U.S. Department of Homeland Security

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AUG 10 2009

MEMORANDUM

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Reply to Attn of: (p) LT Tracey Richards 305-278-6753

To: COMDT (CG-751)
Thru: (1) CG MLCLANT (s)
(2) CG LANTAREA (Am)

Subj: FEASIBILITY IMPACT ASSESSMENT OF SECTOR SAN JUAN FAST RESPONSE CUTTERS

Ref: (a) CG MLCLANT memo 16000 of 9 Aug 2007

1. As requested in reference (a), I contracted with Clark Nexsen Architecture and Engineering to provide a homeporting feasibility study for homeporting six Fast Response Cutters (FRCs) and associated shore support facilities at Sector San Juan in San Juan, Puerto Rico

2. Enclosed is the completed Facility Impact Assessment.

3. If you have any questions or concerns, please contact me or LT Tracey Richards, the study project officer, at (305) 278-6753.

#

Enclosure: (1) Feasibility Impact Assessment of SECTOR San Juan

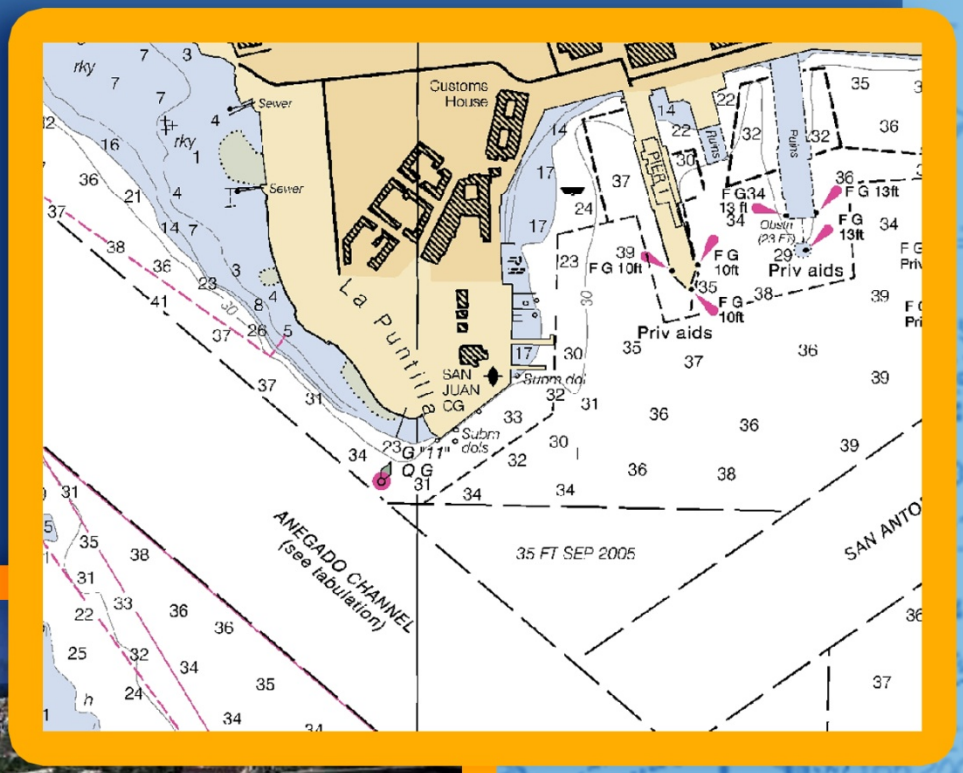
Copy: COMDT (CG-9432)
SECTOR SAN JUAN
CGD SEVEN (dm)
CG SILC (pld)

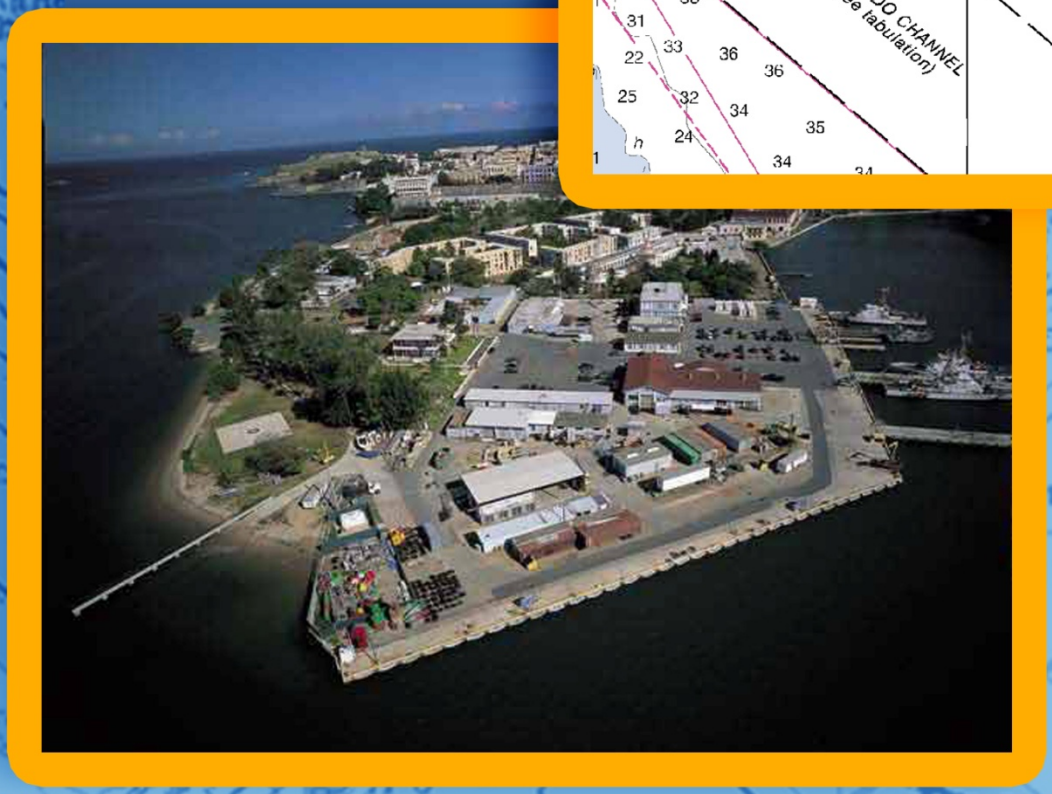
United States Coast Guard
U.S. Department of Homeland Security

HOMEPORTING FEASIBILITY IMPACT ASSESSMENT (FIA)

FAST RESPONSE CUTTER (FRC)

SECTOR SAN JUAN, PR





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EXECUTIVE SUMMARY

E.1 PURPOSE

The purpose of this Feasibility Impact Assessment (FIA) is to identify and determine availability of maritime infrastructure and shore facilities necessary to homeport six (6) United States Coast Guard, Fast Response Cutters (FRC) at Sector San Juan, in San Juan, Puerto Rico.

E.2 BACKGROUND

The Coast Guard has a critical need for additional patrol boats to close an existing patrol boat operational hour gap and to replace the aging legacy 110-foot patrol boat fleet. The Sentinel Class patrol boat project will deliver this vital capability to the Coast Guard. Since the FRC acquisition will help address these needs, advancing the design and construction of this new patrol boat is one of the Coast Guard's top, near-term priorities.

Through the Acquisition Directorate, Deepwater Program, Feasibility Impact Assessments are being conducted at identified bases to determine the availability of services and infrastructure to support the cutters and their crews. Sector San Juan has been selected as a potential homeporting location for six (6) FRC, with anticipated arrival dates in years 2016 (4 FRCs) and 2017 (2 additional).

E.3 REQUIREMENTS

FRC mission support requirements are based on the following projected FRC characteristics:
Length: 154 feet; Beam: 25.4 feet; Displacement: 353 metric tons; Draft: 9.5 feet; Crew size: 22 personnel (2 officers and 20 enlisted).

The FRC mission support requirements for both waterfront and shore infrastructures were set forth in the USCG FRC Homeporting Statement of Work for San Juan, PR, and Panama City, FL. *(Appendix 1)*. Subsequently, updated FRC requirements were released by the USCG in January, 2009. The latest version has now been incorporated into this FIA.

E.4 METHODOLOGY

The projected FRC characteristics and the FRC mission support requirements were used as building blocks in developing this FIA. Facility assets data for Sector San Juan were obtained from USCG CEU Miami and Sector San Juan points of contact. Interviews were held with pertinent contacts and stakeholders to investigate realistic opportunities for implementation of FRC home-porting at Sector San Juan. Initial site visits were conducted August 7 & 8, 2008. An on-site progress review meeting was held November 5, 2008.

Planning Factors were established as guidelines for exploration and analysis (See *FIA Chapter 1, Section 1.4*). Based on the available assets data and established requirements and planning factors, opportunities and constraints were explored and an initial gap analysis performed. Preliminary alternatives were then identified which provide possible solutions to resolve any identified facility shortfalls.

Because of the unique issues involved in each, waterfront infrastructure alternatives were addressed separately from shore infrastructure alternatives. Alternatives were evaluated for feasibility with respect to its ability to satisfy the FRC requirements with regard to any base specific planning factors discussed during the base information gathering sessions. Each feasible alternative was further developed and analyzed with respect to scope and rough cost estimates of capital improvements necessary to meet FRC missions. Conclusions and recommendations, developed on the basis of the analysis, as to the feasibility of FRC stationing were provided, and when possible combined waterfront and shore infrastructure recommendations are included.

E.5 FACILITY ANALYSIS

The following facility analysis at Sector San Juan identified the potential opportunities and constraints to the feasibility to homeporting six (6) FRC in San Juan, Puerto Rico.

Waterfront Infrastructure

Sector San Juan has a variety of waterfront assets including 366' of wharf, referred to as Echo Pier, two timber deck piers with concrete substructures identified as Alpha and Bravo Piers, two concrete piers identified as Charlie and Delta Piers, and two concrete travel lift piers. Sector San Juan is located within the protected waters of the San Juan Harbor so tidal currents are of less concern than some Coast Guard locations. However, the base is adjacent to the busy Port San Juan and its cruise ship terminals. Wake action from traffic in and out of the port is of concern, especially along Pier Echo and the south side of pier Delta.

Shore Infrastructure

Sector San Juan has a full complement of buildings and structures to support its mission. In general the base is divided into two sections with an operational side and a personnel side. The personnel side is composed mainly of structures and facilities to support station members and visiting crews such as the Exchange, UPH facilities, MWR, and health services. The operational side of the base includes the structures necessary to support base and cutter operations and include the piers, operations, engineering, administration and storage buildings. All building structures within this section of the based were reviewed for potential use, with special consideration given to building 101 which was designed for and currently supports all cutter operations of the base.

E.6 ALTERNATIVES DEVELOPMENT AND ANALYSIS

Complete waterfront and shore infrastructure alternatives are identified in *Chapter 3* of this FIA.

Waterfront Infrastructure Alternatives

Analysis of waterfront infrastructure indicates that homeporting six (6) FRC at Sector San Juan can be accomplished but significant issues will need to be resolved prior to final determination. To utilize existing facilities, structural modifications and infrastructure upgrades will need to be made to the facilities. Also, the base's ability to serve as host to visiting vessels will diminish as Echo Pier will need to be utilized for FRC mooring. In addition to the loss of visiting pier space, wake action along this pier face is of concern. To compound this concern, breasting of the cutters along this pier will most likely be required.

Complete new construction of all waterfront facilities can remedy most of the operational issues, however a waiver to some of the FRC mooring requirements will be necessary. In addition, under the new construction alternatives, there will be considerable operational disruption as complete demolition and new construction of new piers is proposed.

Shore Infrastructure Alternatives

In contrast to waterfront infrastructure, shore infrastructure opportunities at Sector San Juan present a number of cost efficient options that can meet the needs of both the base and cutter operations. Three (3) shore infrastructure alternatives were identified, explored and analyzed. Alternative 1, or status quo, was determined to be a viable option although there are some shortfalls in FRC facility needs. Alternatives 2 and 3 in turn satisfy all FRC requirements, and are presented as construction options depending upon the level of service to the base and FRC that is desired.

E.7 CONCLUSIONS AND RECOMMENDATIONS

Based upon review and findings of existing conditions, it is possible to homeport six (6) FRC at Sector San Juan, although it may not be practical. Significant trade-offs will be required in order to locate all six (6) cutters at San Juan. These trade-offs are either a decrease in existing base mission, or waivers from the prescribed minimum standards for FRC berthing. In addition, considerably large capital improvements and expenditures will be necessary.

Critical waterfront assets such as water depth and mooring space are available at the base however some limited dredging may need to occur during construction phases. Existing wharf berthing and mooring facilities are not capable of meeting current mission demands and those of the FRC. To remedy this, the base would either have to lessen its role as a visiting port of call, or would require complete demolition and reconstruction of a new pier and wharf system. Even with new construction, waivers from the prescribed FRC standards may be necessary.

In contrast, as the FRC is designed to replace the WPB 110', buildings at the base, for the most part, are capable of accepting the introduction of the FRC at the full complement of six (6). Building 101 was designed as a cutter support facility and therefore can provide the vast majority of FRC Shore demands. Storage requirements are greater with the FRC than is available, thus new construction will be required to remedy the shortfall. Available land for new construction on the base is at a premium, therefore it is recommended buildings 110 and 111 be demolished and their footprints be recapitalized for a building site. Total shore construction to meet FRC demands and replace the buildings suggested for demolition would be approximately 7,000gsf.

