ENVIRONMENTAL ASSESSMENT REPORT

FOR THE DEVELOPMENT OF

THE ST. JOHN MARINA,

CORAL BAY, ST. JOHN, USVI

SUBMITTED TO:

THE DEPARTMENT OF PLANNING AND NATURAL RESOURCES
DIVISION OF COASTAL ZONE MANAGEMENT

U.S. ARMY CORPS OF ENGINEERS

SUBMITTED BY:

THE SUMMER'S END GROUP, LLC

PREPARED BY:

APPLIED TECHNOLOGY & MANAGEMENT, INC.
BIOIMPACT, INC.
CAIRONE AND KAUPP, INC.

APRIL 2014

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Applicant

The Summer's End Group, LLC
Chaliese N. Summers, Managing Member
5000 Estate Enighed, Suite 63
St. John, USVI 00830

Directory of Professional Affiliates

Applied Technology & Management, Inc.
Stephen C. Swann, P.E.
411 Pablo Avenue
Jacksonville Beach, FL 32250
904-249-8009
sswann@appliedtm.com

Bioimpact, Inc.
Amy Dempsey
P.O. Box 132 Kingshill
St. Croix, USVI 00851
340-773-5881
bioimpact@islands.vi

Cairone & Kaupp, Inc.
Joseph A. Mina, P.E.
1118 E. Columbia Avenue
Philadelphia, PA 19125-4206
215-291-2800
jmina@caironkaupp.com

Panamerican Consultants, Inc
Steve James
91 Tillman
Memphis, TN 38111
Phone (901) 545-4733
jamesposse@aol.com

Marvin Berning and Associates
Land Surveyors and Consultants
Harry Gauriloff, RLS
6501 Red Hook Plaza, Suite 201
St. Thomas, USVI 00804
340-775-6557
hgvisurvey@gmail.com

2.0 LOCATION OF PROJECT

The proposed marina project is located in Coral Bay on the eastern end of St. John, U.S. Virgin Islands. The marina consists of a total of 145 slips in two zones, Zone 1 or North Club, with 96 slips of varying dimensions, and Zone 2 or South Club, consisting of 49 slips of varying dimensions, 12 moorings and minor revetment repair and red mangrove planting along the shoreline immediately adjacent to the marina. The project also includes the reorganization and management of mooring in Coral Harbor. The center of The St. John Marina is located at approximately 18°20'36"N, 64°42'50"W.

A Major Land CZM permit application will be submitted in parallel with this Major Water CZM permit application to address the redevelopment of seven parcels of land immediately adjacent to the marina. The Major Land CZM permit application contains a separate Environmental Assessment Report addressing the upland impacts.

The location of The St. John Marina project is depicted in the following figures.

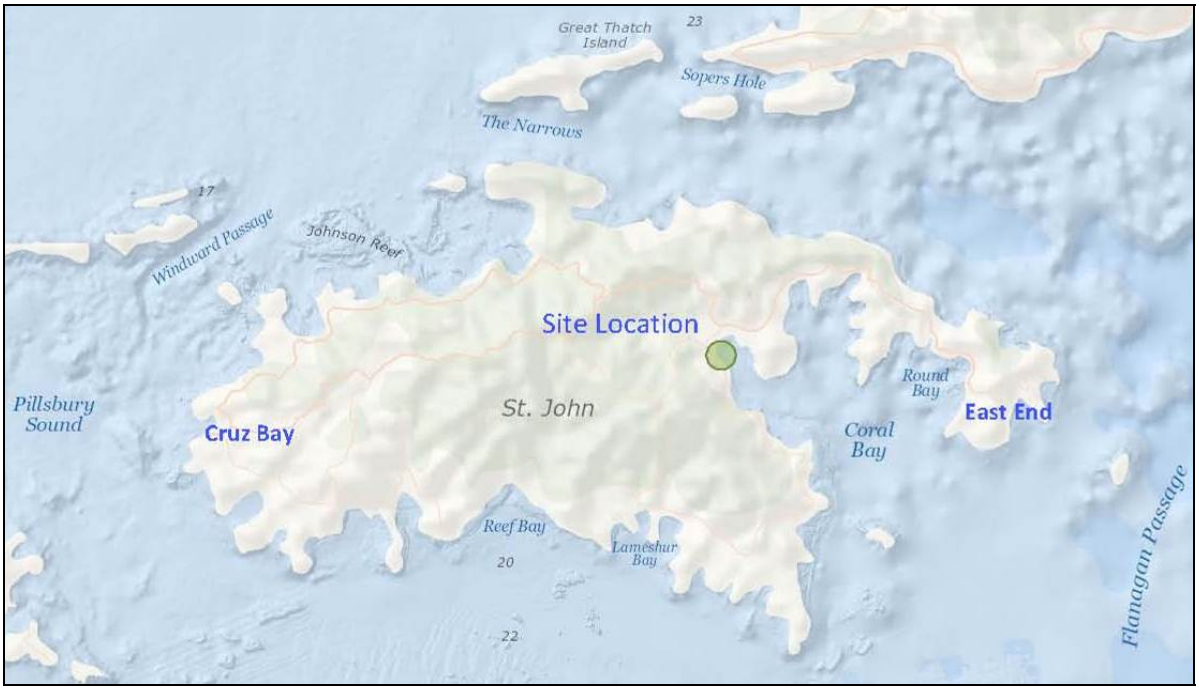


Figure 2.0-1. St. John Location Map

Figure 2.0-2. The St. John Marina Vicinity Map

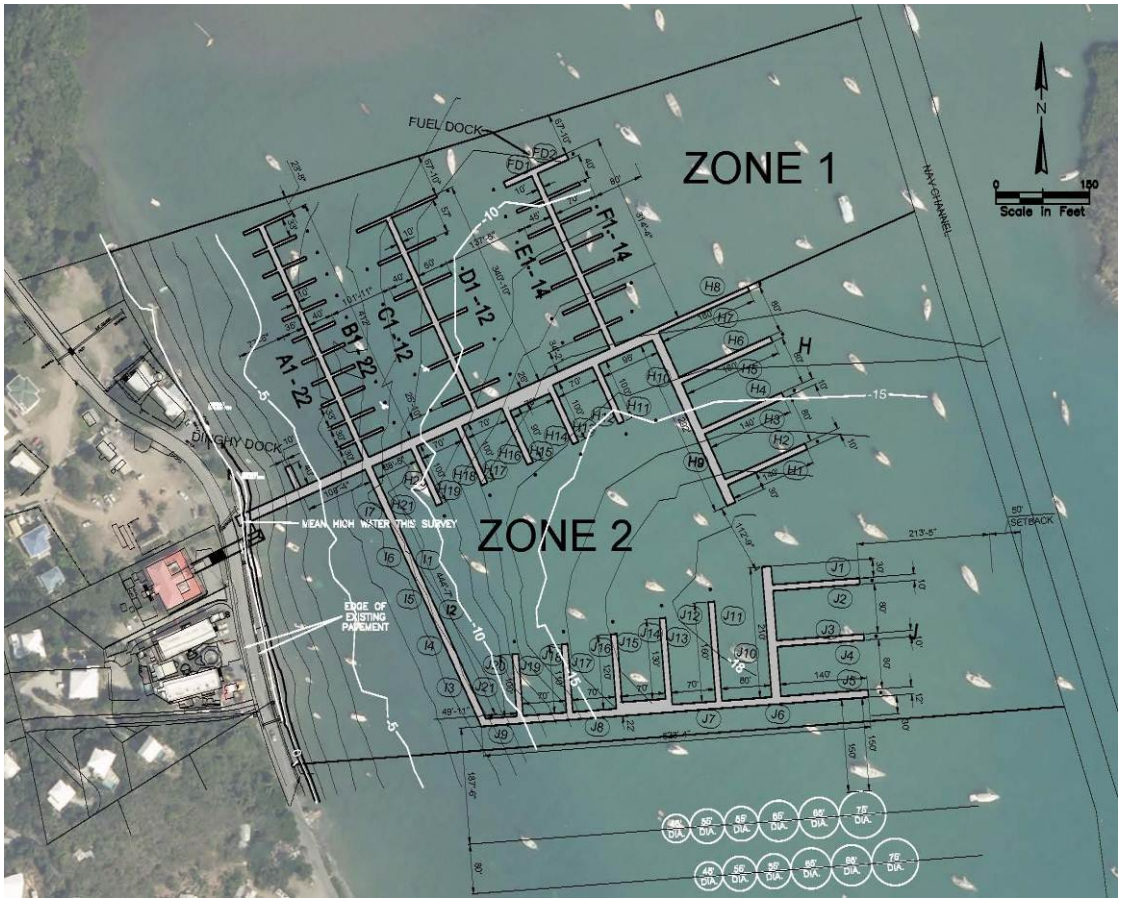


Figure 2.0-3. The St. John Marina Site Map

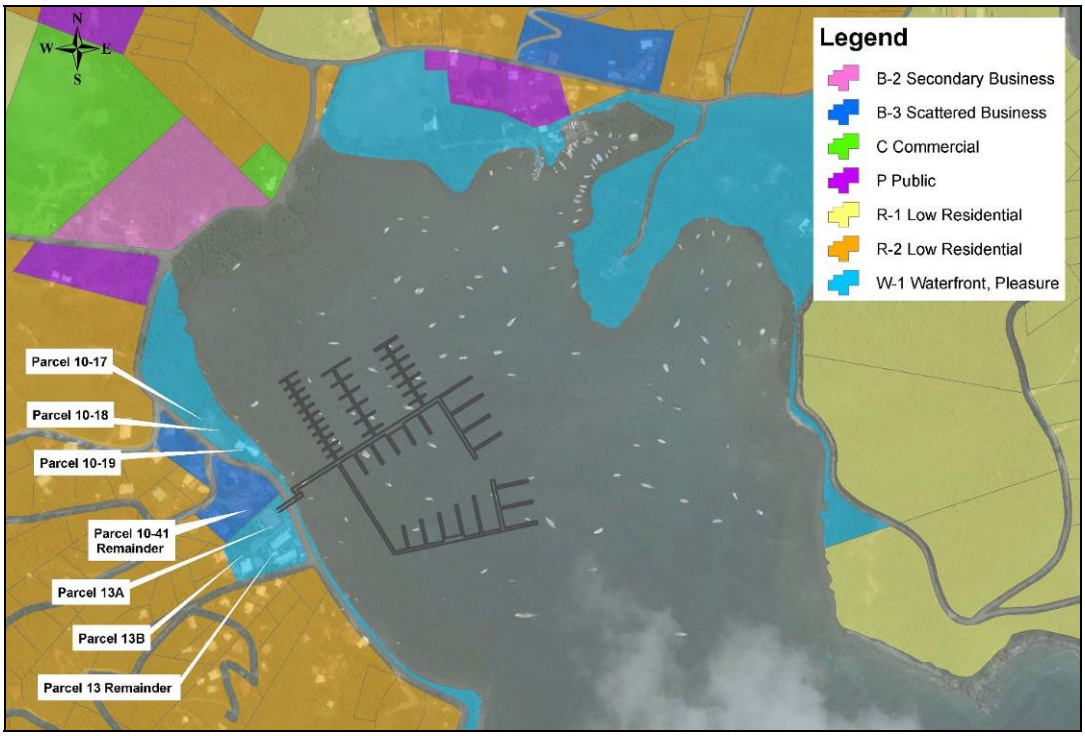


Figure 2.0-4. Agency Review Map

Figure 2.0-5. Adjacent Upland Parcel Map

3.0 ABSTRACT

The Summer's End Group, LLC, is submitting this Environmental Assessment Report (EAR) to support the development of The St. John Marina, a 145-slip fixed-dock marina project located on the western shore of Coral Bay, St. John, U.S. Virgin Islands. This marina fulfills a major need for the local boating community and will provide the transient boating community with secure mooring, dockage, provisioning, fueling and pumpout services, services necessary to sustainably support these communities in Coral Bay. The following are renderings of the proposed marina project.

Figure 3.0-1. Rendering of The St. John Marina – Landside View

Figure 3.0-2. Rendering of The St. John Marina – Waterside View

The marina will also include 12 permanent moorings associated with the marina and the development of a long-term comprehensive mooring program for Coral Bay. This program will provide 75 additional moorings through a public-private partnership with the Department of Planning and Natural Resources (DPNR). A planning level configuration of the long-term mooring field plan is shown below.

Figure 3.0-3. Planning Level Configuration of the Proposed Coral Bay Mooring Field

The St. John Marina will be developed concurrently with an upland redevelopment project on seven generally contiguous parcels in Estate Carolina in Coral Bay and is the subject of a separate Major Land Permit application. PWD Parcel Maps are attached as Appendix A. This upland redevelopment project will provide needed services for the marina, including ample off-street parking, a restaurant, Customs and Border Protection office, a marina office, marina engineering, marina security, crew shower and locker facilities, and apartments to support marina management. No boat maintenance facilities will be associated with this upland redevelopment project.

The development of the marina will create a destination location for the boating community and will increase economic activity throughout the area. In addition to the 145 boat slips and 12 permanent moorings, The St. John Marina project includes facilities for fueling, solid waste disposal, potable water supply and pumpout services for both the marina occupants and the public boating community.

Dock construction will consist primarily of 15-inch coated-steel piles tied together with precast concrete pile caps supporting a grated decking to allow light penetration to the seabed below. Mooring piles will be either 12-inch or 15-inch diameter. Access to the marina will be via a single controlled walkway to the fixed docks. A public dinghy dock will be located midway between the shoreline and the first slip at the marina. The 20-foot by 40-foot dinghy dock will provide a safe docking area and allow ample public access to utilize adjacent businesses in the Coral Bay area. The Zone 1 docks will be a total of about 21,100 square feet (ft^2), Zone 2 will be about 40,800 ft^2 and the main walkway will be a total of about 12,900 ft^2.

The fire suppression and potable water demands for the marina will be met from upland cisterns fed by roof catchments located on the upland areas. Makeup water will be purchased from both the Water and Power Authority (WAPA) and Caneel Bay on an as-needed basis. All water will be stored in existing cisterns, with a distribution piping system installed to serve each slip in the marina. Wastewater generated from the pumpout system, with a publicly accessible pumpout located on the fuel dock and individual connections at the larger boat slips, will be pumped to a 3,000-gallon high-density polyethylene (HDPE) holding tank on the uplands. A local licensed waste hauler will be contracted to empty this tank on an as-needed basis and haul the waste to a permitted wastewater treatment facility for treatment and reuse/disposal.

WAPA will provide electrical power via existing distribution lines through utility conduits built into the docks and will feed two banks of transformers located on the docks. Local telephone and communication companies will supply wireless service and communication links. An emergency generator will provide backup service for emergency pumps and emergency lighting at the marina.

Although significant efforts have been made to eliminate and reduce potential environmental impacts, the construction of this will marina will have several temporary and long-term impacts, primarily associated with elimination of seagrasses in the immediate footprint of the piles and shading from the dock structure and boats moored for a long period of time in the marina. Temporary impacts to upland areas during construction include noise and fugitive dust emissions as well as increased construction-related traffic. Direct impacts during construction in the marine environment include loss of seagrasses in the immediate footprint of the piles, acoustic impacts from pile installation and the potential for turbidity created by construction equipment movement and pile installation. Mitigation plans have been developed to minimize and abate these impacts.

The marina is designed to minimize the long-term impacts of shading on seagrasses as much as possible through the use of fixed docks instead of floating docks, raising of the height of the docks as high as practicable, use of mooring piles to reduce finger pier length and utilizing grated decking. Boat lifts will be used in the furthest landward slips in the marina to raise the boat hulls out of the water and, thus, decrease shading impacts. The furthest landward slips are also offset from the shoreline at least 150 feet to take advantage of the water depth, ranging from 5 to 10 feet, avoiding the need to dredge and providing protection from propeller and propwash impacts to seagrasses between the shoreline and the marina. In addition, the overall layout of the marina avoids any direct impacts to existing corals.

Even with all the minimization efforts undertaken, the dock structure and the small percentage of boats moored long-term at the marina will result in shading impacts. There will also be direct impacts from the placement of the dock support piles. As described in detail in this report, these impacts will be mitigated through the transplanting of seagrasses to adjacent existing damaged areas, planting mangroves along the shoreline for stabilization, and habitat enhancement. The most important mitigation measure will establishing a long-term controlled mooring plan in Coral Bay to eliminate illegally moored and anchored boats and substandard moorings that currently are having a significant impact on seagrasses and water quality. To accomplish this, The Summer's End Group will establish a public-private partnership and work cooperatively with Government and local stakeholders to implement and operate a properly designed and managed mooring system throughout Coral Bay.

In a continued, long-term planning effort, Summer's End Group has formed a Marine Uses Advisory Panel composed of individuals of varied community interest and backgrounds, especially those individuals with knowledge of Coral Bay, the marine environment and boating community. The purpose of this board is to insure, that all concerns and considerations for ongoing and future activities and actions regarding a marina for St. John and the management and protection of St. John's coastal waters are given maximum consideration.

During construction, a turbidity and seagrass monitoring program will be implemented to assure that water quality standards are maintained and submerged aquatic vegetation is protected from construction equipment used to place and drive the supporting piles. In addition, a vibratory hammer will be utilized wherever feasible to reduce potential acoustic impacts and esonification of the bay. Detailed water quality monitoring and mitigation plans for both construction and operational phases are provided with this EAR (Appendix B and C). The St. John Marina intends to meet or exceed clean marina criteria and will strive to achieve Blue Flag status.

This marina project, in conjunction, with the upland redevelopment project, provide much-needed services to the boating community. The Summer's End Group proposes to create a marina of beautiful design and construction and will create a destination that will be a great source of pride for the island of St. John.

Redevelopment of the properties comprising the proposed marina complex will occur in two phases. Phase I will include construction of the marina docks and moorings along with the enhancement of existing commercial business sites at Cocoloba, Shoreline Inn and Island Blues and revive the abandoned Voyages restaurant building. These Phase I improvements for the proposed marina complex include ample off-street parking, a restaurant, Customs and Border Protection office, a marina office, marina engineering, marina security, crew shower and locker facilities, apartments to support marina management, fish and farmers market and proper solid and liquid waste, stormwater and fueling facilities.

Phase II development, which has been preplanned, will be implemented strictly by market demand. This phase proposes an upland development consisting of four new buildings, offering additional retail, restaurant, office, and commercial space and six short-term rental

units. All proposed upland improvements are addressed in a Major Land CZM permit application submitted concurrently with this application.

From a historic standpoint, Coral Bay has a strong maritime culture, having served in the past as St. John's main port and center of commerce. This project will result in the establishment of a fish and farmers market to serve local farmers and fishermen. In addition, The St. John Marina supports community children through its contributions to a myriad of youth organizations including KATS and Using Sport for Social Change.

Even at moderate occupancy, the overall economic impact of this upland redevelopment project in conjunction with the marina is estimated to be an $8,786,500 contribution to the economy of St. John and the U.S. Virgin Islands. For the most part, these are new dollars that were not a part of the local economy prior to the development of this project.

A combined minimum of 90 jobs will be created, with the vast majority of them made available to qualified St. Johnians. To ensure this, a job fair is planned for Coral Bay to provide local residents every opportunity for employment. These jobs, in totality, equate to an estimated labor income of $3,046,000. This is perhaps the greatest value added by this upland redevelopment project and The St. John Marina.

The proposed project is consistent with existing zoning and the project has been designed to meet all applicable Virgin Islands Coastal Zone Management rules and regulations. No rezoning will be required. All proposed buildings shall meet or exceed current building codes and construction activities shall be executed to minimize impact on the environment as detailed in the attached benthic mitigation and monitoring plans (Appendix C and B).

This permit application includes all waterside infrastructure improvements associated with the construction and operation of The St. John Marina.

4.0 STATEMENT OF OBJECTIVES SOUGHT BY THE PROPOSED PROJECT

The objective of this application is to obtain a Major Water Coastal Zone Management (CZM) permit for the construction of a world-class destination marina facility, accommodating both local and transient boats of all sizes in Coral Bay, St. John. The primary objective is to create a premier marina development to serve local needs and to attract private and charter yachts from around the world and establish a properly constructed mooring field for Coral Harbor through a partnership with DPNR.

The workhorse of the USVI economy is tourism. As an economic force, tourism offers the additional benefit of bringing to a destination "new" dollars that did not exist in the local economy previously. The St. John Marina proposed to create much needed jobs and wages for Virgin Islanders, while bringing in millions of new dollars to the territory from recreational boaters and cruisers who previously avoided St. John because of the lack of available access. New spending dollars equate to new tax revenues for the Virgin Islands.

In partnership with the DPNR, The St. John Marina developers were awarded a $1.3 million Boating Infrastructure Grant (BIG) through the U.S. Department of Fish and Wildlife Service's (USFWS's) Wildlife and Sport Fishing Restoration Program in their effort to encourage recreational boating through the construction, renovation and maintenance of facilities for transient boaters. The award letter is attached as Appendix D. This financial endorsement by USFWS highlights the significant need for accessible marine access to St. John.

The marine facility will provide the amenities that boat owners require, including a fuel dock and in-slip fueling for the larger vessels, power, water, provisioning and pumpout services, and will provide a significant new product for the island of St. John to market to local, United States and international markets. This permit application will complement a separate application for a Major CZM Land permit for a commercial hub providing retail and ancillary support businesses adjacent to The St. John Marina.

The island of St. John is the only major Caribbean island in the region without a marina. The proposed marina site, in Coral Bay on the eastern end of St. John, is located in a well-

protected embayment and is in ease reach of the British Virgin Islands. The marina will serve as a center for economic activity within the Coral Bay area.

The St. John Marina is ideally located for several reasons. Uncontrolled mooring within the bay and vicinity with limited facilities to serve boaters has contributed to seagrass damage, trash accumulation and water quality degradation. Construction of this marina and the associated upland redevelopment will provide a safe docking facility with necessary services to properly support the boating community, both local boaters and transients.

Additionally, the proposed public-private partnership to establish a properly designed and managed mooring field in Coral Harbor will provide significant long-term positive environmental benefits.

The applicant has undertaken steps to minimize environmental impacts, and mitigate for any unavoidable environmental impacts.

The proposed project is anticipated to have a positive socio-economic impact by providing increased tax revenues beyond its demand for services provided by the Government, thus contributing positively to the Island of St. John, the local Coral Bay business community and the overall economy of the U.S. Virgin Islands.

The goals of this project also include providing employment opportunities to both skilled and unskilled labor during and after construction, providing job training opportunities and supporting and enhancing local retail business opportunities.

5.0 DESCRIPTION OF PROJECT

5.01 Summary of Proposed Activity

The Summer's End Group, LLC proposes to construct a 145-wetslip, fixed-dock marina with services including wastewater pumpout, proper fueling, and other amenities for marina guests and the boating public. A separate Major Land CZM Permit Application addresses the upgrade and renovation of existing buildings and property, including a land-based U.S. Customs facility, retail, restaurant, parking, and other services. There are no existing marina facilities at this location and the only demolition will involve relocating or removing moorings within the marina footprint.

The marina is proposing to provide electrical power, water, telephone, cable television and internet access to each of the slips. A fuel dock, available to both marina customers and the public, and limited in-slip fueling will be installed and provide for high-speed fueling serviced by upland aboveground fuel storage tanks with projected capacities of 45,000 gallons of diesel and 5,000 gallons of gasoline. All components of the fueling system will be constructed in compliance with U.S. Environmental Protection Agency (USEPA) and DPNR requirements. Refilling the fuel tanks will normally occur via barge. The fuel dock will also contain a pumpout facility, available to both marina customers and the public, for pumping wastewater collected from the boats to a 3,000-gallon upland storage tank. This wastewater collected in the tank will be emptied via land-based contract hauler for treatment at a fully licensed wastewater treatment facility and will not be treated onsite. The larger slips at the marina, primarily in Zone 2, will have the capabilities for in-slip fueling and pumpout services.

The steel-pile-supported docks will have grated decking of about 21,100 square feet (ft^2) in Zone 1, and about 40,800 ft^2 in Zone 2, with main walkway of about 12,900 ft^2 as shown on the U.S. Army Corps of Engineers (USACE) permit drawings (Appendix E). A small covered pavilion area will be located at the shoreline to provide for shade and an area to retreat from the weather. No dredging is proposed as part of this permit application.

5.01a Purpose of Project

The purpose of this project is to develop a world-class destination marina facility in Coral Bay, St. John, to accommodate both local and transient boats of all sizes. The primary

objective is to create a premier marina development to serve local needs and to attract private and charter yachts from around the world. In addition to the marina, the developers of The St. John Marina are working with DPNR to establish a regulated mooring field in Coral Bay through a public-private partnership. This mooring field, is proposed to have 75 moorings, would minimize current environmental impacts resulting from unregulated mooring in the Coral Bay area. DPNR has signed a Letter of Intent to secure a formal agreement with The Summer's End Group to establish this mooring field, see DPNR Letter of Intent attached as Appendix F.

5.01b Presence and Location of Critical Areas

Coral Bay is an area of particular concern and is delineated as such by the Virgin Islands government. Formal management plans have never been finalized for the area. The area has also been identified by the federal government as an area of interest and significant funding has been invested in improving stormwater runoff quality which impacts the bay.

The project is located in Coral Harbor, and Coral Harbor is designated as a mooring area by the Department of Planning and Natural Resources. The area is a heavily used mooring and anchoring area and only a portion of the moorings are legal.

The bay is well protected due to the constriction of its opening and its location in the upper bay. This allows for great protection during storms but results in restricted circulation and has led to a decrease in water quality with the increase in development in the watershed and boating activities in the bay.

The bay is surrounded by mangroves that provide fish habitat and a nursery ground. The bay contains dense seagrass beds, submerged aquatic vegetation (SAV), and therefore is essential fish habitat. The seagrass beds are also forage habitat for endangered sea turtle species and endangered sea turtles have been noted foraging in the bay. The bay is known as a black tip, lemon and nurse shark nursery and bull sharks are known to enter the bay to prey on the other juvenile shark species.

There are endangered coral species in Coral Bay, but not with Coral Harbor proper. Elkhorn (*Acropora palmata*) and staghorn (*Acropora cervicornis*) corals were listed as federally endangered under the Endangered Species Act (ESA) in 2006. Subsequently, the waters

surrounding St. John, including Coral Bay, have been proposed to be designated as Critical Habitat for elkhorn coral (50 CFR Parts 223 and 226, Vol. 73, No. 25, February 6, 2008). A single live *Acropora palmata* colony was located offshore of Harbor Point on the far side of Coral Harbor. This coral lies approximately 1,500' from the project area.

