BIOLOGICAL ASSESSMENT

U.S. VIRGIN ISLANDS

VETERANS DRIVE (ROUTE 30) IMPROVEMENTS

PREPARED FOR

U.S. VIRGIN ISLANDS DEPARTMENT OF PUBLIC WORKS

PREPARED BY

BIOIMPACT, INC.
P.O.BOX 132 KINGSHILL
ST. CROIX, U.S. VIRGIN ISLANDS 00851
bioimpact@islands.vi

Updated August 2024

INTRODUCTION

The U.S. Virgin Islands Department of Public Works (DPW) is proposing to make improvements to Veterans Drive (Route 30) from Tortola Wharf to Long Bay Road (Kronprindsens Tvaer Gade (Windward Passage Hotel) to Long Bay Road/W.G. Lewis Lane (formerly Lovers Lane). The improvements to Veterans Drive are needed to help alleviate traffic congesting along the waterfront. The improvements made further to the east on Long Bay Road and near Mandala Circle as well as Phase I have made significant steps towards lessening the congestion which occurs on a busy cruise ship port day. Veteran's Drive is the main means of egress into the town of Charlotte Amalie from the east. The completion of Phase I has greatly enhanced both residents and visitors' experience on St. Thomas and has improved traffic flow to and from the town of Charlotte Amalie. The completion of the landscaped promenade in Phase I is being enjoyed by both visitors and residents alike and everyone looks forward to the completion of Phase II.

The Department of the Army Permit Number SAJ-1996-01459 (SP-JCM) was issued on July 27, 2017, and permitted the entire project, both Phase I and Phase II. However, at this time only the first phase has been completed and the project is not expected to resume until sometime in 2024. The mitigation activities for the project have been completed and the compensatory mitigation is in its 5th year of monitoring. Phase 1 of the project was completed in July of 2021.

A Biological Opinion was issued for Phase I and Phase II on July 20, 2016, which contains a "take statement" (Appendix A). The National Marine Fisheries Service (NMFS) has concluded in their Biological Opinion that the proposed Veterans Drive Improvements project will have no effect on leatherback sea turtles; and is not likely to adversely affect green, loggerhead, and hawksbill sea turtles; elkhorn, staghorn, boulder star, mountainous star and rough cactus corals; and elkhorn and staghorn coral critical habitat. NMFS also concluded that the project is likely to adversely affect but not likely to jeopardize the continued existence of lobed star and pillar corals. Lastly, NMFS concluded that the project is not likely to affect the Nassau grouper.

No ESA species were "taken" as a result of Phase I of the project and "takes" from Phase II are not anticipated.

The Fish and Wildlife Service in their February 10, 2014, correspondence (see Appendix B) stated that they have provided technical assistance regarding the project proposal since 1995 and that Section 7 consultation under ESA was concluded for species under their jurisdiction and no additional adverse effects to these species are anticipated.

Since the BO the Giant Manta and Queen Conch have been listed and critical habitat for the five non-acropoid corals and Nassau Grouper has been designated. The project will have no effect on Giant Mantas which occur offshore, or Queen Conch which do not occur along the existing bulkhead or in the Phase II footprint. The project area is not within Nassau Grouper critical habitat. The critical habitat for the non-acropoid corals which is in the project footprint overlaps the Acropora critical habitat. Not all of the hard bottom meets the criteria for critical habitat. Water quality within the entire area is poor and settling sediments are a problem due to terrestrial runoff and marine activities within the harbor. In 2024 due to nutrients in the harbor the

remaining hard bottom is heavily algal colonized and there is very little hard bottom available for coral recruitment. St. Thomas Harbor is, however, one of twelve federally maintained harbors and channels: (i) Palm Beach Harbor; (ii) Hillsboro Inlet; (iii) Port Everglades; (iv) Miami Harbor; (v) Key West Harbor; (vi) Arecibo Harbor; (vii) San Juan Harbor; (viii) Fajardo Harbor; (ix) Ponce Harbor; (x) Mayaguez Harbor; (xi) St. Thomas Harbor; and (xii) Christiansted Harbor, excluded from critical habitat designation [50 CFR 226.216(c)(3)(xi)]. Therefore, the hard bottom habitat that will be directly affected by the placement of fill for the roadway expansion in the St. Thomas Harbor is not coral critical habitat.

There are no changes in the project from what was permitted by Department of the Army Permit Number SAJ-1996-01459 (SP-JCM) therefore no changes to impacts addressed in the Biological Opinion issued by NMFS in 2016. Phase II is only being resubmitted for permit since construction has not resumed and will not resume until later in 2024.

This Biological Assessment addresses the species and critical habitat listed since the July 20, 2016 issuance of the Biological Opinion.

PROJECT DESCRIPTION

As permitted by SAJ-1996-01459 (SP-JCM) the project will result in the filling of 8.57 acres of Charlotte Amalie Harbor, resulting in the filling of 1.15 acres of seagrass beds and will result in the filling of a total of 2.97 acres of hard bottom (excluded from critical habitat designation) with sparse coral colonization. Phase I which was completed in 2021 resulted in the filling of 2 acres of the harbor and the remaining 6.57 acres will be filled as part of Phase II. Corals and seagrasses from the entire project area were relocated in 2018 and the compensation mitigation on Triangle Reef was completed in 2020.

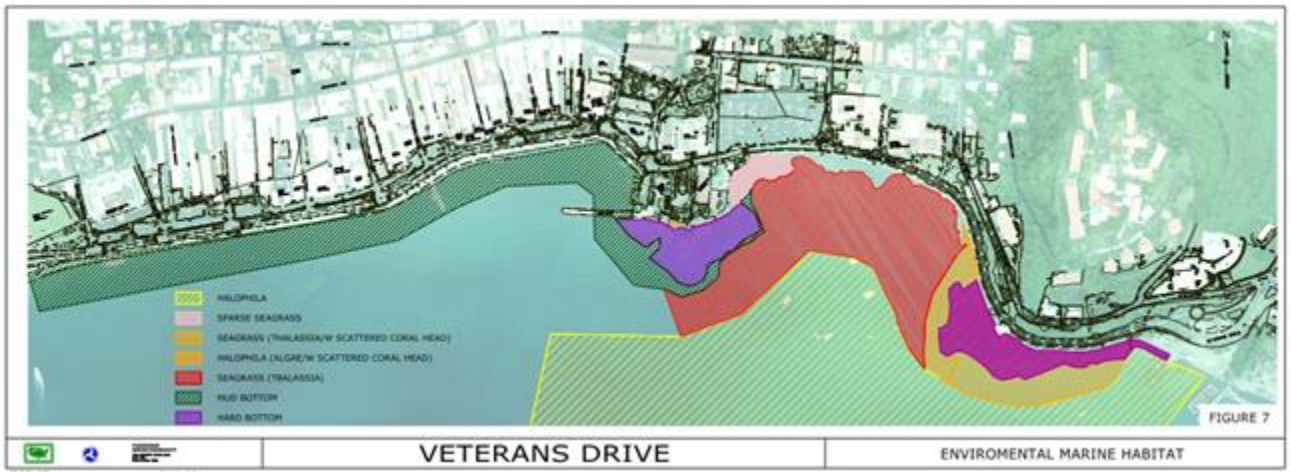
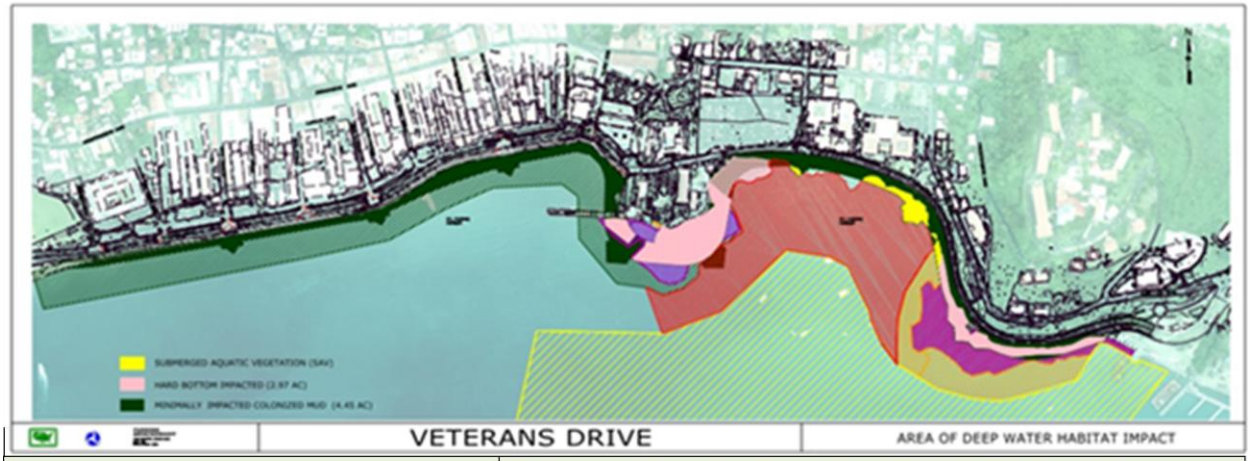


Figure 1. Benthic Habitat within the project area.



Total Area of Direct Impact 8.57 acres	Submerged Aquatic Vegetation (SAV) –Coral Colonized Harbottom – Minimally Colonized Mudbottom –	1.15 acres 2.97 acres 4.45 acres

Figure 2. Area of Direct Impact

Total Area of Indirect Impact 1.28 acres	Submerged Aquatic Vegetation (SAV) –Coral Colonized Hardbottom – Minimally Colonized Mudbottom –	0.32 acre 0.27 acre 0.69 acre

Figure 3. Area of Indirect Imnpact

UPDATE TO FEDERALLY LISTED SPECIES WITHIN THE PROJECT AREA

Sea Turtles - Hawksbill (*Eretmochelys imbricata*), Leatherbacks (*Dermochelys coriacea*) and **Green turtles (*Chelonia mydas*) – No change**

NMFS concluded that the proposed action will have no effect on leatherback sea turtles (*Dermochelys coriacea*), and is not likely to adversely affect green (*Chelonia mydas*; South Atlantic distinct population segment), loggerhead (*Caretta caretta*, Northwest Atlantic Ocean distinct population segment) and hawksbill (*Eretmochelys imbricata*) sea turtles.