Given the prescribed requirements of the FRC and current existing conditions of the USCG Base at San Juan, it may not be feasible to homeport six (6) FRC at San Juan. Adhering to mooring standards given in the SOW for this report, and Stakeholder Criteria established at the San Juan kick-off meetings *(Section 1.3)*, it would appear that only four (4) FRC could meet all parameters.

The conclusions of this report are not a blanket statement that six (6) FRC cannot be homeported in San Juan, but rather an implication that concessions will be required should the decision be made to go forward. If at such a point or time where San Juan may be considered for further study, the findings and recommendations of this report could be considered the basis for the development of a more detailed Planning Proposal (PP). This PP could, in turn, more adequately address the issues, shortfalls and alternatives identified herein.

CHAPTER 1: INTRODUCTION

1.1 PURPOSE

Sector San Juan. Puerto Rico has been selected as a possible homeport for six (6) of the United States Coast Guard, Fast Response Cutters (FRC). This Feasibility Impact Assessment (FIA) is being conducted to determine the compatibility of existing maritime infrastructure and shore facilities necessary to support the new vessel platform.

1.2 BACKGROUND

With an aging legacy 110-foot patrol boat fleet, the Coast Guard has a critical need for additional patrol boats to close an existing patrol boat operational hour gap that currently hinders the Coast Guard's ability to most successfully and efficiently complete all potential missions. Planned as the smallest of three major classes of Coast Guard cutters, the Fast Response Cutter will be able to deploy independently to conduct the service's missions, such as ports, waterways and coastal security, fishery patrols, drug and illegal migrant law enforcement, search and rescue, and national-defense operations. Advancing the design and construction of this new patrol boat is one of the Coast Guard's top, near-term priorities.

As the new vessel platform approaches, the Coast Guard is proactively seeking the most practical and useful sites for homeporting the new FRC. In addition to oversight of ship design, construction and contracting, the Acquisition Directorate's, Deepwater Program is proactively planning shore infrastructure needs necessary to support the new cutter platforms and their crews. Based upon anticipated requirements of the cutters, and mission needs, various bases have been slated for FIAs to determine the practicality of homeporting one or more of the new vessels.

Sector San Juan, Puerto Rico has been selected for review and is currently scheduled to receive six (6) FRC, with anticipated arrival dates in years 2016 (4 FRCs) and 2017 (2 additional).

1.3 MISSION SUPPORT REQUIREMENTS

The requirements listed below in *Table 1.1* represent shore and waterfront infrastructure threshold requirements and optimum objectives for the FRC. These standards were developed based upon FRC RFP requirements and the vessel planning assumptions developed in conjunction with CEU Miami. Additional base assumptions for the FRC are a maximum overall length of one-hundred fifty-three and a half feet (153.5'), a draft of ten feet (10'), and a total crew of twenty-two (22'). Crew make up consists of two (2) officers and twenty (20) enlisted personnel per cutter.

Table 1.1: **Fast Response Cutter Shore and Waterfront Requirements (6 Cutters)**

Requirement	Threshold	Objective
Total Number of Dock Spaces	6	7
Channel Depth	Draft plus 4 feet at extreme low water	Draft plus 7 feet at extreme low water
Channel Depth	Maximum appendage draft multiplied by 1.3 at extreme low water.	Maximum appendage draft multiplied by 1.3 at extreme low water.
Mooring Length	154' plus 20 ft per cutter	154' plus 40 ft per cutter
Slip Width	152.4' for a single berth pier, 178' for multiple ships moored on one pier face, 204' for ships breasted on a single berth pier, 229' for ship's breasted on a multiple berth pier	
Pier Lay down Space	A minimum of 2000 NSF in addition to pier/wharf space. The lay down area should be within 1/2 mile of the pier or wharf.	

Table 1.1: **Fast Response Cutter Shore and Waterfront Requirements (6 Cutters)**

Requirement	Threshold	Objective
Vertical Load	Whenever possible, allow access from AASHTO truck loading HS20. Heaviest anticipated load is hoist of main diesel engine (approx. 1.5 x weight of 110' Paxman engine). Can be satisfied by another protected and accessible government pier (no more than a 25NM protected/littoral waters transit from home pier). Pier loading to be considered should include the crane to move the engine as well as the weight of another engine on the pier.	
Horizontal Load	Based on wind presentation area and "worst case" docking impact of 5 knots perpendicular to pier (See Horizontal Loads in UFC 4-153-01 (3-4)).	
Electrical	Shore ties capable of 400 Amp connection delivering power at a nominal system voltage of 450VAC, 60 Hz, three-phase and each cutter shall be provided its own shore tie connection within 60 feet of one of their shore tie locations upon mooring. All power must be ungrounded and power quality must meet MIL-STD-1399 Section 300B. Shore power facilities must be IAW COMDTINST M9000.6E (Chapter 300)	
Potable Water	A minimum of 1100 gallons per day via one 1-1/2" capable of 100 gpm and a minimum of 30 psi, maximum of 55psi	
Sewage	Minimum capacity of 1500 gallons per day via 4" at 150 gpm. If gravity drainage is not sufficient, an installed lift system is required.	
Telephone	The shore tie connection boxes shall be waterproof, corrosion-proof, and handle a minimum of ten lines (six voice lines with lightning arrestors and four data lines without lightning arrestors).	
Cable TV	The shore tie connection shall be located immediately adjacent to each telephone/data shore tie and shall allow for a type F coaxial connector on the "Cable TV" shore tie to connect to the cutter.	
Local Area Network (LAN)	The shore tie junction box shall have at least 4 fiber optic connections (2 pair) that support line rates of 100 Mbps or 100/1000 Mbps.	
Mooring Devices and Deck Fittings	Min. three (3) bollards and three (3) cleats per cutter	Min. four (4) bollards and four (4) cleats per cutter
Fendering	Fendering should comply with guidelines in UFC 4-152-01	
Fire Protection	Onboard Fire Fighting equipment and cooperation with local Fire Dept (which must be able to physically respond to the ship's location within 15 minutes of initial notification and request for assistance.)	Onboard fire fighting equipment plus access to two 2 ½" shore connections capable of 500 gpm at 125 psi each conform to National Fire Code based on local assessment of fire hazards within 150' of the cutter. The WPB will have one International Shore Connection (cutter) standardized for a 2-1/2" hose.
Fueling	Capable of being fueled at pier either by truck (AASHTO HS20 Truck loading) or by installed fueling system.	
Refuse Removal	Applicable local refuse and recyclable removal procedures shall be utilized, one 10'x10' dumpster within 50 ft of pier head. A recyclable material dumpster may also be necessary depending on local regulations.	
Lighting	Pier lighting should comply with UFC-4-152-01 (2-5.1) and UFC 4-025-01 (For ATFP)	
Compressed Air	None Available	125 PSI and 50 CFM per cutter available on pier
Oily Water Disposal	Pier capable of AASHTO truck loading HS20 for access	
High Purity Water	Pier capable of AASHTO truck loading HS20 for access	

Table 1.1: **Fast Response Cutter Shore and Waterfront Requirements (6 Cutters)**

Requirement	Threshold	Objective
Ammunition Handling	Capable of accommodating ammunition on/off load within 200 mile transit from homeport.	Capability to conduct ammunition on/off load in homeport.
Parking Stalls	114 parking spaces.	138 parking spaces.
Parking Arrangement	60 stalls in close proximity to pier head (500 ft), 54 spaces in secure stacked lot(s) within 2000 ft or 5 minute walk to cutter.	10 individual stalls adjacent to each cutter, 78 stalls in close proximity to the cutter within 5 minute walk
Cutter General Storage	900 NSF	1,800 NSF
Cutter Machine and Engine (MK) Shops	0 NSF (shares space within the MAT/NESU facility)	600 NSF (with large access/roll up door, overhead lifting points and full HVAC) in addition to MAT/NESU facilities. 5 CG Work stations
MAT Requirements	5,000 NSF plus 600 NSF space for a protected small boat bay to allow all weather servicing the cutter boat off the cutter (6,000 NSF optimum)	
Parts / Tool Storage	2400 NSF total (can be consolidated for all cutters in MAT/NESU/Industrial Bldg)	
Flammable Storage	150 NSF can be shared between all cutters in a consolidated facility.	
HazMat Storage	40 NSF per cutter with HVAC and fire protective system. Can be combined and managed as a HAZMAT pharmacy for all collocated cutters (240 NSF)	
Shipping and Receiving	Logistics shipping and receiving custodians and storage space within a 30 minute drive (could be satisfied by other CG shore unit)	Logistics shipping/receiving custodians at home port
Port Engineers Office	100 NSF (when not supported by any other local maintenance command) and 1 CGDN Drop	250 NSF (when not supported by any other local maintenance command) and 1 CG Work station

1.4 METHODOLOGY

In developing this FIA, the basis of spatial and functional needs were derived from anticipated FRC requirements provided in the FRC Homeporting Scope of Work for San Juan, PR, and Panama City, FL. *(Appendix 1),* Personnel Allowance List (PAL) for a crew size of 22 persons per FRC and the Space Allocation List (SAL) found in COMDTINST M11012.9.

Facilities assets data for Sector San Juan were obtained from USCG CEU Miami, and Base San Juan points of contact. Interviews were held with pertinent contacts and stakeholders to investigate realistic opportunities for implementation of FRC homeporting at Sector San Juan. An initial site visit site visit was conducted August 7 & 8, 2008, with a follow up, on-site progress report held November 5, 2008.

Based on the assets data gathered as well as the given requirements, opportunities and challenges were noted and preliminary alternatives were established for the site. Alternatives were then evaluated for feasibility with respect to the above requirements and the additional considerations of a number of planning factors and stakeholder criteria.

These factors and criteria are:

PLANNING FACTORS

The following planning factors were pre-established to evaluate the feasibility of each alternative.

- Rehab/Reuse/New Construction are considered viable options;
- Ability to successfully implement NEPA Policy;
- Ability to meet Life Safety Standards;
- Aviation assets will not be considered as part of this FIA;
- Only unit/depot level maintenance will occur on-site;
- Breasting of FRCs is permissible; however it is not ideal or preferred
- Support functions for 110' WPBs will continue until complete phase in of FRC;
- Spatial requirements in the FIA are based on crew size of 22;
- Facilities must be environmentally safe from hazardous wastes and materials such as Lead Based Paint (LBP) and Asbestos Contained Materials (ACM), which must be encapsulated or removed prior to move in.

STAKEHOLDER CRITERIA

Site specific planning factors were identified and discussed during base visits conducted on August 7 and 8, 2008. The following planning factors unique to the facilities at Sector San Juan were considered when developing possible alternatives.

a. Four (4) FRCs are scheduled for arrival in San Juan in 2016 and two (2) additional in 2017.

b. There are currently five (5) WPB 110's stationed at San Juan. As these ships are replaced, space allocated for these assets can be recapitalized for FRC use.

c. The 87' Coast Guard Cutter Reef Shark is stationed at San Juan. It is anticipated this asset will remain upon delivery of the FRCs.

d. Additional assets requiring docking space at San Juan include:
   1. One (1) 55' WAGB for ANT services
   2. One (1) 47' MLB Station Boat
   3. 15' x 30' of temp/movable jet docking for mooring of trailerable boats (located between Bravo and Charlie piers)

e. Other water assets which are capable of dry or trailer storage are:
   1. *Five (5) 25' RBS patrol boats
   2. *Two (2) 33' SPCLE, and
   3. *One (1) 21' TANB

f. Wake action from arriving ships into the San Juan Port present issues for docking vessels along Echo Pier.

g. The USCG currently has facilities located at the Roosevelt Roads Naval Station. Since this naval station has been closed, opportunities for reuse of the abandoned naval piers should be explored.

h. Given its location in the Caribbean, Sector San Juan hosts a number of visiting ships which are typically docked along Echo Pier

i. Historically, space has been made available by the Port Authority when visiting vessels could not be accommodated at the Coast Guard piers.

1.5 ALTERNATIVE DEVELOPMENT

Preliminary alternatives were developed following the initial site visit and interviews at Sector San Juan, and an Alternatives Report was submitted to CEU Miami and the Base's Points of Contact for review and

comment on September 12, 2008. Following comments and additional data submitted in reference to the Alternatives Report, changes and assumptions were adjusted to refine the alternatives, resolve issues, and gather further pertinent data deemed necessary to finalize the alternatives. A seventy-five percent (75%) progress review meeting was conducted on November 5, 2008 at Sector San Juan to finalize alternatives, and fully develop the Feasibility Impact Assessment.

Preliminary analysis of the alternatives involved measuring the capability of each to satisfy the established FRC mission support requirements and planning factors. Given the unique nature and distinction between waterfront infrastructure (mooring and hotel services for FRCs) and shore infrastructure (office, shop and storage space), shore infrastructure and waterfront infrastructure alternatives were separately identified.

Viable alternatives were subjected to further analysis with respect to overall advantages and disadvantages, including criteria such as operational effectiveness and implementation cost. The recommendations for each facility need, water infrastructure and shore infrastructure, were then consolidated into the most practical options to form a complete, single recommendation. These findings and recommendations form the basis for the conclusions found within this document.

