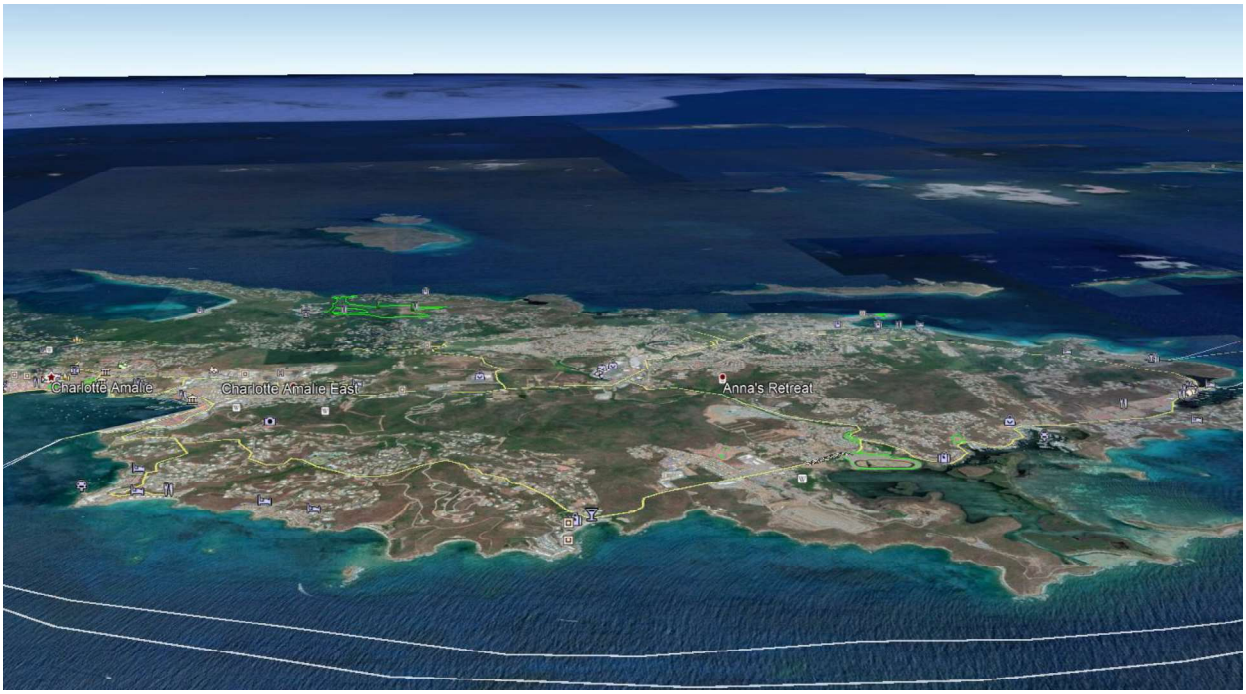
ENVIRONMENTAL ASSESSMENT REPORT FOR "AXIS DEVELOPMENT"



SUBMITTED TO
THE OFFICE OF COASTAL ZONE
MANAGEMENT DEPARTMENT
OF PLANNING AND NATURAL
RESOURCES GOVERNMENT OF
THE VIRGIN ISLANDS

SUBMITTED BY
AXIS DEVLOPMENT GROUP, LLC
9010 ESTATE COTTAGE, SUITE 2
Christiansted, St. Croix, Virgin Islands, 00820

Prepared By
KRAAL ENVIRONMENT, LLC

1.0 NAME AND ADDRESS OF APPLICANT

Axis Development Group, LLC

2.00 LOCATION OF PROJECT

Plot No. 18-M2 Estate Bovoni

2.01 Location and Agency Review Map

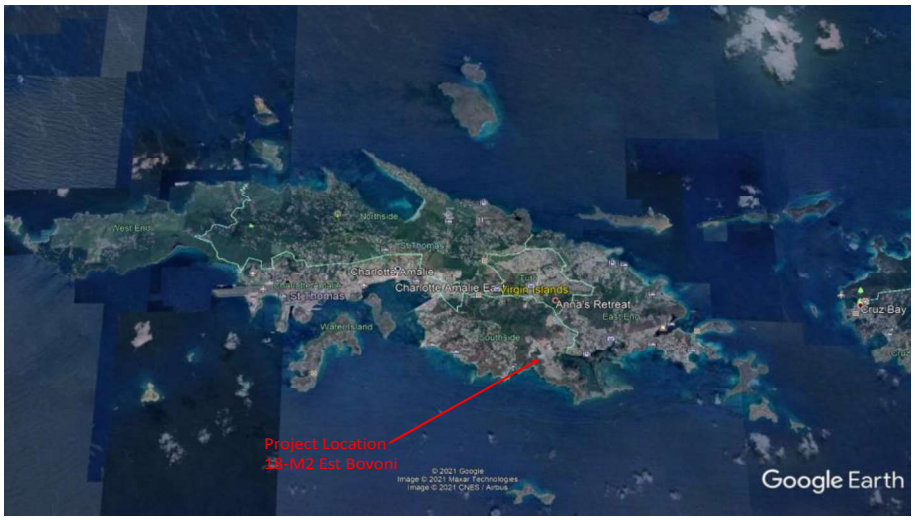


Fig. 1 Location Map

2.02 A copy of the Vicinity Map

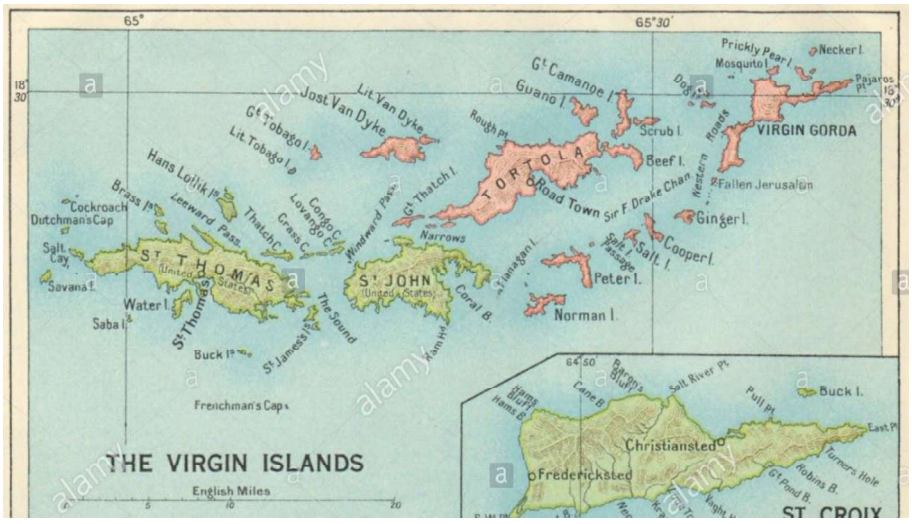


Fig. 2 Vicinity Map

List of Adjacent Property Owners

List of Adjacent Property Owners

1. 18L Estate Bovoni
   Frenchman Bay Quarter
   Plaza Warehousing USVI LLC
   PO Box 502427 St. Thomas VI, 00805

2. 17-E Estate Bovoni
   Frenchman Bay Quarter
   Dry Marina LLC
   7411 Estate Bovoni
   St. Thomas VI 00802

3. 18G Estate Bovoni
   Frenchman Bay
   Western Part
   Raul & Balbina G Rivera

4. 17D Estate Bovoni
   Frenchman Bay (West Part)
   Charles Reynald
   PO Box 308358
   St. Thomas, VI, 00802

5. 17D-1 Estate Bovoni
   No 1&2 Frenchman' Bay Quarter
   Dry Marina, LLC
   1000 Blackbeard S Hill
   St. Thomas, VI 00802

6. 18A Estate Bovoni
   Frenchman Bay Quarter
   Jessie Clark
   PO Box 8485
   St. Thomas VI, 00801

7. 18C Estate Bovoni
   Western Part
   Frenchman Bay Quarter
   Antonio Ogarro
   8168 Crown Bay Marina
   St. Thomas, VI 00820

8. 18D Estate Bovoni (Western Part)
   No. 1&2 Frenchman Bay Quarter
   Phillipe Petit
   614 W Lake St
   Minneapolis, MN 55408

9. 18E Estate Bovoni
   Frenchman Bay Quarter
   William Fett
   6501 Re Hook Plaza
   St. Thomas, VI 00802

10. 16 Estate Bovoni
    Frenchman Bay Quarter
    Desilva F & D Vialet
    PO Box 354 St. Thomas, VI 00804

11. 18M Estate Bovoni
    Bolongo Investments LLC
    544 Newton Rd. Virginia Beach
    VA, 23462

3.00 ABSTRACT

The primary purpose of this project is to develop this site as a base for supporting/conducting other construction related projects on St. Thomas. Consequently, site development will include an access road for entering the property, an administrative office, equipment storage units, a lay down area e and an access road for entering the property. More specifically, permit approval is being requested is to:

- construct an access roadway on western sector of the property;
- clear and grub approximately 72% of the site;
- perform cut and fill operations;
- construct a 0.84 ac-ft retention pond;
- establish a 82,103ft^2 lay down area with 4-inch thick wash rock gravel surface for equipment storage;
- construct a wastewater treatment system;
- establish one (1) 8' x 40' container office and two (2) 8' x 40' container storage vessels; and
- install a series of erosion and sediment control devices.

4.00 STATEMENT OF OBJECTIVES SOUGHT BY THE PROPOSED PROJECT

The main objective is to develop this site as a staging unit and launch base for performing construction projects throughout the island. Basically, it will include an access roadway, an administrative office, perimeter fencing, equipment storage units and lay down area and a series of erosion and sediment control devices.

5.00 DESCRIPTION OF PROJECT

Plot 18-M2 is a 4-acre site located in an area that is known to be a Virgin Island tree boa habitat. After acquisition of approval for conducting a carefully executed hand clearing of the site with trained personnel following the VI Tree Boa site clearance protocol from notification to final inspection, this project will proceed with implementation of the main features delineated on site plan drawings (See C**2**). Located on the southeastern part of St. Thomas, Plot 18-M2 lies in the extreme northeast boundary of the Mangrove Lagoon/Benner Bay Area of Particular Concern and Area for Protection and Restoration. For simplicity envision the shape of the site as being similar to a bowtie[1] with two loops (2 adjacent polygons) where the eastern loop is approximately 2.381-

[1] Or two (2) adjacent polygons (see figure 3 for orientation)

acres (Sector 1) and 1.47 times larger than the 1.619-acre western loop (Sector 2)(See Survey Map Fig 3 below).
Site activities involves construction of a:

1. Three hundred ten (310) feet long by 24 feet wide, 4 inch gravel base access roadway on the northeastern perimeter of Sector 2 ;
2. Zero point eighty-four (0.84) acre-foot (ac-ft) Retention Pond;
3. Eighty-two thousand, one-hundred three (82,103)ft^2 lay down area with 4-inch thick wash rock gravel surface;
4. One (1) 8' x 40' container office and two (2) 8' x 40' container storage trailers;
5. Retaining wall through most of the site (See Site Plans C-2) and cut and fill operations depicted in seven (7) different cross sectional views sections throughout the site (See Grading and Drainage C-4 through C-7)
6. Chain link fence with a strand of barb wire on top;
7. Septic system with a 1,500-gallon tank, infiltrator and distribution box (See Site Plans C-2); and
8. Stormwater catchment system with a manhole and 18-inch diameter pipe in Sector 2.

