	Arecibo
Investigator:	ML Rivera-Vázquez	State:	Puerto Rico

Do Normal Circumstances exist on the site?	☒	Yes	☐	No	Community ID:	RGA
Is the site significantly disturbed (Atypical Situation)?	☐	Yes	☒	No	Transect ID:	Carretera
Is Area a Potential Problem Area? *(if needed, explain on reverse)*	☐	Yes	☒	No	Plot ID:	CC-1

9.1.1.1.12 VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Urochloa maxima*	Herb	FACU-	8	*Sorghum halapense*	Herb	FAC
2	*Paspalum virgatum*	Herb	FACW-	9			
3	*Cyperus odoratus*	Herb	FACW+	10			
4	*Melochia pyramidata*	Herb	FAC	11			
5	*Ipomoea tiliacea*	Vine	FACW	12			
6	*Urena lobata*	Shrub	FAC	13			
7	*Senna bicapsularis*	Shrub	FAC	14			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 30%

Remarks
:

HYDROLOGY

☐ Recorded Data (describe in Remarks)
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No recorded data available

Field Observations:
- Depth of Surface Water: 0 (In.)
- Depth to Free Water in Pit: 0 (In.)
- Depth to Saturated Soil: 0 (In.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patters in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12”
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (explain in remarks)

Remarks
:

SOILS

Map Unit Name (Series and Phase): Coloso Silty Clay

Drainage Class: Poorly drained **9.1.1.1.12.1**

Taxonomy (Subgroup): Isohyperthermic Aeric Tropic Fluvaquent

Field Observations Confirm Mapped Type? **Yes** No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-18	A	10YR 3/2			

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquatic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ Organic Streaking in Sandy Soils
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☒ Listed on National Hydric Soils List
- ☐ Listed on Local Hydric Soils List
- ☐ Other (explain in remarks)

Remarks: Sampling pit coordinates 18.45833707N 66.69910169W

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☐ Yes ☒ No

Wetland Hydrology Present? ☐ Yes ☒ No

Hydric Soils Present? ☒ Yes ☐ No

Is this Sampling Point Within a Wetland? ☐ Yes ☒ No

Remarks: Sampling pit coordinates 18.45833707N 66.69910169W

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DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site:	Renewable Power Generation and Resources Recovery Facility	Date:	30-August-2010
Applicant/Owner:	Energy Answers International	County:	Arecibo
Investigator:	ML Rivera-Vázquez	State:	Puerto Rico

Do Normal Circumstances exist on the site?	☒	Yes	☐	No	Community ID: RGA
Is the site significantly disturbed (Atypical Situation)?	☐	Yes	☒	No	Transect ID: Carretera
Is Area a Potential Problem Area? *(if needed, explain on reverse)*	☐	Yes	☒	No	Plot ID: CC-2

9.1.1.1.13 VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Urpchloa maxima*	Herb	FACU-	8			
2	*Commelina erecta*	Herb	FAC	9			
3	*Neptunia plena*	Herb	FACW	10			
4	*Ludwigia sp.*	Herb	OBL	11			
5	*Paspalum virgatum*	Herb	FACW-	12			
6				13			
7				14			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 10%

Remarks
:

HYDROLOGY

☐ Recorded Data (describe in Remarks)
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No recorded data available

Field Observations:
- Depth of Surface Water: 0 (In.)
- Depth to Free Water in Pit: 0 (In.)
- Depth to Saturated Soil: 0 (In.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patters in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12”
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (explain in remarks)

Remarks
:

SOILS

Map Unit Name (Series and Phase): Coloso Silty Clay

Drainage Class: Poorly drained **9.1.1.1.13.1**

Taxonomy (Subgroup): Isohyperthermic Aeric Tropic Fluvaquent

Field Observations Confirm Mapped Type? **Yes** No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-10	A	10YR 3/2			Silty clay
10-18	B	10YR 3/4			Silty clay

