

2.8 Land Use and Zoning

2.8.1 Existing Use of the Project Site and Adjacent Areas

Most part of the Project site, with an approximate area of 82 *cuerdas*, has been altered by previous activities of Global Paper Mill. The natural topography was modified to reach the existing ground level for the construction of the paper mill structures, the ponds, the channels and other elements. The structures in the west side of the Project site are made of steel frame and are in deteriorated conditions.

The closest house is located north the Project site, adjacent to State Road PR-2. This house is located at 569 meters from the center of the Project site. The schools, courts, hospitals, mental health hospitals and clinics are considered as quiet zones by the EQB. The closest school is located at approximately 1,480 meters northwest of the Project site, and the closest hospital is located at approximately 2,035 meters northwest the Project site. **Figure 2-17** shows the house and quiet zones that are closest to the Project site.

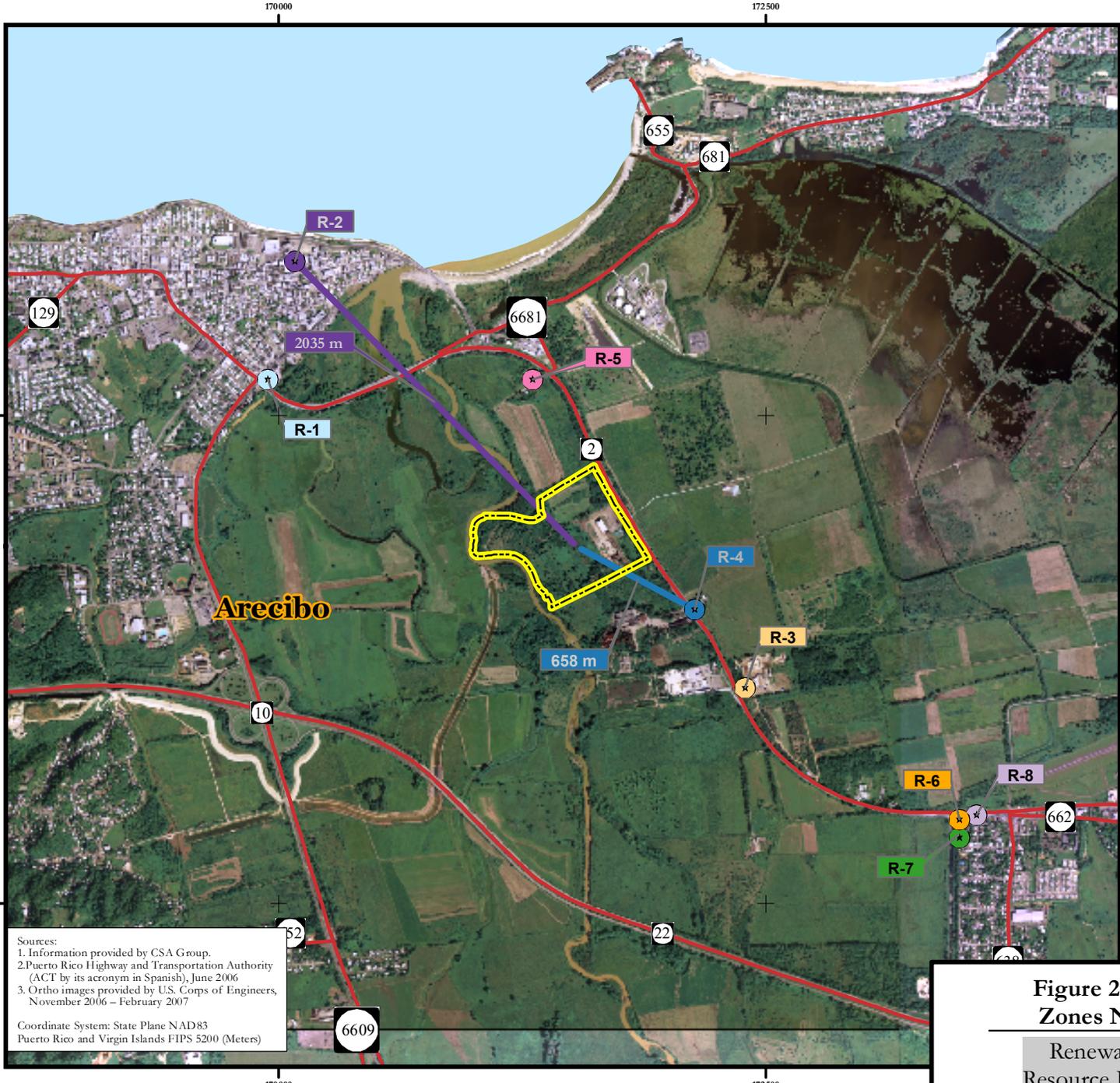
According to visual inspections performed by CSA and the Puerto Rico 2006 and 2007 GAP Analysis Project from the Institute of Tropical Forestry of the US Department of Agriculture, the land use in the Project site and adjacent areas are as follow:

- The structures of the Global Fiber Paper Mill that operated from 1959 to 1996 are located on the east/southeast area of the Project site;
- The remaining area of the Project site is covered by grassland herbaceous vegetation. Although this vegetation is shown in the Land Use Map (USDA 2006) as areas of herbaceous wetlands, there are no wetlands in the Project site, and only the areas occupied by the drainage channels would be subject to the USACE jurisdiction because of their connection to the RGA, as determined by field inspections;
- A small portion south the Project site is occupied by trees, while its northwestern area is shown as a grazing or crop area. However, during field inspections it was verified that aforementioned areas are used as pasturelands and are periodically maintained as part of the property maintenance program, to keep clear the existing internal tracks and to control grass growth;

- The areas around the Project site are surrounded by unused vacant grasslands that were used for sugarcane planting in the past;
- Further south, lands that were industrially used for sugar manufacturing (Former Central Cambalache Sugar Mill) and currently not in use are prevalent;
- Southwest from the former Central Cambalache Sugar Mill, vacant grasslands covered by herbaceous vegetation are identified in the land use map. However, during field inspections and through communications with PREPA, it was verified that the electrical substation that will be used to connect the power generated at the Plant to PREPA's transmission system is located in this area;
- Additional industrial and commercial uses related to concrete blocks manufacturing and battery recycling are evident to the south and southeast area of the former Central Cambalache Sugar Mill;
- The RGA borders the Project site on its west side. Further west, the surrounding lands are predominantly vacant with no use and are covered by herbaceous vegetation typical of grassland;
- State Road PR-2 borders the east side of the Project site. Across State Road PR-2, to the east, the lands are vacant and covered by grasslands with isolated small residential settlements. See **Figure 2-17**;
- The aforementioned land use map shows that the proposed pipeline corridor would run along the right of way of roads PR-2, PR-6681 and PR-681, which are used for transportation, infrastructure and communications. The pumping station area is identified as a developed area with residential settlements surrounded by grassland plains.

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Legend:

Receptors¹

- R-1, Pharmacy (*Farmacia del Carmen*), Commercial
- R-2, Dr Susoni, Hospital Quiet Zone
- R-3, Battery Recycling Center, Industrial
- R-4, Residential Properties
- R-5, Residential Properties
- R-6, Residential Properties
- R-7, Residential Properties
- R-8, Residential Properties
- Roads²
- Property Boundary



Sources:
 1. Information provided by CSA Group.
 2. Puerto Rico Highway and Transportation Authority (ACT by its acronym in Spanish), June 2006
 3. Ortho images provided by U.S. Corps of Engineers, November 2006 – February 2007

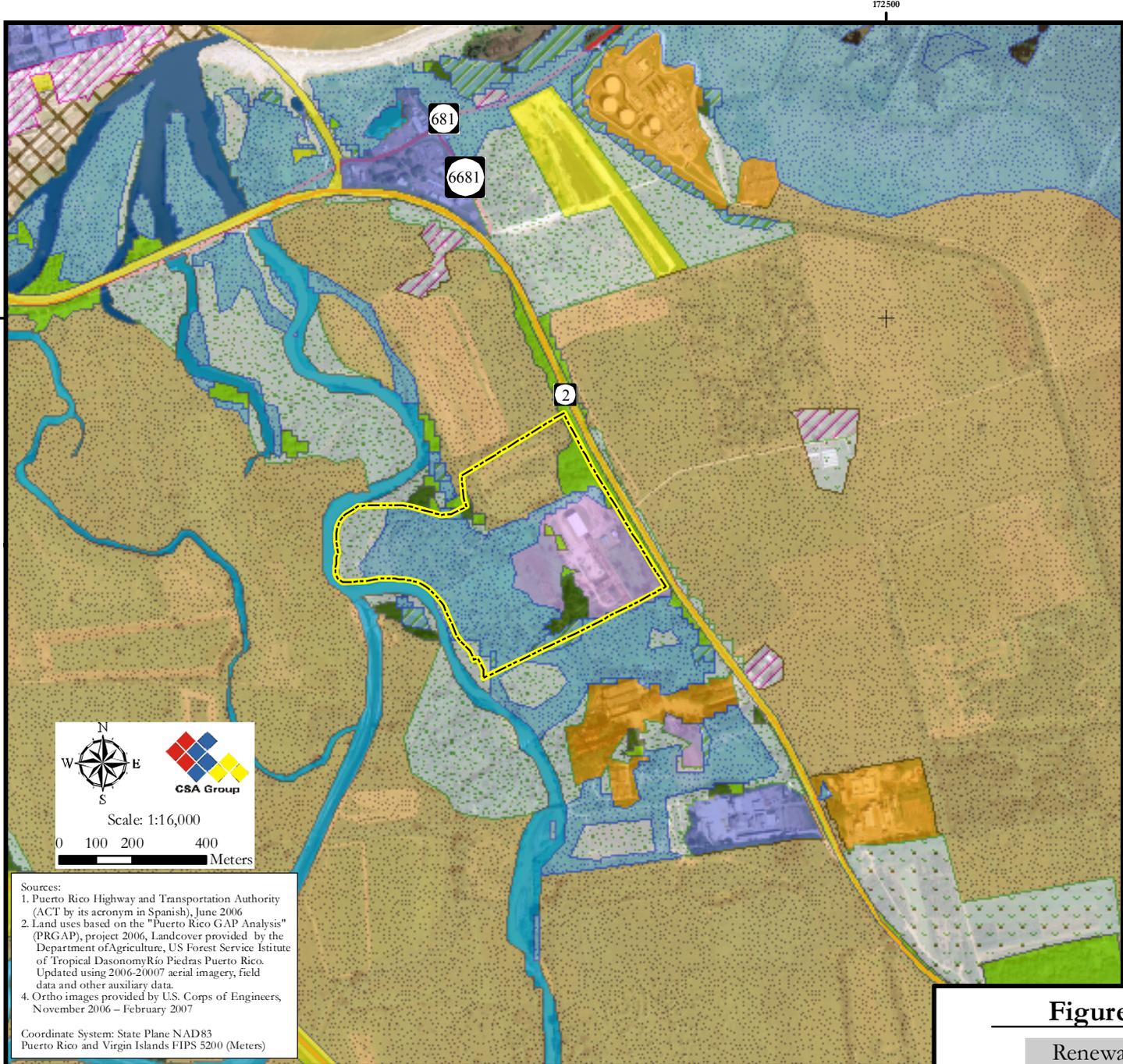
Coordinate System: State Plane NAD83
 Puerto Rico and Virgin Islands FIPS 5200 (Meters)

Figure 2-17: Residential and Quiet Zones Nearest to the Project Site

Renewable Power Generation and Resource Recovery Plant / Arecibo, PR

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- Legend:**
- Roads¹
 - Property Boundary
 - Land Uses²**
 - 11, Residential
 - 12, Commercial and Services
 - 13, Industrial
 - 14, Transportation, Communications, and Utilities
 - 15, Industrial and Commercial Complexes
 - 16, Mixed Urban or Built-up Land
 - 21, Cropland and Pasture
 - 22, Orchards, Groves, Vineyards, Nurseries, and Ornamental Horticultural Areas
 - 31, Herbaceous Rangeland
 - 32, Shrub and Brush Rangeland
 - 42, Evergreen Forest Land
 - 51, Streams and Canals
 - 54, Bays and Estuaries
 - 61, Forested Wetland
 - 62, Nonforested Wetland
 - 72, Beaches



Sources:

1. Puerto Rico Highway and Transportation Authority (ACT by its acronym in Spanish), June 2006
2. Land uses based on the "Puerto Rico GAP Analysis" (PRGAP), project 2006, Landcover provided by the Department of Agriculture, US Forest Service Institute of Tropical Dasonomy Río Piedras Puerto Rico. Updated using 2006-20007 aerial imagery, field data and other auxiliary data.
4. Ortho images provided by U.S. Corps of Engineers, November 2006 – February 2007