Seven corals have also been nominated for federal listing as threatened or endangered under ESA and it is probable that these species will become listed during the summer of 2014. These species include: *Agaricia lamarcki, Dendrogyra cylindrus, Dichocoenia stokesii, Montastrea annularis, Montastrea faveolata, Montastrea franksi* and *Mycetophyllia ferox*. *Montastrea annularis* is present in the nearshore environment on the far side of the harbor and small colonies are present on the hard bottom to the east of the proposed project. The location of these species is shown in the figure below.

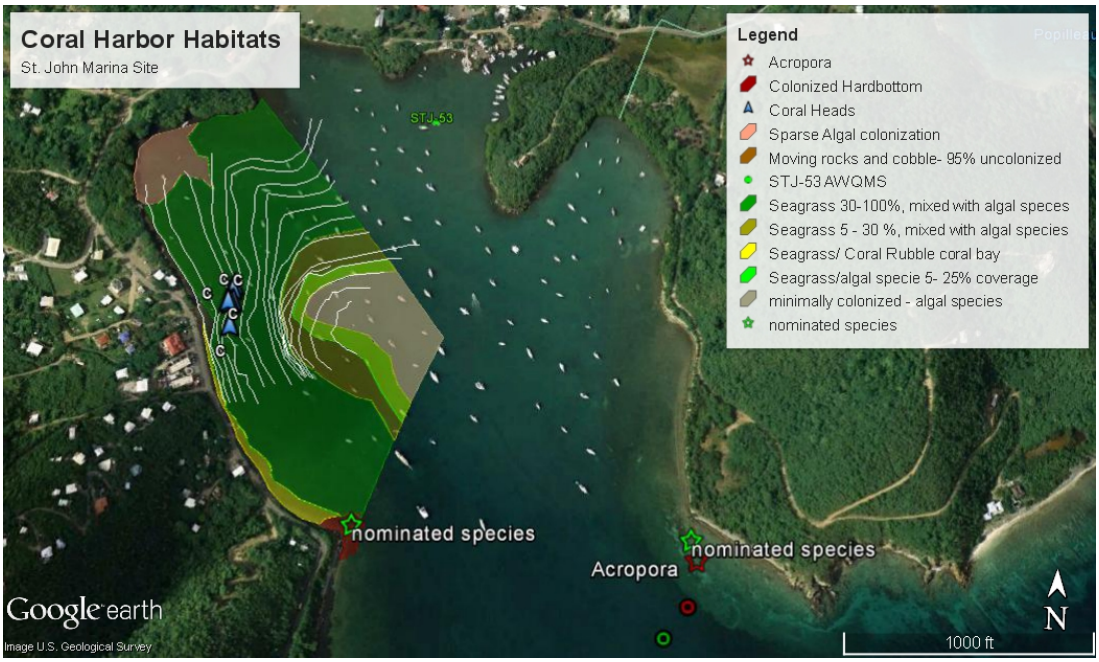


Figure 5.01b-1. Benthic Habitat Map with Location of Listed and Nominated T&E Species

The upland area may have once been a salt pond and wetland but this area was filled prior to any development in the area and there are no wetlands currently on the subject property. The drainage or ghut way across the adjacent upland property does meet the bed and bank criteria and therefore is a USACE jurisdictional area and will require a permit for any alteration. There are no terrestrial endangered species on the upland parcels and no species uses the upland area as an exclusive habitat.

The project proposes direct impact to the marine environment during construction by the driving of piles. Post construction the project will impact the benthic community through shading of the dock structure and associated boats, and boat impacts due to prop wash. Marine water quality may be impacted through suspended sediments, sediments suspended by prop wash, discharges from vessels, and upland runoff.

The project will be directly impacting approximately 2500 ft^2 due to the placement of approximately 1,333 piles ranging from 12-17" in diameters. Due to wave turbulence, there will also be some minimal seagrass loss surrounding the piles. The dock itself occupies 1.42 acres of which 181 ft^2 will be over areas with seagrass and coral rubble, 1,567 ft^2 over area of sparse seagrass, 41,546.37 ft^2 over areas with 30%-100% seagrass coverage, 27,072 ft^2 over areas with 5-30% seagrass and algae coverage and 4,717 ft^2 over areas with 5% seagrass/algae coverage. The dock will result in a maximum shading impact of 1.42 acres. With the use of the grated decking it is estimated that there will be an approximately 46% seagrass survival rate based on NMFS studies (Landry, 2008), resulting in maximum of 0.8 acre seagrass loss due to shading from the marina decking.

To minimize the direct impact of pilings the seagrass within the piling footprints will be transplanted. The transplant plugs will be used to seed the area in the northwest corner of the bay that has been impacted by the deposition of sediment from years of uncontrolled stormwater runoff.

The boats at the dock will shade another 5.7 acres at maximum occupancy. The slips will be occupied on average 47% of the year. As seagrasses are reported to be impacted after approximately two weeks of shading, this will result in some loss of seagrass with in the marina due to vessel shading. This will probably manifest itself as a loss of density as well as denuding of some areas, especially around larger permanently moored boats (if any). It is estimated that as much as 2 acres of seagrass may be lost.

The project also has the potential of impacting SAV within the approximate 8 acres project area due to temporary shading by construction vessels and potential direct construction impact. The direct construction impact will be related to barge movements and spuds and will be minimized through monitoring and delineating spudding and anchoring areas. Barge

shading will be mitigated through the periodic relocation of barges to prevent shading impacts. The surrounding SAV could also be impacted by construction related turbidity impacts. This will be abated by sediment and siltation control through detailed planning, training and stringent monitoring.

Sea turtles may also be impacted by vessels during construction. Therefore, during construction of the project in order to minimize and abate impacts to the listed turtle species, NMFS's construction conditions will be followed.

To avoid and minimize injury or death to marine mammals and sea turtles, the following NMFS measures from the Vessel Strike Avoidance Measures and Reporting for Mariners will be implemented by all vessels associated with the project construction. The following information and signage will be placed in highly visible locations on the dock:

1. *Vessel operators and crews should maintain a vigilant watch for marine mammals and sea turtles to avoid striking sighted protected species.*
2. *When whales are sighted, maintain a distance of 100 yards or greater between the whale and the vessel.*
3. *When sea turtles or small cetaceans are sighted, attempt to maintain a distance of 50 yards or greater between the animal and the vessel whenever possible.*
4. *When small cetaceans are sighted while a vessel is underway (e.g., bow-riding), attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area.*
5. *Reduce vessel speed to 10 knots or less when mother/calf pairs, groups, or large assemblages of cetaceans are observed near an underway vessel, when safety permits. A single cetacean at the surface may indicate the presence of submerged animals in the vicinity; therefore, prudent precautionary measures should always be exercised. The vessel should attempt to route around the animals, maintaining a minimum distance of 100 yards whenever possible.*
6. *Whales may surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel and when safety permits, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.*

Sound in water moves four times faster than in air, and attenuation (sound dissipation) is much lower in water than air. Esonification of the marine environment can have a negative impact on sea turtles, marine mammals and fish. To minimize noise impacts to these species a vibratory hammer will be used to drive piles wherever possible. Vibratory hammers are recommended by NOAA as that they have a lower acoustic impact.

The project will have the potential to impact *Acropora* and the nominated species through vessel strikes. To minimize this impact the applicant will be placing informational buoys delineating the shallow hard bottom areas within Coral Harbor and will be providing information signage on the dock advising mariners of avoiding shallow reefs while in transit and to avoid anchoring in area of coral and seagrass.

5.01c Method of Construction

There is no existing marina at this location, therefore, no demolition is proposed. In preparation for construction, existing moorings within the marina footprint will be relocated or removed as appropriate. Any moorings that will be relocated will be done so with assurances that relocated moorings will be permitted and properly designed to have no impacts to seagrass.

The marina will be primarily constructed from the waterside using barge-mounted equipment to drive the dock and mooring piles with a vibratory hammer, where possible, and place manufactured deck sections. Construction is expected to occur during daylight hours Monday through Saturday. Minor repair and replacement of the existing revetment along the shoreline will be conducted from the uplands, and planting of fringing red mangroves in front of the revetment will be done by hand.

5.01d Provisions to Limit Site Disturbance

The biggest concern during construction is from barge spuds, piling templates placed on the bottom and propeller scarring from workboats and tugs. To minimize these disturbances, all contractors working over water on this site will be required to adhere to a construction management plan that will specifically stipulate how construction operations are to be carried out over sensitive areas within the project limits.

All contractors and crews working on the project will receive orientation stressing the importance of protecting and avoiding critical resources on and adjacent to the marina site. Contractors and crews will be trained on best management practices that will employed during construction. These practices will include daily inspections, water quality testing, installation of floating turbidity screens, use of vibrator hammer whenever possible for pile driving, etc.

The shoreline revetment rehabilitation work and planting of red mangroves is not expected to result in any significant site disturbances.

5.01e Erosion Sediment Control Devices to be Implemented

Floating turbidity screens will be situated during installation of the marina pilings, and a water quality monitoring plan will be implemented as well. The purpose of the water quality monitoring program will be to assure that turbidity standards are met at all times. If sampling indicates that turbidity standards are not being met, adjustments to the turbidity screens and/or work stoppages can be implemented until water quality standards are met. The concurrently proposed upland redevelopment project will have a separate sediment and erosion control plan that will require silt fence along all project boundaries and at the mouth of any drainage ditches or outfall pipes.

5.0lf Schedule for Earth Change and Implementation of Erosion and Sediment Control Measures

Before Construction:

1. Install upland silt fencing
2. Provide contractor training and orientation with respect to sediment and turbidity controls and expectations. Training will also include implementation of the construction management and water quality monitoring plans as well as instructions on proper placement of turbidity screens.

During Construction:

1. Continual shifting of turbidity curtains to remain within the work area.
2. The water quality monitoring plan will remain in effect throughout the project.

5.01g Maintenance of Erosion and Sediment Control Measures

Silt fencing and floating turbidity screens will be inspected throughout the day as a requirement of the construction management plan. The prime contractor will be charged with implementing this schedule and will be required to conduct the water quality sampling and maintain a log of all inspections and water quality results. The logbook will document any exceedances in water quality standards and corrective actions taken. The prime contractor will be required to post DPNR contact information at the project site. Upland

erosion and sediment control measures, such as maintenance of silt fencing, will be addressed under a Stormwater Pollution Prevention Plan developed as a requirement of the Major Land Permit for the upland redevelopment.

5.01h Method Wastewater Collection and Disposal

The only source of wastewater at the marina will be the pumpout stations. The vacuum assisted pumpout facility will route collected wastewater from the boats through an under-dock 4-inch conduit to a 3,000-gallon holding tank located on the uplands. The holding tank will be emptied as needed by a licensed waste hauler and taken to a permitted wastewater treatment facility for treatment and disposal.

The pumpout facility at the fuel dock will be available to all marina patrons as well as the general public. The larger slips will have in-slip pumpout connection available. Signage will direct boaters that utilizing the pumpout facility is required. Virgin Island law specifically states that it is illegal to dump holding tanks within 3 miles of the shoreline. A portable pumpout cart with an integrated storage tank will also be available for use.

5.01i Potable Water Supply

Both potable water and fire suppression demands for the marina will be met from upland cisterns fed by roof catchments located on the upland area of this project. Makeup water will be purchased from both the Water and Power Authority (WAPA) and Caneel Bay on an as-needed basis. Caneel Bay has committed to work with the marina to provide a portion of the projected water demands of this project, if needed. All water will be stored in existing cisterns, with a distribution piping system installed to serve each slip in the marina. A more detailed description of the potable water treatment system is provided in the associated Major Land CZM Permit application.

5.01j Additional Project Permits Required and Agency Cooperation

The applicant is submitting for a new Major Water CZM Permit. The following is a list of the applications/permits that may be required prior to construction.

Submerged Lands Lease

The Summer's End Group, LLC understands that this CZM Application is made to enter into a submerged Land Lease Agreement covering the marina footprint. Such an agreement will

be made formal by a favorable ruling by CZM and the Virgin Island Legislature and cannot be approved prior to CZM approval. It is understood that a submerged land agreement is drafted by CZM after the Commission has approved a project. All parties must agree with the document and provide signatures and then it is forward to the Government House for review and approval. The document is sent to the Legislature for final approval.

U.S. Army Corps of Engineers

All Major Water Permits are simultaneous applications made to USACE and CZM. The USACE application process runs parallel to that of CZM, with USACE approval being subject to CZM approval and the ratification of Submerged Land Lease by USVI Legislature. The applicant has consulted with the USACE and other federal commenting agencies including USFWS and NMFS. An interagency meeting was held recently with these entities to review the area of impact and discuss the project in general.

Territorial Pollutant Discharge Elimination System Permit

The permit will be applied for in parallel with the associated Major Land Application for the operations and discharge of the proposed upland wastewater treatment facility (does not serve the marina) and the potable water treatment plant, if necessary.

Terminal Facility License

This will address the projected 45,000 gallons of diesel fuel and 5,000 gallons of gasoline aboveground storage tanks and pumping of fuel. The subcontracted fuel supplier will apply for the license. The marine Spill Prevention Control and Countermeasure (SPCC) plan will be further developed to include the specific requirements of this permit. The applicant is requesting approval from CZM for the ability to provide fuel at the docks. The vendor that will supply the fuel (one of the major USVI fuel suppliers) historically provides the necessary technical information (construction details, leak detection equipment, specifications, drawings and SPCC plan) to the Territorial Division of Environmental Protection (DEP). The application to DEP will allow operation of a terminal facility and the applicant will comply with all local and federal permits for fuel storage and handling. A draft SPCC plan is attached as Appendix G.

Auxiliary Generator Permit

The applicant will apply for this permit after the auxiliary generators have been sized and selected.

Blue Flag/Clean Marina Program

The applicant will voluntarily participate in the Blue Flag or other Clean Marina Program as appropriate to help assure that this marina is operated in an environmentally sustainable manner.

5.02 Site Plans - USACE Permit Drawings and DPNR Drawings

USACE permit drawings are attached to this document in Appendix E.

5.03 Project Work Plan

The project work plan and schedule will commence upon issuance of the CZM permit, submerged lands lease and USACE permit. Completion of the design will be completed while these permit applications are being processed and it is anticipated that the construction contract will be awarded upon receipt of the necessary approvals. Construction will commence as soon as possible after award of the contract. The marina construction is anticipated to require a total of 12 months, depending on weather conditions. The installation of dock and mooring piles, precast pile bents and precast deck sections will require six months. An additional 6 months will be required to finish out the marina and will included deck grating, utilities, hardware, fueling and pumpout system, etc.

6.0 ECOLOGICAL SETTING AND PROBABLE PROJECT IMPACT ON NATURAL ENVIRONMENT

6.01 Climate and Weather

Prevailing Winds

The Virgin Islands lie in the "Easterlies" or "Trade Winds" which traverse the southern part of the "Bermuda High" pressure area, thus the predominant winds are usually from the east-northeast and east (IRF, 1977). These trade winds vary seasonally and are broadly divided into four seasonal modes: December-February, March-May, June-August and September-November. Below are the characteristics of these modes as taken from Marine Environments of the Virgin Islands Technical Supplement No. 1 (IRF, 1977). Figure 6.01-1 presents summary wind data from Cruz Bay at St. John.

December - February - During the winter the trade winds reach a maximum and blow with great regularity from the east-northeast. Wind speeds range from eleven to twenty-one knots about sixty percent of the time in January. This is a period when the Bermuda High is intensified with only nominal compensation pressure changes in the Equatorial Trough. The trade winds during this period are interrupted by "Northerners" or "Christmas Winds" that blow more than twenty knots from a northerly direction in gusts from one to three days. Such outbreaks average about thirty each year. They are created by strengthening of high-pressure cells over the North American continent, which, in turn, allow weak cold fronts to move southeastward over the entire Caribbean region. These storms are accompanied by intermittent rains, clouds and low visibility. The project site is protected from waves created by these systems due to its location in inner Coral Harbor. There is limited fetch to allow these winds to develop waves.

March - May - During the spring, the trade winds are reduced in speed and blow mainly from the east. Winds exceed twenty knots only thirteen percent of the time in April. The change in speed and direction is the result of a decrease of the Equatorial Trough. These winds will have minor impact by waves attenuated into the harbor.

June - August - Trade winds reach a secondary maximum during this period and blow predominantly from the east to east-southeast. Speeds exceed twenty knots twenty-three percent of the time during July. The trend for increasing winds results from the

strengthening of the Bermuda High and a concurrent lowering of the pressure in the Equatorial Trough. Trade winds during this period are interrupted by occasional hurricanes that can generate wave conditions that can impact the project area.

September - November - During the fall, winds blow mainly from the east or southeast and speeds reach an annual minimum. Only seven percent of the winds exceed twenty knots in October. The low wind speeds result from a decrease in the Equatorial Trough. During this period, especially during late August through mid-October, the normal trade wind regime is often broken down by easterly waves, tropical storms and hurricanes that can generate wave conditions that can impact the project area.

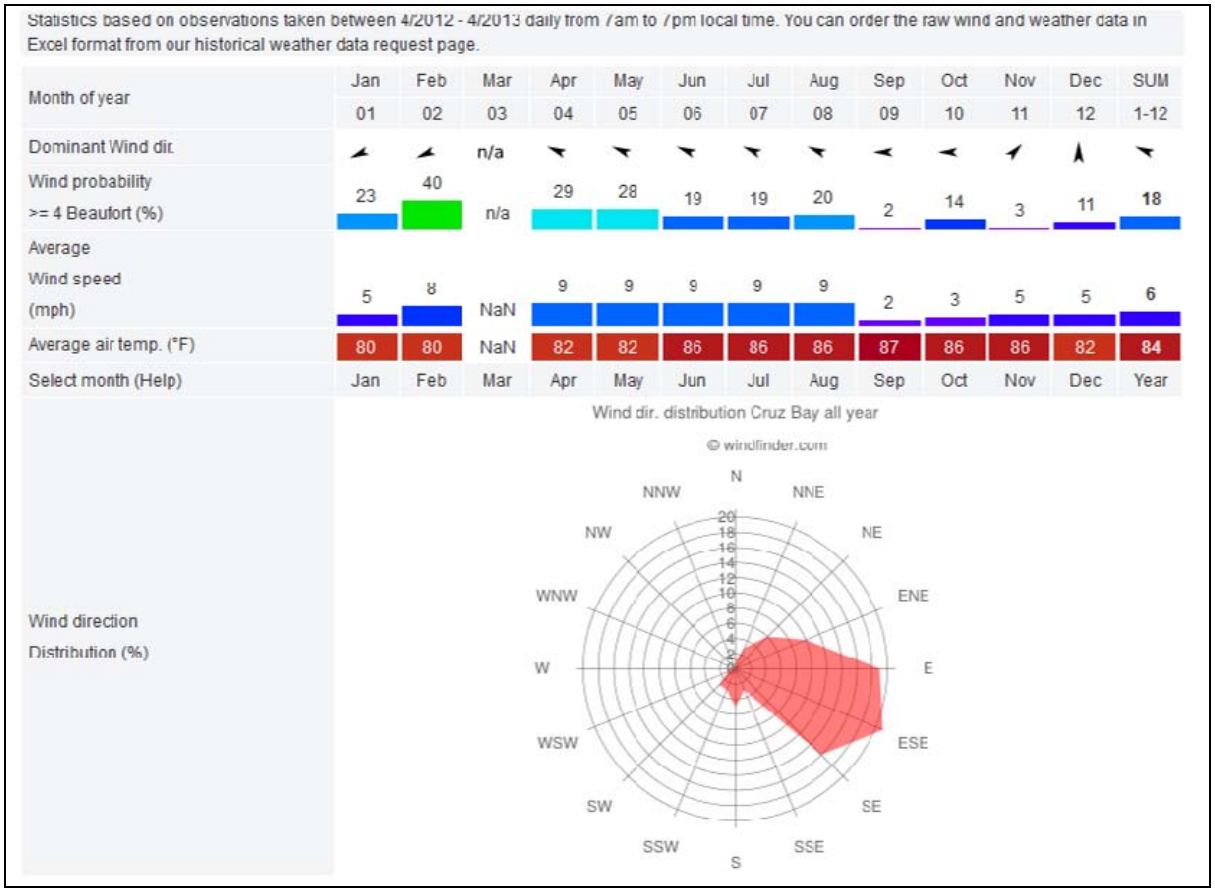


Figure 6.01-1. St. John Prevailing Winds "Wind & Weather Statistics Cruz Bay." Windfinder, 04-13

Storm and Hurricanes

There are numerous disturbances during the year, especially squalls and thunderstorms. These occur most frequently during the summer, lasting only a few hours and causing no pronounced change in the trade winds.

A tropical cyclone whose winds exceed 74 miles per hour is termed a hurricane in the northern hemisphere, and can significant affect the area. These hurricanes occur most frequently between August and mid-October (Figure 6.01-2) with their peak activity occurring in September.

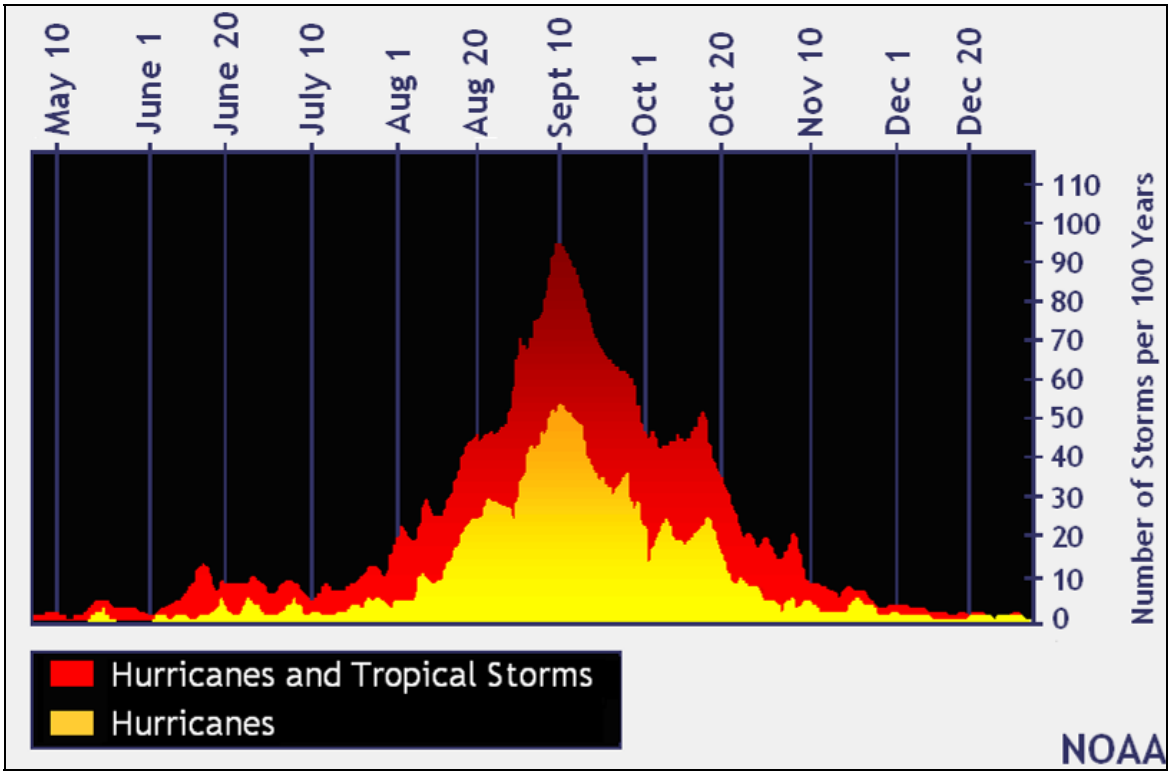


Figure 6.01-2. Tropical Storm and Hurricane Occurrences in the Atlantic, NHC, 31 May 2013

The annual probability of a cyclone is one in sixteen years (Bowden, 1974). Hurricanes have resulted in the erosion of the shoreline in the project area and many of the sunken and derelict vessels within Coral Harbor are the results of the passage of hurricanes. The average cumulative number of tropical systems impacting the USVI is presented in Figure 6.01-3.

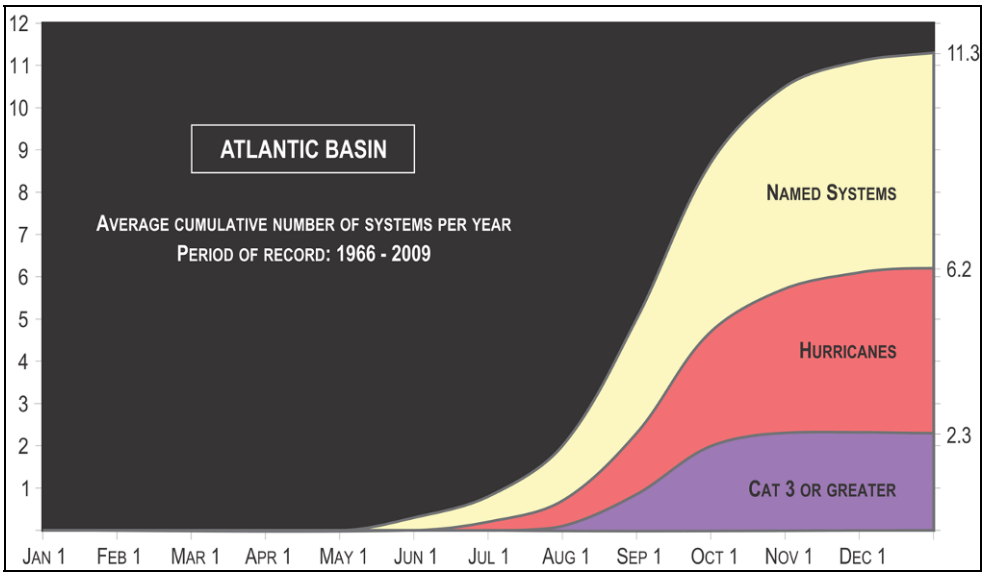


Figure 6.01-3. Tropical Cyclone Frequency in the USVI, NHC, 31 May 2013

Climate

The average annual rainfall on St. John is approximately 45 inches, ranging from 35 inches toward the eastern end of the island to more than 55 inches at the higher elevation to the west. Rainfall usually occurs in brief, intense showers of less than a few tenths of an inch and major rainfall events are associated with weather systems (USGS 1998). The Virgin Islands have no sharply defined wet season. The wettest period generally is from September to November and the driest period is from January to June (USGS 1998). The Coral Bay area receives between 39 and 40 inches of rainfall annually. The closest weather station operated by the Southeast Regional Climate Center is the East End Station (672551), Data from January 1, 1972 and April 30, 2012 are found in the following tables.

