

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter describes the potential environmental impacts that the construction and the operation of the Port of Las Américas may have on the existing environment within the project area.

4.1 Introduction

This chapter describes the potential environmental impacts of the PTA to the existing natural resources within the Project area. Potential impacts that represent relevant issues as identified in Section 1.7.2, are discussed for the four (4) alternatives considered for the PTA as follows: No-Action, Ponce as the only element of the PTA, Guayanilla as the only element of the PTA, and Guayanilla-Peñuelas as the only element of the Project (Applicant's Preferred Alternative).

4.2 General Environmental Effects

The following topics are discussed under this section: Impacts to land use and zoning, and impacts on soils and earth crust.

4.2.1 Land Use and Zoning

The impacts of a Project on land uses can be considered significant and subject to mitigation if the proposed action is not compatible with current land use plans, municipal ordinance plans, existing policy or current government regulations. The alternatives considered are compatible with the current land uses and zoning characteristics as discussed in the sections below.

4.2.1.1 No-Action Alternative

Under the No-Action Alternative, there would be no impacts on the land use or zoning of the area. The areas would remain as they currently exist and the opportunity of revitalizing abandoned areas would be lost.

4.2.1.2 Guayanilla-Peñuelas or Ponce Alternatives

The development of the Port of the Américas (PTA) in Guayanilla-Peñuelas or in Ponce sites is compatible with current land uses and zoning characteristics in the areas within these municipalities, as indicated before. A detailed discussion is included in the following section, Applicant's Preferred Alternative.

4.2.1.3 Applicant's Preferred Alternative

The development of the PTA is compatible with current land uses in the areas within the municipalities of Guayanilla, Peñuelas and Ponce, where the Project components are planned. The impacts of a Project on land uses are subject to mitigation if the proposed action is not compatible with current land use plans, municipal ordinance plans, existing policy or current government regulations.

- In Guayanilla-Peñuelas, the areas where the piers and docks would be located are part of the public lands within the maritime zone, where port facilities approved by the Department of Natural and Environmental Resources (DNER) and the Ports Authority operate for several industrial activities. Moreover, the maritime area next to the Punta Guayanilla strip, to be reclaimed through filling

and used as a dock and container storage area, is currently designated for transportation uses, which is also compatible with the proposed uses. The parcel of land in Guayanilla-Peñuelas chosen for the potential location of value-added activities was for many years part of the petrochemical complex operated by Union Carbide Caribe (UCC). Currently, the complex is closed, except for the operation of several above-ground storage tanks and a distribution terminal to fill tank-trucks with alcohols, solvents, acetates, and monomers.

- In the Ponce area, the land proposed for the development of the PTA is part of the Port of Ponce and it has been in use since the beginning of the 20th century. Parcels adjacent to the port identified for value-added activities are either in use for industrial activities or vacant and not zoned. As a result, there would be no impacts to the current land use, since the proposed use is the same as the current use.

The current *Industrial* zoning of most of the areas proposed for the Project is compatible with the existing municipal and Commonwealth land use plans and the current public policies.

- In the Guayanilla-Peñuelas zone, where most of the land proposed for development housed industrial activities classified as heavy, it is improbable that the parcels can accommodate other uses in the nearby future, such as tourist, agricultural, recreational or residential uses. The construction of the Project would change the contour of the coastal zone between the CORCO and Peerless Oil & Chemicals docks. However, both the dock and the proposed terminal would maintain the same commercial port land use classification. Therefore, the Project would not change the current land use of that portion of the Guayanilla Bay. The design of the Project elements at the Guayanilla Harbor would avoid any construction over Cayo Mata, south of Punta Gotay, to maintain its natural and recreational values and uses with minimal adverse impacts.
- In the Ponce area, the development of the PTA would take place within the existing site and the value-added areas would take place in areas zoned for industrial uses. Therefore, the Project would not impact the land use of the project sites.

The Guayanilla-Peñuelas area where the Project would be located, as well as its surroundings, are zoned as *Limited Heavy Industrial 2 (IL-2)* by its Spanish acronym), according to the zoning maps of the Planning Board [Peñuelas zoning maps, pages 13, 14, 16, 17, 19, 20, 23 (February 13, 1972), 15 (March 25, 1978), 18 (December 22, 1979), and 21 (October 9, 1976)], Section 30.00 of the Puerto Rico Zoning Regulation (Puerto Rico Planning Board Regulation Number 4, 2000). The IL-2 district designates heavy industrial areas that are or would be developed through specific projects that, because of their characteristics and intensity, require a special location for their development.

- The proposed lot in the Ponce area falls under the classification of urban soil as Industrial Building (*EI* and *DE-EI*, by the Spanish acronyms), according to the Soils Classification Map of the Ponce Municipal Plan. This classification is established to provide the parameters required to regulate the installation of offices, warehouses and manufacturing facilities within isolated buildings or as part of industrial parks. Parts of the port areas that would be developed were classified as superimposed conceptual development planning district (*DC*, by its Spanish acronym). The purpose of this district is to facilitate the implementation

of conceptual developments for particular areas, one of which is the port. This area is designated for port expansion and dock extension, which is completely compatible with the proposed Project. In the broad sense, the proposed action is in harmony with the existing zoning, and therefore it is expected that no rezoning of the selected lots would be required to accommodate the proposed Project.

- The Puerto Rico Planning Board (PB) Regulation Number 4 requires that a Land Use Consultation process be conducted in areas that are already zoned, for projects which use or intensity are not allowed by the existing Zoning Regulations or by a Municipal Plan. The PB regulations also require this process for all public improvement projects, with the exception of projects that are developed by agencies that are exempted from this requirement, including municipalities that have obtained their municipal autonomy. A public improvement project, as defined by the PB regulations, is any permanent improvement project, new construction, expansion, or reconstruction of an authorized public work that is paid, supervised, directed, started or controlled by any government entity. In accordance with these criteria, the Land Use Consultation process must be conducted for the PTA in compliance with the PB regulations, the Municipal Planning regulations, and the Transference and Administration of Faculties from the PB applicable to the Municipality of Ponce as an autonomous local government.
- The proposed fill of a shallow area of about 110 acres in the Guayanilla Bay, for construction of the container storage site next to the pier, would result in a new land extension. Presumably, this land would be zoned in accordance with the established use, either as an industrial zone or a port zone.

From the above facts, it follows that the designated area zoning as a consequence of the construction and operation of the PTA would not cause adverse impacts in the area or its surroundings.

4.2.2 Impacts on Topography

4.2.2.1 No-Action Alternative

There would be no impacts on the topographic setting of the area under the No-Action Alternative. Particularly in the Guayanilla-Peñuelas site, filling activities associated to the proposed construction of the dock and containers staging area would not impact the open coastal waters. The areas would remain as they currently exist.

4.2.2.2 Guayanilla-Peñuelas Alternative

The general area for the proposed Project in Guayanilla-Peñuelas site consists of a plain area in the coastal region of such municipalities. The main impact associated to this alternative is the filling activities necessary to construct the dock and containers staging area.

Other impacts to the topographic setting of this alternative is related to the compliance with the Puerto Rico Planning Board Regulation Number 13 (2001) for construction on areas classified as flood zones (Zone 1M and Zone 2). Design criteria for construction on such sites require filling to raise the ground over the flood level.

4.2.2.3 Ponce Alternative

The general area for the proposed Project in the Port of Ponce consists of a plain area in the coastal region of Ponce. This site also presents areas classified as flood zones (Zone 1M and Zone 2) in which construction is proposed. This alternative would impact the topographic setting of the site, similar to the Guayanilla-Peñuelas Alternative.

4.2.2.4 Preferred Alternative

The impacts of the Applicant's Preferred Alternative with regards to the topographic setting are a combination of the impacts discussed for the Guayanilla-Peñuelas and Ponce alternatives, discussed in the previous two sections.

4.2.3 Impacts on Soils and Earth Crust

4.2.3.1 Terrestrial Impacts

4.2.3.1.1 No-Action Alternative

There would be no impacts on terrestrial soils and earth crust of the area under the No-Action Alternative. The areas would remain as they currently exist.

4.2.3.1.2 Guayanilla-Peñuelas Alternative

The terrestrial impacts of the Project in Guayanilla-Peñuelas would result primarily from the rehabilitation of the existing port facilities, development of areas for dock and containers staging area, and development of the parcels for value-added activities.

The fill material intended for the shallow marine bottom adjoining Punta Gotay would be obtained from existing quarries operating in the region from Peñuelas to Juana Díaz. Impacts associated to the transportation of the earth material from the quarries to the Guayanilla-Peñuelas site are discussed under Marine Soils Impacts.

- The activities that would disturb the soil condition in the indicated areas include the cleaning and weeding of parcels, filling of areas reclaimed, excavations for structure foundations, installation of piles, leveling and elevation of the site and landscaping. Because of the long history of industrial land use of the sites, almost no natural soils would be impacted, with the exception of a small parcel of mangrove and salt flats located to the west side of Punta Guayanilla.
- The areas within the Project site have limited agricultural value, and there are no major geological or mineral resources located in the zone. The construction of the Project would not require the use of explosives.
- At the Guayanilla-Peñuelas site the fill material would be compacted to reduce the potential for settlement. The top part of the fill would be made up of special material compacted to provide a stable surface for cargo traffic and container storage. The fill area would be devoted mostly to container yards and transit areas, and small buildings to serve as administrative offices.
- The areas proposed for development within the Guayanilla-Peñuelas Peninsula consist mainly of fill settled and compacted during years of intense industrial activity. New fill material would be required to raise and level the site to the design specifications. It is anticipated that essentially all the construction would

take place on areas that are already impacted, or along existing right-of-way paths, but not on soils in their natural state.

The main impact of the Project on the soils would be the potential erosion that may result from the runoff over the fill areas during the construction period. Lack of erosion controls would result in the transport of sediments into the nearby streams and coastal waters, and degradation of the quality of these waters. Prevention of erosion and sedimentation would be achieved through the development of Sediment and Erosion Control Plans, in accordance with the federal and local requirements established by the EPA and the EQB.

- An NPDES Permit and Sediment and Erosion Control Plans would be prepared as required by the EPA under the Stormwater Amendments of the Clean Water Act (CWA, 1989).
- A similar permit is required by the EQB to comply with the local requirements (CES Permit and Plan).

These permits require the preparation of specific plans showing the location and characteristics of the erosion and sedimentation control measures during each construction phase.

- During construction, stormwater would be collected by a drainage channel and conveyed to a retention lagoon for evaporation. After each phase of the Project is completed, stormwater would be collected by permanent pluvial systems. Barriers to control mud sediment transport to nearby areas would be installed on the embankments of the access roads to the Project areas. Once the construction is completed, the slopes would be stabilized to permanently avoid erosion.
- The preparation of the site would include the areas identified on the permit applications, prior to the start of construction. Temporary systems would be installed to control the erosion and sedimentation around the entire project area before construction begins. Draining dikes and temporary retention lagoons would be built to facilitate draining control inside and outside the project area, until permanent drainage systems can be installed. Temporary and permanent drainage structures would be designed to control runoff from rain events with frequencies of 25 to 100-year recurrence intervals, as required by the area and the nature of the activities. In areas where electric lines and other utilities may be affected, temporary erosion control systems would be installed on the work areas and any nearby wetlands or surface bodies of water.
- Permanent erosion and sedimentation control of the exposed areas during the construction of the Project would be achieved by paving and reforestation with appropriate vegetation. Prior to the planting of this vegetation, nets and mud control barriers or other appropriate measures to control the flow of sediments would be installed. Periodic inspections would be performed to verify the net installation, to ensure that there is no excess of accumulated material or sediments. Any excess sediment would be removed to maintain the efficiency of the system.
- A landscaping architect would plan the reforestation, according to the recommendations, suggestions and requirements established by the DNER, and it would be executed and supervised by a certified tree expert or landscaping professionals, using best management practices (BMPs).

- In the eventuality that contaminated soil is discovered during the construction, work would stop immediately and the EQB and EPA officials would be notified. After coordination with these agencies, appropriate remedial action would be initiated as established in the current laws and regulations, particularly RCRA (40 CFR Parts 260 and 270).
- An Environmental Inspector would be present at the sites during all the construction phases. The inspector would have the primary responsibility for ensuring that the construction is in compliance with applicable environmental laws and regulations.

4.2.3.1.3 Ponce Alternative

The terrestrial impacts of the Project in Ponce would result primarily from the rehabilitation of the existing port facilities and development of the parcels for value-added activities.

- The activities that would disturb the soil condition in the indicated areas include excavations for structure foundations, installation of piles, leveling and elevation of the site, cleaning and weeding of parcels and landscaping. This site, similar to the Guayanilla-Peñuelas site, has been used historically for ports and industrial activities, except for the open area that would be used for value added facilities.
- The areas within the Project site have limited agricultural value, and there are no major geological or mineral resources located in the zone. The construction of the Project would not require the use of explosives.
- As discussed previously in **Section 3.2**, most of the areas presently occupied by man-made facilities in the Ponce site were artificially filled. New fill material would be required to raise and level the site to the design specifications. It is anticipated that essentially all the construction would take place on areas that are already impacted, or along existing right-of-way paths, but not on soils in their natural state.

Potential impacts on soils are similar in nature to those discussed for the Guayanilla-Peñuelas site, including the potential erosion that may result from the runoff over the fill areas during the construction period. An NPDES Permit and Sediment and Erosion Control Plans would be prepared, as discussed for the Guayanilla-Peñuelas Alternative.

Permanent measures would be implemented for the control of erosion and sedimentation, as previously discussed for the Guayanilla-Peñuelas Alternative. Such measures include:

- Permanent erosion and sedimentation control of the exposed areas during the construction of the Project by paving and reforestaing with appropriate vegetation.
- Planned landscaping, according to the recommendations, suggestions and requirements established by the DNER.

4.2.3.1.4 Applicant's Preferred Alternative

The impacts of the Applicant's Preferred Alternative with regards to the terrestrial soils and earth crust are a combination of the impacts discussed for the Guayanilla-Peñuelas and Ponce alternatives, discussed in the previous sections.

4.2.3.2 Marine Soils Impacts

4.2.3.2.1 No-Action Alternative

There would be no impacts on marine soils of the area under the No-Action Alternative. The areas would remain as they currently exist.

4.2.3.2.2 Guayanilla-Peñuelas Alternative

The elements of the Project in the Guayanilla Bay would occupy submerged land reclaimed by fill from a shallow area adjacent to Punta Gotay at the Guayanilla Peninsula. This area, about 110 acres, would be used for the construction of a dock and space for the staging and storage containers. Existing uplands within the Guayanilla Peninsula also would be used for the construction of access roads and other support infrastructure.

- The filling of the shallow marine bottom adjoining Punta Gotay would require approximately 2.5 M cubic yards (1.9 M cubic meters) of material. The material can be obtained from limestone quarries operating in the region from Peñuelas to Juana Diaz. These quarries, authorized by the DNER or the Ponce Autonomous Municipality, can provide the volume of fill required for the Project without impacting other areas. Best management practices would be implemented to avoid dispersion of earth material during transportation. These practices would include covering the trucks loads and providing tires washing areas at the entrance of the Project sites, among others. These practices would be specifically delineated in the Sediment and Erosion Control Plans. The location and capacity of the quarries in the Project area is shown in **Figure 4-1** and **Table 4-1**, respectively. The data on **Table 4-1** shows that the listed quarries can produce approximately 37,774 cubic yards (28,880 cubic meters) of fill material per day. Assuming the material is suitable for the proposed fill, the required volume can be produced in less than 100 days.
- Construction of the piers, docks and areas for storage of containers requires the installation of piles, sheet pilings, and filling of small areas of the marine bottom, including some mangroves and associated salt flats. The cranes that would be used for loading and unloading of the containers will be one of the most important pieces of equipment of the Project. They would be located on the dock, resting on tracks attached to a deck on cement piles. The buildings and other operation-related structures would be located on the reclaimed area and other parcels of the Project.
- The top layer of the sea bed adjacent to Punta Gotay where the fill is proposed, consists primarily of terrigenous sediments, such as quartz, feldspar, and rock fragments, mixed with limestone components of biological origin, such as shell fragments (Puerto Rico Insular Platform Marine Geological Map, 1991). The geological characteristics and soils resistance of these materials indicate that the proposed fill can be supported without any special construction techniques.

4.2.3.2.3 Ponce Alternative

In the Port of Ponce, development of the Project would require the dredging and disposal of approximately 1.96 M cubic yards (1.5 M cubic meters) of bottom material from the navigation channel and turning basin. The potential impacts of the proposed fill and dredging on the water quality and aquatic habitats of the Ponce Bay and marine areas are discussed in Section 4.16.

- The general geologic sequence in the bottom of the Port of Ponce consists of three main units: a basal rock or reef unit, a basal shoal or flank units and an overlying sediment unit. A preliminary set of target horizons were identified that likely represent indurated rocks, which may pose a problem with some types of dredging operations. These targets include several large shoals, smaller isolated shoals, and more laterally widespread bedrock or reef horizons. Core data and acoustic velocity data will provide key ground-truth for calibration of the geologic units and proper thickness calculation of the sediment unit based on acoustic survey data. Analysis of the remaining acoustic data, in conjunction with core samples, should provide a comprehensive image of the subsurface for dredging operations.

The geophysical characteristics of the project sites would be considered in the design process. Preliminary, geophysical studies were conducted, both at Ponce and Guayanilla-Peñuelas sites, for those purposes.

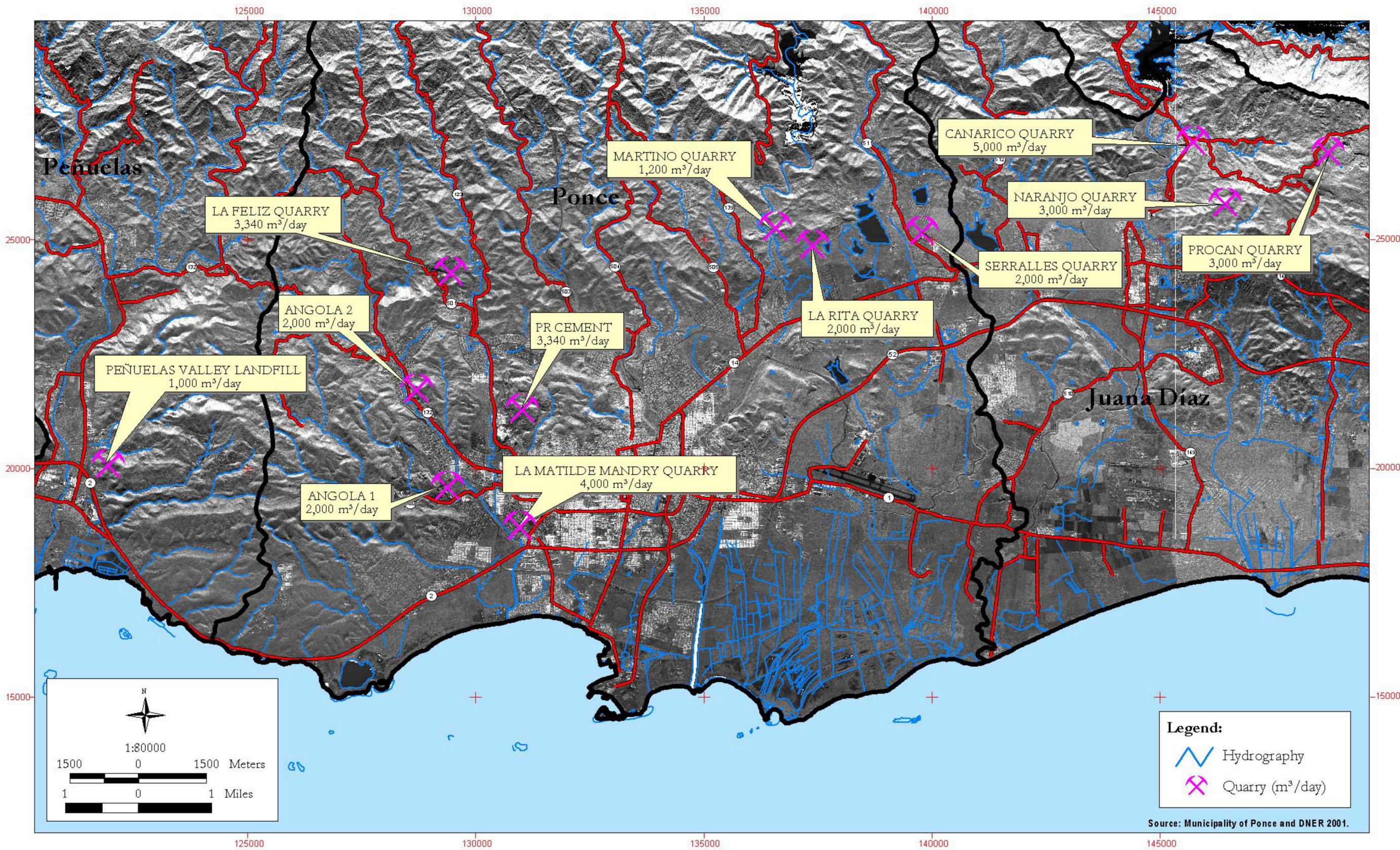
4.2.3.2.4 Applicant's Preferred Alternative

The impacts of the Applicant's Preferred Alternative with regards to the marine soils are a combination of the impacts discussed for the Guayanilla-Peñuelas and Ponce alternatives, discussed in the previous section.

Table 4-1: Quarries Operating within the Transshipment Port Region

| Name | Address | Extraction (m³/day) | Permit Expiration Date | Permit |
|-----------------------------|--|---|-----------------------------------|---------------|
| Plan Site PRC | Road 501, km 2.8, Bo. Magueyes, Ponce | 3,340 | March 2002 | AMP |
| Serrallés | Road 511, km 2.5, Bo. Real, Ponce | 2,000 | April 2003 | AMP |
| Matilde Mandry | Road 2 km 255.2, Ponce | 4,000 | June 2001 | AMP |
| Angola PRC | Road 132, km 2.0, La Cotorra sector, Cañas Ward, Ponce | 2,000 | March 2002 | AMP |
| Martinó | Road 14, km 5.4, Cerrillos Ward, Ponce | 1,200 | December 2003 | AMP |
| Canarico | Road 552, km 0.7, Guayabal Ward, Juana Díaz | 5,000 | May 2002 | DNER |
| La Rita | Road 14, km 7.0, Cerrillos Ward, Ponce | 2,000 | May 2002 | DNER |
| Peñuelas Valley Landfill | Road 385, km 4.5, Tallaboa Saliente Ward, Peñuelas | 1,000 | June 2001 | DNER |
| Angola PRC | Road 500, km 2.0, Cañas Ward, Ponce | 2,000 | September 2001 | DNER |
| PR Cement | Road 10, km 8.0, Maraguez Ward, Ponce | 3,340 | July 2002 | DNER |
| Naranja | Road 555, km 2.7, Tijeras Ward, Juana Díaz | 3,000 | (Renovation requested) | DNER |

Source: Autonomous Municipality of Ponce (2001); Dept. of Natural and Environmental Resources (2001)



Coordinates in State Plane NAD 27

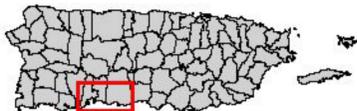


Figure 4-1 Authorized Quarries in the Transshipment Port Complex Region

Port of the Americas



4.2.4 Ground Water Resources

Significant impacts that are associated to ground-water resources need to meet the following criteria:

- Substantially degrade ground-water quality;
- Contaminate a public water supply; or
- Substantially deplete ground-water resources;
- Substantially interfere with ground-water recharge.

The aforementioned criteria are discussed in the following paragraphs, with regards to the Project Alternatives.

4.2.4.1 No-Action Alternative

There would be no impacts on the groundwater resources of the area under the No-Action Alternative.

4.2.4.2 Guayanilla-Peñuelas Alternative

Groundwater resources in the Guayanilla-Peñuelas area have been previously impacted because of several reasons. Most of the groundwater resources in the Guayanilla-Peñuelas area have been severely impacted by a variety of pollutants, particularly petroleum products and other organic compounds as result of accidental spills and decades of poor environmental management practices from industrial entities that once comprised the Peñuelas petrochemical complex, now abandoned. Additionally the area of Guayanilla-Peñuelas has been affected by an increase in the intrusion of saline water from the sea. This phenomenon has adversely affected the fresh water supply of deep wells located to the south of State Road PR-127 and to the east and west of the Río Tallaboa.

The Project proposes the development of segments of the parcel formerly occupied by UCC for value-added activities. Portions of this property are currently being cleaned and monitored by UCC under EPA's supervision. This clean up effort includes the removal of hydrocarbons and other petrochemical products from the soil and groundwater deposits.

The Project would not contribute to the degradation of the groundwater quality or the contamination of a public water supply.

- The Project would not interfere with ongoing groundwater restoration efforts in Guayanilla-Peñuelas, neither through the normal attenuation process, nor through corrective actions currently being undertaken. In fact, the AFI-sponsored inclusion of the UCC property in EPA's RCRA Brownfields Program (RCRA) will promote rehabilitation of these lands and insure that the Project is developed consistent with the need to restore and improve the environmental setting of these areas, including the groundwater resources.
- A Spill Prevention Control and Countermeasures Plan (SPCCP) would be designed and implemented in the Guayanilla-Peñuelas site to avoid improper handling of oil products during construction and operation that would potentially result in additional impacts to ground water resources. Oil is defined as petroleum products, including gasoline, kerosene, jet fuel, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged soil. The SPCCP is

designed to help prevent the discharge of oil. The SPCCP should contain a spill contingency plan. Such plan addresses responsibilities and procedures for containing and cleaning up spills.

- Management measures would be implemented taking into account the best management practices applicable to construction and operation of port facilities. Maintenance and refueling of construction equipment would take place on special designated areas and fuels will be stored in areas provided with secondary containment to reduce the risk of spills. Similarly, construction equipment will be stored in a designated area when not in use.

Extraction of water from wells have been considered among several alternatives considered to supply potable water to the PTA, without affecting the existing water distribution, as discussed in Section 4.20.1. A potential alternative to provide potable water to the Guayanilla-Peñuelas Project site is the activation of existing water wells that locate north of the Guayanilla-Peñuelas industrial complex, beyond Road PR-2, as discussed in Section 3.11.2.

A conservative approach on water extraction from wells would be applied, according to water resources planning basics. Yield tests would be conducted on potential wells to establish the amount of water that could be extracted at a sustainable rate and without negatively affecting the groundwater resource. Monitoring wells would be installed to preserve the water quality from saltwater intrusion. Water quality would be monitored periodically to evaluate water quality parameters and potential changes on water salinity.

The Project would not interfere with ground-water recharge. In Guayanilla, a significant portion of the recharge to the saturated limestone occurs to the north of the bay, in the limestone hills that enclose the Tallaboa Basin, at a distance of 2 to 5 miles (3.2 to 8.0 kilometers) north of the project area.

The PTA may represent an a positive impact on the ground water quality in the Guayanilla-Peñuelas area associated to the potential alternative of constructing a state of the art wastewater treatment plant in the Guayanilla-Peñuelas project site. Treated effluent from this plant could be pumped to recharge the south coastal aquifer, which currently is affected by saltwater intrusion in the lower reaches.

4.2.4.3 Ponce Alternative

The coastal area of Ponce is also affected by an increase in the intrusion of saline water from the sea. This phenomenon has adversely affected the fresh water well supplies.

The Project would not contribute to the degradation of the groundwater quality or the contamination of a public water supply. Similar practices would be implemented in the Ponce site.

- A Spill Prevention Control and Countermeasures Plan (SPCCP) would be designed and implemented in the Ponce site to avoid improper handling of oil products during construction and operation that would potentially impact ground water resources.
- Management measures would be implemented taking into account the best management practices applicable to construction and operation of port facilities.

Extraction of water from wells has not been considered among the alternatives considered to supply potable water to the PTA in Ponce.

The Project would not interfere with ground-water recharge. In the Ponce area, a significant portion of the recharge to the saturated limestone occurs to the north of the Ponce Bay in the limestone mountains that border the basins of the Río Portugués, Río Bucaná and Río Inabón, at a distance of approximately 3 to 5 miles (4.8 to 8 kilometers) north of the Project area.

4.2.4.4 Applicant's Preferred Alternative

The impacts of the Applicant's Preferred Alternative with regards to the groundwater resources are a combination of the impacts discussed for the Guayanilla-Peñuelas and Ponce Alternatives, discussed in the previous two sections. Refer to the corresponding sections.

4.2.5 Urban Quality

Urban quality can comprise a wide array of issues ranging from economic aspects to aesthetics. The Federal Government has developed public policies to promote livable communities. This concept is defined as places where families enjoy sustainable prosperity, personal freedom, a strong sense of community and a high standard of living. This initiative includes topics such as the revitalization of existing communities, improvement of public health and quality of life, provision of transportation alternatives, public school improvement, expansion of economic opportunities, increased public security, crime prevention, and the protection of open spaces and land with high agricultural potential. The reclaim of land through the EPA's Brownfield program has been identified as a tool to promote the livable communities concept. These lands would be productively reused, helping to stimulate private investments on industries that create jobs, and open spaces that improve neighborhoods, among many. This tool also helps to improve and maintain the economy through the reuse of impacted land instead of the development of virgin areas.

- The site proposed for the PTA project in Guayanilla-Peñuelas, as well as its surroundings, has been historically used for industrial and port purposes. This land does not represent a resource that is currently in use by nearby communities. For this reason, the proposed Project would not affect the urban surroundings of the Guayanilla-Peñuelas project site.
- At the present time, neither the area that was once occupied by UCC nor most of the other entities that operated in the petrochemical complex, except for CORCO (adjacent to UCC) are currently operating. The closure of these industries caused the elimination of jobs, the reduction of economic activities and the existence of abandoned buildings in the area. The proposed Project represents an important opportunity to revitalize the area not only because of the direct and indirect economic activity that the Project would generate, but also because of the land rehabilitation initiative proposed as part of the EPA's Brownfield program.
- The project site at Ponce, and most of its surroundings, has been historically used for industrial and port purposes. There is a residential area, Villa del Carmen, immediately east to the Project site at Ponce.
- The construction and operation activities of the PTA at Guayanilla-Peñuelas and Ponce would not require the relocation of people or communities. The lands that would be used for the project are currently been used for industrial and port purposes.
- Significant urban development in the project area is not expected as a result of the PTA. The current unemployment rate in the study area (Ponce, Peñuelas,

Guayanilla, Yauco, Juana Díaz, Santa Isabel and Guánica) is considerable (approximately 13%). It is foreseen that residents of these areas would occupy projected PTA employment positions. However, the development of new commercial facilities and the improvement of existing ones is expected due to increase in economic activity associated to the PTA.

Based on the field studies included in this document, it is not expected that the Project would affect the urban quality. The proposed site is a resource that is not been currently used directly by any community. A portion of the project site consists of an open area that will be used to locate the value-added industries. The wetland area located at the southern part of the site will be preserved. Originally, it was considered to use this land as value-added areas, but it was finally decided to maintain the ecologic integrity of the area as a natural element of the Project, with the potential to be restored as a mitigation measure. As indicated on Section 4.21, the data from the Noise Study shows that the expected noise levels at the land adjacent to the Ponce site would not exceed the standards established by the EQB. Providing landscaping measures at the eastern end of the property would mitigate the impacts on the visual environment. The proposed Project represents an important opportunity to promote direct and indirect economic activity.

4.2.6 Public Safety

The operation phase of the Project would not represent a risk to public safety. It is expected that some of the vessels arriving the proposed transshipment port, in addition to unloading their cargo, will have to refuel, posing a potential risk for a fuel spill, in water or on land. In order to avoid this situation, the following measures would be taken:

- Personnel from the port, as well as from ships, will monitor the refueling flow rate, inspect the hoses and connections, and verify the fuel levels in the fuel tanks.
- Should a spill occurs in open sea, personnel from the port would be prepared to respond with spill-containing equipment, such as absorbent barriers to avoid the spreading of the spill, and mechanical equipment to remove the oil layer from the water surface. The Coast Guard, the National Response Center, the DNER and EQB would be notified immediately.
- Should the spill occurs on land, the fuel refueling area would be provided with containment dikes to hold spills and avoid its spreading. EQB, DNER, EPA and the National Response Center would be notified immediately.
- It is anticipated that the ships arriving at the PTA would transport mainly articles such as electronic devices, computer parts, vehicles, food to be processed and packed, medications, heavy equipment, etc. This cargo would be moved to warehouses or to value-added facilities. The arrival of vessels transporting explosives, reactive or flammable materials is not anticipated. For this reason, it is expected that the probabilities of cargo vessel accident that would affect the public safety are practically null. However, port employees would be adequately prepared and trained to respond to accidents that may occur at the port and to coordinate an emergency response with the corresponding agencies. Emergency plans would be developed and adopted by the organizations in charge of the operation of the ports.
- Access to the port and value-added areas would be controlled to allow access only to authorized personnel and visitors.

Even though the operation of the proposed port at the Guayanilla Bay is not anticipated as representing a public safety risk, the proximity of the new pier and docks to the EcoEléctrica pier would require the implementation of additional safety measures to ensure public safety. The operation of EcoEléctrica involves the use of LNG, which is transported by vessel to this facility. The transfer of this highly volatile fuel, in its gaseous state, has to be conducted under strict management parameters to ensure the safety of on-board personnel and port employees, as well as inland neighbors. USCG regulations would determine the proposed port operation during these events.

The Final EIS (FEIS) prepared for the development of EcoEléctrica power plant (EcoEléctrica, 1996), anticipated that the operation of this facility would have a minimum impact on the traffic in Guayanilla Bay, or in other operations associated in the Guayanilla-Peñuelas bays. Among the safety measures that EcoEléctrica implements for the arrival of LNG vessels are:

- The personnel of each vessel will communicate with the Coast Guard, EcoEléctrica, agents, pilots and other authorized personnel at 72, 48 and 24 hours before its arrival to the pier. This notification will include a certification that the safety equipment for the transfer of LNG is adequately functioning.
- Other safety requirements will be completed, such as Coast Guard pre-inspection. Prior to the vessels arriving at the Guayanilla Bay.
- After the ships arrives at the pier, other safety requirements will be completed before the LNG transfer, such as the inspection of the Coast Guard, verification of the ship-to-port communication system and vice versa.

On April 27, 2001 the Coast Guard amended Section 3, Part 165 of the Code of Federal Regulations (33 CFR Part 165) to include the procedures that will be required for LNG cargo vessels docking at the EcoEléctrica pier, as well as restrictions for the facilities adjacent to this port during transfers of LNG.

The new procedures include the definition of two safety zones, a fixed one and a moving one:

- The moving safety zone defines a radius of 100 yards around the LNG cargo vessel while transiting north of Latitude 17 degrees 56.0 N on approach to or departure from the EcoEléctrica waterfront facility in Guayanilla Bay. This moving safety zone remains in effect until the LNG vessel is alongside the EcoEléctrica waterfront facility in Guayanilla Bay or south of Latitude 17 degrees 56.0 N.
- The fixed safety zone is established in the waters within 150 feet of a LNG vessel when the vessel is moored at the EcoEléctrica waterfront facility. This Safety Zone remains in effect while the LNG vessel is docked at the facility with product aboard or while the vessel is transferring liquefied natural gas.

Also, as a result of the September 11, 2001 attacks, the USCG has established a new measure where vessels have to give a 96-hours advance notice before arriving to port. The Coast Guard Safety Office in San Juan would be responsible for public information and would issue maritime information broadcasts or notifications to the public that specify for which periods the safety zones would be in effect.

It is anticipated that these operations would not impact the operation of the PTA at the Guayanilla Bay, since the maritime traffic in the area would not be hindered because of the

arrival of LNG vessels. However, additional safety measures would be implemented during the transfer of LNG and coordinated with EcoEléctrica once operations of the PTA are in effect to ensure the safety of on-board personnel and port employees, as well as to inland neighbors. Currently, at the Port of Ponce safety measures for the marine traffic are being implemented.

4.2.7 Scientific Resources

Although the marine environment comprised by Guayanilla and Tallaboa bays has undergone extensive scientific research, the area has not been officially recognized as a scientific resource. The industrial nature of the adjacent properties has prompted numerous oceanographic studies through the years, mainly directed at describing the physical, chemical and biological characteristics of both bays, as well as the monitoring of specific parameters as a requirement of government issued permits or authorizations. Scientific resources consist of areas that have received special designations because of their natural characteristics, where academic or applied scientific research is conducted on a routine basis, and whose results are helpful to managers and public administrators in their decision-making process. The closest scientific resources to the Project, including the Port of Ponce, are the Guánica State Forest, east of Guayanilla, Caja de Muertos Natural Reserve, south of Ponce and the Jobos Bay National Estuarine Research Reserve in Salinas. None of these designated areas would be impacted in any way by the development of the proposed action.

4.3 Fish and Wildlife Resources

This section analyzes the potential impacts of the Project on the aquatic and terrestrial flora and fauna resources in the proposed sites, vicinity and the prospective sites where fill material would be extracted for the Guayanilla-Peñuelas reclamation area. Potential impacts to wetlands are discussed in a separate section.

4.3.1 Terrestrial Flora

The main impact on the terrestrial flora would be the removal of the vegetation from the areas designated for the construction of elements of the Project. Any unavoidable direct impacts on the vegetation would be compensated by reforestation and restoration, or creation of new habitats, as determined by the regulatory agencies responsible for the approval of the permits required for the Project.

4.3.1.1 No-Action Alternative

The No-Action Alternative would not result in the elimination of any vegetation at the Project sites, vicinity, nor at the proposed fill material extraction sites. As previously indicated, most of the areas proposed for the Project were disturbed by prior and current industrial activities. The existing vegetation that survived these industrial developments is now recovering its vitality and diversity, as evidenced by the presence of early secondary stages of growth. This is common in disturbed areas, where the vegetation spreads quickly, adapting under stressful circumstances.

Also, undisturbed areas of ecological value such as the wetlands identified for reclamation at the Guayanilla-Peñuelas component would not be subject to fill or impacts of any sort. Under this alternative, the vegetation within the proposed sites would continue their recovery process at the present rate.

4.3.1.2 Guayanilla-Peñuelas Alternative

The principal potential environmental impact on the terrestrial flora in the Guayanilla-Peñuelas area would result from the removal of the limited existent vegetation at the areas within the UCC parcel proposed for value-added activities, the potential fill of about 12 acres of mangrove wetlands at Punta Guayanilla, and the extraction of fill material at a separate location for the reclamation activities scheduled for the northern portion of Punta Guayanilla.

In the Guayanilla-Peñuelas area, the flora subject to potential removal consists mostly of coastal vegetation, including mangrove trees, and thorny pasture-shrub vegetation. The coastal vegetation at Punta Guayanilla consists of secondary coastal forests and wetlands. This vegetation is typical of the southwest coastal region that has been disturbed by industrial activities during several decades.

Regarding the proposed extraction of fill material from nearby quarries, the Applicant is committed to employ fill material extracted from areas already impacted at quarries already in operation and in compliance with the applicable local and federal regulations.

With the exception of wetlands, this vegetation has limited ecological value from its functional perspective, and its value, as wildlife habitat, is marginal. Within the UCC parcel, most of the vegetation was already removed while the petrochemical complex was built or operated.

However, three (3) species of plants considered as critical elements by DNER have been identified in this area and may potentially be impacted, if preventive measures are not implemented: These species are: Holywood lignum vitae (*Guaiaecum sanctum*), Escoba babosa (*Bastardia bivalvis*), and Gray nicker (*Caesalpinia bonduc*). The first two species were located at the eastern portion of the UCC site, which is not scheduled for development. *C. bonduc* was identified along the southern coast of Punta Guayanilla, and it is not likely to be impacted by the infrastructure development or construction activities of the Project.

Nevertheless, any plant species categorized as critical elements by the DNER Natural Heritage program would be treated in a special way to prevent any impacts from the construction activities. One potential prevention measure would be the installation of temporary barriers to limit the impact area, to minimize the contact between the construction works and the critical elements, as well as the relocation of individuals when impacts are unavoidable.

