

2.0 ALTERNATIVES

This chapter discusses the alternatives evaluated for the proposed Project.

2.1 Introduction

This section describes in detail the alternatives considered in the evaluation of the Project, including the No-Action alternative, reasonable alternatives to the proposed action that were studied in detail, and the Applicant's "Preferred Alternative". Utilizing the information and analysis in the chapters on Affected Environment (Chapter 3) and Environmental Effects (Chapter 4), this section also presents a comparison of the beneficial and adverse environmental effects of each of the alternatives considered in the analysis. This process provides a logical framework for the selection of the Preferred Alternative among the options considered.

The environmental evaluation process under NEPA for a project of the complexity and magnitude of the Port of the Americas, requires the evaluation of reasonable alternatives to the proposed action. These alternatives must be evaluated to determine the potential comparative environmental impacts of each alternative, and to compare them with the No-Action alternative (Status Quo Option).

2.2 History and Process to Formulate the Alternatives

For the proposed action, the Commonwealth conceived the idea of developing an international commercial base in the Island for the transshipment of products and materials. As a first step in the implementation of this concept, the Government Development Bank (GDB) commissioned and completed in August 2000 a study entitled "Puerto Rico Transshipment Port Feasibility Study and Project Outline" (Frankel and Associates, 2000) (Appendix B). This study evaluated the physical, economical and commercial feasibility of developing in Puerto Rico a deep-draft port for cargo transshipment in conjunction with free port zones. The study concluded that the Project was financially, economically, and commercially feasible and attractive as well. Also, the EDB commissioned a second study to evaluate the feasibility of the PTA (Ocean Shipping Consultants, Appendix W).

The Project includes some unique requirements that would have a significant bearing on its completion. The development of the PTA would be defined by the "need" of external entities or by the interest of international industries to develop in the Caribbean Region a deep navigation port capable of handling Post-Panamax vessels that would be both economically feasible and efficient in its cargo management. If Puerto Rico is unable to meet the external needs of the Project, the Island would be excluded from the potential increase in transshipment business in the Caribbean Region and beyond, already underway internationally. This DEIS defines the alternatives that can reasonably be evaluated to determine what Puerto Rico can offer to the international industrial community as an "opportunity area", particularly regarding the siting of the Project, its design, and its operational characteristics.

There are at least 15 sites along the coast of Puerto Rico that would meet some of the requirements and physical needs for the development of a transshipment port. However, the development of coastal sites in Puerto Rico is strictly regulated by several agencies of the Federal and Commonwealth governments. This factor is an important element considered by potential investors that would participate in the development of a transshipment port in the

Island, particularly when the window of opportunity available to begin the operation of a profitable port could potentially be limited to three years from the present date.

The objective of the analysis of siting alternatives presented in this DEIS is to comply with the NEPA requirements, while ascertaining that Puerto Rico has the opportunity to satisfy the needs of potential investors on the Project, and meet its economic goals as conceived. If the alternative analysis shows that the Commonwealth proposes a beneficial design for the Project, including a suitable site where the potential impacts to the environment are prevented, minimized and mitigated, while complying with the local and federal environmental regulations, Puerto Rico would then be in a more favorable position than other potential locations in the Caribbean to attract potential investors interested in the development of a transshipment port in the region.

The siting evaluation process for a project such as the PTA requires a definition of the physical nature of the proposed Project and its economic characteristics (discussed in Section 2.3). It is also necessary to measure the compatibility of the physical characteristics of the potential sites against the project plan as conceived. The studies completed by the USACE in 1999 (Appendix C), and by Frankel and Associates in year 2000 (Appendix B), implemented methodologies that meet these requirements. These studies concluded that the south coast of Puerto Rico, between Guayanilla Bay and the Port of Ponce, potentially represents the most suitable areas for the development of the Project.

The Preferred Alternative proposed by the Applicant is based on an extensive analysis of the siting alternatives included in the USACE study of 1999 (Appendix C), as well as further analysis of the engineering, physical and environmental requirements of the Project. The 15 sites in the USACE study were screened, focusing on three potential general sites along the south coast of Puerto Rico, between Guayanilla Bay and the Port of Ponce, as the most appropriate areas for the development of the PTA. The following sites were identified as the preliminary alternatives for the development of the PTA:

- Guayanilla Bay
- Ponce Bay
- Combination of Guayanilla and Ponce bays

These sites were compared to the No-Action alternative (no transshipment port would be developed), as required in the NEPA process.

2.3 Alternative Evaluation and Selection Criteria

The following factors were considered by the Applicant in the selection process of the Preferred Alternative:

- Siting and environmental criteria were developed and evaluated; then, geographical areas of the coast of Puerto Rico were identified to investigate to what extent they conformed to the siting criteria.
- Critical engineering and design characteristics of the components of the PTA were identified.
- Finally, each site was evaluated in detail to identify to what extent they conformed with the international market criteria, without overlooking the

importance of potential adverse effects to the environment resulting from the construction and operation phases of the Project.

2.3.1 Characteristics and Criteria of the Transshipment Port

In general terms, the decision to locate a transshipment port at a given site is reached after considering certain physical criteria, and characteristics of the sites being evaluated. If possible, the preferred site would include the following characteristics:

- Favorable wind and swell patterns, making the construction of breakwaters or other protection measures unnecessary, which would make the Project less expensive.
- Navigation channels and turning basins with enough width and depth to allow passage of Post-Panamax vessels.
- Adequate infrastructure including good access roads able to handle the increased traffic resulting from port activities; ample electric power service; safe and reliable potable water; waste and storm water sewers; and telecommunications.
- Availability of adequate land for future value-added activities.
- Security control.
- Proximity to urban centers to provide additional facilities and human resources capable of supporting the activity.
- Outside of restricted military areas.
- Located outside of flood-prone areas or where flood mitigation costs are significant.

2.3.2 Physical Criteria Discussion

2.3.2.1 Wind and Swell Patterns

Wind and swell patterns are important and critical elements in the site selection process for a transshipment port. The efficiency of container loading and unloading operations in the port is crucial to its financial success and depends to a great extent on the effects of wind and swell inside the port. Loading and unloading of ships may be hampered or delayed by rough seas in an unprotected harbor, affecting the Project's financial viability.

Puerto Rico is located within the northeast trade winds belt, one of the most constant wind currents on the planet. However, the Island experiences strong climatic contrasts that affect the land and coastal areas. Unique climatic characteristics occur along each of the four coasts of the Island. The northern coast is exposed to the warm and humid trade winds, and the rough open waters of the Atlantic Ocean. As a result, this coast is exposed to large waves that may exceed 12 feet during winter storms. The southern coast faces the Caribbean Sea, and gentle swells wash over the reefs into mangrove swamps that border the coast. In the eastern coast, the insular shelf extends beyond the Virgin Islands, and some of the wave energy is reduced by friction with the seabed, partially protecting the coast from the strong swell caused by Atlantic storms. The west coast experiences a low-energy wave pattern resulting from its location in the opposite side of the Island relative to most storm waves, which approach the Island from the northeast or southeast.

In spite of this partial shield, during the winter, the west coast is occasionally affected by strong swells produced by storms in the North Atlantic. At the Ponce and Guayanilla-Peñuelas sites proposed for development of the PTA, the effects of wind and marine currents were evaluated by the USACE in a detailed study included as Appendix V to this DEIS.

2.3.2.2 Post-Panamax Ships

Post-Panamax ships are vessels that cannot cross the Panamá Canal because of their great size. Most of these ships displace 60,000 tons or more, and their average draft is at least 46 feet (Frankel, 2000). At present, larger Post-Panamax ships are under construction, with drafts ranging from 46 to 48 feet and cargo load capacity of as many as 12,000 TEU.. These larger ships will be longer and wider, providing the added capacity without significantly increasing their draft beyond 48 feet. However, for safety purposes, a depth of up to 55 feet is recommended in the navigation channels routing these vessels. In most transshipment ports, dredging is required to maintain these depths.

2.3.2.3 Mooring and Maneuvering Space Requirements

Post-Panamax ships have a large surface area because containers are stacked above the main deck. Because of their great size and displacement, these ships must sustain sufficient speed to maintain steerage until they reach protected waters. Before mooring, and because of their great mass, these large ships must reduce their speed long before entering into port. At least one mile of channel is then required to slow the vessel before it can be maneuvered for docking. When leaving port, at least 2,000 feet of turning space is required to maneuver the ships into the open sea.

2.3.2.4 Infrastructure

The development of the port is more feasible in areas with good infrastructure needed to support port operations. Potable water, electric power, sewer services, storm water control, medical facilities, telecommunications, and firefighting equipment are essential for the operation of the port. In the site selection process, candidate locations with these infrastructure needs available were favored.

2.3.2.5 Space for Value-Added Areas

Value-added (VA) areas are developed once the port is constructed and in operation, since they are a natural consequence of it. However, it is desirable for the sponsor of a deep-draft port, in this case the Commonwealth, to plan and develop a minimum area for value-added activities. These areas can be developed by the public sector as an industrial park, with all the amenities to attract industry and business, or simply set aside with the basic infrastructure for eventual development by private investors. The design criteria in the conceptual plan for the PTA proposes an initial 200 acres between Ponce and Guayanilla as the minimum area requirement to locate value-added activities, with a maximum of 500 acres as the ideal condition. The Commonwealth would provide the essential infrastructure needed to attract private investors to the value-added areas. Other VA areas may be induced outside the project area as indirect consequences.

2.3.2.6 Capacity to Maintain Security

The ability to maintain strict security levels in the port is a very important consideration, particularly for future private investors. This is more important now than before, due to the September 11, 2001 incidents. The expansion of transshipment ports in other Caribbean jurisdictions has been severely affected by security problems. Access control is essential for

the port. The ease with which the Project can be isolated from other operations and from the general public, and the extent to which this isolation could be maintained, favored one site to be rated above another.

2.3.2.7 Proximity to Urban Centers

Approximately 10 to 15 percent of the incoming cargo arriving at the PTA would be distributed in Puerto Rico. The proximity of the port to the urban centers of San Juan, Ponce, Mayagüez, and Aguadilla is a key factor to consider, since transportation time and costs vary according to the distance from the port to these urban centers.

