

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 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). 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, 2001).

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 were 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 SDEIS 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 16 sites along the coast of Puerto Rico that potentially 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 SDEIS 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 site 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, and by Frankel and Associates in year 2000, implemented methodologies that meet these requirements. These studies concluded that the south coast of Puerto Rico, between the Guayanilla Bay and the Port of Ponce, potentially represents the most suitable area 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, a further analysis of the engineering, physical and environmental requirements of the Project, and comments provided during the review process of the DEIS previously published. A total of 16 sites were screened, based on the USACE study and recent announcements by the US Department of Defense (USDoD) concerning the Roosevelt Roads Naval Station near Ceiba. The analyses focused on three potential general sites along the south coast of Puerto Rico, between the Guayanilla Bay and the Ponce Bay, as the most appropriate areas for the development of the PTA. These sites included the Ponce Harbor, the Guayanilla Harbor, and the Matilde Harbor, near the Port of Ponce. Further detailed analyses discarded the Matilde site, concluding that the following sites are the preferred alternatives for the development of the PTA:

- Ponce Bay
- Ponce and Guayanilla: Main Terminal at Ponce

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 their Preferred Alternative:

- Site 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 stormwater sewers; and telecommunications.
- Availability of adequate land for future expansions of the port and development of 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. In the ideal location, loading and unloading of cargo would not be affected except during extreme climatic events such as tropical storms and hurricanes.

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 US Virgin Islands, and some of the wave energy is reduced by friction with the seabed, partially protecting the coast from the strong swells 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 site proposed for development of the PTA, the effects of wind and marine currents were evaluated by the USACE in a detailed study performed in 2001 and updated for this SDEIS, to evaluate the potential changes in the currents at the Ponce Harbor from the modifications to the Preferred Alternative now proposed by the Applicant (Appendix B). The analysis included the recalibration of the mathematical model that simulates the effects of winds and storms on the currents at the Ponce Harbor location with and without the proposed improvements or changes proposed as part of the PTA.

2.3.2.2 Post-Panamax Ships

Post-Panamax ships are vessels that cannot cross the Panama 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. In most transshipment ports, dredging is required to maintain these depths.

At the Ponce Harbor, dredging of the existing navigation channel and turning basin to a minimum of 50 feet below mean sea level (bmsl) would be required to meet this criterion.

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.

The Ponce Harbor meets this criterion, except that dredging would be required to deepen the turning basin to a depth of 50 feet. Dredging of the Ponce Harbor would affect an approximate 248 acres of marine bottoms.

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, stormwater 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.

The Ponce site meets these requirements.

2.3.2.5 Space for Value-Added and Import-Export Areas

Value-added (VA) and Import-Export areas are developed once a transshipment port is constructed and in operation, since they are a natural consequence of its development. In these areas, industrial activities compatible with the port operations develop as a means of

promoting employment and income, one of the main objectives of the Project. Import-Export activities promote international commerce and constitute another important source of income and employment to the host port. 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 and import-export activities. These areas can be developed by the public sector as industrial parks, with all the amenities to attract industry and business, or simply set aside with the basic infrastructure for eventual development by private investors.

The conceptual plan for the value-added and import-export activities associated with the PTA includes an area of about 132 acres near the Port of Ponce. At these sites, the Commonwealth would provide the essential infrastructure needed to attract private investors to the value-added and import-export areas. Potentially, as the Project matures with time, there is the potential that other areas for these activities could develop outside of the immediate zones of the Ponce Harbor as indirect consequences. There are significant parcels of land near the Port of Ponce zoned for industrial purposes that meet this potential but are not part of the Project. However, it is unpredictable when and how these parcels could be developed. Typically, at other locations where similar projects have been developed, such as Freeport and Jamaica, industrial activities not associated with the Project take several years to flourish.

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 incident of September 11, 2001. 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. New regulations adopted by the US Coast Guard require even stricter control than two years ago.

Accesses to the Port of Ponce are relatively easy to control or modify to provide the needed security.

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 distance of the preferred location to the urban centers of Ponce, San Juan, 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 US Department of Defense operates several military reservations in Puerto Rico. Among these, the Roosevelt Roads Naval Station at Ceiba, the US Navy Communications Center in Sabana Seca, Camp Santiago and Ft. Buchanan. Except for the Roosevelt Roads Naval Station, these sites and their immediate vicinities were excluded from consideration as potential sites for the Project since their uses are not compatible with the proposed action. The Roosevelt Roads Naval Station was added as an alternative in this SDEIS and compared to the sites previously evaluated in the DEIS due to recent information from the US Department of Defense pointing at a potential closure of this facility.

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 disposal areas for the dredged material.
- 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, several local and Federal categories are used to protect specific areas or 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 ideal location for a transshipment port would have the depth required to allow navigation of Post-Panamax ships, as well as nearby areas with adequate capacity to store the cargo and containers without requiring the fill of coastal waters or its proximity for said purpose. In the event that dredging and filling of US waters would be necessary to develop an alternative, several permits issued by the USACE are required prior to any work. These permits include:

- Under Section 10 of the Rivers and Harbors Act of 1899, a USACE permit is required to do any work, including dredging, in, over or under a navigable US waters.
- Under Section 404 of the Clean Water Act, a USACE permit is required for the discharges of dredged or fill material into US waters, including navigable waters and wetlands.
- Furthermore, disposal of dredged material into the ocean is allowed only at previously authorized sites, known as Offshore Dredged Material Dumping Sites (ODMDS). 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. In Puerto Rico, the EPA has

authorized ODMDS for the ports of San Juan, Mayagüez, Arecibo, Yabucoa and Ponce. 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 eventual dredging of the Yabucoa Harbor more than two years ago, and although EPA and the USACE recently approved the management plan for ODMDS, the permits for the dredging are pending.

Under the Applicant's Preferred Alternative, in addition to the construction of piers in navigable waters, dredging is required of the Ponce Harbor with disposal of part or all of the dredged material at the Ponce ODMDS. These actions require filing applications for USACE permits under Sections 10, 404 and 103 as described above. Also required is the development of a Site Management and Monitoring Plan for the Ponce Harbor ODMDS.

The Applicant began this process as follows:

- In 2002, the Applicant 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 contractor prepared and submitted to the USACE and EPA a Quality Assurance and Sampling Plan, which was approved by EPA early in 2003. Sampling of the sediments in the harbor took place in March 2003. Analytical results from these chemical analyses and bioassays are included as Appendix C to this SDEIS.
- The same contractor, on behalf of the Applicant, conducted during March 2003 an updated assessment of the marine environment at the ODMDS, as required by EPA as part of the Site Management and Monitoring Plan. The data from this assessment was provided by the Applicant to the USACE and EPA as part of the coordination efforts for the Project.
- The Applicant also filed in March 2003 applications for the required Federal permits under Sections 10, 404 and 103.
- The EPA and the USACE completed during July 2003 a final draft of the Site Management and Monitoring Plan for the Ponce ODMDS. A public announcement of the availability of the draft was issued by EPA in the Federal Register.