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquatic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ Organic Streaking in Sandy Soils
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☒ Listed on National Hydric Soils List
- ☐ Listed on Local Hydric Soils List
- ☐ Other (explain in remarks)

Remarks: Sampling pit coordinates 18.45813389N 66.69887873W

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☐ Yes ☒ No

Wetland Hydrology Present? ☐ Yes ☒ No

Hydric Soils Present? ☒ Yes ☐ No

Is this Sampling Point Within a Wetland? ☐ Yes ☒ No

Remarks: Sampling pit coordinates 18.45813389N 66.69887873W

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DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site:	Renewable Power Generation and Resources Recovery Facility	Date:	30-August-2010
Applicant/Owner:	Energy Answers International	County:	Arecibo
Investigator:	ML Rivera-Vázquez	State:	Puerto Rico

Do Normal Circumstances exist on the site?	☒	Yes	☐	No	Community ID:	RGA
Is the site significantly disturbed (Atypical Situation)?	☐	Yes	☒	No	Transect ID:	Carretera
Is Area a Potential Problem Area? *(if needed, explain on reverse)*	☐	Yes	☒	No	Plot ID:	CC-3

9.1.1.1.14 VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Urochloa maxima*	Herb	FACU-	8			
2	*Commelina erecta*	Herb	FAC	9			
3	*Neptunia plena*	Herb	FACW	10			
4	*Paspalum virgatum*	Herb	FACW-	11			
5				12			
6				13			
7				14			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 25%

Remarks
:

HYDROLOGY

☐ Recorded Data (describe in Remarks)
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No recorded data available

Field Observations:
- Depth of Surface Water: 0 (In.)
- Depth to Free Water in Pit: 0 (In.)
- Depth to Saturated Soil: 0 (In.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patters in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12”
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (explain in remarks)

Remarks
:

SOILS

Map Unit Name (Series and Phase): Coloso Silty Clay

Drainage Class: Poorly drained **9.1.1.1.14.1**

Taxonomy (Subgroup): Isohyperthermic Aeric Tropic Fluvaquent

Field Observations Confirm Mapped Type? **Yes** No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-8	A	10YR 4/2			Silty clay
8-18	B	10YR 4/3			Silty clay

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquatic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ Organic Streaking in Sandy Soils
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☒ Listed on National Hydric Soils List
- ☐ Listed on Local Hydric Soils List
- ☐ Other (explain in remarks)

Remarks: Sampling pit coordinates 18.45785787N 66.69880095W

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☐ Yes ☒ No

Wetland Hydrology Present? ☐ Yes ☒ No

Hydric Soils Present? ☒ Yes ☐ No

Is this Sampling Point Within a Wetland? ☐ Yes ☒ No

Remarks: Sampling pit coordinates 18.45785787N 66.69880095W

Form Content Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site:	Renewable Power Generation and Resources Recovery Facility	Date:	3-September-2010
Applicant/Owner:	Energy Answers International	County:	Arecibo
Investigator:	ML Rivera-Vázquez	State:	Puerto Rico

Do Normal Circumstances exist on the site?	☒	Yes	☐	No	Community ID: RGA
Is the site significantly disturbed (Atypical Situation)?	☐	Yes	☒	No	Transect ID: Central Cambalache
Is Area a Potential Problem Area? *(if needed, explain on reverse)*	☐	Yes	☒	No	Plot ID: CC-4

9.1.1.1.15 VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Urochloa maxima*	Herb	FACU-	8			
2	*Paspalum virgatum*	Herb	FACW-	9			
3	*Commelina erecta*	Herb	FAC	10			
4				11			
5				12			
6				13			
7				14			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 10%

Remarks
:

HYDROLOGY

☐ Recorded Data (describe in Remarks)
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No recorded data available

Field Observations:
- Depth of Surface Water: 0 (In.)
- Depth to Free Water in Pit: 0 (In.)
- Depth to Saturated Soil: 0 (In.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patters in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12”
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (explain in remarks)