Removal of any trees would be limited to the absolute minimum. Any removal of trees would be in compliance with the Puerto Rico Planning Board Regulation Number 25 (1999), which regulates the removal of trees. Before construction of the elements of the Project begins, a detailed survey of the trees in the area would be completed, and a reforestation plan would be prepared in coordination with the DNER, to mitigate impacts and to comply with the permit requirements established under Regulation Number 25.

4.3.1.3 Ponce Alternative

As with the Guayanilla-Peñuelas alternative, development of the key elements of the PTA only in the Port of Ponce area requires the removal of the vegetation cover during construction, particularly in most of the approximately 132 acres proposed for value-added activities.

In the Port of Ponce area, the vegetation consists of species typical of impacted areas and secondary coastal forests. There are approximately 60 acres of jurisdictional wetlands within the study area in Ponce. However, it is not expected that the development of the Project would require partial or complete filling of the wetlands located within the Project's area.

No critical plant species were identified. Therefore, removal of the vegetation in the areas for development would not result in an environmental impact to the already identified critical elements in the area.

As with the Guayanilla-Peñuelas alternative, removal of any trees would be limited and would adhere to the Puerto Rico Planning Board Regulation Number 25 (1999).

4.3.1.4 Applicant's Preferred Alternative

The impacts of this alternative on terrestrial flora would be a combination of the impacts associated to the Guayanilla-Peñuelas and the Ponce components, as discussed above.

4.3.2 Aquatic Flora

4.3.2.1 No-Action Alternative

Under the No-Action alternative, construction of the piers would not happen. Dredging of the Ponce Harbor to a depth of 45 feet would not be executed and neither would the placement of fill in the 110-acre lot in Guayanilla Bay.

Elimination, alteration, or fragmentation of habitats as a consequence of the proposed fill and dredging would not occur. No adverse effects from these activities, and the increases in water column turbidity due to construction, would impact the benthic communities in both Ponce and Guayanilla. The coastline mangroves in the vicinity of the Guayanilla Bay would also be left untouched.

4.3.2.2 Guayanilla-Peñuelas Alternative

The main impact on the aquatic flora in the Guayanilla Bay would result from the placement of fill material during the reclamation of submerged land, which includes approximately 12 acres of wetlands, for the construction of the docks and staging areas at the port. For a detailed discussion of the impacts to wetlands, refer to Section 4.8.

Dispersed patches of seagrasses (approximately 12 acres) occur within the 110 acres of submerged land planned for reclamation and for the construction of the proposed pier in Guayanilla Bay (Appendix BB). The impact over the sparse aquatic flora in this area would be permanent and unavoidable.

Direct effects on the aquatic flora would result from the elimination, alteration, or fragmentation of habitats as a consequence of the proposed fill. However, in a benthic survey recently performed in the study area it was observed that the distribution of the seagrass beds (*Thalassia testudinum*, *Halodule wrightii*, and *Halophila decipens*) was generally scattered, and the fauna associated to them was scarce (Vicente, 2000; García, 2002) (Appendix H and CC). The study suggests, "*this is probably due to the industrial nature of the site and to the poor water quality conditions*".

It is expected that any adverse effects would be mitigated with habitat restoration and/or creation. The mitigation of the direct and indirect impacts on these systems, and any adverse effect from the loss of fish habitats and Manatee feeding grounds, would be required and are addressed in Section 4.5. Nevertheless, potential mitigation measures are discussed in general terms in this section.

The conceptual design of the Project is directed to avoid, as much as possible, impacts to the most sensitive areas, in compliance with Section 404(b)(1) of the CWA. The design of the

Project includes avoidance as much as possible of impacts to habitats, either because they would be minimized, or because of the implementation of mitigation plans in coordination with the USACE and National Marine Fisheries Service (NMFS). As an example of this strategy, the proposed fill would avoid the area around Cayo Mata and most of the west side of Punta Guayanilla, where seagrass beds and mangroves are more robust.

- Any increase in the water turbidity that results from the construction would reduce temporarily the productivity of nearby seagrass beds; however, these impacts are temporary and these systems will recover once the construction is completed. Compensation of the net loss of seagrass beds would be utilized as a mitigation measure. Individuals from the seagrass beds in the fill areas can be relocated to other existing seagrass beds in shallow waters near the Project.
- The turbidity and sedimentation that would be generated as a result of the construction of the Project would be minimized by the use of techniques such as the installation of piles, instead of dredging. In addition, curtains would be used against turbidity, and sheet pilings would be installed prior to the filling activities.
- Impacts to mangroves that cannot be avoided or minimized would be mitigated through restoration and/or creation of mangrove. Wetlands potential mitigation strategies include, among others, the restoration and creation of these mangrove areas, and would favor the establishment of species that prefer this type of habitat.

Potential mitigation strategies include creation and restoration or enhancement of wetlands habitats in the coastal corridor between Punta Verraco and Ponce Harbor. Refer to Section 4.8 for details on these potential strategies.

4.3.2.3 Ponce Alternative

In the Ponce Bay, the Project does not include reclamation of submerged lands, and fill is not contemplated. Therefore, impacts associated to fill operations are not expected. However, the dredging activities planned on the navigation channel would impact bottom habitats. Bottom sediments, along with the associated aquatic flora, would be removed permanently as a result of the dredging operation.

Sediments would also be re-suspended as a result of dredging activities. Increases in the water turbidity resulting from dredging activities would reduce temporarily the productivity of nearby seagrass beds; nevertheless, these impacts are temporary and these systems would recover once the construction is completed. In addition, increases of turbidity in the water column induced by the dredging operation would be minimized by the use of techniques such as sediment curtains.

The proposed modifications to the docks and extension of the piers would take place in shallow waters previously impacted. No corals, seagrass or marine communities are present in these shallow areas. Transient fish occur in the area, which may be temporarily impacted by the proposed construction.

Since the sea bottom of the navigation channel is already devoid of significant marine communities and this area has already been impacted by the previous dredging activity, the associated impacts to marine communities would be temporary and minimal. There should be no net long-term adverse impact to aquatic flora in the Ponce Bay.

Mitigation of any adverse impacts from dredging on the ecosystems of the Ponce Bay would be considered in the Management Plan required as part of the Sections 103 and 404 USACE permit application for the for the site. These mitigation plans would be designed according to USACE policies, including consultations with other Federal agencies such as EPA and NMFS. Filling or dredging of wetlands is not planned as part of the improvements and expansion to the Port of Ponce, including the development of areas for value-added activities. Therefore, no mitigation for potentially impacted wetlands is required.

4.3.2.4 Applicant's Preferred Alternative

Impacts associated to the Applicant's Preferred Alternative on Aquatic Flora are a combination of the impacts associated to the Guayanilla-Peñuelas and Ponce alternatives, described in the previous sections.

4.3.3 Terrestrial Fauna

The potential impacts over the terrestrial fauna would result primarily from the construction activities, including the fill of marine bottoms and wetlands, and from soil movement. These potential impacts would result in the elimination, alteration or fragmentation of habitats, and the potential migration of some individuals to nearby areas.

Impacts on threatened and endangered species are considered in Section 4.6.

4.3.3.1 No-Action Alternative

The No-Action Alternative implies that there would not be any alteration or impacts to the fauna present within the proposed sites. The animal species now present would continue using the habitats within the sites.

4.3.3.2 Guayanilla-Peñuelas Alternative

Prior and current industrial developments near the Guayanilla-Peñuelas area have already disturbed the terrestrial animal population habitats of the zone.

The fill of marine bottoms, which include approximately 12 acres of fringe mangroves and associated salt flats, and construction of the dock and the parking area in Punta Guayanilla, would permanently eliminate part of the habitat for some of these species. Similarly, development of the areas for added-value activities would result in the permanent loss of resting, feeding and nesting areas of other species. Although these impacts would be permanent, the continued existence of the affected species would be a priority of AFI and all potential mitigation efforts would be implemented to comply with this commitment.

Birds comprise the majority of the animal species observed in Guayanilla-Peñuelas areas proposed for the Project (Appendix J).

No impacts to the endangered Puerto Rican Nightjar are expected associated to the extraction of earth material from existing quarries to fill the shallow marine bottom adjoining Punta Gotay. To ensure this, AFI would not accept any fill material that may have been extracted from potential Puerto Rican Nightjar habitat.

It is not anticipated that the Project would change, modify or interfere with the free movement of migrating bird species.

After completion of the construction phase, birds would not suffer any additional disturbances. The docks would serve as resting areas for many of the birds, particularly seagulls, and terns.

Similarly, the open areas that currently exist in and out of the perimeter of the Project would remain essentially undisturbed, thus maintaining the existing habitats. Additional habitats for aquatic birds would be created through the design of the infrastructure for the collection of storm waters within the Project, which would include retention lagoons that can serve as habitats for certain species.

The impacts to terrestrial fauna, composed of amphibious, reptiles, and mammals would be temporary during the construction phase. Some of these animals would migrate to nearby areas as result of alterations to their habitat. This effect is expected only for common species, which could colonize the habitats within the Project areas once the construction is completed.

4.3.3.3 Ponce Alternative

Prior and current industrial developments near the Ponce Bay area have already disturbed the terrestrial animal population habitats of the zone.

Birds also are the predominant species in the area (Appendix J), although some reptiles and mammals were observed. The nesting areas of the birds extend inland away from the areas considered for the Project. Development of the areas for value-added activities would result in the permanent loss of roosting, feeding and nesting areas for some of the birds, reptiles and mammals. These impacts would not change the existing population structures or affect the local diversity of species, or interfere with their survival, growth or reproduction.

It is not anticipated that the Project would change, modify or interfere with the free movement of migrating bird species.

After completion of the construction phase, birds would not suffer any additional disturbances. The docks would serve as resting areas for many of the birds, particularly seagulls, and terns. Similarly, the open areas that currently exist in and out of the perimeter of the Project would remain essentially undisturbed, thus maintaining the existing habitats. Additional habitats for aquatic birds would be created through the design of the infrastructure for the collection of storm waters within the Project, which would include retention lagoons that can serve as habitats for certain species.

The impacts to terrestrial fauna, composed of amphibious, reptiles, and mammals would be temporary during the construction phase. Some of these animals would migrate to nearby areas as result of alterations to their habitat. This effect is expected only for common species, which could colonize the habitats within the Project areas once the construction is completed.

4.3.3.4 Applicant's Preferred Alternative

Impacts associated to the Applicant's Preferred Alternative on Terrestrial Fauna are a combination of the impacts associated to the Guayanilla-Peñuelas and Ponce alternatives, described in the previous sections.

4.3.4 Aquatic Fauna

4.3.4.1 No-Action Alternative

Under the No-Action alternative, construction of the piers would not happen. Dredging of the Ponce Harbor to a depth of 45 feet would not be executed and neither would the placement of fill in the 110-acre lot in Guayanilla Bay.

Elimination, alteration, or fragmentation of habitats as a consequence of the proposed fill and dredging would not occur. No adverse effects from these activities, and the increases in water column turbidity due to construction, would impact the sparse benthic communities in both Ponce and Guayanilla.

4.3.4.2 Guayanilla-Peñuelas Alternative

The main impact on the aquatic fauna in the Guayanilla Bay would result from the placement of fill material during the reclamation of submerged land, for the construction of the docks and staging areas at the port.

The impact over the aquatic fauna present in this area would be permanent and unavoidable. Direct effects on the aquatic fauna would result from the elimination, alteration, or fragmentation of habitats as a consequence of the proposed fill. The area proposed for fill would be permanently unavailable for pelagic fish.

However, according to surveys at Guayanilla Bay, the aquatic fauna associated with the seafloor at the site, especially within the seagrasses, is not as diverse as similar marine systems in Puerto Rico, and benthic shellfish are scarce (Vicente, 2000; García, 2002).

It is expected that any adverse effects would be mitigated with habitat restoration and/or creation. The mitigation of the direct and indirect impacts on these systems, and any adverse effect from the loss of fish habitats, would be required and are addressed in Section 4.5. Nevertheless, potential mitigation measures are discussed in general terms in this section.

The conceptual design of the Project must be directed to avoid, as much as possible, impacts to the most sensitive areas, in compliance with Section 404(b)(1) of the CWA. Unavoidable impacts would be compensated by the implementation of a proposed mitigation plan submitted to the resource agencies. As an example of this strategy, the proposed fill would avoid the area around Cayo Mata and most of the shallow benthic habitat near Punta Gotay.

Potential mitigation strategies include creation, restoration or enhancement of aquatic habitats in the coastal corridor between Punta Verraco and Ponce Harbor.

The construction of the Project has the potential to cause erosion of soils in the areas proposed for development. These increases in erosion potential would occur as follows:

- Lands planned for development of access roads and storage of containers in the Guayanilla Peninsula would be disturbed during construction.
- The material used for reclaiming the submerged lands near Punta Gotay would be exposed to erosion from wind and rain after its initial deposition.
- The segments of the parcel occupied by UCC in Peñuelas, and planned for value-added activities, would be stripped of soil cover during construction, turning them prone to erosion associated to the wind and stormwater runoff.

Any eroded soils would be transported downstream towards the coast if erosion and sediment control measures are not implemented. Potentially, these sediments would cover sizable areas of the bays inhabited by marine benthic communities, therefore affecting their structure. The wetland ecosystems, which are a preferred habitat of aquatic birds on the many coastal areas of the Project, would also be affected by increased sedimentation if appropriate measures are not taken. However, these effects of sedimentation would be minimized if mitigation and protection measures are taken to avoid them.

Implementation of soil stabilization techniques during the construction period would be important to control the effects of erosion. This would help to minimize the flow of sediments towards rivers and wetlands in the areas that are frequently visited by aquatic birds. The measures to reduce the erosion and sedimentation associated to the construction of the Project would be outlined in the Erosion Control Plan for the proposed project.

Construction-related turbidity, sedimentation and dissolved oxygen impacts would be temporary, with conditions returning to pre-project values shortly after pier construction.

4.3.4.3 Ponce Alternative

In the Ponce Bay, the Project does not include reclamation of submerged lands, and fill is not contemplated. Therefore, impacts associated to fill operations are not expected. However, the dredging activities planned on the navigation channel would impact bottom habitats. Bottom sediments, along with the associated aquatic fauna, would be removed permanently as a result of the dredging operation.

However, the investigations of the benthic communities in the harbor and navigation channel (Appendix I) show a low diversity of species and minimal structural complexity. These areas are devoid of vegetation and/or coral reef assemblages. The sea bottom consists of sticky mud and no seagrasses, and their associated fauna, are present. The bottom sediments in the navigation channel and the inner harbor are subject to constant re-suspension caused by maneuvering of vessels and tugboats.

Impacts of dredging on the aquatic fauna in Ponce would be temporary. Dredging would take place only after a Section 103 Permit is secured from the USACE after a Site Management and Monitoring Plan for disposal of the sediments at the authorized marine disposal area is approved by the EPA.

The proposed modifications to the docks and extension of the piers would take place in shallow waters previously impacted. In these shallow areas, there are no corals, seagrass or marine communities. Transient fish occur in the area, which may be temporarily impacted by the proposed construction.

Impacts to pelagic communities are considered temporary. Species movement would resume to its normal state once construction and dredging activities are completed.

The construction of the Project has the potential to cause erosion of soils in the areas proposed for development. Any eroded soils would be transported downstream towards the coast if erosion and sediment control measures were not implemented. Potentially, these sediments would cover sizable areas of the bays inhabited by marine benthic communities, therefore affecting their structure. However, these effects of sedimentation would be minimized if mitigation and protection measures are taken to avoid them.

Implementation of soil stabilization techniques during the construction period would be important to control the effects of erosion. This would help to minimize the flow of sediments towards rivers and wetlands in the areas that are frequently visited by aquatic birds. The measures to reduce the erosion and sedimentation associated to the construction of the Project would be outlined in the Erosion Control Plan for the proposed project.

Construction-related turbidity, sedimentation and dissolved oxygen impacts would be temporary, with conditions returning to pre-project values shortly after pier construction.

4.3.4.4 Applicant's Preferred Alternative

Impacts associated to the Applicant's Preferred Alternative on Aquatic Fauna are a combination of the impacts associated to the Guayanilla-Peñuelas and Ponce alternatives, described in the previous sections.

4.4 Marine Resources and Special Aquatic Sites

Potential impacts to marine habitats were determined for the following: muddy bottoms, seagrass beds, coral reefs, shelf-edge, water column and mangroves. Please refer to Appendix G, I, BB, and CC for additional details on this issue.

A wide-area survey of the proposed project vicinity in Guayanilla was performed by Garcia (2002). The following table summarizes those benthic communities in the Guayanilla Bay vicinity that would be impacted by the proposed project.

Table 4-2: Benthic Communities Potentially Affected at the Guayanilla Bay Site

| Benthic Community | Area (acres) |
|-----------------------------|--------------|
| Sand | 7.5 |
| Coral reef | 0.0 |
| Coral rubble | 3.7 |
| Deep mud | 13.5 |
| Shallow mud | 72.7 |
| Mixed algae and mud | 19.8 |
| <i>Halodule wrightii</i> | 3.9 |
| <i>Halophila decipiens</i> | 1.6 |
| <i>Thalassia testudinum</i> | 6.4 |
| Total | 129.2 |

4.4.1 Muddy Bottoms

4.4.1.1 No-Action Alternative

Under a No-Action scenario the muddy bottoms that make up most of Guayanilla Bay portion proposed for the deposition of fill material and construction of the pier would not be affected. Therefore, no direct, indirect or cumulative impacts to marine ecosystems and marine conditions both at Guayanilla-Peñuelas and Ponce would remain as present.

4.4.1.2 Guayanilla-Peñuelas Alternative

The Project at Guayanilla-Peñuelas would impact approximately 106 acres of muddy bottoms (Appendix BB). Most of the impact would be associated to the filling of approximately 110 acres of seafloor and an additional area of approximately 19 acres of marine waters as a result of the construction of the proposed pier. Most organisms that would be impacted are burrowing invertebrates and small fish. Few finfish species use the muddy bottoms and only White Grunts and Snappers (*Lutjanus* spp.) are included in the managed species list of the Caribbean Fishery Management Council (CFMC). These species would lose a portion of their feeding grounds and would have to modify their natural behavior. Little or no vegetation is present at the muddy bottoms at Guayanilla Bay.

Re-suspension of sediments from the construction activities would temporarily affect these muddy bottoms and their inhabitants. These sediments are expected to settle down quickly, decreasing the degree of impact to this habitat (Garcia, 2002).

During operation, increased vessel traffic would potentially result in impacts to marine resources or special aquatic sites. Post-Panamax ship traffic through the navigation channels would disturb bottom sediments and increase water turbidity. Any significant increment in turbidity would reduce water transparency and productivity, and thus result in added stress to special aquatic ecosystems. However, according to the European Commission for Sustainable Development (2001), the relative contribution of ship traffic to turbidity levels is unknown. It is expected that any increase in turbidity associated with ship traffic in the PTA would be marginal, since ships would be traveling in deep navigation channels of over 53 feet in Guayanilla-Peñuelas.

To assess these scenarios, AFI and its consultants conducted two field tests to evaluate the condition of sediment re-suspension in Guayanilla Bay during the actual passage and docking of large vessels (García, 2002). The results of these tests show that re-suspension of sediments occurs during the passage and docking of large vessels in Guayanilla Bay. However, this re-suspension is mainly attributed to the tugboats assisting the vessels, rather than to the vessels themselves.

Test results showed an average background concentration of TSS of 32.5 mg/l within Guayanilla Bay. The highest concentration of TSS, 51.6 mg/l, was recorded at the ship's dock. The highest increase in the average concentration of TSS, 41.4 mg/l, was recorded two hours after the ship's passage. A general reduction trend in the concentration of TSS was observed four hours after the passage of the ship.

As a basis for comparison (using USGS data for Río Guayanilla at Central Rufina during the 1999 water year), records indicate turbidity values in that river ranging from as low as 0.42 NTU to as high as 130 NTU. This indicates that Guayanilla Bay is exposed to water discharges from the river at least as much as 43 times more turbid than the turbidity observed during the passage of the EcoEléctrica ship, at least during some parts of the year. Very turbid waters are of the order 400 to 450 NTUs. Similarly, TSS values in Guayanilla River ranged from less than 1 to 347. Hence, the load of suspended sediments from the river into Guayanilla Bay after a heavy rainfall could be as much as 7 times the load of re-suspended sediments produced by a passing ship. Total Suspended Solids of the order of 50 mg/l or less are considered very low.

Given the above, it is unlikely that the re-suspended sediments resulting from the anticipated ship traffic associated with the PTA would reduce water transparency to the point of significantly reducing seagrass primary productivity in Guayanilla Bay.

The environmental impacts from the construction of piers and container storage area at the Guayanilla and Ponce Bays, mainly due to increases in turbidity and the fill of 110 acres of marine habitat, would not have a cumulative impact on marine water quality, turbidity or re-suspension of sediments. Any increases in turbidity and re-suspension of sediments induced by the construction would be minimized using pile-driving techniques instead of dredging to install pilings. In the fill area at Guayanilla Bay, increases in turbidity and re-suspension of sediments would be minimized with the use of turbidity curtains and the previous installation of sheet piling.

4.4.1.3 Ponce Alternative

The seafloor at the Ponce Bay is composed of muddy bottoms (García, 2001). Few fish or other organisms are present in such areas. The proposed dredging would not only removed

part of the bottom, but it would also increase, although temporarily, the turbidity of the water. This habitat should recover in a short period of time, including the fish that usually hunt in these bottoms.

Nevertheless, a temporary loss of marine habitat associated with the navigation channel and turning basin would occur during the dredging operations, which would not only affect areas already impacted, but also additional sections of the Ponce Harbor turning basin not previously subjected to dredging. Once dredging is complete, this habitat would return to near normal conditions.

During operation, increased vessel traffic would potentially result in impacts to marine resources or special aquatic sites. Post-Panamax ship traffic through the navigation channel would disturb bottom sediments and increase water turbidity. Any increment in turbidity would reduce water transparency and productivity, and thus result in additional stress to benthic ecosystems. Field observations of the Ponce Harbor and navigation channel documented the re-suspension of sediments by tugboats as they assist large ships into port. In view of the absence of special aquatic sites in the immediate vicinity of Ponce Harbor, no adverse direct impacts to these special aquatic sites are anticipated as a result of the proposed project.

There are no other ongoing or foreseeable construction projects in the zone, and it is anticipated that no adverse cumulative impacts on special aquatic sites would result from the dredging of the navigation channel and the extension of the existing pier in Ponce, when combined with past, present or foreseeable future actions.

4.4.1.4 Applicant's Preferred Alternative

Impacts associated to the Applicant's Preferred Alternative on muddy bottoms are a combination of the impacts associated to the Guayanilla-Peñuelas and Ponce alternatives, described in the previous sections.

4.4.2 Seagrass Beds

4.4.2.1 No-Action Alternative

Under a No-Action scenario, the seagrasses, present in portions of the Guayanilla-Peñuelas project site, would not be affected. There would be no direct, indirect or cumulative impacts to marine ecosystems and marine conditions both at Guayanilla-Peñuelas and Ponce would remain as present.

4.4.2.2 Guayanilla-Peñuelas Alternative

The Project would result in the permanent loss of approximately 11.9 acres of seagrass habitat in the Guayanilla-Peñuelas site (6.4 acres of *Thalassia testudinum*; 3.9 acres of *Halodule wrightii*; and 1.6 acres of *Halophila decipiens*). The impacts to this habitat would be related to the filling of approximately 110 acres of seafloor and the construction of a pier, impacting approximately 19 acres.

Also, any increase in the water turbidity that results from the construction would reduce temporarily the productivity of nearby seagrass patches; however, these impacts are temporary and these systems would recover once the construction is completed.

The turbidity and sedimentation that would be generated as a result of the construction of the Project would be minimized by the use of techniques such as the installation of piles, instead of

dredging. In addition, curtains would be used against turbidity, and sheet pilings would be installed prior to the filling activities.

It is not anticipated that the construction of the pier would affect additional portions of seagrass patches in the Guayanilla Bay. The port would be built at a depth in excess of 45 feet. No seagrasses are expected to occur at this depth. Therefore the anticipated impacts associated with this activity are considered negligible.

Where possible, the location of all pilings within any seagrass patch would be marked and the seagrass removed and replanted at an appropriate site. Additional mitigation for the loss of seagrass habitat resulting from the proposed fill would be provided according to the recommendations of the resource agencies.

During operation, increased vessel traffic would potentially result in impacts to marine resources or special aquatic sites. Post-Panamax ship traffic through the navigation channels would disturb bottom sediments and increase water turbidity. Any significant increment in turbidity would reduce water transparency and productivity, and thus result in added stress to special aquatic ecosystems. However, according to the European Commission for Sustainable Development (2001), the relative contribution of ship traffic to turbidity levels is unknown. It is expected that any increase in turbidity associated with ship traffic in the PTA would be marginal, since ships would be traveling in deep navigation channels of over 53 feet in Guayanilla-Peñuelas.

To assess these scenarios, AFI and its consultants conducted two field tests to evaluate the condition of sediment re-suspension in Guayanilla Bay during the actual passage and docking of large vessels (García, 2002). The results of these tests show that re-suspension of sediments occurs during the passage and docking of large vessels in Guayanilla Bay. However, this re-suspension is mainly attributed to the tugboats assisting the vessels, rather than to the vessels themselves.

Test results showed a general reduction trend in the concentration of TSS was observed four hours after the passage of the ship.

As a basis for comparison (using USGS data for Río Guayanilla at Central Rufina during the 1999 water year), records indicate turbidity values in that river ranging from as low as 0.42 NTU to as high as 130 NTU. This indicates that Guayanilla Bay is exposed to water discharges from the river at least as much as 43 times more turbid than the turbidity observed during the passage of the EcoEléctrica ship, at least during some parts of the year. Very turbid waters are of the order 400 to 450 NTUs. Similarly, TSS values in Guayanilla River ranged from less than 1 to 347. Hence, the load of suspended sediments from the river into Guayanilla Bay after a heavy rainfall could be as much as 7 times the load of re-suspended sediments produced by a passing ship. Total Suspended Solids of the order of 50 mg/l or less are considered very low.

Given the above, it is unlikely that the re-suspended sediments resulting from the anticipated ship traffic associated with the PTA would reduce water transparency to the point of significantly reducing seagrass primary productivity in Guayanilla Bay.

The environmental impacts from the construction of piers and container storage area at the Guayanilla and Ponce Bays, mainly due to increases in turbidity and the fill of 110 acres of marine habitat, would not have a cumulative impact on marine water quality, turbidity or re-suspension of sediments. Any increases in turbidity and re-suspension of sediments induced by the construction would be minimized using pile-driving techniques instead of dredging to install

pilings. In the fill area at Guayanilla Bay, increases in turbidity and re-suspension of sediments would be minimized with the use of turbidity curtains and the previous installation of sheet piling.

Relative to the potential cumulative impacts of the Project on marine and coastal resources in Guayanilla, there is at this time only one foreseeable future coastal project, which has been proposed but not approved, whose operation would result in cumulative impacts when combined with those generated by the PTA. The WindMar Re project in Punta Verraco would have direct and permanent impacts on benthic communities, including seagrass beds, coral reefs and hardbottoms, resulting from the construction of new piers and the installation of offshore wind turbines. The severity of these impacts, which cannot be assessed at the moment, may or may not result in cumulative impacts. This project, however has only been introduced informally to the regulatory agencies and its schedule is unknown.

4.4.2.3 Ponce Alternative

At the Ponce site, the sea bottom consists of fine sticky mud completely devoid of vegetation or reef structures, including sea grasses (García, 2001). Therefore, no impacts are expected to this type of aquatic habitat.

Nevertheless, a temporary loss of marine habitat associated with the navigation channel and turning basin would occur during the dredging operations, which would not only affect areas already impacted, but also additional sections of the Ponce Harbor turning basin not previously subjected to dredging. Once dredging is complete, this habitat would return to near normal conditions.

During operation, increased vessel traffic would potentially result in impacts to marine resources or special aquatic sites. Post-Panamax ship traffic through the navigation channel would disturb bottom sediments and increase water turbidity. Any increment in turbidity would reduce water transparency and productivity, and thus result in additional stress to benthic ecosystems. Field observations of the Ponce Harbor and navigation channel documented the re-suspension of sediments by tugboats as they assist large ships into port. In view of the absence of special aquatic sites in the immediate vicinity of Ponce Harbor, no adverse direct impacts to these special aquatic sites are anticipated as a result of the proposed project.

There are no other ongoing or foreseeable construction projects in the zone, and it is anticipated that no adverse cumulative impacts on special aquatic sites would result from the dredging of the navigation channel and the extension of the existing pier in Ponce, when combined with past, present or foreseeable future actions.

4.4.2.4 Applicant's Preferred Alternative

Impacts associated to the Applicant's Preferred Alternative on Seagrass Beds are a combination of the impacts associated to the Guayanilla-Peñuelas and Ponce alternatives, described in the previous sections.

4.4.3 Coral Reefs

No coral reefs, identified in the Guayanilla-Peñuelas or Ponce project locations, are associated with the proposed fill and pier. Therefore, no impacts to this type of aquatic habitat are anticipated.

4.4.4 Shelf-edge

The shelf-edge of Guayanilla Bay or Ponce area would not be impacted by the Project.

4.4.5 Water Column

4.4.5.1 No-Action Alternative

Under a No-Action scenario, the water column of the Guayanilla and Ponce bays, would not be affected. There would be no direct, indirect or cumulative impacts to marine ecosystems and marine conditions both at Guayanilla and Ponce Bays would remain as present.

4.4.5.2 Guayanilla-Peñuelas Alternative

A section of the water column at Guayanilla Bay would be lost as a result of the fill of approximately 110 acres of seafloor. The filling activity would impact the connectivity between habitats, especially between Punta Gotay Cove and the rest of the Bay, not only by the addition of materials, but also by the re-suspension and increase in turbidity associated to the these activities. However, a study of the ocean currents within Guayanilla Bay concludes that the overall water flow through Guayanilla Bay would not change significantly with the new pier facilities (Scheffner et al., 2001).

4.4.5.3 Ponce Alternative

The main activity related to the Project in the Port of Ponce would be a proposed dredging of the existing navigation channel. This activity may increase the turbidity within the water column, as well as deter some of the fish from using their normal feeding areas (CFMC, 1998). It is expected that these fish species should reestablish their foraging patterns after the construction activities are finished.

4.4.5.4 Applicant's Preferred Alternative

Impacts associated to the Applicant's Preferred Alternative on the water column are a combination of the impacts associated to the Guayanilla-Peñuelas and Ponce alternatives, described in the previous sections.

4.4.6 Mangroves

4.4.6.1 No-Action Alternative

Under a No-Action scenario, the mangroves of the Guayanilla and Ponce Bays would not be affected. There would be no direct, indirect or cumulative impacts to marine ecosystems and marine conditions both at Guayanilla and Ponce Bays would remain as present.

4.4.6.2 Guayanilla-Peñuelas Alternative

The proposed fill would permanently impact approximately 12 acres of coastal mangroves. A proposed mangrove mitigation and restoration plan in the vicinity of the Project would replace some of the lost mangrove habitat and compensate for the direct impacts to this area.

4.4.6.3 Ponce Alternative

No mangrove areas should be affected by the project components in the Port of Ponce. Therefore, no impacts to this type of aquatic habitat are anticipated.

4.4.6.4 Applicant's Preferred Alternative

Impacts associated to the Applicant's Preferred Alternative on the mangroves are a combination of the impacts associated to the Guayanilla-Peñuelas and Ponce alternatives, described in the previous sections.

4.5 Essential Fish Habitat

Section 305 of the Magnuson-Stevens Fishery Conservation and Management Act (Act) requires the NMFS to coordinate with and provide information to other federal agencies on Essential Fish Habitat (EFH) defined in the Act as those waters and substrate necessary to the fish for spawning, breeding, feeding, or growth to maturity. According to the CFMC, in Puerto Rico and the US Caribbean, EFH includes virtually all marine waters and substrates from the shoreline to the seaward limit of the U.S. Exclusive Economic Zone (EEZ). Appendix DD presents an analysis of the impacts to the EFH.

4.5.1 No-Action Alternative

The No-Action alternative would not involve any dredging or filling activity. As previously indicated, the predominant marine habitat in the Project site at Guayanilla-Peñuelas is an anaerobic silty-clay (soft-muddy bottom), while at the Ponce Bay it is a muddy sea bottom. These marine conditions are partially the result of the port and industrial activities occurring in the two bays during several decades. No mangrove habitat would be affected under this alternative.

4.5.2 Guayanilla-Peñuelas Alternative

The proposed fill in Guayanilla Bay would impact about 129 acres of shallow sea floor, mainly consisting of soft muddy bottom habitat, and 12 acres of mangroves. This impact would be permanent and unavoidable and would adversely affect designated Essential Fish Habitat (EFH) for adult individuals *Haemulon plumieri* (White Grunt). Some snappers not included in the managed species also visit this habitat.

In general coral reefs and seagrasses can be considered as the most important EFH for adults and juveniles of the following managed species at Guayanilla Bay: Mutton Snapper (adults and juveniles); Schoolmaster (juveniles); Gray Snapper (adults and juveniles); Yellowtail Snapper (adults and juveniles); White Grunt (adults and juveniles); Banded Butterfly fish (adults); and Spiny Lobster (adults and juveniles). Coral reefs and seagrasses do not support eggs or larvae of any of the 15 managed finfish species (Table 3-1). However, seagrasses provide EFH to the Queen Conch in several of its life stages including eggs, adults, juveniles and spawners. All the managed finfish species present at Guayanilla Bay are known to spawn on coral reefs. The rich biodiversity documented in both habitats (and high importance as an EFH is a result of a relatively high productivity of the photosynthetic organisms in them. As it was mentioned before in this report, no coral reefs are found within the proposed fill area in Guayanilla Bay (Figure 3-1).

The water column has been identified as EFH for the planktonic life stages of all of the 15 managed finfish species identified by the CFMC (1998). Eggs and planktonic larvae are driven by currents and dispersed through the water column. A high diversity of drifting eggs and larvae can be found associated to the shelf-edge of the marine platform. García et al. (1996) identified larvae from 81 fish families, mostly near the shelf-edge. Larvae of Engraulidae, Clupeidae, Gobiidae, and blennies of the families Bleniidae, Clinidae and Tripteriidae dominated these samples. Except for general descriptions, there is little information on the distribution of eggs and the development of larvae, or information on the settling of fish larvae and subsequent development (CFMC, 1998). Most of the information available, regarding planktonic larvae distribution, remains at the Family level.

Mangroves have been identified as EFH for several of the managed species in Guayanilla Bay including the following: *Lutjanus analis* (Mutton Snapper), *Lutjanus griseus* (Gray Snapper),

Ocyurus chrysurus (Yellowtail Snapper), *Lutjanus apodus* (Schoolmaster), *Haemulon plumieri* (White Grunt), *Chaetodon striatus* (Banded Butterfly fish), and *Panulirus argus* (Spiny Lobster). According to the CFMC (1998), these species occur in mangroves as adults or juveniles as follows: Mutton Snapper (juveniles and adults); Schoolmaster (juveniles and adults); Gray Snapper (juveniles and adults); Yellowtail Snapper (juveniles); White Grunt (juveniles); Banded Butterfly fish (adults); and Spiny Lobster (juveniles). No other life stages of these species are known to be present in mangrove areas.

Bottoms where mud is the main inorganic component tends to be less diverse, usually because of a lack of photosynthetic organisms. This limit in productivity hampers the maintenance of a diverse ecosystem. Nevertheless it can be considered as an EFH for juvenile snappers (*Lutjanus apodus*, and *L. griseus*), and adult grunts, which feed upon the infauna. The water column, associated to these bottoms, is used as a corridor between habitats by many of the managed species. Therefore, the lack of diversity in muddy bottoms cannot undermine their importance as a corridor between habitats.

The impacts to the muddy bottoms associated to the construction of the pier at Guayanilla Bay would be permanent and would adversely affect designated EFH for juvenile *Lutjanus apodus* (Schoolmasters), *Lutjanus griseus* (Gray Snapper), and adult *Haemulon plumieri* (White Grunt). The foreseeable impacts associated to the proposed pier include the temporary and localized effect on EFH from increased sedimentation and minor habitat displacement (CFMC, 1998). Pier pilings may contain chemicals that could be released into the water, but overall these structures are not perceived as a significant problem as pilings usually sustain a diverse community of encrusting organisms.

Several patches of seagrass would be impacted by the construction of the pier and the proposed fill. Shading may be the greatest threat associated with piers as they limit the amount of light necessary for optimal growth of submerged aquatic vegetation. Potential impacts to seagrass patches, associated to the pier at Punta Gotay, could be minimized by careful selection of the location of pilings. Seagrass impacts related to the fill would be permanent.

Mangroves represent EFH for adults and juveniles of several managed species. The proposed fill would permanently impact these areas. A proposed mangrove mitigation and restoration plan in the vicinity of the Project would replace some of the lost mangrove habitat and compensate for the direct impacts to this area.

The proposed fill in Guayanilla Bay would also eliminate the water column within the proposed fill area. The filling activity would impact the connectivity between habitats, especially between Punta Gotay Cove and the rest of the Bay, not only by the addition of materials, but also by the re-suspension and increase in turbidity associated to these activities. However, a study of the ocean currents within Guayanilla Bay concludes that the overall water flow through Guayanilla Bay would not change significantly with the new pier facilities (Scheffner et al., 2001).

The coral reef and shelf-edge habitats would not be impacted by the proposed fill and construction of the pier at Guayanilla Bay.

The proposed facilities in the Guayanilla-Peñuelas area may also present the following threats to EFH within Guayanilla Bay. Water quality degradation may occur from point and non-point-source runoffs associated to chemicals commonly discarded, even unintentionally, such as oils from paved roads and parking lots, vehicle fuel, and substances used for the maintenance of roads and other industrial facilities, including paints, grease, and solvents. Also, spills and discharges of hazardous materials are a constant concern in this type of facilities. These are

rare events but their immediate impact can be severe. Another concern is the discharges of marine debris, trash and organic wastes made by the shipping vessels. Such byproducts can adversely affect fish and, both, marine birds and mammals. Another possible threat is the introduction of exotic species. Commercial vessels visit a large number of international destinations, which provide an excellent and rapid dispersal mechanism for exotic, and potentially harmful, species.

4.5.3 Ponce Alternative

Similar to the Guayanilla-Peñuelas site, muddy bottoms dominate the benthic areas where the PTA activities are proposed in the Port of Ponce (García, 2001). These areas include the navigation channel, where dredging is proposed, and the zone adjacent to Pier #8, where extension of the pier is planned. Previous dredging of the Port of Ponce and navigation channels (1986-87) previously impacted these areas. Such impacts are likely to have almost completely transformed the original benthic communities into muddy bottoms.

Of all the managed species, only adults *Haemulon plumieri* (White Grunt) and Silk Snappers (*Lutjanus vivanus*) were reported for this habitat at Ponce Bay (García, 2001). There are no records of the presence of eggs, larvae, juveniles or spawners of the managed finfish species in muddy bottoms. Similarly, the Spiny Lobster and Queen Conch, and each of their life stages, are absent from muddy bottoms. Based on this information, the areas proposed for dredging or construction in the Bay of Ponce can be identified as EFH for adult White Grunts and the Silk Snappers.

The proposed dredging of the Ponce Harbor would have temporary effects in the water column, primarily increases in turbidity due to resuspension of bottom sediments. The water column has been identified as EFH for the planktonic life stages of all of the 15 managed finfish species identified by the CFMC. All of the managed species have planktonic eggs and larvae, but their distribution is unknown. Except for general descriptions, there is little information on the distribution of eggs and the development of larvae, let alone information on the settling of fish larvae and subsequent development (CFMC, 1998). Most of the information available for these stages is only known at the Family level.