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. During the Phase 1A-1B terrestrial archeological investigations, several potential archeological sites were identified in the vicinity of the value-added areas proposed as part of the PTA. Also, the Phase 1A subaquatic archeological reconnaissance in the Ponce and Guayanilla Harbors suggested the potential for resources with historical value. These sites are protected under Federal and local laws. In consequence of these preliminary findings, additional archeological investigations were conducted in the project area and the indicated harbors. However, further efforts demonstrated that the site examined does not appear to meet any of the criteria to be considered a historical or archaeological resource.

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.

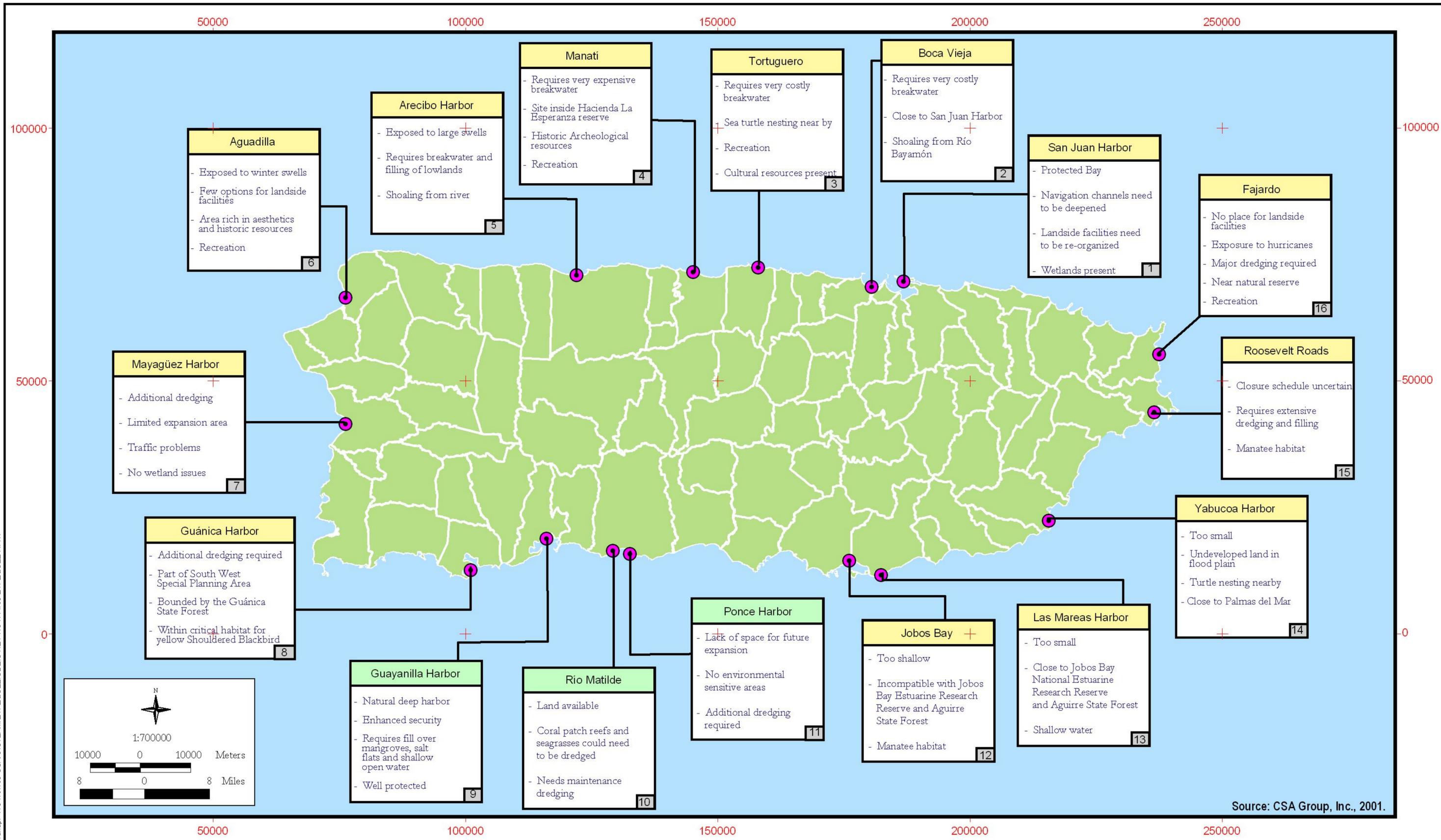
2.4 Alternatives Considered but Eliminated from Detailed Evaluation

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 scoping process for the preparation of the DEIS, and public review of the DEIS. The results of these evaluations were very similar and focused on sites in the south coast of Puerto Rico between Ponce and Guayanilla.

The initial 15 sites, distributed 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 were compared. The Roosevelt Roads Naval Station (RRNS) was not included in this initial assessment because of its incompatibility with the proposed use. The RRNS has been included as an additional site as part of the SDEIS. The environmental screening criteria used in the evaluation of this location were similar to those used by the USACE and Frankel (USACE, 1999 and Frankel, 2000).

The following sites were considered as part of this SDEIS:

1. San Juan Harbor
2. Boca Vieja Bay (Palo Seco at Bayamón)
3. Tortuguero Bay near Vega Baja
4. Manatí Bay
5. Arecibo Bay
6. Aguadilla Port
7. Mayagüez Port
8. Guánica Bay
9. Guayanilla Port
10. Río Matilde Bay (west) at Ponce
11. Port of Ponce
12. Jobos Bay at Guayama
13. Las Mareas Harbor at Salinas
14. Yabucoa Harbor
15. Fajardo Bay
16. Roosevelt Roads Naval Station



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Figure 2-1. Overview of Transshipment Port Site Alternative Analysis

Port of the Americas



Ports of varied magnitudes operate at twelve (12) of the sites evaluated. Two of the ports, San Juan and Ponce, currently operate as transshipment ports for Panamax-type container ships. The piers at Roosevelt Roads are currently handling military vessels of similar magnitude.

Fourteen of the sixteen 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.

The EPA has approved an Ocean Dredged Material Disposal Site in the Atlantic Ocean for dredging activities carried out at the Port of San Juan. A Site Management Plan for disposal was only recently completed by the USACE (ODMDS No. OD0233). Dredging at the site is currently in progress.

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 restructuring 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, 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 subaquatic 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 navigational channel only 25-feet deep that do not provide accessibility to deep draft vessels. 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 Dredged Material Disposal Site located north of the harbor 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 siting 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 Dredged Material 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 Barrier Units within this alternative site.