Since the issuance of the BO in 2016 green sea turtle habitat has been proposed. The potential adverse effects that the proposed project could have on Green and Hawskbill sea turtles would be related to impacts due to injuries and collisions from in-water equipment and vessel traffic and impacts to turtle foraging habitat both directly and through water quality impacts, and potential impacts to turtles due to the ensonification if piles are driven. There is also the potential that turtles may become entangled in the turbidity and noise control curtains. Special precautions will be used to minimize these potential impacts. Coral and Seagrass Transplants, Water Quality Control and Monitoring and Acoustic Impact Mitigation will be implemented in Phase II just like Phase I.

Mitigation efforts have been proposed to minimize and abate impacts to sea turtles and their foraging habitat. Phase II of the project will be constructed in strict observance of NMFS's Sea Turtle and Smalltooth Sawfish Construction Conditions, as well as NMFS's Vessel Strike Avoidance Measures and Reporting for Mariners. The implementation of the construction conditions will provide protection to sea turtles by requiring temporary work stoppages to protect any sea turtles sighted within 50 ft of the in-water work footprint. The avoidance measures will require all vessels to operate at low speeds, have sea turtle and marine mammal observers, and maintain safe distances from sea turtles. NMFS has also determined that installation of metal sheet piles by vibratory hammer will not result in any form of physical injurious noise effects and that the potential for adverse noise behavioral effects would be insignificant. On the other hand, if impact hammer use is determined to be necessary, prior to using this technique, the contractor will be required to coordinate with NMFS to determine whether additional mitigation measures are needed. The design does not include the use of an impact hammer.

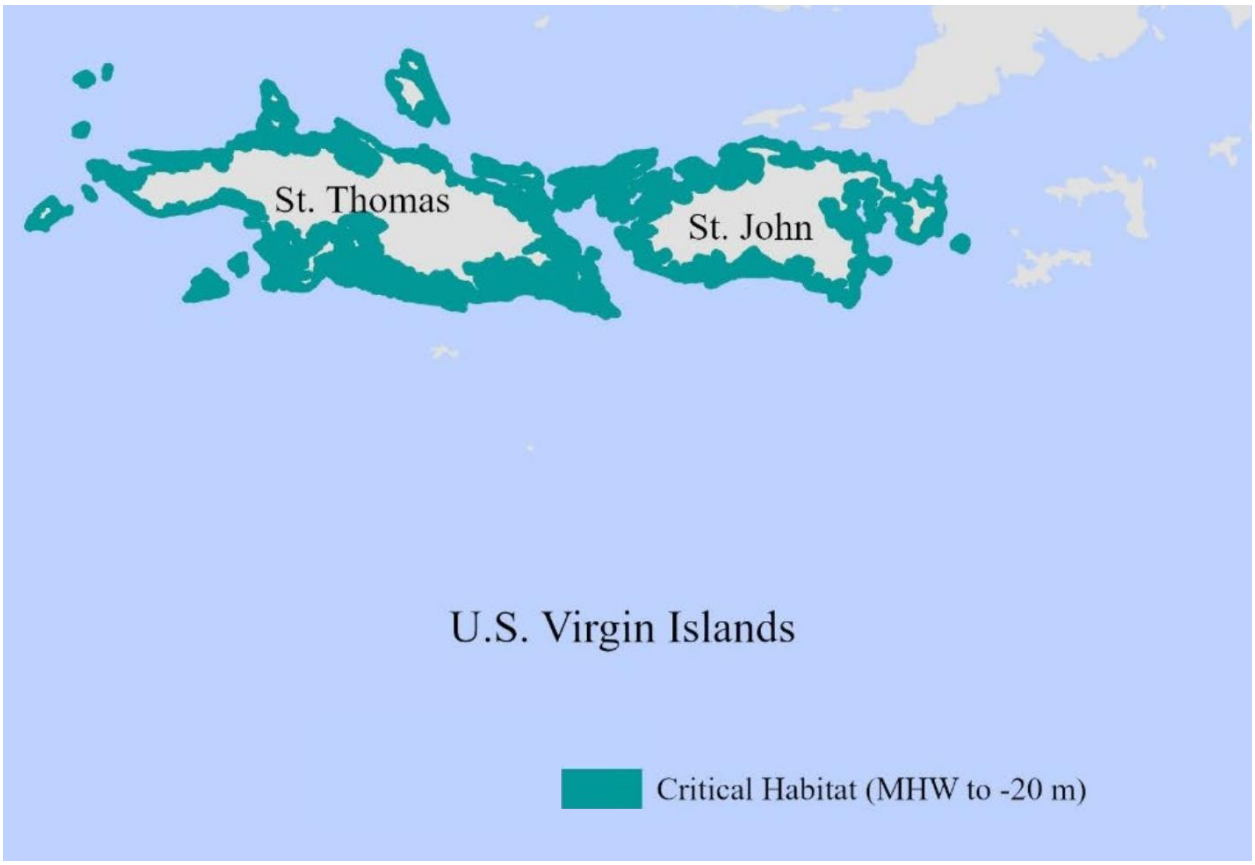


Figure 4. Proposed Green Turtle Critical Habitat

Elkhorn coral (*Acropora palmata*)

The federally listed threatened species of coral, *Acropora palmata* occurs on Rupert's Rock which is located in Charlotte Amalie harbor about 0.69 miles to the south southeast of the project area, on the southern shore of Hassel Island further to the south, and around Muhlenfels Point.

Figure 5. Location of *Acropora* in relationship to the project area.

NMFS concluded that the proposed action is not likely to adversely affect elkhorn (*Acropora palmata*) or staghorn (*Acropora cervicornis*) corals or their critical habitat.

Boulder star coral (*Orbicella annularis*)

Orbicella annularis were present within the project footprint on the rocky outcropping and boulders which extend around the Pump House and the U.S. Virgin Islands Legislature Building. These species were relocated.

NMFS concluded that the proposed action is not likely to jeopardize the continued existence of lobed star (*Orbicella annularis*) coral.

Pillar coral (*Dendrogyra cylindrus)*

A *Dendrogyra cylindrus* was present within the project footprint on the rocky outcropping which extends around the U.S. Virgin Islands Legislature Building during the benthic studies for the project but was no longer viable when the pre-Phase I construction survey was made.

NMFS concluded that the proposed action is not likely to jeopardize the continued existence of pillar coral (*Dendrogyra cylindrus*).

Boulder Coral (Orbicella franksi), Mountainous star (Orbicella faveolata) and rough cactus (Mycetophyllia ferox) corals

NMFS concluded that the proposed action is not likely to adversely affect Boulder Coral (*Orbicella franksi*), Mountainous star (*Orbicella faveolata*) and rough cactus (*Mycetophyllia ferox*) corals.

Nassau Grouper (*Epinephelus striatus*)

The Nassau Grouper (*Epinephelus striatus*) was seen both off the pumphouse and the legislature building in the hardbottom areas during the original site surveys, during the pre-construction surveys for Phase I and during the re-surveys in July and August of 2024.

NMFS concluded that the proposed action is not likely to adversely affect Nassau Grouper (*Epinephelus striatus*).

Critical habitat has recently been designated for the Nassau Grouper, the project areas is not within that footprint.

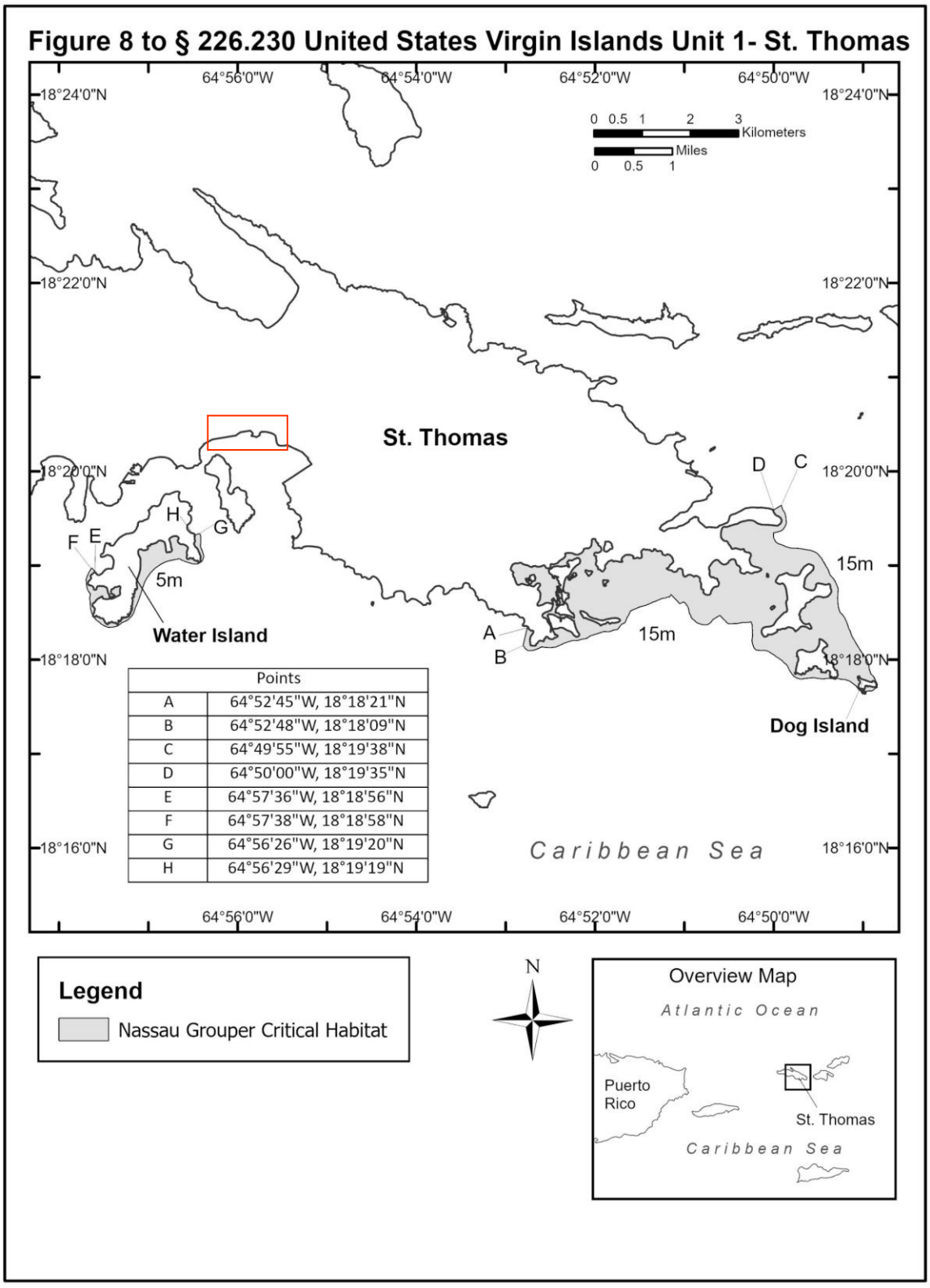


Figure 6. Nassau Grouper Critical Habitat. The project area is within the red box.