The water column has been clearly documented in this report as being an EFH for the planktonic life stages of all of the 15 managed finfish species identified by the CFMC. The main activity related to the Project in the Port of Ponce would be a proposed dredging of the existing navigation channel. This activity may increase the turbidity within the water column, as well as deter some of the fish from using their normal feeding areas (CFMC, 1998). It is expected that these fish species should reestablish their foraging patterns after the construction activities are finished.

4.5.4 Applicant's Preferred Alternative

Impacts associated to the Applicant's Preferred Alternative on Essential Fish Habitat would consist of a combination of the impacts associated to the Guayanilla-Peñuelas and Ponce alternatives, described in the previous sections.

4.6 Threatened and Endangered Species

This Section describes the potential impacts of the different alternatives on threatened and endangered species that occur or are transient through the sites proposed for the elements of the Project. The species considered include those observed during field surveys conducted by

AFI as part of the investigations for the DEIS of the PTA, or described in other investigations in the area. Also considered are species of interest identified by the USFWS and the NMFS in written correspondence to the USACE and during the scoping process, in meetings held on April 4, 2001, October 3, 2001 and November 1, 2001 (Appendix A).

Federal regulations require the preparation of a biological assessment if listed species or critical habitat may be present in an area to be impacted by a "major construction activity," defined as a construction project which involves a major Federal action significantly affecting the quality of the human environment as referred to in the National Environmental Policy Act (NEPA). A Biological Assessment was performed in compliance with Section 7 of the Endangered Species Act of 1973 and is included in Appendix X.

4.6.1 No-Action Alternative

Under the No-Action Alternative, the Project would not occur and there would be no construction or fill in the Guayanilla-Peñuelas areas, nor construction or dredging at the Ponce Harbor. The No-Action Alternative would prevent any direct, indirect or potential impacts to endangered species or their habitats. Terrestrial and marine habitats within the proposed Project sites would continue providing the same level of support to endangered species in terms of food, shelter and reproductive capability. The marine and terrestrial habitats in the region impacted for decades by prior and existing industrial and port activities would remain as present. The No-Action Alternative would eliminate the potential for enhancement and/or habitat restoration in these impacted areas.

4.6.2 Guayanilla-Peñuelas Alternative

The impacts on threatened and endangered species of the alternative to locate the elements of the Project only at the Guayanilla-Peñuelas site would be exactly the same as those pertinent to the Guayanilla-Peñuelas component of the Applicant's Preferred Alternative, discussed in Section 4.6.4.

4.6.3 Ponce Alternative

The impacts on threatened and endangered species of the alternative to locate the key elements of the Project at the Port of Ponce would be similar to those of the Applicant's Preferred Alternative (Section 4.6.4), with some minor variations.

The potential impacts to endangered whales would be similar due to the close proximity between the Guayanilla-Peñuelas and Ponce sites in comparison with the wide distribution of these organisms. Manatees are less likely to be impacted in Ponce because their presence in the area is less frequent.

As for the avian fauna, the impacts would remain virtually the same, since the critical species can naturally occur indiscriminately in the Peñuelas-Guayanilla-Ponce corridor. The same would apply to marine turtles. The Puerto Rican Crested Toad is not found in the Ponce area and neither are the plant species *Buxus vahlii*, *Ottoschulzia rhodoxylon*, *Trichilia triacantha* and *Mitracarpus polycladus*. Dredging activities in the Port of Ponce would increase the potential risks of impacts to sea turtles, and to a lesser degree, to Manatees, while potentially disturbing the feeding behaviors of threatened or endangered seabirds.

Finally, the same measures considered under the Applicant's Preferred Alternative to reduce and mitigate potential impacts to threatened and endangered would be applied under this Alternative.

4.6.4 Applicant's Preferred Alternative

For the purpose of this Section, the environmental consequences discussed below apply to all Project alternatives, except the No Action alternative.

4.6.4.1 Reptiles

4.6.4.1.1 Loggerhead Sea Turtle (*Caretta caretta*)

This marine turtle is rare in Puerto Rico and not known to nest in the area of the Project. Therefore, the proposed construction of the piers and fill would not affect this species.

4.6.4.1.2 Green Sea Turtle (*Chelonia mydas*)

The construction of the proposed piers may have a temporary effect on the normal green sea turtle breeding, foraging, and migratory activities. Although construction of the piers would not include linear barriers that would restrict the movement of individuals in the construction area, construction-related activities including the filling, equipment and noise would cause most green turtles to temporarily avoid shallow water breeding and foraging areas and migratory routes near the pier. On the other hand, the proposed fill of approximately 110 acres would permanently affect some seagrasses which may serve as feeding areas for these turtles.

The Project would not adversely affect Green Sea Turtle nesting habitat or nesting activities. Dredging of the Ponce Harbor would render unavailable the vicinity of the navigation channel for this species during the duration of the dredging activity.

The expected increase in ship operations resulting from the Project would increase the potential of collisions with Green Sea Turtles. However, the probability of such collisions would remain at minimum levels given the relatively low traffic increase anticipated and the mitigation measures that would be implemented to avoid them. Although the Project would impact seagrasses within the habitat of the species, it will not impact nesting areas.

According to the available information, it is anticipated that the Project may affect, not likely to adversely affect this species.

4.6.4.1.3 Hawksbill Sea Turtle (*Eretmochelys imbricata*)

The Project would not affect any known nesting habitat for Hawksbill Sea Turtles, since no nesting habitat exists in the region. The nearest known nesting area is Caja de Muertos Island, located about 8 miles (12.9 kilometers) from the Port of Ponce. There would be little or no impact on foraging habitats used by this species, which usually feeds on sponges and other marine invertebrates on coral reefs or reef-like habitats. Although rare sightings of the Hawksbill Sea Turtles have been reported in the Guayanilla and Tallaboa bays, it is unlikely that the activities such as construction or navigation would result in a direct impact or death of individuals of this species.

The expected increase in vessel traffic resulting from the Project, both at Ponce and Guayanilla, would increase the potential for collisions with sea turtles, including Hawksbill Sea Turtles. However, with the implementation of the proposed mitigation measures the probability of collisions would be reduced.

According to the available information it is anticipated that the Project may affect, not likely to adversely affect this species.

4.6.4.1.4 Leatherback Sea Turtle (*Dermochelys coriacea*)

The Leatherback Sea Turtle was identified as a species of concern based on claims of sightings of specimens in the Guayanilla Bay area. However, as is the case for all sea turtles, the Project would not affect any known nesting areas for this species. No nesting habitat of this species is reported in the zone. The Project would have little or no impact on foraging habitats used by the Leatherback Sea Turtle, which typically feeds on pelagic jellyfish.

According to the available information available information, it is anticipated that the Project would not affect this species.

4.6.4.2 Marine Mammals

4.6.4.2.1 Humpback Whale (*Megaptera novaeangliae*)

The NMFS recently reported that during the period from 1994 to 1998, death and severe lesions to Humpback Whales due to human activity averaged 3.65 per year (NMFS, September 2000). The main causes for these incidents are collisions with ships and entanglements with pelagic fishing nets. The results of mortality and severe lesions reports on North Atlantic Humpback Whales during that period are presented in Table 4-2. None of these incidents occurred in waters near the proposed sites, being located the nearest incident at the Florida Keys.

The projected increase in marine traffic to and from the PTA would potentially represent a higher risk of collisions between ships and whales, particularly during the winter months when the whales are more frequent in the Caribbean. Nevertheless, the probability of such collisions would remain at minimum levels given the relatively low traffic increase anticipated and the mitigation measures that would be implemented to avoid them.

According to the available information, the Project would not affect this species.

4.6.4.2.2 Blue Whale (*Balaenoptera musculus*)

Its presence in the Project area is unlikely. Moreover, because its presence in the U.S. Exclusive Economic Zone (EEZ) is sporadic, it is also anticipated that any increase in marine traffic destined to the PTA would not result in an increased risk of collisions with these whales.

The Project would not affect this species.

4.6.4.2.3 Finback whale (*Balaenoptera physalus*)

In Puerto Rico it has only been observed in deep waters. Between 1984 and 1988 the NMFS reported only three deaths of finbacks attributed to collisions with ships, none of these in the Caribbean. It is unlikely that Finback Whales may be found in the Project areas.

The Project would not affect this species.

4.6.4.2.4 Sei Whale (*Balaenoptera borealis*)

No deaths or severe lesions to this species due to human actions, including collisions with ships, were reported between 1991 and 1997. The New England Aquarium documented a Sei Whale carcass hung on the bow of a container ship as it docked in Boston on November 17, 1994. Although its presence has been recorded in Cuba and the Virgin Islands, the presence of this species in the Project area is unlikely, but still possible.

The Project would not affect this species.

4.6.4.2.5 Sperm Whale (*Physeter macrocephalus*)

According to the NMFS (2000), only one accident was reported for the time period between 1994 and 1998. In May 1994, a ship-struck Sperm Whale was observed south of Nova Scotia. The presence of Sperm Whales in the Project's vicinity is not likely, but possible.

The Project would not affect this species.

4.6.4.2.6 Manatee (*Trichechus manatus*)

The Manatee is probably the most conspicuous of the endangered species known to occur within the Guayanilla-Peñuelas Project site. It has also been sighted west of the Ponce Bay, at the Rio Matilde area, but with less frequency that at the Guayanilla-Peñuelas site.

Sightings of Manatees in the Guayanilla Bay and nearby coastal areas are frequent as documented by Mignucci (Ecoeléctrica, 2001) and others. North of Punta Gotay and close to the marine area proposed for filling, it is assumed that Manatees are attracted to the near shore by the fresh water discharges from local streams and the Costa Sur power generation plant operated by PREPA. EcoEléctrica, as part of the requirements for operation of its pier and port where fuel is received, conducts periodical surveillance of the Manatees in the Bay. A recent study by AFI confirmed that as many as nine (9) Manatees frequent the Project area within Guayanilla Bay (Appendix CC).

The construction of the pier and placement of fill material in Guayanilla Bay are the main Project-related activities that would directly or indirectly have an impact on Manatees.

- Construction activities, related noise, and the presence of construction equipment would cause most Manatees to temporarily avoid the immediate area and any shallow foraging sites nearby.
- Although the placement of fill material for the construction of the container storage area would permanently impact a 110-acre area, the availability of seagrasses present in this area is very limited and it is not considered a significant seagrass foraging habitat. The density of seagrasses in Guayanilla Bay is higher and healthier around Punta Verraco, on the western end of the bay (Plate Number 58 of the Environmental Sensitivity Atlas, NOAA, 2000). Any indirect effects on seagrasses can be potentially mitigated by replanting patches of grass in other areas of the Bay, as was done for the EcoEléctrica Project.
- Pier construction would not require any barricades that would restrict the movement of Manatees in the construction area. However, the placement of pier pilings would limit movements in the vicinity of the pier during the construction phase. Once installed, the pier pilings would act as permanent vertical barriers. The pilings would have to be sufficiently spaced as to allow Manatee movement and are not expected to have an impact on normal behavioral patterns of Manatees.
- Work vessels and the additional shipping traffic resulting from the Project may also affect Manatees. These increases in marine traffic would interfere with the free movement of Manatees in the bay, as well as resulting in an increase of the probability of collisions with ships. As an additional precautionary measure, a fender system at the pier would maintain a minimum 4-foot clearance between the ship's hull and the pier pilings.

Development of elements of the PTA in the Guayanilla Bay would result in an increase in shipping traffic of the order of about 600 mainline ships per year in the next five (5) years. This increment in marine traffic in the bay raises the question about the probability of collisions of Manatees with ships. Traffic related to the PTA would be routed through the deeper waters of the bay, far from where Manatees feed and congregate. Sightings of Manatees in Guayanilla and Tallaboa bays average 2.35 per day, according to the USFWS (USFWS, 1994).

Even though the probability of incidents is low, preventive measures would be implemented to avoid as much as possible collisions with ships. A potential approach to minimize the potential for these collisions during shipping related to the PTA, is the implementation of a Management Plan for the species, similar to that already in effect and currently executed by EcoEléctrica. Such plan may include, among other measures, the designation of a spotter for Manatees and sea turtles while the vessels are in transit. An additional protection measure would include a request to the operators of the Port to maintain a detailed log containing sightings, collisions or injuries to Manatees and sea turtles, and to accelerate the reporting of such events to the USFWS, NMFS and the DNER.

Other measures that can be implemented to protect the Manatee include:

- Installation of permanent signs near the pier area to identify marine zones designated for the protection of Manatees.
- Coordination with the Ports Authority (PA) and the Coast Guard to increase the enforcement of the speed limit regulations in the port, with the DNER to control the use of recreational vehicles in the bay including water bikes and jet skis, where applicable.
- Development of a training program to educate employees about the presence of federally protected species in the port area and the importance of presenting them.

According to the available information, it is determined that the proposed project may affect, likely to adversely affect the endangered Manatee.

4.6.4.3 Birds

4.6.4.3.1 Least Tern (*Sterna antillarum*)

The Least Tern is designated as a threatened species by the DNER. This species is an uncommon resident in Puerto Rico during its reproductive season. It nests from April to July on a wide variety of habitats, from industrial zones to barely above the high-water line on sand bars, coral rubble and dried salt flats. In general they nest as single pairs or in loose colonies (Raffaele et al., 1998).

A colony of nesting Least Terns was observed adjacent to the proposed fill site on Punta Gotay (Guayanilla Bay) during a field survey conducted by AFI during April-May 2001. Even though the proposed fill would directly impact this nesting area, it is not expected that the Project would have an overall significant impact on this species. The lands surrounding the proposed Project site in Guayanilla Bay, and associated open wetlands are not to be developed east of the Union Carbide parcel. These lands are suitable for nesting and would contribute to the continued existence of the Least Tern in the region.

According to the available information, the Project may affect, not likely to adversely affect this species.

4.6.4.3.2 Brown Pelican (*Pelecanus occidentalis*)

The Project would not significantly impact the local Brown Pelican population. There are no suitable nesting or roosting habitats in the Guayanilla and Ponce areas, or within the parcels proposed for added value activities. Although Brown Pelicans reportedly roost on the María Langa and Palomas shoals in Guayanilla Bay (EcoEléctrica, 1996), these areas would not be affected by the Project. Brown Pelicans forage throughout Guayanilla Bay and the Port of Ponce. An impact on the Brown Pelican's foraging habitat is expected as a result of the modification of the shallow water habitat where they feed, either at Guayanilla-Peñuelas or Ponce, although in Ponce the proposed actions relate to the dredging of the existing channel.

It is anticipated that normal behavioral patterns of Brown Pelicans would be disrupted during construction. Construction equipment and associated noise would cause pelicans to temporarily avoid the project site and look for alternate sites for feeding and roosting.

According to the available information, the Project may affect, likely to adversely affect the Brown Pelican.

4.6.4.3.3 White-cheeked Pintail (*Anas bahamensis*)

Although the White-cheeked Pintail is relatively rare in Puerto Rico, several individuals were observed in the Guayanilla-Peñuelas area during the field surveys. Its preferred habitats consist of fresh to hypersaline open water bodies. The mangrove fringes surrounding the Bay may be considered as suitable habitat for the White-cheeked Pintail. Several man-made retention ponds of small size, located on Punta Guayanilla also provide habitat for this species. No nesting areas are known to occur within any of the Project areas.

In view of the above, the Project may affect, not likely to adversely affect the White-cheeked Pintail.

4.6.4.3.4 Roseate Tern (*Sterna dougallii*)

The Project may temporarily affect the Roseate Tern. Roseate Terns usually nest in a sand or coral scrape, or in rock depressions, usually in colonies on offshore cays. The nearest known nesting area is more than a mile (1.6 kilometers) west of the Guayanilla-Peñuelas site. Nesting colonies are not expected to be affected by the PTA

Construction-related activities, equipment, and noise may cause this species to temporarily avoid roosting and foraging areas along Punta Guayanilla. However, normal roosting and feeding activities would resume following the completion of construction.

Considering these conditions, the Project may affect, not likely to adversely affect the Roseate Tern.

4.6.4.3.5 Puerto Rican Nightjar (*Caprimulgus noctitherus*)

There are no reported habitats for this species within the overall Project areas. The nearest documented occurrences of this species include at Punta Verraco, about 1 mile (1.6 kilometers) west of the Guayanilla site, and to the north in the hills north of Highway PR-2 and the areas proposed for value-added activities.

The Applicant is committed to obtain fill material for the reclamation of submerged lands in the Guayanilla Bay from quarries in operation, previously authorized by the DNER, whose fill

material is extracted from already perturbed sources. No fill material would be accepted by AFI if these come from suitable Puerto Rican Nightjar habitat.

The proposed action would not affect Puerto Rican Nightjar or its habitat. On the other hand, suitable Puerto Rican Nightjar habitat may be affected by developments indirectly associated to the PTA. The conservation of this habitat would rely on the State and Federal regulating agencies.

4.6.4.3.6 Yellow-shouldered Blackbird (*Agelaius xanthomus*)

The nearest site with a record of occurrence of this species is about two miles (3.2 kilometers) northwest of the Guayanilla Bay. Marginal habitats for this species exists in the vicinity of the areas proposed for value-added activities at the UCC parcel. However, no specimens were observed during the field surveys. Similar to the Puerto Rican Nightjar, the presence of this species in the hills north of Highway PR-2 would not be affected, since any fill material would be obtained from existing quarries extracting from disturbed areas.

Consequently, the Project would not affect the Yellow-shouldered Blackbird or its habitat.

4.6.4.4 Amphibians

4.6.4.4.1 Puerto Rican Crested Toad (*Peltophryne lemur*)

Project development would not impact to the Puerto Rican Crested Toad. No habitat for this species occurs within the proposed Project sites. Although marginal habitat occurs within the areas proposed for value-added activities in Ponce and Guayanilla-Peñuelas, the crested toad has never been reported at those sites.

Consequently, the Project would not affect the Puerto Rican Crested Toad.

4.6.4.5 Plants

4.6.4.5.1 Vahl's boxwood (*Buxus vahlii*), Palo de rosa (*Ottoschulzi rhodoxylon*) and Bariaco (*Trichilia triacantha*)

These species of plants do not occur within the areas of the Project. Their presence in the region is most likely to occur in the hills north of Highway PR-2, where any extraction operation may jeopardize its existence. Since any fill material for the Project would be obtained from existing quarries authorized by the DNER, and whose fill material comes from disturbed areas, there would be no adverse impacts to these species.

4.6.4.5.2 *Mitracarpus polycladus*

This species does not inhabit the areas of the Project. Its presence in the region is most likely to occur in the hills north of highway PR-2, in limestone hills. Since any fill for the Project would be obtained from operating quarries, there would not be any impact to this species.

4.6.5 Ponce Alternative

Under this alternative, the Project would be developed in the Port of Ponce area. This is an industrial lot where various handlers of regulated substances have been identified, most of them operating in compliance with EPA regulations. No portions of land at this site have been identified as requiring corrective action by EPA or EQB. It is not anticipated that the

construction and operation of the port would alter or impact, nor rehabilitate any of the parcels selected for the proposed action.

4.6.6 Applicant's Preferred Alternative

The impacts of the Applicant's Preferred Alternative with regards to Hazardous, Toxic and Radioactive Wastes would consist of a combination of the impacts associated to the Guayanilla-Peñuelas and Ponce alternatives, discussed in the previous two sections.

4.7 Ecologically Sensitive Areas

4.7.1 No-Action Alternative

Under the No-Action alternative, no development would occur in the Guayanilla and Ponce bays. None of the ecologically sensitive areas mentioned, including the coastal uplands and higher grounds between Punta Verraco and Ponce Harbor, would be subject to indirect and/or cumulative impacts resulting from additional port-promoted developments. Finally, no cumulative impacts to Punta Verraco or the hills north of PR-2 would occur.

4.7.2 Guayanilla-Peñuelas Alternative

The impacts on Ecologically Sensitive Areas of the alternative to locate the elements of the Project only at the Guayanilla-Peñuelas site would be the same as those of the Guayanilla-Peñuelas component of the Applicant's Preferred Alternative, discussed in Section 4.7.4.

4.7.3 Ponce Alternative

The impacts on Ecologically Sensitive Areas of the alternative to locate the key elements of the Project at the Port of Ponce would be similar to those of the Applicant's Preferred Alternative (Section 4.7.4).

4.7.4 Applicant's Preferred Alternative

For the purpose of this Section, the environmental consequences discussed below apply to all Project alternatives, except the No Action alternative.

The south coast of Puerto Rico, where the proposed PTA would be developed, contains numerous ecologically sensitive areas that are outside the jurisdiction of the USACE. These sensitive areas include coastal uplands and higher grounds between Punta Verraco and Ponce Harbor, which would be subject to indirect and/or cumulative impacts resulting from additional port-promoted developments. High on this list of sensitive areas are Punta Verraco, and the hills north of state road PR-2 near Peñuelas.

Federal and local conservation experts have recognized Punta Verraco as an area of high ecological value. Punta Verraco is a high headland with well-developed dry forest underlain by highly erodible soils. According to the USFWS, the point is fringed with red mangroves and has a basin mangrove forest in its western end. The area was slated for port development some time ago, but to date remains reasonably intact. An access road leading to the Point has partially cut off hydrology to the basing mangrove forest and has resulted in a mangrove die off. This site offers an excellent opportunity for mangrove restoration. The federally listed Puerto Rican Nightjar, a ground nesting bird restricted to southwestern Puerto Rico, is known to occur in the Punta Verraco area.

Although the proposed PTA would not infringe into Punta Verraco, there is the potential for other direct and indirect port-related development in the area. At least one reasonably foreseeable future action has been identified for Punta Verraco. WindMar RE, S.E., is proposing to install a wind farm on an 80-acre site at Punta Verraco to the east of the proposed Port of the Américas in Guayanilla. The purpose of this project is to provide a port-related value-added industrial activity using wind energy to grind blast furnace slag into cementitious slag. Development of this project would require the construction of one or more docks with conveyor systems to load and unload deep draft ships, which would deliver bulk materials to be ground and mixed using wind power. This project, however, is on its very early stages of development and its construction is not anticipated to occur within the same time frame as the Port of the Américas.

The forested hills to the north of state highway PR-2 are considered ecologically sensitive areas because of the high probability of serving as habitat for the federally listed Puerto Rico Nightjar. In addition, these hills are likely candidates to contain federally listed endangered plants such as *Buxus vahli*, *Ottoschultzia rhodoxylon* and *Trichilia triacantha*. Concerns stem from the possibility of that the extraction of earth material for the reclamation activity in Guayanilla may destroy sensitive habitat, thus jeopardizing the continued existence of endangered species.

It is anticipated that the Project would not cause adverse impacts to Nightjar populations. There are no reported habitats for this species within the overall Project areas. The nearest documented occurrences of this species include Punta Verraco, about 1 mile (1.6 kilometers) west of the Guayanilla site, and the hills north of Highway PR-2.

The Applicant has agreed, after consulting with the USFW, to perform the extraction of fill material for the reclamation activity in the Guayanilla Bay from areas already impacted in existing quarries, and previously authorized by the DNER.

4.8 Wetlands

4.8.1 No-Action Alternative

Under the no action alternative there would be no impacts to waters of the United States and no wetlands would be affected. There would be no fill, dredging or ocean disposal of dredged material and no need for any permits under the Clean Water Act or the Marine Protection, Research and Sanctuaries Act.

4.8.2 Guayanilla-Peñuelas Alternative

Wetlands are fairly common along the coast in the Project area in Guayanilla primarily because of the geographic, topographic and hydrologic conditions of the region. Field surveys conducted for the Project show that approximately 93 acres of jurisdictional wetlands occur in the Guayanilla-Peñuelas area. Approximately 12 acres of wetlands would be lost permanently because of the proposed fill in Guayanilla Bay.

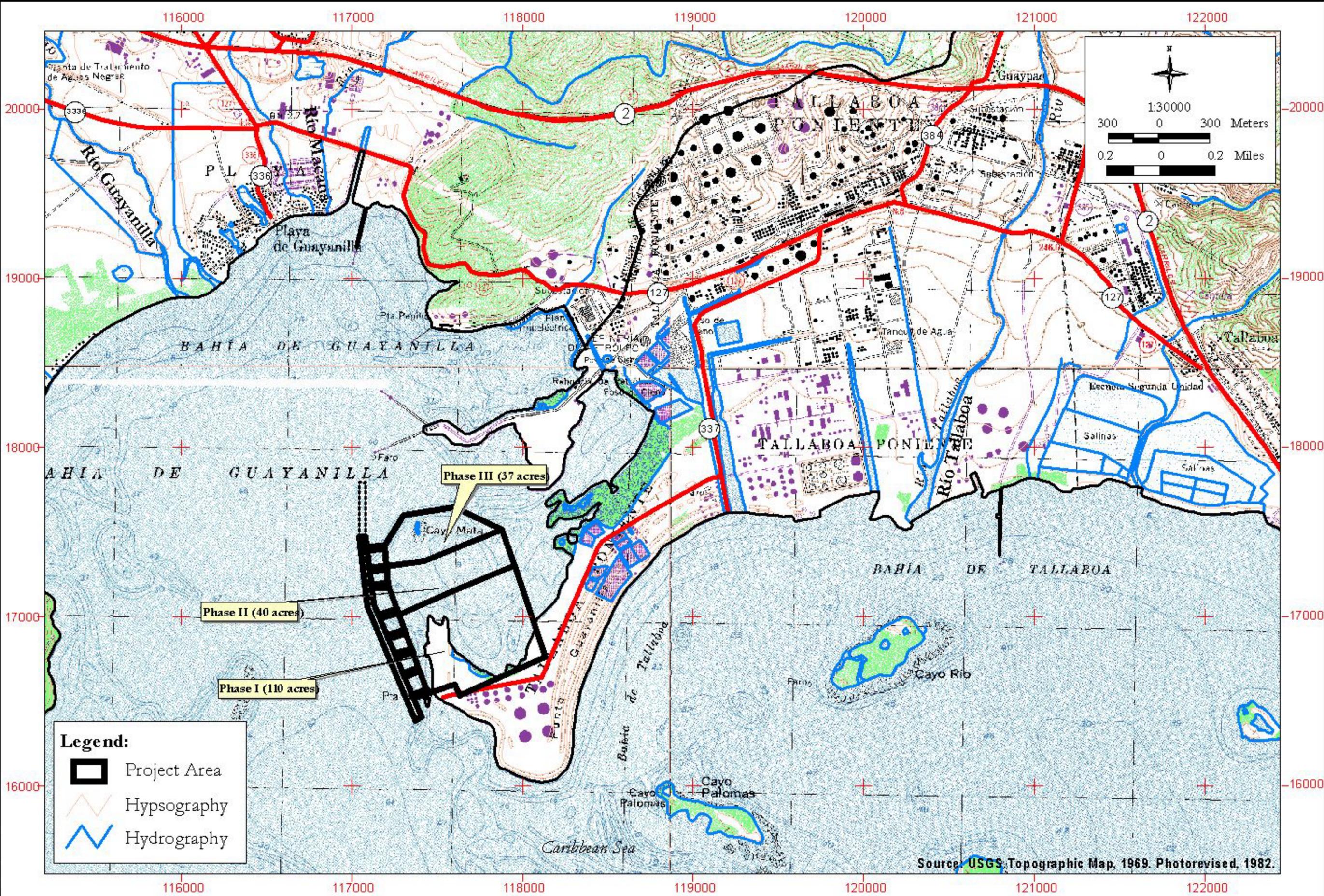
Several alternatives to design were considered to minimize the discharge of fill material into waters of the United States in Guayanilla Bay. As illustrated in Figure 4-2, the original proposed transshipment port layout considered three phases of pier and support area construction. Under this scenario, the proposed design alternative would have consisted a fill area of about 187 acres in three phases. Phase I would have entailed the filling of 110 acres; Phase II, 39.5 acres and Phase III 37 acres, including the filling of Cayo Mata. The amount of fill material required for full development of this alternative would have been about 5.5 million cubic yards.

A second alternative fill design was proposed for consideration that would require less marine filling and would conceivably preserve Cayo Mata, but increasing the amount of coastal wetlands affected. This fill alternative, shown in Figure 4-3, would reduce the amount of deep-water fill areas along the western edge and would require the full use of uplands on the adjacent Punta Guayanilla. However, this alternative would include the fill of a longer strip of coastal wetlands.

The fill areas by Project phase under this alternative design would have been 36 acres, 55 acres and 53 acres, respectively, for a total development scenario of 144 acres. The amount of fill material required for this alternative design would be equal to approximately 0.85 M cubic yards in Phase I, 1.37 M in Phase II and 1.35 in Phase III, or 3.47M for the total project. This represents about 63% of the total fill requirements of the original proposed design.

Both of previous alternative fill designs were discarded in favor of the Applicant's Preferred Alternative in order to minimize and reduce the impacts of fill on waters of the United States, as well as on the coastal wetlands surrounding the proposed fill site. The proposed layout avoided also the west side of Punta Guayanilla, where seagrass beds and mangroves are more robust.

There are a number of mitigation opportunities available to compensate for unavoidable impacts to waters of the United States and wetlands resulting from this alternative. The coastal corridor between Punta Verraco and Ponce Harbor contain important wetland habitats that have the potential of being restored or enhanced to provide additional fish and wildlife value. The areas showing most potential for restoration include an old shrimp farm east of Tallaboa Bay and Laguna Las Salinas just to the east of Punta Cuchara. The lagoon functions as a nursery area and its associated wetlands provide habitat for a variety of wading birds, shorebirds and other coastal avifauna. Additional mitigation measures could be implemented near Punta Verraco, where some mangrove areas have been destroyed. The existing La Guancha area in Ponce contains some wetlands that were impacted by previous port development activities, which can also be restored.



Coordinates in State Plane NAD 27

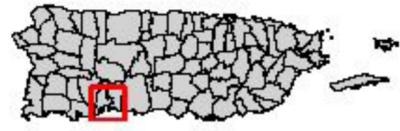
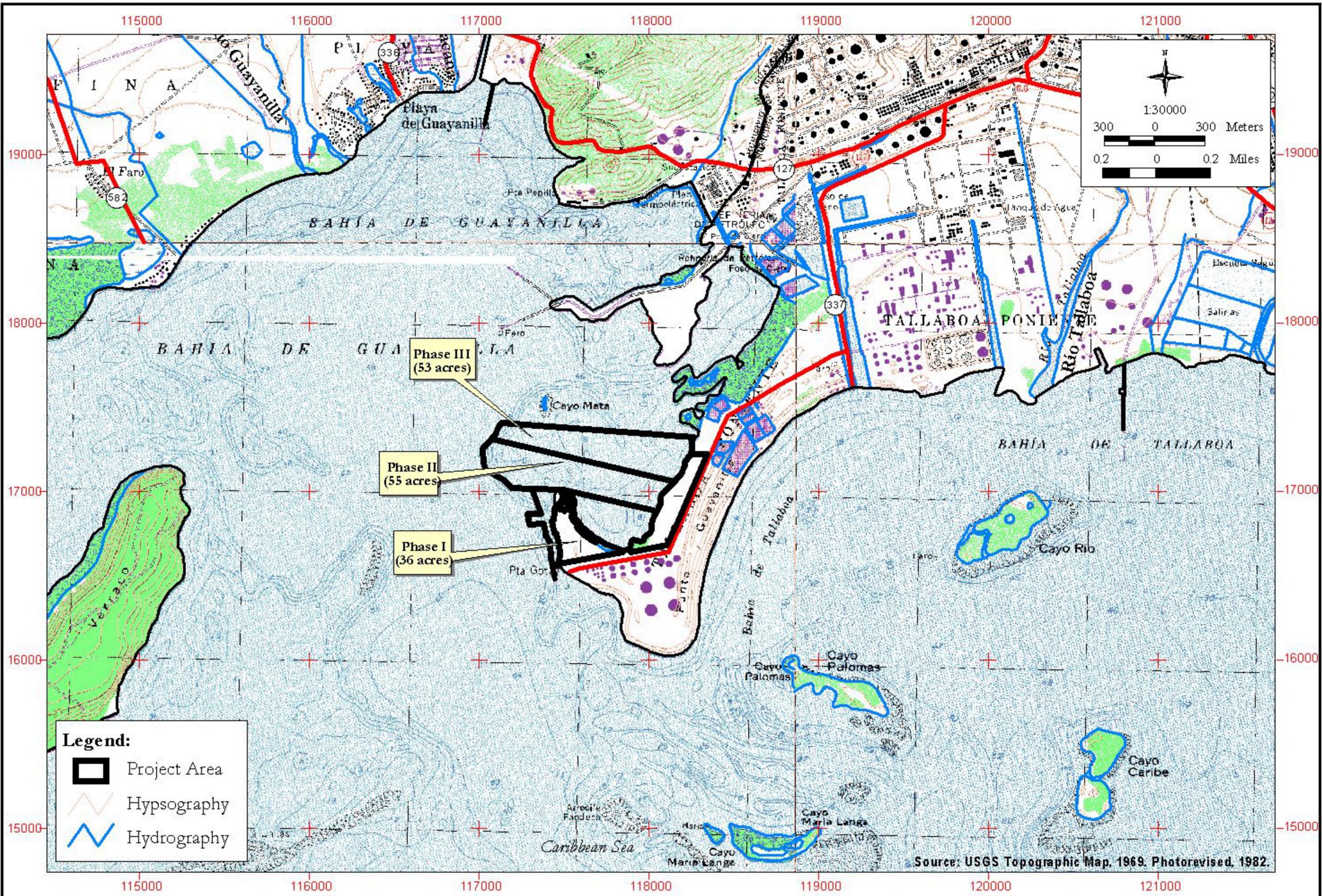


Figure 4-2 Original Conceptual Layout of the Project: Guayanilla-Peñuelas Area

Port of the Americas



z:\00070140\mpt\ba_guayanilla_injles_2.apr_03.apr\02.apr



Legend:

- Project Area
- Hypsography
- Hydrography

Coordinates in State Plane NAD 27



Figure 4-3 Alternate Conceptual Layout of the Project: Guayanilla-Peñuelas Area

Port of the Americas



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4.8.3 Ponce Alternative

A jurisdictional determination study conducted in the areas adjoining the Port of Ponce and Ponce Bay identified approximately 60 acres of jurisdictional wetlands. However, the Ponce only alternative to the PTA does not contemplate the filling or dredging of any of these wetland areas.

Under this alternative, any potential indirect impacts to the adjoining wetlands resulting from port improvements would be prevented or minimized by implementing conservation measures such as the following:

- Training of construction personnel and heavy equipment operators on the correct procedures to avoid impacts on sensitive areas.
- Establishment of a 16.4 ft. (5 meter) buffer zone between wetlands and construction areas by placing protection barriers to prevent mechanical damage from machinery, vehicles or people.
- Preparation of an Erosion and Sedimentation Control Plan indicating the use of silt curtains and retention ponds to control sedimentation.

4.8.4 Applicant's Preferred Alternative

Impacts associated to the Applicant's Preferred Alternative on wetlands would consist of a combination of the impacts associated to the Guayanilla-Peñuelas and Ponce alternatives, described in the previous sections.

4.9 Coastal Zone

In response to the intense pressures for development in the coastal zone, and its importance of the welfare of the United States, Congress passed in 1972 the Coastal Zone Management Act (CZMA). The Act affirms a national interest in the effective protection and development of the coastal zone by providing assistance and encouragement to coastal states and territories to develop and implement regional programs for managing their coastal zones. The purpose of the CZMA was to establish a national policy and develop a national program for the management, beneficial use, protection and development of the land and water resources of the Nation's coastal zone. The Puerto Rico Coastal Zone Management Program (PRCZMP) was approved in September 1978.

The term "federal consistency" refers to the requirement in Section 307(c) of the CMZA that identifies several types of federal actions that must be consistent with the approved Coastal Zone Management Program. In Puerto Rico, the Planning Board is the agency designated to administer federal consistency procedures.

All federal projects to be carried out in the coastal zone are subject to consistency review. The Act also requires that any non-federal applicant for a federal license or permit to furnish a consistency certification that the proposed activity will comply with the local coastal zone management program. Generally, no permit will be issued until the Planning board has concurred with the non-federal applicant's certification.

The CZMP acknowledges that there are certain projects that are critical to the economic development of Puerto Rico, and that some of these projects need to be located on or near the coast. Ports, for example, need to be located on the coast in order to function properly. In view of the coastline configuration and water depth characteristics in Puerto Rico, the areas where

some of these water-dependent industries can be located are limited. The most suitable areas for port development are located along the south and west coasts, between Yabucoa and Rincón. The Commonwealth identified potential coastal sites where these industries can be established and developed. Both Ponce and Guayanilla bays are included among this group.

4.9.1 No-Action Alternative

Under the no action alternative there would be no dredging or filling and no port development. There would be no development in the coastal zone; hence no federal consistency requirements would have to be met.

4.9.2 Guayanilla-Peñuelas Alternative

The Guayanilla only alternative to the PTA involves the filling of about 110 acres of marine bottom for the construction of a pier and container storage area.

The PRCZMP (p.105) established the following criteria for permitting filling activities:

- "...filling of coastal waters...shall, to the maximum extent practicable, be permitted only where necessary and where there is no less environmentally damaging alternative for port or airport expansion...or coastal-dependent facilities;"

In view of the above, and the siting criteria set forth in the last paragraph of the introduction to this section, no impacts due to the development of this alternative are anticipated. The Guayanilla Alternative would be consistent with the PRCZMP and in full compliance with the CZMA.

4.9.3 Ponce Alternative

The Ponce only alternative to the PTA involves dredging of the navigation channel and turning basin in Ponce Harbor and the extension of Pier Number 8 to 3,610 in length to accommodate Post-Panamax ships. The PRCZMP (p.105) established the following criteria for permitting dredging activities:

- "Dredging of coastal waters shall to the maximum extent practicable...be limited to port...facilities, navigational channels, turning basins, vessel berthing and mooring areas..."

In view of the above, and the siting criteria set forth in the last paragraph of the introduction to this section, no impacts due to the development of this alternative are anticipated. The Ponce Alternative would be consistent with the PRCZMP and in full compliance with the CZMA.

4.9.4 Applicant's Preferred Alternative

The Preferred Alternative involves filling activities within the coastal zone in Guayanilla and dredging in Ponce. The PRCZMP established the following criteria for permitting these activities:

- "...filling of coastal waters...shall, to the maximum extent practicable, be permitted only where necessary and where there is no less environmentally damaging alternative for port or airport expansion...or coastal-dependent facilities;"

- “Dredging of coastal waters shall to the maximum extent practicable...be limited to port...facilities, navigational channels, turning basins, vessel berthing and mooring areas...”

Coastal Barrier Units designated by the Secretary of the Interior are located within the proposed Project sites. The closest Coastal Barrier Units are Punta Cabullones (PR-56), Punta Cucharas (PR-57) and Punta Ballena (PR-59), none of which would be affected by the proposed action. In view of this, the PTA would not have any impacts on Coastal Barriers.

In view of the above, and the siting criteria set forth in the last paragraph of the introduction to this section, no impacts due to the development of this alternative are anticipated. The Applicant's Preferred Alternative would be consistent with the PRCZMP and in full compliance with the CZMA.

4.10 Impacts on Flooding Areas

4.10.1 No-Action Alternative

Under the No-Action Alternative, there would be no impact on the flood levels inland or in coastal areas, since there would be no construction.

4.10.2 Guayanilla-Peñuelas Alternative

Under this alternative, all the construction activities would take place in the Guayanilla-Peñuelas selected site. This site includes areas that are classified as Zone 1, Zone 1M and Zone 2 in the Puerto Rico Planning Board flooding maps, corresponding to zones classified as Zone VE, Zone AE and a small area of Zone X by the FEMA. No construction is planned on areas classified as Zone 1 in the Guayanilla-Peñuelas site. The construction on areas that are classified as Zone 1M and Zone 2 would comply with the design criteria for this type of zoning as established in the Puerto Rico Planning Board Regulation Number 13 (2001). It is anticipated that the development of the value-added parcels would not affect potential flood levels.