Table 6.01-1. Summary of Precipitation Data – East End, USVI (672551)
Period of Record: 1/ 1/1972 to 4/30/2012

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Total Precipitation (in.)	2.34	1.66	1.44	2.94	3.52	2.26	2.91	3.72	5.00	4.86	5.89	3.23	39.78

Percent of possible observations for period of record - Precipitation: 96.8%

Source: http://www.sercc.com/cgi-bin/sercc/cliMAIN.pl?vi2551

Table 6.01-2. Monthly Precipitation Data – East End, USVI (672551)

From Year=1972 To Year=2012														
Station:(672551) EAST END														
Averages Daily Extremes														
	Precipitation											Total Snowfall		
	Mean	High	Year	Low	Year	1 Day Max.		>= 0.01 in.	>= 0.10 in.	>= 0.50 in.	>= 1.00 in.	Mean	High	Year
	in.	in.	-	in.	-	in.	dd/yyyy or yyyymmdd	# Days	# Days	# Days	# Days	in.	in.	-
January	2.34	4.68	105	0.69	85	2.92	06/1992	16	6	1	0	0.0	0.0	72
February	1.66	4.74	72	0.52	110	1.91	27/1972	13	5	1	0	0.0	0.0	72
March	1.44	3.21	72	0.01	105	1.48	22/1972	12	4	0	0	0.0	0.0	72
April	2.94	13.71	83	0.07	95	9.50	19/1983	11	5	1	1	0.0	0.0	72
May	3.52	15.33	79	0.30	94	3.95	04/2009	14	7	2	1	0.0	0.0	72
June	2.26	6.94	110	0.13	85	2.76	20/1993	13	5	1	0	0.0	0.0	72
July	2.91	10.99	110	1.09	94	4.55	20/2010	16	7	1	1	0.0	0.0	72
August	3.72	7.98	111	1.18	81	4.95	21/2011	16	8	2	1	0.0	0.0	72
September	5.00	16.39	79	1.55	107	8.92	05/1979	17	9	2	1	0.0	0.0	72
October	4.86	12.77	110	0.90	103	6.10	05/2010	17	10	3	1	0.0	0.0	72
November	5.89	17.05	77	1.50	95	6.30	24/1979	18	10	3	2	0.0	0.0	72
December	3.23	8.85	81	0.34	110	2.78	10/1972	16	7	1	1	0.0	0.0	72
Annual	39.78	64.17	79	22.10	94	9.50	19830419	177	83	20	7	0.0	0.0	72
Winter	7.23	14.47	82	2.53	111	2.92	19920106	45	19	3	1	0.0	0.0	73
Spring	7.90	21.26	83	1.59	95	9.50	19830419	36	16	4	1	0.0	0.0	72
Summer	8.89	22.29	110	3.79	94	4.95	20110821	44	20	4	2	0.0	0.0	72
Fall	15.75	32.13	77	9.07	102	8.92	19790905	52	28	8	4	0.0	0.0	72

Table updated on May 22,

For monthly and annual means, thresholds, and sums:

Months with 5 or more missing days are not considered

Years with 1 or more missing months are not considered

Seasons are climatological not calendar seasons

Winter = Dec., Jan., and Feb. Spring = Mar., Apr., and May

Summer = Jun., Jul., and Aug. Fall = Sep., Oct., and Nov.

Source: http://www.sercc.com/cgi-bin/sercc/cliMAIN.pl?vi2551

The difference between the mean temperatures of the coolest and warmest month is only 5°F to 7°F. The highest temperatures August or September and the lowest are in January or February. The highest average daytime temperature in the warmest months is about 88°F,

and in the coolest months is in the low 80s. Nighttime lows are usually in the mid-70s during the warmer months and in the high 60s during the cooler months (USGS 1998). In general, air temperature in the Virgin Islands ranges between 77°F and 85°F. Average air temperature data is included in Figure 6.01-1.

6.02 Landform, Geology, Soils and Historic Land Use

Geology of St. John

The rocks of St. John, located near the eastern end of the Greater Antilles and near the northeastern corner of the Caribbean plate, consist of Cretaceous basalt, andesite, keratophyre, their volcaniclastic and hypabyssal intrusive equivalents and minor calcareous rocks and chert. These rocks were intruded by Tertiary mafic dikes and tonalitic plutons. The oldest rocks formed in an extensional oceanic environment characterized by abundant keratophyre and sheeted dikes. Subduction-related volcanism of the east-west-trending marine Greater Antilles volcanic arc began on St. John near the transition between the Early and Late Cretaceous. South-directed compression, probably caused by the initial collision between the Greater Antilles arc of the Caribbean plate and the Bahama platform of the North American plate, deformed the Cretaceous strata into east-west-trending folds with axial-plane cleavage. Late Eocene tonalitic intrusions, part of the Greater Antilles arc magmatism, produced a contact aureole that is as much as two kilometers wide and that partly annealed the axial-plane cleavage. East-west compression, possibly related to the relative eastward transport of the Caribbean plate in response to the beginning of spreading at the Cayman Trough, produced long-wavelength, low-amplitude folds whose axes plunge gently north and warp the earlier folds. A broad north-plunging syncline-anticline pair occupies most of St. John. The last tectonic event affecting St. John is recorded by a series of post-late Eocene sinistral strike-slip faults related to the early stages of spreading at the Cayman Trough spreading center and sinistral strike-slip accommodation near the northern border of the Caribbean plate. Central St. John is occupied by a rhomb horst bounded by two of these sinistral faults. Unlike other parts of the Greater Antilles, evidence for recent tectonic movement has not been observed on St. John. The terrain is steep and highly dissected with >80% of the island having slopes exceeding 35% (Anderson, 1994).

St. John can be characterized by a highly irregular coastline, numerous bays, steep, slopes and small drainage areas. For the most part the topography is very mountainous and

coastal plains are almost completely absent. Bordeaux Mountain is the highest peak on St. John at an elevation of 1,297 feet above sea level.

Geology of Coral Harbor

Coral Harbor is a well-protected embayment occupying the northwest end of Coral Bay which is a large embayment occupying the northeast end of St. John. The embayment has one of the largest watersheds in the U.S. Virgin Islands Territory encompassing ~12 km^2, with steep slopes averaging 18% (many >35%) (Brooks et. al, 2007). Coral Harbor occupies an area of approximately 2 km^2 draining a watershed of approximately 6 km^2. Studies have shown that the bay has been highly impacted by anthropogenic influences with a significant increase in sedimentation since development of the watershed began in the 1950s. The sediments within the inner harbor have been found to very fine, terrestrial in origin and with a high organic component. The source of organic matter is difficult to assess, but could be the vegetation surrounding the harbor, or potentially waste from the large numbers of boats typically anchored in the harbor (Brooks et al, 2007).

The upland areas of the project area have all been highly altered. The area has been graded, filled and portions are developed. There is a channelized drainage through the property, only the southernmost portion of this drainage supports natural vegetation.

To protect the roadway, the southern half of the project area's shoreline has been previously armored with boulder riprap. Further to the south, gabion baskets have been placed along the shoreline indicating that the southern portions of the property are subject to shoreline erosion. Dense mangroves protect the shoreline to the north, but the area between the riprap and the mangroves consists of an erosion shorefront. There is a very narrow sandy beach behind which are eroded soils. Many of the seaside maho trees along the shoreline exhibit erosion along their roots.

Historical Use

The project area was undeveloped in 1947 as shown in the following aerial photograph. The area and project parcels remained unchanged through 1971. By the late 1990s the restaurant on the water and a few small shops had been built, but the Cocoloba complex and Voyages have been constructed only within the past 10 years. There has been a question as to whether historic filling on the site was the result of there having been a salt

pond or salt flat at this location. Neither are shown on the 1947 or 1971 aerial photographs, see Section 6.02. The USGS Quad maps from 1922 and 1934 do not indicate the presence of a salt pond or salt flat at this site either.

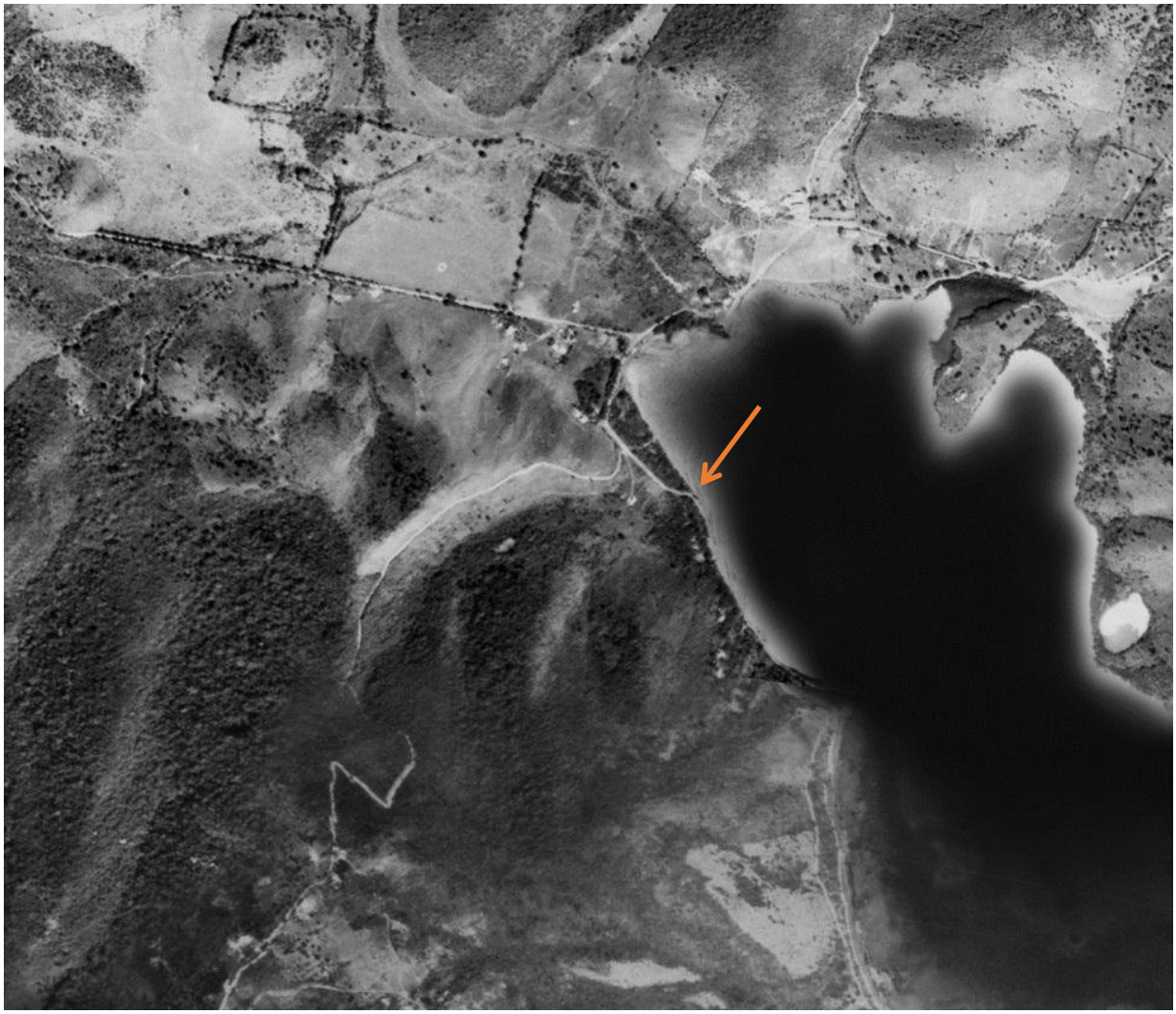


Figure 6.02-1. 1947 Aerial Photograph of Project Area

Figure 6.02-2. 1971 Aerial Photograph of Project Area

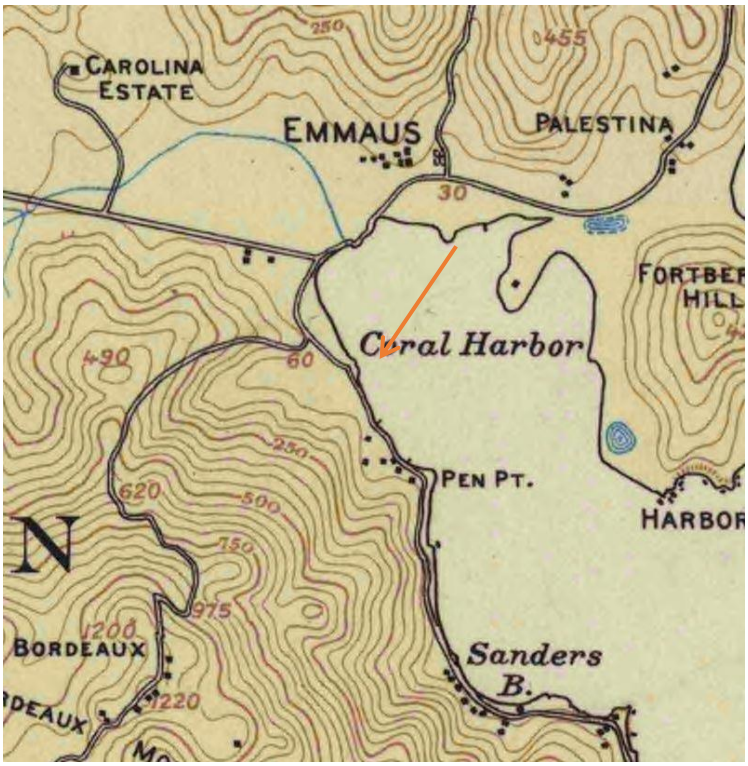


Figure 6.02-3. 1927 USGS Quad Map of Coral Harbor

Soils of the Project Site

Four soil types are identified in the vicinity of the project areas according to the Custom Soil Resource Report Survey of the St. John Marina, Coral Harbor, St. John, United States Virgin Islands. An NRCS Custom Soils Report is attached as Appendix H.

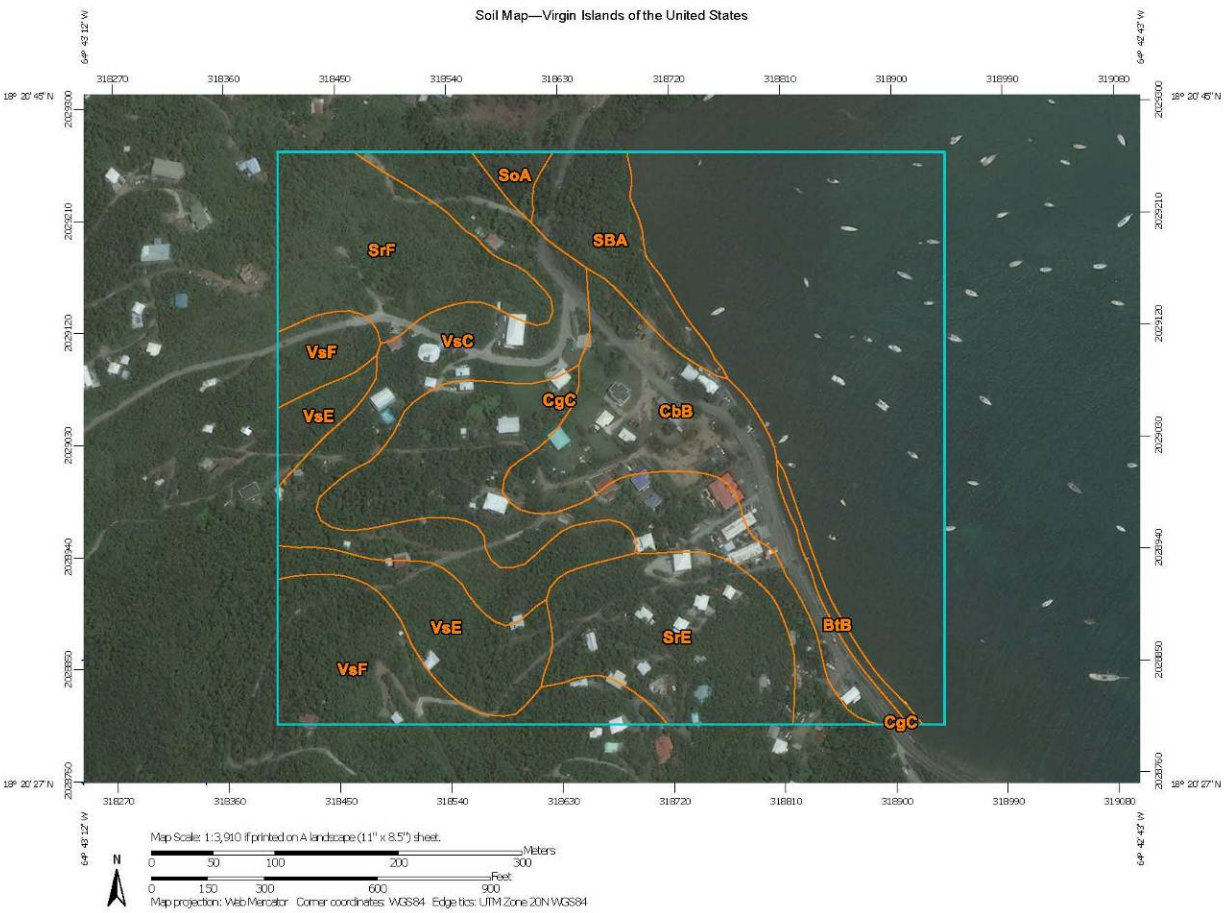
Beaches, stony (BtB) was found along the shoreline of the southern half of the property and represents not only the riprap but the stones and cobble found along the shoreline.

Cinnamon Bay loam, 0 to 5 percent slopes, occasionally flooded (CbB) is found throughout the majority of the property. This soil type is usually found on alluvial fans and terraces adjacent to volcanic uplands. The surface layer is usually a very dark grayish brown loam that is 3 inches thick.

Cinnamon Bay gravelly loam, 5 to 12 percent slopes, occasionally flooded (CgC) is found further inland on the property and as the property elevations begin to rise. This soil type is similar to that listed above but with a steeper slope.

Sandy Point and Sugar Beach soils, 0 to 2 percent slopes, frequently flooded (SBA) is found to the north along the shoreline and adjacent to the mangroves. This soil type is usually located on nearly level saline marshes, saline flats and salt ponds that are adjacent to the sea.

The surface layer is olive gray sandy clay loam from 0 to 3 inches of depth changing to dark gray sandy clay loam between 3 and 6 inches of depth in the Sandy Point type soils and in the Sugar Beach type soils the surface later is black muck to a depth of 4 inches. The shoreline portion of the property is more like the Sandy Point material, although Sugar Beach type soils are present in the mangrove area.



Map Unit Legend	
Map Unit	*Map Unit Name*
BtB	Beaches, stony
CbB	Cinnamon Bay loam, 0 to 5 percent slopes, occasionally flooded
CgC	Cinnamon Bay gravelly loam, 5 to 12 percent slopes, occasionally flooded
SBA	Sandy Point and Sugar Beach soils, 0 to 2 percent slopes, frequently flooded
SoA	Solitude gravelly fine sandy loam, 0 to 2 percent slopes, frequently flooded
SrE	Southgate-Rock outcrop complex, 20 to 40 percent slopes
SrF	Southgate-Rock outcrop complex, 40 to 60 percent slopes
VsC	Victory-Southgate complex, 2 to 12 percent slopes, very stony
VsE	Victory-Southgate complex, 20 to 40 percent slopes, very stony
VsF	Victory-Southgate complex, 40 to 70 percent slopes, very stony

Figure 6.02-4. NRCS Soils Map

Adverse Site Conditions

The typical wave and wave patterns usually have minimal affect Coral Harbor due to its constricted nature. The Harbor and site are well projected by Harbor Point and to a lesser degree by Pen Point. The shoreline area and the offshore area have been determined to be

in VE elevation 14 ft. areas of the coastal flood zone with velocity hazards (wave action). The upland portions of the site are in Zone AE10 where flood elevations for the 100 year storm have been determined to be 10 ft.(Flood Insurance Rate Map, Panel 35 of 94, revised April 16, 2007), Figure 6.02-5.

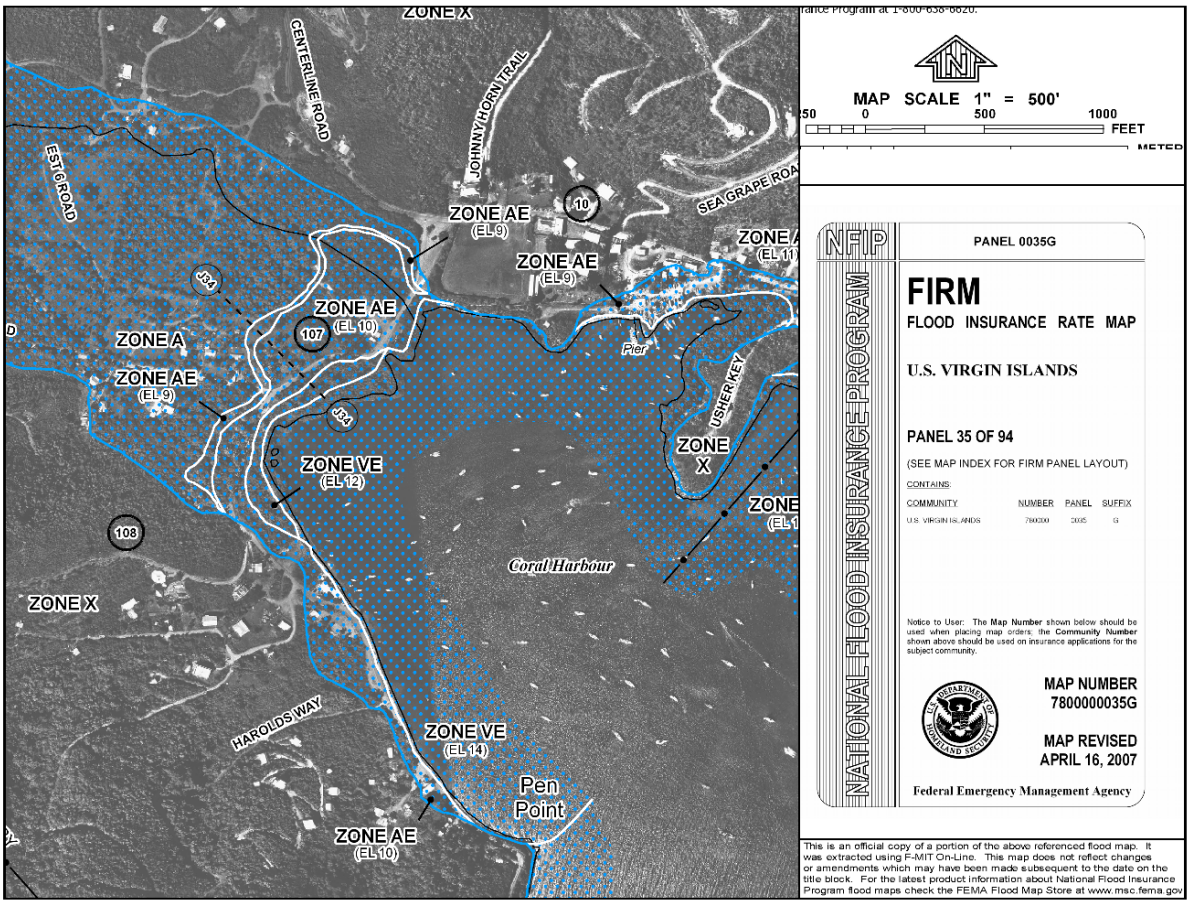


Figure 6.02-5. FEMA Flood Insurance Rate Map, Rev 19-APR-07

Earthquake Probability

The U.S. Virgin Islands lie in one of the most earthquake prone areas of the world, and are susceptible to ground shaking, earthquake-induced ground failures, surface fault ruptures and tsunamis (tidal waves) (Hays, 1984). The activity is mostly associated with large-scale tectonic activity or faulting, originating in the Anegada Trough to the northeast of the islands. The trough and its related scarp apparently were thrown up by block faulting during the late Pliocene or early Pleistocene. It is oriented generally northeast to southwest, separating St. Croix from Puerto Rico and the other Virgin Islands. Based on shallow focus earthquakes, the Anegada Fault Trough is estimated to be more than 400 miles in length. There are indications that strike slip movement is occurring, with St. Croix shifting northeast relative to

Puerto Rico (Puerto Rico Water Authority 1970). The year 2012 marks the 145th anniversary of the last major earthquake in the islands. This quake, which occurred on November 18, 1867, had an identified intensity of VIII on the Modified Mercalli Scale. Earthquakes of this magnitude have generally been associated with epicentral ground accelerations of between 0.05 and 0.35 gravities. Since the 1867 quake, there has been continuous low intensity activity, all below 6.0 Richter. Thousands of tiny earthquakes are encountered every year on the island. This activity is associated with the volcanic eruptions that have been occurring to the southeast on the island of Montserrat. The low-lying property is within the area of highest vulnerability.