*1. Changes were made to the FRC Requirements after release of the initial Scope of Work. These changes have been incorporated into this document and are reflected in Table 1.1 of this chapter.

CHAPTER 2: SECTOR SAN JUAN, SAN JUAN, PUERTO RICO

2.1 THE LOCAL AREA

The Commonwealth of Puerto Rico is located in the Caribbean Sea, about 1,000 miles east-southeast of Miami, Fla. A possession of the United States, it consists of the island of Puerto Rico and the adjacent islets of Vieques, Culebra, and Mona. Founded in 1521, San Juan serves as the capital of the commonwealth, and is the largest municipality in Puerto Rico. As a major cruise and cargo port located on the north side of Puerto Rico, San Juan serves as one of the Caribbean's most important seaports, and is the island's manufacturing, financial, cultural, and tourism center.

Figure 2.1: **Location Map**

Old San Juan is a community found within the municipality of San Juan, and while not as large as the entire city of San Juan, Old San Juan is a culturally, economically, and historically significant area within the region. Actually located on a small islet, Old San Juan sits adjacent to the San Juan Harbor. The US Coast Guard Base for Sector San Juan is located in Old San Juan.

Figures from US Census Bureau indicate a year 2000 population of 434,374 persons, while the 2007 estimates show a decrease in population to 424,951. At approximately 48 sq miles of land area within San Juan, this shows the city is a densely populated area with a population density of 8,853 people per square mile. There are 147,090 households, and 92,716 families residing within San Juan, which correlates to an average household size of 2.8 persons per and an average family size of 3.6.

2.2 SECTOR SAN JUAN, HISTORY AND MISSION

The "Port of San Juan" is the general name used to call the various passenger and cargo facilities located on lands around the San Juan Bay or San Juan Harbor. Its docks are located along San Antonio Creek, a narrow navigable section of San Juan Bay lying south of Old San Juan. In addition to the private commercial ventures at the facilities, San Juan harbor is home to Sector San Juan of the US Coast Guard.

Figure 2.2: **Base Location Map**

Base San Juan is located along the southern tip of the historic district of Old San Juan and west of the Port Authority's cruise ship terminal 1 (*Figure 2.2*). Sector San Juan is currently homeport for five WPB 110 Cutters: The *Sapelo, Cushing, Chincoteague, Key Largo, and Matinicus.* The 87' WPB *Reef Shark* is also in the Sector's fleet of cutters.

Sector San Juan is responsible for all Coast Guard missions in the Eastern Caribbean area. This includes enforcement of laws and regulations of the United States relative to national defense, smuggling/counter

narcotics operations, fisheries management, marine transportation, marine safety, maritime security, protection of natural resources, waterways management, and to carry out general Coast Guard duties in military readiness by the organization, indoctrination, training and discipline of all members assigned.

2.3 EXISTING ASSETS, OPPORTUNITIES AND CONSTRAINTS

Located at #5 La Puntilla Final, on the point of the San Juan Harbor in Old San Juan, Puerto Rico, Base San Juan sits on a site of approximately seventeen (17±) acres of land, and runs along the waterfront of the entrance to the Port of San Juan. In general, the base is divided into two distinct land use patterns with the northwestern side being dedicated to more residential and troop support functions, while the south east section of the base is predominantly industrial and fleet support oriented (*Figure 2.3*).

***Figure 2.3:* Base Overview Map**

Waterfront Assets

Waterfront assets at Sector San Juan include 366' of wharf referred to as Echo Pier, two timber deck piers with concrete substructures identified as Alpha and Bravo Piers, two concrete piers identified as Charlie and Delta Piers, and two concrete travel lift piers. A full graphic of the base is provided in *Figure 2.4 Base Asset Map*. The dimensions of the piers are as follows:

Alpha Pier – 102' long x 10' wide

Bravo Pier – 102' long x 12' wide

Charlie Pier – "L" shaped approx. 191' long x 20' wide

Delta Pier – 150' long x 15' wide

Echo Pier – 366' long wharf

Travel Lift Piers – Approx. 50' long x 7' wide.

The Army Corps of Engineers is responsible for maintenance dredging of the channels leading into the harbor, with the larger channel, the Amerada Channel, having a project depth of 40 to 46 feet. The smaller San Antonio Channel has a project depth of 36 feet. Coast Guard Base San Juan sits at the mouth of the San Antonio Channel, and due its orientation has varying water depths along its piers. According to the 2007 Collins Engineering report water depths found at the time of inspections were as follows:

Alpha Pier– 8.8' to 17.8'

Bravo Pier – 9' to 16.3',

Charlie Pier – 13.5' to 27.3'

Delta Pier – 17.5' to 28.5'

Echo Pier – 6' to 20'

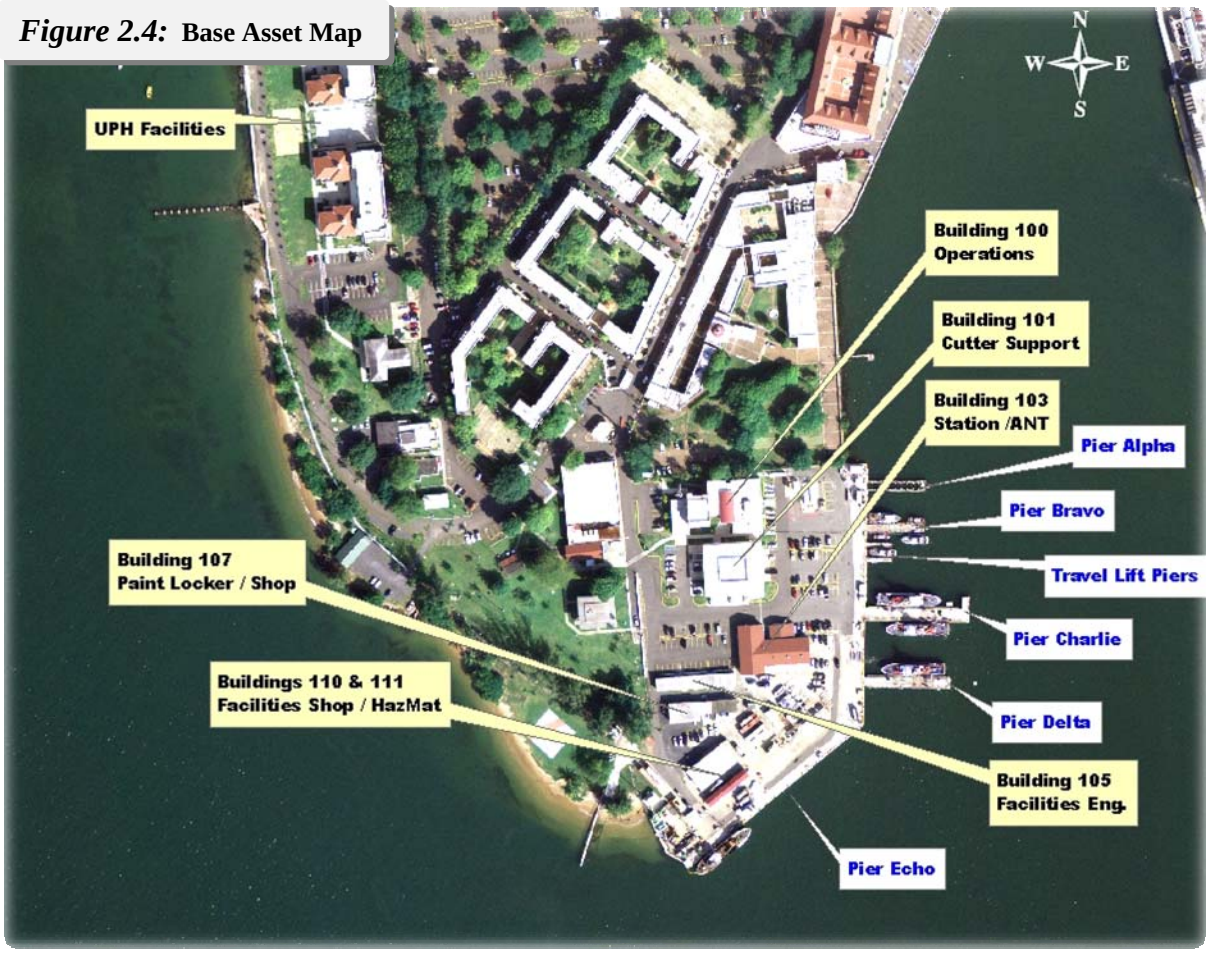

Figure 2.4: **Base Asset Map**

Shore Facilities

There are a number of permanent structures located on Base San Juan which were given early, primary consideration as structures with consolidation and reuse potential for this project. Several of these structures are also older and inefficient, and their footprint areas could potentially be considered for new construction. The structures identified and considered most practical for shore facility use in this study are listed in *Table 2.1* and graphically represented in *Figure 2.4: Base Asset Map.*

Of the multiple structures available on the station grounds, the building of most significance is building 101 which serves as the Cutter Support Facility. Designed to provide shore facilities for the existing WPB 110's homeported in San Juan, this single structure can provide most of the shore requirements listed for the FRC.

The largest demand of the six (6) proposed cutters is the MAT requirement at a minimum of 5,000nsf. Since this requirement can be accommodated within building 101, the next largest demand becomes storage capacity. Storage, in terms of general cutter storage and hazardous and flammable materials storage has an overall demand of approximately 4,600nsf. Of the existing facilities explored on Base San Juan, no single facility can meet this need, and current occupancy and utilization makes it unlikely that FRC uses can be incorporated into existing operations. Therefore recapitalization of existing space becomes the more practical solution. The structures determined to have the most potential for this are buildings 110 and 111. Building 110 is an approximate 2,300 gsf block and metal structure used as the facilities maintenance shop.

Table 2.1: **Existing Facilities, Sector San Juan**

Building	Bldg. Number	Approx. Existing Sq. Feet
Operations	Bldg 100	19,000 gsf
Cutter Support Facility	Bldg 101	16,500 gsf
Station / ANT	Bldg 103	7,200 gsf
Facilities Engineering/Offices	Bldg 105	3,500 gsf
Facilities Maintenance and Paint Locker/Shop	Bldg 106 / 107	4,200 gsf
Facilities Shop	Bldg 110	2,300 gsf
Hazmat Storage	Bldg 111	760 gsf

One of the older buildings on the base, the size, location, and condition make it an attractive site for more practical uses.

In addition building 111 is a smaller (760nsf) but similarly constructed block building adjacent to the facilities maintenance shop.

Demolition of these two structures should provide sufficient building footprint area to allow new construction to meet all FRC storage requirements and to replace the operational duties currently conducted in the facilities.

Figure 2.5: **Building 101 Cutter Support**

Figure 2.6: **Building 110 Facilities Shop**

Figure 2.7: **Building 111 Hazmat Storage**

Other structures considered for use or recapitalization were the operations Building (100), Station/ANT Building (103) Facilities Engineering (105) and the Facilities Maintenance/Paint Facility (106/107). However, based on either, location, design, or detrimental effects from operational displacement during construction, all were determined to be less practical than buildings 110 and 111.

2.4 GAP ANALYSIS

Waterfront Assets

As can be seen from the findings, there are several constraints that pose particular concern in the docking and mooring of the FRC in San Juan. Only Echo Pier and Pier Charlie have sufficient length to moor an FRC, and Pier Charlie has an L shape ending which would only allow docking along one side of the pier.

Echo Pier in contrast has over 350lf of potential wharf face however, this is utilized for the considerable amount of visiting traffic, and is not ideal for smaller vessels due to wake action from harbor traffic.