Access to the port is also a limiting factor, since it requires traveling from Highway PR-2 through several narrow, winding and congested roads. 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 Pargas respectively, are located at 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 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 consists of 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 Antillean 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: Las Mareas and Bahía de Jobos, 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

The 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, Shell of Puerto Rico Inc. the new

owner of the oil refinery near the harbor (previously owned by Sun Oil Company). The refinery recently reopened after closing its operations in 2000, including the commercial operation of the port. The port operations consist 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 Ports Authority, in cooperation with the USACE, began the process to obtain the necessary permits to dredge the harbor, affected by sedimentation caused by several hurricanes. The USACE and the EPA recently approved a Site Management and Monitoring Plan for the disposal of dredged material from the harbor at the Ocean Dredged Material Disposal Site designated by EPA for the Yabucoa Harbor (OD0242). This maintenance dredging has the purpose of keeping the port viable for future industrial activities. The applications for the Federal permits required for the proposed dredging were filed by the Ports Authority in 2002, but will be resubmitted by Shell as the new applicant for the activity.

The Yabucoa 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 container-based 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 of 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, the 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, Laguna 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 Roosevelt Roads Naval Station

The US Naval Station Roosevelt Roads (Roosevelt Roads) is located at the eastern edge of Puerto Rico, near the town of Ceiba. Until recently, the military reservation included about 31,000 acres: 8,600 acres on the island of Puerto Rico and 22,400 acres on Vieques Island, making it the largest naval station in the world. The recent closure of the Vieques range has reduced the size of the reservation.

The station is constructed around the perimeter of Ensenada Honda (Honda Cove). The Ensenada Honda is approximately 1 to 1 1/2 miles wide and 2 miles long. The surrounding areas are used exclusively by the US Navy, with no civil facilities located within the harbor complex. Ostie Field, a naval air station, is located about 1 mile north of the bay.

Roosevelt Roads role is training and service to the Atlantic Fleet. It has an 11,000-foot runway, nine piers, a water treatment plant, four sewage treatment plants, 110 miles of road, 42 miles of oceanfront, 1,340 buildings and approximately 194,000 square miles of ocean for naval exercises. Approximately 300 military and maritime ships (US, foreign and NATO) use the facilities and ranges at Roosevelt Roads annually for military exercises.

The main military harbor for the station is within Ensenada Honda, and includes a small craft marina used by the Navy for small boat mooring and recreational purposes. No facilities are available for repair of ships or machinery. There are three Navy piers located on the east side of the harbor with berthing depths ranging from 30-42 ft. The piers are supported by concrete pilings and have deck heights 8-10 ft above mean sea level. Bulkheads located between the piers provide additional mooring with depths to 15 ft. Pier 1, used for fueling, is the northernmost pier in the harbor. The pier is 450 ft long with berthing depths ranging from 32-36 ft, according to the latest (1982) pilot soundings. Pier 2, located southeast of Pier 1, is used for berthing submarines. It is 400 ft long with berthing depths ranging from 30-32 ft. An LST landing ramp is located about 300 yards (yd) southeast of the cargo pier. Pier 3, approximately 400 yd south of Pier 2 and 1,200 ft long, is equipped to service aircraft carriers. Depths at Pier 3 are about 40 ft on the north side and 44 ft on the south side.

Although Roosevelt Roads includes adequate facilities and the infrastructure needed to build and operate a transshipment port such as the Port of the Americas, the site was eliminated from further analysis for the following reasons:

- The site is still an active military installation not accessible for civilian activities such as the operation of a commercial port.
- Although closure of the installation will take place early in 2004, there is no certainty as to when the site could be available to the Commonwealth. The Commonwealth recently prepared a preliminary development plan for the installation. However, there is no certainty for the development of the plan including the port until a decision by the Navy for the transfer of the land is made.
- From the environmental point of view, Ensenada Honda is rich in natural resources and is recognized as one of the most important habitats in Puerto Rico for the Antillean

manatee. The investigations of the USFWS on the manatee indicated that its presence at Ensenada Honda compares to the conditions at the Guayanilla Harbor. Although the port is active, increased commercial traffic of the scale of a commercial port such as the PTA, could increase the potential for endangering the manatee.

2.4.15 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.

On September 13, 2002, the Corps filed and circulated a Draft Environmental Impact Statement (DEIS) for the Project, as proposed by the Applicant. In response to comments received during the review process of the DEIS, the Applicant modified the scope of the Project, and now proposes to develop the PTA as a single terminal at the Ponce Bay, with no proposed activities at the Guayanilla Bay. These modifications to the Project as originally described in the DEIS are significant, and required additional field studies and environmental impact analyses not included in the original document. This SDEIS for the Project provides additional information not included in the original DEIS circulated by the US ARMY Corps of Engineers (USACE).

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 wetland	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 seabeds found 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	Very good	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.
Roosevelt Roads	Very Good	Adequate	Yes	No	Yes	No	Moderate	Moderate	Unknown	Very good	1:30	No	No	No	Currently operating as a USDOD Naval Facility. Installation will be closed early 2004. Availability of land and port is uncertain.

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 for the Project to take effect 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.
- Moreover, the Status Quo option would have serious negative consequences for the Commonwealth. The Commonwealth is supporting the development of the 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 US 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.

2.5.2 Ponce and Guayanilla: Main Terminal at Ponce

This alternative was included in the original DEIS and includes a combination of the Ponce and Guayanilla alternatives simultaneously, with the main terminal at the Ponce Harbor.

2.5.2.1 Elements of the Ponce and Guayanilla: Main Terminal at Ponce Alternative

The Applicant proposes to develop the PTA at both the Ponce and Guayanilla bays with the capacity to receive Post-Panamax ships and handle as much as 1.5 MM TEUs per year. The Project would include the following components:

- At the Ponce Harbor:
 - Extension of Pier # 8 at the Port of Ponce to a maximum of 3,610 feet and fill of 76 acres of the bay adjacent to the pier for storage of containers in transit, that jointly with an expansion of the port areas would provide a capacity to handle two Post Panamax ships simultaneously and 1.2 million TEU's per year.
 - Dredging of the navigation channel and turning basin at the Port of Ponce to a maximum depth of 50 feet and ocean disposal of most of the 5.5 cubic million meters of dredged material.
 - Extension of the areas adjacent to the Port of Ponce by fill of 41 acres of wetlands and development of 132 acres north of the port for value-added activities.
- At the Guayanilla Harbor:
 - Construction of a 3,000 feet long pier at the Guayanilla Harbor adjacent to Punta Gotay to service two Post-Panamax ships and a capacity to handle 600,000 TEU's per year.
 - Development of approximately 48 acres of areas near Punta Gotay for storage of containers in transit.
 - Development of as much as 338 acres of the Dow Chemical parcel for value-added activities.

2.5.2.2 Project Location

The elements of the Project would be located at both the Port of Ponce and the Guayanilla Bay

- At Ponce,
 - Extension of Pier # 8 at the Port of Ponce to a maximum of 3,610 feet and fill of 76 acres of the bay adjacent to the pier for storage of containers in transit, that jointly with an expansion of the port areas would provide a capacity to handle two Post Panamax ships simultaneously.
 - Dredging of the navigation channel and turning basin at the Port of Ponce to a maximum depth of 50 feet and ocean disposal of most of the 5.5 cubic million meters of dredged material.
 - Extension of the areas adjacent to the Port of Ponce by fill of 41 acres of wetlands and development of 132 acres north of the port for value-added

activities. The land proposed for value-added activities is located within several parcels north of the main warehouses near Piers 4 and 6.