2.3.2.8 Proximity to Military Facilities

The U.S. Department of Defense operates several military reservations in Puerto Rico. The most important of these is the Roosevelt Roads Naval Station at Ceiba, including the firing range in the Municipality of Vieques. Other military facilities include the US Navy Communications Center in Sabana Seca (planned for closure in 2002), and the National Guard camps at Salinas (Camp Santiago) and Tortuguero in Manatí and Vega Baja. These sites and their immediate vicinities were excluded from consideration as potential sites for the Project, since they impose severe restrictions to nearby developments.

2.3.2.9 Environmental Criteria for Port Location

The following environmental criteria were considered in the siting assessment process:

- Proximity to natural areas of high value and critical elements of fauna and flora, including wetlands and endangered species.
- Need to dredge and availability of dredged material disposal areas.
- Proximity to cultural, historic and archeological resources.
- Proximity to recreational areas, parks, public beaches, etc.
- Proximity to a river mouth and possible sedimentation effects in the port area.

2.3.3 Environmental Criteria Discussion

2.3.3.1 Proximity to Natural Areas of High Value

During the assessment of alternative sites for the Project, emphasis was placed on the possible effects of locating the port at or near natural areas of high value. In Puerto Rico, there are several local and federal designation categories for protection of natural resources. Among these protection categories are areas designated as State Forests, Natural Reserves, Estuarine Research Reserve, Critical Wildlife Areas, Wildlife Refuges, Critical Wildlife Habitats, and Special Planning Areas, among others.

For assessment purposes, all wetlands and seagrass beds were considered areas of high ecological value, and the presence of critical elements of flora and fauna was also considered important. These elements include threatened and endangered species, as listed by the USFWS, and the Natural Heritage Program of the DNER.

2.3.3.2 Proximity to Rivers

Under ideal conditions, the transshipment port should be located far from the mouth of rivers, or where the sediment load associated with rivers does not pose sedimentation problems to the port and its navigation channels. Excessive sedimentation normally results in costly and recurrent maintenance dredging, as it happens currently at the ports of San Juan and Yabucoa. In the assessment of siting alternatives, locations with minimal sedimentation problems were favored.

2.3.3.3 Need for Dredging and Filling

The disposal of dredged material into the ocean is allowed only at previously authorized sites, known as Offshore Dredged Material Dumping Sites (ODMDS). In Puerto Rico, EPA has authorized ODMDS for the ports of San Juan, Mayagüez, Arecibo, Yabucoa and Ponce. Disposal of dredged material at these sites requires a USACE Permit under Section 103 of the Marine Protection, Research and Sanctuaries Act, and also a Site Management and Monitoring Plan approved by EPA. Normally, dredged material from a particular harbor or channel cannot be dumped at a site approved for another location. At present, only the ODMDS site serving the San Juan Harbor is active after complying with the above requirements. The Puerto Rico Ports Authority filed the permits for the Yabucoa Harbor site nearly two years ago, with the final approval still pending.

Under the Applicant's Preferred Alternative for the Project, disposal of part of the material dredged from the Ponce Harbor at the Ponce ODMDS would require filing an application for a Section 103 Permit, including the development of a Site Management and Monitoring Plan for the ODMDS. The Applicant began this process, and contracted a private company to characterize the chemical and physical quality of the bottom sediments at the Ponce Harbor, along the areas that would require dredging to allow passage and turning of the Post-Panamax ships. The same contractor will also initiate, on behalf of the Applicant, an updated assessment of the marine environment at the ODMDS, as required by EPA as part of the Site Management and Monitoring Plan. Once these investigations are completed, if the dredged material is free of any substances that would prevent its disposal at the ODMDS, the USACE would complete the evaluation of the Section 103 Permit application. The USACE and EPA estimate that these processes, if run in parallel, would take a minimum of one year from the date that the application is filed.

2.3.3.4 Proximity to Cultural, Historic and Archeological Resources

A number of archaeological sites and structures with historical and cultural value occur along Puerto Rico's coasts. Several archeological sites were identified in the vicinity of the value-added areas proposed as part of the PTA. These sites are protected under federal and local laws. Based on available data, the assessment of alternative sites placed emphasis on this criterion to avoid locating the Project within a cultural sensitive area, and to minimize the impacts upon them.

2.3.3.5 Proximity to Recreational Areas

Adverse impacts to recreational areas are considered to be significant if, during construction or operation of the proposed Project, the access to the areas designated for such purposes is limited or obstructed. Under this criterion, the effect of the Project over the recreational resources was evaluated, based on the potential impacts over land and physical changes to the landscape.

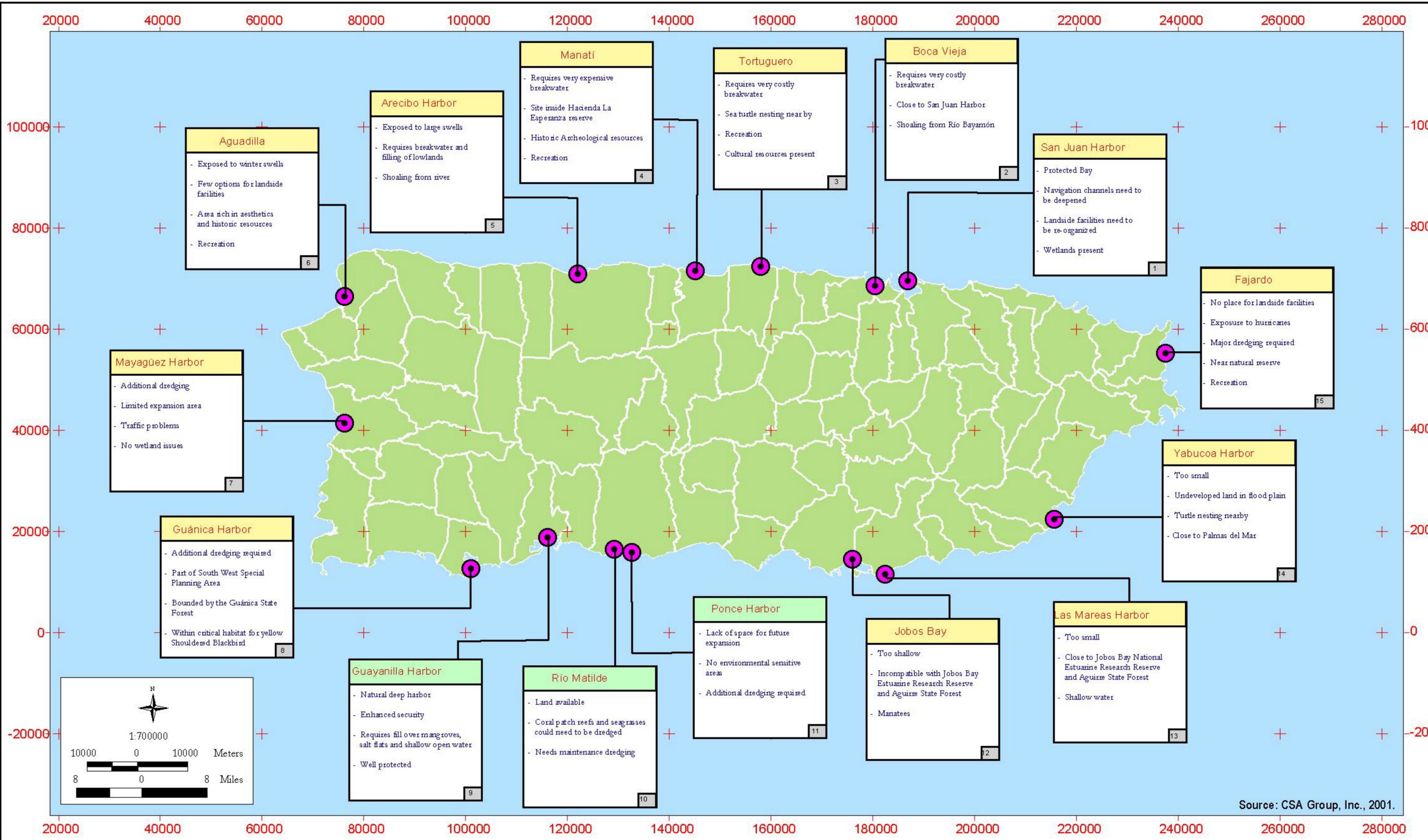
2.4 Alternatives Considered but Eliminated from Detailed Evaluation

The Applicant's Preferred Alternative for the development of the PTA was chosen after careful consideration of the sites evaluated in the USACE report of 1999, and the additional screenings completed as part of this DEIS. The results of these two evaluations were very similar and focused on sites in the south coast of Puerto Rico between Ponce and Guayanilla. A similar screening of potential sites for the construction of the EcoEléctrica cogeneration power plant at the Guayanilla Harbor, involving the transport of fuels by sea, also focused on the Guayanilla Bay primarily because of its deep navigation channel. The power plant is located at Punta Guayanilla, where it operates its own liquefied natural gas (LNG) terminal.

The 15 sites throughout Puerto Rico evaluated by the USACE and included in the initial screening process are shown in Figure 2-1, where their relative advantages and disadvantages are compared. The environmental screening criteria used in the evaluation were similar to those used by the USACE and Frankel (USACE, 1999 and Frankel, 2000). The following sites were considered:

- San Juan Harbor
- Boca Vieja Bay (Palo Seco at Bayamón)
- Tortuguero Bay near Vega Baja
- Manatí Bay
- Arecibo Bay
- Aguadilla Port
- Mayagüez Port
- Guánica Bay
- Guayanilla Port
- Río Matilde Bay (west) at Ponce
- Port of Ponce
- Jobos Bay at Guayama
- Las Mareas Harbor at Salinas
- Yabucoa Harbor
- Fajardo Bay

Ports of varied magnitudes operate at eleven (11) of the sites evaluated. Two of the ports, San Juan and Ponce, currently operate as transshipment ports for Panamax-type container ships.



Source: CSA Group, Inc., 2001.

Coordinates in State Plane NAD 27

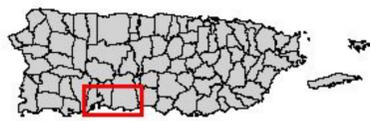


Figure 2-1 Overview of Transshipment Port Site Alternative Analysis

Port of the Americas



z:/00970140/apr/areg/portsanalysis.apr 05/agosto/10 rev.