A complete synopsis of waterfront infrastructure findings are presented in *Table 2.1.*

Table 2.2: **Fast Response Cutter Waterfront Infrastructure Findings (6 Cutters)**

Requirement (see Table 1.1)	**Opportunities**	**Existing Conditions**	**Delta**
Docking Spaces	1. Pier Alpha 2. Pier Bravo 3. Pier Charlie 4. Pier Delta 5. Echo Pier	1. 102'l x 10' w. Depth 8.8' to 17.8' 2. 102'l x 12' w. Depth 9' to 16.3' 3. 191'l x 20' w. Depth 13.5' to 27.3' 4. 150'l x 15' w. Depth 17.5' to 28.5' 5. 366' wharf. Depth 6' to 20'	1. Insufficient water depth, pier length, vertical and horizontal loading requirements. 2. Insufficient water depth, pier length, vertical and horizontal loading requirements. 3. Sufficient for berthing on one side. "L" shape limits ability of docking on both sides. Slip widths insufficient under current conditions. 4. Length of pier questionable for FRC Use. Slip width does not meet recommended requirement. Mooring on outside subject to wake action similar to Echo pier. Horizontal and vertical loading not sufficient. 5. Length and water depths sufficient for 2 FRC or 4 if breasted. Concerns of wake action from vessels entering San Juan Harbor. Loss of wharf for visiting vessels.
Pier Lay down Space	1. Lay down area west side of pier Echo. 2. Lay down area adjacent to buildings 107/108.	1. Both areas provide greater area than the 2,000 sf recommended for the FRC, and are within distance requirements. As replacement vessels for the WPB 110's, trade off of use is capable in one of these areas.	1. Requirement satisfied.
Vertical Load	1. Pier Alpha 2. Pier Bravo 3. Pier Charlie 4. Pier Delta 5. Echo Pier	1. Pier Alpha – Unknown 2. Pier Bravo – Unknown 3. Pier Charlie – Posted on pier 4. Pier Delta – Unknown 5. Echo Pier – Unknown	1. Most likely not sufficient for FRC 2. Most likely not sufficient for FRC 3. Sufficient for FRC use 4. Potential for FRC but further study would be necessary. 5. Sufficient for FRC Use.
Horizontal Load	1. Pier Alpha 2. Pier Bravo 3. Pier Charlie 4. Pier Delta 5. .Echo Pier	1. Pier Alpha – Unknown 2. Pier Bravo – Unknown 3. Pier Charlie – Unknown 4. Pier Delta – Unknown 5. Echo Pier – Unknown	1. Most likely not sufficient for FRC 2. Most likely not sufficient for FRC 3. Sufficient for FRC use 4. Potential for FRC but further study would be necessary. 5. Sufficient for FRC Use.
Electrical	1. Pier Alpha 2. Pier Bravo 3. Pier Charlie 4. Pier Delta 5. Echo Pier	1. Pier Alpha – (2) 100 AMP stations 2. Pier Bravo – (2) 100 AMP stations 3. Pier Charlie – (2) 200 AMP stations 4. Pier Delta – (2) 200 AMP stations 5. Echo Pier – (4) 100 AMP stations	All piers will need upgrades to bring services to FRC Standards.
Potable Water	1. Pier Alpha 2. Pier Bravo 3. Pier Charlie	1. Alpha Pier – 1½" connections @ 50 psi. Capable of 80psi. 2. Bravo Pier – 1½" connections @ 50 psi.	Distribution facilities would need to be upgraded.

Table 2.2: **Fast Response Cutter Waterfront Infrastructure Findings (6 Cutters)**

Requirement (see Table 1.1)	**Opportunities**	**Existing Conditions**	**Delta**
	4. Pier Delta 5. Echo Pier	Capable of 80psi. . 3. Charlie Pier – 1½" connections @ 50 psi. Capable of 80psi. 4. Delta Pier – 1½" connections @ 50 psi. Capable of 80psi. 5. Echo Pier – 1½" connections @ 50 psi. Capable of 80psi.	
Sewage	1. Pier Alpha 2. Pier Bravo 3. Pier Charlie 4. Pier Delta 5. Echo Pier	1. Alpha Pier – Available at pier, needs upgrades 2. Bravo Pier – Available at pier, needs upgrades 3. Charlie Pier – Available at pier, needs upgrades 4. Delta Pier – Available at pier, needs upgrades 5. Echo Pier – Available at pier, needs upgrades	Facility improvements at all piers and wharfs would be necessary.
Telephone	1. Pier Alpha 2. Pier Bravo 3. Pier Charlie 4. Pier Delta 5. Echo Pier	1. Alpha Pier – Available at pier, needs upgrades 2. Bravo Pier – Available at pier, needs upgrades 3. Charlie Pier – Available at pier, needs upgrades 4. Delta Pier – Available at pier, needs upgrades 5. Echo Pier – Available at pier, needs upgrades	Complete utility upgrades required.
Cable TV	1. Pier Alpha 2. Pier Bravo 3. Pier Charlie 4. Pier Delta 5. Echo Pier	1. Alpha Pier – Available at pier. 2. Bravo Pier – Available at pier. 3. Charlie Pier – Available at pier. 4. Delta Pier – Available at pier. 5. Echo Pier – Available at pier.	Satisfied.
Local Area Network (LAN)	1. Pier Alpha 2. Pier Bravo 3. Pier Charlie 4. Pier Delta 5. Echo Pier	1. Alpha Pier – Available at pier, needs upgrades 2. Bravo Pier – Available at pier, needs upgrades 3. Charlie Pier – Available at pier, needs upgrades 4. Delta Pier – Available at pier, needs upgrades 5. Echo Pier – Available at pier, needs upgrades	Complete utility upgrades required.
Fire Protection	1. Pier Alpha 2. Pier Bravo 3. Pier Charlie 4. Pier Delta 5. Echo Pier	1. Alpha Pier – Not available at pier. 2. Bravo Pier – Not available at pier. 3. Charlie Pier – Not available at pier. 4. Delta Pier – Not available at pier. 5. Echo Pier – Not available at pier.	Connections not available on any piers. Salt water pumps onboard ships for containment. Fire protection services to be provided through local service contract.
Fueling	1. Pier Alpha 2. Pier Bravo 3. Pier Charlie 4. Pier Delta	Currently provided via truck from pier head of each pier. Service could continue as provided.	Threshold can be satisfied at minimal levels. Concerns with cutters at echo pier, especially breasted cutters.

Table 2.2: **Fast Response Cutter Waterfront Infrastructure Findings (6 Cutters)**

Requirement (see Table 1.1)	**Opportunities**	**Existing Conditions**	**Delta**
	5. Echo Pier		
Refuse Removal	1. Pier Alpha 2. Pier Bravo 3. Pier Charlie 4. Pier Delta 5. Echo Pier	1. Alpha Pier – Not available at pier. 2. Bravo Pier – Not available at pier. 3. Charlie Pier – Not available at pier. 4. Delta Pier – Not available at pier. 5. Echo Pier – Not available at pier.	10x10 dumpster would need to be located meeting requirements.
Lighting	1. Pier Alpha 2. Pier Bravo 3. Pier Charlie 4. Pier Delta 5. Echo Pier	Lighting provided at pier head of each pier. Service could continue as provided.	Threshold satisfied.
Compressed Air	1. Pier Alpha 2. Pier Bravo 3. Pier Charlie 4. Pier Delta 5. Echo Pier	Currently provided via truck from pier head of each pier. Service could continue as provided.	Threshold can be satisfied at minimal levels. Concerns with cutters at echo pier, especially breasted cutters.
Oily Water Disposal	1. Pier Alpha 2. Pier Bravo 3. Pier Charlie 4. Pier Delta 5. Echo Pier	Currently provided via truck from pier head of each pier. Service could continue as provided.	Threshold can be satisfied at minimal levels. Concerns with cutters at echo pier, especially breasted cutters.
High Purity Water	1. Pier Alpha 2. Pier Bravo 3. Pier Charlie 4. Pier Delta 5. Echo Pier	Currently provided via truck from pier head of each pier. Service could continue as provided.	Threshold can be satisfied at minimal levels. Concerns with cutters at echo pier, especially breasted cutters.

Shore Facilities

Shore infrastructure analysis can be found in *Table 2.2* and shows that the availability of existing building space on Base San Juan can reasonably accommodate the FRC although parking for personal vehicles is extremely limited. The most pressing demand generated by the arrival of the FRC would be in the storage, shop, and MAT facility requirements. The bulk of these types of facilities are provided in building 101 which was originally designed as a cutter support facility. This building's ground floor is designed with approximately 2,700 gsf of MAT/Shop facility surrounded by six individual storage units of approximately 250 gsf for cutter storage. As the FRC is designed to replace the WPB 110, significant portions of this structure can be recapitalized for FRC use. Shortfalls that arise from the use of building come in the overall size of the MAT facility. The recommended facility is a minimum of 5,000nsf and the existing is only 2,700. Renovations to the existing storages spaces on the ground floor can make up for the shortfall, but will need to be made up for in other locations. In addition to the displaced general cutter storage, an approximate 2,400nsf space for parts and tool storage will also be needed.

Opportunities for HazMat and Flammable storage can be found in existing building 111. A total of only 240 and 150gsf is necessary for each use, and is reportedly available within the existing facility. However as an older and inefficient structure, it may be more prudent to recapitalize the land underneath this structure and adjacent building 110 to provide building area to accommodate all the storage needs.

Table 2.3: **Fast Response Cutter Shore Infrastructure Findings (6 Cutters)**

Requirement (see table 1.1)	**Opportunities**	**Existing Conditions**	**Delta**
Ammunition Handling	Base Armory / Pier Loading	Base Armory in Building 104. Limited ammunition for the FRC. Could be satisfied by existing base operations.	Requirement can be satisfied.
Parking Stalls	Existing Base parking.	Parking on the base is difficult with convenience parking in the operations area a premium. Some relief with the UPH facilities providing quarters within walking distance.	Parking in all of historic San Juan is difficult. Finding land for additional parking stalls unlikely.
Parking Arrangement	East side over-flow parking	Parking in the operations area is at a premium. Recommended parking arrangements cannot be met without displacement of existing demands.	Existing spaces not available and no area feasible to construct new parking area present.
Cutter General Storage	1. Building 101 2. Buildings 110 & 111	@ 1,440nsf existing space divided into six (6) individual cutter storage rooms at 240nsf each. Additional 240nsf space available for the existing WPB 87'. If converted into MAT space, space would be provided for in the new facility constructed in the area of building 110 & 111.	Threshold satisfied, however space also considered for potential MAT facility.
Cutter Machine and Engine (MK) Shops	Building 101	1. 480sf room on 1st floor used as shop space. 2. 700sf room on second floor to be converted to shop space.	1. Meets requirements but may be utilized for MAT facility. 2. Exceeds maximum size requirements. Does not meet roll up door/lifting points requirements.
MAT Requirements	Building 101	Existing first floor MAT facility and shop space equals 3,160sf. Potential conversion of storage areas to meet full 5,000 requirement.	Existing space less than required. Adjacent storage areas could be converted to reach full 5,000sf recommended. Storage would need to be reconstructed in another facility.
Parts / Tool Storage	Building 110 & 111	No space of adequate size exists that is conducive to meeting this requirement when compared to other FRC needs. Potential space in building 101, but better utilized for other needs.	No space currently exists in arrangements where 6 FRC arrive. New construction on the location of buildings 110 and 111 would provide space for the shortfall.
Flammable Storage	HazMat Storage Area	HazMat storage area. Currently utilized but potential for additional storage if necessary.	Area considered potential site for new facility.

Table 2.3: **Fast Response Cutter Shore Infrastructure Findings (6 Cutters)**

Requirement (see table 1.1)	**Opportunities**	**Existing Conditions**	**Delta**
HazMat Storage	HazMat Storage Area	HazMat storage area. Currently utilized but potential for additional storage if necessary.	Area considered potential site for new facility.
Shipping and Receiving	1. Building 100 2. Building 101	1. Operations building for the base. 2. Existing cutter office space of 700sf available on second floor.	1. With a net increase of only 1 new cutter, continue shipping and receiving operations through the main building. 2. Convert necessary area from existing cutter office space on second floor.
Port Engineers Office	Building 101	Various office locations should become available on second floor upon transfer from 110' platform to the FRC.	Requirement satisfied.

CHAPTER 3: IDENTIFICATION AND ANALYSIS OF ALTERNATIVES

3.1 INTRODUCTION

Waterfront and shore infrastructure alternatives are developed independently in this document, but the interactions with each other are required to correlate into a cohesive plan. Basis for the creation of each alternative derives from the findings of the inventory review and specific planning assumptions presented in the Scope of Work for this project, and those determined during base interviews.

3.2 WATERFRONT INFRASTRUCTURE ALTERNATIVES

There are a number of concerns with the waterfront infrastructure that will need to be addressed if in fact it is decided to locate the FRCs in San Juan. Existing infrastructure can accommodate the berthing of the FRC but is less than ideal from both, base operations and FRC standards. Other arrangements, through new construction, can lessen the negative impacts, however it appears unlikely that six (6) FRC can be located at Base San Juan without waivers in mission or FRC requirements. The alternatives developed for potential docking arrangements are provided below, and graphically presented in Figures 3.1 thru 3.5.

ALTERNATIVE 1: IDENTIFICATION Complete reuse of existing facilities. Renovate/Reconfigure/Reuse all existing cutter waterfront assets available.

- Piers Alpha and Bravo do not meet minimum water depths, thus considered non-viable for FRC use. Both Alpha and Bravo will continue to be utilized for the WPB 87' *Reef Shark*, and the other small vessels docked in San Juan.
- Pier Charlie (1-2 FRC) – At one-hundred ninety feet (190'), pier Charlie requires only minimal structural modifications for berthing of FRCs. The "L" shape design of the pier would require removal of the leg at the tip of the pier to accommodate mooring on both sides of the pier. Spacing between piers Charlie and Delta are not sufficient under FRC standards, but an additional FRC could potentially moor between the two piers if desired. All utilities will require some level of updating, with electrical upgrades to higher amps and voltage being the most extensive.
- Pier Delta (1 FRC) – At one-hundred fifty feet (150'), pier Delta will require some structural modifications to berth the FRC. The pier will need to either be extended a minimum of twenty feet (20'), or a mooring dolphin will need to be placed off the pier tip. All utilities will require some level of updating, with electrical upgrades to higher amps and voltage being the most extensive. Vertical load requirements cannot be met at pier delta. Horizontal loads and vertical loads could not be established during this review and would need to be verified through structural engineering analysis. Docking along the south side of the pier is less than desirable due to wake action from ships entering and exiting San Juan Harbor.
- Pier Echo (3-4 FRCs) – At three hundred sixty-six feet (366') in length, pier Echo has sufficient length and water depths to accommodate two FRCs against the wharf face. An additional two could then be breasted along those two cutters. Existing utility stations will need to be updated, with electrical upgrades to higher amps and voltage being the most extensive. While docking along the quay wall is the only option available at pier Echo, it is not desirable due to extreme wake action from ships entering and exiting San Juan Harbor.

