

Feasibility of the Construction of an Auxiliary Cargo Ferry Terminal at Fulladosa

Reconstruction of the Cargo Ferry Terminal
Sardinas Bay
Culebra, Puerto Rico

Prepared For:



Prepared For:

ATKINS

Technical Note

Project:	Culebra Cargo Ferry Terminal		
Subject:	Feasibility of the Construction of an Auxiliary Cargo Ferry Terminal at Fulladosa		
Date:	Jun 9, 2015	cc	PRPA, MTA, FEMA

Introduction

The Puerto Rico Ports Authority (PRPA) has evaluated alternatives for the continued cargo and passenger service to the island of Culebra during the reconstruction activities of the cargo ramp in Sardinas Bay. The existing facilities in Sardinas Bay have constraints that decisively limit the possibility to simultaneously operate the cargo and passenger ferry services in addition to conducting the required reconstruction activities. PRPA has requested that Atkins evaluate the feasibility to operate an Auxiliary Cargo Ferry Terminal at the Fulladosa Dock, located on the western shoreline of Ensenada Honda. See **Figure 1** for location.



Figure 1: Location of the Fulladosa Dock in Ensenada Honda and the connecting roadway (Road 250).

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Site Conditions v. Required Facilities

The existing Fulladosa Dock (**Latitude** 18°18'3.79" N and **Longitude** 65°17'27.78" W) has been used by the Maritime Transportation Authority (MTA) for its cargo ferries, which in the past were much smaller vessels than the current fleet. The newer cargo ferries require a docking area width of approximately 40 feet for safe mooring and operation of the cargo door/ramp, as well as an approximate safe draft of 10.5 feet. The existing dock platform has a total width of approximately 12 feet 2 inches, although the flat, useable loading area within the concrete curbs is 10 feet 2 inches (see **Photographic Documentation**, page 9), a fraction of what is required for a safe deployment of the cargo ferry's loading platform. Dredging operations may not be required, since there is a steep slope from a depth of approximately 8 feet at the edge of the concrete platform, which quickly drops to a depth of approximately 15 feet. Nevertheless, the existing facilities would need extensive structural modifications to accommodate the existing cargo ferry fleet.

Located at the edge of a narrow (approximately 5 meters wide) two-way road with no shoulders or median, space availability is the starkest limitation of the Fulladosa Dock. Required cargo terminal facilities include a passenger terminal waiting area, ticket booth, and parking to serve the 24 vehicles uploading to the ferry, plus passenger drop-off and collection. In addition, adequate space is required for the additional 24 vehicles that would be arriving in the ferries. Terminal upland facilities will, thus, require cutting approximately 1.0 acre of the steep (30+ degree slope) land on the opposite side of the road; alternatively, the required facilities could be filled or constructed over pilings within the open waters of Ensenada Honda. The latter would be the safest option, so that the waiting area in the terminal and its associated facilities are on the same side of the road as the ferry. However, from an environmental perspective, it is the least acceptable option. The filling of open waters or the construction of pilings is much more expensive, in addition to the costs associated to the cutting and impacting of uplands. See **Figure 2** for a superimposition of the Sardinias Bay Terminal and current cargo ferries at the Fulladosa site for scale.

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During its operation, traffic in the area would be severely impacted, as the road lacks the minimum width required by the Puerto Rico Department of Transportation and Public Works (DTPW) for such operation. To upgrade the existing roadway, it would require widened for a length of approximately 1,100 meters to a minimum width of 7.4 meters per current design standards¹. The appropriate stormwater infrastructure and light poles would have to be installed, and the slopes cut along the road would have to be stabilized from the proposed facility until reaching the town of Dewey. The PREPA and PRASA infrastructure would have to be relocated, which would leave the residents of the Playa Sardinas II ward in the southeastern section of the island with an interrupted service during relocation works.