Thirteen of the fifteen harbors in Puerto Rico considered as potential sites for the development of the PTA were eliminated from a detailed evaluation. The principal reasons for elimination of these sites are as follows:

2.4.1 San Juan Harbor

The San Juan Harbor in San Juan Bay is the most important commercial port in Puerto Rico and the Caribbean. It is the only port along the north coast of the Island that offers protection against the meteorological disturbances that periodically impact Puerto Rico. The depth of the navigation channels is variable. The Bar and Anegado Channels at the entrance of the Port have depths of 45 and 36 feet, respectively. The Army Terminal, Puerto Nuevo and Graving Dock Channels have depths of 36, 32 and 30 feet, respectively. The dredging of these channels by the USACE is currently on its final stages. Depths of each channel after dredging will be as follows: 51-56 feet on Bar Channel; 40-49 feet on Anegado Channel; and 40, 39 and 36 feet on Army Terminal Channel, and the Puerto Nuevo and Graving Dock Channels, respectively.

The port has 19 docks with a total length of 7,035 feet. Approximately between 10 and 15 percent of the cargo managed at the port is transshipped (2.8 million tons per year). Most of this cargo is handled at the Puerto Nuevo Terminal. In addition, the port receives cruise ships; in 1999 more than 660 cruise ships used the various tourism terminals within the port.

Although the EPA has approved a dredged material disposal site on the Atlantic Ocean for the Port of San Juan, a site management plan for disposal was only recently completed by the USACE (ODMDS No. OD0233), and the dredging has not been concluded. The ongoing dredging of the navigation channels is designed to only support existing operations of the port, at the indicated drafts, and is not adequate to accommodate Post-Panamax ships.

A key disadvantage of the Port of San Juan is the lack of additional space for container storage and development of value-added activities. Expansion of the port to accommodate any additional transshipment and future value-added areas would require re-structuring the entire port surroundings, existing piers and berthing facilities. In addition, many operations that are not directly related to the port activity would have to be relocated to maximize the port's efficiency. Some of the areas that remain undeveloped include wetlands, and their elimination would be in conflict with the Comprehensive Plan for the Conservation and Management of the San Juan Bay Estuary (EPA, 2000). Other areas of the active port zone, such as Puerto Nuevo, operate under long-term leases, and are not available for potential expansions, unless new negotiations with the current tenants take place. There are no federal Coastal Barriers Units within this alternative site.

According to Frankel (2000), there are other operational factors that limit the use of the Port of San Juan as an ideal site for the development of the proposed transshipment port. Some of these include insufficient crane, rail spans; inadequate surface load bearing capacity; little equipment availability and lack of adequate transport, services and infrastructure. The shallow draft of the navigation channels and the congestion due to current port traffic were the main factors in the determination to eliminate the Port of San Juan from further consideration.

2.4.2 Boca Vieja (Península Palo Seco), at Toa Baja

The main advantage of Boca Vieja as a siting alternative for a transshipment port is its proximity to San Juan. This advantage would substantially reduce the costs of shipping materials to San Juan. This area does not present major environmental conflicts in terms of critical elements, the

presence of endangered species, or proximity to areas of special designation. Coastal Barrier Unit Number PR-86P, Punta Salinas, is located on the western side of the Bay.

Because of its location in the north coast, the principal limitation of Boca Vieja as a siting alternative is the exposure to swells, which would require the construction of a breakwater for protection, increasing the Project's costs. In addition, the area would require dredging to accommodate deep-draft ships. The potential high costs of dredging and disposing of the dredged material, and the cost of building a breakwater were the main reasons to eliminate this site from further consideration.

2.4.3 Tortuguero Bay at Vega Baja

Like Palo Seco (and also Manatí and Arecibo), the Tortuguero area is located in the north coast of the Island, in the municipality of Vega Baja. As such, it would also require the construction of a breakwater to protect the port from swells. Even with the breakwater, incoming ships would be subject to the action of strong swells and cross winds while entering and leaving the port during certain periods of the year. Because of these conditions, continuous 24-hour port operation cannot be guaranteed. The construction of a breakwater would have to take place in deep waters (60 to 100 feet), significantly increasing the Project's cost.

The Tortuguero area is known for its important historic, cultural and natural resources. Detailed terrestrial and sub-aquatic archeological investigations would be required prior to obtaining approval for any construction in the area. A beach located to the west of the site is a known nesting place for marine turtles, which would impede any future coastal development in the area. Nearby beaches and Tortuguero Lagoon are used for recreation, which would also create a conflict with the proposed use. Coastal Barrier Unit Number PR-83, Tortuguero, is immediately adjacent to this alternative site. For these reasons, this site was not given further consideration.

2.4.4 Manatí Bay at Manatí

The Manatí Bay presents similar physical and environmental limitations as those present in Palo Seco, Tortuguero and Arecibo, thus limiting its potential for development as a deep-draft port. The bay is exposed to the Atlantic Ocean and surface swells and ocean currents, which would require the construction of a breakwater costing between \$284 to \$354 million dollars, according to USACE estimates. The site is located west of Río Grande de Manatí, within the boundaries of the Hacienda La Esperanza Natural Reserve. Coastal Barrier Unit Number PR-82P, Punta Manatí, covers a significant portion of the coast within this alternative site. This area is known for its many historic and archaeological resources, sea turtle nesting beaches, and wetlands. These facts led to the elimination of this site from further consideration.

2.4.5 Arecibo Harbor

The Port of Arecibo exhibits several characteristics that limit its use as a potential candidate site for the PTA. The port is shallow, with a navigational channel only 25-feet deep, which does not make it accessible to deep-draft ships. The port has a 1,200-foot long breakwater that provides partial protection from ocean swells. Large sediment loads from the Río Grande de Arecibo, which discharges directly into the bay, accumulate in the navigation channel, requiring frequent maintenance dredging. Dredged material would be discharged into an authorized interim ocean disposal site to the north in the Atlantic Ocean (OD0235), but for which a management plan would have to be developed and approved by the USACE and the EPA respectively, prior to its use.

The only area for future expansion of the Port would be to the east of the facility, towards Caño Tiburones (a large wetland drained by a canal flowing from the east into the bay). Caño Tiburones is part of a Natural Reserve designated by the Puerto Rico Planning Board, protected from development. In addition, marine turtles currently use sections of the beach area that would become the inner shore of the port. Humpback whales annually migrate during the winter months north of the bay in the Atlantic Ocean, offshore of the existing breakwater. Coastal Barrier Unit Number PR-81, Puerto de Arecibo, lies immediately to the south of Arecibo Harbor. For these reasons, the Port of Arecibo was not considered as a feasible alternative for the location of the port, and was eliminated from further consideration.

2.4.6 Port of Aguadilla

The Municipality of Aguadilla and the USACE are co-sponsors of a federal project consisting of the construction and maintenance of an 820-foot long breakwater, a 9-foot entrance channel, and a turning basin off the shorefront of the Port of Aguadilla. This Project provides adequate facilities for small, local commercial fishing boats. Other marine facilities in the Aguadilla area include the old sugar transshipment terminal, and the old Ramey Base dock, known as Crash Boat. These piers are 40 and 30 feet deep, respectively.

Although the relatively deep sea near the coast favors the Aguadilla area, other physical and environmental conditions limit its development as an alternative location for the proposed transshipment port. The area is exposed to long and prolonged winter swells produced by storms in the North Atlantic, which would require construction of a breakwater. Moreover, the coastal plain in this region of Puerto Rico is extremely narrow, resulting from an abrupt drop in the topography as it approaches the coast. This condition is not favorable for maintaining good security in the port and severely limits the siting and expansion possibilities for value-added areas. Coastal Barrier Units PR-75 and 75P, Espinar, are located about 5 km to the south of this alternative site. Furthermore, this cliff-bordered zone is densely populated, with numerous residential and commercial properties, a condition which is not favorable or compatible with the port's development. Moreover, and due to topographic conditions, access roads to the site are narrow and winding.

The area between the old Ramey Base and the Madre Vieja Creek is rich in scenic resources, historic structures and recreational areas. The Crash Boat area is one of the best swimming beaches in the region and one of the most widely used by divers in all of Puerto Rico, in addition to supporting a community of commercial fishermen. The place has an extremely attractive landscape with panoramic views of Desecheo Island and the Mona Passage, as well as spectacular sunsets. These uses are in serious conflict with the establishment of a transshipment port. Therefore, this alternative was eliminated from future consideration.

2.4.7 Mayagüez Harbor

The Port of Mayagüez lies within the northern section of the Mayagüez Bay, and includes a navigation channel 30 to 60 feet deep. The depth of both the approach channel and the terminal area is only 30 feet, while the bay itself is 3.8 miles wide. The port operates a free-trade zone, with facilities located on a 42-acre lot with 234,000 square feet of warehouses. This zone operates under the direction of the Puerto Rico Industrial Development Company.

The shallow depth of the navigation channel limits the potential of the Port of Mayagüez for sitting the PTA. Dredging of the 30-foot deep channel would be required to allow the entrance of Post-Panamax vessels. Although there is an EPA-approved interim ocean disposal site for dredged material in the Mona Channel (OD0236), its use would require the development and approval of a Site Management and Monitoring Plan. There are no coastal Barriers Units within

this alternative site. The closest Unit is Number PR-72, Río Guanajibo, located about 7 km (4.3 miles) to the south of the Port of Mayagüez.

Access to the port is also a limiting factor, since it requires traveling from Highway PR-2 through several narrow, winding and congested roads and municipal streets. Once on the main artery, reaching San Juan through Arecibo or Ponce takes at least two-and-a-half hours. The port has limited space to accommodate any value-added facilities, and its surrounding area is already developed, which would hamper its expansion.

For these reasons, the Port of Mayagüez was eliminated from further consideration as an option for the transshipment port location.

2.4.8 Guánica Bay

Although Guánica Bay is considered one of the safest ports in Puerto Rico during hurricanes, its shallow depths and environmental sensitivity limit its potential for siting the PTA. Depths fluctuate between 21 and 27 feet, which is inadequate for the passage of Post-Panamax vessels without prior extensive dredging. The bay is located in an environmentally sensitive area with unique natural resources. The bay is located within the limits of the Southwest Special Planning Area, where the Puerto Rico Coastal Zone Management Plan postulates that conflicts would exist between development and the conservation of natural resources. Coastal Barrier Units PR-61 and 60P, Punta Jacinto and Ensenada Las Pardas respectively, are located on both sides of the entrance to Guánica Bay.