- The improvements to the piers, docks and wharfs are located on the south shore of the existing Port of Ponce within the Playa Ward.
- At Guayanilla,
 - The main terminal would be built at the Guayanilla Harbor, with a new 3,000 feet dock along the Punta Gotay shoreline.
 - Development of as much as 338 acres of the Dow Chemical parcels for value-added activities.
 - No dredging is proposed or required.
 - Marine construction would be limited to the docks, impacting an area of about 30 acres.

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

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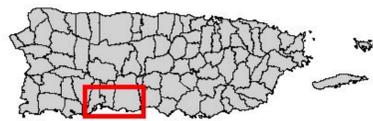
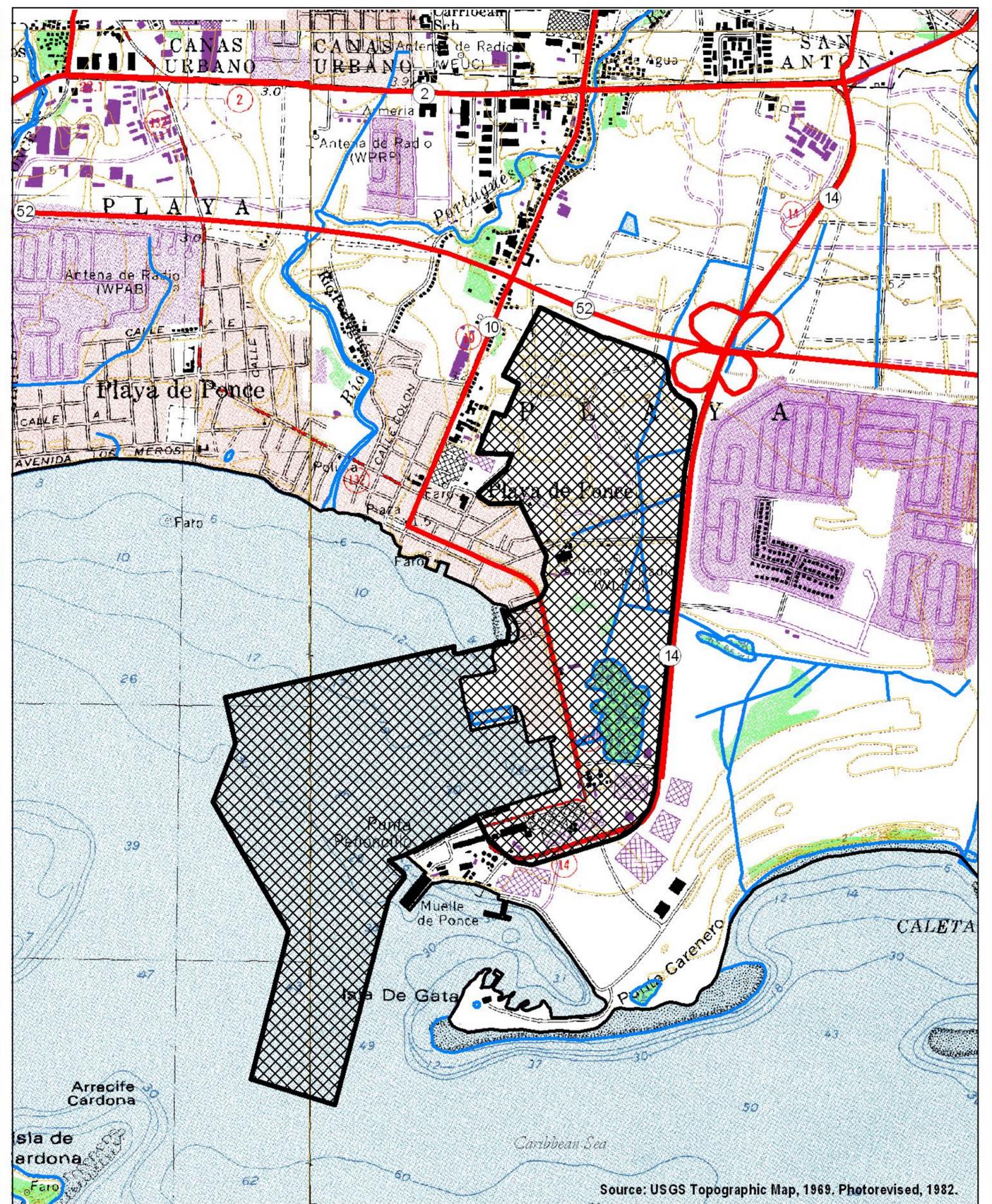
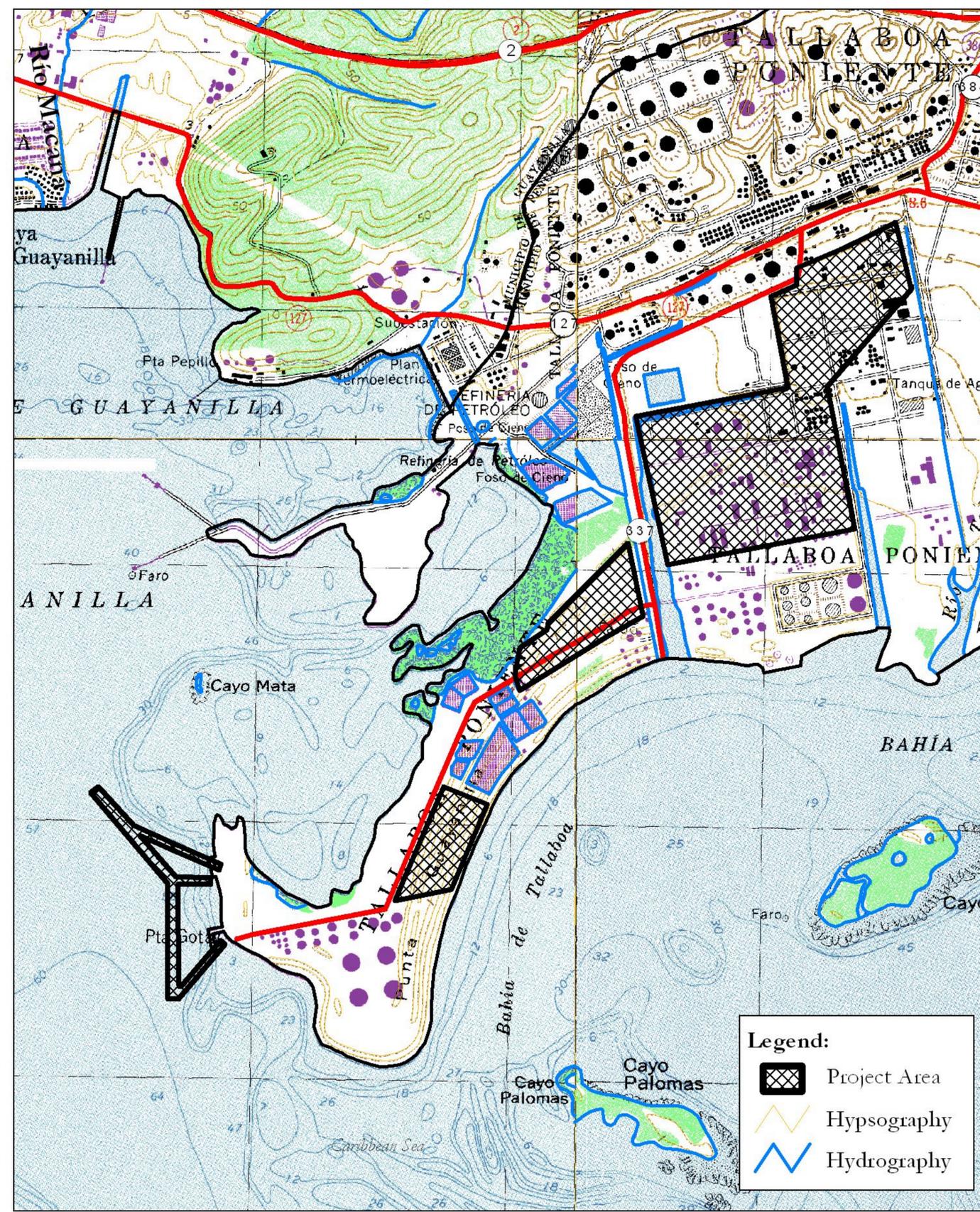
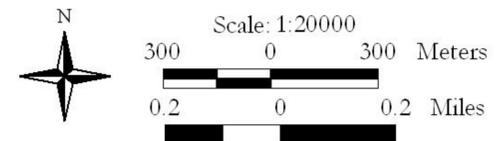