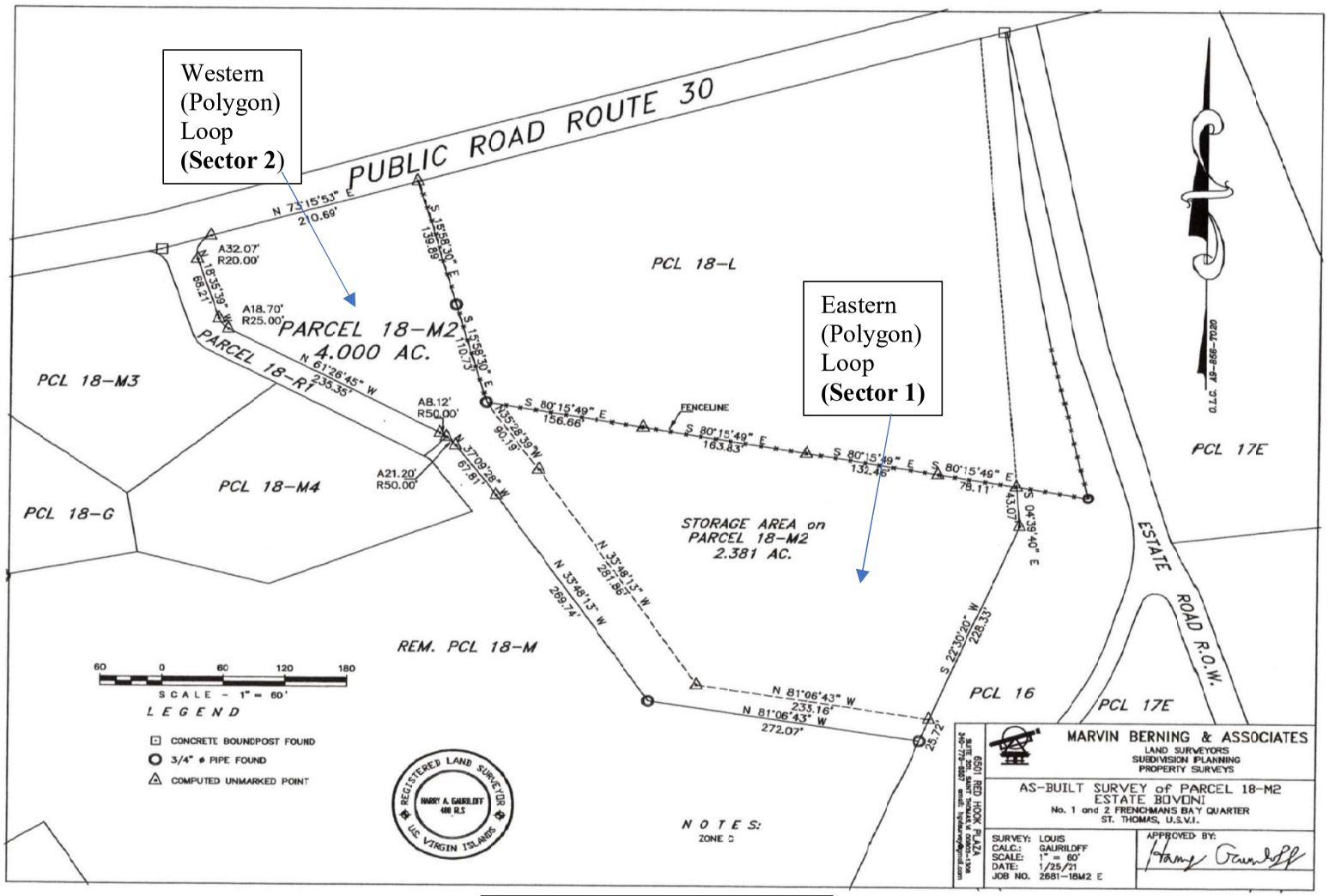


Fig. 3 Survey of Parcel 18-M2

5.01 SUMMARY OF PROPOSED ACTIVITY (To be provided on drawings)

a. Discuss purpose of project

While one project may only marginally positively ensure protection and restoration of significant environmental resources since overall success in meeting the goals of an Area of Particular Concern management plan relies on the coordinated role of multiple regulatory agencies, residents, community - based organizations, and other private sector organizations, this project involves practices that demonstrably upholds our responsibilities with regard to the Mangrove Lagoon and Benner Bay APC management plan.

The purpose of this project is to construct an access road from the north eastern corner of the site running along the eastern perimeter of Sector 2 to the eastern loop (Sector 1). Further, project activities undertaken will be to clear and grub the eastern section of the site in a manner that limits erosion and sediment of soils, and to prepare the surface for development of a container office, storage trailers, an equipment storage area and installation of a sedimentation pond and other erosion and sediment control devices.

b. Discuss the presence and location of any critical area(s) (e.g. historical, environmental or cultural significance/value) and possible trouble spot(s) (e.g. guts, precipices, very steep hillsides)

This is a four (4) acre site located on the southeast portion of St. Thomas in Estate Bovoni shaped like bow tie with the eastern segment or loop (Sector 1) covering approximately 2.381 acres 1.47 times larger than the western loop of 1.619 acres (See Figure 3 As Built above). It is bounded by the Bovoni Road on the northern perimeter and Bovoni Commercial Center (18L Estate Bovoni) to the north-northeast and several industrial/commercial facilities on the eastern perimeter along Trailer Road and the Bovoni landfill to the southeast. This site lies in the extreme northeast boundary of the Mangrove Lagoon/Benner Bay Area of Particular Concern and Area for Protection and Restoration. Mangrove Lagoon / Benner Bay (MLBB) is one of 18 Areas of Particular Concern in the Virgin Islands. The expansive Mangrove Lagoon and Benner Bay APC on the east end of St. Thomas is of exceptional natural value. Its water, mangrove, and sea grass bed systems provide a rich nursery area for fish and a productive habitatfor benthic biota. The lagoon's mangrove-fringed shores are a natural buffer against shore erosion, floods,and hurricane waves. The configuration of the coast also provides a protective anchorage for boats. The area is filled with scenic contrasts, manglar islands, rocky cliffs, ponds and panoramic

ridgelines. Its diverse complex of natural communities provides numerous recreational opportunities for Virgin Islanders. Benner Bay forms a protected harbor and is a commercially important area; charter yacht companies and charter fishing vessels use the numerous large and small marinas sited here. Small docks are scattered throughout the bay and are used by local commercial fishermen.

Lying outside of the boundaries of MLBB, Bolongo bay salt pond is located approximately 700 feet south to the project site. There is greater than 600 feet of heavily vegetated land between the southern boundary of the property and Bovoni Bay lying 860 feet to the south. The western perimeter is also heavily vegetated with bush, shrubs and small trees extending more than 200 feet beyond the western boundary of the property. Generally, the elevation at the site is such that it increases from the northeast to the southwest at two points within the boundaries of the site. Just around the midpoint of the site the elevation increases from roughly 30 feet to 70-75 feet with the steepest rise close to the center of the property. In the eastern loop (Sector 1), the elevation increases in the same direction from approximately 30 feet to around 100 feet. Therefore, stormwater would generally flow from the southwest to the northeast and then radially out in two directions: toward the northwest and Bovoni Road and to the east toward Trailer Road. Just south of the site at Plot 17-E and 16 Estate Bovoni, a phase 11 archaeological survey found, among other artifacts of the 18th and 19th centuries, an intact historic cistern which, individually, is considered eligible for listing in the National Register of Historic Places. Areas of environmental recreational or cultural significance are those already mentioned including the MLBB since the protected harbor of Benner Bay is used by residents and visitors who enjoy sport fishing and bird watching and other similar activities. There are no very steep hillsides associated with the property. As indicated above, the Mangrove Lagoon is approximately 1800 feet to the east and the Bolongo Bay salt pond approximately 700 feet to the south neither will be affected by any development activity associated with this project. A phase 1 archaeological survey will be conducted to determine if further investigation is necessary and ensure that significant artifacts, if present, are identified, protected and preserved.

c. Discuss proposed method of land clearing

A caterpillar D-6 bulldozer and caterpillar 320 excavator will be used the clear and grub a 2.3 acre area on the eastern portion of the site. Top soil will be stripped and safely stored for future use during grading activities.

d. Discuss provisions to preserve topsoil and limit site disturbance

Land clearing activities will be phased and sequenced to reduce the amount and duration of soil exposed to erosion and to increase the effectiveness of BMPs in coordination with site preparation activities. For example, the laydown area in Sector 1 that is 2.381 acres, the goal will be to target an acre or less at a time and take it through the complete construction cycle from clearing to final compaction of wash rock gravel as expediently as possible. This approach will optimally limit the amount of soil surface exposed at any one time throughout the project and preserve topsoil. Further, advantage will be taken on available relevant climatological information on wind direction and velocity and probability of rain events while performing earthwork activities such as clearing, grading, compacting and deposition of gravel. Silt fences will be erected around the site and a gravel-based entrance/exit point will be constructed on the northeast corner at the beginning of the entrance roadway. Not only will this prevent tracking of soil and mud offsite, it will also ensure the any eroded soil by action of water to be captured and retained on the site. Secondly, all of the material excavated for construction of the access roadway and equipment lay down area will be used during grading activities. Existing vegetation on the western loop in Sector 2 outside of the entrance roadway will be left in place. Phasing and sequencing of construction activities will be balanced with the length of time any area will be left exposed erring on the side of protectiveness rather than on efficiency. Existing trees with diameter of 6 inches and greater that can be left in place to assist with soil stabilization activities, will be labeled and protected with high density polyethylene fencing. Initially, mulched materials, if any, will be spread on disturbed areas and used as brush berms to further protect topsoil from direct contact with wind, rain or stormwater. Provisions will be made during construction activities to ensure that exposed soil piles, if any, will not be left exposed at the end of the workday.