Furthermore, the Guánica State Forest, an International Biosphere Reserve designated by the United Nations, surrounds the east and west shores of the bay. In addition, the bay is within the limits of the designated critical habitat of the endangered Yellow-Shouldered Blackbird.

In addition to the environmental considerations that do not favor this location, most of the coastal area to the west of Guánica Bay has been developed, or is occupied by wetlands. Commonwealth agencies, as well as private investors, have plans to develop this region as a tourist area, which makes it incompatible with the development of the proposed port.

The environmental sensitivity factors alone are sufficient to eliminate Guánica Bay as an alternative for the location of the PTA. Based on these considerations, the Guánica Bay was eliminated from further analysis.

2.4.9 Río Matilde (west)

The Río Matilde area west of the Ponce Bay was also considered as a potential site for the location of the PTA, mostly because the area includes approximately 4,500 linear feet of undeveloped coastline where the transshipment port operations would be made feasible. Currently there are no port facilities in the area, which is located between the Ponce Wastewater Treatment Plant and the El Tuque Beach to the west.

However, the occurrence of critical marine and land ecosystems in the area limits the potential of this site. Coastal Barrier Unit Number PR-57, Punta Cucharas, lies just east of this site. The area is mostly open to the Caribbean Sea, exposed to the effects of wind and surf. Access to a potential port at this site would be through a channel between Cayo Viejo and Isla Cardona, where the ocean depth ranges from 45 to 47 feet. The depth of the seabed close to the shore is relatively shallow, increasing gradually until it reaches 30 feet at approximately 1,100 feet from the shoreline. The bottom is composed of hard limestone rocks, with small colonies of coral and seagrass beds. Inland, as much as 971 acres of undeveloped land is available, although wetlands are abundant.

In addition to exposure to wind and swell, the main disadvantage of the site is the extensive dredging needed to provide a navigation channel and berth area for Post-Panamax ships.

On the basis of the environmental sensitivity of the site, it was not considered for further evaluation.

2.4.10 Jobos Bay at Salinas

Jobos Bay is located between the municipalities of Salinas and Guayama. It is conformed by Punta Pozuelo on the east and several mangrove islets to the south and southwest. Its main attribute is the capacity to provide good anchorage in stormy weather, specifically to the northeast of Cayos de Pájaros, at depths that range from 26 to 35 feet. Coastal Barrier Unit PR-46, Cayos de Barca/Ratones Complex, lies to the west of the Bay. Unit PR-45P includes Jobos Bay. The main approach to the Bay is from the west, between Cayo Morrillo and Cayo Ratones, continuing along the navigation channel to the turning basin and the PREPA-owned Aguirre power generating plant. The navigation channel was previously dredged to a depth of 26 feet and a width of 60 feet. The port includes a 1,000-foot long dock owned by the now defunct Aguirre Sugar Mill, which is not in use.

Small vessels access the bay through Boca del Infierno, a narrow entrance between Cayos Caribe and Cayos de Barca. A private channel leads to a cove and private marina on the northwest limit of Punta Pozuelo.

Development of the transshipment port in Jobos Bay would require a large-scale dredging operation, as well as filling of large areas of wetlands for the construction of a pier 3,000 to 5,000 feet in length and container storage areas. The site is close to several ecologically sensitive areas, including the Jobos Bay National Estuarine Research Reserve to the west and the Aguirre State Forest to the northeast. The area is also rich in seagrass beds and coral reefs, and is an important habitat for the endangered West Indian Manatee. Due to these conditions, the Jobos Bay was eliminated from further analysis.

2.4.11 Las Mareas Harbor at Guayama

Las Mareas Harbor is located within the Municipality of Guayama, east of Jobos Bay. It is an artificial port created by the dredging of an extensive mangrove area. Its main operation is the unloading of petroleum products in bulk. Its dimensions are considered too small to accommodate transshipment port's operations. A significant portion of the undeveloped land to the west, which would be used for land-based operations, consists of wetlands dominated by mangroves, and its use for such purposes would not be easily justifiable. Coastal Barriers Units PR-44 and PR-45 are located at both sides of the entrance to the Harbor. Its proximity to the Jobos Bay National Estuarine Research Reserve, and the Aguirre State Forest, disqualifies this site from future consideration as the site for the transshipment port.

2.4.12 Yabucoa Harbor

Yabucoa Harbor is a small facility that does not satisfy the needs of a deep-draft transshipment port, similar to the Las Mareas site at Guayama. The port is owned by the Puerto Rico Ports Authority, which leases it to its main user, Sun Oil Company, an oil refinery that recently announced the closing of its operations, including the port. The port operations consisted mainly in the management, delivery and loading of petroleum and its derived products.

Access to the Harbor is through a 500-foot-long dredged channel that runs from deep waters to a turning area and the pier. The navigation channel has a depth of 49 feet at its center, and a control depth of 43 feet at its entrance. The USACE, in support of the Puerto Rico Ports

Authority, is currently completing a Site Management and Monitoring Plan for the disposal of dredged material from the harbor into an Interim Offshore Dredged Material Disposal Site (OD0242) offshore. This maintenance dredging has the purpose of keeping the port viable for future industrial activities.

The port was designed to address loading and unloading operations of bulk petroleum products. Significant modifications to the piers and provisions for large storage areas would be required to convert the port into a transshipment facility. Although land for potential value-added activities and expansions is readily available nearby, most of it is located within the 100-year flood zone and is used for agriculture. The site is located in a region with a high probability of direct hurricane impact. Coastal Barrier Unit Number PR-39, Puerto Yabucoa, is located just west of the Harbor entrance.

The nearest urban center is the city Humacao, readily accessible through Highway PR-53, which also provides access to the San Juan Metropolitan area via Fajardo. The new PR-53 highway provides a fast connection to Fajardo, but PR-3 from Fajardo to San Juan is congested most of the time.

Due to the physical and environmental limitations described, Yabucoa Harbor was not included for further analysis.

2.4.13 Port of Fajardo

The Port of Fajardo, located on the waterfront in the urban area of the town of Fajardo, currently services intermediate draft vessels. A passenger ferry system to Vieques, Culebra and the Virgin Islands operates from the port. The ferry terminal is 80-feet long and 12-feet deep. There is also a 300-foot-long public pier of similar depth and a private dock 400 feet long and 5 feet deep.

There are no federal Coastal Barriers Units within this alternative site. Coastal Barrier Unit Number PR-07, Lagunas Aguas Prietas, lies about 4 km to the northwest of Fajardo Bay, and Coastal Barrier Unit Number PR-10, Punta Barrancas, 4 km to the south. Coastal Barriers Units PR-08P and PR-09P, Cabo San Juan and Río Fajardo, respectively, lie to the north and south of the proposed alternate site.

The Port of Fajardo was eliminated from further analysis for several reasons. First, the site is located in a region with a high probability of direct impact from hurricanes. In addition, there is not enough land to accommodate the transshipment port's land operations or the value-added areas. The existing depths do not meet the required drafts for Post-Panamax vessels. At least two miles of ocean bottom within the bay would have to be dredged and new access routes would have to be built to meet the port's needs. The Port does not have an authorized offshore dredged material disposal site. The area is one of Puerto Rico's most important tourist centers, an important location for marine resources, including coral reefs, seagrasses, islets, beaches, and other marine life. Furthermore, the area is in close proximity to La Cordillera and Cabezas de San Juan Natural Reserves. For these reasons, the site was not considered for further analysis.

2.4.14 Summary of Preliminary Evaluation Process

The physical and environmental criteria discussed in the previous sections were evaluated for each one of the proposed sites. Table 2-1 summarizes the results of this preliminary evaluation.

Table 2-1: Physical, Infrastructure and Environmental Factors Influencing Transshipment Port Viability

Site	Wave Climate	Existing Port Size	Land Available	Fill Needed In Open Water	Land Excavation Required	Need Breakwater?	Need Dredging & Disposal	Maintenance Dredging	Cultural Resources	Road Infrastructure, Traffic, Transit Time	Time To San Juan (Hours:Min)	Flood Prone	Environmentally Sensitive?	Recreation Conflicts?	Other
Yabucoa	Ok	Too small	Yes	No	Yes	Small	Yes, much	Much	Unknown	Good	1:15	Yes	No	No	Hurricane surge vulnerable.
Las Marías (Guayama)	Good	Too Small	No	No	Yes	No	Yes, much	Moderate	Unknown	Good	1:15	Yes	Yes	No	Extensive wetlands; almost no uplands available.
Jobos Bay	Good	Too Small	No	Yes, in wetlands	No	No	Yes, much	Moderate	Unknown	Good	1:30	Yes	Yes, very	Potentially	Extensive wetlands; almost no uplands available.
Area West of Río Matilde	Good	N/A	Yes	No	No	Yes (to reduce river sediment transport)	Moderate	More than moderate	Unknown	Good	1:40	Moderate	Slightly	No	Exposed to swells, coral patch reefs and turtle grass sea beds exist offshore, sewage outfall relocation.
Guánica	Very good	Too small	No	No	No	No	Much	Moderate	Likely	Moderate	2:15	Yes	Yes	Yes	Conflict with existing and planned tourism and eco-tourism development.
Mayagüez	Severe	Developed pier space too small	No	No	No	Yes	Much	Moderate	Unknown	Bad	2:45	No	No	No	Existing tuna docks too small but there may be additional land available.
Aguadilla	Severe	No commercial port exists. Only an open roadstead	No	Yes	No	Yes very extensive	Little	Moderate	Likely	Bad	2:45	No	Yes	Yes	Site recommended by Port consultants is a popular recreational beach.
Arecibo	Very severe	Too small	No	No	Yes	Yes very extensive	Yes, much	Much	Likely	Good	2:00	Yes	Yes	No	There appears no way to increase the size of this port without excavating dry land.
Manatí	Very severe	None exists; this is an open coast site	No	Yes	No	Yes very extensive	Yes, much	Moderate	Likely	Mod-good	1:45	Yes	Yes, very	Yes	The site the consultant suggested is a Heritage land, already protected.
Tortuguero	Very severe	None exists; this is an open coast site	No	Yes	No	Yes very extensive	Yes, much	Moderate	Likely	Good	1:15	No	Yes	Yes	Currently operating as a public park.
Boca Vieja Bay (Palo Seco)	Severe	None exists; this is an open coast site	Yes	Yes	No	Yes extensive	Yes, much	Much	Yes	Good	0:15	In ocean	No	No	Potentially a large visual impact; potential conflict with National Park Service. Fill required over sewage outfall.