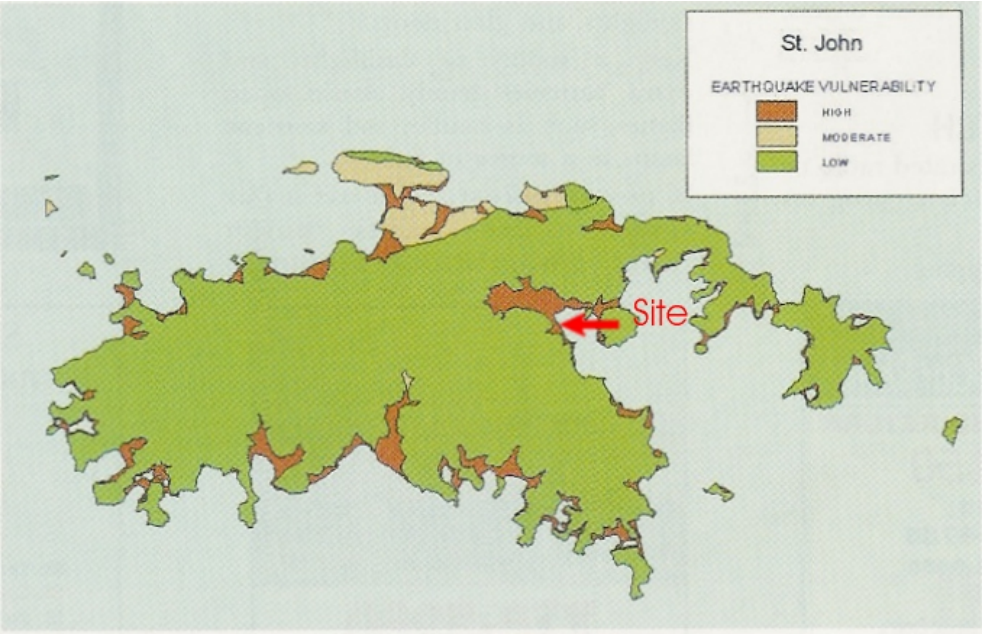


Figure 6.02-6. Earthquake Vulnerability Map for St. John

Impact of Geology on the Proposed Project

There will little if any impact of the local geology on the upland portion of the project area. There may be a potable water well installed on the project site and if so, an amendment to this EAR will be completed. The impact of the local geology on this will be determined after a test boring is completed. On the marina area, conditions permitting, piles are anticipated to be driven with a vibratory hammer and local geological conditions are not expected to adversely impact this plan.

Impact of the Proposed Project

The project will not result in any change in the geology of the site. The project proposed no filling or dredging.

6.03 Drainage, Flooding and Erosion Control

The overall drainage basins in Coral Bay are depicted on the Figure 6.03-1. As this permit application is strictly for over-water construction, site specific drainage patterns relating to the upland portions of this site are discussed in the EAR developed for the associated Major Land CZM permit application.

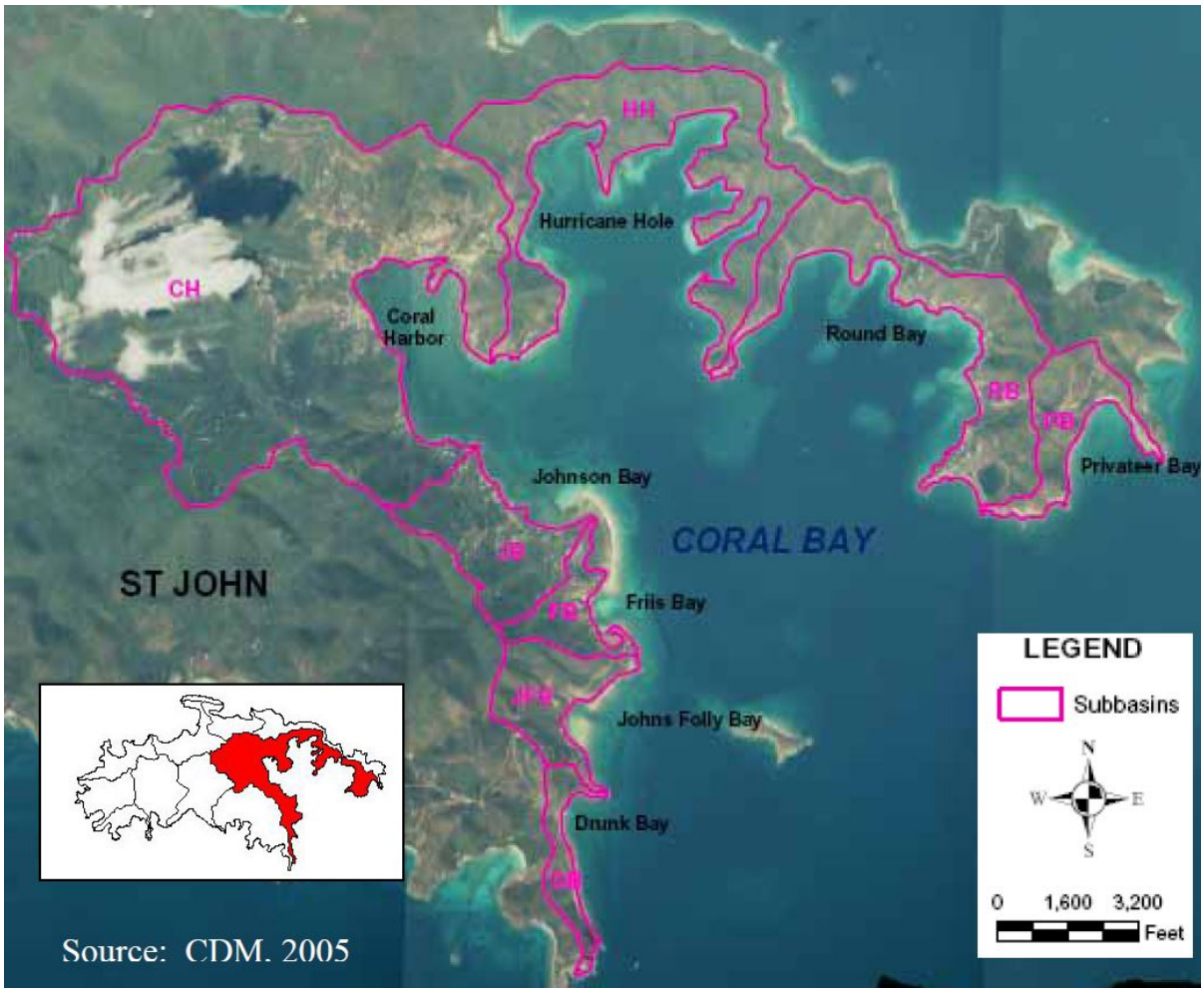


Figure 6.03-1. Water Resources Map (CDM 2005)

6.03a Discuss Impacts of Terrestrial and Shoreline Erosion

This project is for water-side construction and there will be no terrestrial impacts associated with it. To protect the roadway from erosion a boulder riprap revetment has been

constructed across the southern half of the property's shoreline. Further to the south, gabion baskets have been placed along the shoreline indicating that the southern portions of the property were previously subject to shoreline erosion. Dense mangroves protect the shoreline to the north, but the area between the riprap and the mangroves, Parcels 10-17 and 10-18, consists of an eroded shorefront where there is a very narrow sandy beach behind deriving from eroded soils. Many of the seaside maho trees along this shoreline show erosion along their roots.

Red mangroves will be installed along the shoreline in and adjacent to the existing riprap and will be extended across this eroding shoreline. As these mangroves develop and spread, they will provide additional erosion protection to eroding area discussed above. The planting of the mangroves in conjunction with implementing the stormwater management program described previously should significantly reduce any additional erosion in this area.

6.03b Discuss Relationship of Project to Coastal Floodplain

The typical wave and wave patterns usually have minimal affect Coral Harbor due to its constricted nature. The site is subject to wind generated waves attenuated into the harbor from the east and southeast. The Harbor and site are well protected by Harbor Point and to a lesser degree by Pen Point. The shoreline area and the offshore area have been determined to be in VE elevation 14 ft. areas of the coastal flood zone with velocity hazards (wave action). The upland portions of the site are in Zone AE10 where flood elevations for the 100-year storm event have been determined to be 10 ft, see Figure 6.02-5.

6.04 Fresh Water Resources

There are no fresh water resources in the marina footprint that are known. There is currently no reliable potable water source that exists on the uplands at the proposed project site. The existing businesses rely on roof catchment and cistern storage and water purchased from private haulers. The peak water demands projected for this project are estimated not to exceed 12,000 gpd. Potable water supply to meet this demand will be through rainwater collection from rooftops into cisterns supplemented by water purchased from WAPA in Cruz Bay and Caneel Bay Resort. Cisterns for the buildings are sized to allow for large quantities of water to be stored onsite to reduce the frequency of truck deliveries and allow scheduling of the deliveries to minimize impact on the community.

The project site is located adjacent to the bay therefore the potential for a fresh potable groundwater resource is limited.

6.05 Oceanography

6.05a Sea Bed Alteration

The proposed project involves direct impacts to the seabed through the installation pilings for the construction of the marina. A total of 1,333 piles will be driven (1,230 at 15" diameter, 34 at 17" diameter and 69 at 12" diameter). The piles will be driven with a vibratory hammer. A total of 87 moorings are proposed, 12 associated with the marina proper and 75 associated with the managed Coral Harbor mooring fields. The moorings will utilize helix anchoring systems with floated lines. No dredging or fill is proposed and mangroves will be utilized to stabilize the shoreline.

6.05b Tides and Currents

The Virgin Islands coastal areas are not subject to significant tidal ranges or tidal currents. Due to the small size of the islands, the sea flows around the island causing an average tidal height of only a few inches and maximum change of only a little over a foot. Only very narrow intertidal zones are found because of this lack of tidal amplitude and the steepness of the island rising out of the sea. The tides within Coral Bay are primarily semi-diurnal in nature as is the case with the southern shore of St. Thomas, with two cycles of high and low water every 24 hours. The mean tides range from 0.8 ft to 1.0 ft and the spring tidal ranges reach up to 1.3 ft (IRF 1977). There are locally driven tidal currents in the bay and current shifts can be noted with the rising and falling tides due to the constriction of the basin. The NOAA tide gauge in Charlotte Amalie has recorded water levels since 1975 with the highest water level, +3.35 ft, recorded on September 18, 1989 (Hurricane Hugo) and the lowest, -1.44 ft on February 6, 1985.

There is also a tidal station located in Lameshur Bay (ID 9751381) on the south shore of the islands that has been recording since 1983, 18°19.0'N/64°43.4'W. The station records the mean tide as 0.72 ft. and the diurnal range as 0.82 ft.

According to NOAA, there was a tidal station in Coral Harbor (ID 9751373) which was removed in June of 1984 (http://tidesandcurrents.noaa.gov/stationhome.html?id=9751373).

Typical daily data from this tidal station is provided below. For reference, the bathymetric survey conducted at the site recorded the MLLW as 0.000 and the MHHW as 0.896 ft.

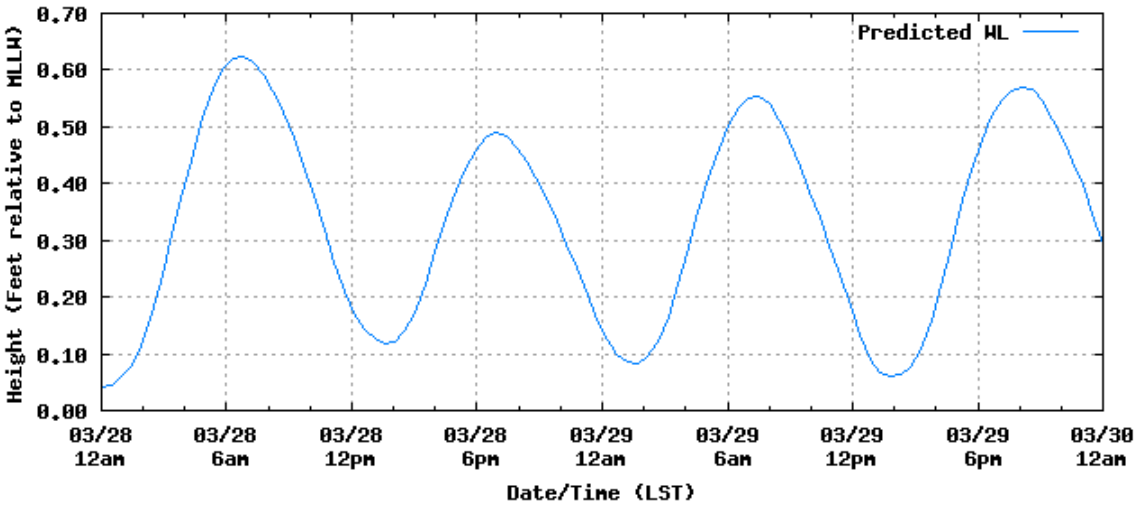


Figure 6.05.b-1. Coral Harbor, St. John Island, VI Station Id: 9751373, Datum = MLLW

Table 6.05b-1. Coral Harbor Historic Tidal Date

Historic Benchmark Elevations		
Month	**Rainfall, Inches**	**Elevation (ft MLLW)**
Mean Higher High Water	MHHW	0.896
Mean High Water	MHW	0.801
Mean Tide Level	MTL	0.443
Mean Sea Level	MSL	0.427
Mean Low Water	MLW	0.082
Mean Lower Water	MLLW	0.000
Source: NOAA Station #9751373 St. John Island, Coral Harbor		

The surface currents throughout the Caribbean are driven by the North Equatorial Current that runs through the islands west-northwest and then joins the Gulf Stream. These currents change very little from season to season with the currents coming more from the south during the summer months.

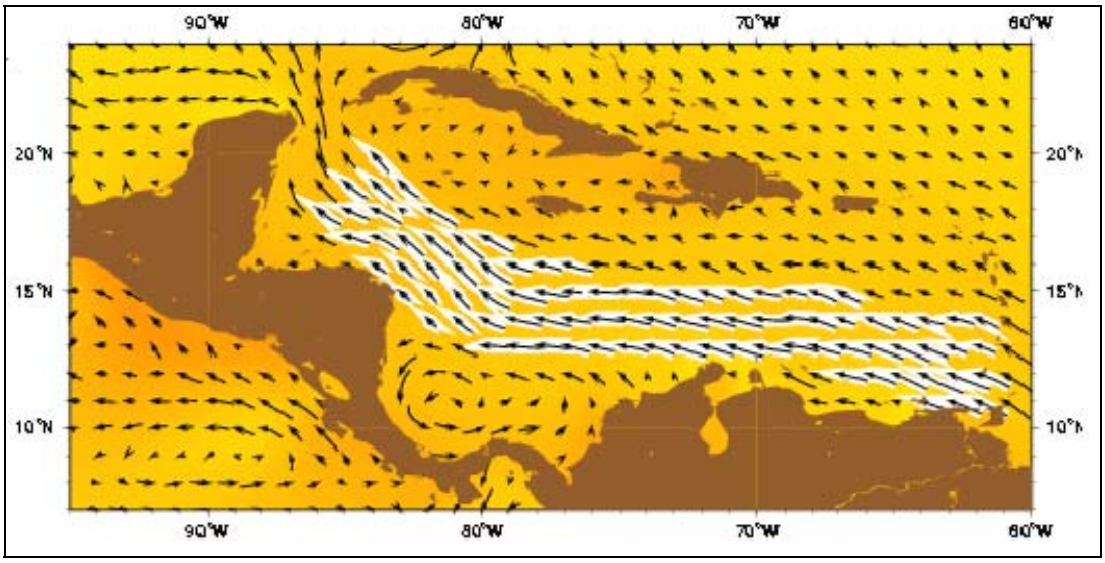


Figure 6.05.b-2. Prevailing Ocean Currents

Because of the shallowness of the Caribbean basin, less than 1000m, mainly surface water from the Atlantic flows through the islands. The westerly drift of the Caribbean current sweeps past the southern cays and rocks, Figure 6.05b-3.

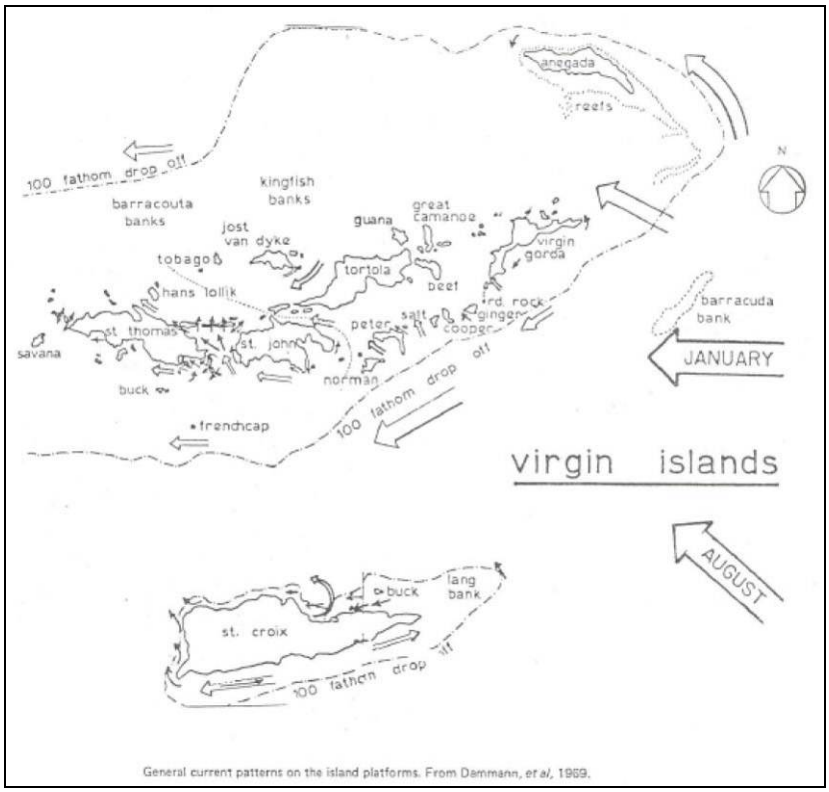


Figure 6.05b-3. Prevailing Currents in the U.S. Virgin Islands, IRF 1975

Currents were measured just outside the entrance to Coral Harbor at 18°20.417'N, 64°42.463'W every two weeks between April and August of 2009 using a Flowtech current meter (Table 6.05b-2). Measurements were taken 1 meter below the surface and 1 meter off the seafloor. Current velocities were generally low at both the surface and at depth. Surface currents were primarily driven by wind and wave approach and moved in a counterclockwise direction around the basin. Currents at depth were found to travel in both a westerly and easterly direction likely reflecting the tidal influence near the sea floor.

Table 6.05b-2. Current Velocity Measurements at the Mouth of Coral Harbor

Date	Surface Current Velocity (-1 Meter)	Current Velocity at Depth (-5 Meter)
04/08/2009	0.3 m/s W	0.3 m/s W
04/15/2009	0.2 m/s W	0.2 m/s E
04/28/2009	0.2 m/s W	0.3 m/s E
05/05/2009	0.1 m/s W	0.2 m/s W
05/20/2009	0.3 m/s W	0.3 m/s E
06/01/2009	0.2 m/s W	0.2 m/s W
06/25/2009	0.1 m/s E	0.1 m/s E
07/21/2009	0.3 m/s W	0.3 m/s W
08/19/2009	0.2 m/s W	0.3 m/s W
08/26/2009	0.2 m/s W	0.2 m/s E

Currents have been measured inside Coral Harbor within the project footprint since May 16, 2012. As of the completion of this report 20 days measurements have been taken. The data is presented below. Currents were measured with a Flowtech current meter at a depth of approximately 0.5 meters.

Currents varied with tidal phase the lowest currents associated with slack tides.

Table 6.05b-3. Current Velocity Measurements at Project Site

Date	Velocity m/s	Direction	Wave height	Turbidity (NTU)
5/12/2012	0.09	330°	4-6”	1.11
5/22/2012	0.1	330°	2-3”	2.12
6/17/2012	0.08	150°	2-3”	3.25
6/18/2012	0.09	330°	4-6”	0.98
6/23/2012	0.11	330°	4-6”	1.76
6/31/2012	0.10	330°	4-6”	0.99
7/31/2012	0.05	150°	none	1.65
8/2/2012	0.07	330°	4-6”	2.65
8/12/2012	0.1	150°	4-6”	0.87
9/14/2012	0.09	160°	4-6”	0.67
9/22/2012	0.1	150°	4-6”	1.73
10/7/2012	0.08	150°	4-6”	1.89
10/8/2012	0.1	330	6”	2.13
11/13/2012	0.09	150°	1”	6.01
12/8/2012	0.09	330°	2-3”	2.10
1/16/2014	0.10	150°	3-4”	1.34
1/20/2014	0.08	330°	None	1.09
1/24/2014	0.1	330°	3-4”	0.96
2/03/2014	0.09	330°	4-6”	0.67
2/25/2014	0.1	150°	2-3”	2.11

6.05c Waves and Wind Impacts

Deep water waves around St. John are primarily driven by the northeast trade winds that blow for the majority of the year. Waves generally range from 1 to 3 ft in height and are predominantly from the east. Larger waves from the southeast, approximately 1 to 12 feet in height, may occur in late summer and fall when trade winds blow from the east or with the passage of tropical storms and hurricanes to the south of the island. Figure 6.05-3, depicts average sea state conditions in the offshore areas of the USVI over an 8-year period of record. Based on the orientation of Coral Harbor the site is well protected and has a limited fetch.

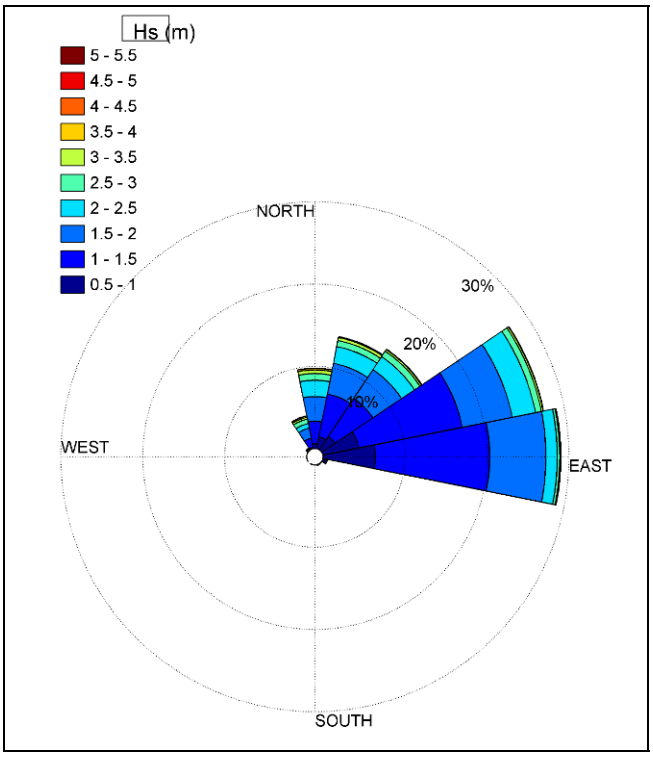


Figure 6.05c-1. Average USVI Sea and Swell Conditions, NOAA WaveWatch Model, ATM 2010

Wave Information Studies, USACE, Station L1-12 is located to the east southeast of Coral Harbor. Information hindcast at WIS station L1-12 revealed that between January 1990 and December 1999 waves approached from between north and east 98.4 percent of the time. Significant wave heights were less than 6.6 feet for 63.7 percent of wave cases recorded and less than 10 feet for 96 percent of the cases recorded. Peak wave periods were between 5 and 10 seconds for 62 percent of all recorded cases. The most extreme wave conditions recorded was in September 1995 when a 44-ft wave with a 15-second period approached from the northwest. This even was likely associated with Hurricane Marilyn. The majority of extreme wave cases, significant wave heights greater than 13 feet (4 meters), come from the north, northeast and east. The wave periods for these extreme waves are usually 10 seconds or greater. Between 1990 and 1999, the months from November to March had the highest mean wave heights, greater than 6.9 feet.

Wave heights at the project area have been observed as noted in the above current table. No waves have exceeded 0.1 meters since the beginning of the study. In the marina footprint however waves have been noted impacting the shore to the south which are as much as 1 ft in height. The site is subject to shoreline erosion as evidence by the placement

of the riprap. Waves enter Coral Harbor from the southeast and are attenuated in to the western portion of the bay, the northeast side of the bay is more protected.

6.05d Marine Water Quality

The water in the project area is classified as Class B and the best usage of the waters is listed as the propagation of desirable species of marine life and for primary contact recreation (swimming, water skiing, etc.). The quality criteria include, dissolved oxygen not less than 5.5 mg/L from other than natural conditions. The pH must not vary by more than 0.1 pH unit from ambient; at no time shall the pH be less than 7.0 or greater than 8.3. Bacteria (fecal coliform) cannot exceed 70 per ml, and turbidity should not exceed a maximum of 3 nephelometric turbidity units (NTU).

The project site is within the Coral Bay Watershed, which encompasses 3,003 acres. The Department of Planning and Natural Resources Division of Environmental Protection takes quarterly water quality samples at station 53 near Coral Harbor. The results of these samples from 2009 through 2012 are provided below.

These samples indicate an area of fluctuating water quality with varying turbidity and occasional contamination by fecal coliform and enterococci bacteria. The total suspended solids (TSS) and turbidity are high compared with other more open embayments. During times of run off the turbidity become extremely elevated from upland erosion. Though no samples were taken during rainfall events as part of this project, runoff samples and samples in the bay have been take as part of the Coral Bay Watershed.

Water Quality Data outside Coral Harbor was collected from July through August 2009. The results are shown below. Note that turbidity is generally lower than those from within the harbor.

Water Quality measurements have been made in the project area on a regular basis since mid-May 2012. A total of 20 measurements have been taken thus far. The results are shown in the table 6.05b-2 presented above between 2012 and 2014. The data shows a highly variable system with fluctuating water quality.

Table 6.05d-1. Coral Bay Water Quality Data, Station STJ 53

Date	TSS (mg/L)	Turbidity (NTU)	Fecal Coliform (#/100mL)	Enterococci (#/100ml)	Temp (C)	Salinity (ppt)	D.O. (mg/L)
3/27/09	10.1	1.91	2	8	25.08	37.41	
6/29/09	35	1.63	0	0	29.92	36.23	6.40
10/8/09	2.6	1.99	1	0	29.97	35.72	8.67
6/16/10	4.2	4.17	0	2	29.70	36.15	
3/30/11	3.1	3.58	4	1	28.22	37.10	6.35
7/28/11	4.3	2.24	1	3	29,92	36.25	6.11
6/6/12	11.7	4.64	6	3	30.35	36.57	5.89
7/17/12	20.5	1.23	0	0	30.32	35.44	6.03
8/20/12	23.4	4.23	1	0	30.82	35.49	6.37
12/6/12	18.1	4.64	1	2	28.19	35.49	6.20

Table 6.05d-2. Water Quality Outside Coral Bay

Date	Turbidity (NTU)	Secchi Depth
6/30/09	1.12	B
7/12/09	0.96	B
7/20/09	1.03	B
7/21/09	0.96	B
7/22/09	0.81	B
7/24/09	0.78	B
7/30/09	0.99	B
8/18/09	1.12	B
8/19/09	1.00	B
6/30/09	1.12	B

Coral Harbor is highly impacted by the input of terrestrial sediment due to runoff and is further impacted by boat anchoring and mooring which serve to resuspend fine bottom sediments and by discharges from these vessels. Spring Gut discharges into Coral Harbor and the footprint of the discharge is readily visible in the marine environment.