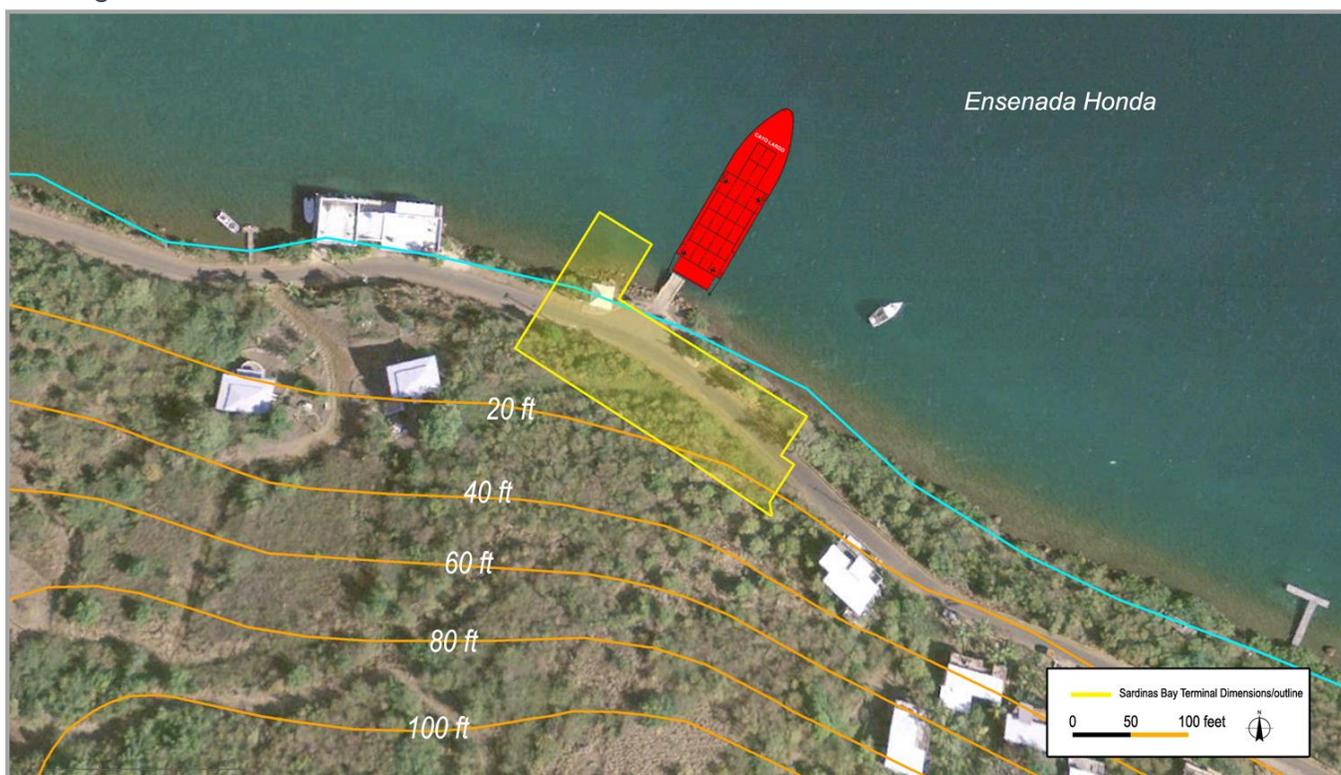


Figure 2: Illustration of the existing Fulladosa Dock relative to the cargo ferries in operation. The yellow polygon is an outline of the Sardinias Bay Terminal. Topography elevation is in feet.

These required improvements would impact approximately 4.5 acres on the south side of the road, which includes numerous property owners, which would have to be expropriated,

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adding time and costs, as well as the local State Police station. In addition, the US Coast Guard has stated that road traffic would have to be stopped during ferry operations. This site also lacks potable water and electrical infrastructure, which must be provided.