Site	Wave Climate	Existing Port Size	Land Available	Fill Needed In Open Water	Land Excavation Required	Need Breakwater?	Need Dredging & Disposal	Maintenance Dredging	Cultural Resources	Road Infra-Structure, Traffic, Transit Time	Time To San Juan (Hours:Min)	Flood Prone	Environ-Mentally Sensitive?	Recreation Conflicts?	Other
San Juan	Severe	Ample, with reallocation of existing space	Very little, without removal-relocation of existing structures	Yes	No	No	Moderate	Moderate	Likely	Best	0:00	No	No	No	Best existing commercial port facilities, infrastructure and roads.
Fajardo	Good	Developed pier space too small	Limited, if available	Yes	No	No	Yes, much	Moderate	Unknown	Good	1:15	Storm surge	Yes	Potentially	Extensive dredging required to reach deep water.

Source: USACE (1999); <http://www.saj.usace.army.mil/pd/transmain>

2.5 Description of Alternatives Evaluated in Detail

2.5.1 No-Action Alternative (Status Quo Option)

The Status Quo option consists in the Commonwealth not taking action in support of the PTA. The development of an international commercial center for the transshipment of goods and materials in Puerto Rico would not happen, even when it has been demonstrated that such a Project is financially, economically, and commercially feasible.

- Under the Status Quo option, the construction of a pier and container storage areas would not occur, and the first necessary component to effect the Project as conceived would be lost. Without the pier and the container storage areas, future value-added areas, which represent the most important element of the Project from the perspective of economic development and employment generation, would not occur either.
- Without the participation of the Commonwealth, there is a low probability for development of the PTA. Development of the Project by other public or private organizations would be limited by the magnitude of the political, economical, and financial commitments needed to attract investors and customers. The evolution of the Project to this point demonstrates that a wide commitment of political and financial resources would be needed to address pre-procurement efforts. The PTA would not be feasible without the direct intervention of the Commonwealth.
- Moreover, the Status Quo option would have serious negative consequences for the Commonwealth. The Commonwealth is supporting the development of this project as a unique opportunity to bring to the Island significant new opportunities of employment, trade and investment. It is known that Section 936 of the IRS Code, which exempts U.S. companies investing in Puerto Rico from federal taxes on profits left in Puerto Rico, is being phased out over a 10-year period. As a result of the phasing out of these incentives, significant job losses have occurred in the manufacturing sector in recent years. While most losses were in labor-intensive industries such as apparel and electronics, other sectors, also suffered under competitive pressures from countries with lower labor costs, as well as several and sustained decline in markets.
- The potential benefits from the development of the PTA would be lost if the Project is not developed. Puerto Rico would lose this opportunity even though it has the physical capabilities to sustain this type of facility. Puerto Rico has to look for other investment incentives that may stimulate alternative economic developments. The PTA is designed, not only to bring new opportunities of employment, trade, and investment, but it is also expected to improve the level of jobs created and to generate significant new investment in productive enterprises. The transshipment port and free industrial port are expected to add about 5,000 direct and more than double that amount in indirect jobs within 5 years from its start, and later phases would nearly double this job creation. The jobs created are expected to be significantly better than those otherwise available and to add about \$150-200,000 per worker to the economy.
- In addition, the Commonwealth must participate in the increasing globalization and internationalization of trade, as well as the world economy. Puerto Rico is

developing a new economy strategy based on a knowledge-based industrial and electronic-commerce oriented economic model, which makes the Island a source of technological products and services. The PTA is designed towards that end. It is not only a project aimed at reducing transport or logistics costs of Puerto Rico in its foreign trade, nor to provide only new employment, but to provide the incentives for massive investments in value-added, port-related industrial developments. If the project is not developed, the Commonwealth would lose a valuable opportunity to enhance its economy by creating long-term positive economic conditions, even when all the studies have shown that the project is physically and economically viable.

- The No-Action alternative would also limit the opportunity for the rehabilitation of the abandoned CORCO-UCC industrial complex in the Guayanilla-Peñuelas area. The development of the PTA represents an opportunity for the rehabilitation of impacted industrial sites that are no longer in use in the Guayanilla-Peñuelas area. This formerly industrial site (part of the Union Carbide Caribe (UCC) property is currently abandoned, and the EPA has endorsed the potential use of the proposed site for commercial and industrial activities through its RCRA *Brownfields* program. The EPA recently approved this application where up to \$100,000 would be provided to the Applicant for the environmental restoration program of the property. This program has the objective of reclaiming industrial sites that are no longer in use, where environmental studies and clean up programs have been conducted. Therefore, by developing the PTA on this site, the Applicant is actually renewing and revitalizing this abandoned industrial site. This would not be possible under the Status Quo option.

2.5.2 Port of Guayanilla

This Section describes the alternative of the Port of Guayanilla as the only element of the proposed PTA. The Guayanilla Bay is one of three potential sites selected for a detailed evaluation. It is located between Punta Verraco and Punta Guayanilla, within the municipal limits of Guayanilla and Peñuelas.

- Its entrance is protected by an extensive reef system that stretches out to the sea for more than a mile. According to the U.S. Coast Pilot (2000), the harbor is the largest harbor that provides adequate protection to ships from tropical hurricanes, and one of the best in Puerto Rico.
- The depth of the bay's entrance channel ranges from 66 to more than 100 feet, with minimal depths of about 42 to 66 feet from Buoy Number 3, to the former PPG dock. Dredging of the bay or its navigation channels to allow passage of Post-Panamax vessels would not be required.
- Guayanilla Bay is home to a highly industrialized zone that includes PREPA's Costa Sur Power Plant, several docks for unloading petroleum products, and industrial lots previously used by the CORCO refinery and the UCC petrochemicals plant, among others. Several piers operate in the bay, including those owned by CORCO, EcoEléctrica, PREPA and Peerless. The Guayanilla Peninsula separates the Guayanilla Bay from the Tallaboa Bay, where loading and unloading operations of petroleum and bulk chemical products also took place. EcoEléctrica, a co-generating plant that uses liquid natural gas (LNG) to

produce electric power, is located on the southern end of Punta Guayanilla. The plant operates its own 1,700-foot dock, which can accommodate vessels equivalent in size and draft to the Post-Panamax class.

- Sediment accumulation in the bay is minimal. During the last 50 years the harbor has not required maintenance dredging, an attribute which enhances the value of this site as a potential candidate for locating the PTA.
- The bay is generally well protected from the wind, and is located in a zone of low hurricane incidence. This advantage reduces the times when bad weather prevents the loading and unloading of ships.
- There are no Coastal Barriers Units within Guayanilla Bay. Coastal Barrier Unit Number PR-58P lies to the east on Tallaboa Bay.
- The construction of a 6,000-foot dock in Guayanilla Bay is feasible to the north of the Peerless Oil & Chemical docks in Punta Gotay. This construction would not require dredging, since at this location the water is almost 60 feet deep.
- Reclamation by fill of approximately 110 acres of shallow coastal submerged land would be required to provide staging areas for containers. Also, filling of about 12 acres of coastal wetlands, mostly mangroves and associated salt flats, would be required to provide access to the staging areas. Other than the indicated wetlands, there are no additional natural protected areas, forests or natural reserves in the immediate vicinity of the proposed pier and fill sites.
- Another advantage of the Guayanilla Bay area is the potential availability of segments of the nearby parcel where Union Carbide Caribe (UCC) once operated a petrochemical complex. Although the soils and groundwater within this parcel are contaminated with petrochemical wastes, approximately one half of the land in the property has been remediated to acceptable levels as certified by the EPA, and can be utilized for value-added activities. Cleanup of most of the remaining land is currently taking place as part of an environmental remediation action by UCC under the monitoring of EPA. The interest of EPA to restore this property for beneficial redevelopment resulted in the recent endorsement of an application by the Applicant to assist in the restoration efforts through the EPA Brownfields Program. This program provides federal seed funds to assist in the restoration for reuse of abandoned industrial areas such as the UCC-CORCO petrochemical complex in Peñuelas.
- The occurrence of the Manatee in the Guayanilla Bay represents the most sensitive environmental challenge to the development of the PTA at the site. Although two endangered bird species also utilize the marine habitats of the area (the Brown Pelican and the Roseate Tern), their potential habitat extends beyond the limits of the area proposed for fill. However, two factors point to the viability of management of the Manatees at the bay and marine traffic:
 - The Port has been active for more than 50 years, with periods of intense marine traffic at the peak of the operations of the CORCO-UCC petrochemical complex. During this period, there are no recorded incidents involving collisions of ships with individual manatees.

- The operation of the EcoEléctrica port to allow passage of the large LNG ships was endorsed by the USFWS and the NMFS conditioned to the implementation of a management and monitoring plan for the Manatee at the harbor and Bay. During the entry of ships to the harbor, monitoring for the Manatee takes place while the traverse of the ships assisted by tugboats through the navigation channel towards the berthing docks.