Remarks
:

SOILS

Map Unit Name (Series and Phase): Coloso Silty Clay

Drainage Class: Poorly drained **9.1.1.1.15.1**

Taxonomy (Subgroup): Isohyperthermic Aeric Tropic Fluvaquent

Field Observations Confirm Mapped Type? **Yes** No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-18	A	10YR 4/3			Silty clay

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquatic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ Organic Streaking in Sandy Soils
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☒ Listed on National Hydric Soils List
- ☐ Listed on Local Hydric Soils List
- ☐ Other (explain in remarks)

Remarks: Sampling pit coordinates 18.45723225N 66.69850146W

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☐ Yes ☒ No

Wetland Hydrology Present? ☐ Yes ☒ No

Hydric Soils Present? ☒ Yes ☐ No

Is this Sampling Point Within a Wetland? ☐ Yes ☒ No

Remarks: Sampling pit coordinates 18.45723225N 66.69850146W

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DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site:	Renewable Power Generation and Resources Recovery Facility	Date:	30-August-2010
Applicant/Owner:	Energy Answers International	County:	Arecibo
Investigator:	ML Rivera-Vázquez	State:	Puerto Rico

Do Normal Circumstances exist on the site?	☒	Yes	☐	No	Community ID: RGA
Is the site significantly disturbed (Atypical Situation)?	☐	Yes	☒	No	Transect ID: Centro
Is Area a Potential Problem Area? *(if needed, explain on reverse)*	☐	Yes	☒	No	Plot ID: CC-5

9.1.1.1.16 VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Urochloa maxima*	Herb	FACU-	8			
2	*Paspalum virgatum*	Herb	FACW-	9			
3	*Ludwigia sp.*	Herb	OBL	10			
4	*Neptunia plena*	Herb	FACW	11			
5	*Sesbania sericea*	Shrub	FACW	12			
6				13			
7				14			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 75%

Remarks
:

HYDROLOGY

☐ Recorded Data (describe in Remarks)
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No recorded data available

Field Observations:
- Depth of Surface Water: 0 (In.)
- Depth to Free Water in Pit: 0 (In.)
- Depth to Saturated Soil: 0 (In.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patters in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12”
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (explain in remarks)

Remarks
:

SOILS

Map Unit Name (Series and Phase): Coloso Silty Clay

Drainage Class: Poorly drained **9.1.1.1.16.1**

Taxonomy (Subgroup): Isohyperthermic Aeric Tropic Fluvaquent

Field Observations Confirm Mapped Type? **Yes** No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-18	A	10YR 4/2			Silty clay
18-20	B	10YR 4/3			Silty clay

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquatic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ Organic Streaking in Sandy Soils
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☒ Listed on National Hydric Soils List
- ☐ Listed on Local Hydric Soils List
- ☐ Other (explain in remarks)

Remarks: Sampling pit coordinates 18.45739469N 66.69990795W

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☒ Yes ☐ No

Wetland Hydrology Present? ☐ Yes ☒ No

Hydric Soils Present? ☒ Yes ☐ No

Is this Sampling Point Within a Wetland? ☐ Yes ☒ No

Remarks: Sampling pit coordinates 18.45739469N 66.69990795W

Form Content Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site:	Renewable Power Generation and Resources Recovery Facility	Date:	30-August-2010
Applicant/Owner:	Energy Answers International	County:	Arecibo
Investigator:	ML Rivera-Vázquez	State:	Puerto Rico

Do Normal Circumstances exist on the site?	☒	Yes	☐	No	Community ID: RGA
Is the site significantly disturbed (Atypical Situation)?	☐	Yes	☒	No	Transect ID: Centro
Is Area a Potential Problem Area? *(if needed, explain on reverse)*	☐	Yes	☒	No	Plot ID: CC-6