ALTERNATIVE 1: ANALYSIS – Feasible but not practical

- As a reuse option provides a cost effective method of meeting basic FRC demands, but at minimal levels if that.

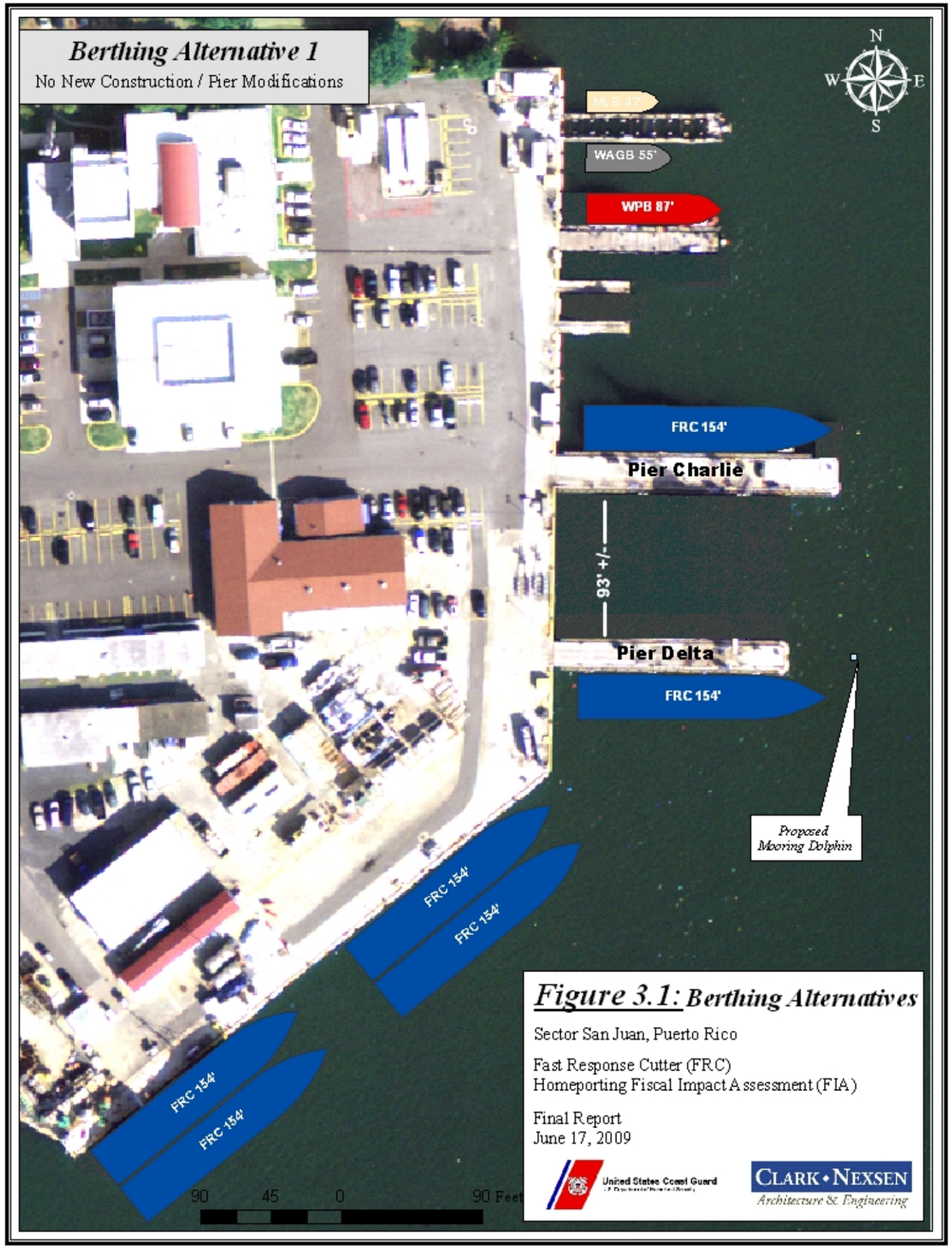

Figure 3.1: ***Berthing Alternatives***

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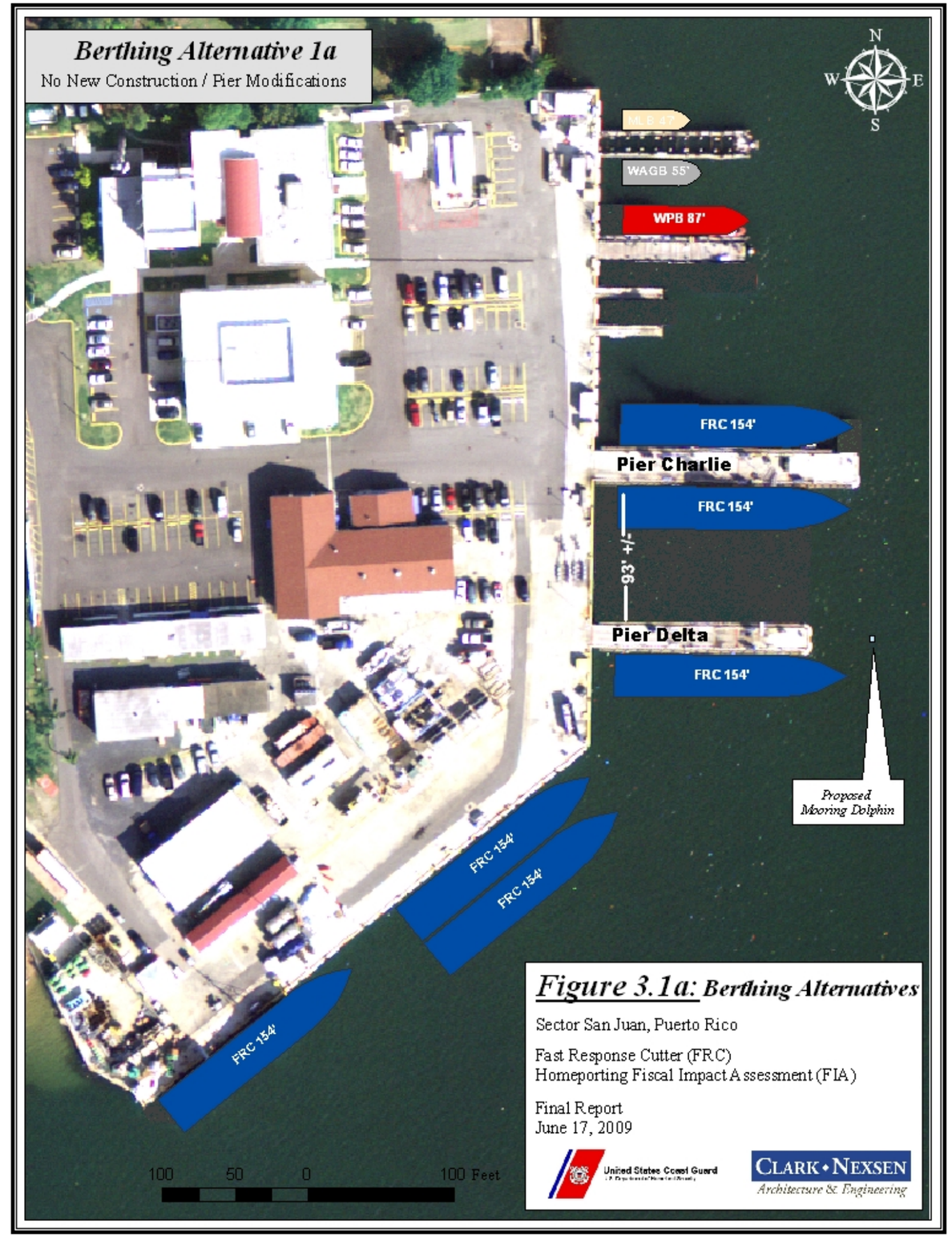

Figure 3.1a: ***Berthing Alternatives***

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- Pier Charlie (1-2 FRC) – Requires structural modifications and utility updates and still only allows docking of 1 FRC meeting recommended standards.
- Pier Delta – Requires structural upgrades and utility updates and still may not meet recommended standards for vertical and horizontal loads. Docking of the FRC would also be on the channel side of the pier which generates concerns of wake action from the volume of traffic entering and exiting San Juan Harbor.
- Pier Echo – Requires utility upgrades. Provides the majority of docking space in the least desirable location and arrangement. Wake action from vessels entering and exiting San Juan Harbor is a considerable concern along this wharf face. Compounding this issue, a minimum of three (3) FRC with the potential of four (4) will need to be docked along the quay wall, which will require the breasting of at least one of the new cutters.
- Pier Echo – Also utilized as the mooring location for the heavy amounts of visiting vessels coming to Base San Juan. If this facility were now used for FRC capabilities, the functions of the base as a host facility would be greatly diminished.
- *SUMMARY* – While providing a low cost alternative to potentially meet the minimum requirements of the FRC, the capabilities come at the cost of overall base mission. Pier Echo becomes heavily utilized in an undesirable fashion, and several of the smaller piers become seriously underutilized. Docking arrangements under this alternative appear to limit the base's capabilities as a location for visiting ships.

Table 3.1 **Sector San Juan, Waterfront Infrastructure Cost Estimates, Alternative 1&1a**

Sector San Juan, Fast Response Cutter Feasibility Impact Assessment					
Waterfront Facilities Assessment, Alternative 1 & 1a					
Facility Needs	**Pier Alpha**	**Pier Bravo**	**Pier Charlie**	**Pier Delta**	**Pier Echo**
Structural	$8,840.00	$12,906.00	$340,000.00	$268,559.00	$2,826,325.00
Electrical	N/A	N/A	$278,548.00	$293,930.00	$340,075.00
Mechanical	$31,824.00	$37,128.00	$133,608.00	$47,736.00	$138,912.00
Communications	$96,356.00	$96,356.00	$121,108.00	$145,860.00	$220,116.00
Dredging	N/A	N/A	N/A	N/A	N/A
Demolition	N/A	N/A	N/A	N/A	N/A
Totals	**$137,020.00**	**$146,390.00**	**$873,264.00**	**$756,085.00**	**$3,525,428.00**
Total Alternative 1					**$5,438,187.00**

ALTERNATIVE 2: NEW CONSTRUCTION: New configuration and construction of piers for all waterfront infrastructure needs.

Alternative 2 provides means to lessen the impacts on base mission and attempts to provide the maximum amount of slip width spacing between the FRC to meet as closely as possible the recommended standards.

Piers Alpha, Bravo, Charlie and Delta would be demolished in their entirety with only the travel lift operations remaining along the east wharf wall of the base. A new parallel wall and pier system would be constructed to provide mooring areas for all existing base water assets as well as six (6) FRC. *Figure 3.2* Cutter docking would be parallel to the existing wall as well as both sides of the new pier wall. Travel lift operations would remain where presently located and would be accessed from the basin formed by the new construction.