e. Discuss erosion and sediment control devices to be implemented

A series of preventative and corrective measures will be employed as a basic principle during construction to control erosion. Climatological information on wind direction and velocity and probability of rain events will be used to determine the most appropriate and protective timeframe for performing earthwork activities such as clearing, grading, compacting and deposition of gravel. This will minimize suspension of very fine particles, saltation and surface erosion as well as splash and sheet erosion. Formation of rills and cullies will also be minimized. Silt fences and a retaining wall will be erected according to design specifications around the entire eastern and northern perimeter of Sector 1, and around the eastern, northern and a section of the western perimeter of Sector 1 except for an entrance/exit on the eastern corner of the northern perimeter in Sector 2 (See site plans C-2). A gravel-

based entrance/exit to control sediment being tracked offsite will be installed. At the end of the day or after rainfall events, silt fences will be inspected and repaired, if necessary. Material collected after the hand clearing activity will be used as a brush berm during construction activities. A 186.49 feet earthen berm with be constructed on the northern perimeter of Sector 2 to eliminate stormwater runoff to Bovoni Road. Working in conjunction with the earthen berm, a stormwater catchment system with manhole and 18-inch drain/conveyor pipe will be established to redirect stormwater that currently flows to the Bovoni Road to the retention pond for treatment vastly improving the drainage dynamics of the area. The 0.84 ac-ft retention pond will be erected on the eastern portion of Sector 1 with a designed capacity that exceeds requirements for 2year 24-hour storm event. Additionally, a retaining wall will be erected on the eastern perimeter of Sector 2 and northern, southern and eastern perimeters of Sector 1 and a partial segment on the northwestern perimeter of Sector 1 (See site plan C-2). The site will also be graded to channel stormwater to the retention pond. Again, except for the entrance roadway, the entire remaining part of Sector 2 that abuts Bovoni Road and everything west of the entrance roadway will be left vegetated. Hydro-seeding will be used to stabilize slopes on the northern perimeter of Sector 2 to stabilize soils and minimize soil erosion, wherever, necessary.

f. Show schedule for earth changing activities & implementation of erosion/sediment control measures

Activity	**Schedule**
Install silt fence	May 26-28, 2021
Establish entrance/exit with gravel	May 28-30, 2021
Construct retention pond	June 3-7, 2021
Clear and grub	June 8-12, 2021
Grade and compact	June 10-17, 2021
Install wastewater treatment system	June 18, 2021
Install 4-inch thick wash rock gravel base	June 13-21, 2021

g. Discuss the maintenance of erosion and sediment control measures

1. All measures stated in the erosion and sediment control section of the SWPPP shall be maintained in fully functional condition until no longer required for a completed work activity or final stabilization of the site. All erosion and sediment control measures shall be checked by a qualified person at least once every 7 on a daily basis and within 24 hours of a 0.5 inch rainfall event, cleaned and repaired.

2. All seeded areas shall be checked regularly to see that a good stand is maintained. Areas should be fertilized, watered and reseeded as needed.
3. Silt fences shall be repaired to their original conditions if damaged & sediment removed from fences when it reaches ½ the height of the silt fence.
4. Construction entrance/exit shall be maintained in a condition to prevent tracking or flow of mud onto public rights-of-way. This may require top dressing of the construction entrance/exit as conditions demand.

h. Discuss method of stormwater management

Primary mechanism for stormwater management is the 0.84 ac-ft retention pond on the northeastern section of the site coupled with and earthen berm and working in tandem with a catchment and 18-inch drainpipe. Further, silt fencing, a retaining wall and hydro-seeding as described in construction drawings. Additionally, site will be graded to control stormwater, stormwater flow rate and to channel stormwater flow to the retention pond with a storage capacity that exceeds DPNR's runoff onsite storage requirements as per TPDES –General Permit VIGSA0000 of 3600 cubic feet per acre (1-inch over an acre) or 2 year-24 hour storm, whichever is greater (See Grading and Drainage Plan C-3 & Stormwater Pollution Prevention Plan C-11-12)

i. Discuss maintenance schedule for stormwater facilities

1. All measures stated in the erosion and sediment control section of the SWPPP shall be maintained in fully functional condition until no longer required for a completed work activity or final stabilization of the site. All erosion and sediment control measures shall be checked by a qualified person at least once every 7 calendar days and within 24 hours of a 0.5-inch rainfall event, cleaned and repaired.
2. All seeded areas shall be checked regularly to see that a good stand is maintained. Areas should be fertilized, watered and reseeded as needed.
3. Silt fences shall be repaired to their original conditions if damaged & sediment removed from fences when it reaches ½ the height of the silt fence.
4. Construction entrance/exit shall be maintained in a condition to prevent tracking or flow of much onto public rights-of-way. This may require top dressing of the construction entrance/exit as conditions demand

j. Discuss method of sewerage disposal

Sewage disposal from the office trailer will be via an onsite 4'x7', 1,500

gallon septic tank, infiltrator system, 2'x2' distribution box and a lined drain field. (See site plan C-2).

5.02 SITE PLANS (Drawings shall be stamped and at a minimum scale of 1'' = 20')

5.02.01 Lot Layout

SEE SITE PLANS In Attachment A

- **a.** Show lot area, dimensions and metes & bounds
- **b.** Show setback dimensions (including natural drainages and wetlands)
- **c.** Show lot density
- **d.** Show lot occupancy
- **e.** Show recreational areas for proposed project (including walkways, benches and other landscape features)
- **f.** Show north arrow
- **g.** Site Topography at 5' intervals; for slopes 25% or greater, provide 10' intervals (Prepared and stamped by a registered land surveyor) with elevation points at each corner. Show rock outcrop and existing trees having a diameter of 6" or greater by species within area to be disturbed
- **h.** Show square footage and percentage lot coverage for all site improvements
- **i.** Show square footage and percentage open space for all site improvements
- **j.** Show project staging and material storage areas
- **k.** Show the distance from low water mark to landward structure
- **l.** Show any filled lands present
- **m.** Show existing vegetation within area to be disturbed

5.02.02 Road Layout

- **a.** Show road profile drawings with percentage grades
- **b.** Show parking and driveway layouts with dimensions, station points and elevations (Permeable materials encouraged)
- **c.** Show calculations for required parking space(s)
- **d.** Show road curb details
- **e.** Show location of utility easement (where applicable)

5.02.03 Position of Structures

- **a.** Identify and number proposed and existing structures - show position using angles and distance from property bound posts (two per each structure corner)
- **b.** Show building size, dimensions, number of stories, and first level finish floor elevation
- **c.** Show location of all storage tanks and cisterns
- **d.** Show location of sewage disposal and all components including disposal area(s)
- **e.** Show site profile including all floor elevations and existing and finish grade elevations
- **f.** Show garbage receptacle area(s)
- **g.** Show and delineate by type all underground utilities

5.02.04 Septic System/Wastewater Treatment

- **a.** Show Setback distances from property lines, water supply, waterbodies and all structures (proposed or existing)
- **b.** Show Septic capacity requirements
- **c.** Show Septic details with cross section
- **d.** Show Disposal site(s) and area of final effluent

5.02.05 Stormwater Drainage

- **a.** Show natural and proposed drainage patterns
- **b.** Cistern capacity/ Roof top collection calculations
- **c.** Show location of stormwater control measures
- **d.** TR-55 calculations and map showing area of watershed(s)

5.02.06 Stormwater Facilities

- **a.** Show capacity of structures
- **b.** Show cross-section design details of structures
- **c.** Identify and describe natural drainage course(s) (guts) existing on site or within 100' of site

5.02.07 Erosion and Sediment Control Plan

- **a.** Show design details, profiles and location of erosion and sediment control devices (such as sediment basins, slope protection measures, retaining walls, silt fences, berms, vegetated swales, etc.).
- **b.** Show location of construction entrance and proposed methods to reduce silt travel onto road
- **c.** Provide final grading plan
- **d.** Show post construction erosion and sediment control plan

5.02.08 Landscaping Plan

- **a.** Show location of existing vegetation of 6" diameter by species, and also show proposed vegetation of 6" diameter or greater by species within area to be disturbed
- **b.** Show Irrigation Plan and details
- **c.** Show location of all endangered plant species within area to be disturbed

5.02.09 Required Maps (Indicate site on all Maps)

- **a.** Recorded parcel map(s)/Registered Survey Map(s)
- **b.** Show all easements on the site and within 50 feet of the property line
- **c.** Official Zoning Map - delineate site zoning and surrounding property zoning
- **d.** FEMA Flood Insurance Rate Map
- **e.** Water Resources Map - delineate watershed(s)
- **f.** Sediment Reduction Program Map
- **g.** Soil Survey - Soils Map

5.03 Project workplan

- **a.** Identification of subprojects and activities
- **b.** Phasing of subprojects and activities

6.00 SETTING AND PROBABLE PROJECT IMPACT ON THE NATURAL ENVIRONMENT

The plot is located at 18-M2 Estate Bovoni. There is a north facing slope comprised primarily of Southgate soil at about 89% and Cinnamon Bay soil at about 11% of the property. The Cinnamon Bay soil is considered hydric soil, but the steep terrain prevents ponding for more than 15 days on the rest of the property. This would subsequently prevent the establishment of hydrophytic vegetation on Southgate portion of the property.

The vegetation class would be described as Dry Forest with portions of semi-deciduous forest and drought deciduous woodland and patches of dry thicket scrub. This vegetation is influenced by the steep slopes, wind, and dry conditions.

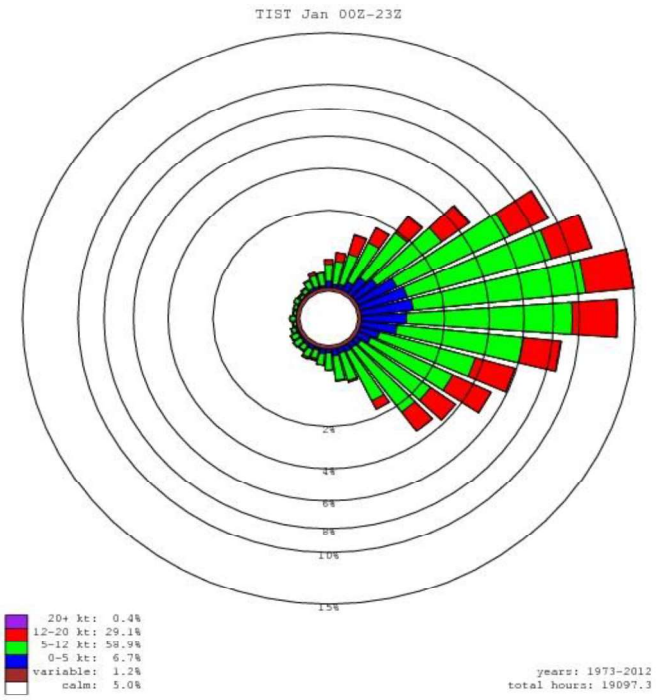
6.01 Climate/Weather

Prevailing Winds

The Virgin Islands lie within the influence of the "Easterlies" or "Trade Winds" which traverse the southern part of the "Bermuda High" pressure area, thus the predominant winds are from the east and east-northeast (IRF, 1977). These trade winds vary seasonally and are broadly divided into 4 seasonal modes: 1) December to February; 2) March to May; 3) June to August; and 4) September to November. Below are the characteristics of these modes as taken from Marine Environments of the Virgin Islands Technical Supplement No. 1 (IRF, 1977).