Figure 2-2. Ponce and Guayanilla: Main Terminal at Ponce Site Alternative
Port of the Americas



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 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 Applicant proposes to develop the PTA at the Port of Ponce with the capacity to receive Post-Panamax ships and handle as much as 1.5 MM TEUs per year. The Port of Ponce would include:

- Construction of an inland navigation channel (from hereon defined as the docking channel) with a length of 3,000 feet, 800 ft wide, and a navigation depth of 50 feet bmsl. The entrance to this channel would be located between Piers 7 and 8 at the Port of Ponce. The length of the channel would be aligned nearly parallel to Highway PR-14 (Los Caballeros Avenue) and would extend north to the limits of what is known today as the PERCON property.
- A narrow waterway would be excavated north of Pier 8 to promote recirculation of the water in the docking channel.
- Excavation of the docking channel would require the removal of approximately 3.4 MM m³ of soil from an area of 45 acres adjacent to the Port of Ponce. Approximately 1.9 MM m³ of this material would be reutilized for filling of a wetland adjacent to the Port of Ponce as described below and other upland areas near the port. The remaining material would be employed as surcharge on the lands proposed for development, and later would be disposed at the Ponce Landfill or discharged at an upland location in the Ponce area.
- Fill of approximately 59 acres of forested and salt flat wetlands adjacent to the Port of Ponce, for the storage of containers and cargo.
- Dredging of the navigation channel, turning basin and berthing areas at the Ponce Harbor to a minimum depth of 50 feet bmsl, to allow entry to the port of Post-Panamax ships. The proposed dredging would require disposal of approximately 5.5 MM m³ of material at the Ponce ODMDS consisting mainly of sand and clays, and would affect an estimated 248 acres of marine bottoms at the Ponce Harbor.
- Improvements to the Port of Ponce as follow:
 - Expansion of the Port storage areas by an additional 135 acres of uplands.
 - Initial acquisition and installation of four (4) Post-Panamax cranes to unload and load containers on ships. At its peak, the operation is expected to employ a total of 12 cranes, which would be acquired as the port activities expand.
- Development of approximately 132 acres of upland area adjoining the Port of Ponce, which would be used to expand the port, including additional areas for storage of containers, access roads, internal transit, and value-added activities such as industries, commerce, offices and warehouses, shops, and other infrastructure needed for the efficient operation of the PTA.

- Improvements to the existing infrastructure of the area, including highways, water, sewers, power and communications.

A conceptual layout for the PTA in Ponce is shown in Figure 2-3. The Ponce Federal Navigation Channel is shown on Figure 2-4.

2.5.3.2 Project Location

All of the elements of the Project would be located within the general area of the Port of Ponce.

- The proposed docking channel would be excavated adjacent to the wetland area located west of Highway PR-14 (Los Caballeros Avenue), extending inland from the vicinity of where Piers 7 and 8 are currently located.
- The wetland area where filling of 59 acres is proposed is located adjacent to Los Caballeros Avenue, east of the current main gate of the Port of Ponce.
- The land proposed for value-added activities is located within several parcels north of the main warehouses near Piers 4 and 6.
- The improvements to the piers, docks and wharfs are located on the south shore of the existing Port of Ponce within the Playa Ward.