9.1.1.1.17 VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Paspalum fasciculatum*	Herb	FACW	8			
2	*Ludwigia sp.*	Herb	OBL	9			
3	*Mimosa pudica*	Herb	FAC	10			
4	*Sesbania sericea*	Shrub	FACW	11			
5	*Paspalum virgatum*	Herb	FACW	12			
6	*Urochloa maxima*	Herb	FACU-	13			
7				14			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 50%

Remarks
:

HYDROLOGY

☐ Recorded Data (describe in Remarks)
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No recorded data available

Field Observations:
- Depth of Surface Water: 0 (In.)
- Depth to Free Water in Pit: 0 (In.)
- Depth to Saturated Soil: 0 (In.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patters in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12”
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (explain in remarks)

Remarks
:

SOILS

Map Unit Name (Series and Phase): Coloso Silty Clay

Drainage Class: Poorly drained **9.1.1.1.17.1**

Taxonomy (Subgroup): Isohyperthermic Aeric Tropic Fluvaquent

Field Observations Confirm Mapped Type? **Yes** No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-18	A	10YR 4/3			Silty clay

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquatic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ Organic Streaking in Sandy Soils
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☒ Listed on National Hydric Soils List
- ☐ Listed on Local Hydric Soils List
- ☐ Other (explain in remarks)

Remarks: Sampling pit coordinates 18.45777305N 66.70035328W

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☒ Yes ☐ No

Wetland Hydrology Present? ☐ Yes ☒ No

Hydric Soils Present? ☒ Yes ☐ No

Is this Sampling Point Within a Wetland? ☐ Yes ☒ No

Remarks: Sampling pit coordinates 18.45777305N 66.70035328W

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DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project Site:	Renewable Power Generation and Resources Recovery Facility	Date:	30-August-2010
Applicant/Owner:	Energy Answers International	County:	Arecibo
Investigator:	ML Rivera-Vázquez	State:	Puerto Rico

Do Normal Circumstances exist on the site?	☒	Yes	☐	No	Community ID: RGA
Is the site significantly disturbed (Atypical Situation)?	☐	Yes	☒	No	Transect ID: Centro
Is Area a Potential Problem Area? *(if needed, explain on reverse)*	☐	Yes	☒	No	Plot ID: CC-7

9.1.1.1.18 VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Urochloa maxima*	Herb	FACU-	8			
2	*Commelina erecta*	Herb	FAC	9			
3	*Melochia pyramidata*	Herb	FAC	10			
4	*Paspalum fasciculatum*	Herb	FACW	11			
5	*Paspalum conjugatum*	Herb	FAC	12			
6	*Sorghum halapense*	Herb	FAC	13			
7				14			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 10%

Remarks
:

HYDROLOGY

☐ Recorded Data (describe in Remarks)
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No recorded data available

Field Observations:
- Depth of Surface Water: 0 (In.)
- Depth to Free Water in Pit: 0 (In.)
- Depth to Saturated Soil: 0 (In.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patters in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12”
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (explain in remarks)

Remarks
:

SOILS

Map Unit Name (Series and Phase): Coloso Silty Clay

Drainage Class: Poorly drained **9.1.1.1.18.1**

Taxonomy (Subgroup): Isohyperthermic Aeric Tropic Fluvaquent

Field Observations Confirm Mapped Type? **Yes** No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-8	A	10YR 3/4			Silty sandy clay
8-18	B	10YR 3/2			Silty sandy clay

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquatic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ Organic Streaking in Sandy Soils
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☒ Listed on National Hydric Soils List
- ☐ Listed on Local Hydric Soils List
- ☐ Other (explain in remarks)

Remarks: Sampling pit coordinates 18.45786734N 66.70092509W

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☐ Yes ☒ No

Wetland Hydrology Present? ☐ Yes ☒ No

Hydric Soils Present? ☒ Yes ☐ No

Is this Sampling Point Within a Wetland? ☐ Yes ☒ No

Remarks: Sampling pit coordinates 18.45786734N 66.70092509W

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