The construction of the proposed dock and container staging area in the Guayanilla-Peñuelas site would take place, almost completely, over an area that would be reclaimed by fill from submerged lands. The susceptibility to flooding of this area of about 110 acres would be assessed by PB and FEMA. On the basis of this evaluation, any building, development or construction on this new parcel of land would be subject to the regulations, terms and conditions established in the Puerto Rico Planning Board Regulation Number 13 (2001). The project design would consider the susceptibility of the area to flooding by storm surges, and the design would comply with the pertinent regulations. Eventually, the area would be incorporated to the flood maps of the zone.

The construction of the PTA in the Guayanilla-Peñuelas area would not have a direct impact on the flood levels inland or in coastal areas, if it is designed and built in compliance with the applicable regulations, plans, and policies.

4.10.3 Ponce Alternative

Under this alternative, all the construction activities would take place in the Port of Ponce area. As mentioned before, the Ponce site includes areas classified as Zone 2 and Zone 1M in the Puerto Rico Planning Board flooding maps, and as Zone A, Zone VE and Zone AE according to the FEMA flooding maps.

The canalization of the two water bodies closest to the Ponce site, the Río Portugués and Río Bucaná, essentially eliminated flooding in the areas near the Port of Ponce. Also, the Cerrillos Dam was completed in 1992, further reducing flood flows in the lower valleys.

The development of the Project in Ponce includes parcels near the coast, where potential flood levels would not be affected. The construction on areas classified as Zone 1M and Zone 2 would comply with the design criteria required by the Puerto Rico Planning Board Regulation Number 13 (2001).

In summary, the development of the Project in the Port of Ponce area would not have a direct impact on the flood levels inland or in coastal areas, if it is designed and built in compliance with the applicable regulations, plans, and policies.

4.10.4 Applicant's Preferred Alternative

Impacts associated to the Applicant's Preferred Alternative on Flooding Areas would consist of a combination of the impacts associated to the Guayanilla-Peñuelas and Ponce alternatives, described in the previous sections.

4.11 Water and Sediment Quality

4.11.1 Water Quality

4.11.1.1 Surface Water

4.11.1.1.1 No-Action Alternative

Under the No-Action Alternative, there would be no impact on marine waters, since there would be no construction activities. Furthermore, this alternative would have no additional impacts on the operation activities of the Port of Ponce.

4.11.1.1.2 Guayanilla-Peñuelas Alternative

Under this alternative, all the construction activities would take place in the selected site in the Guayanilla-Peñuelas area. The impacts of this alternative in the Guayanilla-Peñuelas area are very similar to the impacts of the previous alternative in the Port of Ponce area.

Construction activities could result in temporary degradation of the water quality near the pier and fill area in the Guayanilla Bay. Sediments would be suspended during fill activities, pile installation, pier-related construction near the shoreline and during the placement and removal of the spud piles used by the work barges. The suspension of these sediments would increase turbidity and sedimentation. The re-suspension of sediments in the water column may also reduce dissolved oxygen levels due to increased biological and chemical oxygen demand. The amount of turbidity produced during pier construction and the distance the suspended sediments would travel, would depend on the grain size of the sediments and the velocities of the currents. Construction-related turbidity, sedimentation and dissolved oxygen deficits are expected to be temporary, with levels returning to pre-project conditions shortly after construction work is terminated.

Best engineering practices (BMP's) would be implemented to reduce the temporary effects of construction on the environment. These measures could include the placement of barriers or curtains to lessen sediment diffusion during filling activities. Sheet piles would also be installed prior to the filling activities. Sheet piling consist of a series of panels with interlocking

connections driven into the ground with impact or vibratory hammers to form an impermeable barrier. Sheet piling can be made from a variety of materials such as: steel, vinyl, plastic, wood, recast concrete and fiberglass. Similarly, measures would be taken to assure that the fill material is adequate, not only in terms of its structural utility but in its quality of being free of hazardous substances or heavy metals as well. Any turbidity and sedimentation produced by the Project would be reduced using pile-driving techniques instead dredging to install pilings. Turbidity and sedimentation impacts would be reduced in the fill area with the use of turbidity curtains and the previous installation of sheet piling, to minimize the extent of the area affected by turbidity and sedimentation.

Potential impacts to marine waters would result from increased sediment transport to the sea due to construction activities on the value-added lands. The Applicant would have to prepare a Stormwater Pollution Prevention Plan as required by the EQB and the Clean Water Act, as well as a Sedimentation and Erosion Control Plan (CES, by its Spanish acronym) to comply with EQB's permit requirements. The purpose of the later is to define and schedule the control measures that would be used to minimize erosion, detain stormwater runoff and prevent offsite sedimentation. The plan should serve as a blueprint for the location, installation and maintenance of practices to control all anticipated erosion, and prevent sediment and increased runoff from leaving the site.

The Applicant would also have to comply with the National Pollution Discharge Elimination System as deemed necessary by the EPA. This permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. The permit provides two levels of control: technology-based limits (based on the ability of dischargers in the same industrial category to treat wastewater) and water quality-based limits (if technology-based limits are not sufficient to provide protection of the water body).

Also, port-related activities would have an impact on marine water quality if appropriate measures are not taken. Port-related activities, such as raw or partially treated sanitary discharges from ships, water pollution by hydrocarbon compounds and other pollutants resulting from accidental spills, solid waste generation, and Post-Panamax ship traffic, could degrade water quality. Best management practices would be implemented, and compliance with regulatory requirements would be strictly enforced to avoid or minimize these potential impacts. It is expected that any increase in turbidity associated with ship traffic in the PTA would be marginal, since ships would be traveling in deep navigation channel of over 53 feet in Guayanilla-Peñuelas.

- Potential spills would occur of raw or partially treated sanitary discharges from ships. These discharges may increase pathogen counts in the water and increase the biochemical oxygen demand (BOD), depriving the water column of dissolved oxygen. In addition, these nutrient rich discharges could stimulate phytoplankton and algal blooms with similar consequences. It is expected that, once completed, all ships operating in the PTA would comply with the existing regulations. It is assumed that the vessels' contribution would be limited due to the Federal Clean Water Act (33 U.S.C. 1322). This law requires the vessels to have Marine Sanitation Devices (MSD) that are certified by the United States Coast Guard (USCG) in order to prevent wastewater, with no treatment or with an inappropriate treatment, discharge in waters of the United States. The MSD are required while the vessels are sailing within territorial waters of the United States, the Great Lakes, and navigable waters.

- Water pollution by hydrocarbon compounds and other pollutants resulting from accidental spills, stormwater discharges, bilge drainage, and ship refueling operations. This also includes the operations of the inland port areas and value added land. Best management practices would be applied for the handling, storage and disposal of hydrocarbon or hazardous products that may be used during port operations, as well as the implementation of measures for the control and management of storm waters. The Applicant would address contingencies and control measures to prevent discharge of these substances into US waters in accordance with the NPDES permit regulations.
- Solid waste generation. Inadequate disposal of solid wastes produced during port operations would have adverse effects on water quality in the Project's vicinity. All solid wastes generated during port operations would be adequately managed to avoid disposal in or near the water. Section 4.18.5 of this DEIS presents a detailed discussion of the measures that would be implemented to safely manage and dispose of solid wastes.
- The introduction of exotic organisms and contaminants through ship's ballast water discharges. Ballast waters are used to maintain a ship's balance and stability depending on the weight of its cargo. Water ballast may be taken to make the ship heavier or discharged to make it lighter. Ballast water from ships is one of the largest pathways for the intercontinental introduction and spread of aquatic nuisance species (ANS). The National Invasive Species Act of 1996 established both regulations and guidelines to control the invasion of ANS. The existing rule establishes voluntary water management guidelines for ballast in waters of the U.S. (except the Great Lakes), and establishes mandatory reporting and sampling procedures for nearly all vessels entering U.S. waters. Under this rule, a self-policing program was established where ballast water management is initially voluntary for a period of 24-30 months. However, if the rate of compliance is found to be inadequate, or if the vessel operators fail to submit mandatory ballast water reports to the Coast Guard during this time frame, the voluntary guidelines may become mandatory and civil and criminal penalties could be imposed.
- Post-Panamax ship traffic through the navigation channels would disturb bottom sediments and increase water turbidity. Any significant increment in turbidity would reduce water transparency and productivity. However, according to the European Commission for Sustainable Development (2001), the relative contribution of ship traffic to turbidity levels is unknown. It is expected that any increase in turbidity associated with ship traffic in the PTA would be marginal, since ships would be traveling in deep navigation channels of over 53 feet in Guayanilla-Peñuelas, and a minimum of 45 feet in Ponce.
- Any increase in re-suspended sediments directly resulting from ship traffic is most likely to be insignificant when compared to sediment loads from other sources such as, runoff after heavy rains and natural coastal erosion.

4.11.1.1.3 Ponce Alternative

Under this alternative, all the construction activities would take place in the Port of Ponce area. As discussed in the previous section, construction activities would result in temporary degradation of the water quality near the dredged areas in the Ponce Bay.

Sediments would be suspended in the water column during pile installation, pier-related construction near the shoreline, and during the placement and removal of the spud piles used by the work barges. The suspension of these sediments would increase turbidity and sedimentation. The re-suspension of sediments in the water column may also reduce dissolved oxygen levels due to increased biological and chemical oxygen demand. These impacts are expected to be temporary, with levels returning to pre-project conditions shortly after construction work is terminated. Best engineering practices (BMP's) would be implemented to reduce the temporary effects of construction on the environment.

Other potential impacts to marine waters would result from increased sediment transport to the sea due to construction activities on the value-added lands. A Stormwater Pollution Prevention Plan and a Sedimentation and Erosion Control Plan would be prepared to comply with EQB's permit requirements. Any additional requirement under the National Pollution Discharge Elimination System would be complied with as deemed necessary.

- Dredging activities in the navigation channel at the Port of Ponce may temporarily increase turbidity and decrease dissolved oxygen. It is estimated that dredging of the navigation channel and the inner harbor at Ponce would take as long as 6 months. The adverse impacts of the dredging would last at least the same period, with potential negative impacts to the transient and permanent marine life in the bay.
- As in the previous alternative, port-related activities during operation would have an impact on marine water quality if appropriate measures are not taken. Port-related activities, such as raw or partially treated sanitary discharges from ships, water pollution by hydrocarbon compounds and other pollutants resulting from accidental spills, solid waste generation, and Post-Panamax ship traffic, would degrade water quality. As discussed in the previous section, best management practices would be implemented, and compliance with regulatory requirements would be strictly enforced to avoid or minimize these potential impacts. Moreover, it is expected that any increase in turbidity associated with ship traffic in the PTA would be marginal, since ships would be traveling in deep navigation channels of a minimum of 45 feet in Ponce.

4.11.1.1.4 Applicant's Preferred Alternative

Impacts associated to the Applicant's Preferred Alternative on Water Quality would consist of a combination of the impacts associated to the Guayanilla-Peñuelas and Ponce alternatives, described in the previous sections.

4.11.1.2 Groundwater Resources

Significant impacts to ground-water quality need to meet the following criteria,:

- Substantially degrade ground-water quality;
- Contaminate a public water supply;

Groundwater quality would not be adversely affected by Project development and operation. These are discussed in the following sections, with regards to the Project Alternatives.

4.11.1.2.1 No Action Alternative

There would be no impacts on the quality of groundwater of the area under the No-Action Alternative.

4.11.1.2.2 Guayanilla-Peñuelas Alternative

The quality of the groundwater in the Guayanilla-Peñuelas area has been impacted by two main reasons: spill of contaminants and saltwater intrusion, as previously discussed in Section 3.11.2. Groundwater resources in the Guayanilla-Peñuelas area have been severely impacted by a variety of contaminants, particularly petroleum products and other organic compounds as result of the operation of the Peñuelas petrochemical complex, now abandoned. Additionally the area of Guayanilla-Peñuelas has been affected by an increase in the intrusion of saline water from the sea. This phenomenon has adversely affected the fresh water supply of deep wells located to the south of State Road PR-127 and to the east and west of the Río Tallaboa.

The Project proposes the development of segments of the parcel formerly occupied by UCC for value-added activities. Portions of this property are currently being cleaned and monitored by UCC under EPA's supervision. This clean up effort includes the removal of hydrocarbons and other petrochemical products from the soil and groundwater deposits.

The Project would not contribute to the degradation of the groundwater quality or the contamination of a public water supply.

- The Project would not interfere with ongoing groundwater restoration efforts in Guayanilla-Peñuelas, neither through the normal attenuation process, nor through corrective actions currently being undertaken. In fact, the AFI-sponsored inclusion of the UCC property in EPA's RCRA Brownfields Program (RCRA) will promote rehabilitation of these lands and insure that the Project is developed consistent with the need to restore and improve the environmental setting of these areas, including the groundwater resources.
- A Spill Prevention Control and Countermeasures Plan (SPCCP) would be designed and implemented in the Guayanilla-Peñuelas site to avoid improper handling of oil products during construction and operation that could potentially result in additional impacts to ground water resources. Oil is defined as petroleum products, including gasoline, kerosene, jet fuel, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged soil. The SPCCP is designed to help prevent the discharge of oil. The SPCCP should contain a spill contingency plan. Such plan addresses responsibilities and procedures for containing and cleaning up spills. The following items must be addressed in the SPCCP:
 - An SPCCP is valid for 3 years, if no changes are made to the plan or the facility.
 - Coast Guard, EPA, or RSPA approval is required.
 - "Worst case" scenario must be addressed.
 - Response capability must be documented.
 - EPA Regional Administrator must be notified of spills.

- The SPCCP and facility Spill Response Plan must be available for inspection at the facility.
- The appropriate regulatory agency must be notified in the event of a spill.
- Management measures would be implemented taking into account the best management practices applicable to construction and operation of port facilities. Maintenance and refueling of construction equipment would take place on special designated areas and fuels would be stored in areas provided with secondary containment to reduce the risk of spills. Similarly, construction equipment would be stored in a designated area when not in use.

The PTA may represent an a positive impact on the ground water quality in the Guayanilla-Peñuelas area associated to the potential alternative of constructing a state of the art wastewater treatment plant in the Guayanilla-Peñuelas project site. Treated effluent from this plant could be pumped to recharge the south coastal aquifer, which currently is affected by saltwater intrusion in the lower reaches, as previously discussed.

4.11.1.2.3 Ponce Alternative

The coastal area of Ponce is also affected by an increase in the intrusion of saline water from the sea. This phenomenon has adversely affected the fresh water well supplies.

The Project would not contribute to the degradation of the groundwater quality or the contamination of a public water supply. Similar practices would be implemented in the Ponce site:

- A Spill Prevention Control and Countermeasures Plan (SPCCP) would be designed and implemented in the Ponce site to avoid improper handling of oil products during construction and operation that could potentially result in additional impacts to ground water resources.
- Management measures would be implemented taking into account the best management practices applicable to construction and operation of port facilities.

4.11.1.2.4 Applicant's Preferred Alternative

The impacts of the Applicant's Preferred Alternative with regards to the quality of groundwater are a combination of the impacts discussed for the Guayanilla-Peñuelas and Ponce Alternatives, discussed in the previous two sections. Refer to the corresponding sections.

4.11.2 Sediment Quality

4.11.2.1 No-Action Alternative

Under the No-Action alternative, no fill would be placed in the shallow area at the Guayanilla Bay. Attenuation by natural means of the trace metal amounts detected in those soft sediments would take place without any disturbance. Maintenance dredging activities at the Ponce Harbor would continue with the same recurrence as before with similar levels of bottom-sediment disturbance.

4.11.2.2 Guayanilla-Peñuelas Alternative

The findings of a Sediment Quality Study conducted within the proposed fill area in Guayanilla Bay are discussed in detail in Chapter 3, Appendix F and T. According to this study, low to

mid-level concentrations of nickel, copper, chrome, and aroclor 1254 were detected in sediment samples from the area proposed for fill. However, these concentrations do not exceed EPA's levels of concern. The referenced criteria include maximum recommended values, which not necessarily represent EPA's compliance standards. Among these elements, the levels of nickel in 13 of 16 sampling stations were found to be above EPA's most restrictive criteria (15.9 ppm), suggesting wide dispersal in the area.

The Project proposes the fill of approximately 110 acres of marine bottom sediments at the Guayanilla Bay using selected materials. It is anticipated that this action would result in a positive impact on the existing conditions of Guayanilla Bay by restricting the movement of contaminated sediments, thus reducing potential negative effects in the bay.

It is expected, however, that construction activities, particularly reclamation works, would potentially have some adverse effects, as polluted sediments may be re-suspended into the water column. Site preparation, as well as the placing of fill, would induce bottom sediments to move, which could allow the physical separation of pollutants from the sediments.

Once separated and in the water, or still bound to the sediments or colloidal matter, these substances could enter the food chain as they are ingested by fish or other marine organisms or could spread to other areas within the Guayanilla Bay by ocean currents.

4.11.2.3 Ponce Alternative

An initial analysis of sediment quality at the port of Ponce was performed as part of a preliminary geotechnical study for the PTA (Appendix U). This study was performed by ERTEC in April 2001 and consisted of seven preliminary boreholes, four of them in the ocean portion of the Port of Ponce, and drilled to depths ranging between 15 and 40 feet. Samples were analyzed for the RCRA pollutant list. Results indicated that the subsurface soils in that area could be characterized as non-hazardous. However, prior to the USACE considering issuing the permits for ocean disposal of sediments from the Ponce Harbor, testing would be required utilizing the criteria established in the Evaluation of Dredged Material Proposed for Ocean Disposal Testing Manual ("Green Book") issued by EPA for these actions.

Impacts on sediment quality would be brought about by the dredging of approximately 810,000 cubic yards of bottom sediments from the Ponce Harbor to allow transit of Post-Panamax ships. As with the Guayanilla-Peñuelas alternative, polluted sediments may be re-suspended into the water column, allowing the physical separation of pollutants from the sediments. Once separated and in the water, or still bound to the sediments or colloidal matter, these substances could enter the food chain as they are ingested by fish or other marine organisms or could spread to other areas within the Guayanilla Bay by ocean currents.

4.11.2.4 Applicant's Preferred Alternative

Impacts associated to the Preferred Alternative on Sediment Quality would consist of a combination of the impacts associated to the Guayanilla-Peñuelas and Ponce alternatives, described in the previous sections.

4.12 Air Quality

The potential impacts on the quality of the air from the development of the PTA alternatives were analyzed as part of the DEIS. Cumulative impacts to air quality associated to the Preferred Alternative are discussed in Section 4.22.5. Air emissions into any of the Project sites would increase from the current levels due three different activities:

- Temporary generation of fugitive dust from construction of the docks, piers, parking areas and value-added sites (i.e., clearing, grading earth movement, excavation, etc.), and volatile organic compounds emitted during paving and painting activities.
- Intermittent generation of exhaust gases from heavy equipment, vehicles and other equipment during construction and operation of the ports.
- Generation of exhaust gases during maneuvering and harboring of additional vessels at both ports.

4.12.1 No - Action Alternative

Under the No-Action Alternative, there would be no new air emission sources on the proposed Project areas. The air quality would remain as it is described on section 3.16.

4.12.2 Guayanilla-Peñuelas or Ponce Alternatives

Any of these alternatives, Guayanilla-Peñuelas or Ponce, similarly to the Preferred Alternative, would have air emissions into the sites from three different activities:

- Temporary generation of fugitive dust from construction activities and volatile organic compounds emitted during paving and painting activities.
- Intermittent generation of exhaust gases from equipment and vehicles during construction and operation of the ports.
- Generation of exhaust gases during maneuvering and harboring of additional vessels at the ports.

The emissions associated to any of the alternatives would be obviously less than the emissions estimated for the Preferred Alternative. Estimates of emissions from both alternatives are detailed in Appendix Y.

The construction of the any of these alternatives would not induce the construction of new electrical power generating facilities that would represent emission sources. Some improvements to the electrical infrastructure are needed, including the construction a power substation in Guayanilla-Peñuelas and the upgrade of the 38 KV radial line in Ponce. However, such improvements will not become air emission sources.

4.12.3 Applicant's Preferred Alternative

Calculations of Emissions that would be generated from the construction of the Applicant's Preferred Alternative were divided as follows:

- Fugitive Dust Emissions from heavy construction and vehicular traffic
- Volatile Organic Emissions Associated to Paint Solvent and Paving Emissions

- Construction Equipment Emissions

Emissions that would be generated from the operation of the Applicant's Preferred Alternative were divided as follows:

- Emissions from Stationary Sources during Operation
- Emissions from Additional Vessels (Mobile Sources) during Operation

Estimates of emissions were based on the USEPA AP-42 Air Pollutant Emission Factors for Stationary Point and Area Sources. The assumptions used for such estimates are detailed in the Appendix Y. A summary of the assumptions is included in the sections below.

Fugitive Dust Emissions: An estimate was obtained of fugitive dust emissions from heavy construction applying an emission factor utilized by EPA. This emission factor is 1.2 tons per acre of construction per month of construction activity (EPA, 1995). This is a conservative factor and is based on total particulate matter rather than the fraction of particulate matter with an aerodynamic diameter equal of less than 10 microns (PM₁₀). It was assumed that construction activities would take 30 days in any given month and implementation of control measures with an efficiency of 50 percent.

The parcel of 110 acres of submerged lands proposed for reclamation by fill at the Guayanilla Bay would initially undergo heavy construction during a 12-month period. For the area proposed for value-added activities within the UCC parcel at Peñuelas, it is assumed that 10 percent of the construction area would be subject to heavy construction during a 6-month period.

The area of the project in Ponce that would be subject to heavy construction is estimated at 44 acres and would be located in the areas proposed for value-added activities. Heavy construction would take six (6) months to complete.

Vehicular traffic would also generate fugitive emissions. Estimates consider 50 percent emissions control, based on cleaning the construction vehicles and wetting of roads.

A summary of fugitive dust emissions, assuming 50 reduction from implementation of emission controls, from heavy construction and vehicular traffic for both sites of the Project is presented below (Table 4-2).

Table 4-3: Fugitive Dust Emissions

| | | |
|---------------------------------|---|------------|
| Guayanilla Peñuelas Site | Dust emissions from heavy construction | 1,265 tons |
| | Dust emissions from on site vehicular traffic | 19.2 tons |
| Ponce Site | Dust emissions from heavy construction | 158 tons |
| | Dust emissions from on site vehicular traffic | 13.1 tons |

The applicant has indicated that would provide control measures such as wetting the active construction area and maintaining the vehicles in optimal operating condition to control fugitive dust emissions. Also, a washing area for pneumatics would be provided at the Project entrance to minimize the dust carried outside of the Project.

Volatile Organic Emissions Associated to Paint Solvent and Paving Emissions: Emissions of volatile organic compounds from construction related activities were also calculated. Volatile Organic Compounds (VOC's) are organic chemicals that have a high vapor pressure and easily form vapors at normal temperature and pressure. The term is generally applied to organic solvents, certain paint additives, aerosol spray can propellants, fuels (such as gasoline, and kerosene), petroleum distillates, dry cleaning products and many other industrial and consumer products ranging from office supplies to building materials. VOC's are also naturally emitted by a number of plants and trees.

Volatile organic compounds will be emitted during painting and paving activities. The section below includes the estimated VOC's that would be emitted from the Project.

Paint Solvent Emissions: At the Guayanilla-Peñuelas site it is assumed that 10,000 gallons of paint would be applied during construction. It is assumed that 5,000 gallons of paint would be applied at the Ponce site. The assumptions used in the calculations are detailed in the Appendix Y. Results of this analysis are presented in Table 4-3.

Table 4-4: Total VOC Emissions from Paint Solvent

| Site | VOC Emissions |
|---------------------|---------------|
| Guayanilla Peñuelas | 22.1 tons |
| Ponce | 11 tons |

Paving Emissions: Following is an estimate of emission of volatile organic compounds from paving activities for the Guayanilla-Peñuelas and Ponce sites. Parking areas and internal roads at the Guayanilla-Peñuelas site would be paved, yielding a total of 909,924 square yards (yd²). At the Ponce site the paved area yielded approximately 212,961 yd². The assumptions used in the calculations for Ponce site were the same as the ones for the Guayanilla-Peñuelas site. Table 4-4 summarizes the total VOC's emissions associated to paving activities.

Table 4-5: Total VOC's Emissions from Paving Activities

| Site | VOC Emissions |
|---------------------|---------------|
| Guayanilla Peñuelas | 873 tons |
| Ponce | 204 tons |

Construction Equipment Emissions: The emissions from construction equipment were calculated using information on motor horsepower, the AP-42 emission factors, and an equipment operating time. Emissions from construction equipment at the port zone and value-added zone of the Guayanilla-Peñuelas and Ponce sites are summarized in Table 4-5 and 4-6.

Table 4-6: Emissions from Construction Equipment at the Guayanilla-Peñuelas Port Zone and Value-Added Zone

| Port Zone | | |
|--|----------------|------------------|
| Pollutant | ton/day | ton/month |
| Nitrogen Oxides | 1.36 | 40.68 |
| Carbon Monoxide | 0.30 | 8.94 |
| Sulfur Oxides | 0.13 | 4.02 |
| Particulate matter with an aerodynamic diameter equal or lower than 10 microns | 0.07 | 1.97 |
| Total Organic Carbon | 0.09 | 2.65 |
| Value-Added Zone | | |
| Pollutant | ton/day | ton/month |
| Nitrogen Oxides | 0.28 | 8.26 |
| Carbon Monoxide | 0.06 | 1.78 |
| Sulfur Oxides | 0.02 | 0.55 |
| Particulate matter with an aerodynamic diameter equal or lower than 10 microns | 0.02 | 0.59 |
| Total Organic Carbon | 0.02 | 0.67 |

Table 4-7: Emissions from Construction Equipment at the Ponce Port Zone and Value-Added Zone

| Port Zone | | |
|--|----------------|------------------|
| Pollutant | ton/day | ton/month |
| Nitrogen Oxides | 0.36 | 10.84 |
| Carbon Monoxide | 0.08 | 2.34 |
| Sulfur Oxides | 0.02 | 0.72 |
| Particulate matter with an aerodynamic diameter equal or lower than 10 microns | 0.03 | 0.77 |
| Total Organic Carbon | 0.03 | 0.88 |
| Value-Added Zone | | |
| Pollutant | ton/day | ton/month |
| Nitrogen Oxides | 0.28 | 8.26 |
| Carbon Monoxide | 0.06 | 1.78 |
| Sulfur Oxides | 0.02 | 0.55 |
| Particulate matter with an aerodynamic diameter equal or lower than 10 microns | 0.02 | 0.59 |
| Total Organic Carbon | 0.02 | 0.67 |

Emissions from Stationary Sources during Operation: Following are estimates of potential emissions due to the operation of proposed stationary sources at the port zones of Guayanilla-Peñuelas and Ponce.

- Each Gantry crane would be connected to an emergency generator to assure continuous operation during power loss events. These emergency generators would only be operating when power becomes unavailable from the local grid. In such a case, emergency power for each Gantry crane would be provided by a 500 hp diesel engine. In calculating potential emissions the generators were assumed to operate simultaneously and for a maximum of 500 hours per year. Emissions from emergency generators are transient in nature and should not have an impact on the air quality in the area. Table 4-7 describes the proposed stationary sources for the Project.

Table 4-8: Stationary Sources for Guayanilla-Peñuelas

| Stationary Sources | | | |
|--|------------------------|------------------------|-------------------------|
| Equipment | Number of Units | Horsepower (hp) | Maximum Total hp |
| <i>Port Zone at Guayanilla-Peñuelas</i> | | | |
| Emergency Generators for Gantry Cranes | 12 | 500 | 6,000 |
| <i>Port Zone at Ponce</i> | | | |
| Emergency Generators for Gantry Cranes | 6 | 500 | 3,000 |

Source: Frankel, 2000

The emissions were calculated using AP-42, Section 3.3 Gasoline and Diesel Industrial Engines (10/1996) factors. Potential emissions from the operation of emergency generators at the Guayanilla-Peñuelas and Ponce sites are summarized in Table 4-8 and 4-9.

Table 4-9: Emissions from Stationary Sources at Guayanilla-Peñuelas During Operation

| Pollutant | Emission Factor Lb/Hp-Hr | Potential Emission (Ton/year) |
|--|---------------------------------|--------------------------------------|
| Nitrogen Oxides | 0.0310 | 46.50 |
| Carbon Monoxide | 0.0068 | 10.02 |
| Sulfur Oxides | 0.0025 | 3.08 |
| Particulate matter with an aerodynamic diameter equal or lower than 10 microns | 0.0020 | 3.30 |
| Total Organic Carbon | 0.0025 | 3.77 |

Source: EPA, 1996

Table 4-10: Emissions from Stationary Sources at Ponce During Operation

| Pollutant | Emission Factor Lb/Hp-Hr | Potential Emission (Ton/year) |
|---|-------------------------------------|--|
| Nitrogen Oxides | 0.0310 | 23.25 |
| Carbon Monoxide | 0.0068 | 5.01 |
| Sulfur Oxides | 0.0025 | 1.54 |
| Particulate matter with an aerodynamic diameter equal or lower than 10 microns | 0.0020 | 1.65 |
| Total Organic Carbon | 0.0025 | 1.89 |

Source: EPA, 1996

Based on the potential emission calculations, the emergency generators to be installed at both the port zone of Guayanilla-Peñuelas and Ponce would be considered minor sources of air pollution for the purpose of construction and operating permits. Each port facility would require a construction and operating permit of air emissions sources as defined by the Air Quality Rule from the Environmental Quality Board (EQB).

The construction of the PTA would not induce the construction of new electrical power generating facilities that would represent emission sources. The energy source in Guayanilla-Peñuelas is adequate to provide the needs of the Project for the foreseeable future, subject to the construction of a power substation. In the Ponce area it is anticipated that the infrastructure would not have the capacity to supply the additional electrical power demand for the Project. For this reason, the 38 KV radial line should be upgraded to increase its capacity. However, such improvements would not become air emission sources. It is expected that companies to be located in the value-added areas would be classified as light industries and not be considered as mayor sources of air pollution as defined in Rule 102 of EQB's Regulation for the Control of Air Pollutants and EPA Regulations.

Industries that would be established on the value-added zone include:

- Electronic appliance/computer assembly, customizing, packaging, technology adaptation, etc.
- Automotive part and component manufacturing and supply chain activities to support Caribbean, Central and South American assembly plant networks, and distribution. Customizing automobiles for the Caribbean and Latin America Market
- Food processing and packaging.
- Biotechnological processing of food, feed and medications.
- Heavy equipment assembly, construction, such as cargo handling, materials transfer, agricultural, power plant, etc. Equipment assembly testing and delivery.

- Energy efficiency equipment assembly, such as solar power generation, fuel cells, etc., for delivery and installation in Caribbean and Latin America.
- Water processing treatment and recovery equipment assembly and delivery
- Telecommunications/information systems equipment assembly and installation, transmission equipment, etc.
- Logistic activities (FedEx, UPS, DHL, etc.) supply chain management.

The industries to be established in the value-added zones of the Project must obtain the necessary permits including the permit for the construction and operation of air emissions sources as required on EQB's Regulation for the Control of Air Pollutants.

In summary, it is not expected that air emissions from emergency generators to be located at the Guayanilla-Peñuelas port zone and at the Port of Ponce zone would have a an adverse impact on the air quality on the corresponding areas. Each port facility would not be considered as a mayor source since potential emissions for any criteria pollutant would be less than 250 tons per year. Also, each facility would not be considered a major source of hazardous air pollutants since potential emissions are less than 10 tons per year for any hazardous air pollutant or 25 tons per year for all hazardous air pollutants.

Emissions from Additional Vessels (Mobile Sources) during Operation: Estimates on exhaust emissions from the large containerships that would dock at each port were performed. The emission factors used in the calculations were obtained from an EPA report entitled "Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data" EPA420-R-00-002, February 2000. The following reasonable worst-case assumptions were used for the estimates:

- The maximum number of ships in port would be equal to the number of berths to be constructed. This result in two (2) additional ship calls (arrival and departure) for Ponce and four (4) for Guayanilla-Peñuelas.
- Ships only use their main engine for a short transient period of 30 minutes during maneuvering.
- The load factor during maneuvering is 15 percent. (The load factor is defined as the ratio of actual output to rated output based on the maximum continuous rating of the ship's main engine)
- The maximum continuous engine rating of the additional vessels that would dock at Ponce and Guayanilla-Peñuelas is 20,000 kW and 30,000 kW, respectively
- Ships in port (known as docking or hoteling) only operate auxiliary engines with a capacity of 1000 kW at full load for a period of twelve (12) hours.

Table 4-10 and Table 4-11 provide a summary of the total emissions from maneuvering and hoteling of additional vessels at the Guayanilla-Peñuelas and Ponce sites.

Table 4-11: Total Exhaust Emissions from Maneuvering and Hoteling of Additional Vessels at the Guayanilla-Peñuelas Port

| Pollutant | Emission Factors g/kw-hr | | Total Emissions (Ton/day) |
|--------------------|-----------------------------|----------|---------------------------------|
| | Maneuvering | Hoteling | |
| Particulate Matter | 0.3567 | 0.2610 | 0.03 |
| Nitrogen Oxides | 12.6099 | 10.5751 | 0.81 |
| Sulfur Dioxide | 10.6043 | 10.6043 | 0.77 |
| Carbon Monoxide | 5.5843 | 0.8378 | 0.16 |
| Hydrocarbons | 1.1481 | 0.0667 | 0.03 |

Table 4-12: Total Exhaust Emissions from Maneuvering and Hoteling of Additional Vessels at the Ponce Port Zone at Ponce

| Pollutant | Emission Factors g/kw-hr | | Total Emissions (Ton/day) |
|--------------------|-----------------------------|----------|---------------------------------|
| | Maneuvering | Hoteling | |
| Particulate Matter | 0.3567 | 0.2610 | 0.01 |
| Nitrogen Oxides | 12.6099 | 10.5751 | 0.36 |
| Sulfur Dioxide | 10.6043 | 10.6043 | 0.35 |
| Carbon Monoxide | 5.5853 | 0.8378 | 0.06 |
| Hydrocarbons | 1.1481 | 0.0667 | 0.01 |

Based on the emissions estimates presented on Table 4-10 and Table 4-11, the emissions from increased ship traffic are considered negligible, and therefore, not expected to have a negative impact on air quality.

4.13 Cultural Resources

4.13.1 No Action Alternative

Under this scenario, no development of the Project would occur and no potential impacts to existing cultural and archaeological resources would happen.

4.13.2 Guayanilla-Peñuelas Alternative

Potential impacts to cultural resources for this Alternative are summarized in Section 4.13.4.

4.13.3 Ponce Alternative

Potential impacts to cultural resources for this Alternative are summarized in Section 4.13.4.

4.13.4 Applicant's Preferred Alternative

A Phase IA terrestrial archaeological survey was conducted at the Ponce and Guayanilla-Peñuelas sites to determine the potential impact of the PTA on cultural, historic and prehistoric resources.

- Although the general Project vicinity is considered as a highly sensitive area for archaeological resources, the study did not identify any cultural or historical resources that would be impacted.
- During the field inspection, a prehistoric deposit corresponding to the ceramic period was detected in the margins of Río Tallaboa. This area, however, is outside of the Project site and would not be impacted by the development of the PTA.

The historical records of the area and its vicinity show the potential for occurrence of other historical and cultural resources, which deserves special attention regarding potential indirect effects during the development of the Project. In view of this, contractors to the Project would be instructed to stop any construction work and notify AFI if any historical or cultural artifacts are detected during construction. AFI would in turn notify the State Historic Preservation Office and the Institute of Puerto Rican Culture for appropriate action.

A Phase IA Submerged Cultural Resources Survey was conducted at the Ponce and Guayanilla-Peñuelas sites to determine if any submerged cultural, historic and prehistoric resources are present in the area. The evaluation was based on extensive historic and environmental background data, with a preliminary field photo-inspection. Although no finds were detected, the study concluded that there is a high probability of potential cultural resources in the area, including historical shipwrecks and historic port discards dating back to the 16th century. Consequently, Project contractors would be instructed to stop any construction work if any historical or cultural artifacts are detected during construction. AFI would in turn notify the State Historic Preservation Office and the Institute of Puerto Rican Culture for appropriate action.

4.14 Socio-Economic and Environmental Justice

An analysis of the socioeconomic impact of the development of the PTA was prepared as part of this DEIS (Appendix O and FF). The socioeconomic analysis included a comprehensive

Environmental Justice (EJ) determination as required by Executive Order Number 12898 of February 1994.

The socioeconomic analysis addresses the overall impact of the Project in the municipalities of Guayanilla, Peñuelas and Ponce, and adjacent south coast municipality at Ward levels. The EJ study considers the socioeconomic condition of the municipalities and wards directly impacted by the Project, to determine whether the proposed location of any of its components represents an unfair or excessive impact any particular group because of their economic, social, religious or race standing.

No relocation of people or communities would be required as part of the Project for any of the alternatives discussed herein.

A Cost/Benefit Analysis was performed with the purpose of measuring the costs and benefits of Port of The Américas (Appendix Z). The Port would be developed in the Ponce-Guayanilla region and would concentrate on export-import and transshipment activities.

The study was divided into four main components: Demand Analysis, Supply Analysis, Impacts Analysis, Social Profitability Analysis. The results can be summarized as follows:

- Internal rate of return calculations suggest a very profitable activity, reflecting rates of return of 19.8% in the Base Case down to 12.6% in the Low Case. A 6.5% social discount rate was applied.
- Payback period (PRI) is estimated to be close to five years in the Base Case, but close to ten years in the Very Low Case.
- Profitability index (IR) reflects high values for the Base Case, acceptable values for the Low Case, but not acceptable results for the Very Low Case.
- Other social benefits like “value added” activities and clusters activity are not included in the computations. When included, even the Low Case would reflect a very profitability alternative.

4.14.1 No-Action Alternative

The No-Action Alternative eliminates the opportunity that represents the Applicant's Preferred Alternative for economic growth. The Applicant's Preferred Alternative would provide employment, income and economic activity to the municipalities in the immediate area, the southern region and the entire island of Puerto Rico. As indicated before, the Applicant's Preferred Alternative would impact the employment rate and the income in the municipalities in the south region of the Island, creating approximately 3,833 direct indirect and induced jobs with an income of approximately \$17.7 million dollars for the first year. This impact would be recurrent and would increase according to TEU traffic in successive years.

The No-Action Alternative would not have any effects on the environmental justice issue.

4.14.2 Ponce or Guayanilla-Peñuelas Alternatives

The development of the Ponce or Guayanilla-Peñuelas alternatives separately implies a reduction with respect to the employments and incomes estimated for the Applicant's Preferred Alternative. A cost benefit analysis is being conducted to quantify the specific impacts of both sites independently.

In terms of the environmental justice issue, the development of the Ponce or Guayanilla-Peñuelas alternatives separately would not represent differences with respect to the Applicant's Preferred Alternative. As indicated earlier, the development of the elements of the PTA at the proposed sites in Ponce, Guayanilla and Peñuelas (Playa ward of Ponce, Tallaboa Poniente ward of Peñuelas, and Playa ward of Guayanilla), does not represent a disproportionate environmental impact to these communities.

4.14.3 Applicant's Preferred Alternative

4.14.3.1 Socioeconomic Analysis

The economic impact of a project has two main components: (1) the effects of the required construction investment, including capital investment; and (2) the impact of the regular operations of the Project. The first is a non-recurring effect and would impact the employment rate and the income in the municipalities where the Project would be developed and the south region of the Island. The second is a recurrent effect that would remain as long as the project is operating.

- The construction and the operation impacts can be further divided between two general categories. The first is the direct economic impact on employment rate and income. The other represents the indirect and induced effect of the Project on employment rates and income.
- The analysis included a compilation of data pertinent to the direct economic impact of the Project. These data consist of the total investments for the construction phase and the direct jobs and wages for the regular operations phase. The inter-industrial multipliers developed by the Puerto Rico Planning Board were applied to these data to determine the direct jobs and income, and the indirect and induced jobs and income during the construction, as well as the indirect and induced effects during the operation. These multipliers are widely used to determine the relations among diverse industrial sectors of the economy, since they calculate the impact of the economic activity of one sector over other sectors of the economy.