Giant Manta(Manta birostris)

These species primarily occur offshore. It is possible that Giant Manta Rays could occur in the Harbor since they have been seen off of Brewers Bay. If a Giant Manta is spotted the construction contractor will be notified and work will cease if it approaches the dredging operation.

The project should not have a direct impact on these species. These are large open water species which should move away from the areas of operation.

The project **may affect but is not likely to adversely affect** on the Giant Manta or any shark or ray species.

Queen Conch (*Strombus gigas* or *Alger gigas*)

Queen conch has not been seen in the Phase II area although they were seen in the seagrass beds of Phase I. The project is not expected to impact this species since Queen Conch have not been seen in the Phase II area.

The project **may affect, but is not likely to adversely affect** Queen Conch

Mitigation of General Impacts

Due to the in-water work, pile driving, filling and riprap placement it is anticipated that there would be some short-term water quality impacts as well as acoustic impacts. Stringent sedimentation and erosion control methods would be implemented and a water quality monitoring plan would be implemented during construction. The Environmental Mitigation (Appendix A), Acoustic Mitigation (Appendix B), and Water Quality Monitoring (Appendix C) Programs are proposed.

To further mitigate impacts which could occur during the construction of the proposed project, a Storm Water Pollution Prevention Plan (SWPPP) has been developed. Improvements are being proposed to the existing drainage. These include measures which intercept debris being carried into the sea, measures to reduce the velocity to minimize scour as well as measures to facilitate the settlement of sediments before being carried into the sea.

Proposed Conservation Measures

Sea Turtles - Hawksbill (*Eretmochelys imbricata*), Leatherbacks (*Dermochelys coriacea*) and **Green turtles (*Chelonia mydas*)**
During the construction of the proposed project and in order to minimize and abate impacts to federally listed sea turtle species National Marine Fisheries Service's (NMFS) construction conditions will be followed.

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 (i.e., 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 foot 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.

In order to avoid and minimize an injury or death to marine mammals and sea turtles the following NMFS measures form the Vessel Strike Avoidance Measures and Reporting for Mariners will be taken by all vessels associated with the project:

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 (i.e., 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.

In order to minimize noise impacts to these species the Acoustic Mitigation Plan will be followed which includes:

1. *A double turbidity booms barrier will be installed around all areas where piles are being driving which will act not only as a turbidity control but will also attenuate underwater noise levels in the project area.*
2. *A 500-meter safety zone shall be established around the project area for sea turtles and marine mammals. Trained observers will be used to visually monitor the safety zone for at least 30 minutes prior to beginning all noise creating in-water activities, i.e. pile driving.*
3. *If at any time a sea turtle or marine mammal is observed in the safety zone the operation will be shut down until the animal has left the safety zone of its own volition.*
4. *Observations for protected species will occur at least twice a day to maintain watch for animals in the area, and ensure the curtains are functioning properly. If at any time an animal is observed in the safety zone during the noise creating in-water activity, work shall cease until the animal has left the area of its own volition, or coordination with a DPNR/USFWS representative has occurred, if the animal is injured.*
5. *Records will be maintained of all sea turtle and marine mammal sightings in the area, including date and time, weather conditions, species identification, approximate distance from the construction area, direction and heading in relation to the project area, and behavioral observations. When animals are observed in the safety zone, additional information and corrective actions taken such as a shutdown pile driving equipment, duration of the shut-down, behavior of the animal, and time spent in the safety zone will be recorded. Reports will be provided to NMFS, USACE, and CZM on a monthly basis.*

Moorings and information will be placed at the seagrass transplant site not only to protect the transplanted seagrass but the other seagrasses and corals within the area.

Elkhorn coral (*Acropora palmata*)

No *Acropora* occur within the project footprint but these species and their habitat can be found on hard bottom habitat near the channel leading to this area. In order to minimize impact to this species, the hard bottom areas containing these species as well as the nominated species will be

buoyed. Because these species may be impacted by degradation of water quality, stringent turbidity control measures will be implemented.

Orbicella annularis,* and *Dendrogyra cylindrus

The *Orbicella annularis,* And *Dendrogyra cylindrus* found within the project footprint and area of impact will be transplanted to an area outside the potential area of impact. There are other colonies of these listed species adjacent to the project area and in the area further removed on Rupert Rock, Hassel Islands and Muhlenfels Point. In order to minimize impact to these species, the hard bottom areas containing these species will be buoyed. Because these species may be impacted by degradation of water quality stringent turbidity control measures will implemented.

General

Information signage will also be placed along the waterfront to inform visitors of the resources within the harbor and educate them as the importance of protection the marine environment. The signage will discuss the seagrass bed and coral reefs which once thrived in the harbor and the role they played in providing habitat to marine organisms. The demise of the harbor overtime due to human impact will be discussed as well as steps that are currently being taken to minimize impacts and improve the harbor environment.

Conclusions – Effects Determinations

Table 1. ESA-listed Species in the Action Area and Effect Determination(s)

Species	ESA Listing Status	Listing Rule/Date	Most Recent Recovery Plan/Outline Date	Effect Determination (Species)
Sea Turtles				
Green (North Atlantic [NA] and South Atlantic [SA] distinct population segment [DPS])	T	81 FR 20057/ April 6, 2016	October 1991	NLAA – BO 2016
Kemp's ridley	E	35 FR 18319/ December 2, 1970	September 2011	NE
Leatherback	E	35 FR 8491/ June 2, 1970	April 1992	NE – BO 2016
Loggerhead	T	76 FR 58868/	December 2008	NLAA – BO 2026

Species	ESA Listing Status	Listing Rule/Date	Most Recent Recovery Plan/Outline Date	Effect Determination (Species)
(Northwest Atlantic [NWA] DPS)		September 22, 2011		
Hawksbill	E	35 FR 8491/ June 2, 1970	December 1993	NLAA – B0 2016
Fish				
Smalltooth sawfish (U.S. DPS)	E	68 FR 15674/ April 1, 2003	January 2009	NE
Gulf sturgeon (Atlantic sturgeon, Gulf subspecies)	T	56 FR 49653/ September 30, 1991	September 1995	NE
Shortnose sturgeon	E	32 FR 4001/ March 11, 1967	December 1998	NE
Atlantic sturgeon (Carolina DPS)	E	77 FR 5914/ February 6, 2012	N/A	NE
Atlantic sturgeon (SA DPS)	E	77 FR 5914/ February 6, 2012	N/A	NE
Atlantic sturgeon (Chesapeake Bay DPS)	E	77 FR 5914/ February 6, 2012	N/A	NE
Atlantic sturgeon (New York Bight DPS)	E	77 FR 5914/ February 6, 2012	N/A	NE
Atlantic sturgeon (Gulf of Maine DPS)	T	77 FR 5914/ February 6, 2012	N/A	NE
Scalloped hammerhead shark (Central and	T	79 FR 38213/	N/A	NE

Species	ESA Listing Status	Listing Rule/Date	Most Recent Recovery Plan/Outline Date	Effect Determination (Species)
Southwest Atlantic DPS)		July 3, 2014		
Nassau grouper	T	81 FR 42268/ June 29, 2016	2018	NLAA – BO 2016
Giant manta ray	T	83 FR 2916/ January 22, 2018	2019	NLAA
Oceanic whitetip shark	T	83 FR 4153/ January 30, 2018	2018	NE
Invertebrates and Marine Plant				
Elkhorn coral (*Acropora palmata*)	T	71 FR 26852/ May 9, 2006	March 2015	NLAA – BO 2016
Staghorn coral (*Acropora cervicornis*)	T	71 FR 26852/ May 9, 2006	March 2015	NLAA – BO 2016
Boulder star coral (*Orbicella franksi*)	T	79 FR 53852/ September 10, 2014	N/A	NLAA – BO 2016
Mountainous star coral (*Orbicella faveolata*)	T	79 FR 53852/ September 10, 2014	N/A	NLAA – BO 2016
Lobed star coral (*Orbicella annularis*)	T	79 FR 53852/ September 10, 2014	N/A	Not likely to Jeopardize – BO 2016
Rough cactus coral (*Mycetophyllia ferox*)	T	79 FR 53852/ September 10,	N/A	NLAA – BO 2016

Species	ESA Listing Status	Listing Rule/Date	Most Recent Recovery Plan/Outline Date	Effect Determination (Species)
		2014		
Pillar coral (*Dendrogyra cylindrus*)	T	79 FR 53852/ September 10, 2014	N/A	Not likely to Jeopardize – BO 2016
Queen Conch	T	89 FR 11208/ February 14, 2024	N/A	NLAA
Marine Mammals				
North Atlantic right whale	E	35 FR 18319/ December 2, 1970	June 2005	NE
Blue whale	E	35 FR 18319/ December 2, 1970	July 1998	NE
Fin whale	E	35 FR 12222/ December 2, 1970	August 2010	NE
Sei whale	E	35 FR 12222/ December 2, 1970	December 2011	NE
Sperm whale	E	35 FR 12222/ December 2, 1970	December 2010	NE
Bryde's whale	E	84 FR 15446/ April 15, 2019	2020	NE

Table 2. Critical Habitats in the Action Area and Effect Determinations

Species	Critical Habitat in the Action Area	Critical Habitat Rule/Date	Effect Determination (Critical Habitat)
Green sea turtle (North Atlantic and South Atlantic DPS) (Proposed)	Yes	63 FR 46693/ September 2, 1998 88 FR 46572/ July 19, 2023	NLAA
Elkhorn coral	Yes	73 FR 72210/ November 26, 2008	NE
Staghorn coral	Yes	73 FR 72210/ November 26, 2008	NE
Boulder star coral	Yes	88 FR 54026 September 8, 2023	NE
Mountainous star coral	Yes	88 FR 54026 September 8, 2023	NE
Lobed star coral	Yes	88 FR 54026 September 8, 2023	NE
Rough cactus coral	Yes	88 FR 54026 September 8, 2023	NE
Pillar coral	Yes	88 FR 54026 September 8, 2023	NE
Nassau grouper	Yes	89 FR 126 February 1, 2024	NLAA

E = endangered; T = threatened; NLAA = may affect, not likely to adversely affect; NE = no effect; LAA = Likely to Adversely Affect, N/A = not applicable

`

IMPACT MINIMIZATION PLAN

FOR

PHASE II IMPROVMENTS TO VETERANS DRIVE

ST. THOMAS, U.S. VIRGIN ISLANDS

PREPARED BY

BIOIMPACT, INC.