There are dense seagrasses in the shallower areas of the bay, but these seagrass diminish with depth as light becomes limited due to turbidity caused by suspended sediments and algae. Seagrass grows in dense beds at a depth of nearly 30’ outside the Coral Harbor mouth to the south, the seagrass densities drop significantly at 11’ and become extremely

sparse by 15' within the bay. The conclusion is that existing ambient water quality is impacting the benthic community in the bay.

Impact of the Marina Project

The marina has the potential to have an impact on water quality within the bay both directly and indirectly.

The project does involve upland construction and soils will be disturbed thereby creating the potential for sediment-laden runoff. The project will also introduce additional parking impervious surfaces that will contribute to greater runoff flows and the potential for introduction of oils and greases into the water column. In order to minimize and abate these impacts the project will implement a detailed sediment and erosion control plan and stormwater management plan provided in the associated Major Land CZM permit application.

The project will also treat domestic wastewater with onsite WWTPs providing tertiary treatment and will be utilizing the effluent for irrigation. This has the potential of introducing additional nutrients into an already nutrient-rich environment and could lead to additional algal growth. In order to minimize this impact the project will provide four days of storage for treated effluent at times when irrigation is not desirable and will utilize treated effluent for toilet flushing. As a final option, a licensed waste hauler will be utilized to pump and haul effluent to a permitted treatment facility.

During construction, the project will require the driving of 1,333 piles and will have bottom impact due to barge anchoring and spudding. These activities could result in resuspension of sediment and the movement of vessels in the shallows could also result in propwash eroding seagrass beds and resuspending sediments. To minimize resuspension of sediments during pile driving turbidity barriers will be deployed around the work area. Tugs and all vessels will be required to move dead slow in the shallow water environment to minimize impacts.

During construction, a Water Quality and Environmental Monitoring Program will be implemented. The Water Quality Monitoring Plan is found in Appendix B.

Once the project is complete, there will be the potential for the introduction of hydrocarbons from exhaust and the potential for releases from vessels and or from the fueling system. The marina will have a Spill Contingency Plan and spill containment and clean up materials will be kept within easy reach on the docks.

The marina will require that all vessels within the marina have their heads locked so that wastewater cannot be discharged into the bay. The marina will be providing a pumpout service that should be used by all vessels, not only in the marina but also moored in the bay. The marina will be taking over the management of the bay in cooperation with the Department of Planning and Natural Resources and will be providing the pumpout service to all vessels on the moorings as part of the management fee. This should minimize the amount of waste being discharge from these vessels into the sea and should help limit nutrient introduction.

As part of their mitigation for impacts associated with the project, Summer's End Group will be treating a portion of the offsite stormwater runoff from Bordeaux Mountain for water quality. Terrestrial runoff into the small harbor is one of the greatest impacts to water quality in the bay, by assisting in implementing improvements and by minimizing boat introduced waste, there may be an improvement in water quality long term in the bay.

6.06 Marine Resources and Habitat Assessment

This project proposes alterations to the marine environment through the construction of a marina and will involve the driving of 1,333 piles which will directly impact the seafloor and associated benthic community.

The project area is located on the eastern side of Coral Harbor within Coral Bay on the east end of the island of St. John. There are dense grass beds offshore with a shoreline that is a mixture of muddy/cobble to the north and is riprapped to the south. There is a narrow band of muddy sand between the cobbly shore seagrass beds to the north and a mixture of seagrass and cobble to the south. There are a few large coral heads offshore of the culvert discharge in the middle of the property. Dense seagrass, primarily *Thalassia testudinum*, are found in the offshore environment at a depth of between 1 ft and 11 ft, at which point they begin to diminish and algal species become more prevent. *Syringodium filiforme* also becomes more prevalent with depth.

In 2009, Paul Bologna presented the "Assessing Faunal Utilization of Seagrass and Mangrove Habitats in St. John" at the annual meeting of the International Marine Conservation Congress, George Madison University, Fairfax, Virginia. He stated "Results indicate that Coral Bay Harbor, the most anthropogenically impacted site, had the highest *T. testudinum* biomass, but the lowest floral diversity. Its faunal community was dominated by small polychaetes with significantly lower secondary production".

The area is heavily used for boat mooring and there are large scars associated with most moorings, even those with properly installed anchors. Ropes with associated chains swinging from the moorings denude large areas of seagrass.

Benthic Community Survey Methods

Benthic surveys were undertaken in the proposed project area in June and July 2009, May and November 2012 and in January and February 2014. The surveys were conducted with snorkeling equipment and scuba. Six transects were conducted within the area running from the shoreline out to a water depth of 16 ft. Meter squares were used to assess percent covers along the transect lines (Rogers, 1994). The data from these transects is present in Appendix I.

Figure 6.06-1 provides the Benthic Habitat Map provided by NOS, NOAA (The project area overlaps two of the habitat tiles on the NOAA maps) and Figure 6.06-2 depicts the larger Coral Harbor area including the location of the nearest ESA listed *Acropora palmata* and Figure 6.06-3 shows the marina area at a larger scale.

The NOS Biogeography Program shows the entire area offshore of the site as continuous seagrass beds with patch macro algae in the center of the bay.

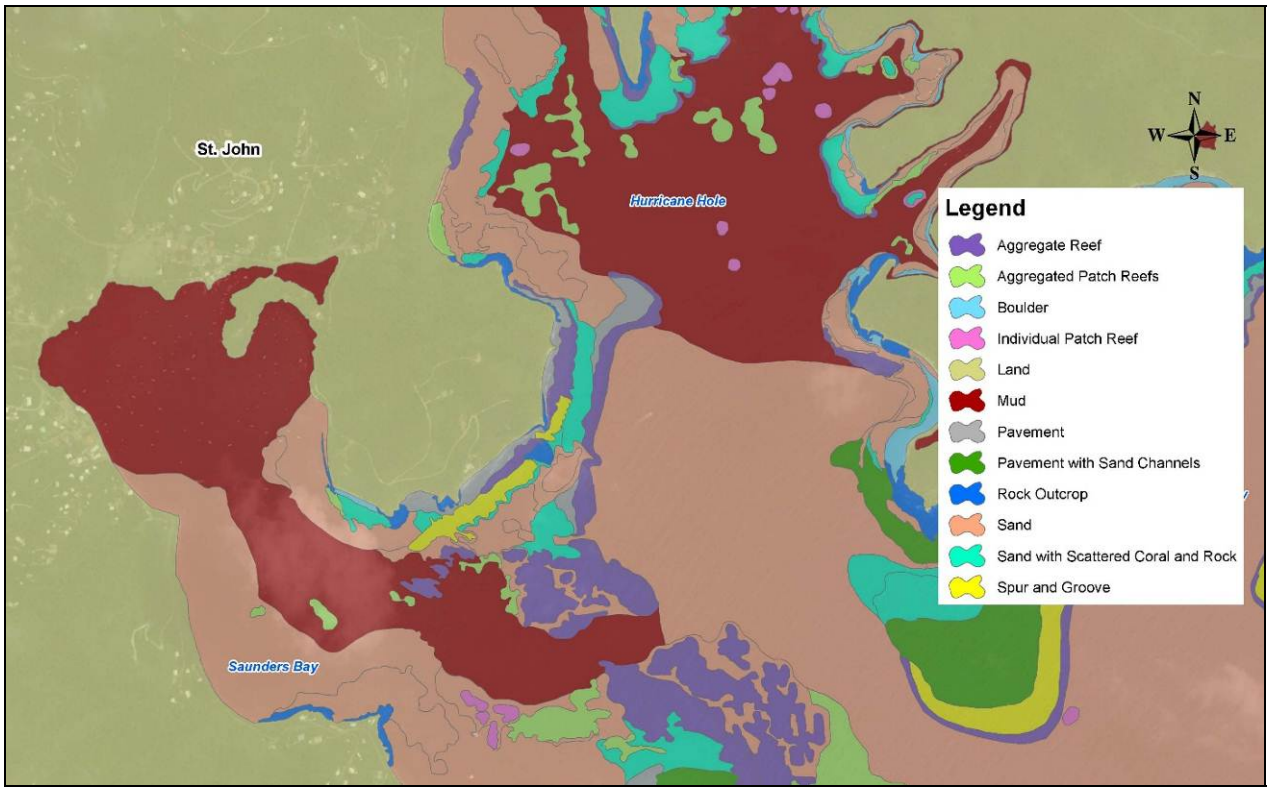


Figure 6.06-1. NOS Benthic Habitat Map – Tile 20 & 22

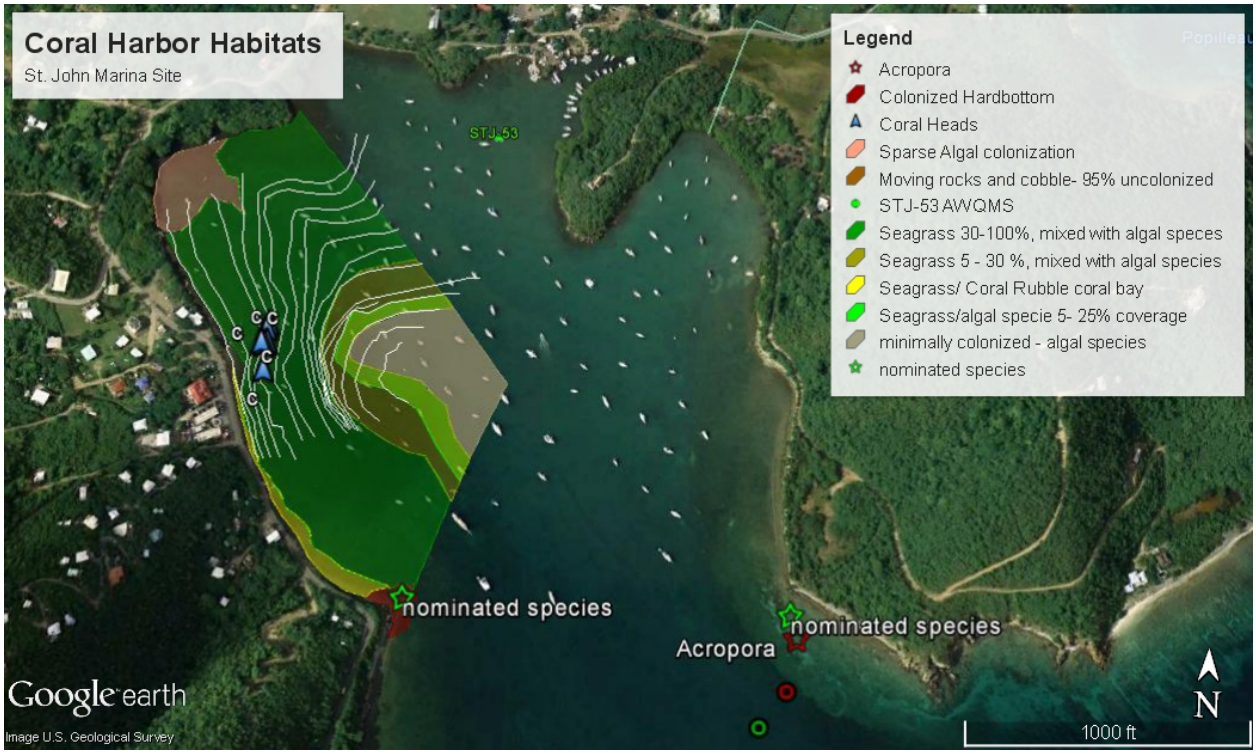


Figure 6.06-2. Habitat Map of Greater Coral Harbor Area and Nearest Acropora & ESA Nominated Species

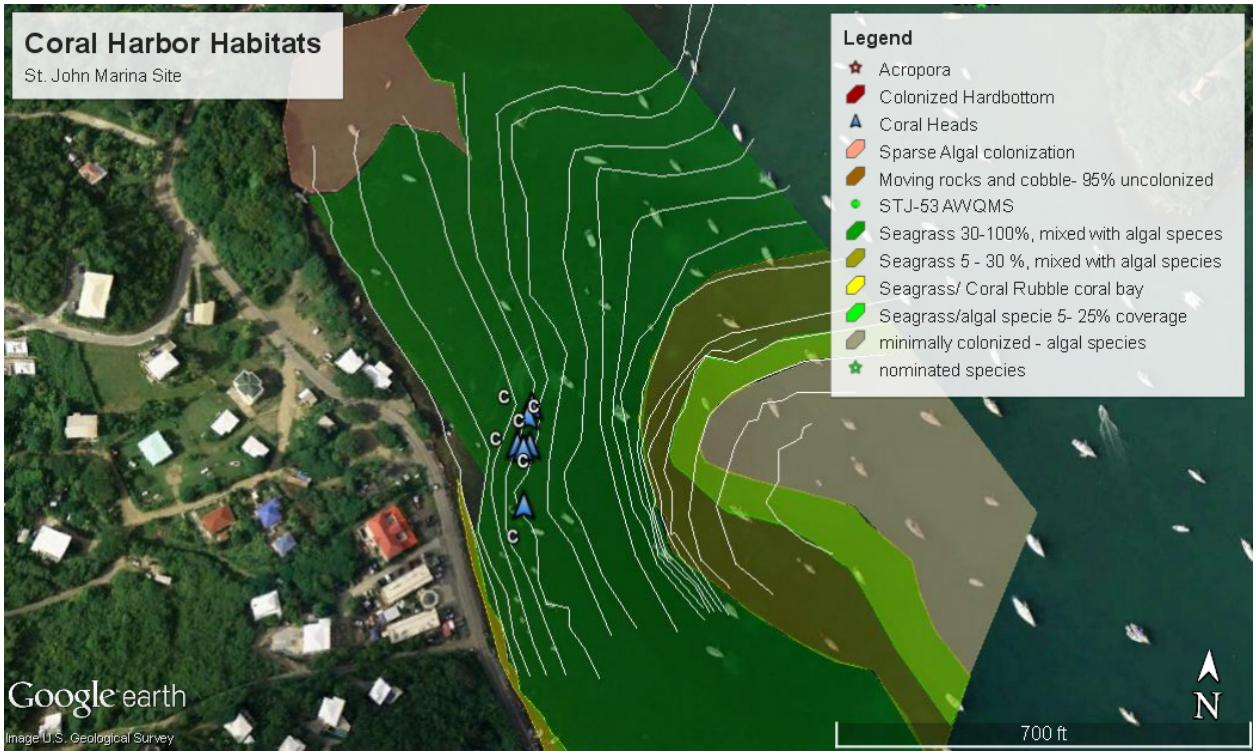


Figure 6.06-3. Benthic Habitats in the Marina Footprint

The Benthic Community

The shoreline to the north of the marina is a mixture of muddy cobbles. The red mangrove (*Rhizophora mangle*) stops to the north of the project area. There is a narrow band of uncolonized muddy sand before seagrass beds begin on the northern side and beyond the nearshore there is a narrow muddy band of uncolonized sand which varies in width between 10 ft and 25 ft. Then *Syringodium filiforme* beds begin which slowly grade into a predominant colonization by *Thalassia testudinum*. The seagrass beds are dense and continuous offshore with occasional blow outs which have been predominantly caused by debris, anchoring or moorings. To the south of the existing stormwater culvert there is riprap revetment along the shoreline and there are cobble amid the seagrass of a distance of 10 ft – 25 ft from shore. *Thalassia* dominates the grass beds all the way into shore on the southern side of the property. These beds are extremely dense only broken by debris and anchor scars.

Immediately seaward of the stormwater culvert there is a large area of sediment deposition which is uncolonized. There are six relatively large coral heads, *Solenastrea bournoni,* found offshore of the discharge point. These corals thrive in low visibility areas and can be

found on sandy bottoms. There are several small Siderastrea radians colonies found on scattered debris in this area as well. These corals all colonized rocks which were carried downstream from the drainage way.

The seagrass densities between depths of 1 ft and 11 ft. range from 30-100%. Thalassia represents 80% of the grass and Syringodium approximately 20%. Small patches of *Halodule beaudettei* are present especially in areas of regrowth. As depth increases, animal burrows increase and the seagrass densities fall and *Syringodium* becomes more prevent. Between depths of approximately 11 ft and 13 ft the seagrass densities fall to between 5 and 30% and by the time the water reaches 13 ft to 14 ft the seagrass densities fall to 5% and the amount of macroalgae increases. By 15 ft of depth there is only an occasional Thalassia shoot, and macroalgae is the dominant colonizer and has colonized between 10% and 70% of the seafloor. Halimedia is the most common algae present. Also found in relatively high abundance are *Caulerpa, Udotea, Avrainvillea, Penicillus capitatus, Laurencia, Hypnea* and *Dictyota.* But by a depth of greater than 15 ft, even the macroalgae density decreases. The system is light limited at this depth.

Sea cucumbers (*Holothuria mexicana*) were common as were sea stars (*Oreaster reticulatus*). Several juvenile conch were noted during all surveys. Due to limited visibility, the number of fish that were seen was limited. Tarpon (*Megalops atlanticus*) and yellowtail jacks (Lutjanus chyrsurus) were both seen, as well as juvenile black tipped shark (*Carcharhinus limbatus*).

The bay is a known shark nursery and the Coral Bay Community Council funded a study of the harbor and found the harbor is heavily used by lemon, black tip and nurse sharks. Figure1 below from their study shows the long line catch locations of sharks within the harbor.

Two small hawksbill sea turtles (*Eretmochelys imbricata*) were seen while diving and two hawksbills were seen in the project area from the boat within the proposed marina footprint.

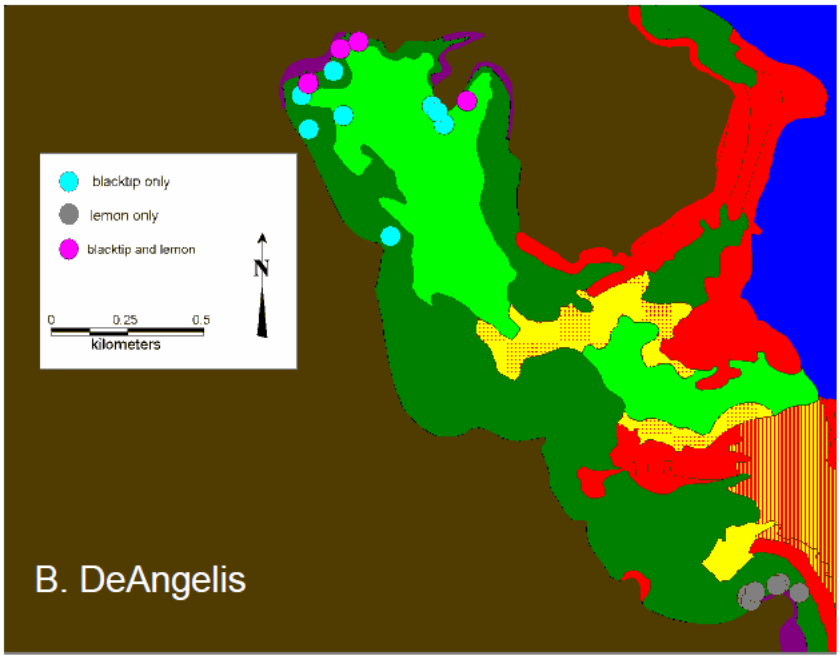


Figure 6.06-4. Coral Bay Community Council Shark Capture Study – Capture Locations of Blacktip and Lemon Sharks in Coral Harbor and Lagoon Point

Surveys were done within the area in over a 5-year period and over that time the density of the seagrass in the nearshore has increased somewhat. While there are new vessel scars, old vessel scars have healed and seagrass has recolonized. The habitat, while highly impacted, is capable of recovery if impacts and stresses are reduced.

Impact of Development

The project will be directly impacting approximately 2,500 ft^2 of seagrass due to the placement of approximately 1,333 piles ranging from 12-17" in diameters. Due to wave turbulence, seagrass will also be lost surrounding the piles. The dock itself occupies 1.42 acres, of which 181 ft^2 will be over areas with seagrass and coral rubble, 1,567 ft^2 over area of sparse seagrass, 41,546.37 ft^2 over areas with 30%-100% seagrass coverage, 27,072 ft^2 over areas with 5-30% seagrass and algae coverage and 4,717 ft^2 over areas with 5% seagrass/algae coverage. The dock will result in a shading impact of 1.42 acres and with the use of the graded decking we are assuming somewhere around a 46% survival rate based on NMFS studies or a 0.8 acre sea turtle foraging habitat loss due to shading (Landry, 2008).

To minimize the direct impact of pilings the seagrass within the piling footprints will be transplanted. The transplant plugs will be used to seed the area in the northwest corner of

the bay that has been impacted by the deposition of sediment from years of uncontrolled stormwater runoff.

The boats at the dock will shade another 5.7 acres at maximum occupancy. The slips will be occupied on average 47% of the year. As seagrasses are reported to be impacted after approximately two weeks of shading, this will result in some loss of seagrass with in the marina due to vessel shading. This will probably manifest itself as a loss of density as well as denuding of some areas, especially around larger permanently moored boats (if any). It is estimated that as much as 2 acres of seagrass may be lost.

The project also has the potential of impacting SAV within the approximate 8 acres project area due to temporary shading by construction vessels and potential direct construction impact. The direct construction impact will be related to barge movements and spuds and will be minimized through monitoring and delineating spudding and anchoring areas. Barge shading will be mitigated through the periodic relocation of barges to prevent shading impacts. The surrounding SAV could also be impacted by construction related turbidity impacts. This will be abated by sediment and siltation control through detailed planning, training and stringent monitoring.

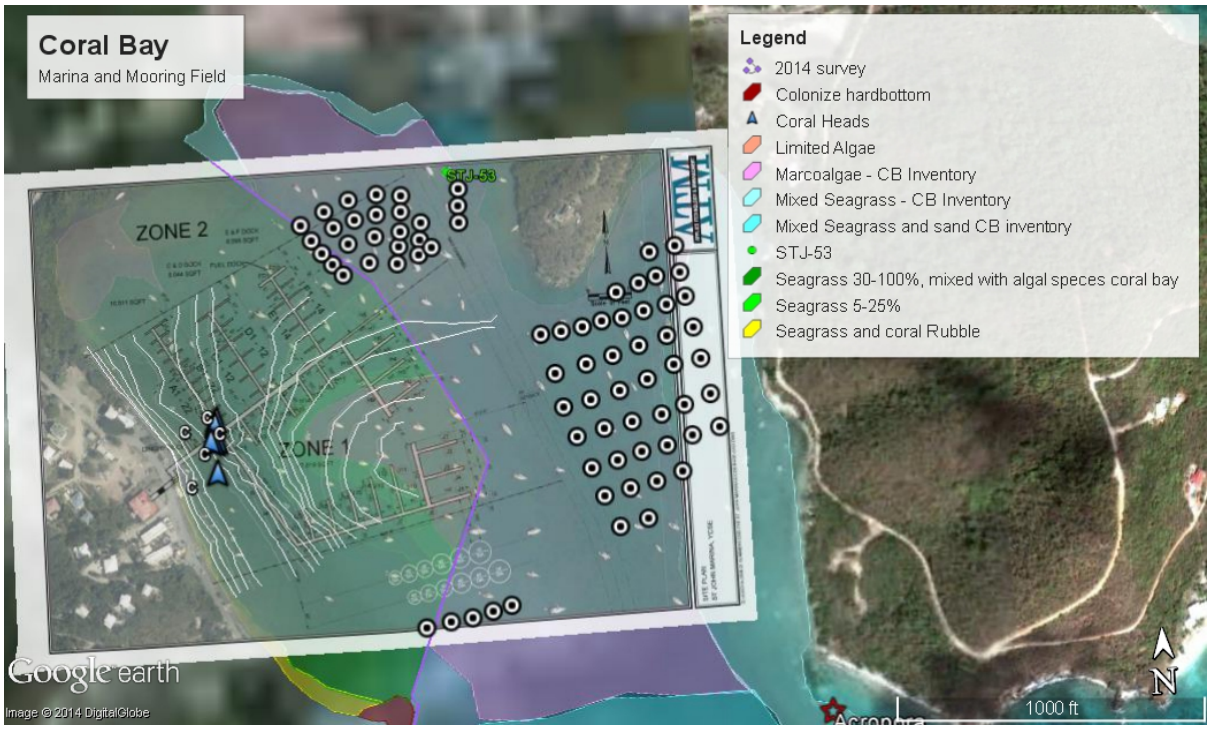


Figure 6.06-5. Impacts of the Marina and Mooring Field

As of last count, there were 115 boats anchored or moored within the bay and these conservatively impact an area of between 34,500 ft^2 and 46,000 ft^2 based on their anchor drag and rope swing impacts. Many of these boats have both an aft and bow anchor increasing this impact.

The applicant is entering into an agreement with DPNR and will take over the management of the mooring field in cooperation with DPNR, see attached Mooring Field Letter of Intent. The applicant will organize the mooring field and replace all the anchors and moorings with properly designed and installed moorings that will have negligible impact on the seafloor. The applicant will also be providing pumpout facilities and waste receptacles which will significantly reduce the indirect impacts of these vessels as these services do not currently exist in the area. This will result in the protection of approximately 16 acres SAV and allow for the recolonization of approximately 1 acre of seagrass by removal of the inappropriate anchors.

Figure 6.06-6. Benthic Habitat Photographs

At 13 ft, algae is become the dominant species.

Seagrass still covers up to 25% at 12 ft.

At 11 ft, the transition happens and seagrass densities start to decline.

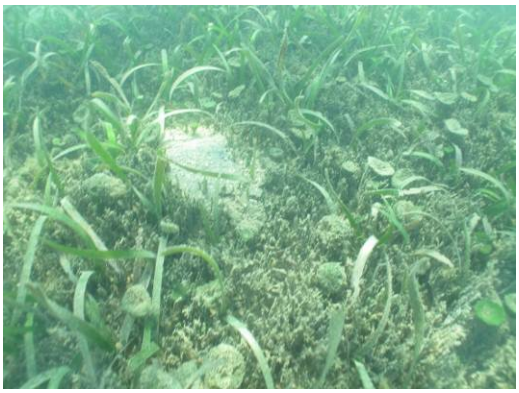
At 15 ft, algal species dominate.

But an occasional seagrass shoot can still be found at 14 to 15 ft.

Seagrass and algae at 13 ft.

Dense beds between 1 and 11 ft.

The seagrasses are thriving.



Some area are highly mixed seagrass and algae.