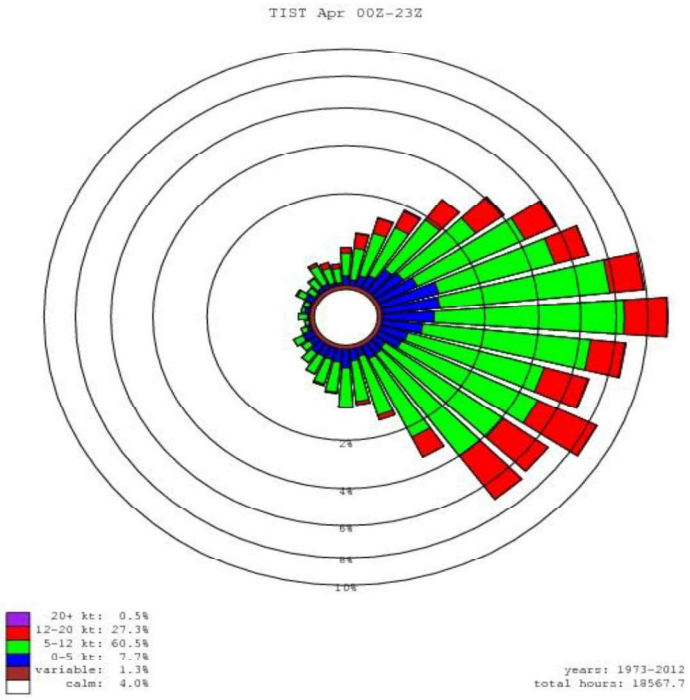
December – February

During the winter, 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" which blow more than twenty knots from a northerly direction in gusts from one to three days. Such outbreaks average about thirty each year and they are created by the strengthening of high pressure cells over the North American continent which, in turn, allows weak cold fronts to move southeastward over the entire Caribbean region. Intermittent rains, clouds, and low visibility for mariners accompany these storms.



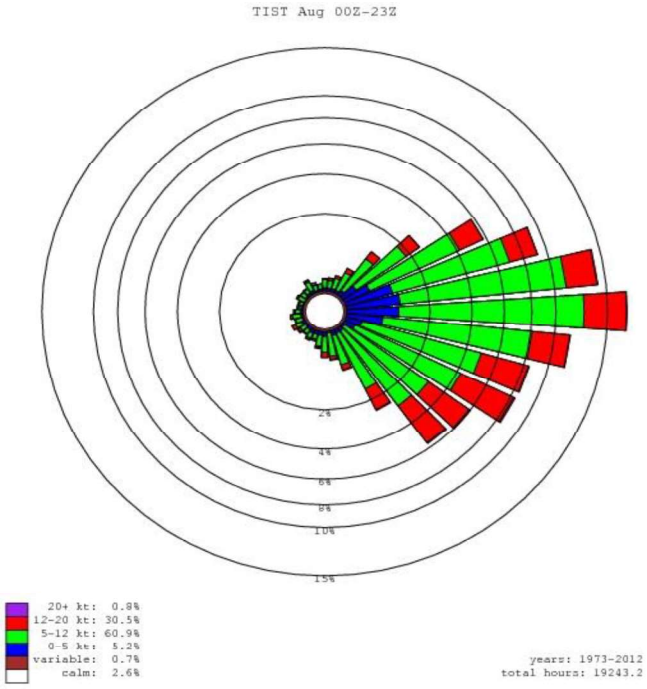
March - May

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 in the Equatorial Trough.



June - August

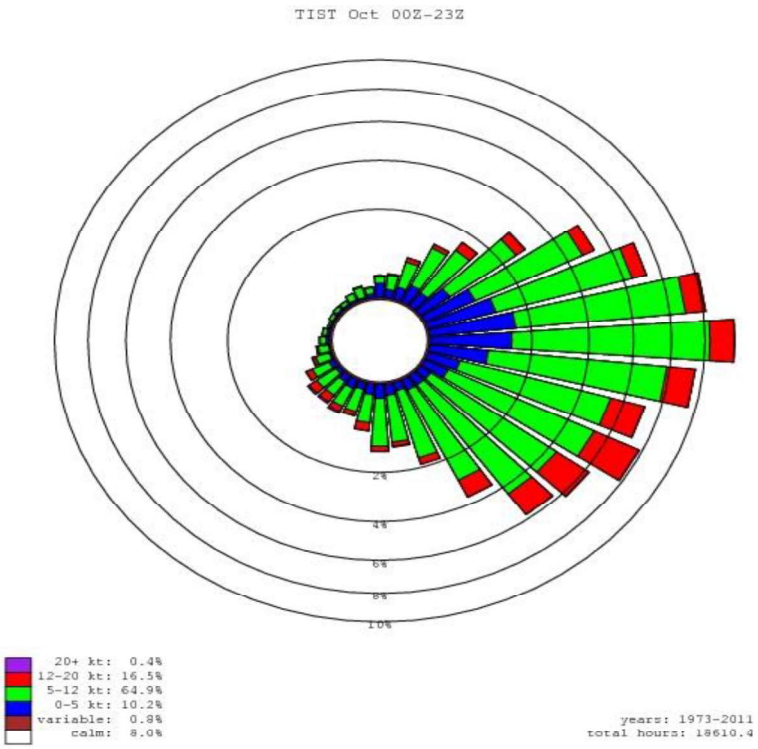
Trade winds reach a secondary maximum during this period and blow predominantly from the east to east-southeast; speeds exceed twenty knots twenty-three percent of the time during July. The trend for increasing winds results from the strengthening of the Bermuda High and a concurrent lowering of the pressure in the Equatorial Trough. Trade winds during this period are interrupted by occasional hurricane.



September - November

During the fall, winds blow mainly from the east or southeast and speeds reach an annual minimum; only 7 percent of the winds exceed 20 knots in October. The low speeds result from a decrease in the Equatorial Trough. During this period, especially during late August through mid-October, easterly waves, tropical storms and hurricanes often break down the normal trade wind regime.

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 thunderstorm develops sustained winds of 25 mph for 20 to 40 minutes with gusts to 40 mph. Line squalls (squall lines) occasionally develop winds of 60 mph for periods of 30 minutes to an hour with gusts to 90 mph. Funnel clouds (tornadoes, water spouts) occasionally develop over the coast or off shore, and may cause winds well in excess of those described above. The average occurrence interval of severe winds in a funnel cloud at an offshore location is greater than once in a hundred years (Howard Needles, Tammen & Bergendoff, 1975).

A tropical cyclone whose winds exceed 74 mph is termed a hurricane in the Northern Hemisphere, and significantly effects the area. These are low-pressure areas around which the wind circulates in a counterclockwise, inward spiral. These hurricanes occur most frequently between August and mid-October with their peak activity occurring in September. Since 1989, the Virgin Islands have been impacted by various hurricanes. Hurricane Hugo impacted the island in 1989, Hurricanes Luis and Marilyn in 1995.

Hurricanes Bertha and Hortense in 1996. No hurricanes passed in the immediate vicinity of the Virgin Islands in 1997. The Virgin Islands experienced Hurricane Georges on September 21, 1998 and Hurricane Lenny, a category 4 hurricane on November 17, 1999. Hurricane Lenny developed very late in the season and approached the island from the southwest. Hurricane Omar struck the Virgin Islands in 2008. Follow Hurricane Omar, Hurricanes Irma and Maria both category 5 struck the Virgin Islands in 2017 with Irma doing more damage to St. Thomas. Finally, Hurricane Dorian passed over St. Thomas in 2019.

Climate

The average monthly precipitation in St. Thomas in 2020 was 3.31 inches. However, November, September and October saw the highest monthly levels 8.76, 5.20 and 4.74 inches respectively, with a monthly low of 0.92 inches in April. The total amount for the 2020 was year through July was 36.39 inches. See more detail information including monthly minimums and maximums from 2000 to 2021 in Table 1.

Annual temperatures average 80.7 for the month of March 2021 79° Fahrenheit (F), with the winter low averaging 76° F and the summer high reaching an average of 84° F. Maximum daily temperatures only reached 90° F once on March 30, 2021.

Click column heading to sort ascending, click again to sort descending.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2000	1.57	2.02	0.76	0.57	3.51	1.55	2.16	4.04	3.84	3.78	2.78	1.12	27.70
2001	2.29	1.63	1.47	2.22	3.92	0.54	4.10	2.72	3.39	4.51	2.03	4.74	33.56
2002	1.73	1.11	0.82	1.50	1.29	3.06	1.29	1.26	9.74	3.41	3.74	3.21	32.16
2003	1.65	2.04	M	11.20	1.36	0.18	2.81	3.34	M	3.68	18.39	3.99	M
2004	2.09	2.92	6.23	0.54	3.68	0.53	2.66	2.40	13.89	4.24	5.86	3.44	48.48
2005	M	0.77	0.65	2.77	2.98	4.83	5.74	8.22	7.49	12.49	3.24	2.03	M
2006	4.83	1.06	1.42	3.46	2.98	3.77	3.90	6.49	4.95	5.41	3.30	2.61	44.18
2007	0.76	0.84	M	6.22	0.28	0.07	0.03	M	3.84	8.72	3.76	3.02	M
2008	3.97	0.60	0.01	1.65	0.06	1.15	1.82	4.76	12.86	11.04	3.04	1.72	42.68
2009	2.34	2.98	2.74	1.05	3.55	5.33	2.56	1.75	5.04	2.27	9.94	3.20	42.75
2010	3.42	0.52	1.75	2.29	5.21	9.51	7.40	5.49	2.69	16.20	5.33	1.57	61.38
2011	1.32	1.50	1.28	3.50	8.04	3.37	3.16	9.14	4.45	1.95	5.92	2.51	46.14
2012	1.99	0.99	3.95	2.61	6.72	0.08	3.09	2.79	0.92	4.62	5.76	2.22	35.74
2013	0.48	M	M	2.16	4.48	4.38	4.28	7.53	9.82	2.28	10.97	7.34	M
2014	1.02	1.56	1.81	2.17	6.68	0.14	0.81	7.76	1.90	2.59	7.13	2.67	36.24
2015	1.68	13.35	1.68	1.08	6.25	1.07	0.22	1.75	1.71	7.96	9.66	3.84	50.25
2016	1.63	1.50	2.43	2.84	1.21	2.32	M	5.57	3.25	7.69	7.46	2.56	M
2017	1.17	1.51	5.83	1.05	1.77	1.33	4.68	4.82	M	M	M	1.18	M
2018	3.37	2.64	2.26	1.06	3.17	3.26	1.54	4.15	1.59	4.64	6.26	1.46	35.40
2019	1.83	1.83	1.30	1.03	2.24	0.58	7.75	6.24	3.51	2.61	3.15	4.93	37.00
2020	3.17	1.89	2.60	0.92	T	2.22	4.16	1.81	5.20	4.24	8.76	1.42	36.39
2021	0.75	M	0.61	M	M	M	M	M	M	M	M	M	M
Mean	2.05	2.16	2.08	2.47	3.30	2.35	3.21	4.60	5.27	5.72	6.32	2.89	40.67
Max	4.83 2006	13.35 2015	6.23 2004	11.20 2003	8.04 2011	9.51 2010	7.75 2019	9.14 2011	13.89 2004	16.20 2010	18.39 2003	7.34 2013	61.38 2010
Min	0.48 2013	0.52 2010	0.01 2008	0.54 2004	T 2020	0.07 2007	0.03 2007	1.26 2002	0.92 2012	1.95 2011	2.03 2001	1.12 2000	27.70 2000