P.O. BOX 132 KINGSHILL
ST. CROIX, U.S. VIRGIN ISLANDS 00851

AUGUST 2024

`

Table of Contents

`

I. INTRODUCTION

The Virgin Islands Department of Public Works (DPW) is commencing Phase II of the improvements to Veterans Drive (Route 30) from Tortola Wharf to Long Bay Road (Kronprindsens Tvaer Gade (Windward Passage Hotel) to Long Bay Road/W.G. Lewis Lane (formerly Lovers Lane).

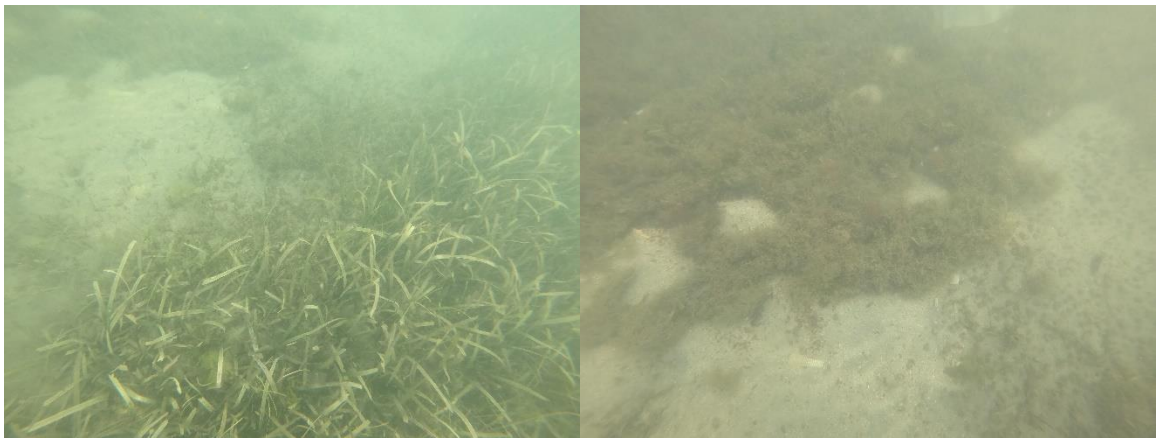
The proposed project is being constructed in two phases:

- Phase I, which has been completed, which limits were Long Bay Road/W.G. Lewis Lane/Lovers Lane (Route 314) to west of Hospital Gade,
- Phase II limits are from Kronprindsens Tvaer Gade (Windward Passage Hotel) to Hospital Gade, an approximate distance of 0.815 miles.

The project is located along the shoreline of Charlotte Amalie Harbor in St. Thomas, US Virgin Islands.

The total project required the dredging of 39,252 cubic yards from the bottom of Charlotte Amelie Harbor and 8.57 acres of fill. The total project results in the impact of 4.45 acres of mud bottom, 1.15 acres of seagrass beds, and 2.97 acres of coral colonized hard bottom in the Charlotte Amalie Harbor including 1.97 acres of impact to critical habitat of acropoid corals. The mitigation for these resources has been completed. The compensatory mitigation for unavoidable impacts has been completed and has a final year of monitoring to complete. Phase I has been completed and Phase II requires 22,008cy of dredging to allow for placement of wall sections and 54,577cy of fill.

In order to minimize and mitigate impacts to ESA species, including corals and fish and EFH, corals and seagrasses within the area of impact (which extends beyond the direct impact footprint) were transplanted prior to construction in 2018. Barge spud impacts were and will also be monitored and where possible impacts to seagrass beds were and will be mitigated.



The line at the edge of the transplant (10ft out from seawall) is clear, and the area from which seagrass was removed is mostly uncolonized and filled with drift algae.

`

II. OBJECTIVES

The objective of this minimization plan is to further minimize impacts by transplanting any corals which have colonized, grown to transplantable size or are no longer diseased from the Phase II project footprint.

III. SITE SELECTION

The transplant site (Figure 1) was selected due to its proximity and similarity to the proposed impact sites. Benthic Habitat Map (Tile # 10) of the recipient site is shown on Figure 2. The recipient site has better water quality than the project site. The coral relocation area off Frederik Point, Hassel Island was chosen since it is of similar rock substrate and there are areas into which corals can be transplanted which are the same depths from which the corals are being taken. There is also available space to relocate the coral rock boulders.

`

Figure 1. Coral Recipient Site

All of the coral species being transplanted, *Diploria strigosa, Solenastrea bournoni, Siderastrea siderea, Agaricia grahamae, Madracis auretenra, Diploria labyrinthiformis, Colpophyllia natans, Madracis decactis, Porites astreoides Porites colonensis* and *Meandrina meandrites* are present within the recipient site area. The recipient site is delineated as the same habitat type, Reef/Colonized Bedrock, of project area in the NOS Benthic Habitat Map (Figure 2). The area is also adjacent to Hassel Island which is protected from development and government held and therefore the mitigation area should not be impacted in the future.

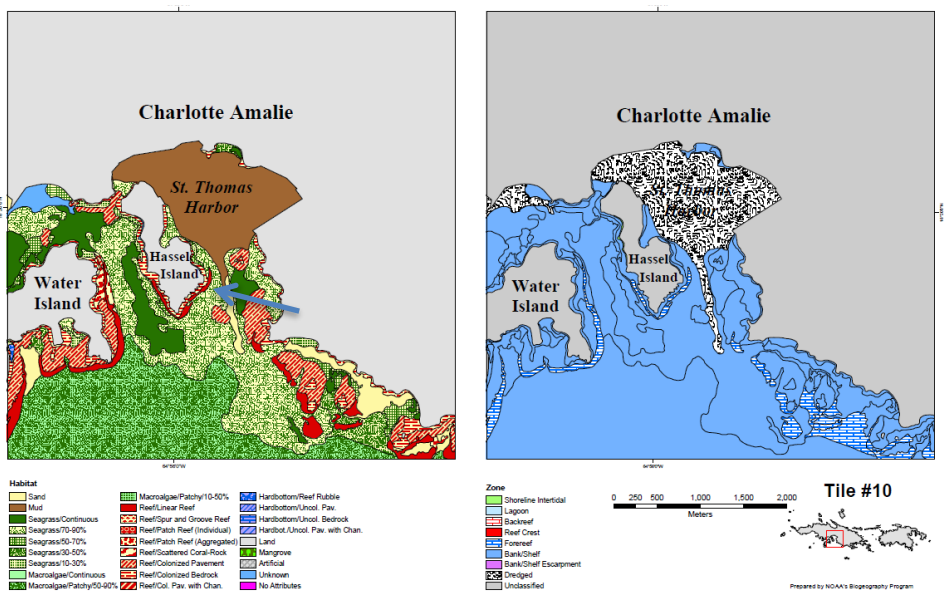


Figure 2. Benthic Habitat Map Tile 10.

Note: the recipient site has been identified on the map.

IV. SITE PROTECTION INSTRUMENT

The recipient site is offshore of Hassel Island adjacent to lands which are held by either the Virgin Islands Government or National Park Service. Any alteration of these areas would require a U.S. Corps of Engineers Permit and a Department of Planning and Natural Resources Water Permit therefore a Site Protection Instrument should not be necessary as that approval for this mitigation plan is being sought through those two agencies. Virgin Islands Department of Public Works will be placing buoys offshore of each mitigation site indicating the presence of protected species and the necessity of caution while boating or anchoring. The site will be placed on the Division of Fish and Wildlife's protected areas map.

V. BASELINE INFORMATION

V.1 Coral Recipient Site Frederick Point, Hassel Island

The proposed recipient site is on the southeastern corner of Hassel Island (Figure 2). It is composed of bedrock and boulders and is of similar rock composition as the project areas which will be impacted. The site has adequate open rock area in the appropriate depths to receive the corals.

`

Figure 3. Transects from Recipient Site.

Within the area are *Acropora palmata, Diploria labyrinthiformis, Diploria strigosa, Stephanocoenia michilini, Siderastrea siderea*, *Orbicella annularis, Porites astreoides, S. radians, Porites porites, Millepora alcicornis, M. complanata, Dendrogyra cylindrus, O. cavernosa, Dichocoenia stokesii, Agarica agaricites* and *Meandrina meandrites*. Several photographs of the recipient site are illustrated in Table 1. This is the site which was used for the original coral transplant and a 91% success rate was achieved at the end of 5 years.

Transect data is provided in Table 1.