The economic impact study, in addition to estimating the jobs and income that would be generated from these jobs, also estimated the fiscal revenue from income taxes paid by employees. The results are shown in Table 4-12.

Table 4-13: Construction Income and Employment Estimates

| | | |
|---------------|---|----------|
| Jobs | Direct (Number) | 5,588 |
| | Direct and Indirect (Number) | 7,373 |
| | Direct, Indirect and Induced (Number) | 11,995 |
| Income | Direct (Millions) | \$ 76.2 |
| | Direct and Indirect (Millions) | \$ 116.3 |
| | Direct, Indirect and Induced (Millions) | \$ 192.5 |

Source: Estudios Tecnicos, 2001 (**Appendix O**)

The construction of the PTA would generate approximately 5,600 direct jobs and a direct income of \$76.2 million per year (Frankel Associates, 2000). The direct, indirect and induced impacts would be about 12,000 jobs and \$192.5 million in income. This impact is non-recurring.

The benefits from the regular operations of the Project are recurring and depend upon projected ship traffic, since this would determine the number of jobs created by the Project and the payroll generated. The economic impact analysis was based on traffic projections from the marine traffic study prepared by Frankel and Associates (Frankel, 2000). Frankel estimated a need of approximately 528 full-time employees for a traffic level of 600,000 TEU per year. These estimates do not include the staff needed in the free zones or the industrial zones of the ports.

The number of jobs and the indirect and induced income are estimated from multipliers provided by the Planning Board. The analysis of the economic impact uses the values of median salaries provided by the Puerto Rico Department of Labor and Human Resources for each type of job required to estimate the income to be generated by the ports. The estimated economic impacts of the operational phase for the first and the tenth year of operation of the PTA are summarized in Table 4-13 and Table 4-14.

- The data show that with a total traffic of 600,000 TEU during the first year (300,000 TEU in Ponce and 300,000 TEU in Guayanilla), the PTA would create 528 direct jobs, and would generate direct income of \$9.27 million per year.
- The combined direct, indirect and induced impact would be of 3,833 jobs, with a total income of \$17.70 million. This impact is recurrent and would increase as a function of the ports' yearly TEU traffic. This does not include the staff required for the industrial or free zones at the ports. **Table 4-14** summarizes this information.

Table 4-14: Employment and Income Estimates for the First Operation Year

| | | |
|---------------|---|--------|
| Jobs | Direct (Number) | 528 |
| | Direct and Indirect (Number) | 1,484 |
| | Direct, Indirect and Induced (Number) | 3,833 |
| Income | Direct (Millions) | \$9.27 |
| | Direct and Indirect (Millions) | \$11.4 |
| | Direct, Indirect and Induced (Millions) | \$17.7 |

Source: Estudios Técnicos, 2001 (**Appendix O**)

- With traffic of 2,300,000 TEU during the tenth year (projected scenario), the PTA would generate approximately 1,511 direct jobs and a direct income of \$25.6 million per year. The direct, indirect and induced impacts are estimated at 10,970 jobs and income of \$49.1 million. This impact is recurrent and would increase until the yearly traffic at the ports is stabilized. These results are summarized in **Table 4-14**.

Table 4-15: Income and Employment Estimates for the Tenth Year of Operation

| | | |
|---------------|---|--------|
| Jobs | Direct (Number) | 1,511 |
| | Direct and Indirect (Number) | 4,246 |
| | Direct, Indirect and Induced (Number) | 10,970 |
| Income | Direct (Millions) | \$25.6 |
| | Direct and Indirect (Millions) | \$31.6 |
| | Direct, Indirect and Induced (Millions) | \$49.1 |

Source: Estudios Técnicos, 2001 (**Appendix O**)

- The construction and operation of the PTA would positively impact the fiscal income of the municipalities of Ponce, Peñuelas and Guayanilla, as well as the entire region and the Island. This impact would be associated to taxes for municipal construction permits; municipal taxes; internal revenue receipt charges; fees required by the Engineering and Surveyors Association of Puerto

Rico for stamping plans and specifications; and personal income taxes. The impact of the construction phase on the fiscal income would benefit the local government of the towns where the Project would be developed, in a non-recurrent way, as well as the Commonwealth government, in approximately \$16 and \$34 million, respectively.

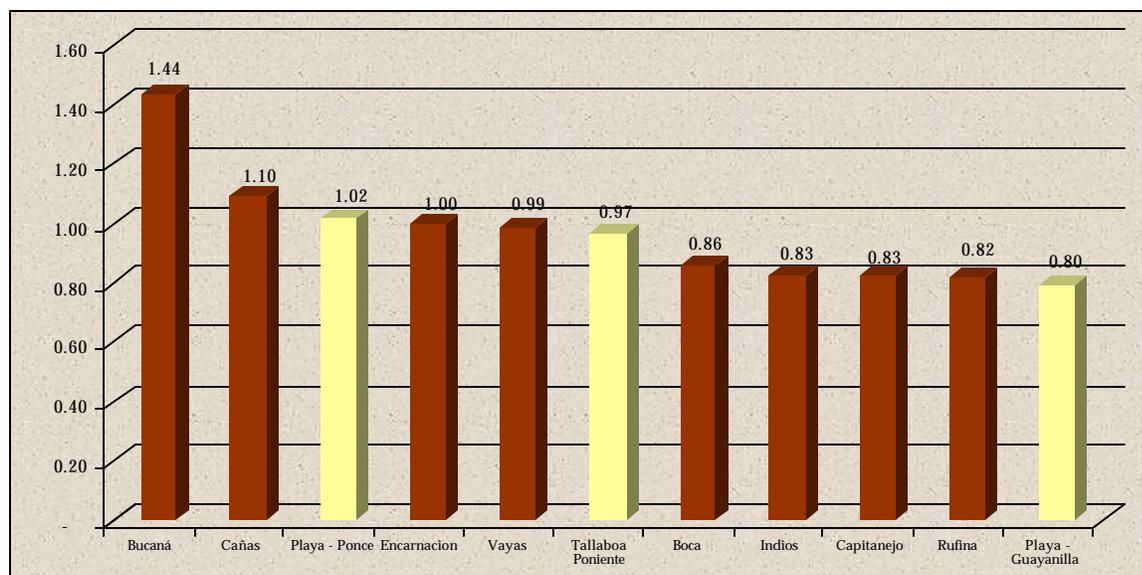
- Within a 10-year period, the operation of the PTA would generate between \$8 to \$23 million to the Commonwealth treasury in personal income taxes. This impact is recurrent and variable according to employment.

4.14.3.2 Environmental Justice Study

Presidential Executive Order Number 12898 (White House, 1994) requires that for any project that involves the Federal interest, the DEIS must include an Environmental Justice study to demonstrate that the adverse environmental impacts of the proposed action do not represent a disproportionate burden on minority or low-income populations.

- The basis of the Environmental Justice study was the evaluation of the social and economic variables of the municipalities of the region. The evaluation included the municipalities of Ponce, Yauco, Juana Díaz, Guayanilla, Peñuelas, Santa Isabel, and Guánica, as well as the coastal wards of Guayanilla (Boca, Indios, Playa, and Rufina), Peñuelas (Encarnación and Tallaboa Poniente), and Ponce (Bucaná, Cañas, Capitanejo, Playa and Vayas). The data from these sites were compared to the sites where elements of the Project are planned, including: Playa ward in Ponce and Playa ward in Guayanilla, together with Tallaboa Poniente ward in Peñuelas.
- The comparative analysis includes two different levels of socioeconomic and geographical groupings: (1) Guayanilla, Peñuelas and Ponce, compared to the municipalities of Yauco, Juana Díaz, Santa Isabel, and Guánica; and (2) Playa ward in Ponce, Playa ward in Guayanilla, and Tallaboa Poniente ward in Peñuelas, compared to the Boca, Indios and Rufina wards in Guayanilla; Encarnación ward in Peñuelas; and Bucaná, Cañas, Capitanejo and Vayas wards in Ponce. The socioeconomic analysis evaluated the following variables:
 - Median family income;
 - Per capita income;
 - Unemployment rate;
 - Households that receive governmental income assistance;
 - Households that receive Social Security benefits;
 - Scholarship (people 25 years or older that have a high-school degree)
 - Housing conditions (houses classified as in good condition);
 - Literacy (people 10 years or older that can read and write);
 - Housing median value;
 - Housing ownership index; and

- Population growth 1990-2000
- The sources of information used in the analysis were the 1990 and 2000 Population Census and data provided by the Statistics Bureau of the Puerto Rico Department of Labor and Human Resources. The variables studied present a comparative picture of the socioeconomic conditions within the municipalities of Guayanilla, Peñuelas, and Ponce, as well as the Playa ward in Guayanilla, Tallaboa Poniente ward in Peñuelas, and Playa ward in Ponce. The data from these sites were compared to other municipalities and adjacent coastal wards in these and nearby municipalities. Each one of the variables was used individually and grouped as a socio-economic index, to allow an appreciation of the prevailing conditions in each municipality and ward. The analysis produced the following results:
 - The municipalities of Ponce, Guayanilla and Peñuelas are in the first, fourth and fifth rank among the seven municipalities within the region, as shown in **Figure 4-4**. Ponce has a socioeconomic index of 1.06; Guayanilla: 0.92; Peñuelas: 0.92; Yauco: 0.95, Juana Diaz: 0.94; Santa Isabel: 0.91 and Guánica: 0.89.
- At the ward level, Playa ward of Ponce ranks higher than the average of the study area, while Tallaboa Poniente ward of Ponce is close to the average. In comparison, Playa ward of Guayanilla reflects an apparent disadvantaged socioeconomic condition in comparison with the other wards of the study area.



Source: Estudios Técnicos, 2001 (Appendix O)

Figure 4-4: Socioeconomic Index: Study Area

- The results of the Environmental Justice study show that, based on the data for the municipalities and wards evaluated:

- The municipality of Ponce exhibits the highest socioeconomic index among the seven municipalities in the region, while the Guayanilla and Peñuelas municipalities ranked as number 4 and 5.
- Playa ward of Ponce exceeded the average for the study area average, ranking third among all the wards compared in the region.
- Playa ward in Guayanilla exhibits the lowest socioeconomic index of the study area; Tallaboa Poniente ward in Peñuelas shows a socio-economic index value of close to one, ranking fourth among the 11 wards compared.

The conclusions from the Environmental Justice analysis establish that, development of the elements of the PTA at the proposed sites in Ponce, Guayanilla and Peñuelas (Playa ward of Ponce, Tallaboa Poniente ward of Peñuelas, and Playa ward of Guayanilla), does not represent a disproportionate environmental impact to these communities. Therefore, the Project complies with the mandate of Executive Order number 12898.

Although the Playa ward in Guayanilla exhibits the lowest socio-economic index among the 11 wards compared, the evidence shows that the site selection criteria depend on many factors such as the existence of port facilities, physical conditions including tides and sea depth, and land availability. The proposed location of the elements of the Project is the result of a detailed analysis of alternatives (Chapter 2), in which potential sites throughout the entire Island was considered.

The proposed action would represent an opportunity for economic growth that would provide employment, income and economic activity to the municipalities in the immediate area, the southern region and the entire island of Puerto Rico.

4.15 Hazardous, Toxic and Radioactive Wastes

4.15.1 No-Action Alternative

Under the No-Action Alternative, the potential utilization of a portion of the UCC petrochemical complex property would not take place. This alternative would have a negative impact, since this site has the potential to be used for industrial purposes and is currently abandoned. Furthermore, the area would not benefit from the environmental restoration Brownfields program, which is also a negative impact.

4.15.2 Guayanilla-Peñuelas Alternative

Under this alternative, the project would be developed in the selected site in the Guayanilla-Peñuelas area. This alternative includes the reclamation by fill of approximately 110 acres of submerged lands adjoining Punta Gotay at the Guayanilla Bay, to provide enough space for construction of parking areas for containers and operational and administrative offices. This alternative also includes potential re-utilization of a portion of the Union Carbide Caribe (UCC) petrochemical complex property (currently out of use) for industrial activities.

- As discussed earlier, the UCC property has an area of approximately 650 acres, of which approximately 93 acres are wetlands. Only about 12 acres of which would be filled as part of the proposed action. Segments of the property are under an environmental cleanup supervised by the EPA. The environmental cleanup includes the removal of hydrocarbons and other petrochemical materials

from soil and groundwater that accumulated in the property after years of operations. The Project would try to maximize the reuse of those portions of the UCC property currently subject to environmental corrective action, in accordance with such actions and taking into consideration the physical and environmental characteristics of the parcel. It is anticipated that approximately 300 acres of this property would be developed for this project.

- The Applicant recently requested an endorsement from the EPA on the potential use of part of the UCC property for commercial and industrial activities through EPA's Brownfields program. The EPA recently approved this application where up to \$100,000 would be provided to AFI for the environmental restoration program of the property. The development of the Project under AFI, would be conducted in such manner that the use and reuse of this property would not interfere with current clean up activities.

4.15.3 Ponce Alternative

Under this alternative, the project would be developed in the Port of Ponce area. This is an industrial lot where various handlers of regulated substances have been identified, most of them operating in compliance with EPA regulations. No portions of land at this site have been identified as requiring corrective action by EPA or EQB. It is not anticipated that the construction and operation of the port would alter or impact, nor rehabilitate any of the parcels selected for the proposed action.

4.15.4 Applicant's Preferred Alternative

The impacts of the Applicant's Preferred Alternative with regards to Hazardous, Toxic and Radioactive Wastes would consist of a combination of the impacts associated to the Guayanilla-Peñuelas and Ponce alternatives, discussed in the previous two sections.

4.16 Dredging and Disposal of Dredged Material

4.16.1 No-Action Alternative

Under the No-Action alternative there would be no immediate dredging in Ponce, and the navigation channel and inner harbor would maintain their current depth of 36 feet. The port would not be able to handle Post-Panamax vessels and transshipment operations in the port would remain at current levels. There would be no need to activate neither the existing Offshore Dredged Material Dumping Site nor the required preparation of a Site Management and Monitoring Plan.

Eventually, as the Ponce Harbor and navigation channel shoal due to sediment accumulation, there would be the need to provide maintenance dredging to keep the port operational. This would entail the preparation of a separate Environmental Impact Statement, compliance with all permit requirements under Section 103 of the Marine Protection, Research and Sanctuaries Act, and the development and approval of a Site Management and Monitoring Plan.

4.16.2 Guayanilla-Peñuelas Alternative

Under this alternative no dredging would be necessary, hence no environmental impacts associated with this activity would result from project development. There would be no need to activate neither an existing Offshore Dredged Material Dumping Site nor the required preparation of a Site Management and Monitoring Plan.

4.16.3 Ponce Alternative

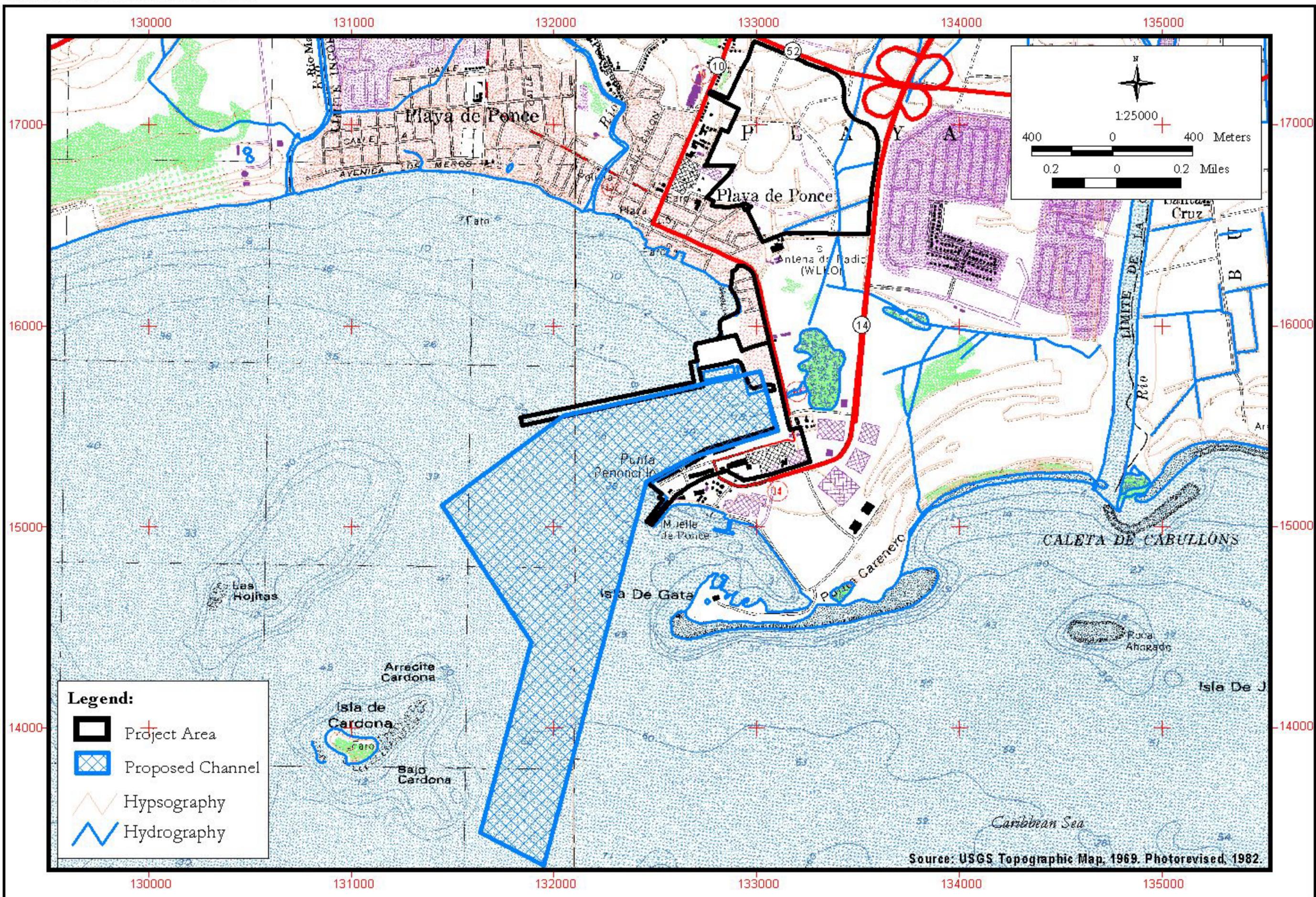
The Ponce Alternative proposes the immediate dredging of Ponce Harbor and its navigation channel to accommodate Post-Panamax vessels. In order for Ponce Harbor to accommodate Post-Panamax vessels, the navigation channel and berthing areas would have to be dredged to a minimum of 45 feet, or 9 feet deeper than the current authorized depth. An additional overdraft of 4 feet may be required to protect Manatees, increasing the harbor's depth to 49 feet.

According to Frankel (2000), a minimum of approximately 810,000 cubic yards of material would have to be excavated along the wharves and turning basin to reach the desired 45 feet depth. Approximately 1.5 million cubic yards would have to be removed to deepen the harbor to 49 feet and about 2.2 million cubic yards to 53 feet. The 49-foot calculation includes an additional factor that accommodates dredging approximately 1,000 feet off the approach channel. Figure 4-5 shows the Ponce Federal Navigation Channel and the proposed dredging layout.

The dredging activity would eliminate the existing benthic habitat of several macro invertebrate species, including sea feathers, gorgonians and polychaete worms. However, it is expected that upon completion of the dredging activity these populations would become reestablished by recruitment from nearby areas. Some temporary changes in water quality are expected to bring short-term adverse effects on aquatic life, but these effects would diminish as the dredging is completed.

The dredging operations would result in increased turbidity in the area. The disruption of accumulated organic deposits during dredging would place organic material in suspension; increasing their oxidation rate and decreasing dissolved oxygen in the water column. These effects are also temporary and water quality should return to normal levels once the dredging operation is terminated. To prevent additional environmental degradation during the excavation and loading operations, silt barriers would enclose the loading area.

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Coordinates in State Plane NAD 27



Figure 4-5 Ponce Harbor Proposed Dredging Layout

Port of the Americas



Endangered marine turtles and the West Indian Manatee are common visitors to the shallow coastal areas of the south coast of Puerto Rico, including the Ponce area. However, no adverse impacts to these species or their habitats are expected as a result of the proposed development of the PTA in Ponce. As indicated earlier in this Section, Ponce Bay does not support any abundant development of seagrasses, and none are present in the proposed dredge areas. In this respect, no direct impacts to Manatee foraging areas are anticipated. Construction activities, related noise and the presence of construction equipment, barges and support vessels would cause any Manatee in the vicinity to temporarily avoid the immediate area and seek shelter elsewhere. As with the Manatee, and essentially because of the same reasons, no adverse impacts are expected on endangered sea turtles. There are no known turtle nesting sites within the Project's boundaries.

For the purposes of the proposed action at the Ponce site, the beneficial use of dredging sediments was deemed feasible. A portion of the total volume of sediment that would be dredged at the Ponce Harbor can be utilized as fill at the Guayanilla-Peñuelas component, disposing of the remainder quantity at the designated Ponce marine disposal area is proposed as part of the Project.

The probable impacts of disposing dredged material from Ponce Harbor at the designated offshore dumping site were evaluated in detail in the Final Environmental Impact Statement for the Designation of Ocean Dredged Material Dumping Sites (ODMDS) for Arecibo, Mayagüez, Ponce and Yabucoa, Puerto Rico (EPA, 1988). No adverse effects are expected on living, mineral, socioeconomic or cultural resources from the future use of the Ponce Offshore Disposal Site. This EPA-approved site has no unique ecological or environmental characteristics, and is similar in sediment types and benthic composition to the proposed dredging areas.

Disposal of dredged material at the designated offshore disposal site would be widely distributed over the sea floor, which varies in depth from 960 to 1752 feet. Because of this wide distribution, only thin layers of dredged material would be deposited at a given sea floor location. It is anticipated that the effects of deposition of this material on the benthic flora and fauna and associated marine communities would be negligible. Bottom organisms at the Ponce ODMDS are primarily deposit feeders, which are generally well adapted to live in high turbidity environments like that might be caused by dredged material disposal. Because the discharged dredged material would be widely dispersed over a large area, it is unlikely that the use of the Ponce ODMDS site would have an adverse impact on benthic communities.

Endangered Sea turtles, Manatees and other sensitive coastal marine species are most active in the near-shore coastal environment and are only transients in oceanic environments. Consequently, offshore disposal of dredged material is not expected to adversely impact these species.

The designated Ponce ODMDS site is located in deep ocean waters well flushed by marine currents. Because of this, any nuisance plant or animal species or pathogens that might be present in the dredged material are unlikely to survive or reproduce at the disposal site or adjacent perimeter of the site where dredged material may settle. The dredged material to be disposed of would be similar in nature to that existing at the site and adjacent areas, and would result in a similar fauna at the site and at nearby areas.

Deep-water (100 to 300 meters) currents of the order of 5 to 10 cm/sec are characteristic of the ocean waters at the Ponce ODMDS site (EPA, 1988). They generally move in a west-northwesterly direction. Because of the fine nature of the material to be dredged, it is expected that these sediments would be transported over considerable distances before settling

to the bottom. Sediment transport in the direction of the coastline would be limited because significant transport only occurs below 300 meters.

If sediment transport toward the coastline were to occur, the dredged material would settle on the bottom as shallower depths are encountered. This is particularly important because it represents the least potential for dispersion affecting near-shore areas that may contain coral reefs or other important benthic communities. According to EPA (1988), modeling of the fate of dumped material at the Ponce site indicated that dredged material would not be transported to the shoreline, and consequently there would be no impacts to the shoreline or recreational areas along the coast.

Although the dumped dredged material will be dispersed over a wide area inside the ODMDS, it is not expected that any sediments disposed of at the Ponce site would damage or adversely impact coral reefs or their associated fish or shellfish components, on which local fisheries are based. There would be no interference with shipping lanes, as there are no designated shipping lanes in the area. No cultural or historical resources of significance would be affected.

4.16.4 Applicant's Preferred Alternative

Impacts associated to the Applicant's Preferred Alternative on Dredging and Disposal of Dredged Material would consist of a combination of the impacts associated to the Guayanilla-Peñuelas and Ponce alternatives, described in the previous sections.

4.17 Navigation

This section discusses the impacts to the navigation setting at Guayanilla and Ponce bays resulting from the development of the PTA. These impacts were evaluated in terms of the need for navigation channel and turning basin improvements associated with the alternatives considered; the ensuing risk of accidents and groundings if no channel improvements are performed, the net increase in vessel traffic in both Guayanilla and Ponce harbors; and the general environmental effects of this increase. It also examines the effect of port operations in relation to current safety requirements, and the effects of construction and operation activities of large-size berthing and/or container staging facilities.

4.17.1 No-Action Alternative

Under the No-Action alternative, no berthing facilities or container staging areas would be built, and no Post-Panamax vessels would arrive to the Ponce and Guayanilla bays. Large-scale dredging of the Ponce Harbor navigation channel would in turn be limited to a maintenance operation with the purpose of preserving its 36-foot depth, and with a recurrence akin to the current conditions. Also, the fill of approximately 110 acres in Guayanilla Bay would not occur.

No net increase in ship traffic would occur neither as a result of a No-Action Scenario. Therefore, the increased risks of collisions with Manatees would not occur, and no refinement of the EcoEléctrica Manatee Management and Monitoring Plan would be necessary. Furthermore, the amplified risks of groundings, spills and other adverse environmental effects would not occur. As a result, no additional safety measures would have to be developed to complement the operation of the LNG terminal at EcoEléctrica in Guayanilla Bay, while the Ponce Harbor would continue to operate under the current regulatory regime.

4.17.2 Guayanilla-Peñuelas Alternative

The development of the proposed action in Guayanilla Bay would not require improvements to the existing navigation channel or turning basin. The depth of the entrance to the navigation channel ranges from 66 to more than 100 feet (NOAA, 2001) and sediment accumulation in the bay is minimal. During the last 50 years the harbor has not required maintenance dredging. Dredging of the bay or its navigation channels to allow passage of Post-Panamax vessels would not be required.

- As for the net increase in ship traffic, it is anticipated that approximately 600 containerships would use the proposed facilities every year to reach the goal of 2.3 million TEU's per year. Maritime traffic would increase from 300 to 500 ships per year to 1,000 ships per year when the PTA is in full operation (Frankel, 2000).
- The potential of spills during refueling operations is also an environmental concern associated with the proposed operation. Proper execution and preventive engineering measures, in accordance to the Coast Guard regulations, would be implemented to minimize associated risks. The arrival of vessels transporting explosives, reactive or flammable materials would not be allowed. Proper emergency plans would be developed or modified, as applicable, by the organizations in charge of the operation of the port.

A quantitative assessment of the environmental risks from increased vessel traffic and port operations in the Guayanilla-Peñuelas PTA site, including the risk of groundings or related accidents was examined in a Marine Safety and Risk Assessment (Appendix AA).

The resulting density and composition of vessel traffic for the future Port of the Americas is expected to be drastically different from existing situation. The overall number of sailings would increase threefold and reach 4.95 daily sailings on average for Guayanilla. In vessel composition, containerships would predominate, including main line container vessels as large as 130,000 det., and feeder vessels as small as 8,000 dwt.

This overall conclusion is that, even with projected high traffic density of containership vessels, marine risk with potentially serious environmental impact is exceptionally low. A number of factors support this conclusion for the Guayanilla component:

- Approach to Guayanilla is wide with only a few restrictions. It was, for example, expert's opinion that a marine accident in the future Port of the Americas would be three times less likely than for San Juan harbor.
- Environmental conditions (wind, current) in the area are mild most of the time (except of hurricanes, when regular navigation is not allowed) and highly constant. The navigation conditions are primarily affected by the steady wind, blowing almost without exception from an easterly direction, between north-northeast and south-southeast.
- The majority of vessels calling to the PTA would be containers. These are highly maneuverable ships with, judging by worldwide experience, excellent safety records.

Based on the analysis, the probability of any kind of marine accident is about once in 5.5 years, or annual probability of 18% for Guayanilla Bay. Probability of a serious accident, such as fire

or oil spill, is even much lower. Such occurrence is expected to be as low as on average once in 18 years, or 6% on annual basis.

Although it is not anticipated the operation of the proposed port at Guayanilla Bay would not represent a public safety risk, the proximity of the proposed new pier to the EcoEléctrica pier would require the implementation of additional safety measures to ensure public safety during LNG transfer activities.

Currently, safety measures for the marine traffic are being implemented effectively at the Guayanilla Bay. The proposed action is not expected to result in substantial changes to the security and safety requirements already in effect at this facility.

The effect to navigation of the proposed structures was evaluated in terms of whether the proposed infrastructure would hinder or significantly modify the current vessel traffic regime of the Guayanilla Bay.

It is anticipated that the construction of the piers would require the installation of piles, and other structural components. Barge-mounted pile drivers and other support small vessels would be present during the construction stage of the berthing facilities at both bays. The space required for this operation is relatively limited. It is also anticipated that most this equipment would be emplaced in a relatively fixed location through the construction process. In general terms, the construction of the berthing facilities would not result in significant impacts to the navigation in the Guayanilla Bay.

The operation of a docking facility up to 6,000-feet long in Guayanilla Bay is feasible to the north of the Peerless Oil & Chemical docks in Punta Gotay. The proposed operations of this facility would occur along a portion of the eastern end of the authorized channel in the Guayanilla Bay with no anticipated impacts to the current maritime traffic. Other elements of the proposed project in the Guayanilla Bay would occupy submerged land reclaimed by fill from a shallow area adjacent to Punta Gotay at the Guayanilla Peninsula.

4.17.3 Ponce Alternative

Impacts to navigation resulting from this alternative would be brought about by the dredging of the Ponce Harbor navigation channel and turning basin to allow the passage of Post-Panamax ships. Such modification will result in an increase in vessel traffic.

- The potential of spills during refueling operations is also a major environmental concern associated with the proposed alternative. Proper execution and preventive engineering measures, in accordance to the Coast Guard regulations, will be implemented to minimize associated risks. The arrival of vessels transporting explosives, reactive or flammable materials will not be allowed. Proper emergency plans will be developed or modified, as applicable, by the organizations in charge of the operation of the port.

A quantitative assessment of the environmental risks from increased vessel traffic and port operations in the Guayanilla-Peñuelas PTA site, including the risk of groundings or related accidents was examined in a Marine Safety and Risk Assessment (Appendix AA).

The resulting density and composition of vessel traffic for the future Port of the Américas is expected to be drastically different from existing situation. The overall number of sailings would increase threefold and reach 2.7 daily sailings on average for Ponce. In vessel composition containerships would predominate, including main line container vessels as large as 130,000 det., and feeder vessels as small as 8,000 dwt.

This overall conclusion is that, even with projected high traffic density of containership vessels, marine risk with potentially serious environmental impact is exceptionally low. A number of factors support this conclusion for the Guayanilla component:

- Approach to Ponce is relatively short and straight.
- Environmental conditions (wind, current) in the area are mild most of the time (except of hurricanes, when regular navigation is not allowed) and highly constant. The navigation conditions are primarily affected by the steady wind, blowing almost without exception from an easterly direction, between north-northeast and south-southeast.
- The majority of vessels calling to the PTA would be containers. These are highly maneuverable ships with, judging by worldwide experience, excellent safety records.

Based on the analysis, the probability of any kind of marine accident is about once in 15 years, or annual probability of 7% for Ponce Harbor. Probability of a serious accident, such as fire or oil spill, is even much lower. Such occurrence is expected to be as low as on average once in 18 years, or 6% on annual basis.

The U.S. Coast Guard and the Puerto Rico Ports Authority have the primary responsibility for enforcing public safety regulations applicable to marine port operations.

Currently, safety measures for the marine traffic are being implemented effectively at the Port of Ponce. The proposed action is not expected to result in substantial changes to the security and safety requirements already in effect at this facility.

The effect of the proposed structures to navigation was evaluated in terms of whether the proposed infrastructure would alter or significantly modify the current vessel traffic regime in Ponce and Guayanilla bays. It is anticipated that the construction of the piers would require the installation of piles, and other structural components. Barge-mounted pile drivers and other support small vessels would be present during the construction stage of the berthing facilities at both bays. The space required for this operation is relatively limited. It is also anticipated that most this equipment would be emplaced in a relatively fixed location through the construction process. In general terms, the construction of the berthing facilities would not result in significant impacts to the navigation in both bays.

The effect of the proposed structures to navigation was evaluated in terms of whether the proposed infrastructure would alter or significantly modify the current vessel traffic regime in Ponce Bay.

It is anticipated that the construction of the piers would require the installation of piles, and other structural components. Barge-mounted pile drivers and other support small vessels would be present during the construction stage of the berthing facilities. The space required for this operation is relatively limited. It is also anticipated that most this equipment would be emplaced in a relatively fixed location through the construction process. In general terms, the construction of the berthing facilities as an expansion of the existing port in Ponce, will not result in significant impacts to the navigation in Ponce Bay.

The proposed layout for the berthing facilities at Ponce Harbor follows the existing channel configuration. The proposed operation of this facility would occur at the northwestern end of the authorized channel with no hindering of vessel traffic in the area.

4.17.4 Applicant's Preferred Alternative

The impacts of the Applicant's Preferred Alternative with regards to Navigation would consist of a combination of the impacts associated to the Guayanilla-Peñuelas and Ponce alternatives, discussed in the previous two sections.

4.18 Infrastructure

4.18.1 Drinking Water

4.18.1.1 No-Action Alternative

Under the No-Action alternative, there would be no need to supply additional potable water to support the operation of the port and the value-added areas. The water supply needs would be due to the expected increase in population.

4.18.1.2 Guayanilla-Peñuelas Alternative

The operation of the Project at Guayanilla-Peñuelas would require water supplies to satisfy two main demands; (1) the port operation, including the ships that would arrive the port facility and (2) the industries located at the value-added areas. Between these two, the value-added areas would require a larger amount of water to satisfy the needs of the employees and the different industrial processes. Estimates of the potential water demands for this alternative are included in Table 4-15. The assumptions considered for the development of these estimates are included below.

Port Operations and Vessels Arrivals

- Water demand estimates for port operations were based on the job projections estimated by Frankel (2000) and Estudios Técnicos (**Appendix O**) as well as the vessel arrival forecasts for the first and tenth years of operation, respectively. Jobs were calculated for Guayanilla-Peñuelas based on the percent of vessels traffic that they would attend for these years. Water demand was based on the water consumption estimates for Puerto Rico (PRASA, 1996), with a per capita value of 117 gallons per day per person. It is estimated that the real demand would be lower than 117 gallons per day per person. However, a more conservative approach was preferred, thus the use of 117 gallons per day per person was justified.
- The vessels would need to fill their water storage tanks from the port facility in Guayanilla-Peñuelas. Estimates were based on projected vessel traffic for the first and tenth years of operation. According to a vessels manufacturer, Odense Steelyard LTD, the capacity of the storage tanks would vary depending on the size of the vessel. The storage tanks of the ships of less than 6,000 TEU have a capacity of approximately 75,000 gallons, while the ships of more than 6,000 TEU have storage tanks with a capacity of approximately 100,000 gallons.

Value-Added Facilities

- The value-added facilities would have to satisfy the water demand from the employees and from the various industrial processes. It was assumed that no value-added operations would occur during the first year of operation. Jobs estimates projected for the tenth year were based on a range provided by

Frankel (2000); 6,000 to 10,000 jobs. Jobs were proportionally segregated for the Guayanilla-Peñuelas site based on the area to be dedicated to value-added activities, respectively. The water demand for industrial processes was based on Frankel estimates (E.G. Frankel and Associates, 2001). The author indicates that 5 cubic meters (1,321 gallons) per acre per day are consumed for industrial uses.

Table 4-16: Estimates of Water Demand During the PTA Operation at Guayanilla-Peñuelas for the Tenth Year

| Project Component | | MGD | |
|-------------------|--|--------------|--------------|
| Ports Operation | Arriving Ships (Year 10) Optimistic Traffic Scenario | -- | 0.085 |
| | Port Operation (Year 10) | -- | 0.111 |
| Value Added | Water Demand Value Added (Industrial Processes) Year 10 | -- | 0.515 |
| | Water Demand Value Added (Personal Uses) Based on jobs range for Year 10 (Range) | 0.570 | 0.951 |
| Total | | 1.282 | 1.662 |

- The potable water lines closest to the Guayanilla-Peñuelas Project area run along the right of way of Highway PR-127.
- Potable water resources in the municipality of Guayanilla – Peñuelas are adequate to supply the proposed Project. Several alternatives have been considered to supply potable water to the PTA without affecting the existing water distribution. The water demand of the Project can be satisfied through the combination of more than one of the alternatives discussed below.

Seawater Desalination

- Desalination is the process of purifying seawater to drinkable water. Desalination must reduce typical seawater at about 34,000 part per million (ppm or mg/L) to an acceptable drinking water standard of below 500 ppm total dissolved solids (tds). Desalination is performed by several methods, including thermal processes (Multi-Stage Flash Distillation, Multiple Effect Distillation and Vapor Compression Distillation), membrane processes (Electrodialysis and Reverse Osmosis) and other processes (Freezing, Membrane Distillation, Solar Humidification Distillation, and Other Solar and Wind-driven processes). The most common methods are reverse osmosis and distillation. Distillation of saltwater is less common than reverse osmosis due to the large energy costs

involved to achieve the necessary purities for municipal use. Generally, reverse osmosis setups have lower operating costs than those using distillation.

- A potential alternative would be the provision of a desalination plant at the Guayanilla-Peñuelas site. Typically the main disadvantage of desalination alternatives is their operational cost if compared to conventional water treatment plants from surface water sources. However, the trend on this market has been a reduction in the costs of desalination. For example, a regional water utility in Florida, Tampa Bay Water, requested proposals for the construction of what will be the largest saltwater conversion plant in the U.S (23 to 25 MGD). This plant will be located in Tampa Bay. All the proposals received presented significantly lower costs than finished water costs at other seawater desalination plants under construction elsewhere (www.Wateronline.com) According to a representative from Tampa Bay Water; the first-year cost estimates for a thousand gallons of desalinated water produced in a new treatment facility all fell below \$2.30 per thousand gallons -- with some coming in below the \$2-per-thousand (October 2002 dollars). This plant will operate at the lowest cost yet of any desalination plant built anywhere in the world, according to the numbers in these proposals.
- A feasibility and economic analysis was recently (1996) conducted for a PREPA power station to produce desalinated water to feed the plant demineralizer system. Five desalination alternatives were evaluated in this analysis. A reverse osmosis desalination plant utilizing sea water wells onsite resulted in the lowest capital cost at \$8.20 millions. This process also had the lowest production cost: \$3.27 per thousand gallons. The capital cost is based on a plant size of 1.6 MGD. However, a specific study would be needed to investigate the feasibility and economics of producing desalinated water to provide potable water to the PTA.
- The EcoEléctrica desalination plant would be a potential source of potable water for the PTA. This alternative would not involve the capital investments and operational efforts and costs. The EcoEléctrica Cogeneration plant produce potable water from a desalination plant that use excess heat energy from the steam turbine portion of the power plant. The desalination plant is a multistage flash (MSF) distillation plant supplied with low-pressure steam from the combined cycle power plant. According to the Final Environmental Impact Statement of EcoEléctrica (1996) this facility would require approximately 1 MGD of potable and high quality water per day for its own use. EcoEléctrica can produce up to 2 MGD at present (Personal Communication). EcoEléctrica is permitted to extract up to 4 MGD of saltwater, however an expansion of the desalination plant would be necessary. A 750,000 MG water tank, property of PRASA, which is connected to the desalination plant, is located in Magas ward in Guayanilla. This tank is intended to receive water from EcoEléctrica for distribution, but it is not currently in operation. A separate water tank could be constructed in the Project site to receive water from EcoEléctrica.