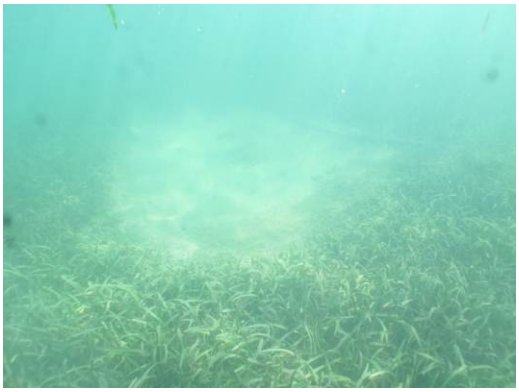
One of the large coral heads (24 inches in diameter).

Coral growing on debris.

Sea star.

Sea cucumber.

A small mooring scar.



More common footprint.

Debris is common.

6.07 Terrestrial Resources

The marina project subject to this permit application consists of over-water construction only. The following information from adjacent upland parcels is provided for reference. Most of the uplands adjacent to the marina had been cleared during the course of development and grading of the site over the years. The area around the existing businesses has been landscaped heavily and has a wide variety of palms and exotics. Noted on the property were fan palms (*Washingtonia robusta*), Christmas palms (*Veitchia merrillii*), bottle palms (*Hyophorbe lagenicaulis*), royal palms (*Roystonea elata*), thatch palms (*Coccothrinax sp*.), coconut palms (*Cocos nucifera*), yucca (*Yucca elephantipes*), Ixora (*Ixora coccinea*), frangipani (*Plumeria rubra* and *P. alba*), crotons (*Croton sp.*), Spanish bayonet (*Yucca aloifolia*), oleander (*Nerium oleander*), pencil bush (*Euphorbia tirucalli*), monkey puzzle (*Euphorbia lactea*), hibiscus (*Hibiscus sp*.), bougainvillea (*Bougainvillea spectabilis*), traveler palms (*Ravenala madagascariensis*), flamboyant (*Delonix regix*) and seagrapes (*Cocoloba uvifera*).

Along the shoreline are seaside maho (*Thespesia populnea*), buttonwood mangroves (*Conocarpus erectus*), widely scattered seagrapes and occasional white mangrove (*Laguncularia racemosa*).

Scattered about the site and on the perimeter and behind the Voyages building are water mampoo (*Pisonia subcordata*), turpentine (*Bursera simaruba*), black mampoo (*Guapira fragrans*), pegion berry (*Cocoloba diversaflora*), *Erythroxylum brevipes*, *Capparis cynophallophora*, wild pineapples (Bromelia penguin), fiddlewood (*Citharexylum fruticosum*), *Capparis indica*, mampos, fish poison (*Icthyomethia piscipula*), Capparis flexuousa, *Ocetea sp*, wild tamarind (*Lueceana luecenaphala*), marble trees (*Cassine xytocarpa*), spineless acacia (*Acaicia muricata*), milk trees (*Plumeria alba*) and casha (*Acacia tortuosa*).

Birds noted during the visits to the site included the brown pelican (*Pelecanus occidentalis)*, American egret (*Casmerodius albus*), Zenaida ground doves (*Zenaida aurita),* ground doves, (*Columbigallina passerine*), gray kingbirds (*Tyrannus dominicensis*) and green throated Caribs (*Sericotes holosericeu*).

Mongoose (*Herpestes auropunctatus*) and donkeys (*Equus asinus*) were observed during the survey. Repitles observed during site surveys included the tree lizards; *Anolis cristatellus, A. puchellus, A. stratulus*, the ground lizards; *Sphaerodactylus marcrolepis* and *Ameiva exsul* and the iguana, *Iguana iguana*.

Impact of Development

There will be no direct impact on terrestrial resources from the marina project. Most of the mature landscaping immediately around the building will remain, but the development will require the clearing of seven large trees, including all of the large trees on Parcel 41 Remainder and four large tree on Parcel No. 13-A behind Voyages. All of the species are common St. John trees.

6.08 Wetlands

The U.S. Army Corps of Engineers defines wetlands as "those areas that are periodically inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and under normal circumstances do support, a prevalence of vegetation typically

adapted for life in saturated soil conditions. Wetlands generally include swamps, bogs, marshes and similar areas." (USACE, 1986).

There are no terrestrial wetlands at the project site as shown on the St. John NE Wetlands map. The offshore areas are delineated as Estuarine and Marine Wetland.

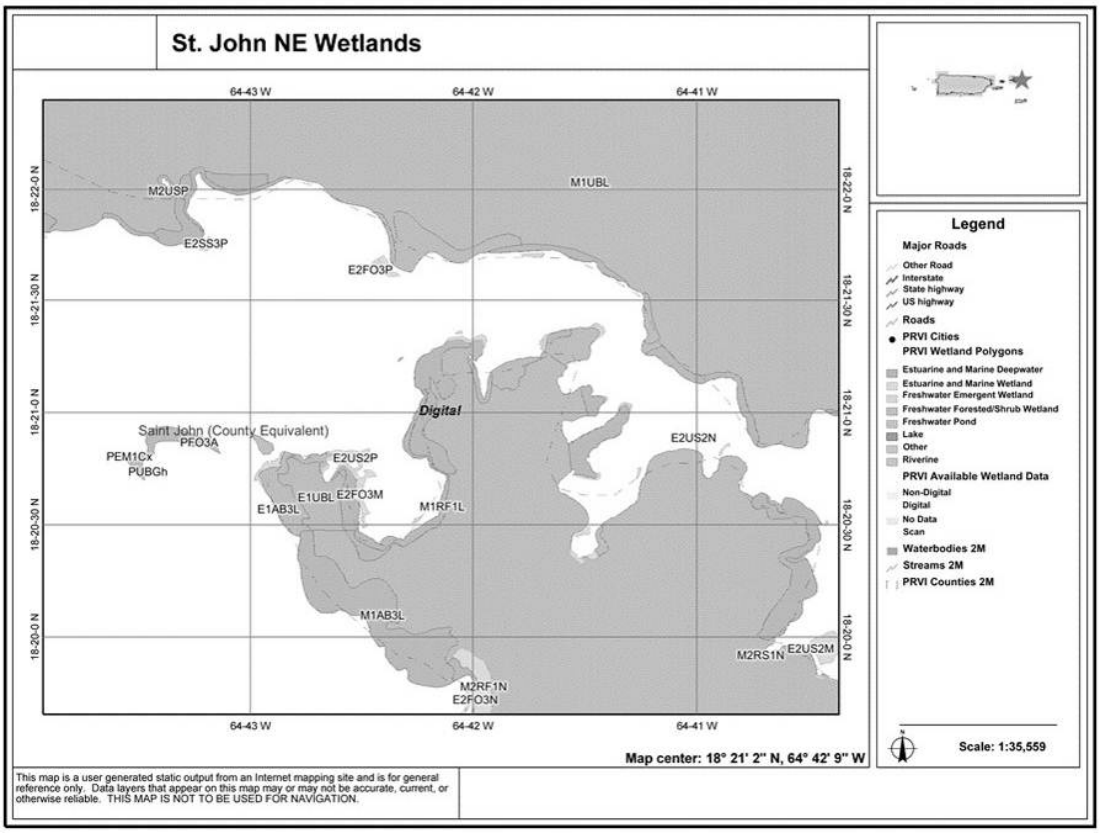


Figure 6.08-1. Wetland Map of Southeast St. John

There has been a question as to whether historic filling on the site was the result of there having been a salt pond or salt flat at this location. Neither are shown on the 1947 or 1971 aerial photographs, see Section 6.02. The USGS Quad maps from 1922 and 1934 do not indicate the presence of a salt pond or salt flat at this site either. The project will have no impact on terrestrial wetlands.

6.09 Rare and Endangered Species

Brown pelicans (*Pelecanus occidentalis*) have been seen within the project area. The brown pelican has been delisted in most of the continental United States, but they remain as

federally listed in the U.S. Virgin Islands. Delisting of these birds is currently being considered in this region.

The federally listed leatherback (*Dermochelys coriacea*), green (*Chelonia mydas*) and hawksbill (*Eretmochelys imbricata*) sea turtles are known to occur within the waters offshore of St. John. Hawksbill sea turtles were seen in the project area during the survey and green turtles were seen during transit in Coral Bay and have been seen during surveys in greater Coral Bay. The project area consists primarily of cobble and revetted shoreline and has an extremely narrow eroded shoreline that is not suitable nesting habitat for these turtles. The project will have no impact on nesting turtle.

The project will impact seagrass beds (SAV) through the installation of the docks. Seagrass is considered a critical foraging habitat for sea turtles. Boats will also be transiting through waters which are known turtle habitat and therefore there is a turtle strike potential for boats transiting the area.

Elkhorn (*Acropora palmata*) and staghorn (*Acropora cervicornis*) corals were listed as federally endangered under the Endangered Species Act (ESA) in 2006. Subsequently, the waters surrounding St. John, including Coral Bay, have been proposed to be designated as Critical Habitat for elkhorn coral (50 CFR Parts 223 and 226, Vol. 73, No. 25, February 6, 2008). A single live *Acropora palmata* colony was located offshore of Harbor Point on the far side of Coral Harbor, approximately 1,500 ft from the project area.

Seven corals have also been nominated for federal listing as threatened or endangered under ESA. It is probable that these species will become listed during the summer of 2014. These species include: *Agaricia lamarcki, Dendrogyra cylindrus, Dichocoenia stokesii, Montastrea annularis, Montastrea faveolata, Montastrea franksi* and *Mycetophyllia ferox*. *Montastrea annularis* is present in the nearshore environment on the far side of the harbor and small colonies are present on the hard bottom to the east of the proposed project. The location of these species is shown in Figure 6.09-1.

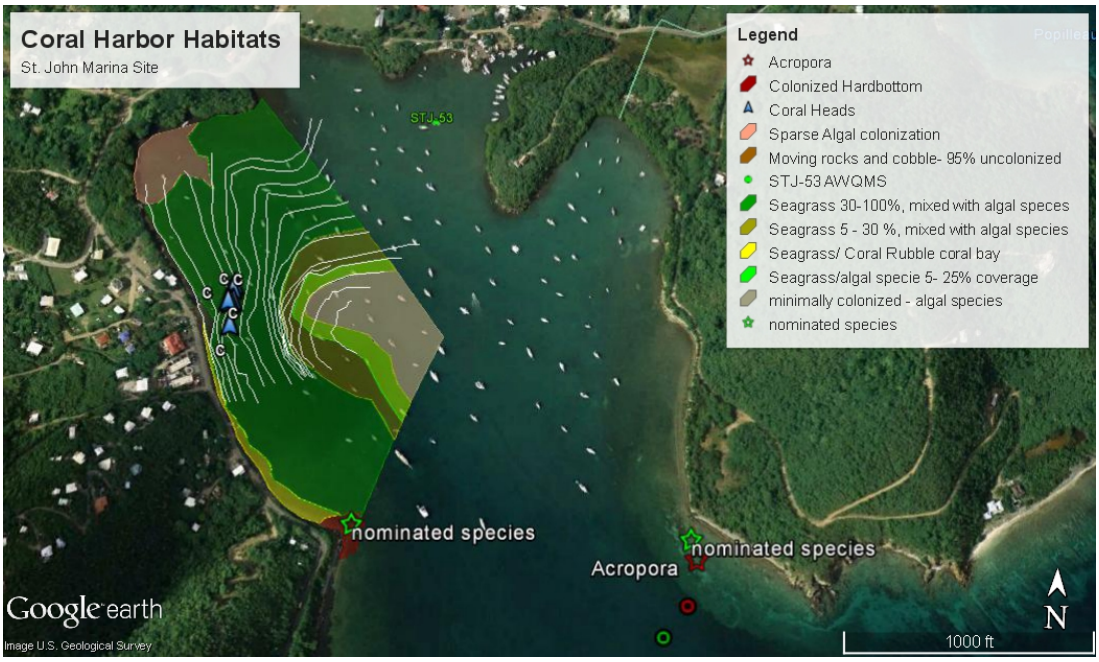


Figure 6.09-1. Benthic Habitat Map Showing Location of Acropora and Nominated Species in Relationship with the Proposed Marina

The project will have no direct impact on these coral species. However, the project does have the potential to impact these species during construction due to water quality impacts and due to vessel strikes.

Impact on Listed and Nominated Species

The project will be directly impacting approximately 2,500 ft^2 of seagrass due to the placement of approximately 1,333 piles ranging from 12-17" in diameters. Due to wave turbulence, seagrass will also be lost surrounding the piles. The dock itself occupies 1.42 acres of which 181 ft^2 will be over areas with seagrass and coral rubble, 1,567 ft^2 over area of sparse seagrass, 41,546.37 ft^2 over areas with 30%-100% seagrass coverage, 27,072 ft^2 over areas with 5-30% seagrass and algae coverage and 4,717 ft^2 over areas with 5% seagrass/algae coverage. The dock will result in a shading impact of 1.42 acres and with the use of the graded decking we are assuming somewhere around a 46% survival rate based on NMFS studies or a 0.8 acre sea turtle foraging habitat loss due to shading (Landry, 2008).

To minimize the direct impact of pilings the seagrass within the piling footprints will be transplanted. The transplant plugs will be used to seed the area in the northwest corner of

the bay, which has been impacted by the deposition of sediment from years of uncontrolled stormwater runoff.

The boats at the dock will shade another 5.7 acres at maximum occupancy. The slips will be occupied on average 47% of the year. As seagrasses are reported to be impacted after approximately two weeks of shading, this will result in some loss of seagrass with in the marina due to vessel shading. This will probably manifest itself as a loss of density as well as denuding of some areas, especially around larger permanently moored boats (if any). It is estimated that as much as 2 acres of seagrass may be lost.

The project also has the potential of impacting SAV within the approximate 8 acres project area due to temporary shading by construction vessels and potential direct construction impact. The direct construction impact will be related to barge movements and spuds and will be minimized through monitoring and delineating spudding and anchoring areas. Barge shading will be mitigate through the periodic relocation of barges to prevent shading impacts. The surrounding SAV could also be impacted by construction related turbidity impacts. This will be abated by sediment and siltation control through detailed planning, training and stringent monitoring.

Sea Turtle and Smalltooth Sawfish Construction Conditions

The permittee shall comply with the following protected species construction conditions:

a. *The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.*
b. *The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.*
c. *Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.*
d. *All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All*

vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.

e. *If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.*

f. *Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.*

g. *Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.*

To avoid and minimize injury or death to marine mammals and sea turtles, the following NMFS measures from the Vessel Strike Avoidance Measures and Reporting for Mariners will be implemented by all vessels associated with the project construction. The following information and signage will be placed in highly visible locations on the dock:

1. *Vessel operators and crews should maintain a vigilant watch for marine mammals and sea turtles to avoid striking sighted protected species.*
2. *When whales are sighted, maintain a distance of 100 yards or greater between the whale and the vessel.*
3. *When sea turtles or small cetaceans are sighted, attempt to maintain a distance of 50 yards or greater between the animal and the vessel whenever possible.*
4. *When small cetaceans are sighted while a vessel is underway (e.g., bow-riding), attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area.*
5. *Reduce vessel speed to 10 knots or less when mother/calf pairs, groups, or large assemblages of cetaceans are observed near an underway vessel, when safety permits. A single cetacean at the surface may indicate the presence of submerged animals in the vicinity; therefore, prudent precautionary measures should always be exercised. The vessel should attempt to route around the animals, maintaining a minimum distance of 100 yards whenever possible.*
6. *Whales may surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel and when safety permits, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.*

Sound in water moves four times faster than in air, and attenuation (sound dissipation) is much lower in water than air. When an in-water sound is generated, a pulse is created that radiates out from the source. Geotechnical conditions (e.g. substrate density) and ocean conditions (e.g. surface condition, current strength, depth of water, salinity, suspended solids in water column) affect the propagation and the attenuation of in-water sound. Attenuation depends on both the frequency and distance travelled, in that as both increase, attenuation also increases (Richardson et al. 1995). Sound typically dissipates more rapidly in shallow, turbid waters over soft substrates and reverberates and scatters when it encounters geological features and structures. The conditions within Coral Harbor should help to dissipate the noise impacts. Therefore, the effects of underwater sound on aquatic life can be very different from that on land or in air.

Underwater sound in the marine environment is generated by a broad range of sources, both natural and human (anthropogenic). Open ocean ambient sound has been recorded between 74 and 100 dB off the coast of central California (Heathershaw et al. 2001). Ambient noise levels for other water bodies based on surveys generally follows in this range. Based on deep-water studies in the Northeastern Pacific, low-frequency background sound has doubled each decade for the past forty years as a result of increased commercial shipping (Andrew et al. 2002, McDonald et al. 2006) resulting in a 15 to 20 dB increase in ambient conditions compared to preindustrial levels. Table 6.09-1 identifies ambient underwater sound levels at various open water and coastal water locations. Coral Harbor will likely be in the 80-87 dBpeak range.

Table 6.09-1. Ambient Noise Levels

Environment	Location	Ambient Noise Levels (dB_{PEAK} unless noted)	Source
Open ocean	Central coast, CA	74 – 100	Heathershaw et al. 2001
Open ocean	Beaufort Sea, AK	80 – 83	Roth 2012
Coastal water	Prudoe Bay, AK	80 – 87	Roth et al. 2012
Marine surf	Fort Ord Beach, CA	138	Wilson et al. 1997
Large marine bay, heavy industrial use, and boat traffic	San Francisco Bay, CA	120 – 155 or 133 dB_{RMS}	Strategic Environmental Consulting, Inc. 2004
Large marine bay, heavy commercial boat traffic	Elliot Bay, WA	147 – 156 or 132 – 143_{RMS}	Laughlin 2006
Large marine bay, nearshore, heavy commercial, recreational boat traffic	Monterey Bay, CA	113	O'Neil 1998

Note: (RMS refers to root mean square)

US Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration's (NOAA's) National Marine Fisheries Service (NMFS), have developed threshold values, values that elicit some response from a target species, for making effect determinations for Endangered Species Act (ESA) listed species as follows:

- Detectability threshold (where the noise is detectable, but reactions are not observable).
- Alert and disturbance threshold (alert is where the noise has been identified by the target species, interest is shown; disturbance is where the target species shows avoidance of the noise by hiding, moving, or postponing feeding).
- Harassment/injury threshold (where the target species is actually injured).

NMFS's current thresholds for impulse noises (ex. impact pile driving) and non-impulse noises (ex. vibratory pile driving, dredging, etc.) for marine mammals are listed below in Table 6.09-2.

Table 6.09-2. Thresholds for Impulse & Non-Impulse Noises for Marine Mammals

Criterion	Criterion Definition	Threshold
Level A	PTS (injury) conservatively based on TTS	190 dB_{rms} for pinnipeds 180 dB_{rms} for cetaceans
Level B	Behavioral disruption for impulsive noise (e.g., impact pile driving)	160 dB_{rms}
Level B	Behavioral disruption for non-pulse noise (e.g., vibratory pile driving, drilling)	120* dB_{rms}

All decibels referenced to 1 micro Pascal (re: 1µPa). Note all thresholds are based off root mean square (rms) levels.
* The 120 dB threshold may be slightly adjusted if background noise levels are at or above this level.

To minimize noise impacts to these species a vibratory hammer will be used to drive piles wherever feasible. Vibratory hammers are a recommended by NOAA as that they have a lower acoustic impact.

Based on this information if a vibratory hammer is used the sound created during construction should be 120 dB and below that which injury occurs.

Based on recommendations of the Fisheries Hydroacoustic Work Group (FHWG) in June of 2008, the current sound thresholds from impulse noises (such as pile driving) that cause injury to fish are:

- 206 dBPEAK
- 187 dB cSELfor fish > 2 grams
- 183 dB cSEL for fish < 2 grams

The designation cSEL indicates the “sound exposure level in octave C”. The threshold for behavioral impacts for all fish is 150 dBRMS (FHWG 2008). Vibratory hammer activities should be below that range.

The project will have the potential to impact *Acropora* and the nominated species through vessel strikes. To minimize this impact the applicant will be placing informational buoys delineating the shallow hard bottom areas within Coral Harbor and will be providing information signage on the dock advising mariners of avoiding shallow reefs while in transit and to avoid anchoring in area of coral and seagrass.

6.10 Air Quality

All of St. John is designated Class II by the Environmental Protection Agency in compliance with National Ambient Air Quality Standards. In Class II air quality regions, the following air pollutants are regulated: open burning, visible air contaminants, particulate matter emissions, volatile petroleum products, sulfur compounds, and internal combustion engine exhaust (Virgin Islands Code Rules and Regulations).

The use of heavy equipment during the construction of this project and related facilities will have a short-term and minimal air quality impact. Once construction is complete, air quality will be impacted by occasional use of a backup generators and vessels transiting the marina. The marina will have one backup generator, located on the adjacent uplands, utilized for emergency potable water pumping and dock lighting only. An operating permit

for this generator will be obtained from the Department of Planning and Natural Resources, Division of Environmental Protection.

Impacts to air quality are expected to minimal and be short-term during construction and short-term & sporadic during operations.

7.0 IMPACT OF THE PROPOSED PROJECT ON THE HUMAN ENVIRONMENT

7.01 Land and Water Use Plans

The waterfront area connecting the marina to the uplands is primarily zoned W-1, Waterfront - Pleasure, with one parcel zoned B-3, Business. Adjacent parcels are zoned B-3 or R-1, Residential. The proposed marina development is allowed under the current zoning designation. The Virgin Islands Zoning Code states that W-1, Waterfront - Pleasure, was established to meet the recreational needs of the people of the islands and the visitors, which this project accomplishes with the marina and associated amenities. Adjacent land uses are primarily residential.

Under the Coastal Zone Management Act (CZMA) of 1972, the U.S. Virgin Islands DPNR designated Coral Bay as one of 18 Areas of Particular Concern (APC) in 1979. An APC is a geographic area designated for purposes of preservation or restoration because of conservation, recreation, ecological, or aesthetic value. The Coral Bay APC was approved in 1991 after the Coastal Zone Management Commission held public hearings on St. Croix, St. John, and St. Thomas.

The Coral Bay APC Management Plan was developed as a planning document to better understand the resources and concerns in the area. The St. John Marina was designed with the goals of this plan in mind, particularly with respect to establishment of a regulated mooring field to minimize damages to seagrasses from improper mooring and anchoring in the bay.

7.02 Visual Impacts

Many iconic photographs of coastal New England hamlets, Floridian seaside villages and Caribbean destinations center on marina settings. Marinas and the wide range of sea-faring vessels that are found there inspire visions of fun and romantic nautical outings and adventures, evoking positive emotions and a sense of wonder.

The St. John Marina, with its new state-of-the-art docks and upland buildings in their classic West Indian architecture vernacular, will evoke those feelings of wonder and through experience of the marina’s services, create memories that could last a lifetime. This positive

visual impact is a primary consideration for the developers of The St. John Marina as this aesthetic is essential to success within target markets.

Landscaped with palm trees, fringing mangroves, bougainvillea and other native flora, this impressive marina and associated upland complex will add to and improve the lifestyle of not only visitors, but residents of Coral Bay by providing much needed services. The beautiful design and construction will create a destination that will be a great source of pride. This is a stark contrast to what is currently exhibited in Coral Bay.

All utilities, including electric, water and wastewater, will be located under the docks and out of sight. Marina lighting will be sea turtle friendly and will take into consideration and generally conform to the conditions outlined in Florida's Model Lighting Ordinance for Marine Turtle Protection (Chapter 62B-55 of the Florida Administrative Code).

7.03 Impacts of Public Services and Utilities

The following sections address impacts to public services and utilities utilized and/or developed by the marina project.

7.03a Potable Water

Potable water will be provided by water collected in cisterns and purchased from both WAPA and Caneel Bay Resort on an as-needed basis and Caneel Bay Resort has committed to providing up to 90% of the projected daily demand if needed. Both sources of potable water are addressed in the associated Major Land Permit application. The potable water demand from the marina facility at normal expected occupancy, based on an average demand per slip of 30 gallons per day, should not exceed 4,500 gallons per day (gpd). During the peak season, empirical data from similarly sized marinas in the Caribbean indicate that a rare peak demand of up to 25,000 gpd could be expected. This is largely due to the large transient vessels expected during the cruising season that normally do not operate their onboard water systems while moored. The potable water delivery line to the marina and distribution lines on the docks will be a minimum of 4-inch diameter and are sized to handle that expected maximum flow plus capacity for fire suppression. All potable water taps will be metered and monitored.

7.03b Wastewater Collection and Disposal

Wastewater will be transported via the marina's pumpout system to a 3,000-gallon upland holding tank, addressed in the associated Major Land CZM Permit application, and will be hauled offsite by a licensed hauler for treatment and disposal at Cruz Bay. The frequency of hauling is expected to be weekly. The frequency will vary seasonally and additional hauling will likely be required during the high season as the pumpout system will be available for public use.

The marina intends to provide pumpout services to the public in an effort to help improve water quality in Coral Bay. The volume of wastewater collected by the marina from non-marina users is not known but the flexibility provided by marina pumpout facilities will be able to handle a significant volume of wastewater if necessary and increase the frequency of hauling as needed to maintain adequate storage capacity. A high-water-level alarm will be installed on the holding tank to alert management when hauling is required.

7.03c Solid Waste

The St. John Marina waste management plan takes into consideration both in the short term and long term the proper disposal of solid, liquid and hazardous wastes.

Construction Phase

The Virgin Islands Waste Management Authority (VIWMA) has specific guidelines and criteria for accepting construction debris. These criteria have been discussed with VIWMA during meeting and phone conferences. The handling of construction solid waste from the building process of The St. John Marina will follow those guidelines and criteria using 20-ft roll-off containers. Waste will be disposed of at the Bovoni Landfill by a local, licensed waste disposal contractor and will include the required Waste Manifest.

Operation Phase

Management of solid waste will follow the model currently used by nearly all St. John businesses and residents. Based on data from similar marina facilities, the expected solid waste generation rate at the marina is 1.5 pounds/slip/day, for a weekly average generation rate of 1,500 pounds of solid waste. Solid wastes will be collected daily throughout the marina as necessary and deposited in one of two 20-ft covered roll-off containers or a single compactor and will be serviced as needed by a licensed, local St. John hauler.

The container will be transported to the Bovoni Landfill on St. Thomas where it will be weighed and processed for disposal.