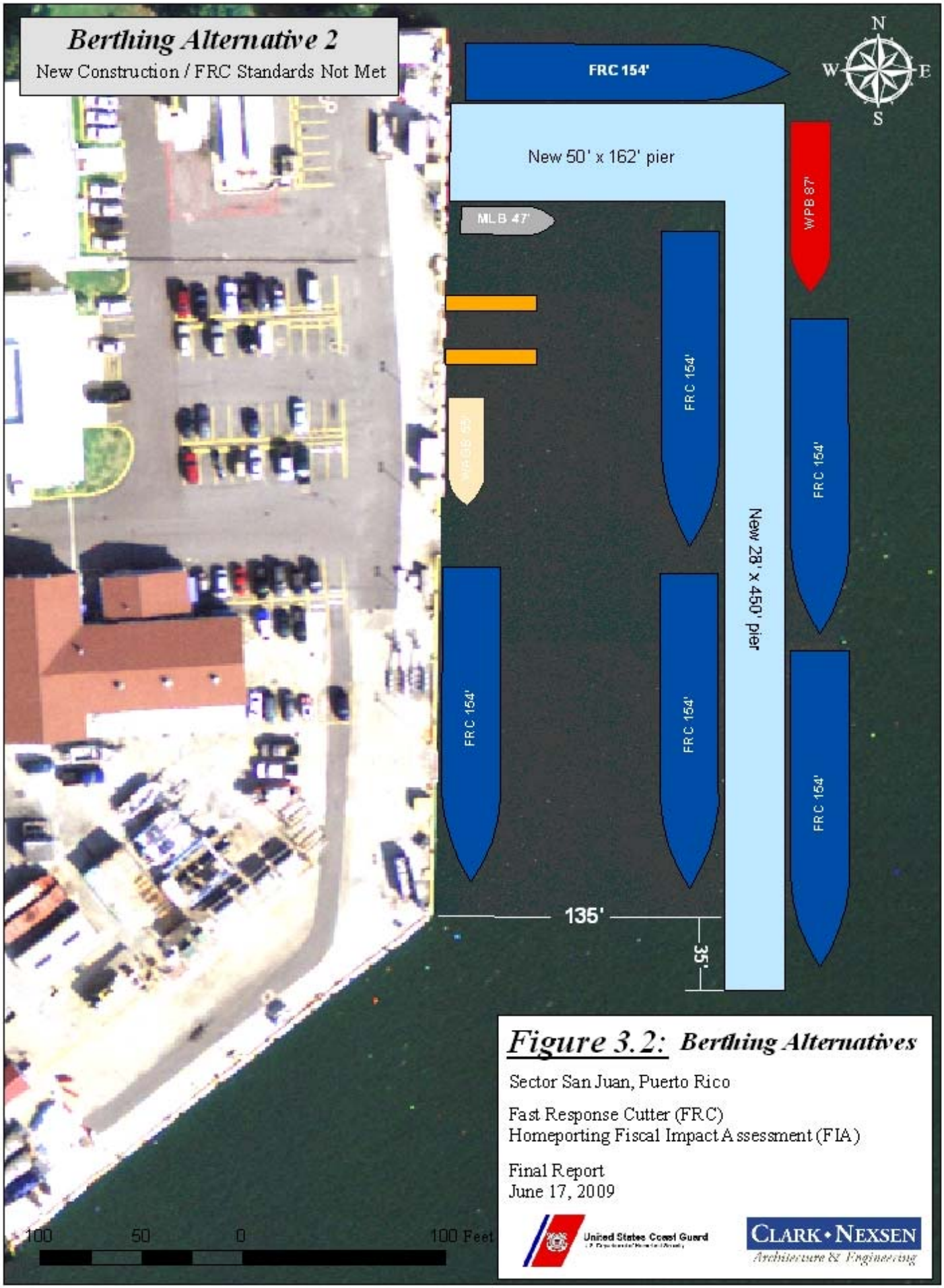

Figure 3.2: Berthing Alternatives

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ALTERNATIVE 2: ANALYSIS – Feasible but does not meet recommended standards for six (6) FRC

- Provides docking space for all current base assets as well as the projected six (6) FRC however does not meet the minimum slip width requirements of the FRC standards. Slip width proposed is approximately 135' while double mooring requirement is recommended at 178'.
- Reutilization of existing facilities is extremely limited with only the travel lifts being retained.
- High costs with complete reconstruction of new facilities.
- High operational disruptions with demolition of all pier facilities.
- Dredging costs associated with new construction and would be required around new portion of pier located in the Pier Alpha and Bravo area.
- New wharf wall extends approximately 35' beyond the current wall edge with pier Echo.
- Docking along the outside wall of new pier generates concerns of wake action from traffic within San Juan Harbor.
- *SUMMARY* – Pier Echo is retained in order to maintain the Base mission as host port, however available shoreline for FRC use must be recapitalized and reconfigured to provide enough docking area for six (6) cutters plus existing assets. High cost alternative that still does not meet the minimum requirements of the FRC. Concerns with base operations during construction and from a long term standpoint given the docking situation outside the proposed basin.

Table 3.2 **Sector San Juan, Waterfront Infrastructure Cost Estimates, Alternative 2**

Sector San Juan, Fast Response Cutter Feasibility Impact Assessment					
Waterfront Facilities Assessment, Alternative 2					
Facility Needs	**Pier Alpha (New Pier)**	**Pier Bravo**	**Pier Charlie**	**Pier Delta**	**Pier Echo**
Structural	$6,953,544.00	N/A	N/A	N/A	$2,380,789.00
Electrical	$309,311.00	N/A	N/A	N/A	N/A
Mechanical	$34,476.00	N/A	N/A	N/A	N/A
Communications	$170,612.00	N/A	N/A	N/A	N/A
Dredging	$530,400.00	N/A	N/A	N/A	N/A
Demolition	$57,708.00	$70,720	$216,120.00	$127,296.00	N/A
Totals	**$8,056,051.00**	**$70,720**	**$216,120.00**	**$127,296.00**	**$3,380,789.00**
Total Alternative 2			**$10,850,976.00**		

ALTERNATIVE 3: NEW CONSTRUCTION: New configuration and construction of piers for all waterfront infrastructure needs.

Alternative 3 provides another arrangement of piers to lessen the impacts on base mission and attempts to provide the maximum amount of spacing between the FRC and retain similar pier arrangements as is current along the eastern shoreline. All pier infrastructure along the existing wharf wall would be demolished and replaced with new facilities. *Figure 3.3*

Four new piers would be constructed to replace the existing Alpha, Bravo, Charlie, and Delta, and new travel lift operations would need to be constructed to allow for maximum spacing between piers.

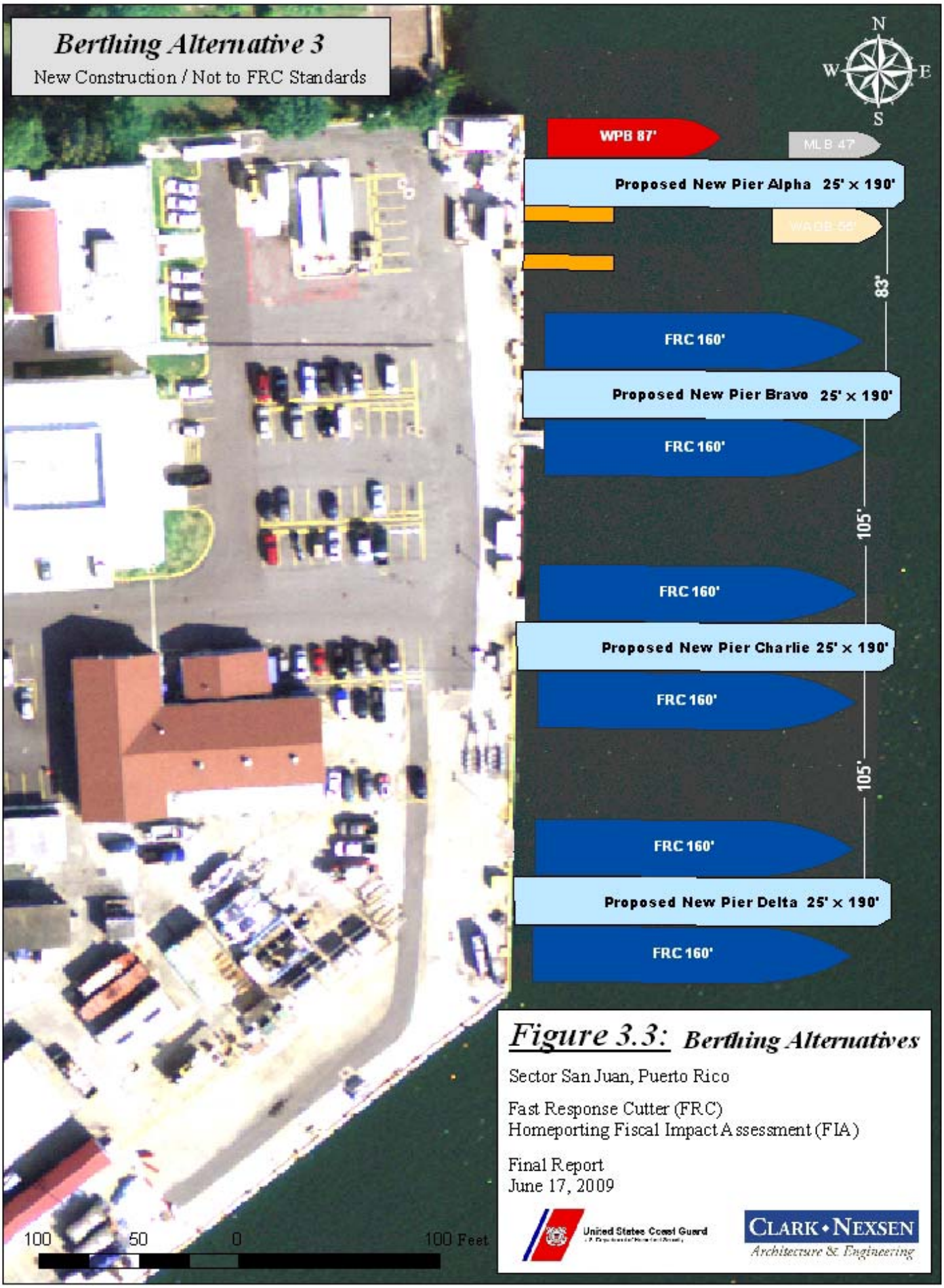

Figure 3.3: ***Berthing Alternatives***

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New piers would be constructed with infrastructure necessary to meet the optimum requirements of the FRC, however, slip spacing widths will not be able to be obtained.

ALTERNATIVE 3: ANALYSIS – Feasible but does not meet recommended standards for six (6) FRC

- Provides improved docking space for all current base assets as well as the projected six (6) FRC, however does not meet the minimum slip width requirements of the FRC standards. Slip width between FRC Facilities is 105' while width between FRC and other vessels are even less at 83'.
- No reutilization of existing facilities as all piers will need to be demolished.
- High costs with complete reconstruction of new facilities.
- High operational disruptions with demolition of all pier facilities.
- Dredging costs associated with new construction and would be required around new portion of pier located in the Pier Alpha and Bravo area.
- *SUMMARY* – Pier Echo is retained in order to maintain the Base mission as host port, however available shoreline for FRC use must be recapitalized and reconfigured to provide enough docking area for six (6) cutters plus existing assets. High cost alternative that still does not meet the minimum requirements of the FRC. Satisfies base concerns of wake action on berthed cutters in all instances except outside (south) slip of pier Delta.

Table 3.3 **Sector San Juan, Waterfront Infrastructure Cost Estimates, Alternative 3**

Sector San Juan, Fast Response Cutter Feasibility Impact Assessment					
Waterfront Facilities Assessment, Alternative 3					
Facility Needs	**Pier Alpha**	**Pier Bravo**	**Pier Charlie**	**Pier Delta**	**Pier Echo**
Structural	$1,595,620.00	$1,680,837.00	$1,595,620.00	$1,595,620.00	$2,380,789.00
Electrical	$247,785.00	$263,167.00	$278,548.00	$293,930.00	N/A
Mechanical	$37,128.00	$42,432.00	$136,260.00	$53,040.00	N/A
Communications	$71,604.00	$96,356.00	$121,108.00	$145,860.00	N/A
Dredging	$530,400.00	N/A	N/A	N/A	N/A
Demolition	$57,708.00	$70,720.00	$216,120.00	$127,296.00	N/A
Totals	**$2,540,244.72**	**$2,153,513.00**	**$2,347,656.00**	**$2,215,746.00**	**$2,380,789.00**
Total Alternative 3			**$11,637,949.00**		

ALTERNATIVE 4: NEW CONSTRUCTION: New configuration and construction of piers for waterfront infrastructure needs meeting base mission and FRC standards.

Alternative 4 provides another arrangement of piers to lessen the impacts on base mission but is designed to provide FRC berthing at recommended specifications rather than for a specific projected number of cutters. Pier arrangements along the eastern shoreline are similar to what is existing, but after demolition only three piers and a reconfigured travel lift operation will be replaced. *Figure 3.4*

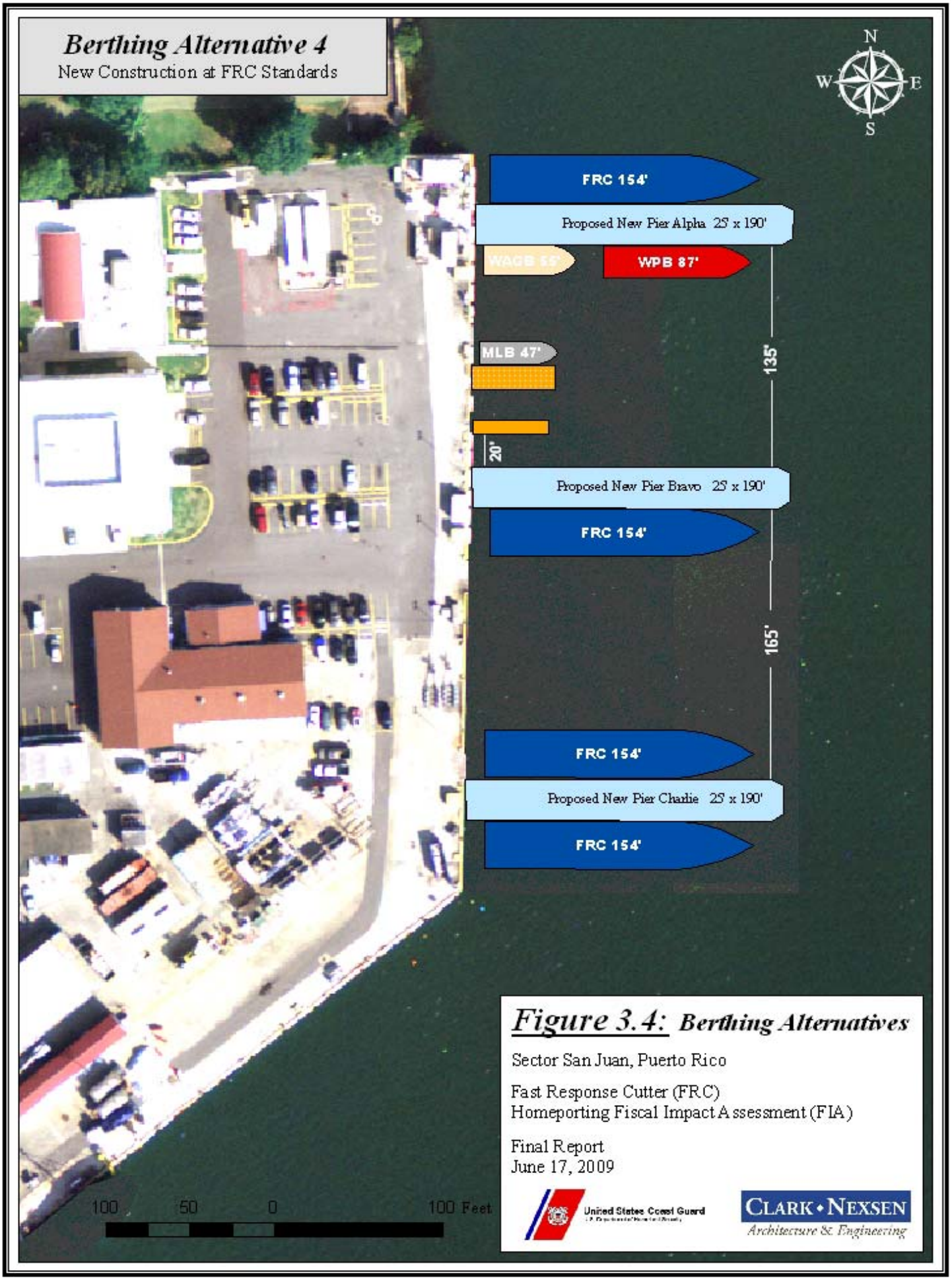

Figure 3.4: Berthing Alternatives

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Three new piers would be constructed along the east wharf wall. Travel lift operations would remain in the same location but one of the piers would be improved to allow docking of one of the base's smaller vessels.