`

Table 1 - Coral Recipient Site Frederick Point, Hassel Island

	Recipient Site Condition	Notes/Observations
1		The reef below the Fort on Hassel Island
2		The shallowest areas have encrusting coral and gorgonian colonization
3		*Acropora palmata* colonies were found within the shallows below the fort
4		This *Acropora* is located immediately below the fort on Hassel Island

`

Table 2: Results of Quadrat Analysis along Transect Lines

Transect	Quadrat	Species	Common Name	Percent Cover/m2	Blades/m2	Substrate
Coral Transplant Transect 1 18° 19.562'N 64° 5.768'W	1	*Siderastrea siderea*	Smooth starlet coral	20%		hardbottom
		Dendrogyra cylindrus	Pillar coral	30%		hardbottom
		Halimeda		5%		hardbottom
		Dictyota		5%		hardbottom
	2	*Montastrea annularis*	Boulder Coral	15%		hardbottom
		Siderastrea siderea	Smooth starlet coral	15%		hardbottom
		Halimeda	Boulder Coral	3%		hardbottom
	3	*Agarica agaricites*	Lettuce coral	5%		hardbottom
		Siderastrea siderea	Smooth starlet coral	5%		hardbottom
		Montastrea annularis	Boulder Coral	5%		hardbottom
		Halimeda		5%		hardbottom
		Dictyota		5%		hardbottom
	4	*Siderastrea siderea*	Smooth starlet coral	15%		hardbottom
		Halimeda		5%		hardbottom
		Dictyota		5%		hardbottom
	5	*Siderastrea siderea*	Smooth starlet coral	25%		hardbottom
		Montastrea cavernosa	Boulder Coral	15%		hardbottom
		Dictyota		2%		hardbottom
	6	*Siderastrea siderea*	Smooth starlet coral	10%		hardbottom
		Montastrea cavernosa	Boulder Coral	10%		hardbottom
		Porites porites	Finger coral	5%		hardbottom
	7	*Siderastrea siderea*	Smooth starlet coral	2%		hardbottom
	8	*Uncolonized*				hardbottom
	9	*Diploria strigosa*	brain coral	10%		hardbottom
	10	*Porites astreoides*	Mustard Hill Coral	15%		hardbottom
		Halimeda		2%		hardbottom
Coral Transplant Transect 2 18° 19.562'N 64° 5.793'W	1	*Pseudoceratina crassa*	tube sponge	15%		hardbottom
		Pseudoopterogorgia bipinnata	sea plume	5%		hardbottom
	2	*Montastrea cavernosa*	Boulder Coral	10%		hardbottom
		Porites porites	Finger coral	5%		hardbottom
		Porites astreoides	Mustard Hill Coral	10%		hardbottom
	3	*Porites astreoides*	Mustard Hill Coral	15%		hardbottom
		Dendrogyra cylindrus	Pillar coral	30%		hardbottom
		Dictyota		5%		hardbottom
		Padina sanctae-crucis		5%		hardbottom

`

Table 2: Results of Quadrat Analysis along Transect Lines (Continued)

Transect	Quadrat	Species	Common Name	Percent Cover/m2	Blades/m2	Substrate
Coral Transplant Transect 2 18° 19.562'N 64° 5.793'W	4	*Siderastrea siderea*	Smooth starlet coral	20%		hardbottom
		Montastrea annularis	Boulder Coral	15%		hardbottom
		Dictyota		5%		hardbottom
	5	*Montastrea annularis*	Boulder Coral	15%		hardbottom
		Siderastrea siderea	Smooth starlet coral	15%		hardbottom
	6	*Siderastrea siderea*	Smooth starlet coral	45%		hardbottom
	7	*Siderastrea siderea*	Smooth starlet coral	10%		hardbottom
		Diploria strigosa	brain coral	5%		hardbottom
		Padina sanctae-crucis		5%		hardbottom
	8	*Siderastrea siderea*	Smooth target	35%		Hardbottom
	9	*Pseudoceratina crassa*	tube sponge	25%		hardbottom
		Valonia		5%		hardbottom
	10	*Montastrea cavernosa*	Boulder Coral	5%		hardbottom
		Montastrea annularis	Boulder Coral	10%		hardbottom
		Diploria strigosa	brain coral	5%		hardbottom
	11	*Montastrea annularis*	Boulder Coral	15%		hardbottom
		Siderastrea siderea	Smooth starlet coral	5%		hardbottom
		Padina sanctae-crucis		5%		hardbottom
	12	*Siderastrea siderea*	Smooth starlet coral	20%		hardbottom
		Porites astreoides	Mustard Hill Coral	15%		hardbottom
		Porites porites	Finger coral	8%		hardbottom
		Dictyota		5%		hardbottom
	13	*Siderastrea siderea*	Smooth starlet coral	15%		hardbottom
		Agarica agaricites	Lettuce coral	5%		hardbottom
		Caulerpa		5%		hardbottom
	14	*Siderastrea siderea*	Smooth starlet coral	15%		hardbottom
		Padina sanctae-crucis		5%		hardbottom
	15	*Erythropodium caribaeorum*	Encrusting gorgonian	15%		hardbottom
	16	*Acropora palmata*	Elkhorn coral	20%		hardbottom
	17	*Acropora palmata*	Elkhorn coral	20%		hardbottom
		Muicea elongata	Spiny sea rod	5%		hardbottom
		Erythropodium caribaeorum	Encrusting gorgonian	5%		hardbottom
	18	*Meandrina meandrites*	maze coral	10%		hardbottom
		Porites porites	Finger coral	5%		hardbottom

Please note that *Orbicella spp*. are still listed as *Montastrea* in the table above.

`

VI. MINIMIZATION OF IMPACTS

VI.1 Relocation of Corals

It has been more than 12 years since the project surveys and 7 years since the transplant of corals from the area. Since that time corals which were not removed have grown, are no longer diseased or bleached and have colonized the rock or sheep pile wall. Approximately 408 healthy corals were noted on the rocky outcropping (141) including some large corals heads which were disease during the initial transplant and (267) corals on the sheet pile wall. The two most abundant are *Siderastrea siderea* (174) and *Porites astreoides* (132) representing 75% of the corals to be relocated. No ESA corals are present, they were all removed during the initial transplant.

VI.2 General Description of Area to be Impacted

Despite repeated disturbance and alterations over the years Charlotte Amalie Harbor still supports a diverse and abundant benthic community. While there are areas of uncolonized or minimally colonized course sand or silty muddy sand in the inner reaches of the harbor, there are also densely colonized seagrass beds and algal meadows and even hard bottom areas which supports a coral and sponge community. Most of the species present are those more suited to high turbidity environs. During the 2024 survey dense seagrass beds are still present outside the area that was transplanted, and some seagrass is recolonizing the 10ft between the in-situ seagrass and the quay wall. The seagrass which was not transplanted due to *Halophila stipulacea* is still thriving as well. And the new bulkhead is completely colonized by algae and *H. stipulacea*.

The new quay wall is completely colonized by *H. stipulacea, Caulerpa spp*, and Padina *sanctae-crucis*. The heavy colonization may be due to persistent sewer leaks in the area of the federal building.

The NOAA NOS Benthic Habitat Map Panel 10 (Figure 2) shows Reef/Colonized Bedrock at the rocky points within the project area, the dense continuous seagrass beds just to the west of the pump house, less dense seagrass beds to the west and the mud bottom further offshore and to the east of the pump stations. This mapping was found to be fairly accurate during the benthic surveys that were conducted in 2008 and 2012.

To the west of Hospital Gade to Long Bay Road is colonized by seagrass (*Thalassia testudinum*) varying in density between 30-100 percent of total bottom coverage. The denser seagrass extends farther to the west than as depicted in the NOS benthic habitat map. The hard bottom areas which extend from around the pump house and around the Virgin Islands Legislature building were colonized hard and soft coral species. Extending beyond the hard bottom there are large scattered coral heads including *Siderastrea*

`

siderea, Diploria strigosa, Solenastrea bournoni and *Orbicella annularis*. The hard bottom extends beyond the roadway footprint.

VI.3 Methods

Surveys were conducted within the project area in 2008 and in March, April and May of the 2012. The surveys were conducted by snorkeling where water depth is less than 1.5 feet and by diving where water depths are 2 feet and deeper. Transects were conducted both parallel and perpendicular to the shoreline and meter squares were used to assess percent covers along the transect lines (Rogers, 1994). A handheld Garmin Montana handheld GPS was placed in a waterproof case and used to delineate the habitat types. The benthic habitat maps are provided below in Figures 4 and 5. The area was resurveyed in July and August of 2024.

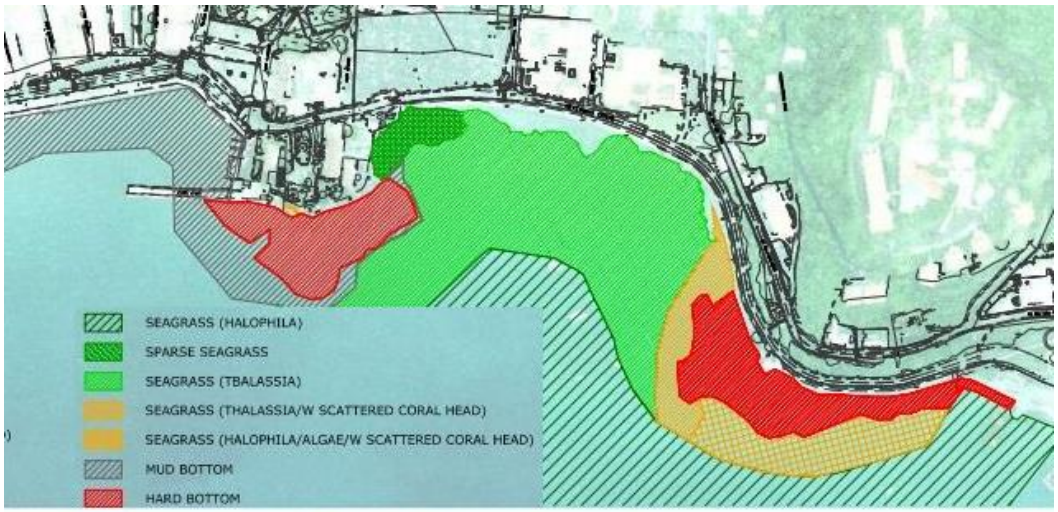


Figure 4. Benthic Habitats in the eastern Project Area

`

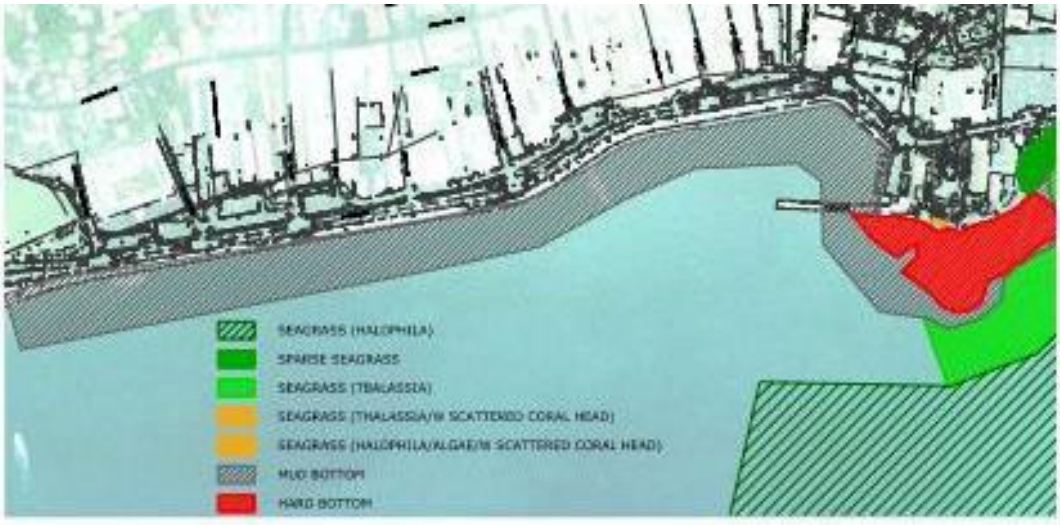


Figure 5. Benthic Habitats in the western Project Area

VI.4 Findings 2024

Seagrass is still dense offshore with large areas colonized by (*Thalassia testudinum*) varying in density between 30-100 percent total bottom coverage. There are dense areas of *Halophila stipulacea*. The grass beds are intermixed with algae (*Halimeda, Udotea, Avrainvillea, Dictyota, Penicillus, Udotea, Caulerpa,* and H. stipulacea). There are several areas where *macro-algae are* the dominant cover.