Water Extraction from Wells

- A potential alternative to provide potable water to the Guayanilla-Peñuelas Project site is the activation of existing water wells that locate north of the Guayanilla-Peñuelas industrial complex, beyond Road PR-2. Groundwater north of Route 2, beneath the Macaná and Tallaboa river valleys, is fresh water (as opposed to brackish and saline groundwater south of Route 2) and selected local saturated lithologic formations in the valley would probably make suitable aquifers for water production both in terms of quantity and quality. The aforementioned wells (identified as Guaypao, La Chala and Valdivieso) were used by CORCO for their industrial processes. Those inactive are not currently under the administration of CORCO; thus, the reactivation of such wells should be coordinated with their respective owners.
- The main advantage of this alternative is its availability as well as its relatively low cost. An evaluation should be conducted on the water quality as well as on the conditions of the existing pumps and pipelines that conduct water to the industrial complex.

Treatment Plants from Surface Water Sources: Proposed Projects and Improvements

- According to information provided by PRASA's Regional Office at Yauco, there will be a series of projects that will increase the water production at Yauco's Water Filtration Plant. PRASA recommends installing a 12-inch diameter pipeline from the plant to the Yauco's town center. The line would run along Highway PR-127 to the 750,000-gallon water storage tank in Guayanilla.

Other alternatives than those proposed by PRASA are discussed below:

- The USACE proposed the construction of a reservoir at the Río Portugués in Ponce. This reservoir is intended for flood control, but it is being designed with provisions to be used as a water supply. This would represent a new raw water source for the Municipality of Ponce. However, this is an alternative that would be available in the long term (Personal Conversation, USACE).
- Another potential raw water source is the redistribution of water from the Yauco area reservoirs system. Water resources in the Yauco area serve a variety of users within a complex system of reservoirs, interbasin water transfers, hydroelectric power plants, and irrigation canals. Water use is regulated by the operation of five reservoirs, including Lago Luchetti and Lago Loco, water intakes, hydroelectric power plants, and an irrigation district. The Yauco Water System Improvements Project proposes to increase the capacity of the existing Urban Filter Plant, as previously indicated, from 1.6 million gallons per day (MGD) to 8.0 MGD maximum, by connecting to a penstock, which connects Lago Luchetti and Lago Loco, as the source of raw water.

A water allocation study for the Yauco area was conducted to determine the existing yield of the reservoir system both at Lago Luchetti and at Lago Loco; to evaluate the existing water uses in the region; and to allocate potential water resources to satisfy the water needs of the proposed filter plant. In conclusion, a water allocation scheme is proposed in this study in which the Loco-Luchetti system will supply 87% of the 19 MGD of public supply needs with a level of service of 99 % probability. A 2.4 MGD water deficit is foreseen due to the fact that demands are higher than the safe yield of the Loco-Luchetti system (16.6 MGD). This deficit projection assumes that

PREPA would maintain the safe yield of the system at its present level. It is assumed that a higher level of maintenance and optimization of system performance would at least increase the water yield of the system and decrease the projected water deficit.

4.18.1.3 Ponce Alternative

The operation of the Project at Ponce, same as in Guayanilla-Peñuelas, would require water supplies to satisfy the demands of the port operations, including the ships that would arrive the port facility, and the industries located at the value-added areas. The value-added areas would require a larger amount of water to satisfy the needs of the employees and the different industrial processes. Estimates of the potential water demands for the Project are included in Table 4-16. The assumptions considered for the development of these estimates were the same as those considered under the Guayanilla-Peñuelas alternative. Jobs were proportionally segregated for Ponce based on the percent of vessels traffic that the port would attend for and the area to be dedicated to value-added activities.

Table 4-17: Estimates of Water Demand During the PTA Operation at Ponce for the Tenth Year

| Project Component | | MGD | |
|-------------------|--|--------------|--------------|
| Ports Operation | Arriving Ships (Year 10) Optimistic Traffic Scenario | -- | 0.039 |
| | Port Operation (Year 10) | -- | 0.065 |
| Value Added | Water Demand Value Added (Industrial Processes) Year 10 | -- | 0.119 |
| | Water Demand Value Added (Personal Uses) Based on jobs range for Year 10 (Range) | 0.132 | 0.219 |
| Total | | 0.355 | 0.442 |

- The Ponce Project area is already connected to PRASA's water distribution system. There is a potable water line that runs from Highway PR-10 to the Ponce Project site.

Potable water resources in the municipality of Ponce are adequate to supply the proposed Project. Several alternatives have been considered to supply potable water to the PTA without affecting the existing water distribution. The water demand of the Project can be satisfied through the combination of more than one of the alternatives discussed below.

Treatment Plants from Surface Water Sources: Proposed Projects and Improvements

- PRASA is also designing a new filtration plant at Ponce, with an intake at Lago Cerrillos. PRASA indicates that it would be necessary to install a 20 inch pipeline to conduct the water from the plant to a 5 million gallons storage tank at Sabanetas Parcels near Ponce. Water would be distributed from this tank to the Ponce Project site.

There are other alternatives than those proposed by PRASA, such as the construction of a reservoir at the Río Portugués in Ponce, and the redistribution of water from the Yauco area reservoirs system. These alternatives were discussed in detail under the Guayanilla-Peñuelas alternative.

4.18.1.4 Applicant’s Preferred Alternative

The impacts of the Applicant’s Preferred Alternative are a combination of the impacts discussed for the Guayanilla-Peñuelas and Ponce alternatives, discussed in the previous two subsections. Estimates of the potential water demands for this alternative are included in Table 4-17.

Table 4-18: Estimates of Water Demand During the PTA Operation at Guayanilla-Peñuelas and Ponce for the Tenth Year

| Project Component | | MGD | |
|-------------------|--|--------------|--------------|
| Ports Operation | Arriving Ships (Year 10) Optimistic Traffic Scenario | -- | 0.124 |
| | Port Operation (Year 10) | -- | 0.177 |
| Value Added | Water Demand Value Added (Industrial Processes) Year 10 | -- | 0.634 |
| | Water Demand Value Added (Personal Uses) Based on jobs range for Year 10 (Range) | 0.702 | 1.170 |
| Total | | 1.636 | 2.104 |

4.18.2 Wastewater Treatment Facilities

4.18.2.1 No-Action Alternative

Under the No-Action alternative, there would be no additional generation of wastewater due to the construction or operation of the Project, and therefore there would be no need to treat additional wastewater generated from the Project. The wastewater treatment needs would be due to the expected increase in population.

4.18.2.2 Guayanilla-Peñuelas Alternative

The wastewater generated during the construction phase of the PTA Project would be managed by portable sanitary services. A private company would be contracted to manage the wastewater generated during the Project's construction phase. This company would be responsible of disposing the generated wastewater at one of PRASA's wastewater treatment plants, following the applicable disposal regulations.

- The wastewater generation during the operation phase of the Project is associated to the main activities that would take place in the Guayanilla-Peñuelas site, such as the port operation, including the ships that would arrive at the port facilities, and the industries located at the areas for value-added activities.
- The wastewater generation for the PTA operations was based on the water demand for this Project component. Wastewater generation was assumed to be 75% of the water demand per person per day. Please refer to Section 4.20.1 for specific assumptions on water demand. It was assumed that the generation of wastewater from vessels arriving at the PTA would be limited due to the Federal Clean Water Act (33 U.S.C. 1322). This law requires the vessels to have Marine Sanitation Devices (MSD) that are certified by the United States Coast Guard (USCG), to prevent discharge of wastewaters with no treatment or with an inappropriate treatment to waters of the United States. The MSD's are required while the vessels are sailing within territorial waters of the United States, the Great Lakes, and other restricted USA navigable waters.
- According to the USCG, there are three types of MSD's based on the quality of the effluent. The Type III devices are the only ones that prevent treated or untreated wastewater discharges. Type III devices consist on retention tanks, incineration systems and circulation systems, being the first two the most popular ones. It is expected that most of the vessels arriving at the PTA would manage their wastewaters in retention tanks. Grey waters, defined as the waters generated from dishwashing, showers, and laundries; can be discharged to the sea without having to go through the MSD. However, as a conservative approach, is assumed that the volume of wastewaters that would be received at the PTA from the vessels would be 100 % of the potable water demand.
- Wastewater generation for areas designated for value-added activities was based on the water demand for this project component, similarly to the assumption considered for the port operations component. Wastewater generation was assumed to be 75% of the water demand per person per day. Please refer to **Section 4.20.1** for specific assumptions on water demand.

Estimates of wastewater that would be generated during the PTA operation at Guayanilla-Peñuelas are included in Table 4-18.

Table 4-19: Estimates of Wastewater Generation during the PTA Operation at Guayanilla-Peñuelas

| Project Component | | MGD | |
|-------------------|---|--------------|--------------|
| Ports Operation | Arriving Ships (Year 10) Optimistic Traffic Scenario | -- | 0.085 |
| | Port Operation (Year 10) | -- | 0.084 |
| Value Added | Value Added (Industrial Processes) | -- | 0.515 |
| | Value Added (Personal Uses) (Range) | 0.428 | 0.713 |
| Total | | 1.111 | 1.396 |

- The proposed Project site in the Guayanilla-Peñuelas area does not have any trunk sewers. The closest pipelines are located at La Playa de Guayanilla Sector. A potential alternative is the initial connection to the existing Guayanilla Wastewater Treatment Plant. At present this plant has an available capacity of 300,000 gallons per day according to PRASA's Regional Office at Yauco. This would require the construction of trunk sewers from the project site to the closest existing trunk sewers.
- According to the information provided by PRASA's Regional Office at Yauco, a 7 mgd capacity wastewater treatment plant will be constructed in Guayanilla in the near future. The construction of a 24-inch diameter trunk pipeline that will run along the Muñoz Rivera Street in the Guayanilla Town is among the proposed improvements for the wastewater infrastructure in Guayanilla, as well as the connection of new users, such as the proposed project.
- A potential alternative is to connect the Project to an existing wastewater treatment plant, which is currently out of service and is located in the Guayanilla-Peñuelas industrial complex, at the former Caribe Oleffins facility.
- Another potential alternative is the construction of a tertiary wastewater treatment plant in the Guayanilla-Peñuelas project site. Treated effluent from this plant could be pumped to recharge the south coastal aquifer which currently is affected by saltwater intrusion in the lower reaches, as discussed in **Section 3.11.2, Ground Water**.

4.18.2.3 Ponce Alternative

As in the Guayanilla-Peñuelas alternative, the wastewater generated during the construction phase of the Project would be managed by portable sanitary services through a private company. This company would be responsible of disposing the generated wastewater at one of PRASA's wastewater treatment plants, following the applicable disposal regulations.

- The wastewater generation during the operation phase of the Project is associated to the main activities that would take place in the Ponce site, such as the port operation and the industries located at the areas for value-added

activities. The assumptions for the calculation of the wastewater generation are the same that were used for the calculation of the wastewater generation under the Guayanilla-Peñuelas alternative, discussed in the previous subsection.

Estimates of wastewater that would be generated during the PTA operation at Ponce are included in Table 4-19.

Table 4-20: Estimates of Wastewater Generation during the PTA Operation at Ponce

| Project Component | | MGD | |
|-------------------|---|--------------|--------------|
| Ports Operation | Arriving Ships (Year 10) Optimistic Traffic Scenario | -- | 0.039 |
| | Port Operation (Year 10) | -- | 0.049 |
| Value Added | Value Added (Industrial Processes) | -- | 0.119 |
| | Value Added (Personal Uses) (Range) | 0.099 | 0.165 |
| Total | | 0.305 | 0.371 |

- The proposed Project site in Ponce is connected to PRASA's sanitary sewer system, which transports the wastewaters to Ponce Regional Wastewater Treatment Plant. This plant has capacity to treat 18 MGD and is currently treating 14 MGD, according to PRASA's Regional Office at Ponce. The capacity of this plant may be expanded. AFI would coordinate with PRASA any improvements of the existing system.

4.18.2.4 Applicant's Preferred Alternative

The impacts of the Applicant's Preferred Alternative are a combination of the impacts discussed for the Guayanilla-Peñuelas and Ponce alternatives, discussed in the previous two subsections. Estimates of the potential water demands for this alternative are included in Table 4-20.

Table 4-21. Estimates of Wastewater Generation during the PTA Operation at Guayanilla-Peñuelas and Ponce

| Project Component | | MGD | |
|-------------------|---|--------------|--------------|
| Ports Operation | Arriving Ships (Year 10) Optimistic Traffic Scenario | -- | 0.124 |
| | Port Operation (Year 10) | -- | 0.133 |
| Value Added | Value Added (Industrial Processes) | -- | 0.634 |
| | Value Added (Personal Uses) (Range) | 0.527 | 0.878 |
| Total | | 1.417 | 1.768 |

4.18.3 Stormwater

4.18.3.1 No-Action Alternative

Under the No-Action Alternative, there would be no construction or operation alternatives at either the Guayanilla-Peñuelas site or the Ponce site as a result of the development of the Project. Stormwater generated from natural events would be collected by the existing collection systems.

4.18.3.2 Guayanilla-Peñuelas Alternative

The water bodies closest to the proposed Guayanilla-Peñuelas site are the Guayanilla Bay and Río Tallaboa (located at the edge of the proposed value-added areas), two large artificial channels, and a drainage channel. Stormwater collection systems operate throughout most of the proposed site at the Guayanilla-Peñuelas area. Stormwater would flow in a southern direction, discharging into the Guayanilla bay and eventually to the Caribbean Sea.

As required by federal regulations, a Storm Water Pollution Prevention Plan (SWPPP) would be prepared and implemented for the construction activities. A similar plan would be prepared and implemented for the operation of the Port in Guayanilla. Likewise, a Sedimentation and Erosion Control (CES) Permit would be obtained from the Puerto Rico Environmental Quality Board. The CES Permit includes the development of a CES Plan, which establishes specific measures that must be used to protect bodies of water during construction activities.

Stormwater control and mitigation measures that would be established are:

- The exposed areas would be kept to a minimum and would remain in this condition for the least amount of time.
- Silt fences would be used as an erosion control measure. These fences typically retain 75% of the transported sediment, and would let the water continue flowing. With the implementation of fences and soil stabilization measures, the water turbidity would be reduced up to 70%.
- In all cases, the erosion control measures would be carefully observed during the construction activity in order to ensure their efficiency. Once the soil is stable after the construction activities, the erosion control measures would not be necessary anymore.

Improvements to the existing drainage system would be made as part of the Project. These improvements would follow the best management practices and would comply with the design parameters of the Puerto Rico Planning Board.

4.18.3.3 Ponce Alternative

There is a channel that runs along the proposed Ponce site. Stormwater collection systems operate throughout most of the proposed site at the Ponce area. Stormwater would flow in a southern direction, discharging into the Ponce bay and eventually to the Caribbean Sea.

The same federal regulations that apply to the Guayanilla-Peñuelas alternative also apply to the proposed Ponce site. Therefore, a SWPPP would be prepared and implemented for the construction activities, and the current plan at Ponce would be updated for the operation of the proposed Project. Likewise, a CES Permit would be obtained from the Puerto Rico

Environmental Quality Board. The CES Permit includes the development of a CES Plan, which establishes specific measures that must be used to protect bodies of water during construction activities. Stormwater control and mitigation measures at the proposed Ponce site would be similar to the measures proposed for the Guayanilla-Peñuelas site, and discussed under the Guayanilla-Peñuelas alternative in the previous subsection.

4.18.3.4 Applicant's Preferred Alternative

The impacts of the Applicant's Preferred Alternative are a combination of the impacts discussed for the Guayanilla-Peñuelas and Ponce alternatives, discussed in the previous subsections.

4.18.4 Traffic Impact

4.18.4.1 No-Action Alternative

Although the No-Action alternative, there would be no impact on traffic due to the development of the proposed Project, either at Guayanilla-Peñuelas or at Ponce. However, it is important to note that the Highway and Transportation Authority (HTA) is currently improving the road infrastructure in the south region, and is working in the following projects:

- Project AC-012710 currently under construction, which consists of the replacement of bridge number 80 over the Río Guayanilla at PR-127 kilometer 8.60. The construction of this project started in March 2000, and is scheduled for completion in November 2001.
- Project AC-012715 currently being designed, which consists of the replacement of bridge number 83 over the Río Tallaboa at PR-127 kilometer 18.1. The bidding process for this project is scheduled for October 2001.
- Project AC-520055 currently being designed, which consists of improvements to the toll collection booths in PR-52, Ponce and Salinas, to implement the "Electronic Toll Collection" system. The bidding process for this project is scheduled for October 2001.
- Projects AC-200186, AC-2000194 and AC-200195 currently being designed, which consist of the conversion of PR-2 from Mayagüez to Ponce to an expressway.

4.18.4.2 Guayanilla-Peñuelas Alternative

As a first step in the analysis of the impacts that the proposed Project will have on vehicular traffic, a Traffic Study was performed on roads and main highways that provide access to the Guayanilla-Peñuelas site (Appendix D). The study included the evaluation of available roads and intersections to determine their capacity to handle existing and future traffic generated by the port activity.

The results from the traffic study show that the construction of the PTA elements, and the operation of the expanded facilities, would have an adverse impact on the vehicular patterns on the roads that provide access to both ports. The Project would result in a significant increase in vehicular traffic generated by the ports activities on its several phases. This impact would be associated to the additional jobs that would be created, and to the increase in heavy traffic due to the movement of cargo within Puerto Rico as its origin, interim destiny or final destiny.

- The impacts to traffic during the construction period would be temporary. It is expected that traffic would be temporarily blocked or detoured at times. A plan for traffic management during these critical periods would be developed in coordination with the HTA. In the areas that surround the Project, structural and management measures would be implemented to minimize the impact on the traffic flow. A construction program would be developed and traffic control devices would be installed to reduce the inconveniences to drivers of adjoining roads. Heavy equipment would be used for work on the roads during normal working hours. This would have a short-term impact on the traffic flow, causing delays. Warnings such as signs, pavement marks, intermittent lightning, arrow signs and warning lights would be placed at the entrance of the project site to warn drivers of the construction.
- In the Guayanilla-Peñuelas area, roads PR-2, PR-385, PR-127 and PR-337, as well as the main accesses to the proposed Project, would be affected. The results of the study show that the service levels would remain acceptable until the year 2010. For years 2010 and 2020, and due to the increase in vehicular traffic and economic activity, the calculated service levels in the in the port entrance area and adjoining streets would not be acceptable (service levels E and F).

To mitigate the effects that the Project would have on the area traffic, and to achieve an acceptable service level in the road system adjoining the Project, it would be necessary to improve the road system. Some of these improvements are:

- Between the years 2009 and 2011, consideration should be given to the widening of roads PR-127 and PR-385 from two to four lanes with median strip, crosswalks, and marginal roads (in the area immediately adjoining the project site to allow two-way traffic.
- The entrance and the port's main street must be a four-lane road with median strip, crosswalks and marginal roads.
- Traffic control devices must be installed, particularly at traffic lights at the intersection of road PR-127 with roads PR-337 and PR-385.
- Between the years 2011 and 2016 several direct entrances must be provided from the port area to road PR-127, between roads PR-337 and Río Tallaboa.
- For year 2015 the existing half cloverleaf intersection between road PR-2 and PR-385, must be changed to a complete cloverleaf intersection with two-lane ramps. This includes widening road PR-2 between PR-127 and PR-385, and road PR-385 between the ramps.

4.18.4.3 Ponce Alternative

A Traffic Study was performed on roads and main highways that provide access to the Ponce site. As in the Guayanilla-Peñuelas evaluation, the study included the evaluation of available roads and intersections to determine their capacity to handle existing and future traffic generated by the port activity.

The results from the traffic study show that the construction of the PTA elements, and the operation of the expanded facilities, would have an adverse impact on the vehicular patterns on the roads that provide access to both ports.

In the Ponce area the main accesses to the Project through roads PR-52 and PR-14 would be affected. The study shows that the service levels would be favorable until year 2005. For years 2010 and 2020, and because of the increase in the number of light and heavy vehicles, and the economic activity, the calculated service levels in the port entrance area were not favorable (levels E and F). To make the state, municipal and port road system operate to an acceptable service level, it would be necessary to improve the road system. Some of these improvements are:

- Between years 2005 and 2007, the substitution of the leveled intersection of road PR-14 and Caribe Avenue for an unleveled intersection with direct port entrance and exit ramps, must be considered. The port's main road would consist of a four-lane road with median strip, crosswalks and marginal roads that would allow two-way traffic on both sides of the road.
- The Comercio, Virtud (PR-585), Puerto Viejo and Avenida de Hostos (PR-10) streets must provide access to the different port areas. This would facilitate the distribution of traffic to the different entrance roads through individual assignments.
- The implementation new traffic light systems, in addition to the installation of adequate signs and pavement marks, are necessary measures to mitigate the traffic conditions.
- Addition of a traffic light and geometric improvements to the intersection of road PR-14 and Comercio Street.

During the construction and operation of the Project, traffic control measures would be implemented to keep the traffic flowing and to ensure road safeness. Management of traffic would be coordinated with the appropriate government agencies and following the recommendations of the Traffic Control Devices Manual.

4.18.4.4 Applicant's Preferred Alternative

The impacts of the Applicant's Preferred Alternative are a combination of the impacts discussed for the Guayanilla-Peñuelas and Ponce alternatives, discussed in the previous subsections.

4.18.5 Solid Wastes

Non-hazardous solid waste would be generated during the construction period, particularly debris, wood and cardboard scraps. In order to ensure compliance with the applicable laws and regulations, the following actions would be taken:

- A DS-3 Permit would be obtained from EQB for the disposal of solid waste generated during the construction phase.
- It is estimated that approximately 18,000 tons of debris and waste would be generated during the construction phase. This estimate was calculated for the Applicant's Preferred Alternative as a whole.

- From this total amount, it is estimated that between 14% and 17%, or between 2,520 and 3,060 tons can be recycled. The solid waste that cannot be recycled would be sent to the Ponce landfill. This facility currently receives the solid waste generated in Ponce, Guayanilla, Peñuelas, and other area municipalities, for final disposal.

Once the proposed project operation begins, non-hazardous solid waste would be generated from three main sources:

- Ships arriving to the port;
- Port operation; and
- Industrial operation on the value-added areas.

The impacts of the three alternatives on the solid waste generation can not be broken down, since it was calculated using the estimated number of employees at the port and value-added activities, according to Frankel (Frankel, 2000) and Estudios Técnicos (Estudios Técnicos, 2001), and the expected number of vessels arriving at both ports. These numbers were calculated and provided for the Applicant's Preferred Alternative, and not as separate units.

The contribution of the incoming ships to the total amount of solid waste that would be generated during the operation phase of the PTA was calculated by using the estimated number of ships arriving to the port (based on TEU traffic as projected by Frankel), and the amount of solid waste to be generated per ship. It is estimated that 141 ships would arrive to the PTA during the first year of operation, and 538 would arrive by the tenth year. According to Frankel (Frankel, 2001), each ship would generate 7.8 tons of solid waste.

The calculation of the amount of solid waste generated from port operations was based on the estimated number of port employees. Frankel estimates that during the first year of operation, the PTA would employ 528 people. Furthermore, the results of the socioeconomic study that was completed as a supporting document to this D-EIS (Estudios Técnicos, 2001) show that during the tenth year of operation, the PTA would employ 1,511 people.

According to the Regional Infrastructure Plan for the Recycling and Disposal of Solid Waste (Solid Waste Management Authority, 1995), the average solid waste generation estimated for year 2010 in the municipalities of Ponce, Guayanilla and Peñuelas is 3.3 pound per person per day. Using this average generation rate, the total solid waste generation from port employees can be calculated.

The amount of solid waste from the value-added industrial areas was estimated by two different methods:

- In the first method (Scenario A), the amount of industrial solid waste to be generated by the municipalities of Ponce, Guayanilla and Peñuelas, was calculated by using data from the Regional Infrastructure Plan for the Recycling and Disposal of Solid Waste. A formula was developed to express the amount of industrial solid waste generated by these municipalities, as the difference between the per capita waste generation, the total amount of solid waste generated by the municipalities, and the amount of hazardous waste generated by the municipalities.
- In the second method (Scenario B), a generic waste-generation index for industrial waste was obtained from the California Waste Management Board

(CWMB, Estimated Solid Waste Management Board, 1995, 2000). This index uses as a basis the number of industrial employees.

The results of these calculations indicate that, during the first year of operation, the amount of solid waste that would be generated as a result of the operation of the PTA would fluctuate from 1,418 tons per year during the first year of operation, to a maximum of 81,026 tons per year during the tenth year. Since during the first year it is expected that there would be no value-added industries established, no solid waste generation is expected from this source. Therefore, only one scenario is presented for the first year. The results of these calculations are shown in Tables 4-21, 4-22 and 4-23.

- According to the Ports Authority's Resolution M-1-5 (expiration date July 2002), Article 3.0.31, it is illegal to discharge, remove, bring, tolerate or allow the discharge of any kind of waste or waste matter from any vessel while stationed at the Ports Authority's facilities. However, any kind of waste or waste matter could be discharged, removed or disposed from any vessel to other vessel(s) or vehicle(s), which should be coordinated with the Chief of the Maritime Bureau of the Ports Authority, to obtain his/her approval for the collection or disposition of waste or residual material. This authorization must follow compliance with applicable US Department of Agriculture regulations, Coast Guard regulations and any local or federal laws and regulations that are implemented by local or federal agencies.
- In accordance with this article, any ships that arrive to the PTA must coordinate with the Ports Authority the collection and disposal of the ship's solid waste, once all applicable federal and local requirements have been met. Staff from the Ports Authority Maritime Bureau has indicated that several private companies currently offer this service to incoming ships.

As discussed in Section 4.17.5, the Regional Infrastructure Plan for the Recycling and Disposal of Solid Waste divided the Island in 11 regions. However, this plan was recently rescinded by an Executive Order of the Governor of Puerto Rico. In the original plan, the proposed project site is located within the Ponce Region, which is comprised of 12 municipalities. Of these 12 municipalities, 4 have landfills that are currently open. These four landfills are located in the municipalities of Ponce, Jayuya, Juana Díaz and Yauco. A new plan is being formulated at this time by the Solid Waste Management Administration (SWMA).

The municipalities of Ponce, Guayanilla and Peñuelas dispose their solid waste in the Ponce landfill. Thus, the Ponce landfill is also the Applicant's Preferred Alternative for the disposal of the solid waste generated from the operation of the PTA. The Ponce landfill currently receives 1,200 tons per day of solid waste (SWMA, telephone communication) from the municipalities of Ponce, Adjuntas, Peñuelas, Guayanilla, and sometimes Aguas Buenas and Cidra (SWMA, 2001). The useful life of the Ponce landfill is estimated at 20 years.

Table 4-22: Solid Waste Generation, Year 1, Scenario A

| Element | Estimated Generation | Total |
|--|-----------------------------|--------------------|
| Ships arriving to port (141 ships /year) | 7.8 tons /ship | 1100 tons per year |
| Port: Port employees (528) | 3.3 pounds/employee/day | 318 tons per year |
| Industrial Zone: Scenario A (0 industries): | 0 tons | 0 tons per year |
| Totals: | N/A | 1418 tons per year |

Table 4-23. Solid Waste Generation, Year 10, Scenario A

| Element | Estimated Generation | Total |
|---------------------------------|-----------------------------|-----------------------------|
| Ships arriving to port (538) | 7.8 tons /ship | 4,196 tons per year |
| Port: Port employees (1,511) | 3.3 pounds/employee/day | 910 tons per year |
| Industrial Zone: Scenario A: | 10,394-51,970 tons per year | 10,394-51,970 tons per year |
| Totals: | N/A | 15,500-57,076 tons per year |

Table 4-24. Solid Waste Generation, Year 10, Scenario B

| Element | Estimated Generation | Total |
|---|-----------------------------|-----------------------------|
| Ships arriving to port (538) | 7.8 tons /ship | 4,196 tons per year |
| Port: Port employees (1,511) | 3.3 pounds/employee/day | 910 tons per year |
| Industrial Zone: Scenario B (6,000-10,000 empleados): | 41.64 pounds/employee/day | 45,625-75,920 tons per year |
| Totals: | N/A | 50,731-81,026 tons per year |

4.18.6 Energy Requirements and Conservation

4.18.7 No-Action Alternative

Under the No-Action Alternative, there would be no additional demand for electric power due to the development of the proposed Project. Increases in the electric power demand would be due to the expected increase in population.

4.18.8 Guayanilla-Peñuelas Alternative

It is estimated that the total electric power demand for the Project operations in Guayanilla-Peñuelas would be about 68,000 KVA (Table 4-24). This demand includes pier activities, such as the use of cranes for containers loading and unloading, the operation of offices, and mainly, the operation of the value-added activities. The potential energy demand of the value-added activities is a conservative estimate using the maximum area of construction that would be available at the UCC parcel, which is estimated to be about 300 acres.

Table 4-25: Electrical Power Demand for Guayanilla-Peñuelas Project Site

| Element | Electrical Power Demand Estimate |
|-------------------------------------|----------------------------------|
| Cranes and Wharf Equipment | 9,000 KVA |
| Containers Storage Area and Offices | 7,000 KVA |
| Industrial Area | 52,000 KVA |

Source: Frankel, 2001

- As indicated in **Section 3.18.5**, a 115 KV transmission line supplies the Guayanilla-Peñuelas Project area. This transmission line was used to supply the UCC plant. This energy source is adequate to provide the needs of the Project for the foreseeable future, subject to the construction of a power substation. The construction of a power substation would be coordinated with the PREPA as part of the development of the Project.

4.18.9 Ponce Alternative

It is estimated that the total electrical power demand for the Project operation in Ponce would be approximately 16,000 KVA. This potential demand is conservative and includes an estimate of the needs of the expanded pier-related activities, such as the use of cranes for containers loading and unloading, the operation of offices, and estimates based on potential areas to be developed for value-added activities. The power demand estimate for the Port of Ponce is presented in Table 4-25:

Table 4-26: Electrical Power Demand for Ponce Project Site

| Element | Electrical Power Demand Estimate |
|-------------------------------------|----------------------------------|
| Cranes and Wharf Equipment | 3,000 KVA |
| Containers Storage Area and Offices | 1,000KVA |
| Industrial Area | 12,000 KVA |

Source: Frankel, 2001

A 38 KV radial line that crosses the pier and the proposed area for the value-added activities serves the Port of Ponce. It is anticipated that this infrastructure would not have the capacity to supply the additional electrical power demand of the Project. For this reason, the 38 KV radial line should be upgraded to increase its capacity. AFI would coordinate with PREPA and the Municipality of Ponce to program the needed improvements for the existing electrical power infrastructure, which are included in the current PREPA Capital Improvement Program.

4.19 Marine Currents

Both Ponce and Guayanilla bays have southern exposure partially protected by offshore islands and shallow regions. Offshore bathymetry drops to over 600 m within 5-10 km of the entrance to either harbor. Because of the exposure and lack of an offshore shelf, tides and storm surges do not become well developed but remain small. For example, spring tides (without wind) in either harbor are less than 0.2 m in amplitude and the maximum storm surge for Hurricane Georges was less than 0.4 m. Therefore, surface elevation impacts of the proposed harbors are small.

Wind driven currents within the bay represent the most potential long-wave threat to the coastal infrastructure resulting from the passage of a tropical or extra-tropical event. For this reason, change in hurricane surge currents as a result of construction of the harbor expansions was identified as the best measure of construction impact. Pre- and post-construction differences in current magnitudes were computed as a means of demonstrating reductions or increases in current as a result of the proposed landfill.

Conclusions of the Current Study performed by the USACE (Appendix V) are twofold. First, simulations show that the ports of Ponce and Guayanilla do not experience large tides or tropical and extratropical storm surges. Secondly, pre- and post-project simulations of severe tropical events show that project impacts are small (less than 1.0 m/sec) a would cause localized reductions in storm circulation currents which do not affect regions further than approximately 1 km from the proposed project sites.

Therefore, impacts from the proposed action, related to the flow and direction of Marine Currents are considered negligible for all the proposed alternatives, with the exception of the No-Action Alternative, where conditions would remain in the present state.

4.20 Noise

4.20.1 No-Action Alternative

Under the No Action Alternative, development of the Project would not occur. No associated construction and operation activities would occur, nor does the resulting increase in noise levels due to machinery and traffic.

4.20.2 Guayanilla-Peñuelas Alternative

There would be a temporary increase in the noise levels at areas adjacent to the sites of the Project due to typical construction activities. The increase in noise levels is due to the operation of stationary-equipment engines, general earthwork equipment and material hauling, as well as the interaction between the equipments and the materials. Examples of typical noise levels for selected construction equipments are shown in the Table 4-26. These levels are expressed in decibels (dB) units, which measure noise intensity. Several measures would be implemented to mitigate the noise levels generated by the construction activities.

- Construction would be limited to the daytime to control the noise levels.
- The stationary equipment would be located in non-sensitive areas or in areas provided with noise buffer/sound absorbing structures. These structures would be used at all times during the operation of the construction equipment.

Table 4-27: Typical Noise Levels for Construction Equipment

| Equipment | Noise Level Range [dB(A)] | Average [dB(A)] |
|------------------|---------------------------|-----------------|
| Front Loader | 72 - 84 | 81 |
| Backhoes | 72 - 93 | 90 |
| Tractors | 77 - 96 | 93 |
| Grader | 80 - 93 | 90 |
| Paver | 86 - 88 | 87 |
| Trucks | 82 - 94 | 91 |
| Concrete Mixer | 75 - 88 | 85 |
| Cranes | 75 - 87 | 84 |
| Pumps | 69 - 71 | 70 |
| Power Generators | 71 - 82 | 79 |
| Compressors | 74 - 87 | 84 |

Source: EPA, 1971

A Noise Study was conducted to evaluate the potential Project-related impacts in the vicinity of the Guayanilla-Peñuelas site during operation. The study is included as Appendix N of this DEIS. The following impact evaluation for the proposed Project operations are based on this Noise Study.

- During the operation phase in the Guayanilla-Peñuelas area, it is expected that most of the noise of the proposed facilities would be generated from loading and unloading operations, specifically from the cranes used in these operations. The proposed operations would be considered as an industrial noise source (Zone III).
- Other proposed uses, which are not expected to generate significant noise levels, would include the operations of warehouses, offices, and industries. Noise from these sources would be primarily generated by the limited vehicular traffic of trucks and employees vehicles. A crane may generate up to 96 dBA during cargo loading, and 80 dBA when it is turned on but not in use. Therefore, the combined sound pressure level that would be generated by these cranes is estimated at approximately 96 dBA (American Federation of Labor and Congress of Industrial Organizations, 2001).
- The combined sound levels that would be experienced by the selected receptors were calculated using values of 96 dB (A) for Guayanilla-Peñuelas for Ponce. (**Section 3.20**) The sound level generated by the proposed sources, combined with the background ambient noise experienced by each receptor, as measured; results in the noise impact associated to the proposed Project. The results of these calculations are summarized in **Table 4-27**.
- In addition to the impacts to the receptors previously identified, noise levels were also determined for the boundary of the proposed Project sites (Sampling Points S1, S2, S3, S4, S5 and S6, refer to the locations specified in **Section 3.20**). Sampling Points S1, S2, S3 and S6 describe the proposed north and east boundaries for the Guayanilla-Peñuelas area of the Project. These proposed boundaries are located in the maritime area and are part of the proposed reclamation area. These points have no limits or actual boundaries, thus it was not possible to determine the existing noise levels. However, the noise levels associated to the proposed Project for these points along the boundary were evaluated to determine if the standards established by the EQB were met. The current background noise levels for these receptors were determined and analyzed to determine if the projected noise levels meet the standards established by the EQB. The results of these calculations are summarized in **Tables 4-28 to 4-29**.

Based on the results of the calculations included in the aforementioned tables, in terms of the noise impacts associated to the Project operation, the following was concluded:

- The increase of the noise levels above the background level at the designated receptors for the operational phase of the site of the Project in the Guayanilla-Peñuelas area, varies between 0 dB(A) to 0.751 dB(A). This increase is less than the increment level that can be normally perceived by a human being, which is 3 dB(A). Expected noise levels, which would result from the operation, at the site boundary would not exceed the limits established by EQB.

Table 4-28: Projections of L_{eq} Change for the Guayanilla-Peñuelas Project Component

| Receptor Description | Receptor Designation | Daytime | | | Nighttime | | |
|----------------------|----------------------|---------------------------|-----------------------------------|--------|---------------------------|-----------------------------------|--------|
| | | Background Levels [dB(A)] | Noise Levels with Project [dB(A)] | Change | Background Levels [dB(A)] | Noise Levels with Project [dB(A)] | Change |
| Residential | R1 | 62.596 | 62.591 | 0.005 | 57.260 | 57.273 | 0.0128 |
| Industrial | R2 | 69.155 | 69.156 | 0.001 | 58.416 | 58.424 | 0.008 |
| Industrial | R3 | 63.021 | 63.031 | 0.010 | 58.443 | 58.465 | 0.022 |
| Industrial | R4 | 65.665 | 65.753 | 0.088 | 53.692 | 53.443 | 0.751 |
| Residential (School) | R5 | 78.520 | 78.520 | 0.000 | 55.398 | 55.407 | 0.009 |
| Industrial | R6 | 65.006 | 65.006 | 0.0004 | 63.910 | 63.911 | 0.001 |

Table 4-29: Comparison of the Noise Levels L₁₀ Projected for the Guayanilla-Peñuelas Project Component with the EQB Noise Limits for Daytime

| Site Boundary Designation | Background Levels L ₁₀ [dB(A)] | EQB Limits L ₁₀ [dB(A)] | EQB Limits, Adjusted L ₁₀ [dB(A)] | Projected Levels with Project L ₁₀ [dB(A)] |
|-----------------------------|---|------------------------------------|--|---|
| Industrial/Residential (S1) | N/A | 65 | 65 | 40.0 |
| Industrial/Industrial (S2) | N/A | 75 | 75 | 45.5 |
| Industrial/Industrial (S3) | N/A | 75 | 75 | 46.4 |
| Industrial/Industrial (S4) | 63.7 | 75 | 75 | 63.6 |
| Industrial/Industrial (S5) | 63.4 | 75 | 75 | 63.5 |
| Industrial/Industrial (S6) | N/A | 75 | 75 | 41.3 |

Table 4-30: Comparison of the Noise Levels L₁₀ Projected for the Guayanilla-Peñuelas Project Component with the EQB Noise Limits for Nighttime

| Site Boundary Designation | Background Levels L ₁₀ [dB(A)] | EQB Limits L ₁₀ [dB(A)] | EQB Limits, Adjusted L ₁₀ [dB(A)] | Projected Levels with Project L ₁₀ [dB(A)] |
|-----------------------------|---|------------------------------------|--|---|
| Industrial/Residential (S1) | N/A | 50 | 50 | 40.0 |
| Industrial/Industrial (S2) | N/A | 75 | 75 | 45.5 |
| Industrial/Industrial (S3) | N/A | 75 | 75 | 46.4 |
| Industrial/Industrial (S4) | 56.0 | 75 | 75 | 57.1 |
| Industrial/Industrial (S5) | 57.2 | 75 | 75 | 57.6 |
| Industrial/Industrial (S6) | N/A | 75 | 75 | 41.3 |

The overall conclusions of the Noise Study show that the elements of the Project as proposed for the Guayanilla-Peñuelas alternative are not a significant source of noise and would not result in a significant increase in noise emissions during the operation phase.

4.20.3 Ponce Alternative

As with the previous alternative, the development of this alternative anticipates a temporary increase in the noise levels at areas adjacent to the sites of the Project due to typical construction activities. Please refer to Table 4-26 for examples of typical noise levels for selected construction equipment. Again and, as with the previous alternative, several measures would be implemented to mitigate the noise levels generated by the construction activities at the Project site in Ponce:

- Construction would be limited to the daytime to control the noise levels.
- The stationary equipment would be located in non-sensitive areas or in areas provided with noise buffer/sound absorbing structures. These structures would be used at all times during the operation of the construction equipment.