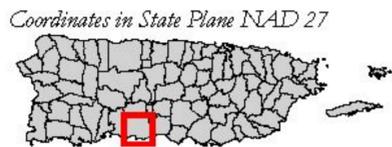
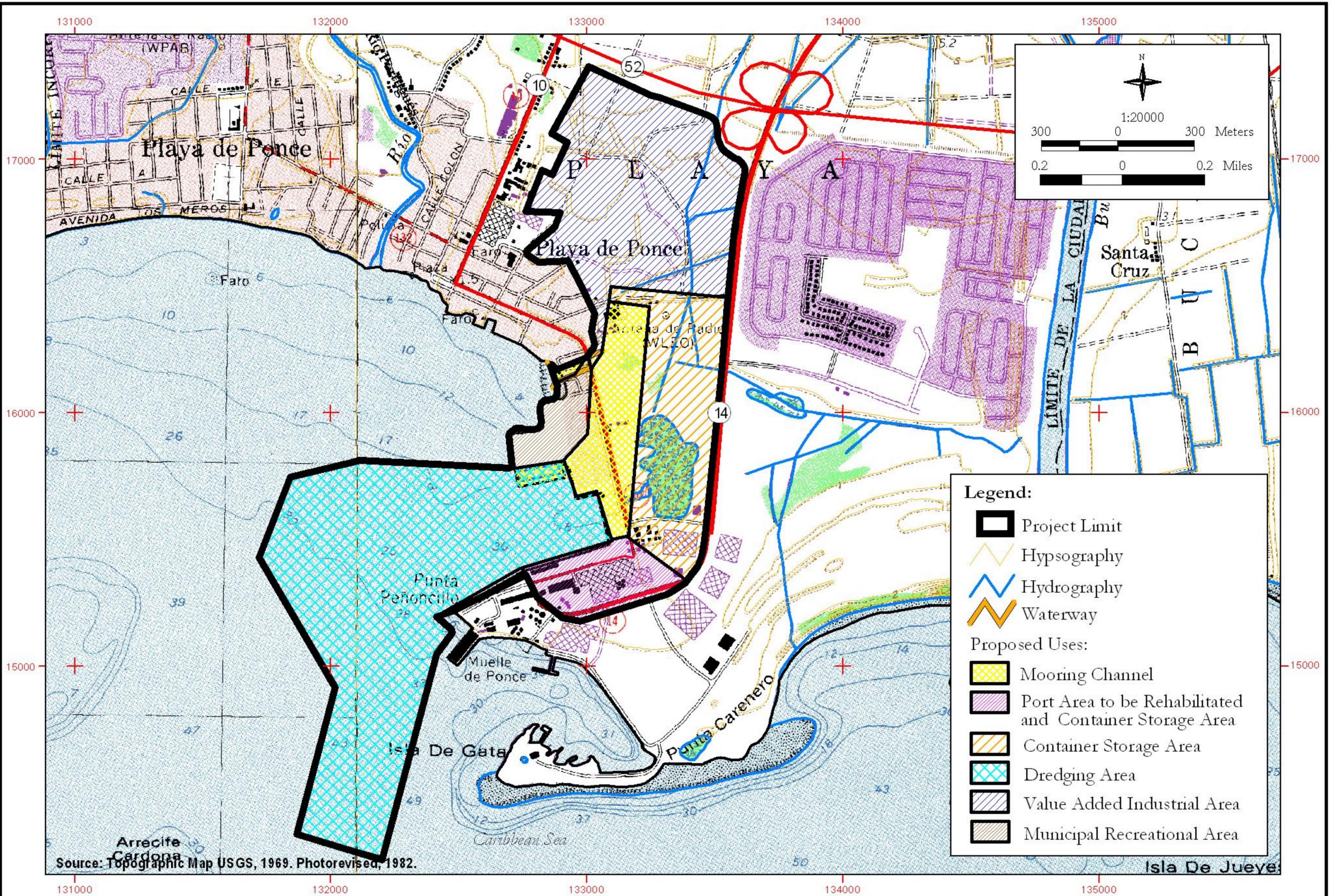
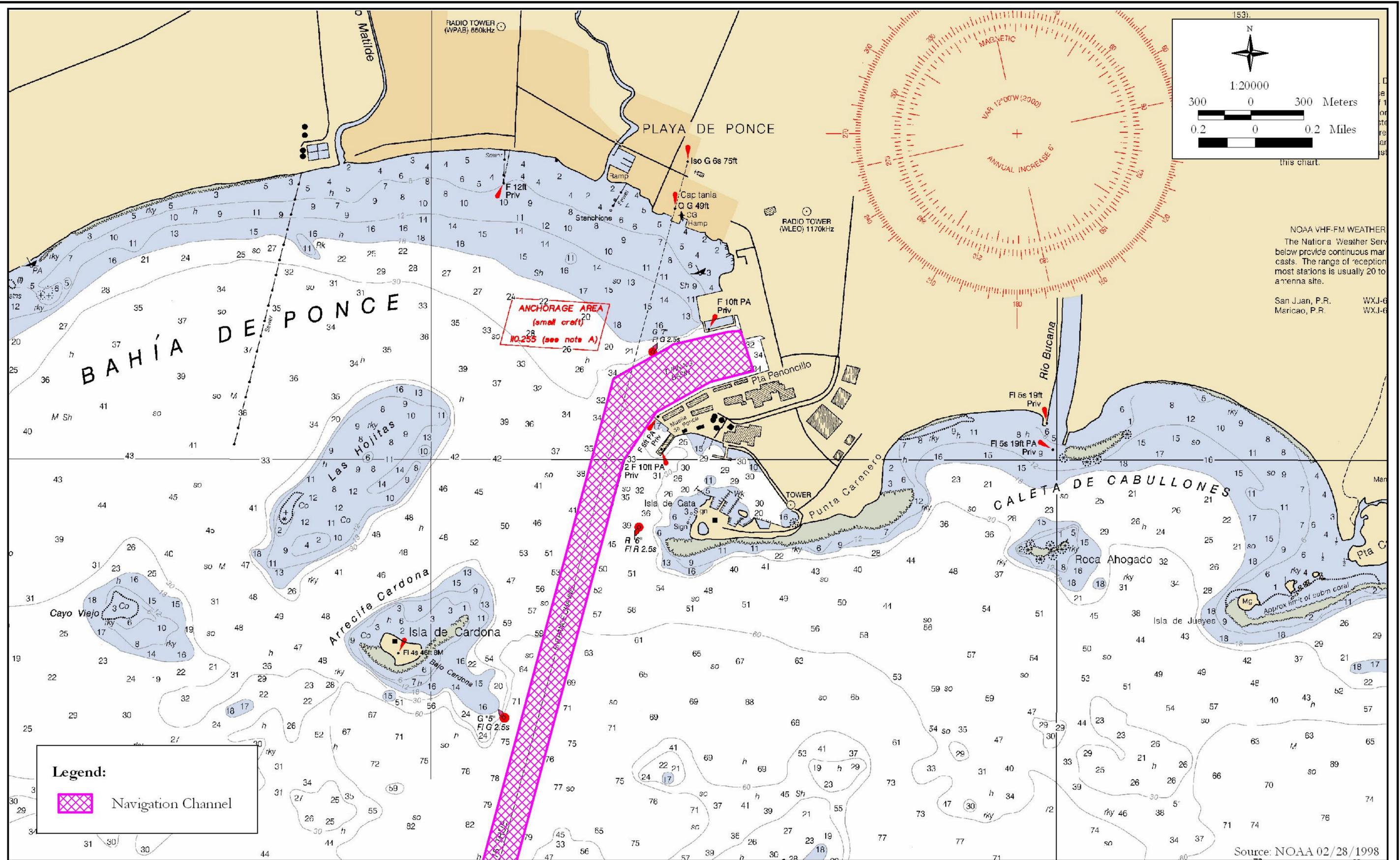


Figure 2-3. Port of Ponce Alternative: Conceptual Layout

Port of the Americas



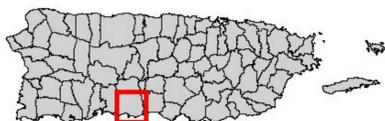
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NOAA VHF-FM WEATHER
 The National Weather Service below provide continuous marine weather forecasts. The range of reception for most stations is usually 20 to 30 nautical miles from the antenna site.
 San Juan, P.R. WXJ-6
 Mericao, P.R. WXJ-6

Figure 2-4. Ponce Harbor Navigation Channel

Port of the Americas



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

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 Federal 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 (US 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 36-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.

The navigation channel is part of the Federal navigable waters program, and has been maintained by the USACE 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 agreement allows the USACE dredging of the port to a maximum depth of 38 (+/-) 2 feet. Dredging deeper than the limits of the Federal channel would be the responsibility of the Commonwealth or the Municipality of Ponce.

This channel was dredged in 1988-89 and the dredged material disposed at an ocean disposal zone previously authorized by EPA. The disposal zone was evaluated by EPA and USACE and found to be suitable for the disposal of materials dredged from the Ponce Harbor. No adverse impact has been detected from this activity throughout a number of studies performed in the area.