ALTERNATIVE 4: ANALYSIS – Feasible but provides berthing slips for only four (4) FRC rather than the projected six (6).

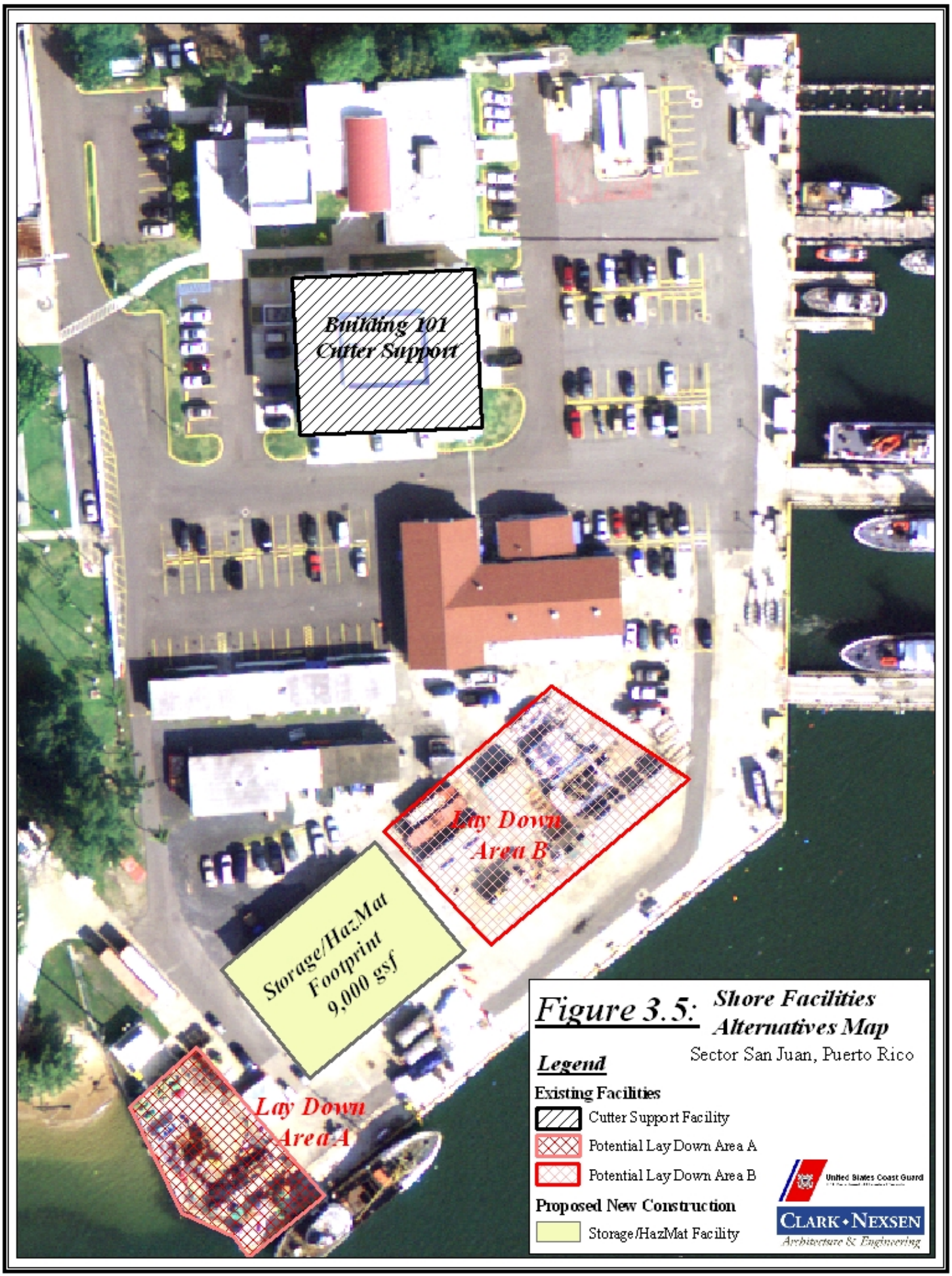
- Provides improved docking space for all current base assets, and meets all the recommended standards for four (4) FRC.
- Limited reutilization of existing facilities as only a portion of the travel lift piers will be reused.
- High costs with complete reconstruction of new facilities.
- High operational disruptions with demolition of all pier facilities.
- Dredging costs associated with new construction and would be required around new portion of pier located in the Pier Alpha and Bravo area.
- *SUMMARY* – Pier Echo is retained in order to maintain the Base mission as host port, however existing pier structures are not adequate for FRC use, and must be recapitalized and reconfigured. Existing shoreline of the east wharf only has sufficient area to provide docking area for four (4) FRC and meet the recommended standards. High cost alternative that meets the Base requirements and the berthing requirements of the FRC, but does not obtain the objective number of vessels. In addition to lessening the number of vessels to four (4) rather than six (6), a single FRC will still be required to berth on the outside (south) slip of pier Delta, which is of some concern.

Table 3.4 **Sector San Juan, Waterfront Infrastructure Cost Estimates, Alternative 4**

Sector San Juan, Fast Response Cutter Feasibility Impact Assessment					
Waterfront Facilities Assessment, Alternative 4					
Facility Needs	**Pier Alpha**	**Pier Bravo**	**Pier Charlie**	**Pier Delta**	**Pier Echo**
Structural	$1,595,620.00	$1,680,838.00	$1,595,620.00	N/A	$2,380,789.00
Electrical	$247,785.00	$270,858.00	$301,621.00	N/A	N/A
Mechanical	$16,089.00	$45,084.00	$146,868.00	N/A	N/A
Communications	$71,604.00	$108,732.00	$158,236.00	N/A	N/A
Dredging	$530,400.00	N/A	N/A	N/A	N/A
Demolition	$57,708.00	$70,720.00	$216,120.00	$127,296.00	N/A
Totals	**$2,519,206.00**	**$2,176,232.00**	**$2,418,465.00**	**$127,296.00**	**$2,380,789.00**
Total Alternative 4			**$9,621,988.00**		

3.3 SHORE INFRASTRUCTURE ALTERNATIVES

Since the FRC is to be a replacement vessel for the WPB 110, analysis of shore infrastructure needs and facilities show that some of the existing space on base can be recapitalized and used for the FRC. However, as the demands of the FRC are greater than the 110, with the full assignment of six (6) cutters, new construction is required to provide for various storage needs.


Building 101
Cutter Support
Lay Down
Area B
Storage/HazMat
Footprint
9,000 gsf
Lay Down
Area A
Figure 3.5: Shore Facilities Alternatives Map
Sector San Juan, Puerto Rico
Legend
Existing Facilities
Cutter Support Facility
Potential Lay Down Area A
Potential Lay Down Area B
Proposed New Construction
Storage/HazMat Facility
United States Coast Guard
CLARK • NEXSEN
Architecture & Engineering

Under the six (6) cutter scenario, available land for construction becomes a primary concern, as Base San Juan is compact and tightly designed. Buildings 110 (Facilities Shop) and Building 111 (HazMat/Flammable Storage) are two older small block structure buildings that could best be used by recapitalizing the land underneath *(Figure 3.5)*. It is recommended that the two structures be demolished and a new facility of approximately 9,000gsf be constructed to house the existing uses currently in this location (3,000gsf and provide for all the storage needs of the cutters 6,000gsf). No other construction would be required as the cutter MAT needs could be addressed in Building 101.

Since demolition of existing buildings will be necessary for acquisition of available land, use of the area under buildings 110 and 111 were considered most viable. Considerations were given to building 105 (Facilities Engineering Building) and 106 (Multi Storage/Paint Locker) however operational disruptions generated by temporarily relocating an administrative facility were determined much greater than the storage and shop space of buildings 110 & 111.

Table 3.5 **Sector San Juan, Shore Infrastructure Cost Estimates, Alternatives 1 and 2**

Sector San Juan, Fast Response Cutter Feasibility Impact Assessment				
Shore Facilities Assessment, Alternatives 1 and 2				
	6 FRC Alternatives		**4 FRC Alternatives**	
Facility Needs	**Project Size**	**Total Cost***	**Project Size**	**Total Cost***
Renovations (Building 101)	6,340nsf	$1,165,749.00	6,340nsf	$1,165,749.00
Renovations (Building 110 & 111)	N/A	N/A	760gsf	$100,776.00
New Construction (Storage / HazMat Facility)	9,000gsf	$2,402,712.00	N/A	N/A
Demolition	3,100	$82,212.00	N/A	N/A
Site Preparation	12,000	42,432.00	N/A	N/A
Totals		$3,693,105.00		$1,266,525.00
Shore Facilities Totals		**$3,693,105.00**		**$1,266,525.00**

❖ Includes 30% project contingency costs for Design, LEED and Construction

3.4 ROOSEVELT ROADS NAVAL STATION ALTERNATIVES

Opportunities at the closed Roosevelt Roads Naval Station have been explored for both shore and waterfront facilities for the USCG. Past conclusions have been that the base is suitable for use by the USCG. In short the USCG would occupy such a small area of a large former Naval Station that it would appear even less prudent that the Naval Station would be a suitable fit for the Coast Guard. In addition, many of the piers, while providing more than suitable services and length, appear to be too large, with height above the waterline being an obvious, visible concern.

Based on past reports and a visual inspection made on August 8, 2008, facilities at the Roosevelt Roads Naval Station were determined to be non-viable.

CHAPTER 4: CONCLUSIONS AND RECOMMENDATIONS

4.1 SUMMARY

In July, 2008, USCG CEU Miami awarded the contract to conduct Feasibility Impact Assessments of the shore and waterfront infrastructure at Sector San Juan, Puerto Rico to determine the base's capabilities of homeporting six (6) FRC. Data provided from CEU Miami and Sector San Juan was reviewed and analyzed, and physical site visits were conducted. This information combined with results of building walk-throughs and interviews with key station personnel were then compared against the mission support requirements of the FRC to determine Sector San Juan's viability as a homeport for the new cutter.

4.2 CONCLUSIONS

The FRC is anticipated to be a replacement for the WPB 110 of which five (5) are currently stationed at San Juan. Along with the five (5) 110's, San Juan is also home port to the WPB 87' *Reef Shark* which will not be replaced by the FRC. Therefore with the anticipated arrival of FRCs, San Juan would serve as Homeport for seven (7) cutters in addition to the other support the base provides. Existing waterfront assets appear unable to accommodate this scenario without significant concessions in either base mission requirements or FRC mooring standards.

Except for some limited dredging near existing piers Alpha and Bravo, critical factors such as channel and mooring water depths are adequate for the FRC, however, existing facilities are simply inadequate to service the FRC. Alternatives have been presented that provide options for homeporting the FRC in San Juan, but under no alternative do the waterfront infrastructure measures meet the criteria prescribed under this statement of work. In alternatives where all six (6) cutters are accounted for, concessions were made in either base support functions or in the standards set forth for berthing the FRC. An additional alternative was presented that meets the FRC berthing standards and retains current base operations, however the number of FRC that could feasibly be accommodated in San Juan is four (4) rather than the six (6) desired in the statement of work.

Unlike waterfront assets, shore facilities at the station are quite capable of supporting the vessels without significant improvements and capital expenditures. Building 101 was designed as a cutter support unit for six (6) WPB 110's. Currently it provides MAT, storage, shop and administrative office space for five (5) 110's and the WPB 87' stationed at San Juan.