Results on the Noise Survey (Appendix N) performed to assess the impact of the proposed action show the following:

- The existing wharf loading and unloading operations at the Port of Ponce would be rehabilitated, and a new industrial zone is proposed with lots for offices, warehouses, and value-added activities. This new source may generate considerable noise levels, caused by a higher rate of vehicular traffic, although limited to trucks and vehicles from warehouses employees. The noise level estimated for the traffic of heavy trucks is 88 dBA (Davis y Cornwell, 1991).
- Other proposed uses, which are not expected to generate significant noise levels, would include the operations of warehouses, offices, and industries. Noise from these sources would be primarily generated by the limited vehicular traffic of trucks and employees vehicles. A crane may generate up to 96 dBA during cargo loading, and 80 dBA when it is turned on but not in use. Therefore, the combined sound pressure level that would be generated by these cranes is estimated at approximately 96 dBA (American Federation of Labor and Congress of Industrial Organizations, 2001).
- It is expected that the majority of the noise generated from the Project would come from the crane operations components. The proposed operations would be considered as an industrial noise source (Zone III).
- The combined sound levels that would be experienced by the selected receptors were calculated using values of 88 dB(A) for Ponce. (**Section 3.20**) The sound level generated by the proposed sources, combined with the background ambient noise experienced by each receptor, as measured; results in the noise impact associated to the proposed Project. The results of these calculations are summarized in **Table 4-28** and **Table 4-29**.
- In addition to the impacts to the receptors previously identified, noise levels were also determined for the boundary of the proposed Project sites (Sampling Points S1, S2, S3, S4, S5 and S6, refer to **Figure 3-65** and **Figure 3-66** in **Section 3.23**). Sampling Points S1, S2, S3 and S6 describe the proposed north and east boundaries for the Guayanilla-Peñuelas area of the Project. These proposed boundaries are located in the maritime area and are part of the proposed reclamation area. These points have no limits or actual boundaries, thus it was not possible to determine the existing noise levels. However, the noise levels

associated to the proposed Project for these points along the boundary were evaluated to determine if the standards established by the EQB were met. For the Ponce component, sampling points along the boundary of the Project, S1, S2, S3, S4 and S5, corresponds to receptors R1, R2, R3, R4 and R5. The current background noise levels for these receptors were determined and analyzed to determine if the projected noise levels meet the standards established by the EQB. The results of these calculations are summarized in **Table 4-30, 4-31** and **Table 4-32**.

Based on the results of the calculations included in the aforementioned tables, in terms of the noise impacts associated to the Project operation, the following was concluded:

- The potential increase of the noise above the background levels at the designated receptors for the operational phase of the site of the Project in the Ponce area varies between 0.001 dB (A) to 0.022 dB(A). This increase is less than the increment level that can be normally perceived by a human being, which is 3 dB(A). Expected noise levels, which would result from the operation at the site boundary would not exceed the limits established by the EQB.

Table 4-31: Projections of L_{eq} Change for the Ponce Project Component

| Receptor Description | Receptor Designation | Daytime | | | Nighttime | | |
|-------------------------------|----------------------|---------------------------|-----------------------------------|--------|---------------------------|-----------------------------------|--------|
| | | Background Levels [dB(A)] | Noise Levels with Project [dB(A)] | Change | Background Levels [dB(A)] | Noise Levels with Project [dB(A)] | Change |
| Residential | R1 | 74.166 | 74.170 | 0.004 | 66.115 | 66.130 | 0.015 |
| Industrial | R2 | 70.001 | 70.002 | 0.001 | 54.409 | 54.431 | 0.022 |
| Residential and/or Commercial | R3 | 68.648 | 68.653 | 0.005 | 59.268 | 59.298 | 0.030 |
| Residential (School) | R4 | 71.457 | 71.460 | 0.003 | 66.924 | 66.930 | 0.006 |
| Tranquility | R5 | 67.899 | 67.903 | 0.004 | 67.170 | 67.174 | 0.004 |

Table 4-32: Comparison of the Noise Levels L₁₀ Projected for the Ponce Project Component with the EQB Noise Limits for Daytime

| Site Boundary Designation | Background Levels L ₁₀ [dB(A)] | EQB Limits L ₁₀ [dB(A)] | EQB Limits, Adjusted L ₁₀ [dB(A)] | Projected Levels with Project L ₁₀ [dB(A)] |
|-----------------------------|---|------------------------------------|--|---|
| Industrial/Residential (S1) | 76.7 | 65 | 70 | 76.7 |
| Industrial/Industrial (S2) | 71.4 | 75 | 80 | 71.4 |
| Industrial/Commercial (S3) | 69.3 | 70 | 73 | 69.3 |
| Industrial/Residential(S4) | 72.8 | 65 | 70 | 72.8 |
| Industrial/Tranquility (S5) | 70.1 | 50 | 50 | 70.1 |

Table 4-33: Comparison of the Noise Levels L₁₀ Projected for the Ponce Project Component with the EQB Noise Limits for Nighttime

| Site Boundary Designation | Background Levels L ₁₀ [dB(A)] | EQB Limits L ₁₀ [dB(A)] | EQB Limits, Adjusted L ₁₀ [dB(A)] | Projected Levels with Project L ₁₀ [dB(A)] |
|-----------------------------|---|------------------------------------|--|---|
| Industrial/Residential (S1) | 69.4 | 50 | 55 | 69.5 |
| Industrial/Industrial (S2) | 55.7 | 75 | 75 | 55.7 |
| Industrial/Commercial (S3) | 60.7 | 65 | 68 | 60.7 |
| Industrial/Residential (S4) | 69.7 | 50 | 55 | 69.7 |
| Industrial/Tranquility (S5) | 71.2 | 45 | 50 | 71.2 |

The overall conclusions of the Noise Study show that the elements of the Project as proposed are not a significant source of noise and would not result in a significant increase in noise emissions during the operation phase.

4.20.4 Applicant's Preferred Alternative

The impacts of the Applicant's Preferred Alternative with regards to Noise would consist of a combination of the impacts associated to the Guayanilla-Peñuelas and Ponce alternatives, discussed in the previous two sections.

4.21 Indirect Impacts

Indirect impacts are impacts on the environment, which are not a direct result of the project, often produced far away or as a result of a complex pathway. Indirect impacts are caused by the action and occur later in time, or at another location, but are still reasonably foreseeable. These impacts may include growth inducing effects and other effects related to induced changes in the patterns of land use, population density or growth rate, and related effects on air and water and other natural systems including ecosystems. Indirect impacts have been discussed in the corresponding sections of this chapter. However, Table 4-34 summarizes such impacts.

Table 4-34: Summary of Indirect Impacts

| Alternative Environmental Factor | No-action Status Quo | Guayanilla- Peñuelas | Ponce | Preferred |
|---|-----------------------------|---|---|---|
| PROTECTED SPECIES | None | Increased boat traffic would affect Manatee populations. None to the Puerto Rican Nightjar if fill material is obtained from existing quarries. | None anticipated | Increased boat traffic would affect Manatee populations. None to the Puerto Rican Nightjar if fill material is obtained from existing quarries. |
| HARDBOTTOMS | None | No indirect impacts to hardbottoms, hardgrounds or rock reefs | No indirect impacts to hardbottoms, hardgrounds or rock reefs | No indirect impacts to hardbottoms, hardgrounds or rock reefs |
| SHORELINE EROSION | None | None, provided erosion control measures are taken | None, provided erosion control measures are taken | None, provided erosion control measures are taken |
| VEGETATION | None | Some vegetation may be temporarily affected during construction | None | Some vegetation may be temporarily affected during construction |

| Alternative Environmental Factor | No-action Status Quo | Guayanilla- Peñuelas | Ponce | Preferred |
|---|-----------------------------|--|--|--|
| WATER QUALITY | None | None, if erosion and sedimentation control measures are taken | Yes. Dredging of navigation channel would affect water quality | Yes. Dredging of navigation channel would affect water quality |
| HISTORIC PROPERTIES | None | No historic properties are present at the project site | No historic properties are present at the project site | No historic properties are present at the project site |
| RECREATION | None | Increased economic activity would induce construction of new recreational facilities | Increased economic activity would induce construction of new recreational facilities | Increased economic activity would induce construction of new recreational facilities |
| AESTHETICS | None | Industrial port zone-aesthetics would not be affected | Industrial port zone-aesthetics would not be affected | Industrial port zone-aesthetics would not be affected |

| Alternative Environmental Factor | No-action Status Quo | Guayanilla- Peñuelas | Ponce | Preferred |
|---|---|--|--|---|
| NAVIGATION | None | No dredging required. | Dredging required to deepen navigation channel to at least 45 feet. Dredged material would have to be disposed of at sea | Dredging required to deepen channel to 45 feet in Ponce. Dredged material would have to be disposed of at sea |
| ECONOMICS | Economy would remain at current levels. Projected revenues would be lost. No new jobs would be added to the economy | At least 5,000 direct jobs would be created within 5 years | At least 5,000 direct jobs would be created within 5 years | At least 5,000 direct jobs would be created within 5 years |
| ENERGY REQUIREMENTS AND CONSERVATION | None | Existing industrial port has the energy requirements to fill the project's needs | Existing industrial port has the energy requirements to fill the project's needs | Existing industrial port has the energy requirements to fill the project's needs |
| ESSENTIAL FISH HABITAT | None | Softbottoms would be filled and impacted directly | Softbottoms would be dredged and impacted directly | Softbottoms would be dredged and impacted directly |

4.22 Cumulative Impacts

The concept of cumulative impacts is defined by the regulations promulgated by the Council on Environmental Quality (CEQ) for implementing the National Environmental Policy Act (NEPA). Cumulative environmental impacts are those, which result from the incremental effects of the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR § 1508.7).

The analysis of cumulative effects is not straightforward, but eight general principles are frequently applied. Each of these principles illustrates a property of cumulative effects that differentiates it from traditional environmental impact assessment. These principles include:

- Cumulative effects are caused by the aggregate of past, present and reasonably foreseeable future actions: The net effects of a proposed action on a particular resource, ecosystem, and human community include the past, present and future combined effects. Such cumulative effects must also be added to the effects (past, present, and future) caused by all other actions that affect the same resource.
- Cumulative effects include direct and indirect effects from all the actions taken on a particular resource, ecosystem, and human community, regardless of the entity that initiated the action (federal, nonfederal, or private): Individual effects from disparate activities may add up or interact to cause additional effects not apparent when analyzing the individual effects one at a time. The additional effects contributed by actions unrelated to the proposed activity must be included in the analysis of cumulative effects.
- Cumulative effects need to be analyzed in terms of the affected specific resource, ecosystem, and human community: Environmental effects are often evaluated from the perspective of the proposed action. Analyzing cumulative effects requires focusing on the resource, ecosystem and human community that may be affected and developing an adequate understanding of how the resources are susceptible to these effects.
- It is not practical to analyze the cumulative effects of an action on the universe; the list of environmental effects most focuses on those that are truly meaningful: The purpose of the analysis of cumulative effects is to assist the decision maker and inform interested parties. The analysis should be focused and meaningful; the boundaries for evaluating cumulative effects should be expanded to the point at which the resource is no longer affected significantly or the effects are no longer of interest to affected parties.

- Cumulative effects on a given resource, ecosystem, and human community are rarely aligned with political or administrative boundaries: Resources typically are demarcated according to agency responsibilities, county lines, grazing allotments, or other administrative boundaries. Because natural and socio-cultural resources are not usually aligned similarly, each political entity actually manages only a piece of the affected resource or ecosystem. The analysis of cumulative effects on a natural system must use ecological boundaries, while the analysis of human communities must use actual socio-cultural boundaries, to insure including all the known or potential effects.
- Cumulative effects may result from the accumulation of similar effects or the synergistic interaction of different effects: Repeated actions may cause effects to build up through simple addition (more and more of the same type of effect), but the same or different actions may produce effects that interact to produce cumulative effects greater than the sum of the individual effects.
- Cumulative effects may last for many years beyond the life of the action that caused the effects: Some actions cause damage lasting longer than the life of the action itself (e.g., acid mine drainage, radioactive waste contamination, species extinction). Cumulative effects analysis need to apply the best science and forecasting techniques to assess future potential catastrophic consequences.
- Each affected resource, ecosystem, and human community must be analyzed in terms of its capacity to accommodate additional effects, based on its own time and space parameters: Analysts tend to think in terms of how the resources, ecosystem, and human community would be modified in response to the development needs of the proposed action. The most effective analysis of cumulative effects focuses on what is needed to ensure long- term productivity or sustainability of the resource.

4.22.1 Geographic Boundaries

Analyzing cumulative effects differs from the traditional approach to environmental impact analysis, mainly because it requires expanding the geographic boundaries and extending the time frame of the analysis to include additional effects on the resources, ecosystems and human communities of concern. For project-specific analysis it is often sufficient to evaluate the effects within the immediate area of the proposed action. However, when analyzing cumulative effects, the geographic boundaries of the analysis almost always need to be expanded.

A useful concept in deciding appropriate geographic limits for a cumulative impact analysis is the project impact zone. In the case of the proposed action, which includes the development of a transshipment port with facilities at the Port of Ponce and at Guayanilla Bay, the general impact zone of the Project was defined as the area shown in Figures 3-10 and 3-11. However, since the impact zone of a project or proposed action is likely to vary for different resources and environmental media, boundaries for individual resources were set following the criteria outlined in the previous section (Table 4-34).

Table 4-35: Geographic Areas used in Cumulative Impact Analysis

| Resources | Possible Geographic Areas for Analysis |
|-------------------------|--|
| Air Quality | Metropolitan area, airshed |
| Water Quality | Stream, watershed, river basin, estuary, aquifer |
| Vegetation | Watershed, forest, range or ecosystem |
| Wildlife | Habitat or ecosystem |
| Fishery Resources | Stream, river basin, estuary, spawning area, ecosystem |
| Historic Resources | Neighborhood, ward, rural community, city, town or historic district |
| Sociocultural Resources | Neighborhood, community, ward |
| Land Use | Community, metropolitan area, municipality |
| Coastal Zone | Coastal region or watershed |
| Recreation | River, lake, geographic area, or land management unit |
| Socioeconomic | Community, metropolitan area, municipality, or town |

4.22.2 Cumulative Impact Analysis

Cumulative impacts, whether beneficial, adverse or indifferent, can occur when the effects from a project are added to the effects from existing projects or facilities. They are caused by the aggregate of past, present and reasonably foreseeable future actions, and represent the total effect, both direct and indirect, on a resource, ecosystem or human community of all actions taken regardless who has taken the action.

- The analysis of the cumulative effects from the development of the PTA indicates that there are three potential sources of cumulative environmental impacts: (1) the continued or expanded operation of existing facilities at the ports of Guayanilla-Peñuelas and Ponce; (2) the resumption of operations of facilities presently inactive in the areas near the indicated ports, such as industries; and (3) the construction of new projects in the same vicinities and within the same time frame as the schedule for development of the PTA.

- At present, the only potential major project with preliminary plans within the same time frame and vicinity area of the proposed action is the WindMar project. The analysis that follows considers specific design features, construction techniques, operational criteria, and mitigation measures that would reduce or avoid potential environmental impacts associated with the construction and operation of the PTA. The strategy for development of the Project is designed to prevent or minimize cumulative impacts associated with past, present or reasonably foreseeable future projects in the general area from Guayanilla to Ponce.

4.22.3 Socioeconomic Cumulative Impacts During Construction

Presently there are no construction projects in the immediate area of the sites proposed for the PTA. WindMar RE, S.E., a limited partnership organized under the laws of Puerto Rico, is proposing to install a wind farm on an 80-acre site at Punta Verraco to the east of the proposed Port of the Américas in Guayanilla. The purpose of this project is to provide a port-related value-added industrial activity using wind energy to grind blast furnace slag into cementitious slag. Development of this project would require the construction of one or more docks with conveyor systems to load and unload deep draft ships, which would deliver bulk materials to be ground and mixed using wind power. As previously indicated, this project, however, is on its very early stages of development and its construction is not anticipated to occur within the same time frame as the Port of the Américas. The potential adverse effects on socioeconomic conditions from construction activities, both at Guayanilla-Peñuelas and Ponce, are considered small.

- Overall, independently or in combination with the benefits from the operation of EcoEléctrica and possibly the construction of the WindMar RE project, development of the PTA would have a positive socioeconomic cumulative impact in the region. The Project would stimulate the regional economy during its construction and operation phases. This economic stimulus would result from direct project expenditures on goods, services, salaries, indirect and induced spending, and multiplier effects. Economic impacts differ between the construction and operation phases of the Project in both quantity and tenure. Temporary or permanent socioeconomic impacts include level of regional economic activity, employment and increase in government tax revenue.
- The municipalities of Ponce, Peñuelas, and Guayanilla would receive most of the benefits associated with the construction and operation of the PTA.

Socioeconomic Cumulative Impacts During Operation: The Project would have a beneficial cumulative impact on the local and regional economy as well as on the quality of life of neighboring communities. It would augment the economic and social benefits generated by EcoEléctrica and other nearby industries, including WindMar RE if and when developed. During construction, about 5,600 direct jobs would be created. Eventually, the elements of the PTA, including potential value-added activities, would generate as many as 10,000 permanent new jobs in the region. The direct and indirect revenues associated with these workers would have a positive effect on the area, where the unemployment rate currently approximates 13%. Similar to the construction activities, the operation of the PTA would generate additional tax revenues to the local and overall economy of Puerto Rico. This economic stimulus from the Project, when combined with the benefits from EcoEléctrica and WindMar RE, if it becomes operational, would energize the economy of the region, creating jobs and reducing unemployment.

4.22.4 Cumulative Impacts During Operation

The operation of the PTA would contribute to the cumulative impacts of other industries and activities in the region, although these impacts would be minimal. In the Guayanilla-Peñuelas area, the following principal industries or activities operate currently: the Costa Sur Power Plant (PREPA), Peerless Chemical, and the EcoEléctrica Cogeneration and LNG import terminal. The WindMar RE wind farm project is a proposed activity and is not currently in operation. There are no significant industrial activities in the immediate vicinity of the Port of Ponce. These industries or activities are sources of contaminants that impact the quality of the air and waters in the region, and affect socioeconomic development, public safety, marine and coastal resources, land use, endangered species, and transportation. The marine and port activities of the PTA would induce additional discharges of air and water pollutants to the region, albeit under controlled conditions that meets current maximum local and federal standards. The design of the elements of the Project includes measures to comply with the existing environmental regulations, which take into account current levels of contamination and environmental impacts from other sources in the region.

4.22.5 Cumulative Impacts on Air Quality

Port-related activities associated with the operation of the Project would result in a slight increase in air emissions from increased vehicular traffic, the occasional use of emergency electrical generators powered by diesel engines, and increased ship traffic. Indirect impacts to the quality of the air from fugitive dust would occur from a greater degree of development of the land for commercial and industrial uses particularly in the areas proposed for value-added activities. Potential increases in emissions to the air from additional marine traffic are not significant, since the overall number of additional vessels entering the ports is estimated at less than 1,000 vessels per year in 10 years.

- Cumulative air quality impacts from the proposed action and other existing and reasonably foreseeable actions would not be significant. Major existing air pollution sources include the Costa Sur power plant, EcoEléctrica, CORCO, and Peerless Chemical in Guayanilla, and Central Mercedita, Puerto Rico Cement, the Serrallés Distillery in Ponce (**Table 4-35**). Individual air quality permits issued by EQB, in compliance with the National Ambient Air Quality Standards, govern the emissions and air quality impacts from these facilities. No significant adverse impacts to air quality would be expected from WindMar's RE wind farm. Since the proposed Project as such would not require the issuance of an air quality permit, and because its contribution to air pollution would be insignificant, no adverse cumulative impacts to air quality are anticipated.

Table 4-36: Actual Emissions (ton/year) Generated by TV Sources-1999

| Name | City | PM ₁₀ | SO ₂ | NO _x | CO | VOC | HAP _s | Actual |
|--------------|----------|------------------|-----------------|-----------------|--------|--------|------------------|----------|
| CORCO | Peñuelas | - | - | 0.07 | 0.36 | 121.22 | 6.84 | 128.3 |
| EcoEléctrica | Peñuelas | 450 | 182.61 | 561.02 | 1179.8 | 96.90 | - | 1290.91 |
| Peerless | Peñuelas | - | - | - | - | 254.78 | - | 254.78 |
| C.Mercedita | Ponce | 54.85 | 805.98 | 11.89 | 10.20 | 0.57 | - | 973.29 |
| D.Serrallés | Ponce | 13.00 | 221.27 | 45.60 | 4.15 | 217.09 | - | 497.77 |
| PR Cement | Ponce | 86.13 | 31.03 | 2,199.99 | - | 58.70 | 25.41 | 2,401.26 |
| Costa Sur | Peñuelas | 3,278 | 44,922 | 8,505 | 1,006 | 155 | - | - |

Source: EQB, 2000

4.22.6 Cumulative Impacts on Water Quality

Implementation of the proposed action combined with past, present and future actions would not result in adverse cumulative impacts to water quality. Potential additional sedimentation or increases in turbidity in the Ponce, Guayanilla and Tallaboa bays would be temporary only during the construction phases of the Project, specifically due to the dredging activities proposed for the Port of Ponce and the placing of fill in the Guayanilla Bay sector.

- Dredging activities in the Port of Ponce would cause some temporary changes in water quality that are expected to bring short-term adverse effects on aquatic life, but these effects would diminish as the dredging is completed. The main potential adverse environmental impact associated to the dredging activity would result from the practice of “agitation dredging”, defined as “the process which intentionally discharges overboard large quantities of dredged material with the objective in view of that a major portion be transported and permanently deposited outside the channel limits by tidal, river or littoral currents. Agitation dredging ordinarily is utilized when the material is comprised mainly of small grain size in the silt and clay categories with extremely slow settling rate.” (Engineer Regulation 1125-2-312). The potential adverse environmental effects of “agitation dredging” are more critical in the (offshore) disposal area rather than in the area being dredged.
- The dredging operation would result in increased turbidity in the area. The disruption of accumulated organic deposits during dredging would place organic material in suspension; increasing their oxidation rate and decreasing dissolved oxygen in the water column. These effects are also temporary and water quality should return to normal levels once the dredging operation is terminated. To prevent additional environmental degradation during the excavation and loading operations, silt barriers would enclose the loading area. Use of curtains around

pile-driving operations instead of dredging to install pier pilings would minimize the re-suspension of sediments and increases in turbidity.

- The land reclamation activities proposed for the project site at Punta Guayanilla area would cause as well temporary impacts in the water quality. As with those effects associated with the Ponce dredging operations, the principal impacts to the water quality would be the increase in turbidity in the area. As said before, these effects are also temporary and water quality should return to normal levels once the dredging operation is terminated. The use of barriers to limit the extent of the turbidity caused by sea bottom disturbance during reclamation activities would help containing the transport of suspended sediments and would control its dispersion, thus limiting the effects of a temporary increase in turbidity. Any increased turbidity that might result from the construction of piers for the WindMar RE project would also be temporary but would occur in a different time frame than the proposed Port, and thus would not add to the overall effects of the Project as it relates to water quality.
- During the operational phase of the Project, stormwater would be collected by existing or new storm sewer systems, and control measures established in accordance to a Storm Water Pollution Prevention Plan and permit prepared as part of the National Pollutant Discharge Elimination System program operated by EPA (NPDES).
- Existing water discharges into Guayanilla and Tallaboa bays include the cooling water discharges from the Costa Sur and EcoEléctrica power plants. These discharges result in increases in the temperature of the inner bays, increases turbidity, causes re-suspension of sediments, and augments the salinity near the point of discharge, presumably without increasing the pollution levels within the bay. The Project would not have any similar discharges that would have a cumulative impact on water quality when added to the existing discharges. Therefore, no adverse cumulative impacts on water quality are anticipated as a result of the proposed action.

4.22.7 Cumulative Impacts on Public Safety

Cumulative risks to public safety due to the proposed Project and existing marine operations are generally associated with increased boat traffic and potential collisions between container ships, including LNG and petrochemical tankers. Maritime port operations, like airport operations, are highly regulated activities subject to strict and rigorous safety procedures. The U.S. Coast Guard and the Puerto Rico Ports Authority have the primary responsibility for enforcing public safety regulations applicable to marine port operations. Safety at the ports of Ponce and Guayanilla is the responsibility of the Ports Authority Port Captain, who is responsible for enforcing the established rules and procedures, including coordination with port pilots charged guiding vessels as they approach the harbors and sail through the port. The Coast Guard, on the other hand, provides maintenance to navigation aids and issues specific rules and restrictions as deemed appropriate.

- At present, maritime traffic in Guayanilla averages 1.5 ships per day. It is anticipated that this traffic would more than double to about 4.3 operations per day with the development of the Project. An undetermined volume of ship traffic may result if the WindMar RE project is established. Although this increase in ship traffic is not much different than the existing traffic at the time when

CORCO, UCC and PPG were operating at full capacity in Guayanilla. In this sense, and since Guayanilla Bay has ample capacity to handle large volumes of traffic, it is determined that the proposed project would not have any cumulative impacts on public safety.

4.22.8 Cumulative Impacts on Water Supply

The development of the PTA would not induce cumulative adverse impacts on the current or future water supplies of the region. The water supplies in the region are ample for the current need, and several projects now under development or planned (Section 4.20.1), would provide additional water to meet the future demands, including the PTA and its facilities.

- These projects include the new 7 mgd aqueduct at Yauco, supplied from Lake Luchetti; the new 10 mgd Cerrillos Filtration Plant at Ponce; and the eventual development of the Portugués reservoir.
- Also, there are several idle wells in Peñuelas and Guayanilla capable of producing several million gallons per day of potable water. These wells provided water to the inactive petrochemical industries in the area, mainly CORCO and UCC. Potentially, these wells can be assigned by the DNER to meet other water demands, including domestic and industrial needs.
- A modest amount of water is also available from EcoEléctrica, which produces 750,000 gpd using waste steam at the power plant.

Cumulative impacts to regional water supplies would, however, occur during times of high water demand or during periods of prolonged drought, although it is anticipated that these impacts would not be significant. The proposed Project would not be a large volume consumer of water relative to other users in the area. The principal use of the water would be for potable purposes and ship re-supply. It is estimated that during the first year of operation, the port would consume about 36 million gallons of water, with a consumption of 766 million gallons per year when the Port reaches its tenth year of operation.

- The PTA, once the value-added areas develop, would induce the construction of large number of houses in the corridor from Ponce to Yauco, which also would stimulate the development of business, commerce, schools and industries. These activities would increase the water demands in the region. Under the worst-case scenarios the inclusion of a water-supply capability in the new Portugués Reservoir, would provide as much as 14 mgd to the region, which would help meet demands. In addition, some of these future demands would be supplied from desalination plants. The cost of desalination is rapidly approaching competitive levels when compared to surface water sources, as new technologies develop.
- Along with the Project, the proposed WindMar development may pose additional, cumulative impacts related to water supply. It is anticipated that the establishment of an industrial operation for construction aggregates bulk products, would require as much as an additional 1 mgd of water for its operations.

4.22.9 Cumulative Impacts on Marine and Coastal Resources

Guayanilla Bay has hosted numerous industrial and port development projects throughout the years. The most recent projects include the construction of the EcoEléctrica cogeneration plant and the LNG terminal. Currently, there are no maritime development projects under construction in Guayanilla, and only one, the WindMar Re wind farm in Punta Verraco, is under preliminary evaluation.

- The environmental impacts from the construction of the pier and container storage area at the Guayanilla and Ponce bays, mainly increases in turbidity and loss of 110 acres of marine habitat, would not have a significant cumulative impact on marine water quality, turbidity or re-suspension of sediments. Any increases in turbidity and re-suspension of sediments induced by the construction would be minimized using pile-driving techniques instead dredging to install pilings. In the fill area at Guayanilla Bay, increases in turbidity and re-suspension of sediments would be minimized with the use of turbidity curtains and the previous installation of sheet piling.
- The Project would adversely impact a portion of the shoreline and ocean floor in Guayanilla Bay where mangroves and sea grasses are present. The principal mangrove component consists of red mangroves that grow in Cayo Mata and along the western shoreline of Punta Guayanilla and to the northeast of Punta Gotay. The sea grasses *Tahlassia testudinum*, *Halodule wrightii*, and *Halophila decipiens* are sparsely distributed within the proposed fill area (Vicente, 2000). It is not anticipated that the construction or operation of the Project would result in a significant reduction of habitat for these species. The PTA has been designed to avoid any filling around Cayo Mata and most of the western shore of Punta Guayanilla, where the distribution of mangroves and sea grasses is denser. The direct impacts on these species, as well as the adverse effects of the loss of essential fish habitat, would be compensated accordingly, as outlined in a mitigation plan required under Section 404 of the Clean Water Act.
- In the Ponce area, loss of marine habitat would not occur, since the proposed improvements to the docks and piers would occur on areas already impacted. If dredging of the harbor and navigation channel are included as part of the Project, a temporary loss of marine habitat would occur during the dredging operations. Once dredging is complete, this habitat would return to near normal conditions.
- Shading by the pier is expected to have a minimal impact on sea grass beds. Most of the pier would be constructed in waters that exceed 45 feet. The most productive sea grass beds are usually found at depths of less than 15 feet, although individuals can occur at greater depths. Construction-related increases in turbidity and sedimentation would temporarily reduce productivity in the adjacent near shore sea grass beds, but these impacts would be of short duration with a rapid recovery after the termination of construction activities.
- Relative to the potential cumulative impacts of the Project on marine and coastal resources in Guayanilla, there is only one foreseeable future coastal project whose operation would result in cumulative impacts when combined with those generated by the PTA. The "WindMar Re" project in Punta Verraco and Punta Ventana would have direct and permanent impacts on benthic communities, resulting from the construction of new piers and the installation of offshore wind

turbines. The severity of these impacts, which cannot be assessed at the moment, would result in cumulative impacts.

- Cumulative Impacts on Endangered Species: Port operations in Guayanilla-Peñuelas associated with the PTA would have a cumulative impact on the local population of Manatees. It is expected that the Project would result in an increase in the number of ships arriving at the port of as much as 600 ships over current shipping levels. Although this increase in shipping would increase the potential for collisions with Manatees, this increase is not expected to have a significant adverse effect on the local population of this species. Maritime operations associated with the port would take place in the deeper waters of the Guayanilla Bay, far from where Manatees feed and congregate. Most Manatee sightings reported by the USFWS (1994) in the Project's impact zone (Guayanilla and Tallaboa bays), occur while they feed in shallow water. Maintaining a minimum clearance of four feet between the vessels and the pier or dolphin pilings, to avoid crushing any specimens, would also reduce potential impacts to Manatees.
- Except for a potential increase in the number of ships delivering LNG to EcoEléctrica, no significant increases in shipping are expected in the foreseeable future as a result of other existing or proposed operations in the area. Currently EcoEléctrica receives an average of 25 ships per year, whose frequency of delivery is determined by the LNG storage capacity of the plant. A Manatee management plan was developed by EcoEléctrica and approved by the USFWS to minimize and reduce potential impacts to this species in Guayanilla Bay. There is no data available to estimate any additional increase in ship traffic that would result from the operations of the proposed "WindMar Re" project. In view of the above, cumulative impacts on the Manatees may result from the increase in shipping traffic generated from the combination of the proposed Project with past, present or any foreseeable future operations in the area.
- The Project would also have a cumulative impact on potential Manatee and sea turtle foraging areas, specifically seagrass beds. Although the Project's impact zone has been subject to industrial development for many years, it still maintains much of its natural condition, including mangroves, coral reefs and seagrass beds in excellent condition. Nevertheless, the impact area close to the proposed fill has been influenced for many years by the PREPA thermal discharge, and recent studies have demonstrated the loss of sea grasses on foraging habitat near this outfall.
- The marine area near Punta Gotay where fill of about 110 acres of submerged lands is proposed, is not part of the foraging habitat for Manatees or sea turtles, since the area is essentially devoid of sea grasses or other marine life. However, the eastern portion of Guayanilla Bay and the area around Punta Verraco is rich in mangroves, seagrasses and coral reefs. Accordingly, any development in that area, such as the proposed WindMar Re project, would result in additional impacts to the proposed Port of the Américas.
- In the Port of Ponce endangered species occur with much less frequency than in Guayanilla-Peñuelas. Manatees have been sighted in the periphery of the Port and Brown Pelicans often rest in the area. There are no current or reasonably foreseeable marine construction projects in the Ponce area. Hence, no

cumulative impacts on any other threatened or endangered species, terrestrial or marine life is expected from the proposed action.

4.22.10 Cumulative Impacts on Land Use

The proposed Project would be compatible with existing and future land uses of the area. The Project area in Guayanilla-Peñuelas is currently zoned IL-2, which is consistent with the Project's zoning requirements. In Ponce, the Project area is classified as EI, for industrial buildings and as DC, for areas of future development, including port expansion and improvements. Site development activities would ensure the protection of Project facilities from flooding, and studies would be conducted to ensure that these activities do not affect adjacent land areas. The Project as proposed would not have adverse cumulative impacts on land use. However, when combined with past actions in the area, the Project would have a beneficial cumulative action as it relates to the restoration of Brownfields in the Peñuelas area, which represents a better use of the land than before, and maximization of land potential uses, while providing a significant boost to the Island's economy.

4.22.11 Cumulative Impacts on Cultural Resources

No cumulative impacts on cultural resources are expected as a result of the Project.

4.22.12 Cumulative Impacts on Transportation

Historically, in the Guayanilla-Peñuelas site, the existing roads were able to accommodate the traffic associated with previous massive industrial construction and sizable operation labor forces, when CORCO, PPG, UCC and other satellite industries operated in the area. At its peak, this labor force fluctuated between 5,000 and 7,000 workers. In the area of the Port of Ponce, sizable industrial developments have not occurred, but several tourism and commercial developments generate nearly 2,000 jobs that reach the area in individual automobiles. The existing roads and accesses to the Port of Ponce can handle this traffic without major delays.

The number of potential jobs that would be generated by the PTA in the Guayanilla-Peñuelas and Ponce areas is similar to the peak employment in the region when the petrochemical complex operated in the region. It is then logical to conclude that the existing road system, after some improvements, would be able to handle the projected traffic without significant delays. Since there are no known planned projects in the foreseeable future in the region of the magnitude of the PTA, it is not anticipated that any adverse cumulative impacts would result from the construction and operation of the Project on the transportation system in the area.

4.23 Unavoidable Adverse Environmental Impacts

The analyses of the proposed action show that the following impacts are considered unavoidable:

- The elimination of approximately 110 acres of ocean bottom in Guayanilla Bay as a consequence of the proposed fill for the construction of the pier and container staging area. This action would unavoidably result in the destruction of the benthic flora and fauna within the fill area, as well as the loss of essential fish habitat.
- The elimination of approximately 12 acres of wetlands near Punta Gotay, which would be filled for the construction of access to the port and the container parking

area. This action would unavoidably result in a reduction of wildlife habitat. All of the above impacts are considered potentially adverse.

- Temporary increases in turbidity and re-suspension of sediments at the Ponce and Guayanilla bays from the construction of the proposed docks and piers, and the dredging of the Ponce Bay.
- Removal and disposal of at least 810,000 cubic yards of dredged material from the Ponce Harbor at the authorized Ponce Offshore Marine Disposal Site. As stated in the previous bullet, this operation would cause temporary increases in turbidity and re-suspension of sediments in selected areas at the Ponce Harbor.
- Irreversible utilization of as much as 3.5 million cubic yards (2.7 M cubic meters) of fill material for the land reclamation near Punta Gotay at Guayanilla Bay. Although the quarries from which this material would be obtained are authorized to extract materials from the earth crust, this additional demand would accelerate the closure of some of these quarries, with the eventual, need to open new ones in undisturbed areas nearby.

4.24 Local Short-Term Uses and Maintenance of Long-Term Productivity

The main objective of the proposed Project is the development of an international commercial base for the transshipment of goods and materials in Puerto Rico. This effort represents an important development of infrastructure for the entire Island, particularly for the south coast, where the socioeconomic advantages of the Project would benefit the municipalities of the region. The construction and operation of the PTA would require some local short-term uses of the environment, which would in turn result in enhanced long-term productivity.

- Short-term uses of the environment include the use of rock, stone and gravel for filling a portion of the seabed in Guayanilla Bay. There are certain risks to the environment associated with extraction of material from the earth's crust, including erosion and sedimentation, which, if unattended, would result in adverse impacts to the environment.
- The use of a portion of the seabed for the construction of the pier and container parking area would be permanent and irreversible. The fill would eliminate an unspecified number of benthic organisms, as well as approximately 12 acres of seagrass beds and approximately 12 acres of wetlands.
- The use of heavy equipment during construction would cause some alterations to the soil and would result in a temporary increase in gas emissions to the air.
- The development of the value-added activities would necessitate the removal of the vegetative cover, temporarily exposing the soil and increasing the potential for erosion and sedimentation of nearby water bodies.

Notwithstanding these short-term impacts, the proposed Project would result in a number of long-term benefits, such as:

- The creation of 1,484 direct and indirect jobs during the first year of operation.

- Greater access to foreign manufactured goods and increased capacity for exportation of local products to international markets.
- New incentives for the development of value-added activities such as manufacturing and assembly of products, as well as the promotion of other economic activities such as banking services, communications etc.
- The clean up, restoration, reutilization and increased productivity of segments of the parcel previously occupied by UCC, which has been inactive for more than 20 years.

The economic revitalization of the region, where the unemployment rate is almost 13.6 %, (3.5 % higher than Puerto Rico), and where approximately two thirds of the families live below the federal poverty level standards with a median annual income of \$8,500 per family.

4.25 Irreversible and Irretrievable Commitment of Resources

The development of the PTA would require the irreversible commitment of certain natural and socioeconomic resources, both during the construction and operation phases of the Project:

- The construction of the pier and container parking area would require the fill of approximately 110 acres of ocean bottom in Guayanilla Bay. This action would commit the use of fill material and other construction aggregates, which would be obtained from commercial quarries in the region authorized by the DNER or the Municipality of Ponce. Approximately 2.5 million cubic yards of fill would be required for the construction of the pier and container parking area. Currently there are more than 10 authorized quarries operating between Ponce and Guayanilla, with a total production of more than 20,000 cubic yards per day of different types and grades of material, mainly crushed limestone. The commitment of fill material for the Project would not constitute a significant depletion of this abundant natural resource.
- The Project would result in the permanent loss about 110 acres of ocean bottom as a consequence of the proposed fill. The submerged lands where the fill would be placed consist of mud, sand, coral rubble or a combination of these. Although some small patches of sea grasses have been reported for the area, their distribution is sparse and its associated fauna is poor (Garcia, 2002). Recent surveys revealed only the presence few individuals of *Strombus pugilis*, a type of conch of low commercial value. There are no coral reefs or coral communities of importance within the proposed fill area. Some sponges were observed in the vicinity of Punta Gotay. Nonetheless, according to the Caribbean Fishery Management Council the area is considered as an Essential Fish Habitat. The Project would also result in the permanent loss of about 12 acres of wetlands, primarily mangroves near Punta Gotay. The irreversible and permanent commitment of these resources would require the development of mitigation strategies to compensate for the losses. These would take the form of creation of new habitat to promote the reproduction of fish and wildlife, as well as the restoration of impacted habitats with similar purposes.
- The development of value-added lands in Guayanilla-Peñuelas would take place in approximately 300 acres of previously industrialized lands but currently not in use. The first phase of development is designed to attract medium to large

industries, with an average of 200,000 square feet of construction space in 10-acre subdivisions, approximately. In Ponce the value-added lands and container parking area comprise about 132 acres. No resources of importance or wetlands would be committed in the development of these areas.