Sea grass is thriving south of the new section of Veterans Drive. Large areas are completely covered by drift algae.

The quay wall is densely colonized by algae, especially turf algae with scattered *Caulerpa sp.* and *Padina sanctae-crucis*.

`

The new quay wall is completely colonized by*, Caulerpa spp (C. taxifolia, C. sertuloriordes, C. mexicana, C. racemose)*, *H. stipulacea*, and Padina *sanctae-crucis*. The heavy colonization may be due to persistent sewer leaks in the area of the federal building. (Blades from the offshore *Thalassia* are tangled in the algae.

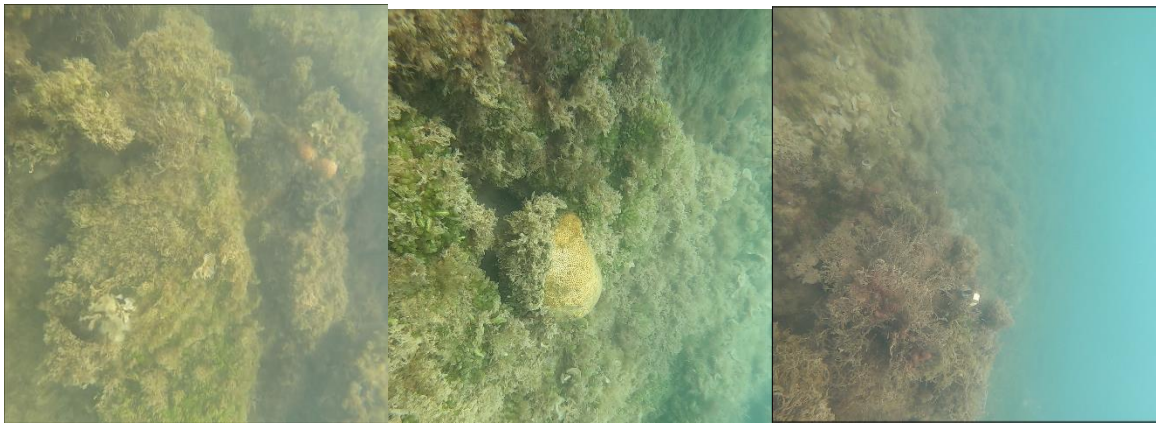
To the east approaching where the pump house used to be beyond the quay wall, there still are coral heads including (*Diploria strigosa, Stephanocoenia michilini, Solenastrea bournoni, Porites astreoides and Siderastrea siderea*) on the hardbottom and some larger boulders offshore. It should be noted that most of *P. astreoides* were bleached.

To the west hardbottom around the legislature was almost completely involved in a dense algal turf and some of the corals heads which had been part of the monitoring were completely overgrown with algae. *Siderastrea siderea* were the most abundant corals, followed by *Porites astreoides*, which again was mostly completely bleached. Also present were large *Solenastrea bournoni,* and a few *Pseudodiploria strigosa* and 3 *Montastrea cavernosa*.

Outside of the roadway footprint, there are Solenastrea bournoni, and Siderastrea siderea. The rocks are completely algal covered and no longer have the characteristics of critical habitat.

There are some larger heads at the edge of the project footprint.

`



Two *Siderastrea siderea*, a loose *Solenastrea bournoni*, and a totally bleached *P. astreoides*. The *S. bournoni* is partially bleached (and had black band at the time of the original transplant, the dead area from black band is still notable) and the *P. astreoides* is completely bleached.

There are corals which have colonized since the transplant from the area. Including S. siderea, S. bournoni and P. astreiodes.

There are corals which no longer have black band disease and can now be transplanted.

There are a number of *P. astreoides* on the hardbottom, almost all of which are bleached.

`

To the north of the Coast Guard Dock there is a large patch that is a mix of *Thalassia testudinum, Syringodium filiforme* and *H. stipulacea* (the reason it was not transplanted). The bulkhead (2700ft in length) has *Siderastrea siderea* (100+), *Solenastrea bournoni* (40+), *Porites astreoides* (70+), *Psuedodiploria strigosa* (30+), *Diploria labyrinthiformis* (5+), Agaricia grahamae (20+), *Madracis auretenra* (2), *Madracis decactis* (3), *Colpophyllia natans* (2), *Montastrea cavernosa* (5) and *Meandrina meandrites* (3). Some of the corals do not have good color and their relocation will be evaluated at the time of relocation.

Mixed seagrass, algae and H. stipulacea west of Coast Guard Station.

The sheet pile wall along the 2700ft of waterfront is heavily algae colonized, and there are scattered corals which have colonized since the last transplant or were diseased and not transplanted.

Some of the corals which were not transplanted before are up to 75% algal colonized.

`

There are sponges as well as corals and where possible sponges will be removed and relocated.

There is some bleaching on some of the corals on the sheet pile wall.

Most of the bleaching appears heat related by not all.

The corals are clustered primarily due to the previous clustering of diseased corals.

`

Most of the corals on the sheet pile are S. siderea, but the are a scattering of other species.

There is algal growth on the sheet pile walls and around the culverts there are large areas where the algae are bleached white and slimy. Tunicates are present scattered along the wall.

The seafloor colonization along the bulkhead is primarily *H. stipulacea* and scattered macro algae and a few areas have *Thalassia* intermixed with *H. stipulacea*. There is some scattered debris.

Impact of Roadway Improvements

The project involves direct (Figure 5) and indirect impacts (Figure 6) to the marine environment. Phase II will be directly impacting 6.57 acres of submerged aquatic habitat.

Area of Direct Impact, Total area of impact 8.57 acres, 1.15 acres of SAV impact, 2.97acres of coral colonized hardbottom and 4.45 acres of minimally colonized mud bottom.

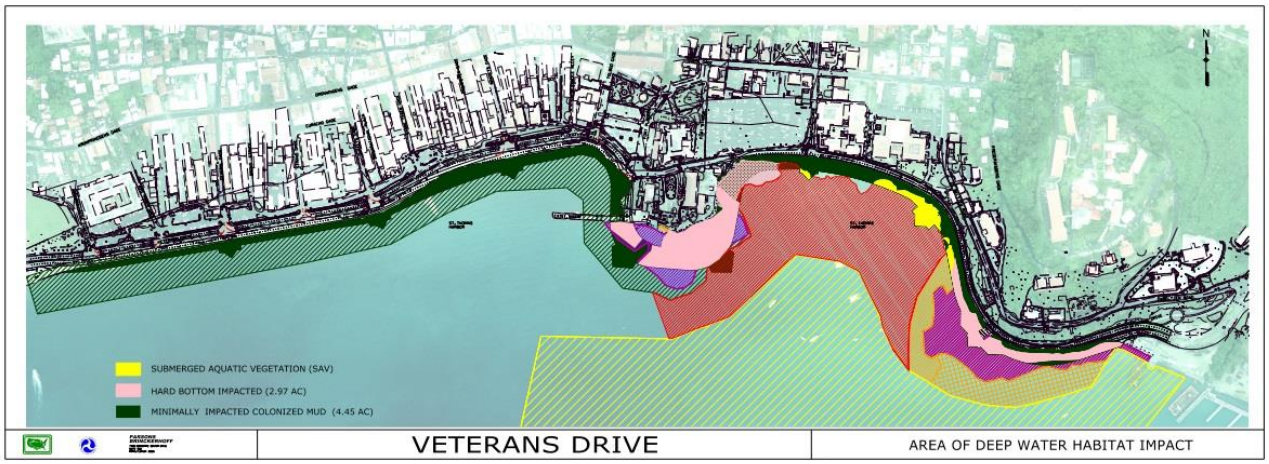


Figure 5. Direct Benthic Impact overall project

Area of Indirect impact. Total area of indirect impact 1.28 acres, 0.32 acres of SAV impact, 0.27acres of coral colonized hardbottom and 0.69 acres of minimally colonized mud bottom.