2.5.2.1 Elements of the Port of Guayanilla Alternative

According to the U.S. Coast Guard Pilot (2000), the Guayanilla Bay is among the safest harbors in Puerto Rico for ships during tropical hurricanes. Guayanilla Bay is home to a highly industrialized zone that includes the Costa Sur Power Plant operated by the Power and Energy Authority (PREPA), several docks for unloading petroleum products, and industrial lots previously used by the CORCO refinery and the UCC petrochemicals plant, among others. Several piers operate in the bay, including those owned by CORCO, EcoEléctrica, PREPA and Peerless. The Port of Guayanilla has the following advantages over other locations in the island:

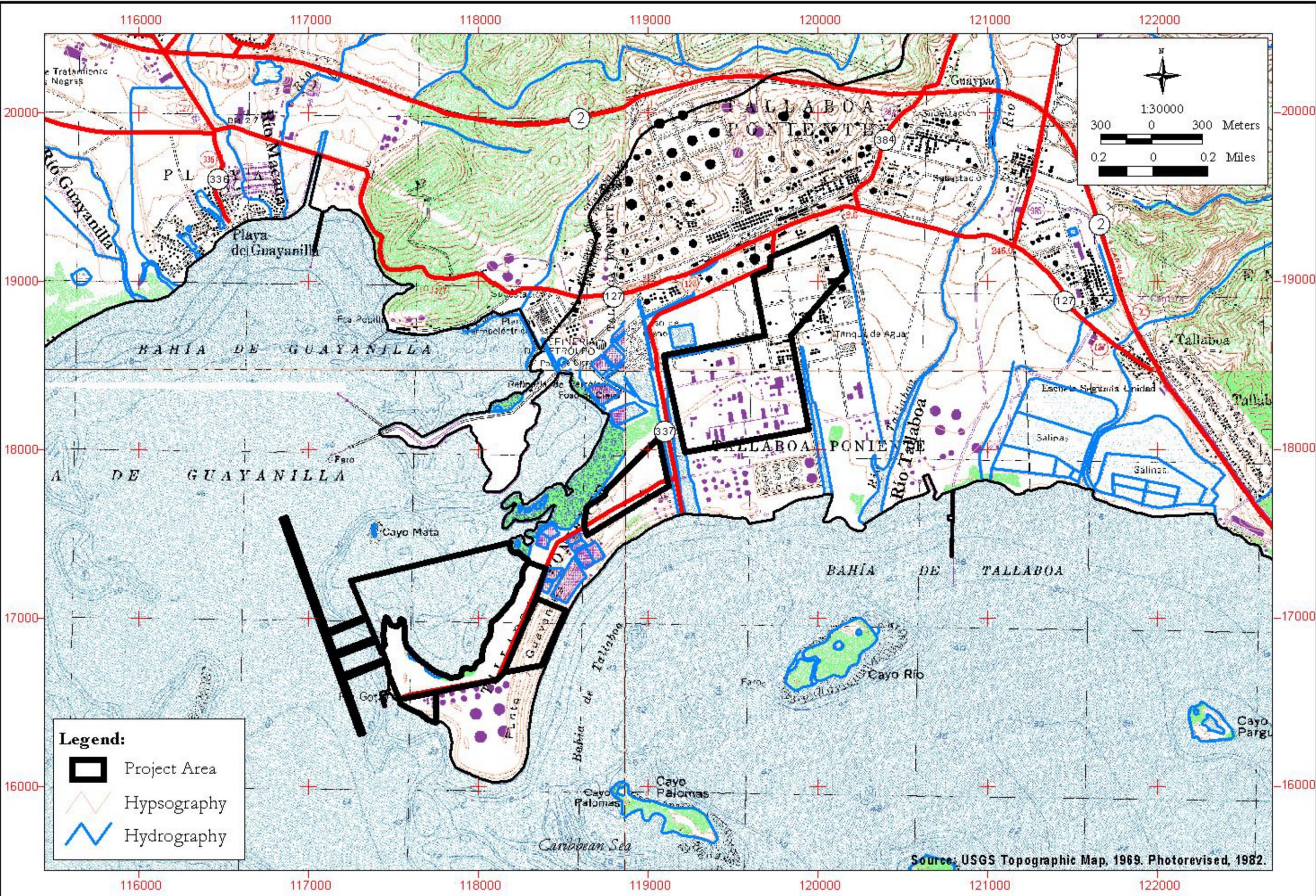
- It is the largest harbor that provides adequate protection to ships from tropical hurricanes.
- No dredging of the bay or its navigation channels to allow passage of Post-Panamax vessels would be required.
- Sediment accumulation in the bay is minimal.
- The construction of a 6,000-foot dock required to tend the Post-Panamax ships is feasible.
- There are approximately 300 acres contiguous to the proposed port facility located on a parcel owned by Union Carbide Caribe (UCC), which would be potentially used to develop value-added industries to support the port operations.

The main disadvantages of the Guayanilla site include:

- Reclamation by fill of approximately 110 acres of shallow coastal submerged land would be required to provide storage areas for containers in transit, and approximately 19 acres associated to the proposed pier.
- Filling of a maximum of 12 acres of coastal wetlands, mostly mangroves and associated salt flats, which would be required to provide access to the staging areas. Other than the indicated wetlands, there are no additional natural protected areas, forests or natural reserves in the immediate vicinity of the proposed pier and fill sites.

There are concerns about potential impacts of the Project on the Manatees that share the habitats in the bay, as shown in other section of this DEIS. These impacts would affect their normal behavioral patterns and part of their feeding habitat. Also, the increase in large vessel traffic may increase the probabilities of collisions between Manatees and these ships. The Applicant has stated to the USACE that the activities that the PTA will generate would be managed effectively to allow coexistence with the Manatee, minimizing to the maximum possible extent the adverse impacts to this species and its habitat.

A conceptual layout for the PTA in Guayanilla is shown in Figure 2-2.



Coordinates in State Plane NAD 27

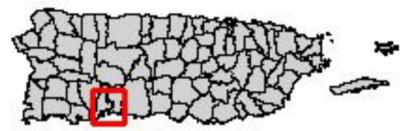


Figure 2-2 Conceptual Layout of the Project: Guayanilla-Peñuelas Area

Port of the Americas



2.5.3 Port of Ponce

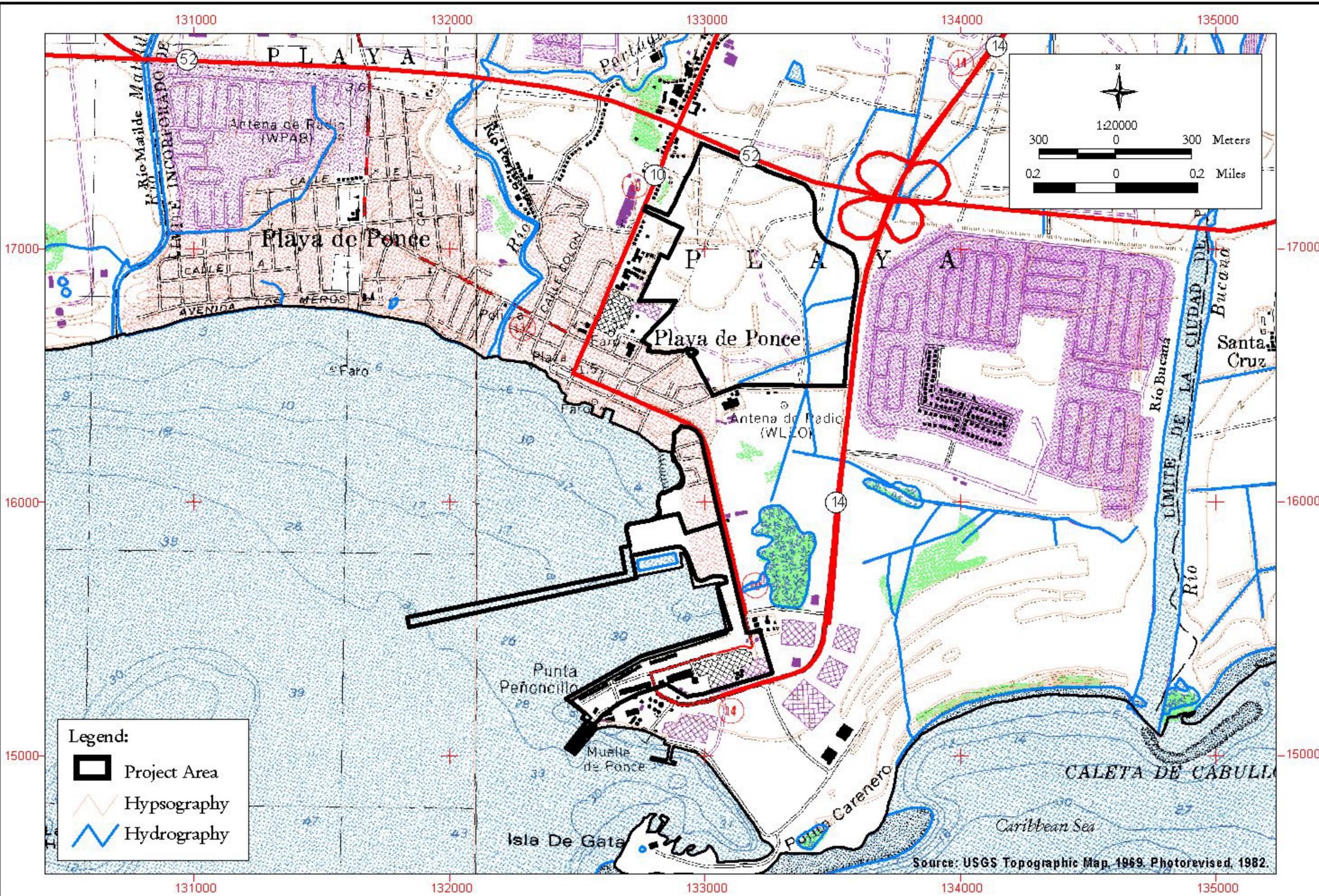
This Section describes the alternative of the Port of Ponce as the main and only element of the proposed PTA. Under this alternative, no transshipment port development would take place in Guayanilla, and Puerto Rico would rely solely on the Port of Ponce as its only transshipment hub for containership cargo.

2.5.3.1 Elements of the Port of Ponce Alternative

The Port of Ponce is the second largest commercial port in Puerto Rico, with current transshipment activities in Panamax class vessels. The port is owned and operated by the Autonomous Municipality of Ponce.

- The existing inner navigation channel is 200 feet wide and 36 feet deep. The diameter of the turning basin is about 950 feet. The entrance to the bay and the port are partially protected from the trade winds by Punta Peñoncillo and Isla de Gata, but are exposed to the southern winds and swells and is not considered a safe port during hurricanes (U.S. Coast Guard Pilot 5, 2000; USACE 1999).
- The Port includes a 610-foot-long container dock capable of accommodating vessels up to 800-foot long, and six general-cargo berths. The port also operates two specialized berths to unload coal and to manage rail freight. These nine berths have a total linear length of approximately 4,362 ft. The depths along these berths vary between 29.8 and 38.5 feet.
- There are two approach channels, approximately 38-feet deep each. The maximum dredging limit authorized in the federal navigation channel maintained by the USACE is 36 feet.
- The port is equipped with a 40-ton capacity PACECO traveling crane adjacent to a 37-acre lot where containers are stowed. An additional container yard nearby provides approximately 30 acres for parking, with a second lot of about 53 acres available for storage. Although it lacks sufficient space to accommodate the expected Project goal of 2.3 million TEU's per year after five years, including 132 acres of space for warehouses and value-added areas, the Port has enough space available for expansion and the potential to manage limited transshipment operations.
- The Port currently handles containership traffic, has existing infrastructure, and extensive experience and local staff familiar with transshipment activities. Other advantages include the availability of nearby land for value-added activities and the minimal environmental impacts that further development of the site would entail.