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

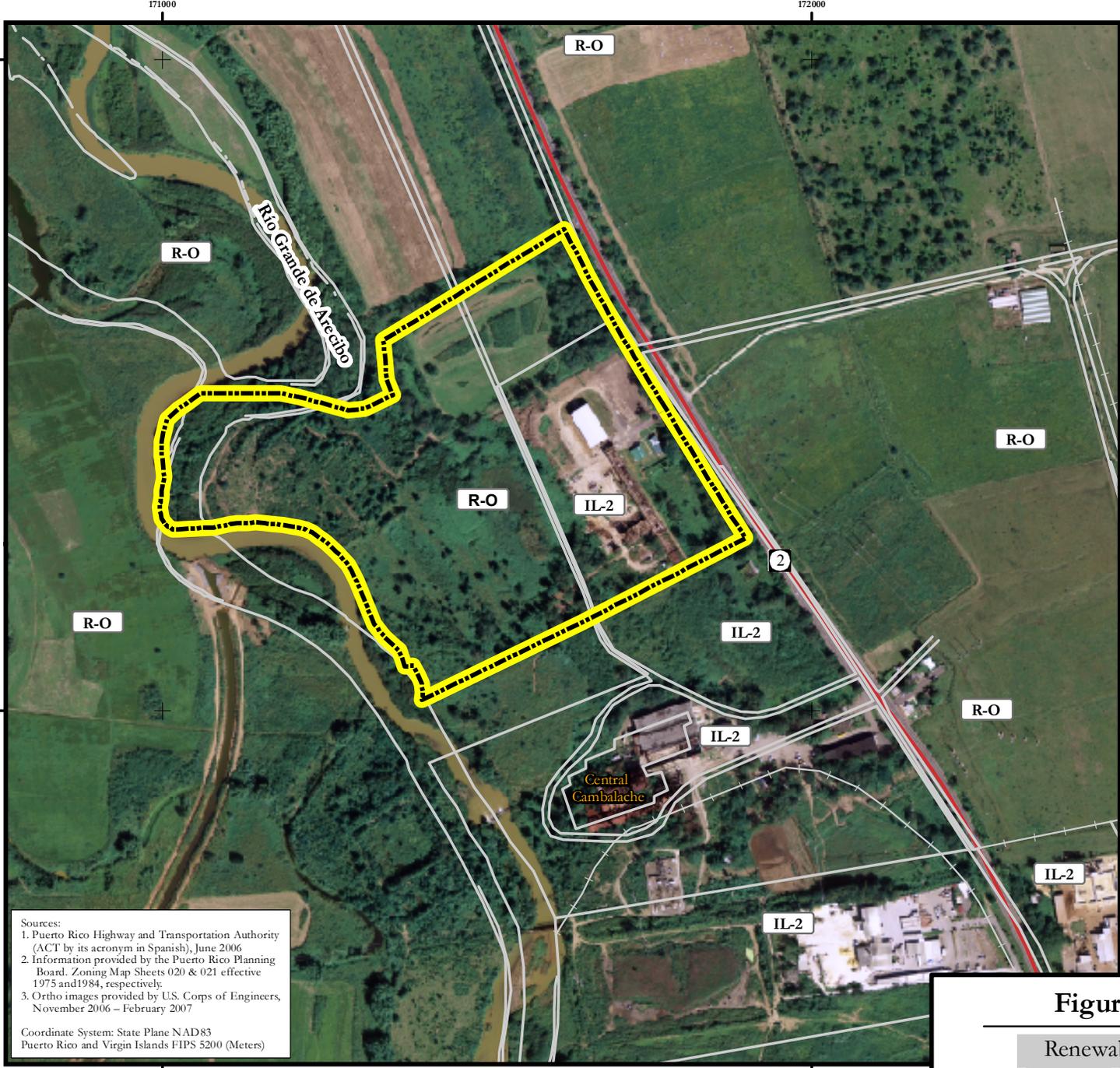
Figure 2-18: Land Use Map
 Renewable Power Generation and Resource Recovery Plant / Arcibo, PR

2.8.2 Zoning

Zoning in Arecibo is ruled by the Puerto Rico Zoning Regulation (Planning Regulation No. 4 of the PRPB) of December, 2008 and by the Arecibo Land Use Plan (POT) effective June 6, 1993 (currently under evaluation by the PRPB). According to PRPB Zoning Maps Sheet Number 20 (effective since 1975), the zoning district in the southeastern portion of the Project site (location of the abandoned structures) is IL-2 (Light Industrial 2). IL-2 districts are equivalent to the I-P district (Heavy Industrial), as established by the transitional clause of Regulation No. 4, Section 1.12. The I-P district is established to classify heavy industrial areas that are developed or will be developed for specific Projects which, because of their nature and identity, require a special location. On the other hand, it should be noted that the remaining area of the Project site is zoned as a UR district (Developable Land), previously zoned as District R-0 (Residential Zero). See **Figure 2-19**. The proposed use for the Project site in the corresponding Arecibo POT map, which, as previously indicated, is currently under evaluation by the PRPB, is consistent with the proposed use. For more details refer to **Section 3.6**.

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- Sources:
1. Puerto Rico Highway and Transportation Authority (ACT by its acronym in Spanish), June 2006
 2. Information provided by the Puerto Rico Planning Board. Zoning Map Sheets 020 & 021 effective 1975 and 1984, respectively.
 3. Ortho images provided by U.S. Corps of Engineers, November 2006 – February 2007

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



Scale: 1:9,000



Legend:

- Roads¹
- Property Boundary

Zoning Districts²

<i>Residential Districts</i>	
R-0 (UR)	Building Land <i>(Terrenos Urbanizables)</i>
	<i>Urbanizables</i>
<i>Industrial Districts</i>	
IL-2 (I-P)	Heavy Industrial <i>(Industrial Pesado)</i>
	<i>Pesado</i>



Figure 2-19: Zoning Map

Renewable Power Generation and Resource Recovery Plant / Arcibo, PR

2.9 Infrastructure

This section describes the existing infrastructure components in the area of the Project site. Infrastructure components include water mains (drinking water), storm and sanitary sewers pipelines, electric lines and solid waste facilities.

2.9.1 Drinking Water

PRASA supplies more than 617 million gallons per day (mgd) of drinking water to approximately 3.8 million people through a system composed of approximately 130 filtration plants, 328 deep wells, 12,400 kilometers of water mains (pipelines), 1,679 storage tanks, and thousands pumping stations and valves. The primary types of drinking water facilities operating in Puerto Rico are: potable water filtration plants, partial water filtration plants, wells and springs. Potable water filtration plants treat raw water by chemical coagulation, filtration and disinfection. Partial treatment involves a similar process but without filtering. Water taken from wells and springs is usually disinfected and then pumped to distribution systems.

The Santiago Vazquez Potable Water Filtration Plant (the Plant) is approximately 4.8 miles southeast of the Site and has capacity to supply approximately 100 million of galling (mg) of potable water. The water from the filtration plant flows through a 36inch diameter transmission line along State Road (SR) PR-22 heading south from the Project site to Domingo Ruiz Avenue. Then the transmission line is reduced to a 16-inch diameter pipe until reaching State Road PR-2 where the line connects to the existing 12-inch diameter pipepipeline that runs along the eastern boundary of the Project site. This 12-inch diameter pipeline continues toward State Road PR-6681 (northbound) in an east-west direction along the State Road PR-681. At SR PR-10 (northern portion) near a diversion channel the pipeline transitions to a 12-16 inch diameter pipe.

Figure 2-20 on page 68 shows the location of these water mains along the aforementioned state roads.

Roughly four (4) miles southeast from the the Project site, there are two (2) water tanks with storage capacity of approximately 7 million gallons (MG). The Project site is connected to the PRASA system with drinking water infrastructure. The location of these transmission lines (water mains) along the road is displayed in **Figure 2-20**. **Table 2-7** presents information related

to the design capacity and current production of the Santiago Vázquez Water Filtration Plant.

Table 2-7: Existing Filtration Plant in Arecibo

Name of the Water Filtration Plant	Design Capacity (mgd)	Current Production Capacity (mgd)
Santiago Vázquez Water Filtration Planta	100	100

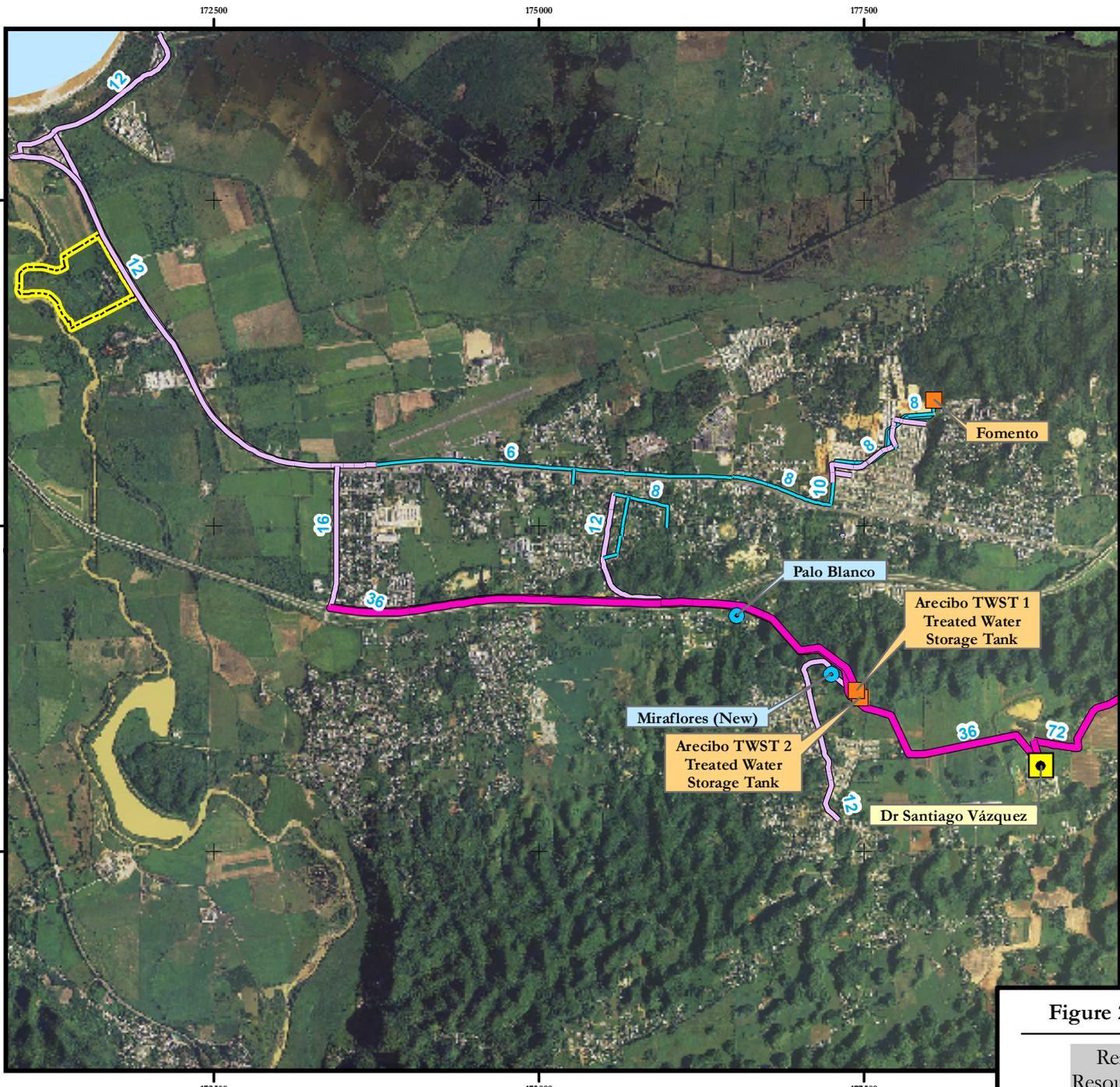
Source: PRASA, June 30, 2009.

2.9.2 Sanitary Sewer System

PRASA operates 60 wastewater treatment plants throughout Puerto Rico, Vieques and Culebra. These treatment plants serve roughly 55% of the population of the Island processing an average 308 mgd per day. Most of the urban centers in the 78 municipalities have sanitary sewer service provided by PRASA. Individual, commercial and industrial septic tanks are used in most rural areas of the island, discharging and infiltrating into the subsoil. The wastewater inflow received by the PRASA wastewater treatment plants is primarily domestic discharges.

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Legend:

-  Pump Station¹
-  Water Filtration Plant¹
-  Tanks¹

Water Pipes¹

Diameter in inches

-  6-10
-  12-16
-  36-72

 Property Limit

Sources:
 1. Data obtained from Puerto Rico Aqueduct and Sewer Authority, July, 2009
 2. Puerto Rico Highway and Transportation Authority (ACT by its 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 and Virgin Islands FIPS 5200 (Meters)



Figure 2-20: PRASA Water Infrastructure

Renewable Power Generation and Resource Recovery Plant / Arecibo, PR

The Arecibo Regional Wastewater Treatment Plant is the primary wastewater treatment plant that receives the wastewater from the Arecibo region, located in the Islote Ward roughly two miles northeast of the Project site. The plant receives has a capacity of 10 MG, but the average flow is recorded a 4.3 mgd (Refer to **Table 2-8**). The treated effluent from the plant is discharged into the Atlantic Ocean..

Table 2-8: Arecibo Regional Wastewater Treatment Plant

Municipality	Treatment Type	Design Capacity (mgd)	Average Flow (mgd)
Arecibo	Primary	10	4.3

Source: PRASA, Jue 30, 2009.

Although the Project site has no connection to the sanitary sewer system, there is a 48-inch diameter sanitary trunk line along State Road PR-2 in the eastern boundary of the site. Refer to **Figure 2-21** on the next page for the location of this infrastructure.