Fulladosa Seafloor – Qualitative Assessment

A brief assessment of the areas surrounding the Fulladosa Dock included a qualitative assessment of the seafloor. During this assessment, the water column was very turbid beginning approximately five feet below the surface, with an approximate photic depth of fifteen feet. The bottom at less than approximately eight feet was covered in dead seaweed, mangrove leaves and other debris over the rip-rap and sand; some rope sponges were observed. Beyond the cover of dead seaweed, from approximately eight to approximately fifteen feet, the bottom was dominantly silt with scattered debris, with live macroalgae covering over 50 percent of the bottom. Dominant species in this area were various species of *Dyctiota* sp. Rope sponges comprised at least ten percent of the bottom coverage in this layer. Beyond approximately fifteen feet, the bottom was again covered mostly in plant debris and human debris (garbage) over a silty substrate. See *Photographic Documentation*, page 11.

Environmental Impacts

The PRPA would have to expropriate approximately 5.5 acres of land to habilitate the Fulladosa Terminal Site and its required road improvements. The preparation of the upland areas facility for the cargo ferry operation will require the removal of approximately 3,000 cubic yards of earth crust material from the land located adjacent to the dock site, plus approximately 1,000 cubic yards of earth crust from the road improvement areas and the stormwater controls for the road improvements. These upland improvements are based on a facility with dimensions similar to those at the existing terminal in Sardinias Bay (approximately 1,600 square meters of available port area), which presently has many physical and operational constraints, such as: limited availability of parking spaces, poor space distribution, limited port dimensions, and limited waiting areas for vehicles and passengers.

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Seaward improvements for Fulladosa would include facilities similar to those preliminarily designed for San Ildefonso, assuming that the landward facilities for the Auxiliary Terminal will be on the opposite side of the road. Preferably from the logistics and public safety standpoint, landward facilities will include approximately 1,600 square meters of facilities on pilings over water or filled Ensenada Honda.

Studies required for this effort include: Geomatics (survey), geotechnical, traffic capacity, traffic access, terrestrial flora and fauna, bathymetric survey, benthic habitat survey, tree survey, archaeological, Endangered Species Act Section 7 consultation, PREPA and PRASA consultations. Expropriations carry socio-economic impacts, which must also be evaluated. Some of the above-mentioned studies are feasibility studies, and in case any of them finds a fatal flaw the Fulladosa Alternative may not be a viable option.

Estimated Costs

The costs required for the facilities have been estimated at between \$8 million and \$9 million dollars. This estimate includes studies, permits, taxes and construction, but does not include legal and other costs associated with land expropriation.

Estimated Timetable

The studies, design, expropriations, permitting and construction of the Auxiliary Cargo Ferry Terminal at Fulladosa could take an estimated thirty four months. **Table 1** is a breakdown of the estimated timetable. The Studies timetable does not presume that an ichthyofaunal study will be required. The Design timetable shows the conceptual, permitting, and for construction designs; the latter requires that expropriations be completed, since construction permitting requires evidence of property ownership. The Permitting timetable includes NEPA and local environmental compliance.

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Table 1: Estimated schedule for construction of the Fulladosa Dock required improvements.

Tasks/Months	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34																					
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Discussion and Conclusions

Implementation delays (schedule), lack of available land at the Fulladosa dock seaward of the access road, the required land acquisitions, the required improvements to the site and the access road makes the use of the Fulladosa site an impossible alternative for the Auxiliary Cargo Ferry Terminal:

1. A thirty two month delay in the reconstruction of the Sardinias Bay Terminal is an unacceptable risk. The existing damage at the Sardinias Bay Cargo Ramp has been characterized as imminent, which means that every day that this project is delayed there is an increasing (cumulative) risk that it collapses under the weight of, for example, a fuel truck, with the potential loss of life, the spilling of gasoline and spreading into the adjoining Luis Peña Marine Reserve, a potential fire, and property loss. In addition, this scenario would leave the population in Culebra without a supply of essential goods, since the Sardinias Bay Terminal has the only cargo ramp in the island.
2. The US Coast Guard has stated that road traffic would have to be stopped during ferry operations. Closing a road three times per day for a few hours is not an acceptable proposal; access interruption to emergency situations, such as medical services for the population served by this road, is unacceptable.
3. There are at least nine distinct properties on the south side of the road to negotiate easements with or expropriate land from. Expropriation proceedings in Puerto Rico take approximately two years.