7.03d Roads, Traffic and Parking

This project will add driveway and parking areas. The number of parking spaces required for the marina patrons and staff was calculated per the Virgin Island Code (see 5.00, Description of Project - Project summary data on the associated Major Land Permit application). Planned parking spaces include off street parking for 116 vehicles, 5 ADA compliant parking spaces and 5 loading/unloading spaces as shown on the attached site plans. Construction parking will be contained on the associated uplands immediately adjacent to the marina in the material staging areas, which shall be parcels 10-17, 10-18 and 10-41.

The developer commissioned a traffic impact study in 2013 (Appendix J) to assess potential impacts from this project. This study concluded that there will be a minor increase in traffic in the area due to this project but the increase is not expected to overburden the existing road system. The conclusions and recommendations from this study are as follows:

1. The project is estimated to generate approximately 152 trips in the Friday morning peak hour, 319 trips in the Friday afternoon peak hour, and 336 trips in the Saturday peak hours. Most of the traffic generated by this project will be recreational traffic during off-peak times.
2. Access will be provided via three unsignalized driveways to Route 107 (including relocated Estate Road) and will operate at a highly acceptable level of service (LOS) A during the peak periods.
3. The offsite intersection of Route 10/Route 107 will operate at very good LOS NB for the stop-controlled approach of Route 107. There are no improvements at this intersection necessary to accommodate the increase in traffic attributable to this project.
4. The traffic generated by the proposed project can be integrated into the adjacent roadway network without significant negative traffic impact. It is recommended that a minimum 20-foot-wide cartway be maintained on Route 107 within the project limits.

There are no auxiliary turn lanes required along Route 107 to accommodate the future traffic.

Construction traffic will result in a temporary increase in vehicles from workers and equipment and supply delivery. Construction workers will be encouraged to carpool and will arrive and exit the project during peak traffic times. This may result in a minor slowdown in traffic patterns during construction. Delivery of equipment and supplies will occur sporadically during the day and are not expected to cause a disruption in the normal flow of traffic on Route 107 at this site. Disruptions to vehicular traffic transiting Route 107 during the work day will be minimal and the contractor will be required to develop a maintenance of traffic plan for both safety and transit of vehicles while Route 107 is impacted by the project's construction.

Parcels 17 & 18, which are currently cleared, will be utilized for land-based storage and staging of construction materials as-needed.

7.03e Electricity

The developers of The St. John Marina have met with WAPA's head of operations for St. John, Winston Smith, and WAPA engineer Lowell Fahie to discuss the load requirements and infrastructure necessary for the project. Both Mr. Smith and Mr. Fahie have stated that the current infrastructure and capacity of 5 megawatts (MW) for WAPA that can adequately meet the peak usage of the 1.5 MW estimated as the proposed project demand.

The St. John Marina submitted the preliminary Load Requirement Sheet that WAPA requested, Appendix K. This Load Requirement Sheet identifies the electrical requirements for the project and allows WAPA to run the necessary calculations needed to make sure that both the community and the proposed project will have sufficient power as required by the marina vessels and the upland businesses. Additional infrastructure required by the proposed project, such as transformers, underground lines, etc., will be funded by the developer.

WAPA currently has three-phase power at the site of The St. John Marina. Distribution is to be facilitated by a series of transformers and switch gear to supply multiple voltages that include 480 three-phase, 220 single-phase, and three-phase 110 ground fault interrupter

(GFI). The costs and installation will be borne by the proposed project. All electrical distribution lines will be underground or under docks in conduits. Two of the transformers will be located on the marina docks to reduce cabling requirements. WAPA has informed the developer that the use of the three-phase power by this project will not detract from the single-phase power that the community of Coral Bay uses.

7.03f Schools

The patrons of this project will be either existing residents or transients. Therefore, there is no impact anticipated to the school system.

7.03g Fire & Police Protection

The nearest fire station is located six-tenths of a mile from the marina. Police emergencies are expected to be handled by nearest unit dispatched through the Cruz Bay station. The marina will also have a detailed security plan as well as on site security guards on duty at all times.

A comprehensive fire suppression system will be specified during the final design process, with guidance provided by National Fire Protection Association (NFPA) 303, and NFPA 307, and local codes. All local fire codes will be followed, with coordination with the local fire official during the early stages of the final design. The St. John Marina will provide training for personnel that meet or exceed the requirements of all federal and territorial governing agencies.

The marina will be equipped with a boat mounted stationary fire pump capable of producing 350 gallons per minute of seawater and additional fire hose sections totaling 1,000 feet. The boat will be equipped with covers and compartments for all hose and firefighting apparatus and will be routinely used for drills and training to insure it is in good working order at all times. Additionally the boat will have a tow post that will allow the boat to be used to pull yachts that are a fire hazard from the dock thus minimizing the fire risk to other vessels.

Dockside there will be a gasoline powered golf cart with a stationary 350 gallon per minute fire pump as well as a portable pump and various lengths of hoses to pump salt water and or potable water from the main water source on the dock should a fire emergency occur.

The emergency cart will also have emergency medical equipment and first aid supplies on board in addition to “turn out gear” and other protective fire apparatus for the personnel responsible for its operation. This unit will routinely be used for training and drills and will be dedicate solely to emergency response.

At intersections of not more than 100’ feet apart the dock will be equipped with standpipes constructed in accordance with NFPA 14 connected the potable system with the ability to quickly be disconnected and charged via fire truck. Each stand pipe will also have a hose cabinet and fire extinguisher.

Additionally, a valve connection will be provided for a fire truck to hook directly to the upland cistern water supply in the event additional water is needed, thus increasing the availability of water and reducing the travel time for the fire trucks. Total cistern capacity on site will be approximately 150,000 gallons of potable water and up to 100,000 gallons of collected stormwater.

7.03i Public Health

Long-term or significant affects to the Public Health system are expected to be negligible from this project. Employees at the marina development will be drawn from local residents and should not increase the demand on existing health services. It is possible that transient boaters may require emergency care and would be treated by the emergency services in St. John or possibility St. Thomas. Existing services should be able to handle the number of potential required visits.

7.04 Social Impacts

The St. John Marina hopes to have a positive social impact on both visitors and the local community. Decades of unsatisfied demand by the St. John community and recreational boaters will be fulfilled in Coral Harbor through the development of The St. John Marina, which will provide much needed dockage, fuel, provisioning and pumpout services.

The St. John Marina will be located on a combination of land leased from a long-time St. John family and purchased property. This highly visible St. John project will be a substantially locally owned marina, in and of itself constitutes a significant and positive

social impact. In addition, further business opportunities in the marine sector will occur once there is a marina to provide the needed support services.

The provision of marina facilities in the place of haphazard anchoring and mooring patterns will yield a positive social impact on the St. John and Coral Bay communities.

The following sections discuss several areas that this project will further contribute positive social impacts to the community at large.

Organizational Synergy

As a committed community member and leader by example, The St. John Marina partners have been and will continue to be active supporters and participants with various St. John civic and community organization activities and programs. Based on projected EDC benefits, a minimum of $50,000 in annual contributions is budgeted to help ensure the quality of life and pursuit of happiness for all St. Johnians.

The following is a partial list of the organizations and activities The St. John Marina ownership, management, employees and partners support directly.

Guy Benjamin School (GBS)

The St. John Marina partner Rick Barksdale, as a part of Using Sport for Social Change delivered backpacks filled with school supplies to every student in attendance at the GBS on Friday, October 5, 2012. This is the first of many efforts to encourage and support education and opportunity for Coral Bay children.

Island Green Builders Association (IGBA) & Island Green Living Association (IGLA)

With local partners as Professional Members, The St. John Marina enthusiastically supports IGBA's goal of responsible and sustainable development on St. John. This includes projects that are planned and completed that provide St. John with a sustainable economic base while honoring its unique diversity, ecological health, sense of community and quality of life.

Kids and the Sea (KATS)

The KATS website cites the Virgin Islands' greatest human resource is its youth and its greatest natural resource is the sea. The St. John Marina proudly supports KATS members

and volunteers in increasing the enjoyment, understanding and safety of youngsters understanding of their relationship with the sea. Through hands-on seamanship training, members become aware of boater safety, recreational activities and career opportunities in the marine industry.

Coral Bay Community Council

Local marina principals are active in a number of CBCC initiatives. Rick Barksdale was instrumental in the facilitation of the vision process for the future of Coral Bay, generated through the American Institute of Architects Sustainable Development Assessment Team in April and May 2013.

Both Mr. Barksdale and The St. John Marina principal Chaliese Summers are proactive in Phase ll of the Coral Bay Watershed Management project. Both serve on the Marine Uses Planning group, with Rick a part of the Marina subgroup and Chaliese a part of the Mooring subgroup. Rick most recently participated in the planning for the application of a grant to remove derelict boats from Coral Bay.

Additionally, in an effort to maximize protection of the environment and to incorporate the work done in Phase l and planned for Phase ll of the Coral Bay Watershed Management Plan, The St. John Marina developers have hired Joe Mina, PE, who was the civil engineer responsible for each success of the Phase l plan.

Friends of the Park

International Coastal Cleanup, called Coastweeks on St. John and sponsored by Friends is one of several clean water, beach and shoreline projects that The St. John Marina enthusiastically supports.

St. John Community Foundation

The new Go Green Initiative program is an endeavor to make a positive impact on the environment by educating the community on best practices for the conservation and reduction of waste and to foster an understanding of the importance of making environmentally responsible decisions.

The Life Skills and Career Development

This summer program helps St. John students measure 12 interest factors directly related to occupations and systematically compare their aptitudes and interests to more than 2,500 jobs. Participants select 3 to 5 potential job titles to work toward and add them to their Career Portfolio.

Citizens Advisory Committee (CAC)

VIWMA's Citizens Advisory Committee is a group of volunteer citizens interested in waste management issues and the protection of natural resources. Rick Barksdale is one of five St. Johnians committed to solving the waste management issues faced by the entire territory. In partnership with VIWMA and CAC membership, The St. John Marina partners have proposed an adopt-a-site program that includes improved collection methodology, elevating site standards, landscaping, signage and maintenance. The St. John Marina has volunteered to be the first to adopt a site, located in Coral Bay.

Yacht Clubs

The Coral Bay Yacht Club's "Almost" Annual Flotilla benefiting the Guy Benjamin School is an initiative that the local partners of The St. John Marina enthusiastically support. The St. John Marina welcomes area yacht clubs and their membership and supports area yacht clubs efforts through regattas and other fund raising efforts to the benefit of children's boating and sailing programs, safe boating and environmental awareness.

USVI Department of Tourism (USVI-DOT)

In cooperation with the USVI-DOT, The St. John Marina supports initiatives to continue to bring visitors to St. John to experience the island's unique beauty, culture and lifestyle, with emphasis on visitors by sea. As an example, educational programs emphasizing environmental sensitivity and responsibility and safe boating will be offered periodically at the marina to visitors by sea as well as local boaters.

St. John Animal Care Center (ACC)

Wagapalooza is one of the most popular of several fund raising efforts of the ACC and is one of St. John's best attended island events. The ownership and management of The St. John Marina are proud supporters of all of ACC's programs and efforts.

Using Sport for Social Change (USFSC)

Under the SJCF umbrella, every year USFSC sponsors JUST PLAY! One of many activities, JUST PLAY is a day of fun outdoor activities helping St. John youth focus on fun and fitness as a lifestyle, thus promoting healthier, happier kids. The St. John Marina partner Rick Barksdale has been a key volunteer and promoter of this event since its first JUST PLAY! event in 2009.

Community Involvement

Historically, Coral Bay has always had a strong maritime culture, having served in the past as St. John's main port and center of commerce. As a proactive member supporting Coral Bay, through community involvement The St. John Marina and its partners will continue to contribute to this unique Caribbean village in a variety of ways.

The proposed **fish and farmer's market** will serve as not only a place of commerce for local farmers and fishermen, but as an old-fashioned community center where friends gather to buy St. John's freshest and finest produce and fish, and a gathering place to share good times and the news of the day.

Internship is a successful method to support young people in their growth and development as they look to establish a career path and gain valuable experience in the workplace. In support of the community's youth, The St. John marina will establish several internships positioning Coral Bay's youth for career success.

As a part of the Clean Marina and Blue Flag programs, The St. John Marina will provide **field trip opportunities** for St. John students helping them better understand environmental stewardship, the joy of recreational boating and career opportunities in the maritime industry. Safe operation and respect for the environment are cornerstones to a healthy boating community. **Adult education** on both topics will be available to both visitors and residents through workshops and seminars in the marina's Clean Marina and Blue Flag programs.

The St. John Marina developers have been vitally active with their valuable contributions as volunteers and facilitators for years.

Rick Barksdale

- Volunteer (only developer) for Phase ll Coral Bay Watershed Management Planning (CBWMP) through the Coral Bay Community Council
- Member of Marine Uses Planning team of CBWMP-Phase ll and member of the Marina Sub-group – most recently planned for grant application for Coral Harbor cleanup of derelict vessels
- Volunteer/Steering Committee member for the American Institute of Architects Sustainable Design Assessment Team (AIA-SDAT)
- Member St. John Group (5) VIWMA – Citizens Advisory Committee
- Volunteer Coastal Clean Up through Friends of the Park, USVI Dept. of Tourism
- Member/supporter of IGBA/IGLA initiatives – Guest panelist for recent renewable energy forum sponsored by Island Green Building Association
- Volunteer with St. John recycling

Chaliese Summers

- Member of Moorings, Dingy Dock & Anchorage Subgroup of the Marine Uses Planning Group, Phase ll of The Coral Bay Watershed Management Plan through Coral Bay Community Council
- Participant in preliminary and primary AIA-SDAT meetings
- Volunteer with St. John recycling
- Member/supporter of IGBA/IGLA initiatives
- Member/supporter of Friends of the VI National Park

The St. John Marina's proposed **Adopt-A-Site** program whereby St. John businesses, civic organizations and religious groups adopt a waste collection site, seeks to refine the process of waste management through improved collection methodology, elevating site standards, landscaping, signage and maintenance.

Fishermen

According to a recent Fisheries of the United States (2011) report by National Oceanic and Atmospheric Administration (NOAA)National Marine Fisheries Service, commercial fishing in the USVI represents a $7.1 million industry, which equates to approximately 1.3 million pounds of fish, most of which is consumed exclusively in the territory.

The USVI has a history of supporting commercial fishermen through a variety of initiatives, including dedicating government controlled land for exclusive use by fishermen. The St. John Marina is firmly committed to preserving the historical culture of Coral Bay fishermen and their contribution to the local economy and convenience to residents by providing fresh catch. The developers of the project have done much research and legwork to ensure that conditions are improved for this integral part of St. John culture and commerce.

In an effort to support and encourage local fishermen and increase public safety, the applicant proposes to improve safety and marketability for Coral Bay fishermen by providing space and incorporating a "catch of the day" at their proposed Fish & Farmer's Market. This will eliminate the imminent danger of vehicular traffic and provide a platform from which fishermen may address the other health and safety issues they face.

7.05 Economic Impacts

The information presented in this section is the result of research using an analytical model developed by Drs. Ed Mahoney, Dan Stynes and Yue Cui of the Recreational Marine Research Center, Michigan State University, with the considerable assistance of Dr. David Harding, Florida Fish and Wildlife Conservation Commission.

The model was developed through the compilation of data collected from approximately 30,000 surveys of registered boat owners that distilled and analyzed 17,300 specific boat trips and annual vessel spending of almost 3,800 boat owners from 2006 to 2008.

The model estimates annual vessel -related spending in eight categories and trip spending in ten categories. Employment and income effects are reported for a dozen economic sectors. Data about boat size, type and lease or rental term specific to The St. John Marina was input into the matrix to generate the results for this study.

Even at moderate occupancy, The St. John Marina's impact is estimated to contribute $8,786,500 contribution to the economy of St. John and the USVI. For the most part, these are new dollars that were not a part of the local economy prior to the development of The St. John Marina. As examples, on a typical day trip, a powerboat in the 42-ft to 48-ft category will spend an average of $671 and a sailboat of 36 ft or greater would spend an average of $197, in part on fuel, marina services, provisioning, marine supplies, recreation and

entertainment. Virtually all areas of the local economy are impacted secondarily through taxi fares, car rentals, restaurants and tourist services providers.

Jobs

This research indicates that a minimum of 90 jobs will be created, with the vast majority of them made available to qualified St. Johnians. To ensure this, a job fair is planned for Coral Bay to give local residents every opportunity for employment. These jobs equate to labor income of $3,046,000, which is perhaps the greatest value added by The St. John Marina as it provides opportunities for the families of Coral Bay and the East End.

Internship/Mentoring

The St. John Marina will provide the opportunity for professional jobs in the marine industry. The St. John Marina will establish internships and mentorships in marine related professions.

Fish & Farmer's Market

A fish & farmer's market is proposed. The market will allow area farmers and fishermen to sell everything from fresh vegetables, fruit, honey, lobster and other catches of the day. This market is intended to support local farmers and fishermen.

Real Estate Valuation and Marketability

St. John Realtors have stated that the addition of The St. John Marina will have a significant, positive impact on real estate values and marketability. Qualified brokers estimated that, conservatively, the construction of the marina had the potential to increase real property values 10 to 20 percent within 3 to 5 years.

In summary, according to the Economic Development Authority of the USVI government, 90 percent of the territory's Gross Domestic Product is based on tourism and nearly 100 percent of St. John's economy is directly related to tourism. The St. John Marina gives Coral Bay and St. John the opportunity to expand its tourism potential.

7.06 Impacts on Historical and Archaeological Resources

A Phase I Archaeological Underwater Survey investigation was conducted at the marina site in January 2013. The investigation utilized diver transects, metal detecting, and probing in

concert with differential global positioning system, and was designed and implemented to identify the presence or absence of submerged historic remains. Results of the investigation documented no potentially significant archaeological sites within the project area.

Based on the results of the Phase I Archaeological Underwater Survey, the VISHPO concurred that no significant cultural resources were discovered onsite, had no objection to this development, and is requiring no additional studies. This investigation and the VISHPO clearance letter are provided in Appendix L.

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7.07 Recreational Use

The shoreline and upland areas are not used for recreational activities. People kayak and paddle board within the bay. The development of the marina will not preclude those activities. It is probable the marina development will include recreation related businesses.

7.08 Waste Disposal

VIWMA requires a Special Waste Disposal Permit for certain types of solid or liquid waste deemed non-hazardous, yet unacceptable for landfill disposal. The St. John Marina intends to submit the Special Waste Disposal Application for the appropriate VIWMA permit to be compliant throughout the construction process as well as once the marina is operational.

Hazardous waste at The St. John Marina will likely consist of used engine oil, batteries and flares. Dedicated secure storage areas on the uplands will be provided for temporary storage of used batteries and out-of-date flares. A used-oil storage tank will be located near the marina for the temporary storage of used engine oil. These materials will be stored safely under roof until a licensed private waste hauler removes them offsite for proper disposal.

7.09 Accidental Spills

The St. John Marina staff will be well trained and regularly drilled to prevent, identify and properly respond to spills of all types as required by the SPCC and Terminal Facility License. Potential sources of liquid spills at the marina include wastewater from vessel holding tanks, oily water from bilge pumps, and fuel. Oil changes and other boat maintenance activities will be prohibited.

Wastewater spills are unlikely to occur due the nature of the vacuum-powered pumpout system. However, if a wastewater spill originating from a vessel holding tank does occur, it would likely occur during a pumpout procedure. Protocol in this case will be to cease the transfer of the wastewater until the source of the leak is determined and eliminated.

As part of providing full service to the guests of The St. John Marina, diesel and gasoline fueling facilities will be incorporated into the project. Fuel will be made available to both guests of the marina and the public. Boaters on the south and east side of St. John will no longer have the expense and inconvenience of motoring to Cruz Bay for fuel. This service saves both time and money for consumers and help to protect the environment through lower fuel usage and traffic and proper dispensing method.

The applicant has meet with Syed Syedali, DPNR's Groundwater, UST, Terminal Facility Program Manager and Kent Bernier, Groundwater, UST, Terminal Facility Program Staff to review the guidelines and requirements of the fuel storage on the site and have incorporated the information in to the design.

Aboveground storage tanks with integrated secondary containment with capacity for approximately 45,000 gallons of diesel and 5,000 gallons of gasoline will be located on the western portion of Parcel 13 Remainder as shown on the site plans. These tanks will be

surrounded by concrete retaining walls and will each contain inventory monitoring, spill, and leak detection system equivalent to a Veeder Root TLS 300 leak detection system as described in the associated Major Land CZM permit application. This system provides in-tank warnings and alarms for leaks, overfills, low product, sudden loss, high water, delivery needs and test failures. The system will also incorporate a printer providing a printed record of inventory control, leak detection and alarms. Both the tanks and fuel lines will be doubled walled and inspected regularly to ensure their integrity as per the Terminal Facility Requirements. In addition, fuel lines over water will be contained in an additional conduit for further redundancy.

Floating booms and sorbent pads will be staged in water resistant containers strategically placed on the uplands and around the marina. This assures that this equipment will be available for use immediately in response to oily bilge water or fuel spills. Additionally, emergency shutoff valves will be installed at the point of distribution, delivery and storage in the unlikely event of a spill.

Sorbent pads and fuel traps to catch incidental spillage from vessel fuel tank vents will be used during fueling operations to prevent any discharges of fuel to the water. Additionally, emergency shutoff valves will be installed at the point of distribution, delivery and storage in the unlikely event of a spill.

7.10 Marina Security

The St. John Marina will be governed by all United States federal and territorial regulations, as well as those of the International Maritime Organization (IMO) and the International Ship and Port Facility Security Code (ISPS Code).

U.S. Customs and Border Protection

The U.S. Coast Guard recognizes Coral Bay as an officially port of entry, according to the local U.S. Customs and Border Protection office. The St. John Marina will provide CBP space based on its specifications to service the needs of incoming international guests and residents returning from foreign visits.

U.S. Coast Guard, DPNR & CZM

USCG officials as well as DPNR and CZM staff that they are welcome onsite at the marina at any time. It will be standing policy at The St. John Marina to accommodate these agencies and their vessels in the performance of their business.

Marina Security

The St. John Marina will have a security chief and security guards on staff, in addition to 24-hour monitored security. Security guards will be on patrol at all times and be responsible for patrolling both the upland and waterside marina elements.

The main walkway that connects the dock to the shore will have a card-activated security gate. Marina management will distribute cards exclusively to guests and marina personnel. The gate will remain locked at all times and will only be accessible with the assigned cards. There will be no unauthorized overnight parking at the dingy dock or in the land-based parking lots.

Security cameras will be installed throughout the marine and upland facilities and the feed from these cameras will be monitored and recorded by marina security. Cameras will be positioned to ensure that each of the dock trees, as well as all of the primary upland areas, are under video surveillance at all times.

7.11 Hurricane Preparedness

Hurricanes are a risk for any coastal marina operating in the Caribbean, Gulf of Mexico or Atlantic Ocean. For owners and managers of marinas, hurricanes and other natural disasters are considered manageable risks worldwide and The St. Johns Marina will manage this risk through comprehensive insurance and through a hurricane contingency plan (HCP).

As a marina operating in the Caribbean Basin, a comprehensive HCP is an absolute necessity and must be reviewed periodically to ensure its effectiveness. Alerts and warnings issued by the National Weather Service, USVI and federal authorities will activate a condition level with a response preparation time ranging from 36 to 72 hours prior to the occurrence of a tropical weather event. Appropriate actions and responses are predetermined for each condition level and involve every aspect of marina operations from

securing docks, managing evacuations, and ensuring the safety of visitors, personnel and property.

In addition to the HCP, innovative engineering and construction methodology developed over the past few years gives the added benefit of being able to resist moderate hurricane influences as well as seismic activity. The St. John Marina incorporates much of this modern engineering and design for hurricane resistance. The dock structures in the marina are designed with grated decking installed as discrete panels that provides less resistance wave forces and will remain attached to dock structure during severe weather conditions. In addition, reverse flow valves will be a part of both fuel and liquid waste systems. In the event of a hurricane, this allows for fuel lines and liquid waste disposal lines to be emptied, thus reducing any danger of spillage.

For the Post-Storm Stage, all personnel deemed essential will notify management of their personal status and then, if appropriate, will report for duty as soon as permitted by emergency management authorities. Reporting personnel will begin an immediate assessment and documentation of any damage and render assistance as deemed necessary to protect life and property. Upon securing the facility, a sequential protocol will be followed to return The St. John Marina to operational status as soon as safely possible.

7.12 Potential Adverse Effects, Which Cannot be Avoided

The general rule of construction in the Virgin Islands is 6 days a week except on residences, which is 7 days a week. The applicant agrees that construction noise during church services would be unacceptable but would not want to be restricted to 5 days per week which will prolongs the construction time. As for work hours, 7:30 is a late start on weekdays as construction workers like to get started with the sun and not work during the heat of the afternoon. Most families are up and getting ready for the day by 7:00. The applicant proposes working 6 days per week, with a 7:00 AM - 5:00 PM work schedule for the weekdays and 7:30 AM – 3:00 PM on Saturday.

Virgin Islanders have had firsthand experience with what happens during hurricanes, both to marinas, land structures and infrastructure. The VI Legislature acknowledged the need to provide the territories with the best current codes applicable to our natural conditions. These codes will be followed in the construction of The St. John Marina as well as the

upland structures. The minimum finished floor elevations of any occupied structure will be based on flood elevations contained in the FEMA FIRM map. The dock structures in the marina are designed with grated decking installed as discrete panels, which provides less resistance wave forces and will remain attached to dock structure during severe weather conditions.

It is probable that if a major hurricane was to pass over the territory this marina and facilities as well as the bay would be impacted. As with all facilities, a hurricane preparedness plan will be developed for pre- and post-events. This plan will include the responsibility for cleanup and assistance within the community to minimize long-term impacts to the human environment. As discussed in this EAR, The St. John Marina will have backup power capable of running the water pumps and providing potable water to Coral Bay residents.

Other potential impacts from the project may arise primarily from temporary disturbance and sedimentation on and into adjacent waters during construction. To mitigate for these potential effects, strict turbidity, erosion and sediment control measures will be employed during construction. The purpose of these measures will be to prevent uncontrolled runoff into Coral Bay and excessive turbidity plumes.

There is expected to be some unavoidable increase in noise and traffic during construction. However, most of the marina construction will occur from the waterside and will not impact traffic significantly. There will be noise during marina construction from general construction activities as well as pile driving. Noise will minimized as much as possible during placement of the piles through the use of a vibratory hammer as much as possible. This method of construction emits much less noise than an impact pile driver.