A conceptual layout for the PTA in Ponce is shown in Figure 2-3.



Coordinates in State Plane NAD 27

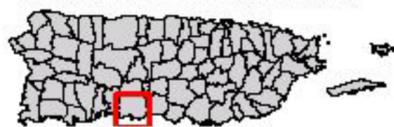


Figure 2-3 Conceptual Layout at the Project: Ponce Area

Port of the Americas



17/00097.01.047.apr.dia_posse_english.apr_04/06/02.apr

The proposed action contemplates the following:

- About 132 acres would be available for industrial development and value-added facilities. An additional 35 acres of existing port facilities would also become available for transshipment support activities.
- Under this scenario, the Ponce alternative of the PTA would be able to handle a container traffic of about 600,000 TEU's per year, or 26 per cent of the total 2.3 million TEU traffic goal expected from the PTA as conceived. To be effective, therefore, the Ponce alternative of the PTA would have to meet the following requirements:
 - Handle a minimum of 2 large Post-Panamax container vessels.
 - Achieve an annual throughput of 500,000-600,000 TEU movements.
 - Provide a minimum of 2,000 feet of continuous wharfs with contiguous draft of a minimum of 45 feet and a maximum of 53 feet in depth.
 - Provide rails and operation facilities for four (4) container gantries of 40-45 tons capacity.
 - Provide at least 60 acres of paved container storage capacity and adequate access roads.
 - Provide technical services, communication facilities, administration, customs, banking and other related services.

To achieve these requirements the following work would be necessary:

- Dredging of the navigation channel and berthing areas from its authorized depth of 36 feet to a minimum of 45 and a maximum of 53 feet. This action would require the removal of a minimum of 810,000 cubic yards and a maximum of 2.2 million cubic yards of material from the harbor. **Figure 2-4** shows the navigation channel proposed for modifications.
- Lengthening of Pier 8 from 610 to a maximum of 3,610 lineal feet capable of handling Post-Panamax vessels and the installation of four container gantries of 40 to 45 tons capacity each.

2.5.4 Ponce / Guayanilla

This alternative is presented as a combination of the previous two alternatives simultaneously. The development of the PTA at the Guayanilla and Ponce ports present several advantages that make the Project more viable.

2.6 Description of Past, Present and Reasonably Foreseeable Future Actions Not Part of the Proposed Action

Existing facilities at the Guayanilla-Peñuelas site include the EcoEléctrica Cogeneration Plant and LNG import terminal, the PREPA Costa Sur Power Plant, the CORCO refinery facility, and the Peerless Chemical Plant. Currently in operation are the EcoEléctrica, Costa Sur, and Peerless plants.

- Although the refinery portion of CORCO was shut down in 1982, the facilities were never dismantled, which in theory would allow for its potential use at some point in the future.
- Part of the CORCO complex owned by GulfChem is also closed. CORCO currently utilizes the port and some of the existing tanks for a gasoline and fuel blending and distribution operation. Ships use the CORCO Island terminal facilities to off-load petroleum for the Costa Sur plant and their own use.
- The Union Carbide Caribe petrochemical plant at Peñuelas near the Guayanilla Peninsula also ceased operations. Most of the structures at the site were dismantled, and segments of the parcel are vacant, with the potential for redeveloped in the reasonably foreseeable future. The PTA proposes the utilization of some of the parcels to promote value-added activities, such as industries, commerce and offices. Union Carbide and Peerless Chemicals currently operate a small petrochemical storage and distribution operation from a small tank farm on Punta Guayanilla. Chemicals are off-loaded from ships at the UCC existing pier adjacent to the site where the PTA port facilities are planned.

The Ponce site includes the existing Port of Ponce with the following general facilities:

- Eight (8) piers with a total length of 4,362 linear feet.
- Berths and docking facilities currently capable of servicing 6 vessels at the same time in the areas for container terminal, liquid and dry bulk, general cargo and multipurpose activities.

The Port of Ponce consists of approximately 100 acres in which are located the following facilities:

- One Panamax Paceco crane capable of handling 40 tons of cargo with an annual movement capacity of 100,000 TEU's
- A container terminal with an area of near 340,000 s.f.
- Covered warehouse space of approximately 174,000 s.f.
- Cargo handling area of 572,000 s.f.

The navigation channel is part of the federal navigable waters program, and has been maintained by the corps under a cooperative agreement with the Municipality of Ponce. The entrance channel is 14,784 feet by 2,640 feet and has varying draught between 50 to 150 feet.

This channel was dredged in 1988-89 and one ocean disposal zone was authorized by EPA at that time to dispose the dredged material. This interim zone was evaluated and found to be suitable for the materials dredged from the bay. No adverse impact has been detected from this activity throughout a number of studies performed.

At present, the potential major projects with preliminary plans within the same time frame and vicinity area of the proposed action are: WindMar RE Guayanilla Project, and a relocation of the PREPA's Costa Sur cooling water outfall.

- WindMar RE Guayanilla Project - This project, proposed at Punta Verraco and Punta Ventana, is in its initial investigation and planning phase, and it is not known when any applications or permits for its development will be filed at the local or federal levels. WindMar RE plans to develop an industrial facility for processing furnace slag into cement additives, two piers that would provide deep-port access, and eolic turbine field, and a scientific research center over 320 hectares. This project may cause cumulative impacts similar to those of the proposed action. However, impacts of this project have not been evaluated at present time.
- Relocation of the Puerto Rico Electric Power Authority (PREPA) Costa Sur Power Plant Cooling Water Outfall- PREPA operates a thermal water outfall that discharges to the Guayanilla Bay from the Costa Sur Power Plant. The Environmental Protection Agency (EPA) informed the Puerto Rico Electric Power Authority (PREPA) that it will deny the thermal variance request under the Clean Water Act Section 316(a) for the Costa Sur Power Plant. As a result, the renewal of the National Pollutant Discharge Elimination System (NPDES) permit for the Costa Sur Plant would require that an alternative to this thermal discharge be developed. At present the EPA and PREPA are coordinating the evaluation of potential alternatives to relocate this outfall.

2.7 Alternatives Not Within Agency's Jurisdiction

A number of alternative sites have been proposed as legitimate competitors to the proposed action. The majority of these facilities are being proposed in neighboring countries of the Caribbean Basin. The following locations are considered among the most likely alternate sites for a transshipment port comparable to the proposed action:

- Manzanillo and the Canal Zone, Panamá
- Freeport, Bahamas
- Kingston, Jamaica
- Haina and Puerto Caucedo, Dominican Republic
- Puerto Cabello, Venezuela

None of these ports, which are either operational or under development, fall under the jurisdiction of the USACE. Technically, Puerto Rico could choose not to build a deep-draft port, abandon its interest to participate in the international transshipment market, and rely of one or more of these foreign ports to handle its transshipment needs. However, this alternative would have significant economic and social impacts in Puerto Rico, impacting directly the economy and limiting the opportunities for future growth and improved employment in the southern region and throughout the Island.

2.8 Summary Comparison of Alternatives and the Predicted Environmental Effects of All the Alternatives

The assessment of alternative sites for the location of the transshipment port in Puerto Rico resulted in the elimination of 13 of the 15 sites under evaluation. The Port of Ponce and the Guayanilla Bay alternatives, located in the south coast of Puerto Rico, were chosen for a detailed comparative assessment. In this assessment, engineering and design criteria were considered. Based on this assessment, it was determined that the Guayanilla Bay and the Ponce Harbor are the best locations to develop the Project. A summary of the above discussion of the Preferred Alternative is presented in Table 2-2 and 2-3.

The results of the physical and engineering considerations analysis for locating the PTA are summarized in Table 22. Table 23 summarizes the environmental considerations of the Project alternative sites and includes a comparison with a No-Action scenario.

Table 2-2: Summary of the Detailed Assessment of Siting Alternatives: Physical and Engineering Criteria (USACE, 1999).

Objective	Guayanilla	Ponce	Guayanilla and Ponce
Hurricane Risk	This is one of the safest ports in Puerto Rico.	The south and southeast of the port are exposed to hurricane effects. The port operation could be interrupted 20 to 30 days per year.	The Guayanilla component offers one of the safest ports in the Island. The Ponce component is exposed to hurricane effects. The Port of Ponce operation could be interrupted 20 to 30 days per year.
Depth and area to accommodate Post-Panamax ships	The entrance channel is more than 65 ft deep. Depth at the dock would be 55 ft. Dredging would not be required.	The existing channel has a depth ranging from 36 to 39 ft. Dredging necessary for access by Post-Panamax ships (minimum of 45-ft deep).	Channel depth adequate in the Guayanilla component. The Ponce component would require dredging to a minimum of 45-ft deep to provide access to Post-Panamax ships.
Access canal and turning basin	Access canal 1,500 feet wide and turn basin of 3,300 ft.	Access canal of 600-ft wide with a turn basin of 950 ft.	Access canal 1,500 feet wide and turn basin of 3,300 ft in the Guayanilla component. The Ponce component has an access canal of 600-ft wide with a turn basin of 950 ft.
Existing Infrastructure	Industrial area with an efficient infrastructure.	Commercial-industrial port area with efficient infrastructure.	Industrial areas with efficient infrastructure. The Ponce component includes also a well-established commercial zone.
Dock construction	A 6,000 ft long dock can be constructed along the contour of 50 to 55 ft deep.	Total existing dock area consists of approximately 4,400 ft. The existing 610-ft long dock would be expanded to a maximum of 3,610 ft.	A 6,000 ft long dock is proposed along the contour of 50 to 55 ft deep in the Guayanilla component. The existing dock in Ponce would need an expansion to 3,610 ft.
Terminal Area	Approximately 180 acres of terminal area can be obtained through filling activities. Proposal is for 110 acres.	Approximately 132 acres nearby available for storage and value-added activities.	A proposed 110 acres of terminal area can be obtained through filling activities in the Guayanilla component. The Ponce component has available approximately 132 acres nearby for storage and value-added activities.
Space for Value-Added Areas	Approximately 300 acres available adjacent and to the east to the port.	Limited area available next to port. Additional 132-acre lot located north of the site.	Approximately 300 acres available adjacent and to the east to the port site in Guayanilla. In Ponce, limited area available next to port but an additional 132 acres are available north of the site.
Security	Easy to control the entrance since the proposed area is a peninsula.	Difficult to keep the security in the area. It is located in a developed area where there are many uses. The terminal area is not contiguous to the dock.	Access control adequate in Guayanilla, but needs improvements for the Ponce component.
Urban Area Proximity	Less than 10 miles from Ponce. Good access to San Juan in about two hours.	At Ponce, approximately 1.5 hours from San Juan.	Access to San Juan ranging between 1.5 and 2 hours. The Guayanilla component is located less than 10 miles from Ponce.
Military Restrictions	None	None	None

Table 2-3: Summary of the Detailed Assessment of Siting Alternatives: Environmental Issues.