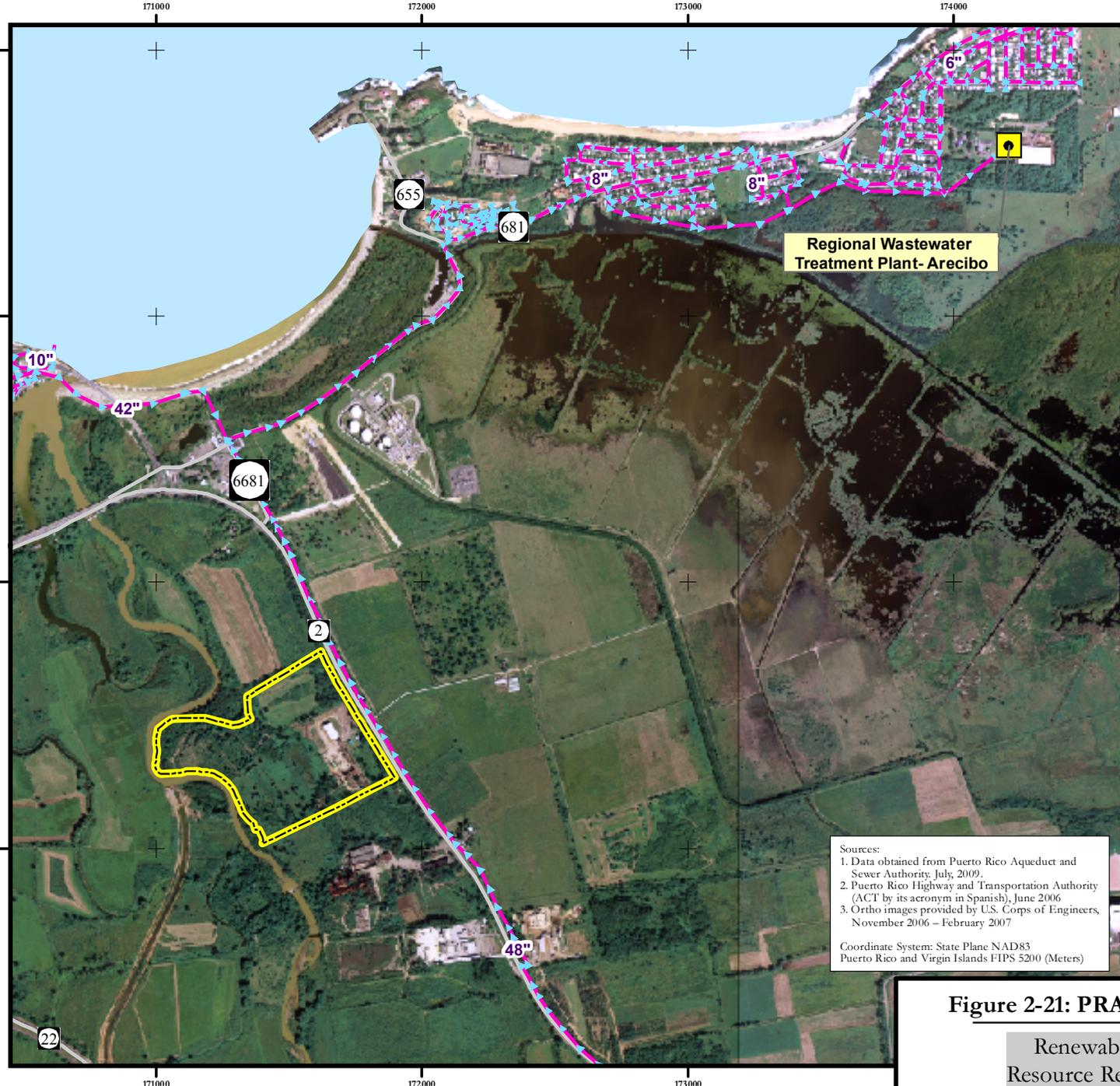
2.9.3 Storm Sewer

The area immediately adjacent to the Project site is currently in its natural condition; unaltered and undeveloped with the exception of the State Road PR-2 that abuts to the east of the Project site. The storm sewer system of the Project site and its surrounding areas, consists of sheet flow which flows toward the lowest unimpervious relief areas. Runoff percolates into the subsoil through the air spaces between the sediment grains.

The existing State Road PR-2 has no stormwater system, thus the runoff flows over the paved surface based on the road slope, discharging into a small earthen drainage ditch located on the northeastern corner of the Project site. The discharge flows in a westerly direction along the north boundary discharging into the RGA.

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Legend:

-  Water Treatment Plant¹
-  Wastewater Pipes¹
-  Roads¹
-  Property Boundary



Sources:
 1. Data obtained from Puerto Rico Aqueduct and Sewer Authority; July, 2009.
 2. Puerto Rico Highway and Transportation Authority (ACT by its acronym in Spanish), June 2006
 3. Ortho images provided by U.S. Corps of Engineers, November 2006 – February 2007
 Coordinate System: State Plane NAD83
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Figure 2-21: PRASA Wastewater Infrastructure

Renewable Power Generation and
 Resource Recovery Plant / Arecibo, PR

Within the Project site there are unused channels that are 1,191.1 linear meters long. These channels run along the eastern boundary of the Project site, across the site, and then connect to the channel that runs along the Project site northern boundary, and eventually draining to the RGA. This network of channels comprises the internal stormwater system that controls the surface stormwater and the former paper mill manufacturing process runoffs. The paper mill used a system of four artificial dirt ponds as mitigation structures for the stormwater runoff management system and process water.

Discharges of stormwater runoff reaching the Project site as well as those of the site itself will be taken into consideration for the design of the stormwater sewer system. This design will comply with Section 14.00 of the Planning Regulation No. 3.

2.9.4 Electrical Lines

PREPA is responsible for supplying and distributing electricity in Puerto Rico. Most of the energy produced by PREPA is generated in five major power generation plants: Costa Sur, Aguirre, San Juan, Palo Seco, and Cambalache. The installed capacity is approximately 5,864 Mega Watts (MW), of which almost 70% comes from petroleum burning. The transmission system consists of approximately 2,416 miles of 115 KV and 230 KV transmission lines, and lower voltage 38 KV subtransmission lines. In addition, the system has 175 transmission centers with distribution lines totaling roughly 28,952 aerial miles, 1,723 underground miles, and 334 substations.

The Cambalache substation, built in 1997, is located approximately 450 meters southwest of the Project site. The Project site property has 38 and 115 KV lines that originate from the Cambalache substation. See Figure 2-22 on the next page. 115 KV transmission lines run along State Road PR-2 before diverting to the Cambalache Power Generation Plant, south of State Road 681. The Power Generation Plant has a capacity of 247.5 MW and uses distillate fuel No.2 to operate.

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Sources:
 1. Information provided by the Puerto Rico Planning Board.
 2. Puerto Rico Highway and Transportation Authority (ACT by its 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 and Virgin Islands FIPS 5200 (Meters)



Scale: 1:20,000
 0 150 300 600 Meters

Legend:

- Substations¹
- Power Generating Plants¹
- Transmission Lines¹
- Roads²
- Property Boundary



Figure 2-22: PREPA Power Transmission System
 Renewable Power Generation and Resource Recovery Plant / Arecibo, PR

The Project will have a connection point with PREPA as a back-up element. The energy produced by the Project will be distributed using the PREPA transmission lines. PREPA will be consulted to identify the connection point.

Under the Public Utilities Regulatory Policy Law (*Ley de Política Reguladora de las Utilidades Públicas*), PREPA is required to purchase energy produced at "reduced cost" by qualified facilities. The Project is considered a qualified facility and source of renewable energy under the provisions of this Act. A contract has been signed between PREPA and EAI to buy the energy produced by the Project.

2.9.5 Communication Systems

The Puerto Rico Telecommunications Regulatory Board's (PRTRB) mission is to promote fair competition between companies offering telecommunication services and cable television. According to PRTRB statistics, a total of eighty nine (89) companies are certified to provide telecommunications service; eleven (11) companies offer cable TV service and eight (8) companies provide universal services. There are twenty-two (22) commercial mobile radio service (CMRS) companies which provide mobile phone services. A certification is issued by the PRTRB for purposes of compliance with regulations and laws under the jurisdiction of the agency.

Currently, there are no telecommunication lines in the Project site area. The closest available phone line runs parallel to State Road PR-10 until it reaches the antenna located at State Road PR-129 in the Pueblo Ward. The necessary steps to connect to the telecommunications line closest to the Project site will take place during the operation phase.

2.10 Archaeological, Historical and Cultural Resources

Cultural Resources studies Phase IA and IB have been completed in the study area for the Project as part of compliance with Law 112 of July 20, 1988, also known as the Law for the Protection of Archaeological Heritage (*Ley para la Proteccion del Patrimonio Arqueológico*), as amended. In August 2010, archaeologists Eduardo Questell and Carlos Figueroa conducted the study titled: "Archaeological Assessment Report Phase IA-IB, Global Fibers, Inc. Industrial Development Project, Road PR-2, Cambalache Ward, Arecibo, Puerto Rico (*Informe de Evaluación Arqueológica Fase IA-IB, Proyecto Desarrollo Industrial Terreno de Global Fibers, Inc. Carr. PR 2, Bo. Cambalache, Arecibo, Puerto Rico*") (See **Appendix F**). The areas studied by Questell and Figueroa on that time included the site that is being proposed for the development of the Renewable Power Generation and Resource Recovery Plant. In addition, they studied the connection routes of the brackish water line and the electrical line located outside the Project site. Inventories of archaeological sites of the Council for the Protection of the Terrestrial Archaeological Heritage of Puerto Rico and the State Historic Preservation Office were consulted as part of Phase IA study. The consultation of these inventories revealed no presence of prehistoric or historic evidence in the specific area where the Project will be developed. The archaeological site nearest the Project area consisted of a residuary (destroyed) located under the streets and homes of the urban area of Arecibo and that was located about 900 meters northeast the Project site. The Project does not affect cultural resources included in the National Register of Historic Places. Based on the data obtained during archival investigation and the negative results of stratigraphic test pits (Phase IB) that were made, Questell and Figueroa recommended that the proposed development continue without requiring additional archaeological studies to the proponent.

The study conducted by Questell and Figueroa in August 2010 did not include an underground survey (Phase IB) in the southern portion of the studied area (area where the Project will be developed). In 2010 an Archaeological Phase IB Study was conducted in the Project site with the purpose of determining whether the site proposed for development contains archaeological material under the soil surface. The archaeologists in charge of this study were Eduardo Questell

and Federico Freytes. The study conducted by Questell and Freytes included a surface reconnaissance and the excavation of test pits. During the surface reconnaissance they identified the remains of a paper mill, as well as structures associated its fire protection system and “sotrmwater ponds related to the paper mill industry.” Due to the severity of impacts seen on the surface, the strategy was modified to survey field areas that showed a lesser impact degree.

As part of Phase IB study by Questell and Freytes 35 test pits were manually dug and 35 trenches were excavated using heavy machinery, for a total of 70 tests. From total tests, 3 were positive to the presence of historic brick fragments. These findings were categorized as "isolated and without any kind of context" by the study's authors. Based on the results obtained, Questell and Freytes determined that: "... the area investigated has been highly on most of its surface, and is totally devoid of any kind of archaeological materials. It will not be necessary to recommend additional investigations to proceed with the proposed development."

Also test pits were made through the brackish water transmittion line in a stretch of approximately 3,100 linear meters in part of roads PR-681, PR-6681 and PR-2. Similar test pits were established along the route of the power line connection in a 1,335 linear meters section; approximately 485 meters within the Project site and 855 meters (mostly cross-country) south the Project.

2.11 Visual Setting and Odors

The visual setting of the Project area is predominantly rural with low development level, except for its southern boundary, which is predominantly an industrial location and is the site of the former Central Cambalache Sugar Mill. The visual environment southeastward turns to residential and it is occupied by five (5) structures located on the opposite side of State Road PR-2. North and west, the visual setting is open areas dominated by the causeway of the RGA, and typical herbaceous and shrub vegetation from alluvial valleys. To the East, the lanscape is interrupted by road PR-2. The existing visual site lanscape will be permanently displaced as result of the proposed Project development. However, the construction of the Project will reduce the visual impact of the former Central Cambalache Sugar Mill, which is not in use and its condition is very deteriorated.

Also a landscaped buffer zone will be established in its perimeter, in such a manner that the Project will improve the visual aesthetics of the area and general landscape.

Currently, there is no unpleasant odor generation since the industrial activity of the paper mill, known as Global Fibers Paper Mill ceased operations in 1996. **Figures 2-23, 2-24, 2-25, 2-26 and 2-27** below show pictures taken from several points in the area of the structures within the Project site, the power lines of PREPA and the stacks in the former Central Cambalache Sugar Mill..



Figure 2-23: Picture taken from north facing the Project site and the Former Central Cambalache Sugar Mill



Figure 2-24: Picture taken from west to the Project site and the Former Cambalache Sugar Mill



Figure 2-25: Picture taken from southeast to the Project site



Figure 2-26: Picture taken from the Project site to the former Cambalache Sugar Mill



Figure 2-27: Picture taken from road PR-10 to the Project site and the former Cambalache Sugar Mill

2.12 Occupational Safety and Health

The United States Occupational Safety and Health Administration (OSHA) and the Puerto Rico State Insurance Fund Corporation (“*Cooperación del Fondo del Fondo del Seguro del Estado*”) regulate the prevention of occupational injuries and diseases. Activities associated to the construction and operation phases of the Plant will comply with the applicable federal and state requirements and regulations.

2.13 Noise

As indicated, the project area served as an industrial plant for the manufacture of paper. Currently, most of the buildings within the facility are out of operation. The building located north of the facility is rented and is currently used for storage of electronic equipment.

On January 2010, CSA conducted a Noise Study to characterize the existing noise levels in areas adjacent to the study area and identify potential impacts from the construction and operation of the Project in the Receptors closest the Project area. The Study identifies the vehicular traffic as the main noise source in the area.

Heavy trucks and light industry activity were identified as secondary Noise sources. The ambient noise levels were recorded at specific receptors for a period of 30 minutes during the day (*i.e.*, 7:00 AM to 10:00 PM) and night time (*i.e.*, 10:01 PM to 6:59 AM) , as required in the current Regulation for the Control of Noise Pollution (*Reglamento para el Control de la Contaminación por Ruidos*) of the Environmental Quality Board. Currently, the EQB is amending this regulation. The proposed ammendment (draft) to the 2010 regulation, Rule 5 of the General Provisions provides the following language:

- *"to establish standards and requirements for the control, reduction or elimination of noise that can be harmful to health and disrupt the public welfare.";* and
- *"to establish requirements for noise emissions levels among zones, sound emission levels of motor vehicles and the administration and procedures related to the assessment of noise levels."*

Sensitive Receptors

Five (5) Receptores (classified from 1 to 5) were identified in the study area, that are potentially sensitive to the noise generated during the development and operatio of the Project.

- Receptor 1 correspond to a commercial zone located approximately 1,785 meters northwest the Proposed Project;
- Receptor 2 corrponds to a quiet zone located approximately 2,035 meters northwest the Project site;
- Receptor 3 represents an industrial zone located approximately 1,112 meters southeast the Project site;
- Receptor 4 represents a residential zone located approximately 658 meters southeast the Project site;
- Receptor 5 also represents a residential zone located approximately 861 meters north the Project site. All these receptors are located at a distance greater than approximately 500 meters.