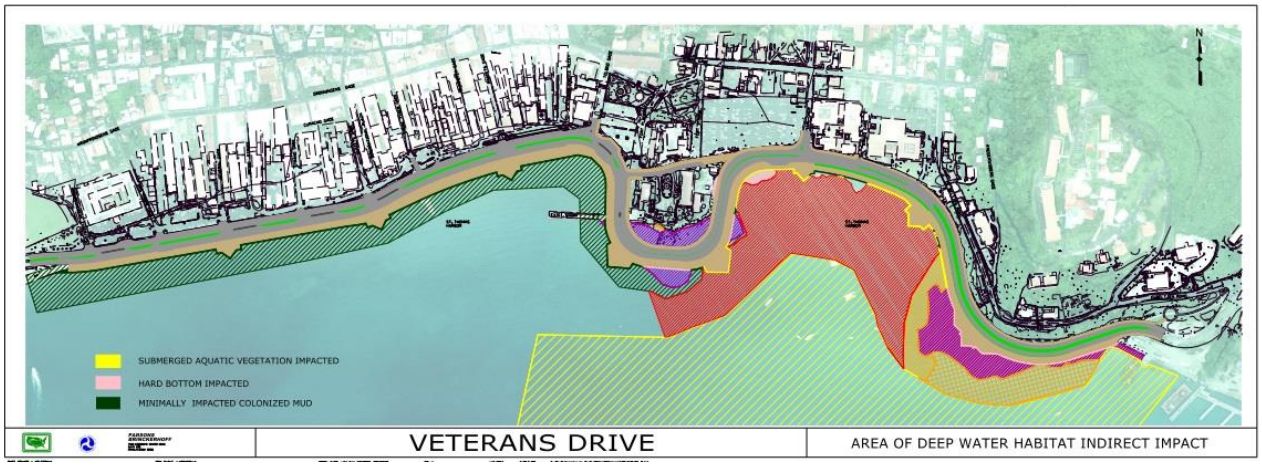


Figure 6. Indirect Benthic Impact overall project

Overall, most of the corals on the rocky point around the legislature are much healthier than they were pre-construction of Phase I despite the obvious high nutrient input. During the 2018 transplant many of the corals appeared diseased or bleached and were not relocated. And except for *P. astreoides* the corals overall had better color and no sign of black band disease was noted which was prevalent in 2018. Some of the corals showed areas where tissue had been lost previously. This will allow the relocation of some of the large *Solenastrea bournoni* colonies and *S. siderea* colonies which could not be moved in 2018 because of fear of contamination of the other transplant corals.

`

VII. MINIMIZATION WORK PLAN

VII.1 Corals

First divers will collect those corals and sessile invertebrates that colonize the bedrock around the legislature that are of a small enough size to allow hand carrying. Divers will wear disposable gloves while working with corals and keep away from any coral that appears unhealthy or diseased. If a coral is handled that appears unhealthy or diseased gloves will be changed prior to working with other corals. The corals will be placed in underwater bins and these bins will be placed on a transport tray suspended underneath the vessel which will be used to relocate the corals. Once the tray is full, the vessel will slowly motor to the recipient site. Once on site the corals in their baskets will be carried by divers to the seafloor. The coral encrusted rocks and rubble will be placed in the recipient site in such a fashion that the rock is stable and will not be subject to movement. Care will be taken so that these transplanted materials will not impact existing organisms at the transplant site.

Using lift bags and ropes divers will lift and transport larger coral colonized rocks, coral heads and uncolonized coral boulders on to a transport tray which has been placed on the seafloor. The tray will be then lifted with lift bags to the harness below the vessel and firmly secured to the vessel. The vessel will then slowly carry the organisms to the recipient site. Once on-site lift bags will be attached to the tray, and it will be released from the vessel and the tray will be carefully lowered to the seafloor. Once on the seafloor the boulder or coral will be lifted by lift bag and then placed in its new location. When attaching the corals to the lift bags ropes will be placed so that they avoid live coral tissue. If necessary, a plate may be placed underneath the coral so that it lifted without the tissue being impacted by the ropes.

Individual corals that are attached to the pavement or to rocks or boulders that cannot be moved will be removed with chisels. This includes small head and plate corals (most of what will be relocated). These corals will be collected in bins and then placed on the underwater transport tray under the vessel. Once the tray is full, the vessel will slowly motor to the recipient site. The bins will be carried by divers to the seafloor. These corals will then be fixed in placed in their new locations with two-part underwater epoxy, which sets in a matter of minutes (Slashzone). The base of the coral will be carefully cleaned with a wire brush and the new substrate will be cleaned to remove algae and any other material which might interfere with the adhesion of the epoxy or cement. The new locations will either be existing uncolonized coral boulders or rubble or bedrock. The coral will be carefully placed and held until the epoxy or cement starts to set.

The recipient site is located to the south, the area is a similar habitat type with bedrock and dead coral substrate and has similar water depth to the area from which the corals will be taken (0'-10'). The area is typically less turbid than the site from which the coral is being transplanted from. The area is more open and has more current.

There are a number of large coral boulders which are located on rocky headland which lie within the impact and potential impact footprint most of these are *Solenastrea bournoni* and were not healthy at the time of the last transplant. These will be broken free if possible and relocated. It is possible that these may require fragmentation due to size. If they are in the indirect impact area they will not be moved. Depending on the equipment used to excavate the quay wall footprint the contractor may be asked to help lift the coral boulder outside the footprint. The boulder would then be stabilized in its new position.

`

VII.2 MAINTENANCE PLAN

Divers will survey the coral recipient site on a bi-weekly basis for the first two months after the transplant to ensure that the corals have not become unattached or shifted. If for any reason the corals become loose or move, they will be re-situated and or reattached. After the first two months the corals will be monitored on a monthly basis for the first year, making sure that the rocks have remained stable and not shifted, and that corals and sponges have not come loose. If necessary, corals will be repositioned and re-attached.

VIII. ECOLOGICAL PERFORMANCE STANDARDS

This a minimization project as the mitigation for the project has already been completed therefore it will not be subject to the same performance standards as the original mitigation. The object of this plan is to minimize impact to benthic resources which have grown, colonized or healed since the mitigation of the area was conducted.

It is the intent of this minimization program to obtain a minimum of 85 percent survival of the transplanted corals and seagrasses. The Virgin Islands Public Works Department is committed to put forth the greatest effort to see that the relocation is successful and that they obtain the greatest potential survival of transplanted organisms.

IX. MONITORING

Monitoring the compensatory mitigation project site is necessary to determine if the project is meeting its survival goal and to determine if measures are necessary to ensure that the Impact Minimization project is accomplishing its objectives.

In total twenty-five percent of the relocated corals representative of all the species and all sizes classes of corals relocated will be marked with numbered tags for monitoring (100 corals). The same number of corals of the same species and size class already at the transplant site will also be monitored as controls. These corals will be marked and surveyed at the conclusion of the transplant. The marked corals will be surveyed for health and photographed on a monthly basis for the first twelve (12) months. Maintenance will also continue throughout this time to ensure that corals reattach to the new substrate. All photographs will include location and scale as well as the description of the health of the corals photographed. Corals will then be monitored every six months for the next four (4) years.

If at any time during the monitoring degradation of the corals is noted, these corals will be compared to those within the other monitoring quadrats and corals in areas outside the impact area of the transplant project. This information will be used to determine whether the degradation of the corals is due to the transplant activities). If the corals appear to be stressed due to the transplant, the reason for the demise will be assessed, poor positioning, sand scour, light attenuation, etc. If necessary, the coral will be repositioned. Every effort will be made to save the coral. If the degradation is seen both in the project area non-transplanted corals and the transplanted corals, the reason for the demise will be assessed.

Reports will be provided to the U.S. Army Corps of Engineer and PWD within 60 days of completing the survey activity.

Revised Water Quality Monitoring

Veterans Drive (Route 30) Improvements
St. Thomas U.S. Virgin Islands

1. Introduction

The following is the proposed monitoring program for the construction of the Veterans Drive (Route 30) Improvements in Charlotte Amalie, St. Thomas, U.S. Virgin Islands.

The Virgin Islands Department of Public Works (DPW) is proposing to make improvements to Veterans Drive (Route 30) between Hospital Gade and Long Bay Road. The project has been segmented in phases for construction purposes. Below are the limits of each phase:

- Phase 1 limits are from Tolbod Gade to Long Bay Road Lane, a total distance of 0.70 miles. This phase will be subdivided in two sub-phases; 1A and 1B. Phase IA has been completed.
- Phase 2 limits are from Kronprindsens Tvaer Gade (Windward Passage Hotel) to Tolbod Gade, an approximate distance of 0.48 mile.

The improvements to Veterans Drive are needed to help alleviate traffic congesting along the waterfront. Improvements have been implemented further to the west on Long Bay Road and are ongoing near Mandala Circle. These improvements have made significant stride towards lessening the congestion which occurs due to cruise ship activities, port traffic, and Veterans Drive being the main thoroughfare servicing the town of Charlotte Amalie. Further expanding the four-lane roadway will greatly enhance the visitors' experience on St. Thomas and will improve traffic flow to and from the town of Charlotte Amalie. The improvements include the development of a landscape promenade along the waterfront for the enjoyment of visitors and residents alike.

1.1. Potential Impacts

The project directly impacts 8.57 acres of benthic habitat within the Charlotte Amalie Harbor. This includes 1.15 acres of seagrass and 2.97 acres of hard bottom with scattered coral colonization. The project involves both dredging and filling. The dredging will be done to remove soils of poor structural quality within the fill area. Corals and seagrass were relocated from the project area prior to the commencement of Phase I.

In order to mitigate these impacts, corals and seagrasses within the proposed roadway improvement area (which extends beyond the direct construction impact area) were transplanted prior to construction. Improvements to drainage structures along the waterfront are also being made to help improve water quality of runoff into the bay.

In any marine construction the potential for physical damage to marine life and degradation of water quality exist**.** When sediments are suspended in the water column through disturbance of the seafloor these suspended sediments add to the turbidity of the water. The lowering of the transparency of seawater can greatly affect sessile marine organisms that rely on the transmission of the light for their existence. Settling sediments can also smother coral colonies and prevent larval sediment of reef organisms.

Two sediment samples were taken along the route of the Veterans Drive Improvements to assess potential impacts of dredging within the area to remove poor quality sediments before filling. The locations of sampling were those areas most likely to be impacted by upland runoff.

Samples were analyzed for heavy metals, mercury, pesticides, PAH, hydrocarbons and PCBs. Elutriate testing was also done to access the potential impacts of suspending the soils in the water column during dredging.

The result of the sediment analysis can be compared against NOAA's Sediment Quality Guidelines. NOAA has established Effects Ranges where adverse effects were identified. From the ascending data tables, the 10th percentile and the 50th percentile (median) of the effects database were identified for each contaminant. The 10th percentile values were named the "Effects Range-Low" (ERL), indicative of concentrations below which adverse effects rarely occur. The 50th percentiles were named the "Effects Range-Median" (ERM) values, representative of concentrations above which effects frequently occur.