Table 1- Annual Precipitation 2000-2021

Climatological Data for CYRIL E. KING AIRPORT, VI - March 2021.[2]									
Date	Temperature				HDD	CDD	Precipitation	New Snow	Snow Depth
	Maximum	Minimum	Average	Departure					
2021-03-01	84	73	78.5	-0.4	0	14	0.05	M	M
2021-03-02	85	74	79.5	0.6	0	15	0.01	M	M
2021-03-03	84	73	78.5	-0.4	0	14	0.05	M	M
2021-03-04	84	75	79.5	0.6	0	15	0.00	0.0	0
2021-03-05	85	74	79.5	0.5	0	15	0.00	M	M
2021-03-06	85	76	80.5	1.5	0	16	0.00	M	M
2021-03-07	86	76	81.0	2.0	0	16	0.02	M	M
2021-03-08	85	77	81.0	2.0	0	16	0.01	M	M
2021-03-09	88	76	82.0	2.9	0	17	0.01	M	M
2021-03-10	86	74	80.0	0.9	0	15	0.01	M	M
2021-03-11	85	74	79.5	0.4	0	15	T	M	M
2021-03-12	84	79	81.5	2.3	0	17	T	M	M
2021-03-13	87	74	80.5	1.3	0	16	0.00	M	M
2021-03-14	85	75	80.0	0.8	0	15	0.06	M	M
2021-03-15	85	76	80.5	1.2	0	16	T	M	M
2021-03-16	85	77	81.0	1.7	0	16	0.00	M	M
2021-03-17	85	74	79.5	0.2	0	15	0.05	0.0	0
2021-03-18	86	74	80.0	0.6	0	15	T	0.0	0
2021-03-19	88	75	81.5	2.1	0	17	T	M	M
2021-03-20	86	74	80.0	0.5	0	15	0.01	M	M
2021-03-21	85	76	80.5	1.0	0	16	0.00	M	M
2021-03-22	85	75	80.0	0.4	0	15	0.00	M	M
2021-03-23	85	76	80.5	0.9	0	16	0.03	M	M
2021-03-24	85	77	81.0	1.4	0	16	0.00	M	M
2021-03-25	86	77	81.5	1.8	0	17	0.17	M	M
2021-03-26	88	76	82.0	2.3	0	17	0.03	M	M
2021-03-27	88	77	82.5	2.7	0	18	T	M	M
2021-03-28	89	76	82.5	2.7	0	18	0.01	M	M
2021-03-29	87	78	82.5	2.6	0	18	T	M	M
2021-03-30	90	76	83.0	3.1	0	18	0.09	M	M
2021-03-31	88	77	82.5	2.5	0	18	T	M	M
Sum	2664	2341	-	-	0	497	0.61	0.0	-
Average	85.9	75.5	80.7	1.3	-	-	-	-	0.0
Normal	85.9	72.8	79.4	-	0	445	1.42	0.0	-

Table 2- Cyril E King Station Climatological Data March 2021

6.02 Landform, Geology, Soils & Historic

[2] Observations for each day cover the 24 hours ending at local standard time.
Max & Min Temperature & Precipitation:midnight

St. Thomas is the second largest of the now four islands that make up the Virgin Islands. It is approximately forty miles north of St. Croix and sixty miles east of Puerto Rico. In total area it is about 32 square miles of 19 acres. Water Island is south-southwest of Charlotte Amalie, the capital of St. Thomas. The West Gregerie Channel separates St. Thomas from Water Island. Characterized by irregular coastlines numerous bays and very steep slopes, rubbly guts and relatively small acreages of watersheds, St. Thomas has almost no coastal plains because volcanic mountains dominate the topography. The highest peak is 1,556 above sea level. Due to extremely high steep topography and small watershed basins, gutflow responds quickly to rainfall. Streams flow mainly during periods of intense rainfall. Ground water supplies are limited.

The island of St. Thomas consists geologically of two predominantly mountainous areas (the North side and the East End ranges), with a central sediment filled valley in between. The oldest rocks underlying both ranges and probably in the valley as well are from the Cretaceous period, 80 million years ago. These sedimentary rocks which were formed from the erosion of volcanic ash and debris, and are beset with igneous intrusions, underwent a period of orogeny lifting them up from the ocean floor and forming two islands with a channel in between. Oligocene clay and mud were deposited in this channel forming what is known as the Jealousy formation. Next, Tertiary limestone was deposited when this channel area became a lagoon encircled by coral reef. The limestone and marl that overlay the Jealousy formation are known as the Kingshill formation.

See Hydric Rating Map in **Attachment B** for Information/Data on Soils

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6.03 Drainage, Flooding and Erosion Control

a. Discuss existing drainage patterns

There are two locations on the property where the elevation rises going from northeast to southwest. At the western most highpoint which is close to the midpoint of the property (i.e.,just east of the knot of both loops), generally, the elevation at the site is such that it increases from the northeast to the southwest from roughly 30 feet to a maximum of between 90-100 feet but only to about 70 feet at the southern perimeter of the site. Consequently, in this section of the property stormwater would generally flow from the southwest to the northeast and then radially out in two directions: toward the north to the Bovoni Road and to the east toward Trailer Road.

The other location where the elevation rises is at the midpoint of Sector 1 which is in the eastern loop. Here the elevation within the property boundaries rises from the north to the south. Therefore, stormwater drains from the south to the north. (See Grading and Drainage Plan Sheet C-4 and Water Resources Map included in permit application package)

b. Discuss proposed alterations to drainage patterns

Plot 18-M2 Estate Bovoni, St. Thomas consist of two main hexagonal regions hereinafter referred to as the Western Loop (Sector 2) and the Eastern Loop (Sector 1). The existing historical flow patterns for the Sector 2 based on the topography illustrates stormwater runoff to the northwest into the main Bovoni Roadway. The existing historical flow patterns for the Sector 1 based on the topography illustrates stormwater runoff to the northeast into the adjacent property Plot 18-L.

Proposed site development will improve drainage flow patterns by eliminating offsite stormwater runoff. An earthern berm will be constructed along the property perimeter adjacent to Bovoni Road which will redirect runoff away from Bovoni Road into a new onsite stormwater drainage system channel runoff to a new onsite retention pond located within the northeast region of the property. The Eastern Loop portion of the site will be graded to ensure that sheet flow runoff will be to the northeast into a newly constructed retention pond. In addition, a concrete wall extending a minimum of three (3) feet above grade will be constructed along the entire northern perimeter of the site which will absolutely ensure that all site runoff is contained and prevented from flowing into the adjacent property Plot 18-L.

c. Discuss the relationship of the project to the coastal floodplain

This project will be far enough inland that it will not affect the coastal floodplain.

d. Peak stormwater flow calculations

See attached hydrology study in **Attachment C**

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e. Discuss any existing stormwater disposal structures.

There are no existing stormwater disposal structures associated with the property. The property consists of dense small trees and shrubs.

f. Discuss proposed stormwater control facilities

A series of preventative and corrective measures will be employed as a basic principle during construction to control erosion. Again, climatological information on wind direction and velocity and probability of rain events will be used to determine the most appropriated and protective timeframe for performing earthwork activities such as clearing, grading, compacting and deposition of gravel. This will minimize suspension of very fine particles, saltation and surface, as well as splash and sheet erosion. Formation of rills and cullies will also be suppressed. Silt fences will be erected according to design specifications around the entire property except for an entrance/exit on the eastern corner of the northern perimeter in Sector 2 that will also include gravel to control sediment being tracked offsite (See site plan C-11). At the end of the day or after rainfall events silt fences will be inspected and repaired, if necessary. Material collected after the hand clearing activity will be used as a brush berm during construction activities. Additionally, a retaining wall will be erected on the eastern perimeter of Sector 2 & northern, southern and eastern perimeters of Sector 1 and a partial segment on the northwestern perimeter of Sector 1. A 186.49 feet earthen berm with be constructed on the northern perimeter of Sector 2 to eliminate stormwater runoff to Bovoni Road and the slope on that same side will be stabilized with hydro-seeding. An 0.84 ac-ft retention pond will be erected on the eastern portion of Sector 1 for which the designed capacity will exceed requirements for 2year 24-hour storm event. The site will also be equipped with a new onsite drainage system and graded to channel stormwater to the retention pond. Again, except for the entrance roadway, the entire remaining part of Sector 2 that abuts Bovoni Road and everything west of the entrance roadway will be left vegetated. Hydro-seeding will be used to stabilize slopes and minimize soil erosion, wherever, necessary.

g Discuss maintenance schedule for stormwater facilities

1. All measures stated in the erosion and sediment control section of the SWPPP shall be maintained in fully functional condition until no longer required for a completed work activity or final stabilization of the site. All erosion and sediment control measures shall be checked by a qualified person at least once every 7 calendar days, or more frequently, and within 24 hours of a 0.5 inch rainfall event, cleaned and repaired.
2. All seeded areas shall be checked regularly to see that a good stand is maintained. Areas should be fertilized, watered and reseeded as needed.
3. Silt fences shall be repaired to their original conditions if damaged & sediment removed from fences when it reaches ½ the height of the silt fence.
4. Construction entrance/exit shall be maintained in a condition to prevent tracking or flow of much onto public rights-of-way. This may require top dressing of the construction entrance/exit as conditions demand.
5 Retention pond and drainage system components will be checked and maintained to ensure system functions as designed.

h Discuss proposed method of land clearing

A caterpillar D-6 bulldozer and caterpillar 320 excavator will be used the clear and grub a 2.3 acre area on the eastern portion of the site. Top soil will be stripped and stored for future use during grading activities.