Issue	No Action	Guayanilla	Ponce	Guayanilla and Ponce
Fish & Wildlife Resources	None.	Removal of existing vegetation for value-added activities; fill of 12 acres of estuarine wetlands, and 110 acres of shallow near Punta Gotay.	Removal of existing vegetation for value-added activities; dredging activities will eliminate sparse benthic habitat in areas where previous maintenance dredging took place.	Removal of existing vegetation for value-added activities; dredging and fill activities will eliminate benthic habitat and vegetation.
Marine Resources / Special Aquatic Sites	None.	Fill will take place in areas mostly characterized by muddy bottoms. Approximately 106 acres of muddy bottoms will be affected by fill as well as 12 acres of wetlands. The fill will eliminate about 12 acres of seagrasses. No coral reef or shelf-edge habitat will be impacted.	Dredging activities will affect mostly muddy bottoms at areas where previous dredging took place. No coral reef or shelf-edge habitat will be impacted.	Fill and dredge activities will take place in areas mostly characterized by muddy bottoms. About 12 acres of seagrasses and 12 acres of wetlands will be eliminated by the fill in Guayanilla. No coral reef or shelf-edge habitat will be impacted.
Essential Fish Habitat	None.	Fill will impact designated EFH for adult individuals of White Grunt.	Dredging will impact designated EFH for adult individuals of White Grunt and Silk Snapper.	Fill and dredging will impact designated EFH for adult individuals of White Grunt and Silk Snapper.
Threatened or Endangered Species	None.	Guayanilla Bay is a habitat of the Manatee. Management Plan for the Manatee developed by EcoEléctrica must be adopted and expanded to accommodate for the additional sea traffic and modified to prevent impacts. Whales traversing south of entrance to bay, but would not be impacted.	Manatees have been sighted in the vicinity of Ponce Bay. Whales traversing south of port entrance would not be impacted.	Guayanilla Bay is a habitat of the Manatee while sightings have been recorded in the vicinity of Ponce Bay. A Management Plan would be prepared for the Guayanilla component based on EcoEléctrica's.
Ecologically interest areas	None.	None.	None.	None.
Wetlands	No impacts to wetlands.	Approximately 12 acres of wetland must be filled for access road to terminal.	No impacts to wetlands are expected.	A total of approximately 12 acres of wetlands would be impacted.
Coastal Zone	None.	None.	None.	None.
Flooding	None.	No construction activities will take place in Zone 1. Construction in areas classified as Zone 1M and 2 will adhere to the PB regulations.	No construction activities will take place in Zone 1. Construction in areas classified as Zone 1M and 2 will adhere to the PB regulations.	No construction activities will take place in Zone 1. Construction in areas classified as Zone 1M and 2 will adhere to the PB regulations.
Water Quality and Sediment Quality	No impact on the quality of water.	Temporary impacts from fill of storage area and construction of pier. Increased potential for spills due to increased traffic.	Temporary impacts from dredging, expansion of pier and any fill. Increased potential for spills due to increased traffic.	Temporary impacts from dredging in the Ponce component, land reclamation in the Guayanilla component and construction and expansion of piers in both areas. Increased potential for spills due to increased traffic.

Issue	No Action	Guayanilla	Ponce	Guayanilla and Ponce
Air Quality	No effect on air quality.	Increase in emissions to area from additional ships and vehicles. Compliance with air quality standards achievable. Potential impact of value-added activities unknown.	Increase in emissions to area from additional ships and vehicles. Compliance with air quality standards achievable. Potential impact of value-added activities unknown.	Increase in emissions to area from additional ships and vehicles. Compliance with air quality standards achievable. Potential impact of value-added activities unknown.
Cultural Resources	No impact on archaeological resources.	No impact. Archeological find on UCC parcel outside of project area.	No impact to cultural resources. Evaluation of historic resources needs further work.	No impact on cultural resources. Evaluation of historic resources in the Ponce component needs further work.
Socioeconomic Impacts	Economic index would remain the same.	Generation of jobs and overall contribution in increasing the economic level of the area.	Generation of jobs and overall contribution in increasing the economic level of the area.	Generation of jobs and overall contribution in increasing the economic level of the area.
Hazardous, Toxic and Radioactive Waste	None.	Reuse of approximately 300 acres under the RCRA Brownfields Initiative.	No impacts with regards to this issue are anticipated at Ponce.	Reuse of approximately 300 acres under the RCRA Brownfields Initiative in Guayanilla.
Dredging and disposal of dredged material	No dredging necessary.	Dredging is not necessary. Approximately 3.5 million cubic yards of fill material is required for the containers terminal.	Dredging of the navigation canal is required. Approximately 810,000 cubic yards must be dredged to reach a 45 ft depth. The USACE permits and a Management and Monitoring Plan are required to the dredging material disposal at the ocean.	Approximately 3.5 million cubic yards of fill material is required for the containers terminal in Guayanilla. Dredging of the Ponce navigation canal is required. Approximately 810,000 cubic yards must be dredged to reach a 45 ft depth. A USACE permit plus a Management and Monitoring Plan is required for ocean disposal in Ponce.
Navigation	Transit levels would remain the same.	No improvements to navigation channel or turning basin. Overall number of sailings would increase to 4.95 per day. Marine risk associated deemed extremely low.	Dredging of the navigation canal is required. Approximately 810,000 cubic yards must be dredged to reach a 45 ft depth. Overall number of sailings would increase to 2.70 per day. Marine risk associated deemed extremely low.	No improvements to navigation channel or turning basin in Guayanilla. Dredging of the navigation canal is required in Ponce. Overall number of sailings would increase to 4.95 and 2.70 per day in Guayanilla and Ponce, respectively. Marine risk associated deemed extremely low on both locations.
Infrastructure	None.	Improvements to water and wastewater distribution system required. Minor modifications to the power grid required due to power plant proximity. Solid waste will be disposed of at the Ponce Landfill.	Improvements to water and wastewater distribution system required. Some modifications to the power grid required to increase capacity. Solid waste will be disposed of at the Ponce Landfill.	Improvements to water and wastewater distribution system required at both sites. Modifications to the power grid required as well. Solid waste will be disposed of at the Ponce Landfill.
Marine Currents	None.	None.	None.	None.
Noise Levels	None.	Increase in background noise from additional ships, new port machinery and vehicles. Noise standards would be met.	Increase in background noise from additional ships, new port machinery and vehicles. Noise standards would be met.	Increase in background noise from additional ships, new port machinery and vehicles. Noise standards would be met.

2.9 Applicant's Preferred Alternative

The Applicant's Preferred Alternative includes the development of deep draft terminals at both the Guayanilla and Ponce bays, including development of value-added areas nearby both terminals. The strategy in this combined alternative is to provide long-term and ample port anchoring and handling capacity with the combination of both ports to capture a sizable share of the transshipment market in the Caribbean and the Americas. The dual deep-port system also provides reliability in the event of weather, accidents, or any other circumstances that could require the temporary closure of one of the ports.

The following are the elements of the Applicant's Preferred Alternative:

- Guayanilla Bay:
 - Construction of a berthing pier of up to 6,000 feet long, anchored to land west of Punta Gotay, capable of mooring as many as four Post-Panamax ships.
 - Reclamation by fill of approximately 110 acres from Guayanilla Bay adjacent to the new pier and Punta Gotay, and fill of about 12 acres of mangrove wetlands adjoining Punta Guayanilla, for the construction of parking and container storage areas, and administrative and operations facilities.
 - Development of parts of the parcel occupied by UCC in Peñuelas, for the development of value-added activities including industrial, commercial and other infrastructure facilities as part of the Guayanilla Port. Approximately 300 acres in the parcel would be available for eventual development. The EPA recently selected this area for inclusion in the RCRA Brownfields Program, designed to reclaim abandoned industrial sites.
 - Improvements to the infrastructure of the zone, including roads, water, sewers, power and communications.
- Port of Ponce:
 - Expansion of Pier No. 8 in Ponce to a maximum length of about 3,610 feet to allow simultaneous handling of as many as two Post-Panamax ships.
 - Immediate dredging of the navigation channel at the Ponce Bay and the adjacent areas at the berth to a minimum of 45 feet and a maximum of 53 feet to allow entry to the port of Post-Panamax ships. The proposed dredging would require removal and reuse or disposal of a minimum of approximately 810,000 cubic yards and a maximum of 2.2 million cubic yards of material, either at the EPA designated ocean disposal site south of Ponce, or at an upland, as determined from the proper environmental analysis.
 - Development of approximately 132 acres of land adjoining the Port of Ponce, for construction of value-added activities such as industries,

commerce, offices and warehouses, shops and other infrastructure needed for the efficient operation of the port.

- Improvements to the infrastructure of the zone, including roads, water, sewers, power and communications.

The initial estimated construction cost of the Project is approximately \$800 million.

2.10 Compensatory Mitigation

The development of deepwater ports in Guayanilla and Ponce would result in environmental impacts to both bays. According to the Applicant, the long-term feasibility of the PTA depends on its ability to handle the largest number of vessels at the same time, and without the dual capacity of both ports, its long-term success would be at risk.

The Applicant has indicated its willingness to provide adequate compensatory mitigation as determined by the USACE. However, at this point, the Applicant has not proposed any particular mitigation actions to compensate for the unavoidable direct and indirect impacts from the Project to the aquatic resources of the area.