No hydrocarbons were detected in either soil sample. Both samples had extremely high Aluminum levels at 6800mg/kg and 7000mg/kg for station 1 and 2 respectively. But only 21ppb was released into the water column during the elutriate test for Station 1 and no aluminum was released into the water column at station 2. This was not surprising based on the number of aluminum cans that are present in both areas. Aluminum is not listed on the Effects range tables. Copper was higher than the ERL of 34ppm for both samples but well under the ERM of 270ppm at 45mg/kg (ppm) and 50mg/kg(pp) for stations 1 and 2 respectively. Zinc right at the ERL of 150ppm for station 1 and only slightly above it at 170ppm at station 2. The ERM for zinc is 410ppm. PCBs were not detected in either sample.

The dredging of the material and its disposal in an appropriate upland area should have a negligible impact on water quality and the environment. No special testing during dredging should be required.

The upland construction and development also has the potential to impact marine water quality. This will result in exposed loose soils and an increase in the potential for sedimentation and erosion. A stringent sedimentation and erosion control program and a Storm Water Pollution Prevention Plan have been prepared and will be implemented to help abate this potential impact. The erosion and sediment control devices include floating turbidity barriers along the harbor within the construction limits surrounding areas of work and de-watering, silt fences and or fiber rolls along the edge of on-going terrestrial construction phase, stabilized construction entrances equipped with soil tracking prevention device, rock bags or synthetic bales for inlet sediment control.

The water quality monitoring plan also includes monitoring of settling sediments to look at the effectiveness of the sedimentation control and the quality of discharged waters and monitoring of the environmental resources within the area to look for sediment and turbidity impacts. The construction contractor, throughout the duration of the project, is responsible for installing, maintaining and inspecting all storm water erosion and sediment control measures.

Through careful planning and monitoring, such potential impacts can be minimized and abated. A preconstruction benthic survey will be conducted to determine the exact number and location of ESA-listed corals within the in-water work footprint that will be relocated and within the general area adjacent to all temporary and permanent in-water work, including barge transit routes, barge anchoring locations, and the in-water footprint of the expanded roadway. In addition to being used to determine the number and location of ESA-listed corals to be relocated, the survey results will be used to determine whether there are other ESA-listed coral colonies adjacent to the in-water work footprint. If ESA-listed coral colonies are present adjacent to the in-water work footprint, these colonies will be surveyed as part of the implementation of the Water Quality Monitoring Plan.

1.2. Monitoring Plan Approach

In order to ensure that water quality is maintained this water quality monitoring program will be implemented during construction, this includes all in-water work including dredging, filling and dewatering, as well as the upland construction impacts on sedimentation and erosion. This plan will monitor turbidity and settling sediments to look at the effectiveness of the sedimentation control and the quality of discharged waters. If any degradation of water quality is detected immediate measures must be taken to abate the impacts. This plan will also monitor the benthic community off shore of the proposed project site.

The purpose of this monitoring plan is to document any degradation in water quality or in the health of the benthic community and detail a course of action that can be immediately implemented to abate that degradation if significant changes are observed. The water quality monitoring plan was implemented throughout Phase I.

2. Water Quality Monitoring

Prior to the start of the construction of Phase II, a baseline of water quality conditions will be established. A total of four(4) sampling locations will be established around the waterfront and two (2) control sites one to the east and one to the west of the project area. The monitoring samples will be collected in the areas most likely
to be impacted by the project construction. The control sites will be located in areas which should be exposed by the same ambient conditions, but should not be impacted by the construction project.

At each site the turbidity expressed as NTUs will be taken in-situ and a sample will be collect to be analyzed for Total Suspended Solids (TSS). Samples will be taken on a weekly basis for two (2) months prior to the start of construction. Baseline data will be used to compare with data collected during the construction to help assess whether readings are a result of the construction project or are due to ambient conditions.
The site locations are illustrated on Figures 1 and 2.

Figure 1 - Water Quality and Environmental Monitoring Locations for Phase II
WQS represents Water Quality Sampling Station, CWQS is a Control Water Quality Station.

2.1. During Construction

During in water construction, four (4) samples will be taken around the area of in-water work as shown in the above figure. In water work will include dredging, filling, and de-watering of dredge spoils and of the fill area. Samples will be taken one (1) meter below the surface and will be analyzed by a Hach Turbidity meter. Samples will be taken on a daily basis. During upland construction when in-water work is not occurring, water samples will be taken after rainfalls of ¼ and greater. A digital recording rain gauge will be placed at the site.

The control samples will be utilized to determine whether elevated turbidity is a function of the project or due to ambient conditions. As per the Virgin Islands Code, visual depth visibility readings (Secchi disk measurements) should not fall below one (1) meter; NTU readings may not exceed three (3) NTU in class C waters.

Baseline samples will be utilized to determine if elevated readings are the result of sea conditions.

Wind speed and direction, wave height and direction, and rainfall will be recorded at the time of sampling.

During construction, if the water samples show NTUs readings in excess of the allowable limits, Department of Planning and Natural Resources (DPNR), Division of Environmental Protection (DEP) and US Virgin Islands Department of Public Works (DPW) will be notified in writing. The baseline samples will be utilized to determine if an increase in turbidity is a result of natural phenomena or if the monitoring sample is elevated above the ambient background as a result of the construction project. If it is determined that the elevated turbidity is the result of the construction, the source of the problem will be identified and methods worked out to reduce suspended sediments. A representative must be on hand at the site at all

times who has the authority to implement sediment control devices, so that problems can be solve or resolved by the monitor, DPW, DEP, and DPNR.

3. Sediment Loading

3.1. Before Construction

Prior to the start of construction of Phase I sediment traps will be placed off shore of the project site to determine the pre-construction sediment loading. Five (5) sediment traps will be deployed along each phase of the project.

The sediment traps will be double traps modeled after the methodology currently used by the National Park Service in St. John with a collection cup at the sea floor (to catch moving existing sediment) and one located approximately one (1) meter from the sea floor to catch newly introduced sediment from in-water work or from terrestrial runoff. To establish a baseline, sediment traps will be collect bi-weekly for a period of one (1) month.

3.2. During Construction

Once earthwork or in-water work begins sediment traps will be sampled on a biweekly basis throughout the duration of construction. The sediment trap results will be compared to the baseline figures and if the catchment is seen to increase over that seen during the baseline study, methods will need to be implemented to abate the loss of sediment into the marine environment or the re-suspension of sediment in the marine environment. Studies have shown that sedimentation levels greater than 10 mg/cm2/day exceed *Acropora's* ability to recover. The levels will not be allowed to approach this range.

DPNR, DEP and DPW will be notified in writing if elevated sediment trap readings are encountered. The baseline samples will be utilized to determine if an increase in catchment is a result of natural phenomena or if the monitoring sample is elevated above the ambient background as a result of the construction project. If it is determined that the elevated turbidity is the result of the construction, the source of the problem will be identified and methods developed to reduce suspended sediments. A representative must be on hand at the site at all times who has the authority to implement sediment control devices, so that problems can be solve or resolved by the monitor, DPW, DEP, and DPNR.

Elevated readings will require additional sediment controls to be put in place. If the elevated readings are the result of terrestrial runoff, additional erosion control will have to be implemented. If the additional catchment is due to marine activities, more effective sediment control will have to be installed. This may include additional turbidity barriers or changes in construction practices.

Selected locations for Phase II of the project are illustrated on Figure 2. Traps have been concentrated near coral resources.

Figure 2 - Location of sediment traps for Phase II

4. Environmental Monitoring

Fauna and flora that will be affected by the project shall be surveyed and monitored. They are the true indicators of the water's ability to sustain its current residents.

Ten (10) permanently marked modified meter square photo quadrats will be established within the area of potential impact off shore of each phase of the proposed project. Locations for the quadrats will be established when the baseline begins.

In hard bottom areas, the quadrats will be selectively placed within the areas of potential impact to encompass the greatest diversity of sessile organisms and flora, including coral and sponge species.

Metal pins will be inserted into the substrate to serve as markers for the camera stand to insure the exact relocation of the photograph in repetitive samplings. Organisms will be identified and quantified as to the percentage of cover and health prior to the commencement of construction. The amount of viable living coral tissue cover, coral color, presence or absence of an excessive mucus coat, algal over growth, and sediment sloughing, will be used to determine health. Any indication of disease will be noted and the agencies will be immediately notified. Seagrass quadrats will be marked with PVC poles and blade counts and presence of epiphytes and new growth will be assessed.

The quadrats will be established and monitored monthly for a period of two (2) months prior to the start of construction to establish a baseline.

The photoquadrats will be monitored on a monthly basis during all project construction including the in-water work and the upland construction. All visible changes will be documented and reasons for these changes assessed. Coral health will be evaluated as to changes in coral color, amount of mucus, amount of sediment on the corals, and amount of algal growth and grazing marks will be noted. Seagrass health will be evaluated as to changes in density, new growth and epiphytes.

A preconstruction benthic survey will be conducted to determine the exact number and location of ESA-listed corals within the in-water work footprint that will be relocated and within the general area adjacent to all temporary and permanent in-water work, including barge transit routes, barge anchoring locations, and the in-water footprint of the expanded roadway. In addition to being used to determine the number and location of ESA-listed corals to be relocated, the survey results will be used to determine whether there are other ESA-listed coral colonies adjacent to the in-water work footprint. If ESA-listed coral colonies are present adjacent to the in-water work footprint, these colonies will be surveyed. These corals will be marked with numbered cattle tags and photographed on a monthly basis and their pictures and analysis of change in health will be documented in the monthly photoquadrat reports.

Photographs and detailed survey information containing the above listed parameters will be given to the Department of Planning and Natural Resources (DPNR), the Division of Environmental Protection (DEP), National Marine Fisheries Service (NMFS), Fish and Wildlife Service (FWS), the U.S. Army Corps of Engineers (ACOE) and DPW on a monthly basis.

5. Monitoring of Sedimentation and Erosion Control Devices

On a daily basis the individual selected as monitor will inspect the sedimentation and erosion control devices which have been installed for the current phase of the project. If deficiencies in the devices are noted the monitor will immediately inform the construction manager of the issue. The monitor will record the problem and the solution on the daily field sheet. If the problem cannot be immediately addressed and if the construction activity is causing on going water quality degradation the activity must cease until such time the control measure can be repaired or replaced. If measures are found to be ineffective, more effective measures will need to be implemented. The monitor, DPW and the contractor will work with DPNR and

permitting agencies to devise measures that will adequately prevent the degradation of water quality within the impacted area of the proposed construction on Veterans Drive.