i Discuss provisions to preserve topsoil and limit site disturbance

Land clearing activities will be phased and sequenced to reduce the amount and duration of soil exposed to erosion and to increase the effectiveness of BMPs in coordination with site preparation activities. For example, advantage will be taken on available relevant climatological information on wind direction and velocity and probability of rain events while performing earthwork activities such as clearing, grading, compacting and deposition of gravel. Silt fences will be erected around the site and a gravel-based entrance/exit point will be constructed on the northeast corner at the beginning of the entrance roadway. Not only will this prevent tracking on soil and mud offsite, it will also ensure the any eroded soil by action of water to be captured and retained on the site. Secondly, all of the material excavated for construction of the access roadway and equipment lay down area will be used during grading activities. Existing vegetation on the western loop outside of the entrance roadway will be left in place. Phasing and sequencing of construction activities will be balanced with the length of time any area will be left exposed erring on the side of protectiveness rather than on efficiency. Existing trees with diameter 6 inches and greater that can be left in place to assist with soil stabilization activities,

will be labeled and protected with high density polyethylene fencing. Initially, mulched materials, if any, will be spread on disturbed areas and used as brush berms to further protect topsoil from direct contact with wind, rain or stormwater. Provisions will be made during construction activities to ensure that exposed soil piles, if any, will not be left exposed at the end of the workday

j. Discuss the presence and location of any critical area(s) and possible trouble spot(s).
Discuss the presence and location of any critical area(s) (e.g. historical, environmental or cultural significance/value) and possible trouble spot(s) (e.g. guts, precipices, very steep hillsides)

This is a four (4) acre site located on the southeast portion of St. Thomas in Estate Bovoni shaped like bow tie with the eastern segment or loop (Sector 1) covering approximately 2.381 acres 1.47 times larger than the western loop of 1.619 acres (See Figure 3 As Built above). It is bounded by the Bovoni Road on the northern perimeter and Bovoni Commercial Center to the north-northeast and several industrial/commercial facilities on the eastern perimeter along Trailer Road and the Bovoni landfill to the southeast. This site lies in the extreme northeast boundary of the Mangrove Lagoon/Benner Bay Area of Particular Concern and Area for Protection and Restoration. Mangrove Lagoon / Benner Bay (MLBB) is one of 18 Areas of Particular Concern in the Virgin Islands. The expansive Mangrove Lagoon and Benner Bay APC on the east end of St. Thomas is of exceptional natural value. Its water, mangrove, and sea grass bed systems provide a rich nursery area for fish and a productive habitat for benthic biota. The lagoon's mangrove-fringed shores are a natural buffer against shore erosion, floods, and hurricane waves. The configuration of the coast also provides a protective anchorage for boats. The area is filled with scenic contrasts, manglar islands, rocky cliffs, ponds and panoramic ridgelines. Its diverse complex of natural communities provides numerous recreational opportunities for Virgin Islanders. Benner Bay forms a protected harbor and is a commercially important area; charter yacht companies and charter fishing vessels use the numerous large and small marinas sited here. Small docks are scattered throughout the bay and are used by local commercial fishermen.

Lying outside of the boundaries of MLBB, Bolongo bay salt pond is located approximately 700 feet south to the project site. There is greater than 600 feet of heavily vegetated land between the southern boundary of the property and Bovoni Bay lying 860 feet to the south. The western perimeter is also heavily vegetated with bush, shrubs and small trees extending more than 200 feet beyond the western boundary of the property. Generally, the elevation at the site is such that it increases from the northeast to the southwest at two points within the

boundaries of the site. Just around the midpoint of the site the elevation increases from roughly 30 feet to 70-75 feet with the steepest rise close to the center of the property. In the eastern loop (Sector 1), the elevation increases in the same direction from approximately 30 feet to around 100 feet. Therefore, stormwater would generally flow from the southwest to the northeast and then radially out in two directions: toward the northwest and Bovoni Road and to the east toward Trailer Road. Just south of the site at Plot 17-E and 16 Estate Bovoni, a phase 11 archaeological survey found, among other artifacts of the 18th and 19th centuries, an intact historic cistern which, individually, is considered to be eligible for listing in the National Register of Historic Places. Areas of environmental recreational or cultural significance are those already mentioned including the MLBB since the protected harbor of Benner Bay is used by residents and visitors who enjoy sport fishing and bird watching and other similar activities. There are no very steep hillsides associated with the property. As indicated above, the Mangrove Lagoon is approximately 1800 feet to the east and the Bolongo Bay salt pond approximately 700 feet to the south neither will be affected by any development activity associated with this project. A phase 1 archaeological survey will be conducted to determine if further investigation is necessary and to ensure that significant artifacts, if present, are identified, protected and preserved.

k. Discuss erosion and sediment control devices to be implemented

A series of preventative and corrective measures will be employed as a basic principle during construction to control erosion. Again, climatological information on wind direction and velocity and probability of rain events will be used to determine the most appropriated and protective timeframe for performing earthwork activities such as clearing, grading, compacting and deposition of gravel. This will minimize suspension of very fine particles, saltation and surface, as well as splash and sheet erosion. Formation of rills and cullies will also be suppressed. Silt fences will be erected according to design specifications around the entire property except for an entrance/exit on the eastern corner of the northern perimeter in Sector 2 that will also include riprap to control sediment being tracked offsite. At the end of the day or after rainfall events silt fences will be inspected and repaired, if necessary. Material collected after the hand clearing activity will be used as a brush berm during construction activities. A 20-foot retaining wall will be established along the entire northern & southern perimeters of Sector 1, the eastern perimeters of Sectors 1 & 2, and for 104.1 feet on the western perimeter of Sector 1 to assist in the management of stormwater. A 0.84 ac-ft retention pond will be erected on the eastern portion of Sector 1 for which the designed capacity will exceed requirements for 2year 24-hour storm event. The site will also be graded to channel stormwater to the

retention pond. Again, except for the entrance roadway, the entire remaining part of Sector 2 that abuts Bovoni Road and everything west of the entrance roadway will be left vegetated. Hydro-seeding will be used to stabilize slopes and minimize soil erosion, wherever, necessary.

l. Discuss the maintenance of erosion and sediment control devices

1. All measures stated in the erosion and sediment control section of the SWPPP shall be maintained in fully functional condition until no longer required for a completed work activity or final stabilization of the site. All erosion and sediment control measures shall be checked by a qualified person at least once every 7 on a daily basis and within 24 hours of a 0.5 inch rainfall event, cleaned and repaired.
2. All seeded areas shall be checked regularly to see that a good stand is maintained. Areas should be fertilized, watered and reseeded as needed.
3. Silt fences shall be repaired to their original conditions if damaged & sediment removed from fences when it reaches ½ the height of the silt fence.
4. Construction entrance/exit shall be maintained in a condition to prevent tracking or flow of mud onto public rights-of-way. This may require top dressing of the construction entrance/exit as conditions demand.

m. Discuss the impacts of terrestrial and shoreline erosion

This project occurs far enough inland so as project activities will not cause any terrestrial and shoreline erosion. It also includes site development strategies that will keep exposed surfaces during earth moving activities to a minimum and limit the size areas targeted for the construction cycle from clearing through final stabilization to units that can be accomplished in one day. Further, site development planning will optimize use of climatological information to guide when earth moving activities will occur. Finally, the natural drainage path and alternations thereof prevents stormwater flow toward shoreline and consequently, project activities will have no adverse or negative impacts on terrestrial and shoreline erosion.

604 Fresh Water Resources

The site is within the Jersey Bay Watershed (ref: USGS HUC 14 delineation) which was assessed in by DPNR on June 23,2015 and based on 18 groundwater wells the extraction rate was estimated at 13, 158,611gpd. Using a watershed size of 3,594 acres (ref: UVI-CDS Jan 2002 Watershed Characteristics Map) and reduced amount of available for groundwater recharge due to % developed land use, (i.e., impervious surfaces, steep slope analysis greater than 25% and conservative 5% recharge of annual precipitation of 30 inches per year), the

aquifer recharge rate is estimated at 22,099 gpd. Consequently, the mass balance between estimate recharge rate and total withdrawal rate is negative meaning the groundwater source is being over-pumped.

According to the Water Wells on St. Thomas, U.S. Virgin Islands 1993 report, as indicated above, there are 18 documented groundwater wells in Estate Bovoni and two are in fairly close proximity to the site. One on the northern side of the Bovoni Road and the other just southeast of the site. The depth ground water below the surface ranges from 12 to 21 feet.

6.05 Oceanography **(Tier 1 Only)**

This project does not bear any relationship to the marine environment, it is conducted far enough inland that a discussion of biological and physical oceanographic information is unwarranted.

i. Sea Bed alteration

Sea bed alteration will not occur as part of this project since it occurs inland away from the shoreline

ii. Tides and currents

The Mangrove Lagoon/Benner Bay (MLBB) area of St. Thomas receives an average of about 40 inches of rainfall per year (Rogers and Teytaud, 1988). February and March are normally the driest months, September and October the wettest, with most rainfall coming in brief showers. Heavy rainfall sometimes occurs during the passage of easterly flowing tropical waves that occasional intensify into tropical depressions, tropical storms, or hurricanes.

Temperatures in the Virgin Islands range from the mid to high 80s during the days, down to the mid to high 70s at night. In the summer months (June through September), temperatures are approximately five degrees higher, due to a cessation of the trade winds. The easterly flowing trade winds are the predominant winds affecting the Virgin Islands and the Mangrove Lagoon/Benner Bay area of particular concern. During the summer months, the winds are from a more southeasterly direction than in the winter, thus having a greater effect on water circulation in the Lagoon in the summer months. The lagoon enjoys shelter from the harsher, northeasterly winter winds. Entering along the shallow reef systems around Patricia, Bovoni, and Cas Cays, wind-driven currents are a predominant force for the lagoonal system's water exchange and flushing capacity.

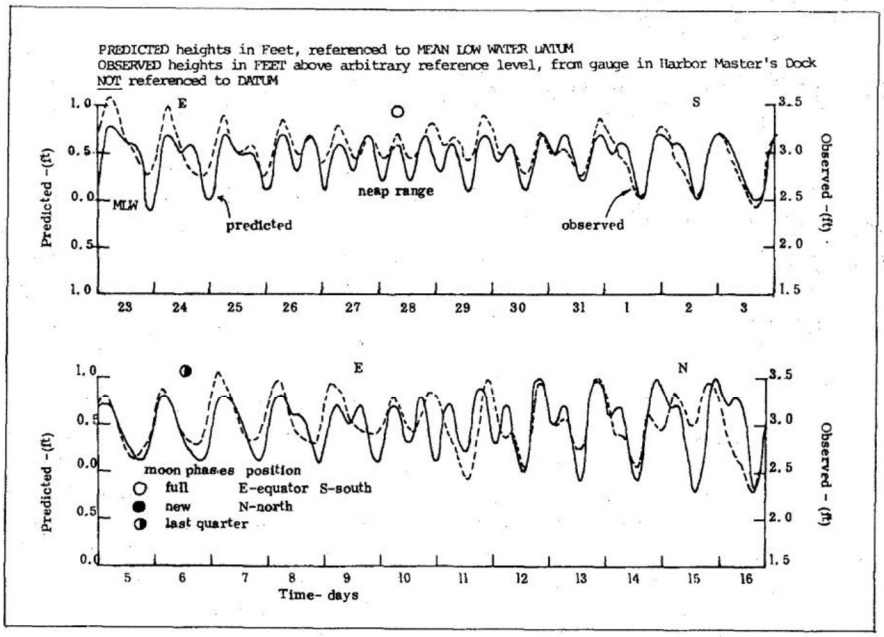

Figure 4 Predicted and observed tidal ranges in St. Thomas harbor, March-April, 1972. From Percious, van Eepoel, and Grigg, 1972.