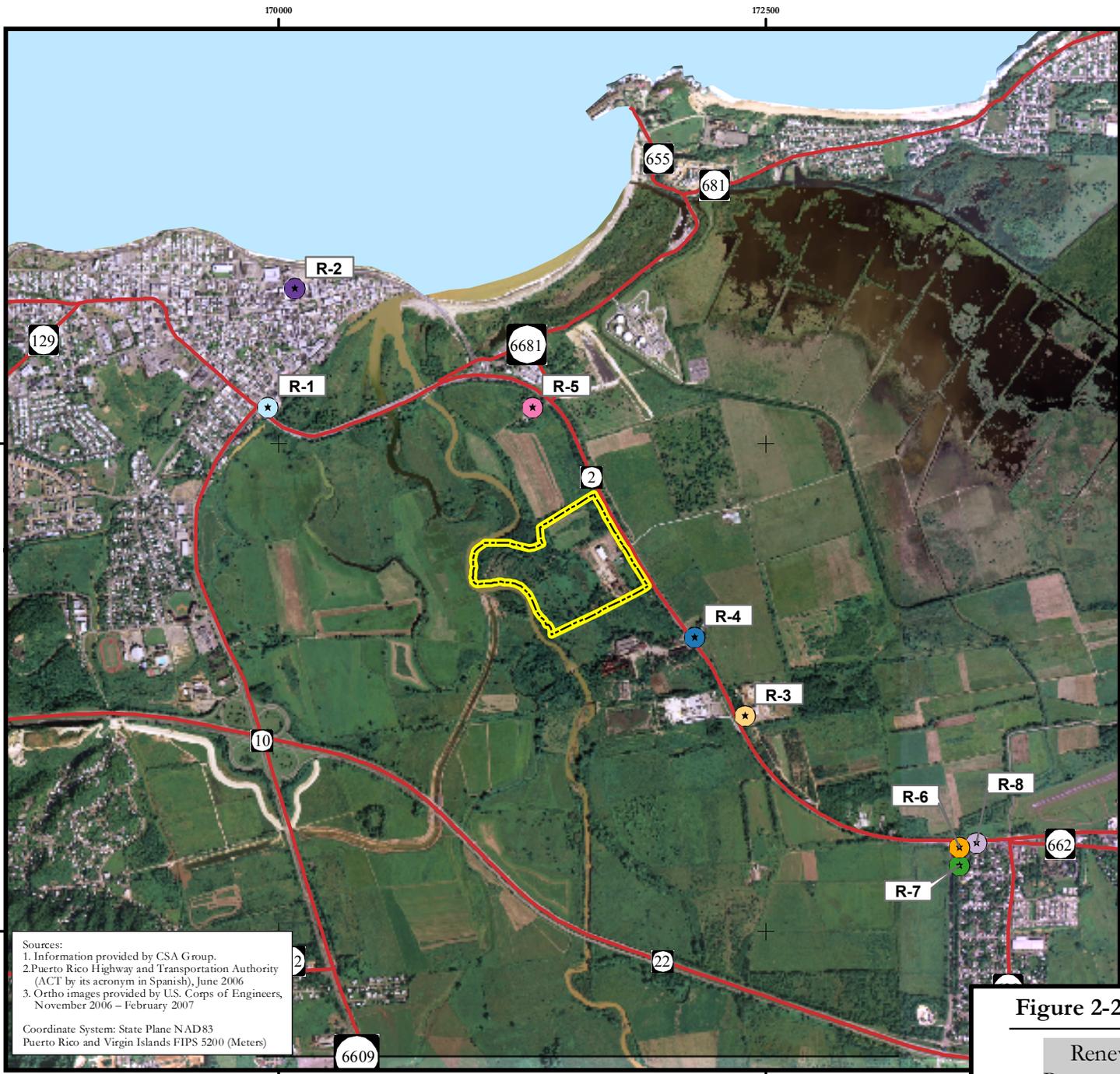
Also three (3) additional receptors, adjacent to State Road PR-2 and southeast of the Project site, were included in the field investigations. These receptors were identified as 6, 7 and 8, and were clasiffied as residential zones. The purpose of analizing these sampling points was to evaluate the existing noise levels generated by vehicular traffic along State Road PR-2. **Table 2-9** provides the description and location of each receptor. **Figure 2-28** shows the Receptors over an aerial photo.

Table 2-9: Receptors Identification

Receptor	Classification	Coordinates		Description
		Latitude	Longitude	
1	Zone II – Commercial	18°28'1.69"N	66°43'4.21"W	Farmacia Del Carmen
2	Zone IV – Quiet Zone	18°28'22.95"N	66°42'59.56"W	Hospital Metropolitano Dr. Susoni
3	Zone III – Industrial	18°27'9.95"N	66°41'41.73"W	Battery Recycling, Inc.
4	Zone I – Residential	18°27'23.93"N	66°41'49.77"W	Residential Properties
5	Zone I – Residential	18°28'2.14"N	66°42'17.99"W	Residential Properties Santa Bárbara Parcel
6	Zone I – Residential	18°26'49.15"N	66°41'3.17"W	Domingo Ruiz Ward (Residential)
7	Zone I – Residential	18°26'46.53"N	66°41'3.26"W	Domingo Ruiz (Residential)
8	Zone I – Residential	18°26'49.41"N	66°41'0.16"W	Domingo Ruiz (Residential)

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 1. Information provided by CSA Group.
 2. Puerto Rico Highway and Transportation Authority (ACT by its 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 and Virgin Islands FIPS 5200 (Meters)

Scale: 1:30,000
 0 200 400 800 Meters

- Legend:**
- Receptors¹**
- R-1, Pharmacy (*Farmacia del Carmen*), Commercial
 - R-2, Dr Susoni, Hospital Quiet Zone
 - R-3, Battery Recycling Center, Industrial
 - R-4, Residential Properties
 - R-5, Residential Properties
 - R-6, Residential Properties
 - R-7, Residential Properties
 - R-8, Residential Properties
- Roads²
 Property Boundary



Figure 2-28: Location of Noise Receptors
 Renewable Power Generation and Resource Recovery Plant / Arcibo, PR

The values corresponding to the L_{10} parameter for each receptor were compared with the maximum levels of background noise allowed in the current RCNP implemented by the EQB and in the proposed amended version that is under review process.

Table 2-10 present a summary these levels. For this evaluation, the noise source is the Project site. This area is currently considered as an industrial zone. However, at the moment of the preparation of this document there is no industrial activity in the Project site. The Project will also constitute an industrial operation. Due to the noise source is classified as an industrial operation, the noise levels presented in **Table 2-9** that apply are from Zone III.

Table 2-10: Environmental Quality Board’s Noise Emission Limits [dB(A)] [Noise Level Exceeded in 10% of the Measurement Period (L_{10})]

Emitting Source	Receptors Zones							
	Zone I (Residential)		Zone II (Commercial)		Zone III (Industrial)		Zone IV (Quiet Zone)	
	Day	Night	Day	Night	Day	Night	Day	Night
Zone I (Residential)	60	50	65	55	70	60	50	45
Zone II (Commercial)	65	50	70	60	75	65	50	45
Zone III (Industrial)	65	50	70	65	75	75	50	45

Notes:

1. The daytime period corresponds to the hours between 7:01 AM and 10:00 PM.
2. The nighttime period corresponds to the hours between 10:01 PM and 7:00 AM.
3. Source: Environmental Quality Board Regulation for the Control of Noise Pollution, amended version (EQB, 1987) and Amendment Draft Version (JCA, 2010), Regulation for the Control of Noise Pollution.

According to the RCNP provisions, the limits in **Table 2-10** are adjusted depending on the quantity of background (ambient) noise in one of the following forms:

1. If existing noise levels are less than the level specified in **Table 2-10** by more than 5 dBA, the limits specified in **Table 2-10** are applied;
2. If existing noise levels are less than the level specified in **Table 2-10** by less than 5 dBA, 3 dBA are added to the limits specified in **Table 4-3**;
3. If existing sound levels are greater than the level specified in **Table 2-10**, 5 dBA are added to the limits specified in **Table 2-10**; and,
4. For any stationary noise source that emits noises in cycles, or in repetitions of impulsive

noises, the limits specified in **Table 4-3** are reduced by 5 dBA.

The FHWA guidelines titled “*FHWA Highway Traffic Noise Analysis and Abatement Policy and Guidance*” (the Guidelines) were considered during the evaluation of noise impact based on a potential increase in trucks traffic due to the operation of the Project. **Table 2-11** describes the noise abatement criteria used by the FHWA for any necessary mitigation measure as result of an increase in noise levels due to an increase in traffic. Accordig to the Guidelines, the receptors 6 through 8 are classified as category B activity (Residential).

Table 2-11: Noise Abatement Criteria (NAC) Hourly A-Weighted Sound Level in Decibels (dBA)

Category	L ₁₀ (h)	Description of Activity Criteria
B	70	Picnic areas, recreation areas, playgrounds, active sports areas, residences, motels, hotels, schools, churches, libraries, and hospitals

Table 2-12 summarizes the noise levels exceeded in 10% of the measurement period and the noise limits established by the EQB for each receptor. **Table 2-13** summarizes the noise levels exceeded in 10% of the measurement period and the noise limits established by the Guidelines for each receptor, respectively.

Table 2-12: Noise Level Exceeded in 10% of the Sampling Period (L10) in dB(A)

Receptor	Day (dB(A))		Night (dB(A))	
	Background Noise	Regulatory Level	Background Noise	Regulatory Level
1	68.1	73	66.0	70
2	68.8	55	61.2	50
3	78.3	80	73.9	78
4	74.9	70	70.3	55
5	64.0	68	63.5	55

Table 2-13: Noise Level Exceeded in 10% of the Sampling Period (L10) in dB(A) for Additional Receptors

Receptor	Day (dB(A))	
	Background Noise	Regulatory Level
6	66.9	70
7	62.1	70
8	72.0	70

During the daytime period, existing noise levels exceeded the regulatory limit at Receptors 2 and 4. Receptor 2 represents the quiet zone and Receptor 4 represents a residential zone. Noise levels at Receptor 2 exceeded the limits allowed because of the current vehicular traffic in road PR-2. Noise levels at Receptor 4 exceeded the EQB threshold because the residential properties are adjacent to road PR-2, where high vehicular traffic volume transists daily.

Receptor 1 represents a commercial zone and Receptor 3 represents an industrial zone. At Receptors 1, 3, 4 and 5 the main noise source is the traffic through road PR-2. As shown in **Figure 2-28**, these Receptors are located more than 500 meters away from the Proposed Project. Receptor 2 is located approximately 1.25 miles (2 km) northwest the Project site and is classified as a quiet zone. Noise to be generated from the Project is not expected to cause any impacts at this receptor because of the distance and the structures located between Receptor 2 and the Plant that would have the capacity to attenuate the noise impact that may be generated.

Receptors 2, 4, and 5 exceeded the noise limits established by the EQB during the nighttime period. Noise levels are mostly generated by the vehicular traffic along PR-2 during nighttime

period. Noise levels at Receptor 5 are mostly generated by the operation of a dragging racetrack, which is located approximately 350 meters east Receptor 5, and the vehicular traffic in road PR-2, which is located east this receptor. The racetrack operates 3 to 4 days a week from 6:00pm to 2:00am.

Receptors 6 and 7 did not exceed the 70 dB(A) limits of the Guidelines for noise abatement in highway projects. However, noise levels at Receptor 8 exceeded the limits established by the FHWA. This is because Receptor 8 is the closest one to road PR-2.

2.14 Transportation Means and Traffic

This section describes the existing transportation infrastructure in the area near the Project site. The transportation system in the local area is connected connects to the regional and interstate transportation system though air, maritime and terrestrial transportation methods.

Regional aviation infrastructure of the north coast of Puerto Rico includes four (4) public-use airports, which are intergated to the local and national airports network. These are Fernando Luis Ribas Dominicci Airport in Isla Grande, Luis Munoz Marín International Airport in Carolina, Antonio Nery Juarbe Airport in Arecibo and Rafael Hernández International Airport in Aguadilla. The Luis Muñoz Marín and Rafael Hernández airports are both international airports.

Antonio Nery Juarbe Airport in Arecibo is approximately 1.26 miles southeast the Project, in the Barrio Santana, road PR-2, Km 69.5 in a site with an acreage of 164 *cuerdas*, and five (5) miles southeast from the City of Arecibo and 50 miles west of San Juan. The airport has passenger terminal facilities, ground transportation, parking runways and taxiways with capacity for commercial flights. Originally it was used with military purposes. Currently it is used for general aviation, with average daily operations of eight departures and arrivals. On March 31, 1947, the airport was transferred by the U.S. Navy to the Puerto Rico Ports Authority, along with the Mercedita Airport and the old Santa Isabel Airport.

Existing airports within a fifty (50) miles radius from the Project site are listed in **Table 2-14**.

Table 2-14: Airports within a Fifty (50) Miles Radius from the Project Site

Name	Municipality	Latitude	Longitude	Distance (nautical miles)
Antonio Nery Juarbe	Arecibo	18°27'04"N	66°40'32"O	1.43
Rafael Hernández	Aguadilla	18°29'41"N	67°07'46"O	24.62
Mercedita	Ponce	18°00'29"N	66°33'46"O	28.03
Eugenio María de Hostos	Mayagüez	18°15'20"N	67°08'54"O	28.36
Fernando Luis Ribas Dominicci	San Juan	18°27'24"N	66°05'53"O	34.28
Luis Muñoz Marín	San Juan	18°26'21"N	66°00'07"O	39.79
Patillas	Patillas	17°58'55"N	66°01'09"O	48.16

1. One nautical mile = 1.15 miles = 1.852 KM.

Ports

The Port of Arecibo is approximately 1.30 miles northeast from the Project site, and has a breakwater to provide protection to the docking area and existing port structures from heavy swell. The marginal wharf is 600 feet long with a 20 feet draft. The main operation of the port is associated to fuel transmission by means of a pipeline to the PREPA Cambalache Power Plant at Cambalache. A area of the dock facilities are used by private boats. This is not a port of entry for customs purposes.