The Port of Ponce is an industrial zone that has operated for decades with the consequent development of industrial, commercial, tourism and residential developments nearby. Most of the development in the vicinity of the Port of Ponce and its harbor has been light industrial, commercial, tourism and residential.

There are no large industrial activities nearby the Port of Ponce. Light industries such as steel recycling, fuels handling and pharmaceutical products storage occur near the port. Commercial developments relative to port exports and imports occupy most of the industrial areas near the port. Significant tourism and recreational developments have taken place near the port in recent years. The development of the Ponce Hilton Hotel and the "La Guancha" tourism and recreational development are the main activities. The Mercedita Airport, owned by the Ports Authority is nearby, and plans for its expansion are now under consideration. The airport handles now mostly small aircraft and limited passenger and cargo traffic.

2.7 Alternatives Not Within Agency's Jurisdiction

A number of alternate 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:

1. Manzanillo and the Canal Zone, Panamá
2. Freeport, Bahamas
3. Kingston, Jamaica
4. Haina and Puerto Caucedo, Dominican Republic
5. 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 on 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 14 of the 16 sites under evaluation. The Port of Ponce, and a combination of both the Port of Ponce and Guayanilla Bay were chosen for a detailed comparative assessment. In this assessment, engineering and design criteria were considered. Based on the assessment made by the Applicant, they believe that a facility with a main terminal at the Ponce Harbor is the best location to develop the Project.

The results of the physical and engineering considerations analysis for locating the PTA are summarized in Table 2-2. Table 2-3 summarizes the environmental considerations of the project alternative sites and includes a comparison with a No-Action scenario.

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

Objective	Ponce	Ponce and Guayanilla Main Terminal at Ponce
Hurricane Risk	The south and southeast of the port are exposed to hurricane effects. Docking channel would provide adequate harbor for mainline vessels.	The Ponce component is exposed to hurricane effects. The Port of Ponce operation could be interrupted 20 to 30 days per year. The Guayanilla component offers one of the safest ports in the Island.
Depth and area to accommodate Post-Panamax ships	The existing channel has a depth ranging from 36 to 39 ft. Dredging necessary for this component as well as the docking channel to an estimated 50 ft.	The Ponce component would require dredging to a maximum of 50-ft deep to provide access to Post-Panamax ships. Channel depth adequate in the Guayanilla component.
Access canal and turning basin	Access canal of 600-ft wide with a turning basin of 950 ft.	The Ponce component has an access canal of 600-ft wide with a turn basin of 950 ft, which would have to be expanded as part of the development of the Project. Access canal 1,500 feet wide and turn basin of 3,300 ft at the Guayanilla component.
Existing Infrastructure	Commercial-industrial port area with efficient infrastructure.	The Ponce component includes also a well-established commercial zone. Both components include industrial areas with efficient infrastructure.
Dock construction	Total existing dock area consists of approximately 4,400 ft. A quay of up to 4,100 ft long would be added, modifying the actual layout of Piers 7 and 8.	The existing dock in Ponce would need an expansion to 3,610 ft. A 3,000 ft long dock is proposed along the contour of 50 to 55 ft deep in the Guayanilla component.

Objective	Ponce	Ponce and Guayanilla Main Terminal at Ponce
Terminal Area	Terminal area would be located east of the docking channel. Filling of 59 acres of wetlands would be necessary to enable this component.	A proposed 76 acres of terminal area can be obtained through filling activities in the Ponce component.
Space for Value-Added Areas	Approximately 132 acres would be available north of the proposed terminal, with additional space around the Ponce Harbor area and the Mercedita Ward.	Approximately 132 acres would be available north of the proposed terminal, with additional space around the Ponce Harbor area and the Mercedita Ward. Approximately 338 acres available adjacent and to the east to the port site in Guayanilla.
Security	Access may need some improvements. Located in a developed area where there are many uses.	Access needs improvements for the Ponce component, adequate in Guayanilla.
Urban Area Proximity	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

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

Issue	No Action	Ponce	Ponce and Guayanilla Main Terminal at Ponce
Fish and Wildlife Resources	None.	Removal of existing vegetation for value-added activities; dredge activities would eliminate benthic habitat in areas where previous maintenance dredging took place, but would enable new fish habitat at the docking channel.	Removal of existing vegetation for value-added activities; dredge and fill activities would eliminate benthic habitat and vegetation at the Ponce Harbor.
Marine Resources / Special Aquatic Sites	None.	Dredging of the navigation channel and turning basin would affect mostly muddy bottoms at areas where previous dredging took place, but would enable new fish habitat at the docking channel. About 59 acres of wetlands would be filled for additional storage and terminal space near the docking channel. No coral reef or shelf-edge habitat would be impacted.	Fill and dredge activities would take place in areas mostly characterized by muddy bottoms. Fill would take place in bottoms characterized by a mixture of mud and seagrass (<10% of total area). About 41 acres of wetlands would be filled in Ponce for additional storage space near the terminal. No coral reef or shelf-edge habitat would be impacted.
Essential Fish Habitat	None.	Dredging would impact designated EFH for adult individuals of white grunt and silk snapper. Docking channel construction would create new fish habitat.	Fill and dredging would impact designated EFH for adult individuals of white grunt and silk snapper.
Threatened or Endangered Species	None.	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.

Issue	No Action	Ponce	Ponce and Guayanilla Main Terminal at Ponce
Ecologically interest areas	None.	None.	None.
Wetlands	No impacts to wetlands.	Approximately 59 acres of wetlands must be filled for additional storage areas near the docking channel.	Approximately 41 acres of wetland must be filled in Ponce for additional storage areas near the terminal.
Coastal Zone	None.	None.	None.
Flooding	None.	No construction activities would take place in Zone 1. Construction in areas classified as Zone 1M and 2 would adhere to the PB regulations.	No construction activities would take place in Zone 1. Construction in areas classified as Zone 1M and 2 would adhere to the PB regulations.
Water Quality and Sediment Quality	No impact on the quality of water.	Temporary impacts from dredging, and construction of docking channel. Increased potential for spills due to increased traffic.	Temporary impacts from dredging and filling in the Ponce component, and construction and expansion of piers in both areas. Increased potential for spills due to increased traffic.
Air Quality	No effect on air quality.	Increase in emissions to area from additional ships, equipment and vehicles, during construction and operations. 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 to cultural resources. Subaquatic investigation of the areas planned for dredging yielded no significant remains of historic significance.	No impact on cultural resources. Evaluation of potential sunken ship at the Ponce Harbor yielded no significant remains of historic significance.