- Raw materials such as wood, sand, gravel, cement and steel, as well as any other material used for construction would be irreversibly committed by the Project. Similarly, cranes and other equipment for handling containers in the piers would also be committed.
- Approximately 0.3 to 0.5 mgd of water would be initially committed for use by the Project in the pier and value-added areas.
- The PTA would not generate hazardous wastes. Non-hazardous solid wastes would be disposed of at municipal landfills within the region, most probably at the Ponce landfill. This would result in a reduction of the residual capacity of the landfills due amount of solid wastes generated by the Project. The Project is expected to generate 18,000 tons of non-hazardous solid waste during its construction phase, and 1,500 tons per month during operation.

The commitment of natural and economic resources is necessary when undertaking infrastructure projects for the social benefit of the community. The proposed Project would bring long-range economic and environmental benefits, mainly through the creation of new jobs and the overall revitalization of the regional economy, which justifies the investment in the proposed natural and economic resources.

4.26 Environmental Commitments

The Applicant is committed to avoid, minimize or mitigate any adverse impacts that may result from the proposed action. Some of the activities proposed to achieve this goal include:

- The conservation of approximately 60 acres of jurisdictional wetlands in the Ponce area.
- The conservation of an additional 83.5 acres of wetlands in the parcels proposed for value-added activities in Guayanilla-Peñuelas.
- The potential for creation or restoration of wetland areas and essential fish habitat as compensatory mitigation, for any adverse effects of the fill in the Guayanilla Bay. This action would also compensate for the reduction of marine habitat.

4.27 Natural or Depletable Resources

Development of the Project would require utilization of non-renewable natural resources, including fill material, cement, steel, fuels and lubricants. To a certain extent, the power needed for the Project also can be considered non-renewable.

- The principal non-renewable material used in the Project would be the fill material that would be used to reclaim 110 acres of submerged lands from the Guayanilla Bay. An estimated volume of 2.5 M cubic yards of fill will be required

for the activity. Most probable, this material would be limestone from quarries operating in the area. The use of this material for fill and the construction of the pier and container storage area would partially deplete the resource, regardless of its origin. This non-renewable natural resource cannot be replenished once extracted and used.

- Cement, gasoline, diesel fuel and lubricants, as well as any other petroleum products used for the construction, or to operate equipment at the ports, are also considered depletable non-renewable resources.

4.28 Reuse and Conservation Potential

On April 2001, the EPA announced the allocation of \$100,000 to AFI to start of a pilot project under the Brownfields Program. Brownfields consists of commercial and industrial facilities that are abandoned, evacuated, currently unused and where any future expansion or development is threatened by the real or perceived presence of environmental contamination. The Brownfields program promotes that the States, the Commonwealth, territories, communities and groups that have interest on the economic development of a former industrial site work rapidly together on the prevention, evaluation and accomplishment of the Brownfield cleanup, in order to promote the lands' sustainable reuse. In order to achieve these objectives, the EPA subsidizes up to \$200,000 for pilot projects to develop methodologies, coordination and community training programs that would lead to the cleanup of these areas. In addition, the program subsidizes up to \$1,000,000 in loans for cleanup activities.

With the EPA's subsidy, AFI is seeking to revitalize an industrial corridor located at the edge of road PR-127, between Guayanilla and Peñuelas. This effort is as a direct element of the Project. During the 1970's energetic crisis, many of the industrial facilities located at the corridor ceased operations or continued production at a reduced level. Some of the properties in the corridor, which are suspected to be contaminated, have been unused for more than 20 years and there are no plans for their reuse in the near future. The reduction of the economic activity in the corridor has contributed to the economic distress of families that live in the area, where the unemployment rate reaches 13.6%. Two thirds of the families are under poverty level, with an average annual income of \$8,500 (Estudios Técnicos, 2001).

AFI's main objective is to transform the Brownfields to usable areas in order to locate the PTA support facilities, once it starts to operate. As part of these efforts, the Project includes the development of an inventory of all the properties located along the corridor and an exhaustive evaluation of the area, including the development of profiles for one of three properties that have been identified as priorities parcels. It also includes the organization of public participation, including the creation of an Advisory Committee for the Project.

The proposed component of the Project at the Port of Ponce includes the conservation of 60 acres of wetland located east of the existing terminal. Originally, it was proposed to use this land as part of the value-added activities, but it was finally decided to maintain the ecologic integrity of the area as a natural element of the Project, with the potential to be restored as a mitigation measure.

4.29 Compatibility with State Objectives

The proposed Project is compatible with the objectives and public policies of the Commonwealth agencies with authority over the development of projects of this nature.

4.29.1 Environmental Quality Board

The EQB is responsible for the enforcement of the basic environmental laws in Puerto Rico, and for the administration of certain federal programs delegated by EPA for the protection of the quality of the water, air, land and other components of the natural environment.

- ***Environmental Public Policy Act of Puerto Rico (Law No. 9 of 1970, as amended).*** The Environmental Public Policy Act sets forth the environmental public policy of the Commonwealth of Puerto Rico and its dependencies. The Act created the EQB, which was assigned the authority to implement this public policy. Article 9 of the Act declares that it is the responsibility of the Commonwealth to promote the general well being of its entire people; to use every practical means to create and maintain the conditions under which humanity and nature can exist in productive harmony; and to fulfill the social and economic needs of present and future generations. Article 4(C) of the Act mandates all government entities to comply with this public policy, to take into account environmental considerations in decision-making, and to submit a detailed written statement for decisions that have significant impact on the environment. Conforming to the law, AFI is submitting this Draft Environmental Impact Statement (DEIS) to EQB's consideration. In it, the Applicant presents a detailed description of the environmental impacts associated with the Project.
- ***Federal Clean Water Act of 1970, as amended.*** As indicated earlier, Section 401 of the Clean Water Act requires that, prior to the issuance of a permit under Section 404 of the Act, a Water Quality Certificate from the state agency with jurisdiction over water pollution must be obtained. In Puerto Rico this responsibility is under the jurisdiction of EQB, and the Applicant would coordinate with that agency the permit application.

4.29.2 Department of Natural and Environmental Resources

The DNER is responsible for the implementation several laws and regulations related to the protection of natural resources in Puerto Rico. The applicability of these laws and regulations relative to the proposed Project is discussed below:

- Regulation for the Use, Surveillance, Conservation and Management of the Territorial Waters, Submerged Lands thereunder, and the Maritime Zone. This regulation was promulgated to implement Section 19, Article VI of the Constitution of Puerto Rico, which states that it shall be the public policy of the Commonwealth to conserve, develop and use its natural resources in the most effective manner possible for the general welfare of the community.
- ***Law Number 23 of June 20, 1972 (Organic Act of the Department of Natural Resources).*** This law grants the DNER the authority to implement the constitutionally mandated public policy, but also the surveillance and conservation of the territorial waters and its submerged lands, and the maritime zone.
- ***Law Number 6 of February 29, 1968.*** This law was delegated initially to the DTOP and now to the DNER responsibility for the conservation of coastal resources, including the authority to investigate and control floods; the surveillance, conservation and clean up of beaches; control of sand and gravel extractions from beaches; delineation and reparation of the maritime zone; and

the surveillance and care of mangrove forests under Commonwealth ownership. The provisions of this regulation do not apply to “... *harbors and their waters, piers on public property, submerged lands in harbors and under all piers and their waters, the maritime zone within any port zone duly delineated by regulation, and all buildings therein under the jurisdiction of the PA; or under the jurisdiction of any municipal entity...*”. This exclusion clearly exempts the proposed Project from compliance with this Regulation since the Port of Ponce is under the jurisdiction of the Municipality of Ponce and the Port of Guayanilla under the Ports Authority.

- **Regulation to Direct the Extraction of Materials from the Earth’s Crust.** Law Number 144 of June 3, 1976 grants the DNER the authority to regulate the issuance of permits for the extraction, excavation, removal and dredging of earth’s crust components. Among these are included sand, gravel, rock, earth, silica, clay and other similar constituents, which are not regulated as economic minerals in private and public lands. The proposed Project requires the use of materials similar to those described above as fill material for the construction and improvements of port facilities in Ponce and Guayanilla-Peñuelas. AFI identified over 10 authorized quarries in the Project area with enough capacity to supply the demand for the Project (see **Section 4.2.2**). For this reason, it is anticipated that the need for fill material for the Project would be satisfied from existing quarries, without the need for additional permits.

4.29.3 State Historic Preservation Office

Section 2 of the Historic Preservation Act of 1966 (16 U.S.C. 470) sets forth the public policy of the Federal Government on historic preservation, including:

- To contribute in the preservation of historic and pre-historic resources outside of federal property, and to encourage to the maximum the work of institutions and individuals involved in their preservation.
- To encourage the preservation of historic resources by public or private entities, and to promote the utilization of all useful elements of the nation’s historic environment.
- To assist state and local governments in expanding their historic preservation programs and activities.

In Puerto Rico, the State Historic Preservation Office (SHPO), ascribed to the Office of the Governor, administers the national program. SHPO is responsible for the review and analysis of archaeological and cultural resources documents related to projects with a federal component (i.e. the need for a federal permit or funds) submitted as part of the local environmental evaluation process, and for the coordination of the participation of the Commonwealth in the implementation of the Act and its regulations.

4.29.4 Institute of Puerto Rican Culture

One of the main objectives of the Institute of Puerto Rican Culture (ICP) is the preservation of Puerto Rico’s cultural values. As such, the ICP has the responsibility to see for the preservation and restoration of structures with historic and cultural value.

- **Law 112 of July 20, 1988.** This law created the Council for the Protection of Puerto Rico's Terrestrial Archaeological Heritage, ascribed to the IPC. The Council has authority to approve studies and archaeological excavations and research conducted on land, and supervises compliance of its resolutions. The Regulation for the Submittal and Archaeological Evaluation of Construction and Development Projects was adopted under this law. The principal objective of this Regulation is to insure adequate protection and study of Puerto Rico's terrestrial archaeological heritage, through the establishment of minimum criteria to guide different phases of archaeological research subject to regulation.

In compliance with the objectives of Law 112, Phase IA investigations of the terrestrial and submarine archeology of elements of the Project sites were completed (Appendices K, L and N). A detailed discussion of the scope and results of this study is presented in Section 4.13.1 of this DEIS. A copy of the study with conclusions and recommendations was submitted to the ICP for approval.

4.29.5 Puerto Rico Planning Board

The Planning Board is responsible for implementing the public policy on land use throughout the Island, among other responsibilities. The board has issued a series of regulations with the objective of achieving a controlled development of the land resources in Puerto Rico. The pertinent regulations relative to the Project include:

- **Comprehensive Development Plan of April 1979.** Chapter II, Sector III sets forth as public policy of the Commonwealth to foster external commerce and with the United States to broaden the industrial and commercial capacity of the Island, as well as a source of employment. Among the specific objectives of this public policy are:
 - the development of infrastructure capable of augmenting commercial interchange with foreign countries and promoting the exportation of locally produced products; and
 - develop Puerto Rico into an international center for commerce and services taking maximum advantage of its geographical position and transportation facilities.
- Chapter IV, Sector I establishes the development of infrastructure as an important source of direct and indirect employment, both during the construction phase as well as during basic services provision activities. Similarly, it encourages the creation of additional jobs as promoter of other economic activities. This Chapter also emphasizes the vital importance of shipping to the economic development of the Island, since it is the main venue for the transportation of goods and products for commerce and industry.

The Commonwealth's public policy on transportation is the creation of an integrated, balanced and coordinated system encompassing all the means and elements of transportation. Similarly, according to the Plan, both air and maritime transportation should respond to the growing demand for these services.

The proposed Project is an initiative of the Commonwealth of Puerto Rico, not only to serve the domestic demand for maritime transportation services, but also to allow the Island to compete as an international trade center. In addition, construction of the PTA would bring economic

opportunities to thousands of Island residents, both during its construction and operation phases.

- ***Four Year Investments Program of the Planning Board dated November 1997.*** One of the main objectives of the Four Year Investments Program is to improve maritime and air transportation systems to favor the development and expansion of commerce, industry and tourism. As indicated before, the proposed Project would not only serve the need for development and expansion of these three elements, but would also give Puerto Rico a competitive advantage for the establishment of an international trade center.
- ***Sitting Requirements in Floodable Areas (Planning Regulation Number 13).*** Portions of the proposed Project in Ponce, as well as in Guayanilla-Peñuelas, would be built in floodable areas classified as Zones 1M and 2 by the PB.
 - In the Ponce Bay area, the PB classifies the proposed construction sites as Zones 1M and 2. Zone 1M is used to identify high-risk areas, subject to flooding by wave action, which are located along the coast. Zone 2 includes the area of the floodway subject to floods with a frequency of 100 years where construction is allowed as long as backwater effects do not exceed 0.3 meters.
 - In Guayanilla Bay, the PB classifies the proposed construction sites as Zones 1M and 1. Zone 1 is used to identify the main floodway, where construction is not allowed unless it is demonstrated through a hydrologic/hydraulic study that the activity would not result in any increase in flood levels.
 - Construction in areas classified as Zone 2 and/or 1M would be conducted in compliance with the design criteria required for the type of location, consistent with the Flood Zone Regulation. Construction of the Project does not represent a risk to public safety inasmuch that it would comply with the design criteria required for this type of location.
- ***Puerto Rico's Land Use Plan – Public Policy Goals and Objectives for Industrial and Infrastructure Development.*** The policy and goals of the Commonwealth for industrial development include the sitting of new developments in strategic areas whose location, characteristics, infrastructure and services are better adapted for that type of use, in harmony with the general objective of attaining a full and judicious use of the land and its natural resources. Within this goal, the public policy to concentrate industrial developments on locations appropriately adapted for such uses, while fostering maximum intense use of the land.
 - The proposed Project site has two special attributes that allow it to comply with the objectives of this public policy. First, the Project site lies within an industrial zone with the necessary infrastructure to attend its needs and uses. Second, the sitting of the Project in the proposed area would allow for the reutilization of idle lands under the Brownfields Program. These two characteristics provide for the best use of the land, while assuring it's most intensive use.

- The goals and public policies of the Commonwealth in the area of infrastructure include the development of projects to attain a level of economic strength and expansion that could stimulate a harmonious and complementary relationship among all regions of the Island. These goals also have the objective of modifying the external perception of Puerto Rico as a good place for investments, using scheduling and infrastructure construction as instruments of land use planning to plan and promote comprehensive development.
- Within this goal, one of the objectives of the Plan is the development of each of the components associated with socioeconomic activity: tourism, industry, commerce, construction and agriculture, among others. Section 23.00 of the Land Use Plan establishes the following public policies:
- Complement marine, air and terrestrial transportation to respond to real demand; and
- Set aside coastal lands for port use, expansion, improvements and implementation of future plans.

In accordance with these public policies, construction of the PTA would:

- Attend domestic and international demands and develop an infrastructure to provide more and better marine transportation services; and
 - Use of industrial coastal lands in Ponce and Guayanilla-Peñuelas for the long term improvement of existing facilities and services
- ***Puerto Rico Coastal Zone Management Program.*** The Planning Board approved the Puerto Rico Coastal Zone Management Program (the CZMP, or “Program”) on June 22, 1978. The Program, developed under the Coastal Zone Management Act (16 U.S.C §1451 et seq.), guides state agencies in decision-making and actions pertaining to developments in private and public properties in the coastal zone. Among the principal objectives of the Program are:
 - The protection of natural resources in the coastal zone, including wetlands, flood zones, estuaries, beaches, dunes, coral reefs, fish and wildlife and their habitats;
 - Management of coastal development to minimize the loss of life and property due to inappropriate use of the land;
 - Assign priority to coastal-dependent uses and siting procedures for major recreational facilities, among others; and
 - Provide coastal access for recreation.
 - The CZMP divides the Island in eight coastal sectors. The proposed PTA area is located between two of these sectors: the south sector, which encompasses the area between Río Grande de Patillas and Río Tallaboa in Peñuelas, and the southwest sector, from Río Tallaboa to Guaniquilla Point in Cabo Rojo. The south sector is relatively dry, while the southwest sector is considerably drier, but rich in natural ecosystems.

- One of the Program's main tasks is to identify coastal problems and their characteristics. For each problem identified, the Program recommends management measures to resolve the issues, including the application of existing public policies, past actions taken by state and federal agencies, and new areas of opportunity requiring future action. A major element of the Program is the identification of coastal areas suitable for coast-dependent industrial development.
- The CZMP acknowledges that there are certain projects that are critical to the economic development of Puerto Rico, and that some of these projects need to be located on or near the coast. Ports, for example, need to be located on the coast in order to function properly. In view of the coastline configuration and water depth characteristics in Puerto Rico, the areas where some of these water-dependent industries can be located are limited. The most suitable areas for port development are located along the south and west coasts, between Yabucoa and Punta Rincón. The Commonwealth identified potential coastal sites where these industries can be established and developed. Two of these sites are Ponce and Guayanilla bays.
- Conflicts may arise when some of these sites are also important for other purposes, in particular when valuable natural resources are present. In some cases, through careful planning, many, if not all of these conflicts can be resolved without harming the environment or its natural resources.
- The Program enunciates several policies to deal with coastal-dependent industry:
 - Urban development shall, to the maximum extent practicable, be located away from the shorefront;
 - Coastal sites designated by the PB as suitable for coastal-dependent industries shall, to the maximum extent practicable, be protected against other kinds of development and reserved for coastal-dependent industry except in those instances where natural systems destruction is unacceptable.
- Sites reserved for coastal-dependent industry, but which are also important from the stand point of natural values, shall be developed for industry only after the fullest practicable consideration of location and design alternatives available to protect natural systems.
- The PTA is compatible with the public policies of the CZMP related to coastal-dependent developments. It is important to point out that the proposed Project would be located in an area previously used by industry, and that the project site is relatively far from urban developments and was previously impacted by the construction of facilities.

4.30 Compliance with Federal Environmental Requirements

4.30.1 National Environmental Policy Act of 1973

All relevant environmental information on the PTA was compiled in this DEIS. Copies of the DEIS and its appendices were circulated to the pertinent federal and local agencies. In parallel, AFI filed with the DNER a Joint Federal/Commonwealth Permit Application for the potential permits required for the Project under Sections 10, 103 and 404 of the pertinent laws; for the Water Quality Certificate from the EQB; and the CZMP conformance from the PB. The USACE published in the local media and the Federal Register on August 28, 2001 a Public Notice to inform the general public of its intent to prepare and circulate the DEIS for the Project (Appendix A). The purpose of these announcements is to provide an open forum for comments relative to the Project and the DEIS to any agency, organization or individual. USACE also created a Web page under the following address:

<http://www.saj.usace.army.mil/permit/EIS-Las-Américas/CONRTENT.html>

Additional information is available to the general public at this site, and written comments can be submitted. Upon completion of the evaluation process of the DEIS, after consideration of all comments and suggestions relative to the Project, either from the announcements in the local media, the Federal Register or the Web page, USACE will incorporate the pertinent information into a Final Environmental Impact Statement (FEIS). Preparation and publication of the FEIS will complete the requirements under NEPA.

4.30.2 Endangered Species Act of 1973

Section 7 of the Endangered Species Act (ESA) requires that federal agencies, in consultation and with the assistance of the Secretary of the Interior, insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species, or result in the destruction or adverse modification of habitat of such species. Since the range of endangered species includes terrestrial as well marine species, both the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) play active roles in Section 7 consultations.

In early scoping with the USFWS and the NMFS, a total of 13 threatened and or endangered species were identified in the general vicinity of the Project, including the area known as the Guayanilla hills north of Highway PR-2. The Section 7 consultation process includes the preparation of a Biological Assessment by the proponent agency and a Biological Opinion prepared by the USFWS and the NMFS, which outlines any mitigation requirements and measures that must be undertaken by the potential permit holder. The USACE has prepared a Biological Assessment for the Project and has initiated an informal Section 7 consultation as required by the Act. Compliance with the Act would be attained when the USFWS and NMFS present their respective Biological Opinions.

4.30.3 Fish and Wildlife Coordination Act of 1958

The Fish and Wildlife Coordination Act (FWCA) was enacted to assure that fish and wildlife resources receive equal consideration with other values during the planning of water resources development projects, including navigation. The Act requires federal agencies to consult with the USFWS whenever they plan to conduct, license, or permit an activity involving the impoundment, diversion, deepening, control or modification of a stream or body of water. The purpose of this process is to promote conservation of wildlife resources by preventing loss of and damage to such resources and to provide for the development and improvement of these

resources in connection with the agency action. Coordination under the FWCA will be initiated during Section 404 of the Clean Water Act permitting process.

4.30.4 National Historic Preservation Act of 1966 (Inter Alia)

The National Historic Preservation Act (NHPA) created the Advisory Council on Historic Preservation to advise the President on matters related to historic preservation. The Council also provides a forum to private citizens, local communities, and other concerned parties, to influence federal programs and decisions as they impact historic properties and their attendant values. Section 106 of the NHPA requires that all Federal agencies take into account the effects of their actions on historic properties, and provide the Council with a reasonable opportunity to comment on those actions and the manner in which Federal agencies are taking historic properties into account in their decisions. The effects may be any change in the qualities that make the property eligible for the National Register of Historic Places. These properties include historic, archeological, architectural, engineering, or cultural sites or objects. The Section 106 process must be completed before the USACE issues any authorization under its jurisdiction.

The Archeology and Historic Preservation Act of 1960 and 1974 directs Federal agencies to notify the Secretary of Interior whenever they find that a federal or federally assisted, licensed, funded, or permitted project may cause loss or destruction of significant prehistoric or archeological data. The Secretary may take action necessary to recover and preserve the data prior to the commencement of the Project. These actions usually take the form of imposing certain preservation obligations upon the permit holder in the form of mitigating measures incorporated into the EIS and final permit conditions.

The Project is not expected to cause loss or destruction of significant prehistoric, historic, archeological or cultural properties, structures or data. The Project is in compliance.

4.30.5 Clean Water Act of 1972

The Clean Water Act (CWA) derives from a 1977 amendment to the Federal Pollution Control Act of 1972, which set the basic structure for regulating discharges of pollutants into waters of the United States. Section 404 of the CWA establishes programs to regulate the discharge of dredged and fill material into waters of the United States, including wetlands. Activities in waters of the United States include fills for development, water resources projects, infrastructure development, and conversion of wetlands to uplands for farming and forestry.

The basic premise of the Section 404 Permit program is that no discharge of dredged or fill material can be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be significantly degraded. Before obtaining a permit under Section 404, it must be demonstrated that; (1) steps have been taken to avoid wetland impacts where practicable (2) potential impacts to wetlands have been minimized and (3) compensatory mitigation for any remaining, unavoidable impacts through restoration or creation of wetlands is provided.

The proposed Project will comply with all the requirements of Section 404 of the CWA. The scope of the Project was discussed with the USACE representatives assess compliance with the parameters, objectives and public policies established by the Act.

Section 401 of the Act requires that prior to the issuance of a permit under Section 404, the applicant must obtain a Water Quality Certificate (WQC) from the State Agency responsible for regulating water pollution. In Puerto Rico this agency is the EQB. The Federal/Commonwealth

Joint Permit Application in preparation by AFI includes the appropriate WQC to also comply with Section 401 requirements. According to EQB regulations, a Section 401 water quality certification cannot be applied for until the NEPA process is complete.

4.30.6 Clean Air Act of 1972

The Clean Air Act is a comprehensive Federal law that regulates air emissions from area, stationary and mobile sources. This law authorizes EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment. The goal of the act was to set and achieve NAAQS in every state. The setting of maximum pollutant standards was coupled with directing states to develop state implementation plans applicable to appropriate industrial sources in the state. The Act was amended in 1977 primarily to set new dates for achieving NAAQS since many areas of the country had failed to meet the original deadlines.

The DEIS addresses potential air emissions associated with the development and operation of the PTA. The proposed Project would not be a major source of air emissions (Section 4.12). In that respect, any emissions associated with the Project would be minor and in compliance with the NAAQS. The Project is in compliance.

4.30.7 Coastal Zone Management Act of 1972

In response to the intense pressures for development in the coastal zone, and its importance of the welfare of the United States, Congress passed in 1972 the Coastal Zone Management Act (CZMA). The Act affirms a national interest in the effective protection and development of the coastal zone by providing assistance and encouragement to coastal states and territories to develop and implement regional programs for managing their coastal zones. The purpose of the CZMA was to establish a national policy and develop a national program for the management, beneficial use, protection and development of the land and water resources of the Nation's coastal zone. The Puerto Rico Coastal Zone Management Program (PRCZMP) was approved in September 1978.

The term "federal consistency" refers to the requirement in Section 307(c) of the CMZA that identifies several types of federal actions that must be consistent with the approved Coastal Zone Management Program. In Puerto Rico, the Planning Board is the agency designated to administer federal consistency procedures.

All federal projects to be carried out in the coastal zone are subject to consistency review. The Act also requires that any non-federal applicant for a federal license or permit to furnish a consistency certification that the proposed activity will comply with the local coastal zone management program. Generally, no permit will be issued until the Planning Board has concurred with the non-federal applicant's certification.

The proposed Project involves filling activities within the coastal zone. The PRCZMP established the following criteria for permitting these activities:

- Diking or filling of coastal waters shall, to the maximum extent practicable, be permitted only where necessary and where there is no less environmentally damaging alternative for port or airport expansion or coastal-dependent facilities;
- Dredging of coastal waters shall to the maximum extent practicable be limited to port facilities, navigational channels, turning basins, vessel berthing and mooring areas

In view of the above, it is anticipated that the proposed Project would be consistent with the PRCZMP.

4.30.8 Farmland Protection Policy Act of 1972

The purpose of the Farmland Protection Act is to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses. The Act insures, to the maximum extent practicable, that Federal programs are administered in a manner that is compatible with State, unit of local government and private programs to protect farmland.

The proposed Project would be located in an industrial zone. Therefore, no unnecessary and irreversible conversion of farmland to non-agricultural uses would take place. This Act is not applicable.

4.30.9 Wild and Scenic River Act of 1968

The Wild and Scenic River Act declared as policy of the United States that certain selected rivers of the Nation, with immediate environments that possess outstanding and remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values, will be preserved in free-flowing condition. The Act also states that their immediate environments will be protected for the benefit and enjoyment of present and future generations. The purpose of this Act is to institute a national wild and scenic rivers system, designating the components of that system, and prescribing the methods and standards by which additional components may be added to the system from time to time.

There are no designated wild and scenic rivers within or near the proposed project site. Therefore, this Act is not applicable.

4.30.10 Marine Mammal Protection Act of 1972

The Marine Mammal Protection Act (MMPA) was enacted to protect and manage marine mammals and their products. The primary authority for implementing the act is assigned to the USFWS and the NMFS. The Act expresses the intent of Congress that all marine mammals (regardless of protective status) be protected and encouraged to propagate in order to maintain the health and stability of the marine environment. It also imposes a perpetual moratorium on the harassment, hunting, capturing or killing of marine mammals and marine mammal products without a permit. Consultation with the USFWS and the NMFS in the context of the MMPA will occur jointly with Section 7 consultation under the Endangered Species Act. The results of the MMPA consultation will be incorporated into the same Biological Opinion issued by the resource agencies outlining the authorized level of "taking." As with Section 7, consultation under the MMPA will result in mitigating measures being developed in the context of the West Indian Manatee, which is common in Guayanilla Bay. These protective measures would be included and formalized in the permit conditions that would be issued by the USACE. A Biological Assessment addressing potential impacts to marine mammals, among other species, has been prepared with the intent of obtaining a Biological Opinion from the USFWS and the NMFS.

4.30.11 Estuary Protection Act of 1968

The Estuary Protection Act of 1968 highlights the values of estuaries and the need to conserve their natural resources. It authorized the Secretary of the Interior, in cooperation with other Federal agencies and the States, to study and inventory estuaries in the United States, and to determine whether such systems should be by the Federal Government and protected. The

Secretary was also required to encourage State and local governments to consider the importance of estuaries in their planning activities related to Federal natural resource grants.

The areas proposed for development of the elements of the PTA are outside of any estuary of importance. Although several rivers discharge into the Ponce, Guayanilla and Peñuelas bays, forming riverine estuaries, none of the proposed structures would impact these estuaries. The natural environment within the Project area is maritime but distant from the mouth of the rivers in the zone, and there is no federally owned estuarine lands or habitats in the vicinity. Compliance with this statute need not be further considered.

4.30.12 Federal Water Project Recreation Act

The Federal Water Project Recreation Act (FWPRA) declares the intent of Congress that recreation and fish and wildlife enhancement be provided full consideration in Federal water development projects. This is conditioned to non-Federal local sponsors agreeing to bear part of the costs allocated for recreation and fish and wildlife enhancement, administer project land and water devoted for these purposes, and bear all costs of operation and maintenance.

The proposed Project is not a Federal water development project. Hence, compliance with the FWPRA is not required.

4.30.13 Fishery Conservation and Management Act of 1976

This law, also known as the Magnuson Fishery Conservation and Management Act, established a 200-mile fishery conservation zone and Regional Fishery Management Councils comprised of Federal and State officials, including the Fish and Wildlife Service. The concept of a fishery conservation zone was later changed to the Exclusive Economic Zone (EEZ), with the inner boundary being the seaward boundary of coastal states (10.35 miles for Puerto Rico). The Act provides for management of fish and other species in the EEZ under plans drawn up by the Regional Councils (Caribbean Fishery Management Council, CFMC in Puerto Rico).

Section 305 of the Act requires the NMFS to coordinate with and provide information to other federal agencies on Essential Fish Habitat (EFH), defined in the Act as those waters and substrate necessary to the fish for spawning, breeding, feeding, or growth to maturity. According to the CFMC, in Puerto Rico and the US Caribbean, EFH includes virtually all marine waters and substrates from the shoreline to the seaward limit of the EEZ.

Locally, Federal agencies are required to consult with the NMFS and the CFMC when any of their actions may adversely affect EFH. In turn, these Federal entities are required to provide comments and recommendations on EFH issues back to the agencies. To the extent possible, the EFH process will be carried out concurrently with the Section 7 consultation, and mitigating measures would be developed to offset any adverse impacts to fish habitat. Consultations with the NMFS and CFMC have been initiated, but no final recommendations have been issued. The Project is not yet in compliance with the Act.

4.30.14 Submerged Lands Act of 1953

Under the Submerged Lands Act of 1953, the location of the energy and mineral resources determines whether or not they fall under state jurisdiction. Specifically, the Act granted states title to the natural resources located within three miles of their coastline (three marine leagues for Puerto Rico). For the purpose of the Act, the term "natural resources" includes oil, gas, and all other minerals.

The proposed Project would be located over state-controlled submerged lands. Therefore, the Act does not apply.

4.30.15 Coastal Barriers Resources Act and Coastal Barrier Improvement Act of 1990

The Omnibus Budget Reconciliation Act (OBRA) was passed in 1981. Section 341 of that Act amended the National Flood Insurance Act of 1968, to prohibit the issuance of Federal flood insurance coverage after October 1, 1983, for any new construction or substantial improvements of structures located on undeveloped coastal barriers. The OBRA set a precedent for withdrawal of Federal financial assistance for development as one means of protecting coastal barriers and reducing recurring Federal costs associated with their development and reconstruction.

In accordance with the OBRA, in 1982 the Secretary of the Interior submitted to Congress a report that made recommendations relating to the term coastal barrier and listed 188 sites recommended for designation as undeveloped coastal barriers under OBRA. In the fall of 1982, acting on the Secretary's recommendations, Congress passed the Coastal Barrier Resources Act (CBRA).

The CBRA retained the prohibition under OBRA against issuing federal flood insurance for new construction of substantial improvements on structures on undeveloped coastal barriers. However, it expanded the scope of the prohibition of Federal expenditures and financial assistance to include all Federal programs that support development on the undeveloped coastal barriers within the Coastal Barrier Resource System (CBRS).

In 1990, Congress enacted the Coastal Barrier Improvement Act, which greatly expanded the CBRS to include Great Lakes units and otherwise protected areas, including public or private lands that are held for conservation purposes. After the Coastal Barrier Improvement Act, the System contained approximately 1.3 million acres of undeveloped coastal barrier fastland and associated aquatic habitat, 1,200 miles of shoreline, and 585 units.

In Puerto Rico, the CBRS contains 41 units totaling 19,381 acres distributed along 51.4 miles of shoreline. The proposed transshipment port site is not within any of the listed units, and therefore compliance with the CBRA is not required.

4.30.16 Rivers and Harbors Act of 1899

Section 10 of the Rivers and Harbors Act of 1899 as amended (RHA) requires that a permit be issued by the Secretary of the Army prior to the construction of any wharf, pier, dolphin, bulkhead or other structures in any port, harbor, canal or other waters of the United States. Prior authorization is also required to excavate or fill, or in any manner alter the condition of any port, harbor or channel of any navigable water of the United States. For compliance with this Act, the proposed action would be subject to public review as part of the joint permit process. This process includes issuing of a Public Notice, conducting public hearings and coordination among local and federal regulatory agencies.

4.30.17 Anadromous Fish Conservation Act

Anadromous fish species would not be affected by the proposed Project. The Project has been coordinated with the NMFS and compliance with the Act is not required.

4.30.18 Migratory Bird Treaty Act and Migratory Bird Conservation Act

No migratory birds would be affected by the proposed activities. The Project is in compliance with these Acts.

4.30.19 Marine Protection, Research and Sanctuaries Act

Section 103 of the Marine Protection, Research and Sanctuaries Act (MPRSA) specifies that all proposed operations involving the transportation and dumping of dredged material into ocean waters have to be evaluated to determine the potential environmental impact of such activities. In accordance with Section 103, the USACE is the permitting authority for dredged material, subject to EPA review. Environmental evaluations have to be in accordance with applicable criteria developed by the EPA.

The Project as proposed would involve offshore disposal of material dredged from the Ponce Bay. Prior to any disposal of dredged material from the Ponce Harbor at the designated OMDS, a "Site Management and Monitoring Plan" for EPA must approve the action. Any disposal activity resulting from the Project would be evaluated under Section 404 of the Clean Water Act.

4.30.20 E.O. 11990, Protection of Wetlands

Executive Order mandates federal agencies to take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. The Order, however, does not apply to the issuance by Federal agencies of permits, licenses, or allocations to private parties for activities involving wetlands on non-Federal property. Since the proposed Project is a local government activity on non-Federal property, compliance with E.O. 11990 is not required. Any impacts to wetlands associated with the Project will be dealt with through Section 404 of the Clean Water Act.

4.30.21 E.O. 11988, Flood Plain Management

Executive Order 11988 requires federal agencies to take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains. In Guayanilla, the proposed fill would not occur in a floodplain nor it would increase the flood base. The regulations require that any new development within the parcels proposed for value-added activities in Ponce and Guayanilla-Peñuelas, would have to be designed following specific construction standards, criteria and guidelines aimed at minimizing potential harm to the floodplain, as well as reducing the impacts of floods on human safety and the general welfare of the surrounding population. Final construction plans have not been completed. The Project is not yet compliant with the Executive Order.

4.30.22 E.O. 12898, Environmental Justice

Executive Order 12898 issued by President William J. Clinton indicates, among others aspects that: *"each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low income populations..."*. Moreover, the executive order states that all federal agencies *"whenever practicable and appropriate, shall collect, maintain and analyze information on the race, national origin, income level, and other readily accessible and appropriate information for areas surrounding facilities or sites expected to have a substantial environmental, human health, or economic effect on surrounding populations, when such facilities or sites become the*

subject of substantial Federal environmental administrative or judicial action. Such information shall be made available to the public,...

The Environmental Justice Analysis prepared for the Project concluded that locating the PTA in Ponce's Playa ward, Peñuelas' Tallaboa Poniente ward, and Guayanilla's Playa ward does not constitute a socioeconomic discrimination that would violate Environmental Justice precepts as described in Executive Order 12898. The Project is in compliance with the Executive Order.

4.30.23 E.O. 13089, Coral Reef Protection

Executive Order 13089 established a Federal policy for the protection of coral reefs. All Federal agencies whose actions may affect U.S. coral reef ecosystems shall: (1) identify their actions that may affect coral reefs; (2) utilize their programs and authorities to protect and enhance the conditions of such ecosystems; and (3) to the extent permitted by law, insure that any actions they authorize, fund, or carry out will not degrade the conditions of such ecosystems.

There are no significant coral reefs formations within the proposed fill site at Guayanilla, or the potential dredging sites at the Ponce Bay, and no degradation of coral reefs are anticipated. The Project is in compliance with the Executive Order.

4.31 Conflicts and Controversies

Currently, the most sensitive possible area of controversy associated with the Project includes the adverse effects of the proposed fill of the seabed in Guayanilla-Peñuelas. The nature of the impacts associated with the fill includes the elimination of the scarce benthic flora and fauna where the pier and container staging area would be built, as well as the loss of a relatively small area of wetlands and essential fish habitat. A second issue is the potential dredging of the Ponce Bay, including the navigation channel, with the ocean disposal of the dredged material. The dredging would eliminate temporarily any benthic flora and fauna in the harbor, and the ocean dumping could impact marine species in the disposal zone.

- The Project design would take into consideration the adverse effects that result from filling activities, thereby adjustments are planned to avoid and minimize, to the maximum extent practicable, the adverse effects associated with this action. As a result, the Project design would avoid the fill over Cayo Mata and the mangroves on the western side of Punta Guayanilla near the thermal outfall from the Costa Sur power plant.
- The impacts to mangroves and associated salt flats have been reduced to only 12 acres. Mitigation for the loss of benthic habitat, including some isolated patches of sea grasses and essential fish habitat, may be required to maintain the ecological integrity of these systems. The coastal corridor between Punta Guayanilla and Ponce contains natural resources of great value and provides excellent opportunities for restoration, enhancement and protection of fish and wildlife habitat. Similarly, Punta Verraco and its environs presents itself as another area of opportunity, where mangrove restoration measures would be implemented, as well as additional measures to assure the preservation and conservation of dry forest areas, endangered species, marine bird nesting areas, basin mangroves, coral reefs and sea grass beds.
- Relative to the dredging of the Ponce Bay, the navigation channel and turning basin are essentially devoid of permanent organisms, since dredging is required

periodically, the last occurring in 1986. Dredging of the harbor would require a Section 404 Permit, while the disposal of the dredged material would require a Section 103 Permit. Prior to any disposal of dredged material from the Ponce Harbor at the designated OMDS, EPA must approve a "Site Management and Monitoring Plan" for the proposed action.

It is expected that the topic of the origin of the fill material would not generate conflict or controversy, nor it would represent a threat to wildlife, since there are over 10 authorized quarries in the region, with enough production to supply the Project's demand for fill material. The impacts of these quarries already occurred, and expansion of any to address the additional demand of fill for the Project would require further evaluations of potential additional impacts, and permits from the DNER. Therefore, it is not anticipated that there would be a need for new quarries as a direct result of the Project.

4.32 Uncertain, Unique or Unknown Risks

The development of the PTA does not involve uncertain or unknown risks. The PTA has been planned taking into account the economic, physical, environmental and social aspects and requirements of the proposed action, to insure its feasibility with the least risks possible. As previously discussed, it has been demonstrated that the Project is an attractive enterprise, financially, economically, and commercially feasible (Frankel, 2000). It has also been demonstrated that Guayanilla Bay has the physical requirements to accommodate a deep-water port.

The possible environmental and socioeconomic risks associated with the Project are methodically anticipated, evaluated and discussed in this D-EIS, and it is concluded that they are predictable and manageable under current laws and regulations. The development of the Project does not require the use of experimental techniques or methods that would present uncertain or unknown risks.

4.33 Precedent and Principle for Future Actions

Although the PTA is unique in its class in Puerto Rico, it would not set a precedent that determines or justifies future actions. Its operations would be similar to those of other ports on the Island that currently handle containership cargo, such as San Juan and Ponce. The main difference between current and proposed operations is the volume of cargo and maritime traffic. It is anticipated that approximately 600 mainline containerships would use the port to reach the goal of 2.3 million TEU's per year. This goal assumes that one third of half of the containers are loaded and unloaded during each ship's entry to port, and that Puerto Rico is the final destiny of 5 % of the cargo in containers. It is also anticipated that maritime traffic would increase from 300 to 500 ships per year to 1,000 ships per year when the PTA is in full operation.