Roads

The northwest area is served by an excellent road network that consists mainly of primary and secondary roads. This network has been remarkably improved as follows:

The construction of primary and secondary roads allow easy access from north to south, east to west or around the Island, considerably shortening travel time and connecting to the tertiary roads system. This network of primary and secondary roads is used by freight trucks to transport food and general merchandise to commercial and industrial sectors at different areas of the

Island, also is used as well by private vehicles. The roads are defined below according to the Manual of Uniform Devices for Traffic Control on Public Roads (*Manual de Dispositivos Uniformes para el Control del Tránsito en las Vías Públicas*) of DTPW 1979.

- Highway: is an arterial roadway system divided by a central median, with or without frontage road, with full access control and overpass intersections with all other public roads.
- Main Road: a road that typically has the highest traffic volume in its access to an intersection.
- Secondary road: a road that typically has lower traffic volume in its access or accesses to an intersection.

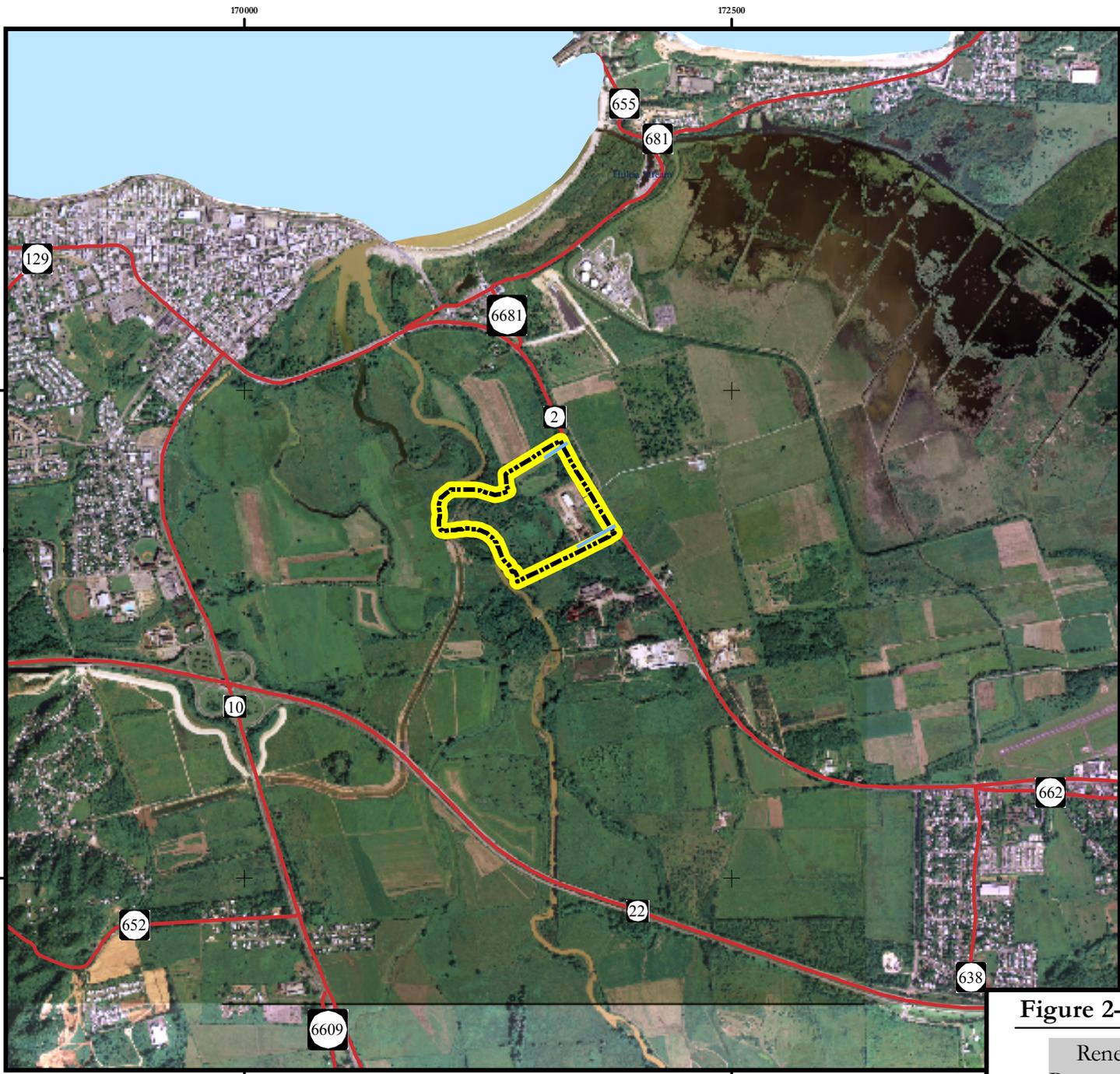
The main connecting roads between the Arecibo region and the municipalities of the Island Northern Area are mentioned below:

- Road PR-2 is the longest road in the Puerto Rico's network system. It begins in its intersection with Ponce de León Avenue in Santurce, San Juan Municipality, and extends from east to west connecting all the municipalities of the North Coast up to the Aguadilla Municipality, from where it extends north to south through the western part of the Island, up to the Ponce Municipality. East the Project site, road PR-2 consists of four (4) lanes, two in each direction divided by a concrete median barrier, where there are also left turning lanes at the center of the road, protected by median barriers.
- Highway PR-22 is a four lanes toll road which begins in the San Juan Municipality and extends from east to west connecting the municipalities of the North zone ending in the Hatillo Municipality. In the vicinity of the Project site it consists of four (4) lanes separated by a grassy median. Along the entire route, there are six alternating one-way toll plazas.
- Highway PR-10 begins in the Ponce Municipality and extends from south to north, ending in the Arecibo Municipality. The intersection that is close to the Project site consists of four (4) lanes with no median barrier.

From these roads, PR-2 provides an excellent direct access to the Project site on its eastern side. Road PR-2 can be accessed by east from PR-22 or by west from road PR-10, in Arecibo. **Figure 2-29** illustrates road network in the Arecibo area.

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Scale: 1:30,000
0 200 400 800 Meters

Legend:

- Project Site Access Roads
- Roads¹
- Property Boundary

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



Figure 2-29: Project Site Access Roads

Renewable Power Generation and Resource Recovery Plant / Arcibo, PR

2.15 Socioeconomic Aspects

Estudios Técnicos, Inc. prepared a Socioeconomic Analysis and Economic Impact Study (**Appendix I**) for the Project site. The study contains demographic information taken from various reference sources including the Census Bureau 2000. Relevant aspects of the socioeconomic study are discussed briefly below.

On this study, the analysis was divided into two parts. The first part discusses socioeconomic conditions in Arecibo within a regional context. Regional conditions were also compared, with socioeconomic conditions in Puerto Rico as a whole. The statistically referenced region is composed by the municipalities of Arecibo, Barceloneta, Camuy, Florida, Hatillo, Manatí, Quebradillas and Utuado (See **Figure 2-30**).

The second part of the study evaluates current conditions at Cambalache Ward and compares the socioeconomic characteristics of the wards that comprise Arecibo (See **Figure 2-31**). The following variables were considered in the study:

Socioeconomic Variables:

- Population and population density;
- Populational densities;
- Population by gender and age;
- Maximum educational level;
- Individual income;
- Median family income
- Households with income below poverty level;
- Households with public assistance income; and
- Households with Social Security income.

Job Variables:

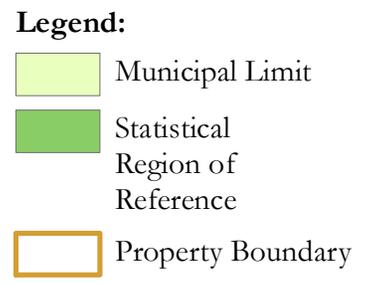
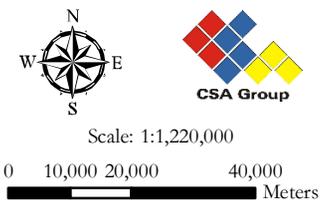
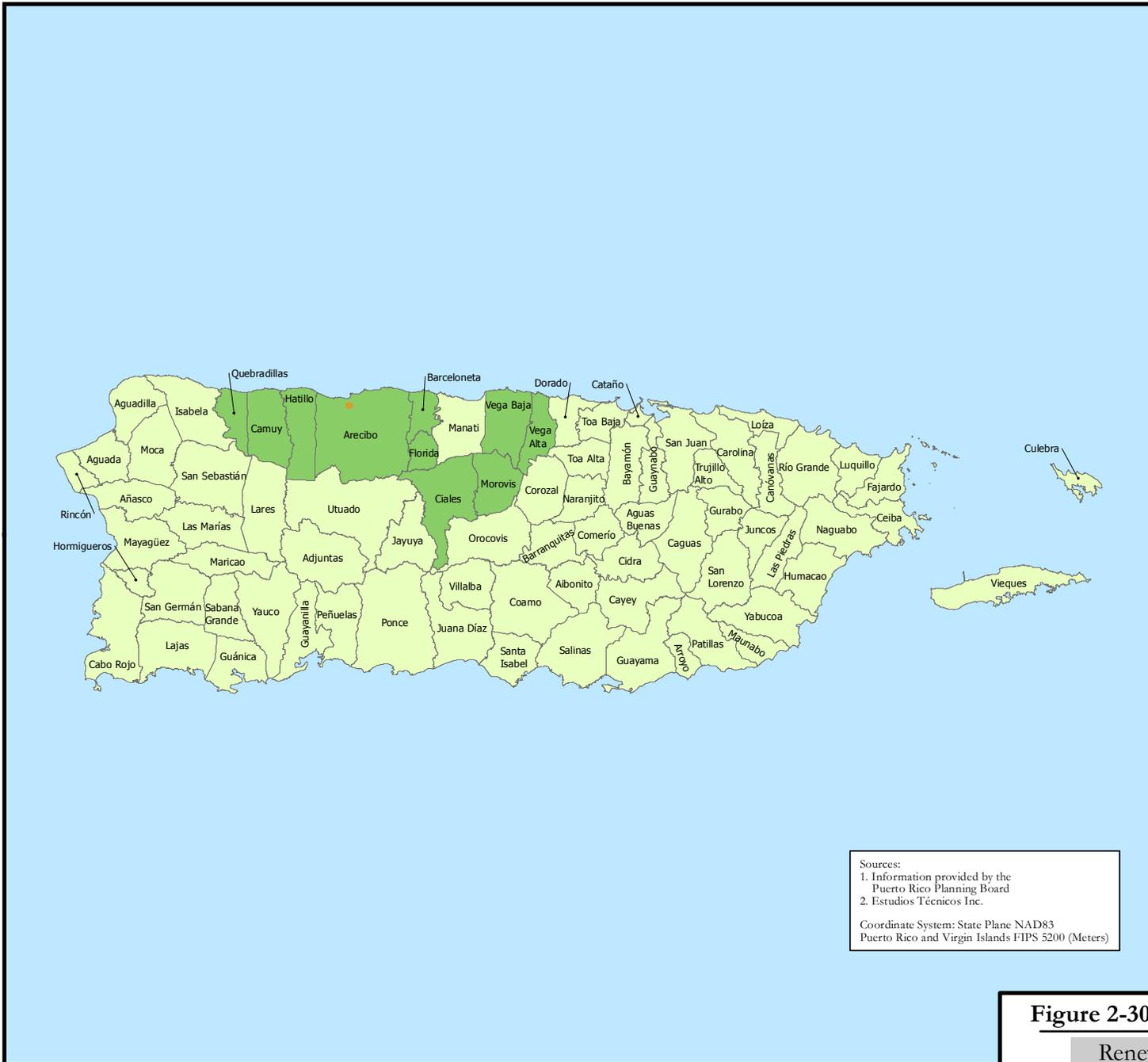
- Work force and labor situation

Housing Variables:

- Housing occupancy and cost of housing.

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Sources:
1. Information provided by the Puerto Rico Planning Board
2. Estudios Técnicos Inc.

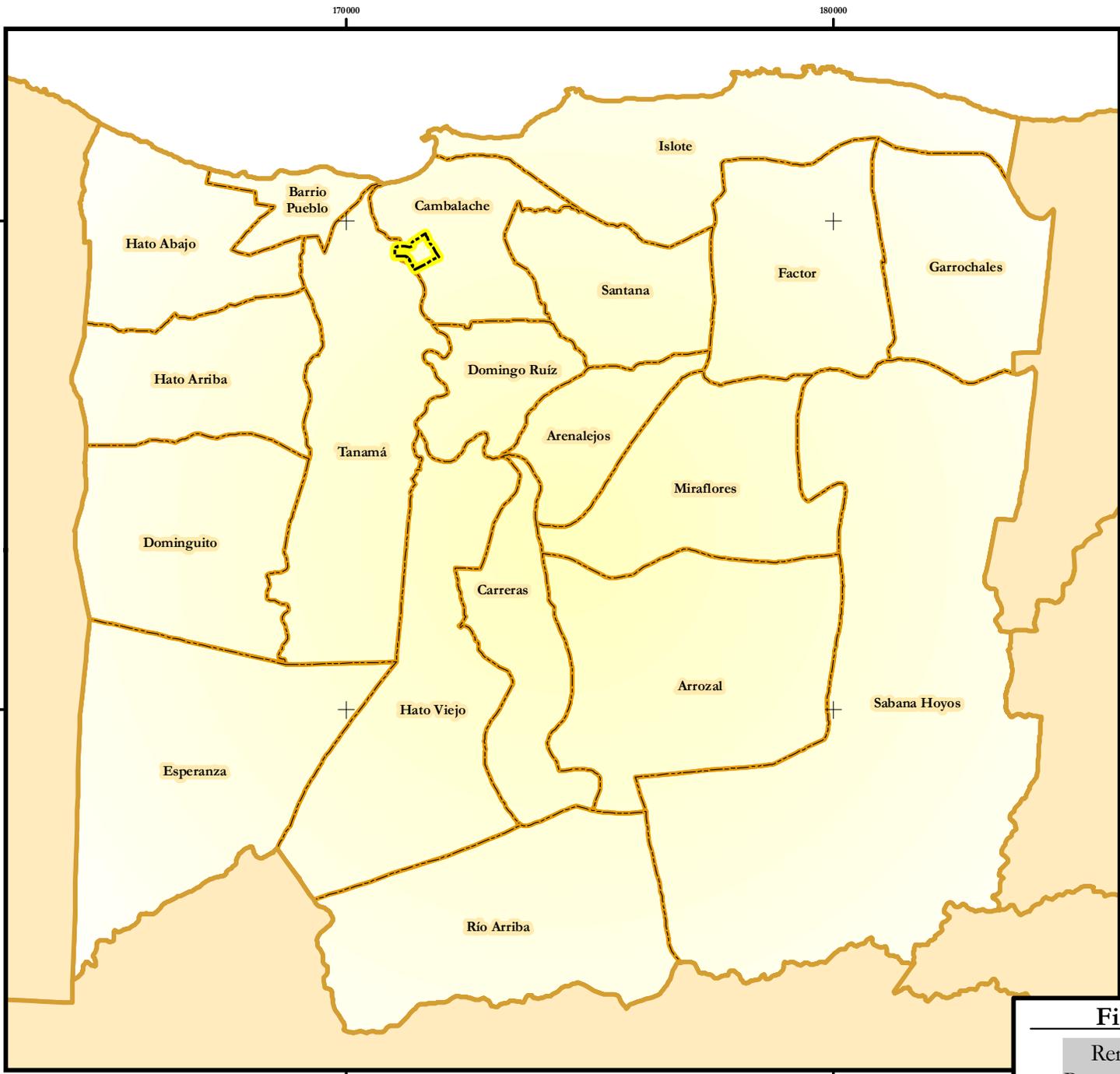
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Figure 2-30: Statistical Region of Reference
Renewable Power Generation and Resource Recovery Plant / Arcéibo, PR