Construction of the marina will result in a decrease in available mooring within the immediate footprint of the marina. Based on a recent inspection perhaps up to 6 permitted vessels may be required to move. The St. Johns Marina will work with these vessel owners to provide an alternative mooring site. In the long-term, a revamped mooring field in Coral Bay will be developed through the proposed public-private partnership with The St. John Marina, which will result in a net increase in properly designed moorings throughout Coral Bay.

Most of the mature landscaping immediately around the building will remain, but the development will require the clearing of seven large trees, including all of the large trees on the Parcel 41 Remainder and four large tree on Parcel No. 13-A behind Voyages. All of the species are common St. John trees.

The marina has the potential to have an impact on water quality within the bay both directly and indirectly. The project involves upland construction and soils will be disturbed thereby creating the potential for sediment-laden runoff. The project will also introduce additional parking impervious surfaces that will contribute to greater runoff flows and the potential for introduction of oils and greases into the water column. To minimize and abate these impacts a stringent sedimentation and erosion control plan has been developed for both during and after construction. The project intends to make use of as much collected stormwater runoff as practicable in stormwater retention system to be reused for non-potable purposes. The project will also have onsite WWTPs and will be utilizing the effluent for irrigation. This has the potential of introducing additional nutrients into an already nutrient rich environment and could lead to additional algal growth.

During construction, the project will require the driving of 1,333 piles and will have bottom impacts due to barge anchoring and spudding. These activities could result in resuspension of sediment, and the movement of vessels in the shallows could also result in propwash eroding seagrass beds and resuspending sediments. To minimize resuspension of sediments during pile driving activities, turbidity barriers will be deployed around the work area. Tugs and all vessels will be required to move dead slow in the shallow water environment to minimize impacts.

During construction, a Water Quality and Environmental Monitoring Program will be implemented. The Water Quality Monitoring Plan is found in Appendix B. Once the project is complete, there will be the potential for the introduction of hydrocarbons from exhaust and the potential for releases from vessels and or from the fueling system. The marina will have a Spill Contingency Plan and spill containment and clean up materials will be kept within easy reach on the docks.

The project will be directly impacting approximately 2,500 ft^2 of bottom due to the placement of 1,333 piles ranging from 12”-17” in diameters. Due to wave turbulence, seagrass will also

be lost surrounding the piles. The dock itself occupies 1.42 acres of which 181 ft^2 will be over areas with seagrass and coral rubble, 1,567 ft^2 over area of sparse seagrass, 41,546.37 ft^2 over areas with 30%-100% seagrass coverage, 27,072 ft^2 over areas with 5%-30% seagrass and algae coverage and 4,717 ft^2 over areas with 5% seagrass/algae coverage. The dock will result in a shading impact of 1.42 acres and with the use of the grated decking we are assuming somewhere around a 46% survival rate based on NMFS studies or a 0.8 acre loss due to shading (Landry, 2008).

The boats at the dock will shade another 5.7 acres. The slips will be occupied on average 47% of the year as that seagrasses are impacted after approximately two weeks of shading this will result in the loss of seagrass with in the marina due to vessel shading. This will probably be seen as loss of density as well as denuding of some areas especially around larger boats that are permanently moored. It is possible that as much as two acres of seagrass may be lost.

The project also has the potential of temporarily impacting SAV within the approximate 8 acre project area due to shading of construction vessels and potential construction impact. The construction impact will be related to barge movements and spuds and this can be minimized through monitoring and delineating spudding and anchoring areas. Barge shading will be mitigate through the periodic relocation of barges to prevent shading impacts. The surrounding SAV could also be impacted by construction related turbidity impacts. This will be abated by the sediment and siltation control and through stringent monitoring.

Depending on weather and occupancy conditions, additional water trucks will be required to refill the onsite potable water cisterns. During peak season and dry weather conditions, up to five water trucks per day may be required to meet the potable water demand at the marina resulting increased traffic in the project area.

8.0 MITIGATION PLANS

The project has attempted to avoid impact to environmental resources to the greatest degree possible and to minimize impacts to those resources that will be impacted. The docks have been positioned offshore to avoid dredging and to avoid the maximum amount of the densest seagrass while still allowing unimpeded access into the bay.

The project will be directly impacting approximately 2,500 ft^2 of seagrass due to the placement of approximately 1,333 piles ranging from 12-17" in diameters. Due to wave turbulence, seagrass will also be lost surrounding the piles. The dock itself occupies 1.42 acres of which 181 ft^2 will be over areas with seagrass and coral rubble, 1,567 ft^2 over area of sparse seagrass, 41,546.37 ft^2 over areas with 30%-100% seagrass coverage, 27,072 ft^2 over areas with 5-30% seagrass and algae coverage and 4,717 ft^2 over areas with 5% seagrass/algae coverage.

With the use of the grated decking it is estimated that there will be an approximately 46% seagrass survival rate based on NMFS studies (Landry, 2008), resulting in maximum of 0.8 acre seagrass and loss sea turtle foraging habitat loss due to shading from the marina decking.

To minimize the direct impact of pilings the seagrass within the piling footprints will be transplanted. The transplant plugs will be used to seed the area in the northwest corner of the bay that has been impacted by the deposition of sediment from years of uncontrolled stormwater runoff. The Benthic Mitigation Plan is attached as Appendix C.

The boats at the dock will shade another 5.7 acres at maximum occupancy. The slips will be occupied on average 47% of the year. As seagrasses are reported to be impacted after approximately two weeks of shading, this will result in some loss of seagrass with in the marina due to vessel shading. This will probably manifest itself as a loss of density as well as denuding of some areas, especially around larger permanently moored boats (if any). It is estimated that as much as two acres of seagrass may be lost.

The project also has the potential of impacting SAV within the approximate 8 acres project area due to temporary shading by construction vessels and potential direct construction

impact. The direct construction impact will be related to barge movements and spuds and will be minimized through monitoring and delineating spudding and anchoring areas. Barge shading will be mitigate through the periodic relocation of barges to prevent shading impacts. The surrounding SAV could also be impacted by construction related turbidity impacts. This will be abated by sediment and siltation control through detailed planning, training and stringent monitoring. The Water Quality and Environmental Monitoring Plan is attached as Appendix B.

As of last count, there were 115 boats anchored or moored within the bay and these conservatively impact an area of between 34,500 ft^2 and 46,000 ft^2 based on their anchor drag and rope swing impacts. Many of these boats have both an aft and bow anchor increasing this impact.

The applicant is entering into an agreement with DPNR and will take over the management of the mooring field in cooperation with DPNR, see attached Mooring Field Letter of Intent in Appendix F. The next step in this process is to execute the formal agreement for the management of the mooring field as committed to by DPNR. This agreement is expected to be executed within 90 days. After execution of the formal agreement, the applicant will organize the mooring field and replace all the anchors and moorings with properly designed and installed moorings, which will have negligible impact on the seafloor. The applicant will also be providing pumpout facilities and waste receptacles that will significantly reduce the indirect impacts of these vessels as these services do not currently exist in the area. This will result in the protection of approximately 16 acres SAV and allow for the recolonization of approximately 1 acre of seagrass by removal of the inappropriate anchors.

The marina has the potential to have an impact on water quality within the bay both directly and indirectly. The marina project does involve upland construction, addressed under a separate Major Land CZM permit application, and soils will be disturbed thereby creating the potential for sediment-laden runoff. The associated upland project will also introduce additional parking impervious surfaces, which will contribute to greater runoff flows and the potential for introduction of oils and greases into the water column. To minimize these potential impacts to the maximum extent practicable, a comprehensive stormwater management system employing various Best Management Practices has been developed along with a sediment and erosion control plan and Stormwater Pollution Prevention Plan.

Based on stormwater management calculations in Appendix M the upland BMP's will manage the first 20,700 CF (154,800 gal) of runoff by entirely containing it within the SWM Basin. Additionally, the remaining volume of the basin will function as a detention basin, and slowly release an additional 28,500 CF (213,100 gal) over time. These two functions, in conjunction with the vegetation and proper management of the SWM facilities will create substantial removal of solids, Nitrogen, and Phosphorus from the land based runoff in addition to cleansing water that runs off from tributary parking areas of oils and grease.

It has been shown that the retention portion of the basin (20,700CF) will remove up to 85% of TSS, 85% of TP, and 30% of TN from the runoff. For the remaining 28,500 CF, the removals associated with the detention portion of the basin are 60% of TSS, 40% of TP, and 20% of TN. While the actual amounts of these pollutants in the stream is not known, and varies from storm to storm, we can say that based on the volumes produced with the first inch of runoff over the entire Bordeaux Mountain watershed, when routed throughout the facility (see Appendix M) the volume of the entire storm is approximately 110,000CF. The facilities provide treatment for 49,200 CF of this. When weighted, the net removals over the entire water quality storm is 30% TSS, 26% TP, and 11% TN removal. This represents treatment of the entire 68 acre Bordeaux Mountain area. The 49,200 CF represents the entire volume of runoff from the first 1" of rainfall over the subject parcels. The removals, if calculated solely for the subject parcels, approach the maximum removals reported above. Based on this analysis, it can be said that substantial improvement will be made to the quality of the upland runoff due to improvements installed as part of the upland marina development.

The associated upland project will also have advanced onsite wastewater treatment facilities that will be utilizing the effluent for irrigating. This practice does have the potential of introducing additional nutrients into an already nutrient rich environment and could lead to additional algal growth. To minimize this potential, during periods when irrigation is not feasible, the treated effluent will be stored onsite and utilized for toilet flushing and other non-potable uses.

During construction, the project will require the driving of 1,333 piles and will have bottom impact due to barge anchoring and spudding. These activities could result in resuspension of sediment and the movement of vessels in the shallows could also result in propwash eroding seagrass beds and resuspending sediments. To minimize resuspension of sediments during pile driving, turbidity barriers will be deployed around the work area. Tugs and all vessels will be required to move dead slow in the shallow water environment to minimize impacts. During construction, a Water Quality and Environmental Monitoring Program will be implemented. The Water Quality Monitoring Plan is found in Appendix B.

Once the project is complete there will be the potential for the introduction of hydrocarbons from exhaust and the potential for releases from vessels and or from fueling activities. The marina will have a Spill Prevention Contingency and Countermeasure (SPCC) plan and spill containment and clean up materials will be kept within easy reach on the docks and throughout the marina. The draft SPCC plan is found in Appendix G.

The marina will require that all vessels within the marina and mooring field have their heads locked so that wastewater cannot be discharged into the bay. The marina will be providing a pumpout service that should be used by all vessels not only in the marina but also moored in the bay. The marina will be co-managing the bay in partnership with DPNR as described above and will be providing access to the pumpout service to all vessels on the moorings. This should minimize the amount of waste being discharge from these vessels into the sea as there is no pumpout facility currently in the area, and should help limit nutrient introduction.

Summer's End Group will be participating in and helping to fund an effort to improve stormwater runoff quality throughout the entire Coral Harbor area. The specific focus will be on the runoff that is impacting the northwestern corner of the bay where sedimentation has resulted in the elimination of much of the benthic habitat and seagrass beds that historically existed in this location.

Terrestrial runoff into the Coral Harbor area is one of the greatest impacts to water quality in the bay, by assisting in implementing improvements and by minimizing boat introduced waste, there will likely be a measureable improvement in water quality long term in the bay due to these Actions.

Sea turtles could also be impacted by vessels during construction therefore during construction of the project in order to minimize and abate impacts to the listed turtle species NMFS's construction conditions will be followed (Section 6.09).

To avoid and minimize injury or death to marine mammals and sea turtles, the following NMFS measures from the Vessel Strike Avoidance Measures and Reporting for Mariners will be implemented by all vessels associated with the project construction. The following information and signage will be placed in highly visible locations on the dock:

1. *Vessel operators and crews should maintain a vigilant watch for marine mammals and sea turtles to avoid striking sighted protected species.*
2. *When whales are sighted, maintain a distance of 100 yards or greater between the whale and the vessel.*
3. *When sea turtles or small cetaceans are sighted, attempt to maintain a distance of 50 yards or greater between the animal and the vessel whenever possible.*
4. *When small cetaceans are sighted while a vessel is underway (e.g., bow-riding), attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area.*
5. *Reduce vessel speed to 10 knots or less when mother/calf pairs, groups, or large assemblages of cetaceans are observed near an underway vessel, when safety permits. A single cetacean at the surface may indicate the presence of submerged animals in the vicinity; therefore, prudent precautionary measures should always be exercised. The vessel should attempt to route around the animals, maintaining a minimum distance of 100 yards whenever possible.*
6. *Whales may surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel and when safety permits, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.*

Sound in water moves four times faster than in air, and attenuation (sound dissipation) is much lower in water than air. When an in-water sound is generated, a pulse is created that radiates out from the source. These acoustic impacts have a negative impact on sea turtles, marine mammals and fish species.

To minimize noise impacts to these species a vibratory hammer will be used to drive piles wherever technically feasible. Vibratory hammers are a recommended by NOAA as that

they have a lower acoustic impact. Based on this information if a vibratory hammer is used the sound created during construction should be 120 dB and below that which injury occurs.

The project will have the potential to impact Acropora and the nominated species through vessel strikes. To minimize this impact, the applicant will be placing informational buoys delineating the shallow hard bottom areas within Coral Harbor and will be providing information signage on the dock advising mariners of avoiding shallow reefs while in transit and to avoid anchoring in area of coral and seagrass, see Benthic Mitigation Plan, Appendix C.

9.0 ALTERNATIVES TO PROPOSED ACTION

The following discusses the site selection process for the St. John Marina as well as minimization and avoidance activities implemented during the design process as well as for proposed marina operations. Every effort was made to eliminate impacts as much as possible through the minimization and avoidance process. Where impacts were not completely able to be eliminated, mitigation plans as described in Section 8.0 were developed to offset the potential impact.

No-Action Alternative

The No-Action Alternative of the proposed marina would avoid any potential negative impacts to the environment, which have been carefully considered and addressed. However, the No-Action Alternative negates the opportunity for the project impact to the St. John economy to a tune of over $32M and employment and wage impacts of a projected 90 jobs and $3M in employee earnings in just the first year of operation.

A No-Action Alternative leaves vacant buildings and land to sit fallow. Additionally, the No-Action alternative results in maintaining the status quo with respect to illegal and improperly designed mooring in Coral Bay and the dumping of untreated human waste into the harbor with respect to pumpout unavailability. The continued damages to seagrasses and water quality would continue unabated for the foreseeable future under this No-Action scenario.

Preferred Alternative

The St. John Marina will be located on the northwestern side of Coral Harbor where some support businesses already exist. This site offers St. John's best location to service the needs of recreational boaters now and in the future while it serves the community through employment, tax revenue and education.

Most importantly, the proposed project has considered all potential environmental impacts and has taken avoidance, minimization and mitigation steps to minimize overall impacts. In addition, The St. John Marina proposes to sponsor adult and child education, as an active participant in Phase ll of the Coral Bay Watershed Management Plan and membership in at least 3 environmental monitoring programs including Blue Flag. Exposure issues have been

addressed with a dock design and construction method to withstand impacts from seasonal swells to those of category 3 hurricanes.

The proposed location of The St. John Marina represents best use principles as this location provides for adequate parking and opportunity for controlled growth in a non-congested area of Coral Bay.

Considerations

Literally, the largest factor to consider in locating a marina site on St. John are The Virgin Islands National Park, The Virgin Islands Coral Reef National Monument and the proliferation of coral surrounding her shores. An estimated 70% of the land area of St. John is protected by the National Park. When shore protection is added to that of the National Monument and live coral, it is safe to say that over 90% of St. John's shoreline is legally unavailable for use by a marina.

Of those areas not protected by the National Park and Monument, another estimated 90% of what remains is zoned for residential use. Of the small percentage remaining that is zoned for commercial activity, most of it is already in use, incompatible for marina use or unavailable, or all three.

Land availability – The St. John Marina requires both dry and submerged land for the project. Thus, there must be both adequate land to provide support goods and services for the marina, and an amount of submerged land that will adequately support an economic model that is sustainable considering the current and projected future market.

Exposure - A suitable site must not have dominant exposure issues regarding excessively high seas and winds. A suitable site will be able to successfully manage any moderate exposure issues.

Zoning – A major consideration of a site's suitability is its current zoning and compatibility within the area. For a site to be suitable, it must be zoned for marina compatible use and within a commercial area.

Buildability – While a site may provide adequate acreage, it must do so in a way that income can support the cost basis inherent in using that particular site. If a site has limitations such as accessibility or incompatible topography then it is not considered a viable site.

Environmental Compatibility – What are the environmental resources on site and can they be successfully avoided, and if impact is necessary are there ways to minimize the impact.

Aquatic Suitability – For a particular location to be aquatically suitable, it must be easily accessible and have adequate depth to support a commercial marina operation. A submerged land lease must be able to be obtained that will allow for docks to be designed in such a manner as to meet market needs and be economically sustainable.

Best Use – Best use practices ask if the proposed project maximizes the potential available. Best use often increases the value of not only the proposed site, but increases the value of other property within its area of influence. Best use is also tied to economic viability in that when best use is achieved, it helps to insure long-term success of a project.

Economic Viability – To be a positive contribution to the St. John economy, a marina has to be sustainable for a long period of time. A realistic approach involves cost considerations weighed against potential economic success. Does this site offer everything needed for the St. John marina to be financially successful for the long term?

Location – This criterion involves assimilating other considerations to ask the question: Does this location make sense?

Parking – Another major consideration of any location is the ability to meet the additional need for parking by the marina. Does the location under consideration support adequate parking?

Community – Will this site serve the needs of the community through the production of jobs, increase quality of life, support youth and education, foster growth of local businesses and foster community involvement?

Market Appeal – This is probably the most important consideration to the recreational boater, charter or yacht owner. Each of these prefers a marina set in post card setting where only steps from their boat they can find necessities, respite and repast.

Alternative Site Analysis

The sites below represent the areas of St. John that have been researched by the developers of the St. John marina in an effort to perform proper due diligence with respect to understanding the overall landscape of potential marina sites and their ability to meet project compatibility requirements.

Both current and previous MLS records have been used in the evaluation of the sites listed below. Long time St. John Realtors and successful St. John business owners were also consulted in the research and evaluation of the potential sites listed below.

Cruz Bay – In recent years as many as six redevelopment plans have been proposed for "downtown" Cruz Bay, several of which had a marina component. The current vehicular and boat traffic congestion, lack of parking, limited available land and frail infrastructure all torpedoed any hope of redevelopment. All of the issues that downtown redevelopment faced were amplified by those developers looking to put a marina in Cruz Bay who have since abandoned their hope of doing so due to the plethora of insurmountable issues with that location, both on land and water.

Turner Bay/Enighed Pond – While this site offers a few positive aspects, this location lacks the most important consideration of any commercial venture, market appeal. Existing boat traffic congestion, especially by large commercial barges is just one of many factors that are a detriment to this area's appeal to the local and transient recreational boating community.

South Side STJ – From Great Cruz to Calabash Boom (Lagoon Point) there are many beautiful views. However, they are zoned residential and have significant unmanageable exposure to wind and sea.

North Shore – From the NPS dock to Haulover Bay the entire shoreline is protected by the National Park and National Monument.

East End – St. John's East End shore is nearly completely encircled by live, active coral and is does not provide for a safe location during adverse weather conditions. While there is a 5-acre waterfront parcel currently available, it is zoned for residential use in a deeded residential community and not suitable for a marina development.

Zootenvaal – Estate Zootenvaal is 5-10 minutes ENE of Coral Bay. Currently offered is a 5-acre combination waterfront and hillside site consisting of five cottages that have in the past been operated as short term rental property. However, this site and the adjacent available 20 acres are zoned for residential use and are not suitable for marina development.

Calabash Boom – During season, Johnson's Bay can average upwards of 30 vessels both anchored and on moorings, and is located approximately 3-5 minutes south of Coral Bay. There are no commercially available properties large enough for the facilities to support a marina.

Coral Harbor – Over the past three decades Coral Harbor has been targeted by marina developers as the location best suited to almost meet all of the criteria necessary to support a successful marina for St. John. Its well-known location to boaters, easy accessibility and protected harbor just begin the list of positive attributes of locating a marina there. There are some unavoidable environmental impacts associated with a marina in Coral Bay, but as discussed in this report, they have been minimized and will be mitigated for as necessary.

Table 9.0-1represents a comprehensive look at possible marina sites for St. John. The conclusions are based on scientific evidence, market analysis by experts, sound business principles, the opinions of professional marina developers and managers with decades of experience in the Caribbean.

Subsequent to the selection of Coral Bay as the most feasible site in St. John for The St. John Marina project, the developer initiated efforts to evaluate each component of the project that may have an environmental impact, assess alternatives and determine how these potential impacts may be avoided completely and if not able to be totally avoided, assess how they can be minimized. Table 9.0-2 is a summary of these efforts. Details pertaining to these impacts and minimization efforts are contained in Sections 6 and 8 of this report.

Table 9.0-1. Matrix of Potential St. John Marina Sites and their Suitability

Evaluation Criteria	Location							
	Cruz Bay	Turner Bay	South Side	North Shore	East End	Zooten-vaal	Calabash Boom	Coral Harbor
Land Available	N	N	N	N	Y	Y	N	Y
Exposure	Y	Y	N	Y	N	N	Y	Y
Zoning	Y	N	N	N	N	N	N	Y
Buildability	N	N	N	Y	N	Y	N	Y
Environmental Compatibility	Y	Y	N	N	N	N	Y	Y
Aquatic Suitability	N	N	N	N	N	N	Y	Y
Best Use	N	N	N	N	N	N	N	Y
Economic Viability	N	N	N	N	N	N	N	Y
Location	N	N	N	N	N	N	N	Y
Parking	N	Y	N	Y	Y	Y	N	Y
Community	N	Y	N	N	N	N	N	Y
Market Appeal	N	N	N	N	N	N	N	Y

Table 9.0-2. Summary of Design & Construction Alternatives/Minimization Efforts

Impact Evaluated	Alternative/Minimization & Avoidance Effort
Design and Construction Related	
Seagrass & Coral - Elimination from piling footprint	Reduce pile size and count through innovative structural design
	Realign marina to avoid corals
	Reduce number of slips in Zone 1
	Utilize mooring piles to eliminate up to 7,900 ft^2 of finger pier
Benthic damage from barges and work boats	Require construction plan that minimizes spud use
	Prohibit piling templates attached to the bottom
	Utilize pre-cast dock components for faster construction and less work activities over water
	Move marina waterward to a minimum of depth of -5’
Noise/acoustic impacts	Require contractor to utilize vibratory hammer where feasible
Displaced vessels from marina footprint	Work with mooring ball permit holder and DPNR to relocate to properly constructed new mooring balls
Marina lighting	Model design after Florida standard for sea turtle safe lighting while maintaining nighttime safety and security
Reduced public access to shoreline	Construct public dinghy dock
Seagrass – Shading from dock structure	Grated decking, fixed docks instead of floating and raise docks as high as possible
	Reduce slip number in Zone 1 to the north
	Commit to create regulated Coral Bay mooring field under public-private partnership with DPNR
	Utilize mooring piles to eliminate ~7,900 ft^2 of finger piers
	Move marina waterward to a minimum of -5’ of depth
	Alter marina design to eliminate all but one access walkway from the shoreline
	Eliminate wave attenuator from marina design
	Move proposed building structures on docks to upland areas
	Utilize fixed docks instead of floating and maintain as much air space as possible underneath docks
Seagrass – Shading from boat hulls	Install boat lifts on slips closest to the shoreline
	Market marina in Zone 2 area to larger transient boaters, leading to fewer boats and lower long-term occupancy of slips
	Commit to create regulated Coral Bay mooring field under public-private partnership with DPNR
Seagrass – Prop scour by work boats	Move marina waterward to a minimum of -5’ of depth
Shoreline habitat degradation	Remove bulkhead from design and stabilize with rip rap where needed
	Plant fringing mangroves along shoreline
	Install upland stormwater controls to reduce sedimentation

Table 9.0-2. Summary of Design & Construction Alternatives/Minimization Efforts

Impact Evaluated	Alternative/Minimization & Avoidance Effort
Operational Related	
Elimination of existing mooring within marina footprint	Work with mooring permit holder and DPNR to relocate to properly constructed new mooring balls
	Create regulated mooring field with 75 moorings through Public-Private partnership with DPNR
Unlawful wastewater and solid waste discharges from existing vessels in Coral Bay	Commit to create regulated Coral Bay mooring field under public-private partnership with DPNR
	Allow public use of marina pumpout system
	Provide refuse containers available to the public
	Achieve Blue Flag status for marina to assure environmental protection
	Initiate education program for residents and marina users regarding environmental protection
Seagrass – Prop scour by recreational vessels	Install warning buoys in shallow areas of the marina adjacent to the shoreline
Sea Turtles – Boat impacts	Initiate education program for residents and marina users regarding sea turtle safety
	Restrict vessel speed to no wake within marina controlled areas
Navigation safety	Locate proposed mooring field outside of channel area
	Install proper markers in Coral Bay navigation channel
Fuel spillage	Site specific SPCC plus leak detection and double-wall piping within additional conduit
	Allow public access to fueling facility to assure fueling is done in a controlled environment

10.0 RELATIONSHIP BETWEEN SHORT AND LONG TERM USES OF MAN'S ENVIRONMENT

The Coral Bay area is currently heavily used for boat mooring and there is no full-service marina located at the eastern end of the U.S. Virgin Islands or the island of St. John. The creation of such a facility with fueling, provisioning and pumpout capabilities will serve to bring back marine businesses which has moved into the British Virgin Islands

The immediate upland area surrounding The St. John Marina is primarily in commercial use. The development of this marina would not result in a change of land use. Commitment to the type of use proposed was made in 1972 when the area was zoned W-1. The land was removed from its natural state by construction use as a refuse disposal location and installation of culverts. The proposed development is consistent with the goals and polices of the VI Coastal Zone Management Act and with the stated policies of the government of the Virgin Islands.

This marina project will generate employment and increase tax revenue and will also provide additional recreational opportunities for both residents and visitors. The marina project will result in a managed mooring system within Coral Harbor and will help limit future impacts to the marine environment and facilitate the management the resources.

An ongoing concern in Coral Bay is damage to seagrasses and water quality from uncontrolled mooring in the bay. This project will work to alleviate this concern through the construction of a properly designed mooring field and implementation of a controlled mooring plan for the bay through a public private partnership.

There will be temporary construction impacts and long-term impacts to seagrass in the marina footprint from pile installation and shading. However, minimization and mitigative measures have been incorporated into the planning of the project to avoid irreversible damage both during and after construction.

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