To complete shore facility needs for the anticipated six (6) FRC storage capacity at the base would need to be increased as the units in building 101 would be converted to MAT facility space. Therefore building 110 and 111 are identified for demolition and new construction of a facility adequate to house all existing operations and provide parts and tool storage, general cutter storage and HazMat/Flammable Storage services.

The existing facilities on base, capable of supporting the mission requirements of the FRC, are all occupied and operating at, or above capacity levels. In order to fulfill the mission requirements of the FRC, new construction of facilities will be necessary. Two alternatives were developed to address these needs.

4.3 RECOMMENDATIONS

Of the alternatives developed for this report, none are capable of meeting the standards and planning factors of the base as prescribed in the Statement of Work. The station has only one wharf facility and one pier capable of supporting the FRC, however serious concerns arise with use of the wharf both from a base operations standpoint, and from a practical point of its utilization for the FRC. The only other options are for complete new construction, however, even with complete new construction, it appears only four (4) FRCs can feasibly be homeported at San Juan under the recommended standards.

Feasibility Impact Assessment: Fast Response Cutter

While serious shortfalls exist in waterfront infrastructure needs, shore facilities would be quite capable of supporting the full assignment of six (6) cutters. Under a situation where six (6) were homeported in San Juan, new construction would be required to provide the amounts of storage required. In conclusion, there appears no feasible way to accommodate six (6) FRC at San Juan under the planning factors presented within the Statement of Work and base interviews. Alternatives to accommodate six (6) FRC were developed and an alternative for a maximum of four (4) was presented for consideration for utilization of the base. However, further consideration on either the number of vessels for homeporting or waivers in the minimum standards will need to be deliberated. Should it be determined to progress further in the consideration of San Juan as a homeporting location, the findings, results and initial alternatives can serve as foundation and problem statement for any subsequent Planning Proposal for the Base.

REFERENCES

RS Means Building Construction Cost Data, 65th Annual Edition, 2007

UFC 3-701-07 DoD Facilities Pricing Guide, July 2007

Commandant Instruction (COMDTINST) M16475.1D, "National Environmental Policy Act Implementing Procedures," Nov 29, 2000.

Shore Facilities Standards Manual COMDTINST M11012.9

Field Planning for Shore Infrastructure / Field Planning Manual COMDTINST M11000.17

Coast Guard Housing Manual, COMDTINST M11101.13E

Waterfront Structural Inspection at United States Coast Guard Base San Juan, Underwater Inspections Report, February, 2007 Collins Engineers PC.

Santo Toribio: The Forgotten Battery At La Puntilla. Prepared for the US Coast Guard by URS Group, Inc.

Puerto Rico National Estuary Program Coastal Condition Report, Chapter 7, San Juan Bay Estuary

Appendix 1: ***Scope of Work***

SCOPE OF WORK

FRC HOMEPORTING

IN

SAN JUAN, PR, & PANAMA CITY, FL

FEASIBILITY IMPACT ASSESSMENT

COMMANDING OFFICER
U.S. COAST GUARD
CIVIL ENGINEERING UNIT
MIAMI, FL 33177

Feasibility Impact Assessment: Fast Response Cutter

AUTHOR: LTJG Tracey Richards DATE: MAY 2008

BACKGROUND

This assignment includes preparation of Feasibility Impact Assessments (FIAs) for the homeporting of Fast Response Cutters (FRCs) in the following locations:

Sector San Juan, PR: six (6) FRCs

Station Panama City, FL: two (2) FRCs

The anticipated arrival schedule is depicted in Table 1-1. It is to be assumed that the 110' WPBs and WMECs currently based at these homeports will be moved once the FRCs arrive; however, all other CG assets/commands in these homeports will remain. These ports must retain the capability to moor a 110' WPB and WMEC until the Coast Guard has fully transitioned to full use of the Deepwater assets. .

Table 1-1: FRC ARRIVALS

Site	2014	2015	2016	2017	2018
San Juan			4	2	
Panama City		2			

This FIA will determine if the existing infrastructure can support the FRC and identify any environmental concerns, through an initial National Environmental Policy Act assessment, or improvements that will be needed to successfully homeport FRCs at each port. The FRC requirements are listed in Table 1-2.

Table 1-2: FRC REQUIREMENTS*

	Threshold	Objective
Depth of water at moorings:	Draft plus a minimum of 3 feet at lowest predicted tide.	Draft plus a minimum of 7 feet at lowest predicted tide.
Mooring length:	Estimate 153.5' LOA plus 15 ft minimum	Estimate 153.5' LOA plus 30 feet
Total number of Dock spaces (per 6 cutters): Add one dockside space to Miami.	4	6
Vertical load:	Whenever possible, allow access from AASHTO truck loading HS20. Heaviest anticipated load is hoist of main diesel engine (approx 1.5X weight of 110' Paxman engine) from at least one pier position.	
Horizontal load:	Based on wind presentation area and "worst case" docking impact of 5 knots (perpendicular to pier).	
Electrical.	400 Amps	
	Threshold	**Objective**
Potable Water.	875 gallons per day via one 2-1/2" at 600 gpm at 60 psi	
Sewage.	Minimum capacity of 875 gallons per day via 4" at 350 gpm	
Bilge Water.	Minimum capacity of 200 gallons per day.	
Telephone.	Ten (10) telephone line pairs.	
Cable TV.	Provide one (1) commercial service	
Local Area Network (LAN).	Three (3) pair Category 5 fiber optics connectors.	
Mooring Devices and Deck Fittings.	Minimum of three (3) Bollards and Cleats for each cutter.	Minimum of four (4) Bollards and Cleats for each cutter
Fendering.	Soft, non-marking fendering will be provided along piers/bulkheads	

Fire Protection.	Cooperation with local Fire Dept.	Two 2 ½" shore connections capable of 500 gpm at 125 psi each Conform to National Fire Code recommendation. Local fire codes and possible fire hazards will determine the equipment and the type of protection needed at a specific pier. The WPB will have onboard one International Shore Connection (cutter) standardized for a 2-1/2" hose.
Refuse Removal.	Applicable local refuse removal procedures shall be utilized.	
Parking Stalls.	19 Parking spaces (Spaces for 80% of crew and one gov't vehicle)	23 Parking spaces (Spaces for 100% of crew and one gov't vehicle)
Lighting.	Adequate security lighting	
Compressed air.	None provided	Available on pier
Oily water disposal	Provided via truck	
High purity water	Provided via truck	
Cutter Offices to include at least 2 phone lines, from 3 to 8 workstations, and two file cabinets (per cutter but can be consolidated for all cutters, 6 homeported and 1 visiting)	100 NSF	300 NSF
Cutter General Storage (per cutter)	225 NSF	300 NSF
Cutter Shops (per cutter but can be consolidated for all cutters in MAT/NESU/Industrial Bldg)	0 NSF	100 NSF
All hands meeting facility (per 6 cutters)	25 people	30 people
Conference room (per 6 cutters)	10 people	10 people
	Threshold	**Objective**
MAT/NESU/Industrial Requirements (Per six cutters)	11000 NSF	11000 NSF
Cutter storage space:	225 NSF	300 NSF
Parts/tool storage:	400 NSF (per cutter but can be consolidated for all cutters in MAT/NESU/Industrial Bldg)	
Flammable storage: Can be combined and shared with other FRC :	25 NSF	
HAZMAT storage: Can be combined and shared with other FRC	40 NSF	

* These requirements were based on a length overall of 160 ft, draft of 10 feet and 22 crew members.

WORK TO BE DONE

Task Number ONE – Establish Planning Factors,

1a. Clear planning factors must be established for the project. Planning factors shall consider the following (at a minimum):

- Rehab/Reuse/New Construction are considered viable options;
- Ability to successfully implement NEPA policy
- Ability to meet Life Safety Standards.
- Aviation assets will not be considered as part of this FIA;
- Only unit/depot level maintenance will occur on-site;
- Breasting of FRCs is permissible; however it's not ideal or preferred.
- Support functions for 110' WPB and 270' WMEC as phasing in FRCs;
- Spatial requirements in the FIA are based on a crew size of 22;
- Facilities must be environmentally safe from hazardous wastes and materials such as Lead Based Paint (LBP) and Asbestos Contained Materials (ACM), which be encapsulated or removed prior to move in.

1b. The planning factors and requirements will be discussed during the Kick-Off Meeting. The USCG PM will coordinate the meeting, but the contractor will be responsible for preparing the agenda and facilitating. The established/verified planning factors determined from the meeting will be sent electronically to USCG PM.

Task Number TWO - Identify Alternatives

2a. Upon completion of Task ONE the next phase is to identify all possible ranges of alternatives based on FRC requirements and approved planning factors established in Task ONE. The alternatives shall be listed as a title and a brief paragraph description of each. No alternative shall be presented in a manner to make it preferred over any other. Alternatives considered but rejected due to established planning factors should be listed as well as a brief justification for its rejection.

2b. Upon completion of Task 2a, a report shall be sent to the USCG PM. The report shall be generated and distributed in an Adobe PDF document via a web-based document exchange. One week after dissemination of the report, a stakeholder meeting will be held at each site to discuss the possible alternatives.

Task Number THREE –Develop Alternatives

3a. Fully develop all viable alternatives taking findings from task THREE into consideration,

3b. Provide a life cycle cost economic analysis of the alternatives developed in Task 3a.

Task Number FOUR – Written Report

Organize Data from Tasks ONE, TWO, and THREE into a written feasibility impact assessment, format for Coast Guard review for each location. Include back-up information to justify the values used in the economic analysis. Create graphics for support of the major points of the FIA where necessary. Include an executive summary highlighting major points of the findings contained in the FIA document, as well as the preferred alternative.

A 75% FIA document shall be sent electronically to the CEU project manager for review. After all changes are incorporated a "Pre-Final" report shall be sent electronically to all parties identified by CEU Miami. When all comments are received and incorporated the final report will be printed. The final FIA shall be an original unbound version. 5 bound copies shall also be delivered to the CG upon completion of the project. An electronic version capable of being viewed with existing CG shall also be delivered with the final report.

III REQUIREMENTS:

a. PERSONNEL

A/E personnel used for the project must have a broad civil engineering, architectural, or facilities background. They must have at least 3 years experience with inspecting and analyzing shore facilities including industrial buildings and waterfront infrastructures.

b. MEETINGS

1a. Upon award of the task order:

The A/E's Project Manager shall contact (via telephone) the designated point of contact at CEU Miami for introductions, provide background/amplifying information, and coordinate the site visit.

1b. Kick Off Meeting

The A/E shall conduct an on-site analysis to formally kick off the project with USCG stakeholders. This analysis will take a **maximum of 3 days** for each site. Prior to the

site visit the A/E shall provide the USCG PM a detailed schedule outlining the visit. The schedule must be provided to the USCG PM no later than one week prior to the initial site visits.

During the visit the A/E shall validate facility availability and adequacy of potential shore facilities and waterfront assets by; (1) assessing all shore and waterfront facilities via a visual survey; (2) take photographs and video images, do sketches, mark drawings, or conduct other appropriate activity to record and illustrate findings; (3) explore opportunity for new construction; (4) meet with the USCG stakeholders in order to clarify potential constraints.

1c. Progress review

End of Task TWO - An on-site progress meeting will be conducted at each location. The A/E team will be expected to prepare a presentation on work completed to date, the alternatives proposed and future intentions. Following the presentation, a customer listening session will be held to identify any concerns/additional information on the project to date and the alternatives proposed.

IV POINTS OF CONTACT

Point of contact at CEU Miami is LTJG Tracey Richards at (305) 278-6753 or Tracey.Richards@uscg.mil. Primary point of contact at Sector San Juan is LT Lisa Sharkey at (787) 729-4302 or Lisa.M.Sharkey@usc.mil. Primary point of contact for Station Panama City is BMC Charles Durham at (850) 234-2377 or Charles.E.Durham@uscg.mil.

V DELIVERABLES

a. Progress Reports

The following progress reports will be required during the course of this project:

- Planning Factors (electronically)
- Alternative Identification (electronically)
- 75% FIA (electronically and one hard copy for each location)
- Pre-Final FIA (electronically and one hard copy for each location)
- Final FIA (electronic and 4 bound hard copies* for each location)

Final Report will include a CD containing text (in both Word and PDF formats), AutoCAD (.dwg) drawings, ArcGIS (*.mxd) files and affiliated shape files and *.mdb files, raster graphics, all spreadsheets and databases in .xls and .mbd format, digital photographs and all other electronic information used or produced. All submittals are to have color photographs and all PDF files must be searchable.

vi SCHEDULE

The specific schedule for this project will be coordinated with CEU Miami; however the general schedule is as follows:

	Event	Weeks after Notice to Proceed
A.	A/E initial contact with CEU Miami	0
B.	Site Visits	3
C.	Planning Factors Report	7
D.	Alternative Report	10
E.	On Site Progress Meeting	12
F.	75% FIA to CEU PM	17
G.	CG Reviewers Comments	19
H.	Pre-Final FIA	21
I.	CG Review of Pre-Final	22
J.	Final FIA	24
	Total Calendar Days:	**120**