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Scale: 1:120,000
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Legend:

-  Property Boundary
-  Ward Limit²
-  Municipal Limit²

Sources:
 1. Information provided by the Puerto Rico Planning Board.
 2. Ortho images provided by U.S. Corps of Engineers, November 2006 – February 2007

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



Figure 2-31: Wards in Arcibo
 Renewable Power Generation and Resource Recovery Plant / Arcibo, PR

2.15.1 Population

To perform this analysis variables of population were used, such as population density and population projection. In the 2000 Census, the population reported for Puerto Rico was 3,808,610 inhabitants. Moreover, the most populated municipalities reported in the reference region were Arecibo with 100,133 inhabitants and Manatí with 45,409 inhabitants. See Table 2-15.

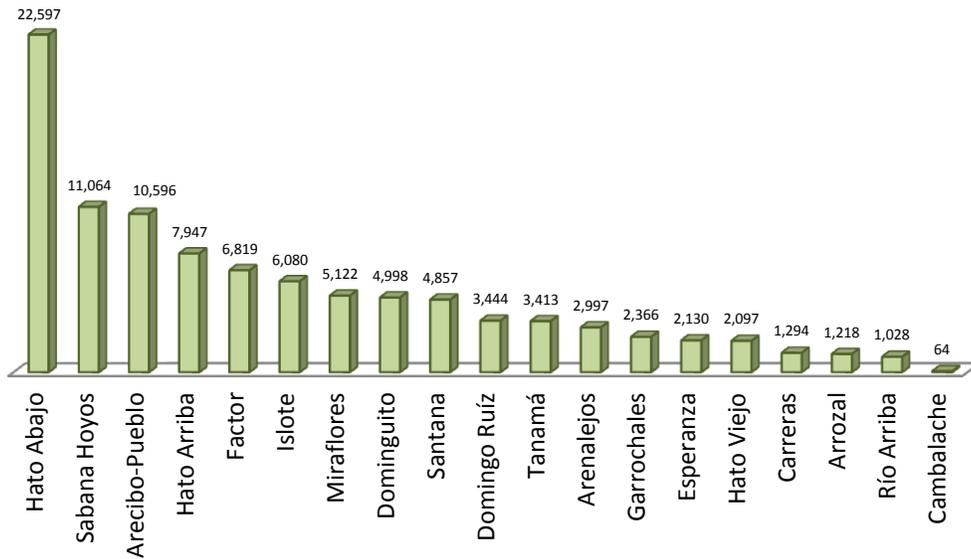
Table 2-15: Population and Density

Population and Density		
Area	Population	Population Density (hab/km ²)
Barceloneta	22,322	458
Camuy	35,244	293
Florida	12,367	314
Hatillo	38,925	360
Manatí	45,409	381
Quebradillas	25,450	425
Utado	35,336	119
Arecibo	100,131	305
Region	315,184	281
Puerto Rico	3,808,610	423

Source: U.S. Census Bureau. 2000 Census of Population and Housing.

In Arecibo, the population density found was 305 inhabitants per km². However, Hato Abajo Ward has the largest population with 22,597 inhabitants and densities were 1,815 inhabitants per km². The population is less at Cambalache Ward with 64 inhabitants and a population density of 7 inhabitants/km². **Figure 2-32** illustrates the population of all wards within the Municipality of Arecibo.

Figure 2-32: Ward Population in Arecibo



Fuente: US Census Bureau. Summary File 1 (SF 1) 100-Percent Data).

Population by age and gender

According to the 2000 Census data, the majority of the inhabitants of Arecibo are between the ages of 18-64. This trend is similar to that of other municipalities that comprise the region analyzed and Puerto Rico as a whole. In Arecibo, about 61% of the population is in this age group, followed by 27% of people between the ages of 0-17 and almost 13% is 65 years old or older.

It is worth noting, that Arecibo has a percentage of the population that is age 65 or older (12.71%) slightly higher than in the rest of Puerto Rico (11.16%), the region (11.33%) and other municipalities individually. The nearest municipality in this category would be Utuado, with 11.86% of the population in this age group.

In Cambalache Ward, most of the population is between 18-64 years old (60.94%), followed by population between the ages of 0 to 17 years old (23.44%) and those who are age 65 or older (15.63%). Nevertheless, it is important to note that the population age 65 or older in Cambalache Ward is proportionally greater than in most wards in Arecibo, with the exception of Arecibo Barrio-Pueblo.

Table 2-16: Ward Population in Arecibo by age

Population by Age & Sex: Arecibo's Wards									
Geographic Area	Total	Male Population	0-17 Years	18-64 Years	65 Years and Over	Female Population	0-17 Years	18-64 Years	65 Years and Over
Arecibo-Pueblo	10,596	46%	13%	26%	7%	54%	14%	29%	11%
Arenalejos	2,997	48%	13%	29%	6%	52%	13%	33%	7%
Arrozal	1,218	48%	13%	30%	5%	52%	15%	32%	6%
Cambalache	64	50%	14%	34%	2%	50%	9%	27%	14%
Carreras	1,294	49%	16%	27%	6%	51%	15%	30%	6%
Domingo Ruíz	3,444	48%	13%	28%	7%	52%	12%	32%	8%
Dominguito	4,998	49%	13%	30%	6%	51%	13%	32%	6%
Esperanza	2,130	52%	16%	31%	5%	48%	15%	28%	5%
Factor	6,819	48%	16%	28%	4%	52%	14%	33%	5%
Garrochales	2,366	50%	15%	29%	6%	50%	13%	29%	7%
Hato Abajo	22,597	47%	13%	28%	6%	53%	12%	34%	8%
Hato Arriba	7,947	49%	14%	29%	6%	51%	13%	32%	6%
Hato Viejo	2,097	49%	13%	30%	6%	51%	14%	31%	7%
Islote	6,080	49%	13%	30%	6%	51%	13%	32%	6%
Miraflores	5,122	53%	15%	34%	4%	47%	14%	29%	5%
Río Arriba	1,028	49%	15%	29%	6%	51%	14%	30%	7%
Sabana Hoyos	11,064	51%	13%	33%	5%	49%	13%	31%	5%
Santana	4,857	48%	14%	28%	6%	52%	12%	33%	7%
Tanamá	3,413	50%	14%	29%	7%	50%	12%	30%	8%

Source: U.S. Census Bureau. 2000 Census of Population and Housing [Summary File 1 (SF 1) 100-Percent Data].

In Cambalache Ward, the male and female population is equally distributed. In the 2000 Census, only one (1) resident 65 years or more was reported, accounting for 2% of the small population of the District, and 9 females of the same age, which constitutes 14% of the population. As in other districts and municipalities studied, most men and women are between the ages of 18-64.

According to projections made by the PRPB, Arecibo's population in 2010 was 104,995. The population growth rate in Arecibo from 2000 to 2010 is lower than almost all municipalities and the region. The PRPB estimates that by 2025, Arecibo will have a population of 107,348 inhabitants or 30% of the regional population and 2.57% of the population of Puerto Rico. See **Table 2-17**.

Table 2-17: Regional Population Forecast

Regional Population Forecast							
Municipality	2000 Census	2005	2010	Growth 2000-2010	2015	2020	2025
Barceloneta	22,322	22,968	23,391	4.79%	23,769	24,080	24,434
Camuy	35,244	37,503	39,524	12.14%	41,216	42,763	43,258
Florida	12,367	13,706	15,007	21.35%	16,115	17,212	17,414
Hatillo	38,925	41,439	43,682	12.22%	45,529	47,182	47,800
Manatí	45,409	47,818	49,877	9.84%	51,530	52,893	53,333
Quebradillas	25,450	27,007	28,392	11.56%	29,534	30,516	30,870
Utuado	35,336	35,748	35,938	1.70%	36,156	36,166	36,458
Arecibo	100,131	102,986	104,955	4.82%	106,301	107,093	107,348
Region	315,184	329,175	340,766	8.12%	350,150	357,905	360,915
Puerto Rico	3,808,610	3,929,885	4,022,446	5.61%	4,095,642	4,149,291	4,177,077

Note: Census data have a reference date of April 1, 2000. Projected Population data are dated July 1 of each year projected.

Source: P.R. Planning Board, *unta de Planificación, Economic and Social Planning Program, Census Bureau.*

2.15.2 Households

In 2000, Puerto Rico had 1,418,476 housing units, while Arecibo had 33% (38,974) of the housing units in the region and about 3% of the housing units in Puerto Rico. At of that date, 34,245 of 38,974 units in the City were occupied, representing 88%. This proportion is slightly lower than that reported in other municipalities and in Puerto Rico, which means that Arecibo has a higher proportion of vacant housing units than the rest of the studied region. Cambalache Ward had a total of 32 housing units. The Hato Abajo Ward had the largest number (8,741) housing units. For more details on the occupation of houses by Neighborhood see Table 16 in the Socioeconomic Study.

2.15.3 Educational Attainment

Approximately one in four people aged 25 or more in Arecibo has a high school diploma, higher than other municipalities in the region, with the exception of Barceloneta (26.5%).

Most people have a Bachelor degree, both in Arecibo (12.10%), as in other towns and in Puerto Rico (13.57%). The proportion of the population of Arecibo with a bachelor's degree is also higher than that reported by other individual municipalities.

Arecibo's population that completed graduate studies is proportionately greater in this Municipality than in others, particularly regarding master degrees and professional degrees. However, the Municipality of Manatí has greater doctorate degrees, 0.47% vis a vis Arecibo, with 0.27%.

A 5.48% of the population of Arecibo reported not having completed any schooling, lower than that of other municipalities in the region, with the exception of Quebradillas (5.04%).

According to the 2000 Census, 26.19% of the population of Cambalache Ward reported not having completed any upper education degrees, while nearly 31% of the population had a bachelor's degree. Nearly 74% of the population of Cambalache has at least a high school diploma, which ranks as the ward in Arecibo with the highest proportion of residents graduating from high school. **Table 2-18** illustrates the educational level achieved by population in the 25 year range and over.

Table 2-18: Educational Attainment

Educational Attainment by Gender in Arecibo						
	No Schooling Completed	Preschool to 12th Grade (No Diploma)	High School Diploma (includes equivalent)	Some College	Associate's Degree	Bachelor's Degree or higher
Arecibo-Pueblo	7.25%	39.70%	21.50%	9.75%	4.53%	17.27%
Arenalejos	8.50%	31.46%	24.67%	11.63%	10.59%	13.15%
Arrozal	17.75%	40.43%	27.01%	6.02%	5.25%	3.55%
Cambalache	26.19%	0.00%	11.90%	0.00%	14.29%	47.62%
Carreras	11.38%	39.82%	29.58%	10.49%	3.16%	5.56%
Domingo Ruíz	5.62%	42.69%	22.74%	11.55%	7.08%	10.32%
Dominguito	3.73%	37.99%	26.83%	13.23%	5.71%	12.51%
Esperanza	7.03%	53.71%	20.92%	6.40%	3.36%	8.59%
Factor	3.81%	32.15%	25.35%	11.98%	11.27%	15.44%
Garrochales	3.81%	39.73%	25.15%	13.18%	7.22%	10.90%
Hato Abajo	4.51%	29.46%	22.51%	12.79%	7.40%	23.32%
Hato Arriba	4.39%	33.29%	21.44%	13.30%	5.43%	22.15%
Hato Viejo	11.29%	38.12%	30.98%	8.24%	6.27%	5.10%
Islote	7.34%	43.36%	24.78%	9.28%	5.75%	9.49%
Miraflores	4.56%	42.25%	33.91%	7.52%	4.56%	7.20%
Río Arriba	5.99%	50.38%	20.58%	9.98%	2.61%	10.45%
Sabana Hoyos	5.36%	35.96%	30.31%	10.63%	7.12%	10.63%
Santana	3.28%	27.90%	28.22%	12.56%	7.13%	20.90%
Tanamá	4.10%	44.60%	27.61%	8.56%	3.69%	11.44%
Arecibo	5.48%	35.94%	25.11%	11.19%	6.56%	15.73%
Region	6.41%	39.35%	23.12%	11.07%	6.20%	13.86%
Puerto Rico	4.88%	35.17%	22.28%	12.24%	7.15%	18.28%

Source: U.S. Census Bureau, Population Census 2000, Summary File 3 (SF 3) - Sample Data.