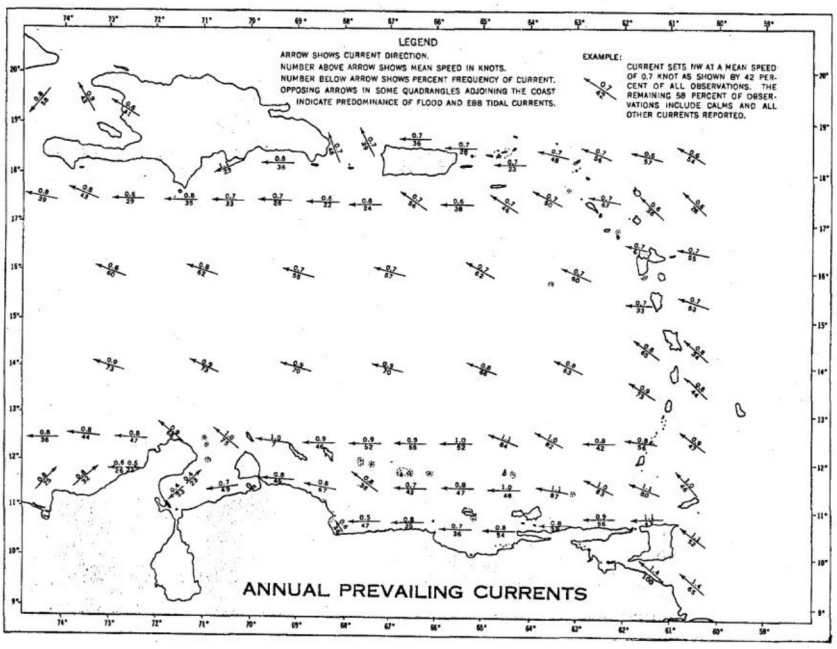

Figure 5 Annual prevailing currents in the Caribbean. From U.S. Naval Oceanographic Office, Sailing Directions 1963

iii. Wave and wind impacts

Waves are the main source of energy that move beach sediment and that affect shipping and shore- line structures during storms. Waves differ widely according to their heights, length,

period and speed. Their energy depends mainly on height and period.
The deepwater wave regime of offshore waters is driven by the northeast trade winds most of the year. On the average, wave heights of one to three feet approach from the east 42 percent of the time throughout the year. For short periods, 0.6 per cent of the time, these easterly waves reach 12 feet.

The southeasterly swell with waves one to twelve feet high becomes significant in late summer and fall when the trade winds blow from the east or when tropical storms and hurricanes pass the islands at a distance to the south. The east-south- easterly wind and wave regime is associated with the doldrum belt located over the interior of Venezuela and with an intensive high pressure area over Bermuda.

By contrast, during winter when the doldrum belt is located farther south along the equator and the Bermuda High is weak, a long length and long period northern swell develops. Although the swell offshore is only one to five feet high and occurs only four percent of the time, it is significant because it gains heights of ten to twelve feet nearshore. By refracting around the west coasts of the islands, this swell affects leeward coasts for short periods.

Variations in the depth of water and orientation of the coast nearshore greatly modify the height and length of approaching swells.

Much of the Mangrove Lagoon's circulation comes from ocean water that washes over the shallow false entrance reefs between Patrick Point and Patricia Cay and between Patricia Cay and Cas Cay. This "piling" of the water into Mangrove Lagoon from the south forces an outflowing bottom current to travel east through the channel separating Bovoni Cay from the mainland into Benner Bay, and south along the bottom of Jersey Bay.

The waves that enter Jersey Bay feel bottom and are refracted into gently curved patterns with crests more or less parallel to the bottom contours. Because of the narrowness of the west entrance channel and the protection provided by Manglar Island and its adjacent shoals, waves do not enter Benner Bay under normal conditions. Bovoni Cay excludes waves from entering Mangrove Lagoon.

Tidal ranges vary from 5 to 10 inches and are mostly diurnal, with one high and one low tide per day (IRF, 1977). Although tidal forces are small compared to wind and wave transport over the reef, they are the most persistent force over the long term. They are also the main force during periods of light weather, a time when worst-case conditions for exchange and flushing of pollutants develop

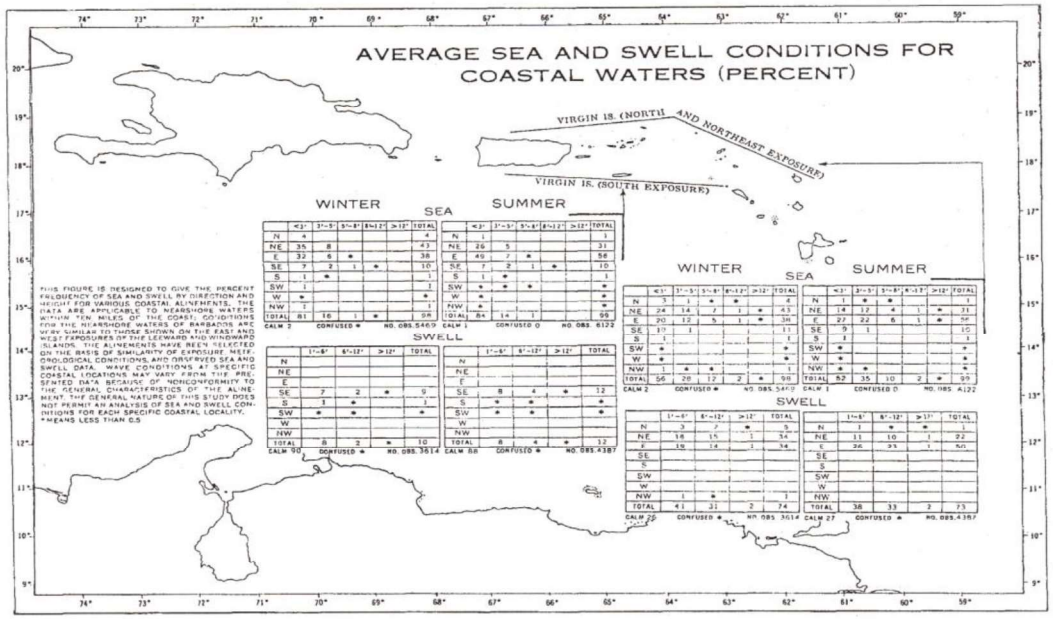

Figure 6 Average sea and swell conditiong for Virgin Islands coasts. From U.S Naval Oceanographic Office, 1963

As a result of refraction, wave energy is concentrated on seaward projecting points and, at the same time, it is diffused within the bays. Thus, waves tend to straighten the north coast of St. Croix by erosion of headlands and deposition of sand in the bays. Straightening along the north coast of St. Thomas and St. John is opposed by the variations in resistance to erosion of different rock types. For example, the projecting points on the north side of Magens Bay, St. Thomas, at Mary's Point, St. John and of Thatch and Grass Cays owe their origin to the Tutu rock formation which is more resistant than the Brass limestone.

Commonly, on the north coasts, waves approach the shore from two principal directions. Short period waves and chop approach from the east and northeast, and, at the same time, long period swells approach from the north. However, in the winter, from November through March, the north- ern swells are larger than in summer, and they are refracted and redirected more around points and islands. Because of their high angle of approach and large size, such waves create strong longshore currents. Around islands like Dutchcap Cay, St. Thomas and Buck Island, St. Croix, the two wave types produce very complicated patterns of crossing sea and swell which can be observed on aerial photographs.

In many harbors and bays, periodic surging of the water surface, called "seiching" or "surging", has been recorded. Although the seiches are usually less than 15 centimeters high, they reate oscillations within a harbor that induce horizontal movements that can drive ships sideways against the dock. Such movements have not been observed in Virgin Islands harbors, but they need to be taken into account when evaluating proposed changes in harbor geometry.

d Marine Water Quality

There is no available water quality data in the 2016 USVI Integrated Water Quality Monitoring and Assessment Report on Bovoni Bay. However, water quality in the Mangrove Lagoon does not comply with its designated uses. Best usage of Class B waters include maintenance and propagation of desirable species of aquatic life including threatened and endangered species listed pursuant to section 4 of the Federal Endangered Species Act and threatened, endangered and indigenous species listed pursuant to Title 12, chapter 2 of the VI Code. It is also intended to serve as area for primary contact recreation, (swimming, water skiing, etc.). Due to its failure to comply with the following water quality criteria for Class B waters: fecal coliform, enterococci, Turbidity and pH, the Mangrove Lagoon is considered an impaired water body. The lagoon receives discharges from the landfill, Mangrove Lagoon Wastewater Treatment Plant and a marine fuel dock.

Parameter Class B Water Quality Criteria	Criteria
Dissolved Oxygen	> 5.5 mg/L
pH	7.0 - 8.3
Temperature	<90 degree Fahrenheit
Bacteria	70MPN/100 ml (geometric mean)
Dissolved Gas	<110% of Atmospheric
Phosphorus	< 50 ug/L
Suspended, Colloidal, Settleable Solids	Maintain Designated Use

6.06 Marine Resources **(Tier 1 Only)**

Project activities will occur inland at a fair distance away from the Bolongo Bay salt pond, Bovoni Bay which is the closest marine environment to the project approximately 960 feet away. There are also natural buffers between where site development activities will occur on 18-M2 Estate Bovoni the salt pond and Bovoni Bay.

6.07 Terrestrial Resources

Historic Land Use

Parcel 18-M2 Estate Bovoni is situated on the southern portion of the Bovoni Estate, in the areaoriginally named Estate Dwergsteen. In 1796, Joseph Bovoni

purchased the struggling property, which included abandoned indigo works and a small ruined sugar works. Four years later, Bovoni also acquired Estate Emanuel, to the north, consolidating the land into the large Estate Dwergsteen and EmanueL The historic record includes earlier references to the arid and barren nature of the Dwergsteen property. In 1805, Bovoni reported 30 acres in cotton, 30 acres in provisions and 339 acres in pastureand bush (Knight, 2006). After Bovoni sold the estate in 1825, a succession of owners came and went from the property.(Knight, 2006) By 1850, it was described as a stock estate, meaning the primary activity on the approximately 400 acres was raising livestock (McGuire1925).

On this 4-acre parcel of Bovoni, it appears that cattle grazing was abandoned before 1900, probably in favor of the flatter portion of the estate to the east and northeast, where drainagefrom the hills and deeper soils would have better supported grasses and other cattle fodder.