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4. Finally, there are the landside facilities required for the ferry terminal, which will either be filled or built on pilings over Ensenada Honda; one proposal is environmentally unacceptable (filling of open waters) and the other is cost-prohibitive (construction of pilings)—especially when an alternative is available at San Ildefonso which does not require cutting and bulk-heading a hill, the filling of open waters, or the potential dredging of the bay.

Additionally, the Fulladosa alternative would cost approximately \$6 million more than the alternative in San Ildefonso, which was the first port in the island of Culebra. This site was originally selected by the US Navy for its first naval base in the Caribbean, and used for nearly 100 years, and which poses minimal environmental and social impacts and disruptions.

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Above: Views of Road 250, travelling south to the location of the Fulladosa dock. The limited width of the road, development along its north (shore) side, the PRPA infrastructure, and various sections with retaining walls are some of the difficulties of developing the access to the dock minimal to DTPW standards.



Above: Views of Road 250, travelling south to the location of the Fulladosa dock. The limited width of the road, development along its north (shore) side, the PRPA infrastructure, and various sections with retaining walls are some of the difficulties of developing the access to the dock minimal to DTPW standards.

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Above, left: Part of a retaining wall and entrance to a residential area along Road 250.



Above, right: Residential structure on the shoreline just before reaching the Fulladosa Dock.



Above, left: General view of the Fulladosa Dock.



Above, right: At least 1.0 acre of the steep (30+ degree slope) hill, located on the opposite of the Fulladosa Dock, would have to be cut down to allow space for the terminal upland facilities.

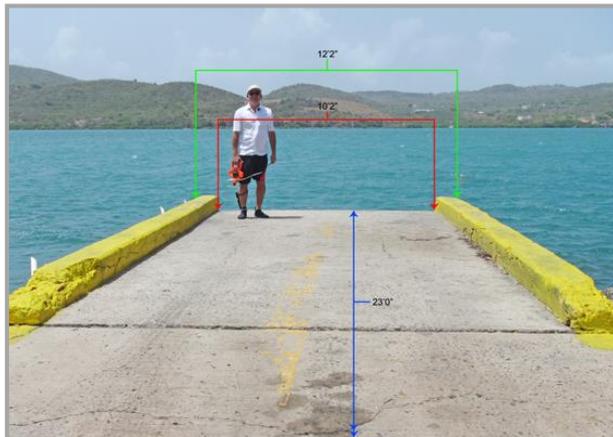
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Photographic Documentation



Above, left: Fire hydrant, located at the base of the hill opposite of the Fulladosa Dock. The location of this hydrant typically indicates that a potable water line runs along Road 250, which would have to be relocated during the widening of the roadway.

Above, right: View of the steep (30+ degree slope) hill, located opposite of the Fulladosa Dock, that would have to be cut down to allow space for the terminal upland facilities.



Above, left: Dimensions of the Fulladosa Dock. For the adequate deployment of the cargo ferry loading platform, the dock would have to be widened to at least four times its actual size.

Above, right: View of the steep (30+ degree slope) hill, located opposite of the Fulladosa Dock, that would have to be cut down to allow space for the terminal upland facilities.

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Photographic Documentation



Above: Typical benthic habitat composition in areas in front of the existing Fulladosa Dock.



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ⁱ PRDOT&PW (1979) Puerto Rico Highway and Transportation Authority Design Manual. Commonwealth of Puerto Rico Department of Transportation and Public Works, Highway Authority. Table 1-13.