2.15.4 Employment

The labor force consists of a civilian population aged 16 or over who is employed or actively seeking employment. According to data from the Labor Department and Human Resources (DTRH), Arecibo has 31,600 people employed which constitute the largest workforce in the region until April 2010. However, this number decreased by about 600 people compared to April 2009. Between those dates the labor force also declined in the region and in Puerto Rico (sees **Table 2-19**).

Table 2-19: Labor Statistics

Labor Statistics									
Area	Labor Force		Employment		Unemployment			Unemployment Rate(%)	
	April, 2009	April, 2010	April, 2009	April, 2010	April, 2009	April, 2010	Growth (%)	April, 2009	April, 2010
Barceloneta	7,300	7,200	5,800	5,600	1,500	1,600	6.67%	20.1	22.6
Camuy	12,600	12,600	10,900	10,400	1,700	2,200	29.41%	13.4	17.3
Florida	4,300	4,200	3,500	3,400	800	800	0.00%	18.5	19.0
Hatillo	12,600	12,700	10,700	10,300	1,900	2,400	26.32%	14.9	18.7
Manatí	14,700	14,200	12,000	11,500	2,700	2,700	0.00%	18.4	18.9
Quebradillas	8,500	8,600	7,200	6,900	1,300	1,700	30.77%	15.2	19.9
Utuado	9,040	8,450	7,380	6,650	1,660	1,800	8.43%	18.4	21.3
Arecibo	32,200	31,600	27,400	26,200	4,800	5,400	12.50%	14.9	17.2
Region	101,240	99,550	84,880	80,950	16,360	18,600	13.69%	16.2	18.7
Puerto Rico	1,335,000	1,310,000	1,139,000	1,089,000	196,000	221,000	12.76%	14.7	16.9

Source: P.R. Department of Labor and Human Resources, Local Area Unemployment Statistics, April 2010.

According to DTRH for April 2010, Arecibo had the lowest unemployment rate in the region (17.2%), slightly higher than in Puerto Rico (16.9%). Between April 2009 and April 2010, the unemployment rate increased by 12.5% in Arecibo although it was lower than the reported rate for Puerto Rico. However, the 2000 Census reported only thirteen (13) people in the labor force for Cambalache Ward, with a zero unemployment rate.

2.15.5 -Per Capita Income

According to the 2000 Census, per capita income was \$7,290 in Arecibo, compared with that of Puerto Rico (\$8,185). At the regional level only Manatí municipality surpasses it with a per capita income of \$7,502. **Figure 2-33** below shows per capita income in 1999.

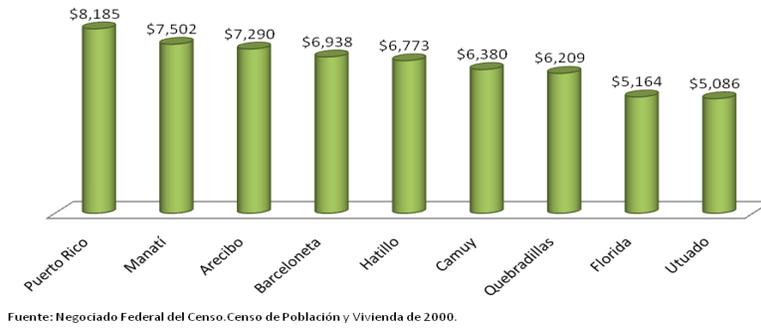


Figure 2-33: Per Capita Income in 1999.

It is relevant to mention that from the Federal Bureau of Statistics 2000 Census, Cambalache Ward reported the highest per capita income (\$28,726) of all the districts of Arecibo. In comparison, it is almost three times the per capita income of Santana Ward, the second highest in the Municipality.

The Environmental Justice Study includes an estimated per capita income (**Table 2-20**) in 2000, which showed that Cambalache Ward reported Municipal per capita income greater even than that of the region and Puerto Rico.

Table 2-20: Per Capita Income

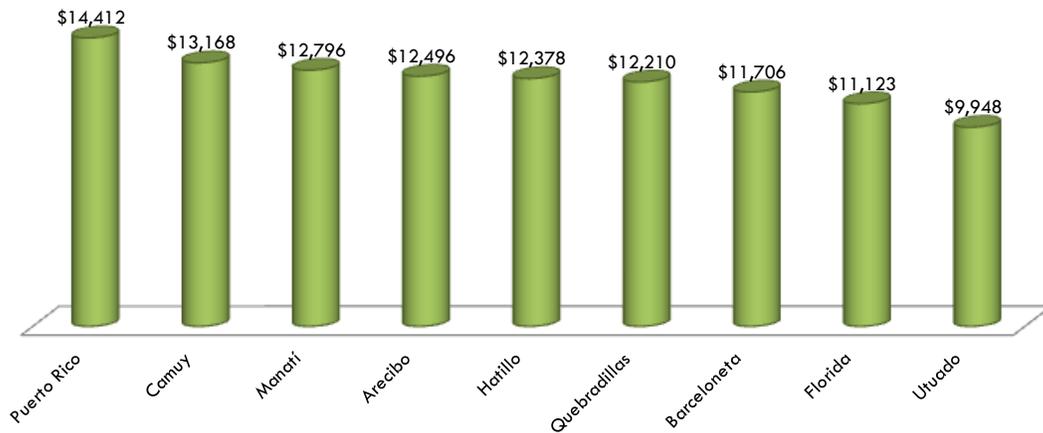
Per Capita Income	
Area	Income (\$)
Wards	
Arecibo-Pueblo	\$ 6,511
Arenalejos	\$ 8,182
Arrozal	\$ 3,436
Cambalache	\$ 28,726
Carreras	\$ 4,012
Domingo Ruíz	\$ 5,753
Dominguito	\$ 6,767
Esperanza	\$ 5,032
Factor	\$ 7,784
Garrochales	\$ 9,163
Hato Abajo	\$ 8,289
Hato Arriba	\$ 8,192
Hato Viejo	\$ 4,901
Isote	\$ 6,746
Miraflores	\$ 5,071
Río Arriba	\$ 5,196
Sabana Hoyos	\$ 7,530
Santana	\$ 9,872
Tanamá	\$ 5,751
Arecibo	\$ 7,290
Region	\$ 6,712
Puerto Rico	\$ 8,185

Source: U.S. Census Bureau, Population Census 2000 [Summary File 3 (SF 3) - Sample Data].

2.15.6 Median Household Income

Per capita income may be biased if a group of high-income people increases the average of a relatively low-income majority. For this reason, it is used as a complementary indicator median household income (**Figure 2-34**). This is the household income which has an income greater than half of the residents and less than the other half of the residents.

The median household income was lower in Arecibo (\$12,496) than in Puerto Rico (\$14,412). However, of the eight municipalities of the studied region, only Manatí and Camuy have a median household income greater than Arecibo.



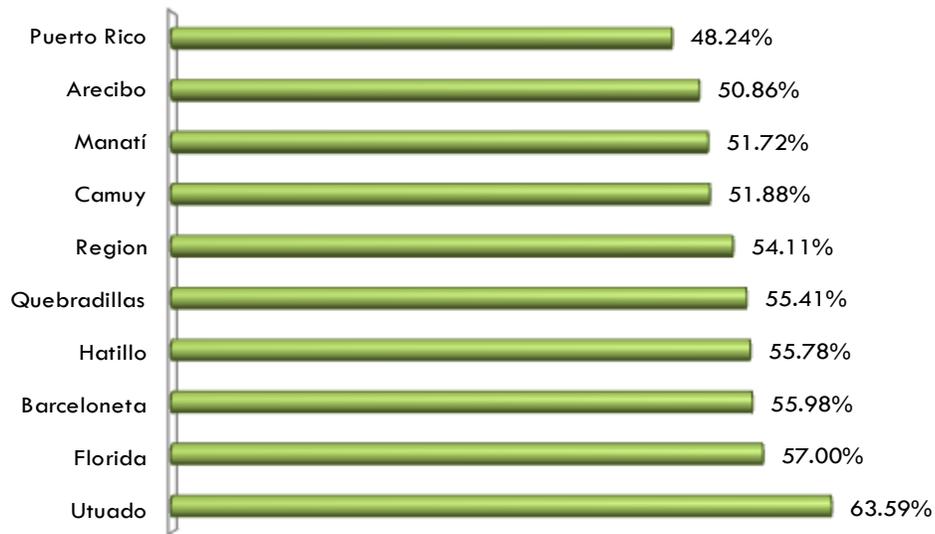
Source: U.S. Census Bureau. 2000 Census of Population and Housing.

Figure 2-34: Median Household Income

Higher economic status is also reflected in other statistics as the median household income (**Figure 2-34**). Median household income shown in the 2000 Census showed that Cambalache Wards represents the highest median household income of Arecibo: \$67,679. Followed by Santana Ward with \$17,713 or 26% of the household income of Cambalache Ward.

The other indicator of household income that is used is under poverty level households (**Figure 2-35**). A significant middle class population could mean a good level of household median income parallel to a high percentage of households below the poverty level.

In Arecibo, the percentage of households with incomes below poverty level is lower than that of the region. However, approximately 50.86% of the population in Arecibo is under the poverty level, compared with 48.24% in Puerto Rico.



Source: U.S. Census Bureau. 2000 Census of Population and Housing.

Figure 2-35: Households below Poverty Level

The distribution of poverty level condition is a favorable one for Cambalache Ward. Cambalache Ward has a household level under the poverty level more favorable than the reflected average in the reference area.

The poverty level was defined by the Social Security Administration in 1964 and then amended in 1969 and 1980 by federal interagency committees. This definition was described by the Office of Management and Budget Federal Directive 14, as the standard to be used by federal agencies for statistical purposes.

The limits for families, households and individuals were grouped in a table giving the poverty line by family unit size and taking into consideration the number of related children under 18 years. **Table 2-21** shows the number of households below the poverty level in Arecibo Ward.

Table 2-21: Households with Incomes below the Poverty Level.

Households with Incomes Below Poverty Level in 1999			
Area	Total Households	Below Poverty Level	
Wards			
Arecibo-Pueblo	10,401	6,576	63%
Arenalejos	2,997	1,384	46%
Arrozal	1,132	824	73%
Cambalache	53	0	0%
Carreras	1,324	916	69%
Domínguez Ruíz	3,380	1,846	55%
Domínguito	4,987	2,239	45%
Esperanza	2,118	1,280	60%
Factor	6,786	2,828	42%
Garrochales	2,388	1,182	49%
Hato Abajo	22,727	9,718	43%
Hato Arriba	7,858	3,439	44%
Hato Viejo	2,092	1,242	59%
Isote	5,925	3,455	58%
Miraflores	4,734	3,078	65%
Río Arriba	1,053	606	58%
Sabana Hoyos	10,433	5,580	53%
Santana	4,919	2,052	42%
Tanamá	3,501	2,011	57%
Arecibo	98,808	50,256	51%
Region	313,391	169,582	54%
Puerto Rico	3,769,782	1,818,687	48%

Source: U.S. Census Bureau, Population Census 2000 (Summary File 3 (SF 3) - Sample Data).

2.16 Environmental Justice

Estudios Técnicos, Inc prepared the analysis of Environmental Justice Study (EJ) for the Project, **Appendix J** of the P-EIS. Below is a discussion summarizing the relevant aspects of the study.

Consideration of EJ analysis as public policy arose from federal and state laws that were in effect at the time as the National Environmental Policy Act (NEPA), the RPPETDA and Executive Order No. 12898 issued by President William J. Clinton on February 11, 1994. The evaluation of impacts in EJ is applied so that the actions proposed by organizations or entities do not generate direct or excessive negative impacts on any particular racial, ethnic or socioeconomic group.

EPA defines Environmental Justice as: *“Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with*

respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies”

Through NEPA EJ has been institutionalized as part of the environmental assessment process and definition of impacts. Under the fundamental principles mentioned, demographic analysis should be undertaken of the geographic area affected by a project to determine the socioeconomic and racial composition of the area or locality and if there will be direct impacts or excessive in defined groups. So then it is possible to propose mitigation actions to minimize potential adverse impacts.

Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” issued by President Clinton states: "Each Federal agency shall look for the achievement of EJ as part of its mission to identify and resolve, as appropriate, the effects on human health or disproportionately high and adverse environmental of its programs, policies and activities on minority populations and low-income groups."

The community that is the subject of the EJ study is Cambalache Ward, referred to as community of concern. Under certain circumstances, a community of concern can be virtually indistinguishable from its neighbors with respect to a given factor of EJ.

Examples of Region 2 are found in Puerto Rico and the Virgin Islands, where all communities are classified Hispanic and color, respectively, even when there are additional racial differences. When people in the general area that incorporates the target community is relatively homogeneous with respect to a given demographic factor, usually is not useful to calculate a difference in this factor between the community of concern and the reference area.

Considering this approach all Puerto Ricans are considered a minority group. For this reason, even though racial composition is mentioned, the main criteria used were the socio-economic conditions of the population. The analysis will demonstrate whether or not the population in the target community is being discriminated against because of its socio economic condition.

According to this, the community under the EJ analysis must be analyzed and compared with other geographic units to meet its demographic and socioeconomic status. This comparison area is called statistical reference region

For this project, the statistical region of reference consists of the municipalities of Arecibo, Hatillo, Camuy, Quebradillas, Utuado, Barceloneta, Florida and Manatí. Accordingly, Cambalache Ward was selected as the target community for being where the Project will be located.

Cambalache Ward is the least populated of the 19 wards that make-up Arecibo. The reported population for Census 2000 for this neighborhood was 64 inhabitants, with a population density of 7 inhabitants / km ².

Cambalache population is concentrated along State Road PR-2. West of the community, in Pueblo Ward, dotacional facilities and services such as hospitals and schools concentrate. **Table 2-22** presents population data at Puerto Rico, regional and municipal levels.

Even when compared to other studied areas, Cambalache has a significantly lower population, Cambalache population presents a favorable economic situation vis a vis other Arecibo districts, Puerto Rico and the region. Even if the target community had been defined as having Arecibo wards adjoining Cambalache that have a larger population, the survey results would be the same since other districts of Arecibo have a similar economic situation between them, as with the region and Puerto Rico (see **Figure 2-36**).