Issue	No Action	Ponce	Ponce and Guayanilla Main Terminal at Ponce
Socioeconomic Impacts	Economic index would remain the same.	Generation of jobs and overall contribution in increasing the economic level of the region.	Generation of jobs and overall contribution in increasing the economic level of the region.
Hazardous, Toxic and Radioactive Waste	None.	No impacts with regards to this issue are anticipated at Ponce.	No impacts with regards to this issue are anticipated at Ponce. Reuse of approximately 338 acres under the RCRA Brownfield Initiative in Guayanilla.
Dredging and disposal of dredged material	No dredging necessary.	Dredging of the navigation channel and turning basin is required. Approximately 5.5 MM m ³ must be dredged to reach 50 ft bmsl. The construction of a docking channel would result in the generation of approximately 3.4 MM m ³ . Only sediments from the navigation channel would be disposed of at the designated ODMDS. The USACE permits and a Management and Monitoring Plan are required for the dredging and disposal of material at the ocean.	Dredging of the navigation canal is required. Approximately 5.5 MM m ³ must be dredged to reach 50 ft bmsl. The USACE permits and a Management and Monitoring Plan are required to the dredging material disposal at the ocean. Dredging is not necessary in Guayanilla.
Navigation	Transit levels would remain the same.	Dredging of the navigation canal is required, as well as for the construction of a docking channel of up to 4,100 linear feet. Overall number of sailings would increase to 5.7 per day. Marine risk associated with increased traffic determined to be 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.

Issue	No Action	Ponce	Ponce and Guayanilla Main Terminal at Ponce
Infrastructure	None.	Improvements to water and wastewater distribution system required. Some modifications to the power grid required to increase capacity. Solid waste would 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 would be disposed of at the Ponce Landfill.
Marine Currents	None.	None.	None.
Noise Levels	None.	Increase in background noise from additional ships, new port machinery and vehicles. Noise standards would be met during construction and operations.	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 a deep draft terminal at the Ponce Bay. This alternative includes the development of value-added areas near the terminal. The following are the elements of the Applicant's Preferred Alternative:

Development of a deep-draft terminal at the Port of Ponce with the capacity to receive Post-Panamax ships and handle as much as 1.5 MM TEUs per year. The Port of Ponce would include:

- Construction of an inland docking channel with a length of 3,000 feet, 800 ft wide, and a navigation depth of 50 feet bmsl.
- The entrance to this channel would be located between Piers 7 and 8 at the Port of Ponce. The length of the channel would be aligned nearly parallel to Highway PR-14 (Los Caballeros Avenue) and would extend north to the limits of what is known today as the PERCON property.
- A narrow waterway would be excavated north of Pier 8 to promote recirculation of the water in the docking channel.
- Excavation of the docking channel would require the removal of approximately 3.4 MM m³ of soil from a 45-acre area adjacent to the Port of Ponce. Most of the material would be used for the filling of the wetland adjacent to the Port of Ponce as described below and other areas near the Project. Any remaining material would be disposed at the Ponce Landfill or discharged at an upland site.
- Fill of approximately 59 acres of salt flat and arboreal wetlands adjacent to the Port of Ponce, for the storage of containers and cargo. Adequate mitigation would be provided to this area as described in the next section.
- Dredging of the navigation channel, turning basin and berthing areas at the Ponce Harbor to a minimum depth of 50 feet bmsl, to allow entry to the port of Post-Panamax ships. The proposed dredging would require disposal of approximately 5.5 MM m³ of material consisting mainly of sand and clays, and would affect an estimated 248 acres of sea bottoms at the Ponce Bay.
- Improvements to the Port of Ponce as follow:
 - Expansion of the Port storage areas by an additional 135 acres of uplands.
 - Initial acquisition and installation of four (4) Post-Panamax cranes to unload and load containers on ships. At its peak, the operation is expected to employ a total of 12 cranes, which would be acquired as the port activities expand.
- Development of approximately 132 acres of upland area adjoining the Port of Ponce, which would be used to expand the port, including additional areas for storage of containers, access roads, internal transit, and value-added activities such as industries, commerce, offices and warehouses, shops, and other infrastructure needed for the efficient operation of the PTA.

- Improvements to the existing infrastructure of the area, including highways, water, sewers, power and communications.

2.10 Compensatory Mitigation

2.10.1 Impact Area

The development of a deepwater port in Ponce would result in environmental impacts to the Ponce Bay, as well as approximately 59 acres of jurisdictional wetlands. 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. The Applicant has indicated its willingness to provide adequate compensatory mitigation as determined by the USACE.

Wetland vegetation within the project site consists of five main vegetative communities: herbaceous (17.7 acres), forested (7.1 acres), open water (0.5 acres), salt flats (24.2 acres), and mangroves (8.6 Acres). This classification is based on the dominant wetland vegetation community that was present during the wetland delineation activities and in the employment of photo-interpretation analyses using Geographic Information System (GIS) software.

2.10.2 Mitigation Site Description

There are two main mitigation sites where wetland reestablishment activities would take place (Figure 2-5). The sites are located within the parcel known as "Finca La Esperanza", approximately 3 kilometers east of the project site. Conservation Easements, comprising the proposed wetland mitigation actions, would be established throughout these areas and adjoining existing wetlands including salt flats, mangroves, and channels. Both, wetland impact areas and wetland mitigation sites are located in the same US Geological Survey's Hydrologic Unit (HUC No. 2101004).

The "Finca La Esperanza" parcel consists of a complex wetland system that includes low-lying areas; interconnected, fresh-brackish water canals within a salt (tidal) flat; and a mangrove forest. The parcels are located in grounds currently owned by the Wirshing-Mayoral Estate totaling an approximate 500 acres. It is believed that two areas were impacted between 20 to 30 years ago by the discharge of cement production byproducts. The total impact area approximates 108 acres. The goal of the proposed wetland mitigation is to re-establish wetland functions in these two areas that have been impacted. Also, at a minimum, the parcels to be used in the compensatory mitigation plan would be preserved through conservation easement.

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Figure 2-5. Wetland Mitigation: Finca La Esperanza

Port of the Americas



2.10.3 Mitigation Summary and Approach

The wetland mitigation actions would consist in the removal of the filling material in the areas previously mentioned to the appropriate elevations necessary to obtain the needed hydrology to allow the area to become a functional wetland. This action will ensure the establishment of a better and more frequent hydrologic regime, which is essential for wetland establishment. To provide a more desirable wildlife habitat, the final soil elevation of the re-establishment areas would be lower than the adjacent existing wetlands. This will promote a more frequent ponding effect resulting in the increase of faunal species richness.

2.10.4 Wetland Mitigation Goals and Objectives

The goals for the mitigation actions are to:

1. Achieve no net loss of wetland acreage, functions and values;
2. Reestablishment of wetlands;
3. Create a Conservation Easement;
4. Promote an increase in overall habitat functions;
5. Provide habitat to support wildlife; and,
6. Increase the ecological integrity of the landscape.

To achieve these goals, the following objectives have been developed for the mitigation actions:

1. Reestablishment of impacted wetland areas;
2. Reestablish suitable land elevations using known elevations of immediately adjacent wetlands and field data on ground water level;
3. Reestablishment of a more frequent hydro-period or hydrologic regime;
4. Provide area and functional replacement for impacts to approximately 59 acres of wetlands; and,
5. Assure the long-term protection of the mitigation sites.