Table 2-22: Population and Density

Population and Density		
Area	Population	Population Density (person/km ²)
Wards		
Cambalache	64	7
R ío Arriba	1,028	45
Arrozal	1,218	50
Carreras	1,294	128
Hato Viejo	2,097	94
E s peranza	2,130	82
Garrochales	2,366	169
Arenalejos	2,997	454
T anam á	3,413	159
Dom ingo R uíz	3,444	533
S antana	4,857	486
Dom inguito	4,998	287
Miraflores	5,122	325
Is lote	6,080	315
F actor	6,819	435
Hato Arriba	7,947	638
Arecibo-Pueblo	10,596	3,320
S abana Hoyos	11,064	186
Hato Abajo	22,597	1,815
Arecibo	100,131	305
Region	315,184	281
Puerto Rico	3,808,610	423

Source: U.S. Census Bureau, Population Census 2000. Summary File 1 (SF 1) 100-Percent Data.

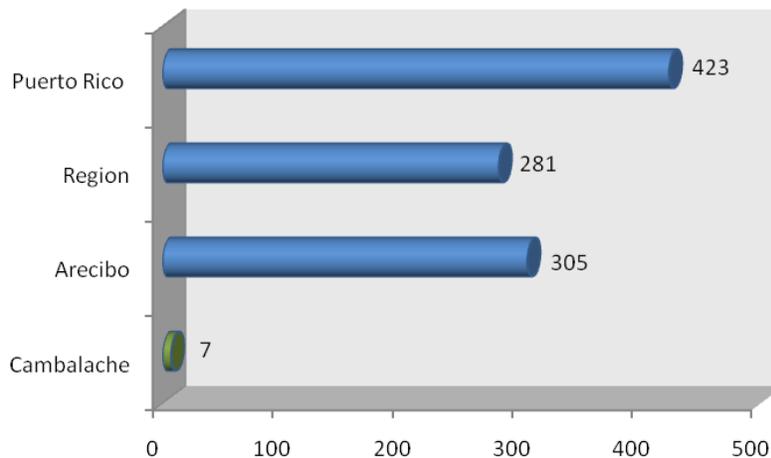


Figure 2-36: Population Density

The 2000 Census reported 27 homes in Cambalache Ward. Out of these, 20 households were made up by two heads of family, of whom eight had children under 18 years old.

2.16.1 Educational Attainment

The population of Cambalache, as reported in the 2000 Census, had the largest proportion of the population 25 years of age and above that had not completed any level of schooling (26.29%); but it also had the greatest proportion of those with post-secondary education. The proportion with no educational degree is the highest in Arcibo, the region and Puerto Rico. (See **Figure 2-37: Educational Attainment of the Population 25 Years of Age and Older.**)

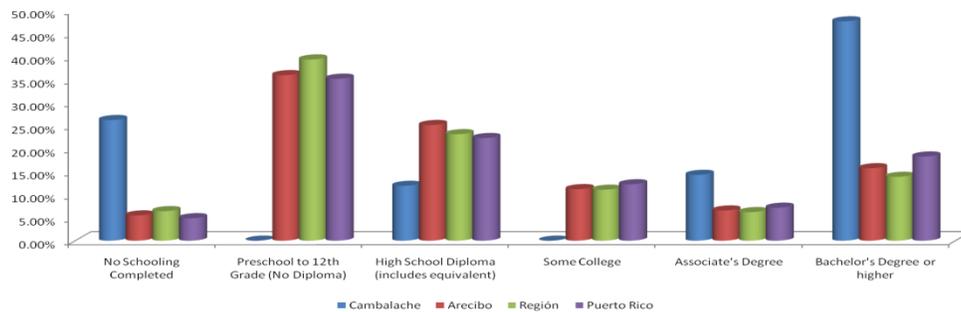


Figure 2-37: Educational Attainment of the Population 25 Years of Age and Older

In Cambalache only 11.9% of residents 25 and above has attained a high school degree. However the proportion of those with an Associate’s degree (14.29%) is the highest. In Cambalache, 61.90% of the population has taken university courses, has completed an Associate’s Degree or another post secondary degree. (See **Table 2-23**).

Table 2-23: Educational Attainment

Educational Attainment by Gender in Arecibo						
	No Schooling Completed	Preschool to 12th Grade (No Diploma)	High School Diploma (includes equivalent)	Some College	Associate's Degree	Bachelor's Degree or higher
Arecibo-Pueblo	7.25%	39.70%	21.50%	9.75%	4.53%	17.27%
Arenalejos	8.50%	31.46%	24.67%	11.63%	10.59%	13.15%
Arrozal	17.75%	40.43%	27.01%	6.02%	5.25%	3.55%
Cambalache	26.19%	0.00%	11.90%	0.00%	14.29%	47.62%
Carreras	11.38%	39.82%	29.58%	10.49%	3.16%	5.56%
Domingo Ruíz	5.62%	42.69%	22.74%	11.55%	7.08%	10.32%
Dominguito	3.73%	37.99%	26.83%	13.23%	5.71%	12.51%
Esperanza	7.03%	53.71%	20.92%	6.40%	3.36%	8.59%
Factor	3.81%	32.15%	25.35%	11.98%	11.27%	15.44%
Garrochales	3.81%	39.73%	25.15%	13.18%	7.22%	10.90%
Hato Abajo	4.51%	29.46%	22.51%	12.79%	7.40%	23.32%
Hato Arriba	4.39%	33.29%	21.44%	13.30%	5.43%	22.15%
Hato Viejo	11.29%	38.12%	30.98%	8.24%	6.27%	5.10%
Islote	7.34%	43.36%	24.78%	9.28%	5.75%	9.49%
Miraflores	4.56%	42.25%	33.91%	7.52%	4.56%	7.20%
Río Arriba	5.99%	50.38%	20.58%	9.98%	2.61%	10.45%
Sabana Hoyos	5.36%	35.96%	30.31%	10.63%	7.12%	10.63%
Santana	3.28%	27.90%	28.22%	12.56%	7.13%	20.90%
Tanamá	4.10%	44.60%	27.61%	8.56%	3.69%	11.44%
Arecibo	5.48%	35.94%	25.11%	11.19%	6.56%	15.73%
Region	6.41%	39.35%	23.12%	11.07%	6.20%	13.86%
Puerto Rico	4.88%	35.17%	22.28%	12.24%	7.15%	18.28%

Source: U.S. Census Bureau, Population Census 2000, Summary File 3 (SF 3) - Sample Data.

2.16.2 Median Household Income

Table 2-24 compares per capita income for the population of Puerto Rico, the region and Arecibo’s reported on the 2000 Census. Cambalache’s per capita income is substantially higher than the per capita income observed in the other regions included in the analysis. At \$28,726, it is nearly four times higher than the per capita incomes observed in Arecibo, the Region, and Puerto Rico.

The median household income in Cambalache is \$67,679, which is significantly higher than the median income reported in Arecibo’s other wards. For example, Santana has the second highest median household income, which at \$17,713 is nearly a fourth of Cambalache’s.

Table 2-24: Per Capita Income

Per Capita Income	
Area	Income (\$)
Wards	
Arecibo-Pueblo	\$ 6,511
Arenalejos	\$ 8,182
Arrozal	\$ 3,436
Cambalache	\$ 28,726
Carreras	\$ 4,012
Domingo Ruíz	\$ 5,753
Dominguito	\$ 6,767
Esperanza	\$ 5,032
Factor	\$ 7,784
Garrochales	\$ 9,163
Hato Abajo	\$ 8,289
Hato Arriba	\$ 8,192
Hato Viejo	\$ 4,901
Isote	\$ 6,746
Miraflores	\$ 5,071
Río Arriba	\$ 5,196
Sabana Hoyos	\$ 7,530
Santana	\$ 9,872
Tanamá	\$ 5,751
Arecibo	\$ 7,290
Region	\$ 6,712
Puerto Rico	\$ 8,185

Source: U.S. Census Bureau, Population Census 2000 [Summary File 3 (SF 3) - Sample Data].

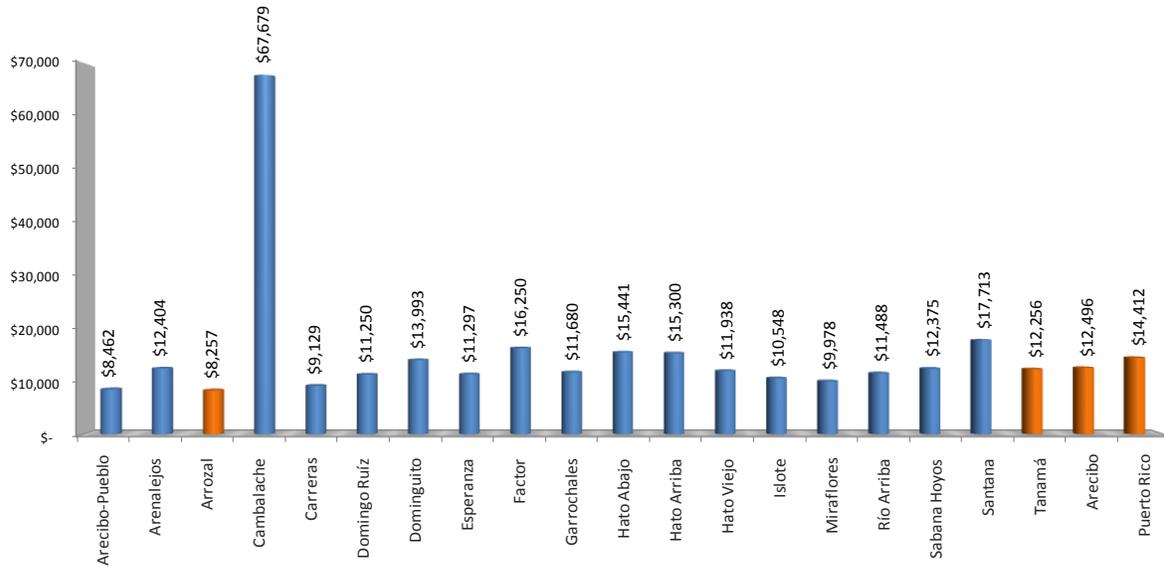


Figure 2-38: Median Household Income

2.16.3 Households below the poverty level

As of Census 2000 data, no households fell below the poverty level in Cambalache. Arrozal has the highest proportion of households with incomes below the poverty level in Arecibo (73%). Other wards such as Carreras (69%), Miraflores (65%), Pueblo (63%), and Esperanza (60%), had a significant portion of households with incomes below the poverty level. Compares Households with Incomes below Poverty Level

Table 2-25: Households with Incomes below Poverty Level

Households with Incomes Below Poverty Level in 1999			
Area	Total Households	Below Poverty Level	
Wards			
Arecibo-Pueblo	10,401	6,576	63%
Arenalejos	2,997	1,384	46%
Arrozal	1,132	824	73%
Cambalache	53	0	0%
Carreras	1,324	916	69%
Domingo Ruíz	3,380	1,846	55%
Dominguito	4,987	2,239	45%
Esperanza	2,118	1,280	60%
Factor	6,786	2,828	42%
Garrochales	2,388	1,182	49%
Hato Abajo	22,727	9,718	43%
Hato Arriba	7,858	3,439	44%
Hato Viejo	2,092	1,242	59%
Isote	5,925	3,455	58%
Miraflores	4,734	3,078	65%
Río Arriba	1,053	606	58%
Sabana Hoyos	10,433	5,580	53%
Santana	4,919	2,052	42%
Tanamá	3,501	2,011	57%
Arecibo	98,808	50,256	51%
Region	313,391	169,582	54%
Puerto Rico	3,769,782	1,818,687	48%

Source: U.S. Census Bureau, Population Census 2000 [Summary File 3 (SF 3) - Sample Data].

Based on presented data, Cambalache Ward is in a better economic condition when compared to other wards of Arecibo, Puerto Rico and the region.

2.17 Public Services

Arecibo has hospitals, Diagnostic and Treatment Centers (CDT), fire stations, police stations and FEMA stations near the Project site. The municipality also has recreational areas which will be described in this section in terms of their distance related to the Project site.

Dr. Susoni and *Cayetano Coll y Toste* Hospitals are at an approximate distance of 1,600 meters and 2,600 meters of the Project site, respectively. The Good Shepherd Hospital is 1,460 meters away and the Hospital *Dr. Manuel Figueroa* is located at 2,440 meters from the Project site. All of these hospitals are located to the northwest of the Project site.

The nearest CDT is located at a distance of 3,480 meters northwest of the Project site. A private health clinic is also located 1,860 meters from the site.

The nearest fire station is situated 2,290 meters northwest of the Project site. The Municipal Agency for Emergency Management is 2,680 meters away from the site. The stolen vehicle police station is 2,480 meters to the west and the narcotics police station is located 4,040 meters to the southeast of the site.

There are no recreational areas in the immediate area of the site of the proposed Plant. The distance to the nearest recreational areas are located beyond the limits of the Project site follow: *Rodríguez Olmo* Passive Park located northeast of the Project site at 2,565 meters. The *Arecibo Lighthouse* Historical Park is approximately 2,096 meters to the northeast. *Caño Tiburones* is located 1300 meters to the northeast which has recreational fishing facilities. The *Club Náutico de Arecibo* is located 1,500 meters to the northeast and another marina is located 1,900 meters to the northeast.

Other nearby recreational areas in Cambalache Ward is a small parking lot adjacent to the boat ramp which adjoins the estuary of the RGA roughly 1,360 meters to the northeast. Recreational fishing is permitted on the coastal waterfront and from the bridge on PR-680 at approximately 1,600 meters northwest in the area near the boat ramp. The *Arecibo Sports Center* is 1,628 meters to the southwest. The *Arecibo Coliseum Manuel "Flask" Iguina* is located approximately 4.0 miles west of the Project site.

There are no recreational facilities on the banks of RGA which bounds the Project Site to the west. A small playground is located in *Domingo Ruiz* Ward roughly 2,834 meters to the southeast of the site perimeter. In *Higuillales* Ward there is a small ballpark that is located southwest at an approximate distance of 1,450 meters.