Present Vegetation

The vegetation of the parcel was surveyed on May 5, 2021. A prolonged dry season had madethe foliage less dense, and some annual plants and vines that might be present after high rainfall may have been in a dormant state. Although some of St Thomas's most pristine forests and shrublands lie less than a mile from this site-- on the inland hills to the north and west---the species and communities here on Parcel 18-M2 were probably irreversibly altered by the intensive grazing in the 19th century. One of thecommonest trees in Bovoni (and neighboring Estates Nadir and Frydenhoj) is apparently a relic of the cattle era here: *Libidibia coriaria*, the divi-divi tree, is an 18th century introduction closely tied to leather production. The pods of this hardwood tree were the source of tannins that were extensively used in curing leather throughout the American tropics, and exported to other parts of the world.

Besides the divi-divi trees described above, almost all species enumerated were either toxic to cattle, or too spiny to be consumed. Long past decades of consumption of more palatable native plants have led to a community of relatively low diversity. Additionally, the extreme aridity has stunted growth, resulting in a generally low-statured forest, grading into shrubland where exposure to the easterly winds increases. The commonest woody species seen

were two small native trees, *Elaeodendron xylocarpa* (false nutmeg or nothing nut) and *Eugenia cordata* (lathberry).

Native species dominate the site, with 31 out of the 42 plant species encountered. Introducedplants were mainly seen near the public road and more disturbed eastern side of the property (see appendix I).

A few somewhat larger native trees occur on the north-facing slope in the southern section of the property. These are faster-growing softwoods, including *Bursera simaruba* (turpentine) and *Guapira fragrans* (black mampoo).

Overall, plant diversity was lower than expected, although the forest appears to have been recovering from historic clearing for at least 100 years, based on the size of hardwood shrubs, the absence of non-native plants, and the dry conditions.

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Topography and Soils

The parcel is somewhat hour-glass shaped, with a smaller polygon fronting on the main road tothe north, which then narrows to approximately 60ft. before widening

to the larger (main) portion of the plot. The smaller north section is only slightly sloped, draining to the north and northeast. The larger polygon includes most of the northern slope of a small hill, with the boundary line crossing the ridge to a portion of the east-facing slope. A shallow but obvious drainage swale traverses the larger triangle from west to near the base of the southern hill.

The soils on the site are classified as mainly Southgate series, with a smaller amount (11%) ofCinnamon Bay soil. The Cinnamon Bay soil is restricted to the northeast corner on the main road, and the north end of the eastern end of the property (Rudy O'Reilly Jr, NRCS, personal communication).

Although the Cinnamon Bay soil is considered hydric, there was no evidence that ponding can occur in these sections, or any area on the parcel. No plant species that have any associationwith periodically saturated soils were observed.

Other Observations

The site visit was brief and focused on inventory of plant species, but notes were taken of thelimited wildlife observed. Neither bird nor terrestrial animal life was abundant on the site.The on-ogoing drought conditions in this section of St Thomas meant that there were almost no flowers, fruit, or seedson any vegetation.

Only a few very common birds were noted-- pearly eyed thrashers (*Margarops fuscatus*), zenaida doves (*Zenaida aurita*), laughing gulls (*Leucophaeus atricilla*) overhead. On the ground,only the common crested anole (*Anolis cristatellus*) was seen. The vegetation would appear to be suitable habitat for the Endangered Virgin Islands Tree Boa (*Epicrates monenis granti*).

Plant Species of Parcel 18-M2 Estate Bovoni

N=Native to St ThomasI=Introduced

1.	*Abrus precatorius*	jumbie bead	I
2.	*Agave missionum*	karata, century plant	N
3.	*Aloe barbadensis*	medicine aloe, semper vive	I
4.	*Amyris diatrypa*	torchwood	N
5.	*Amyris elemifera*	torchwood, sea amyris	N
6.	*Bourreria succulenta*	pigeonberry, chinkberry	N
7.	*Bromelia pinguin*	pinguin, wild pineapple	I
8.	*Bursera simaruba*	turpentine tree	N
9.	*Callisia fragrans*	basket plant	I
10.	*Chromolaena odorata*	bitter bush	N
11	.*Coccoloba microstachya*	puckhout	N
12.	*Crossopetalum rhacoma*	maiden berry	N
13.	*Croton astroites*	white maran	N
14	.*Cynophalla flexuosa*	Limber caper	N
15.	*Elaeodendron xylocarpa*	false nutmeg, nothing-nut	N
16.	*Erythroxylum brevipes*	brisslet	N
17.	*Eugenia biflora*	rodwood	N
18.	*Eugenia cordata*	lathberry	N
19.	*Forestiera eggersiana*	inkbush	N
20.	*Guapira fragrans*	black mampoo	N
21.	*Guettarda odorata*	velvet seed	N
22.	*Jacquemontia pentanthos*	clashie-malashie	N
23.	*Jasminum fluminense*	Azores jasmine	I
24.	*Krameria ixine*	ratany	N
25.	*Lantana camara*	red sage	I
26.	*Leucaena leucocephala*	wild tamarind, tan-tan	I
27.	*Libidibia coriaria*	divi-divi	I
28.	*Malvastrum americanum*	malvastrum	I
29.	*Megathrysus maximus*	Guinea grass	I
30.	*Opuntia repens*	sucker cactus, suckers	N
31.	*Pithecellobium unguis-cati*	bread-and-cheese	N
32.	*Plumeria alba*	wild frangipani	N
33.	*Quadrella cynophallophora*	black caper, black widdie	N

34.	*Quadrella Indica*	White caper	N
35.	*Randia aculeata*	inkberry	N
36.	*Reynosia guama*	guama, guama-berry	N
37	.*Samyda dodecandra*	samyda	N
38.	*Scleria lithosperma*	rock sedge	N
39.	*Scolosanthus versicolor*	no common name	N
40.	*Serjania polyphylla*	basket wiss	N
41.	*Tillandsia utriculata*	airplant, wild pine	N
42.	*Vachellia farnesiana*	*sweet cassie*	I
43.	*Vachellia macracantha*	stink casha	I (?)

6.08 Wetlands

There are no wetlands associated with the site of that could be impacted by project activities.

6.09 Rare and Endangered Species

This site is a known habitat for the Virgin Islands Tree Boa and strict adherence to the VI Tree Boa: Site Clearance Protocol will be observed.

6.10 Air Quality

The United States Virgin Islands is located in a Class II air quality region and must comply with the National Air Ambient Quality Standards. The Department of Planning and Natural Resources is the state regulatory agency enforcing the Clean Air Act and VI Air Pollution Control Act through the Air Pollution Control Program.

During excavation a backhoe or other appropriate equipment will be used and will emit low levels of combustion byproducts such as CO etc. None of these emissions are expected to exceed air quality, visible or fuel burning emission standards nor pose a nuisance or threat to human health or environment.

The Department of Planning and Natural Resources implements an air pollution control program that has a particulate monitoring network on St. Thomas. Currently, this network consists of one PM2.5 monitoring station at Vendors Plaza on St. Thomas.

7.00 IMPACT OF THE PROPOSED PROJECT ON THE HUMAN ENVIRONMENT

7.01 Land and Water Use Plans

The project site and every zoning designation within 200 feet in every direction is also zoned R-1. Closest area not zoned R-1 is over 500 feet to the north and it is zoned R-3.

7.02 Visual Impacts

This project will not have a negative visual impact on surrounding properties and will be extremely compatible with the numerous commercial and industrial facilities on the northeastern and eastern perimeter of the site. Further, a 20-foot retaining wall will be erected on practically 70% of the site and on the northeastern corner a 24-foot wide section of shrubs and trees will be replaced with gravel entrance to the property.

7.03 Impacts on Public Services and Utilities

The site is within the Jersey Bay Watershed (ref: USGS HUC 14 delineation) which was assessed by DPNR on June 23,2015 and based on 18 groundwater wells the extraction rate was estimated at 13, 158,611gpd. Using a watershed size of 3,594 acres (ref: UVI-CDS Jan 2002 Watershed Characteristics Map) and reduced amount of available for groundwater recharge due to % developed land use, (i.e., impervious surfaces, steep slope analysis greater than 25% and conservative 5% recharge of annual precipitation of 30 inches per year), the acquifer recharge rate is estimated at 22,099 gpd. Consequently, the mass balance between estimate recharge rate and total withdrawal rate is negative meaning the groundwater source is being over-pumped.

A maximum of five employees will occupy the site at any one time and provisions have been made to construct a septic system with a lined drain field. Therefore, this project will not add to the incoming load of the Mangrove Lagoon Wastewater Plant. This project site is expected to consume approximately 2000 kilowatt hours of electric power per month.

Waste characterization studies indicates that Virgin Islanders generates approximately twice as much waste person as is generated in the United States. After adjustment, it was estimated the average person on St. Thomas generates approximately 10.75 pounds of waste per day. Based on the above an average 53.75 pound of trash will be generated at this site per day and an estimated 16. 770 per year. Based on a waste characterization study performed in 2009, St. Thomas generated 67,748 tons of waste. This site would therefore produce an insignificant 0.012 percent of the total annual waste produced on St. Thomas.

7.04 Social Impacts

This project is anticipated to have minimal social impact since there will be only a small increase in the number of people.

7.05 Economic Impacts

This project will have a positive economic impact due additional property taxes, electric and water consumption revenues that the USVI government will accrue. In addition to the foregoing, the GVI will benefit from tax revenues generated from other projects conducted on St. Thomas that are conducted with equipment stored at this site.

7.06 Impacts on Historical and Archaeological Resources

A phase 11 archaeological and evaluation survey was performed during November 30 through December 21, 2015 at Plot numbers 17-E and 16 Estate Bovoni and significant cultural resources were identified. Plot No. 16 is adjacent to Plot No. 18-M2 where the proposed project is located. Therefore, therefore, according to Title 29, Chapter 17 of the VI Code, the VI Antiquities and Cultural Properties Act of 1998, a Phase I Cultural Resource Survey will be required and will be performed following the Department of Planning and Natural Resources Division of Historic Preservation "Guidelines for Cultural Resources Investigations". The procedure implemented complied with Federal law and Coastal Zone Management (CZM) regulations which requires a consideration of the effects of proposed undertakings on all historic and prehistoric cultural resources (terrestrial and submerged) which are listed on or determined eligible for the National Register of Historic Places.

7.07 Recreational Use

Project development activities will not create any adverse impacts on current or traditional recreational activities within the area.

7.08 Waste Disposal

All waste generated during construction will be collected and temporarily stored in waste for pickup by a waste hauler. As indicated above, during normal operation of the site at the most 5 persons will occupy the site. Since average person on St. Thomas generates approximately 10.75 pounds of waste per day. Based on the above, an average 53.75 pound of trash will be generated at this site per day and an estimated 16. 770 per year. A waste hauler will be contracted to remove the waste for disposal at the landfill.

A small amount of fuel oils will be stored on the site for use during light and routine equipment maintenance. Less than 110 gallons of used will be kept on site in a sealed

drum contained with a secondary containment device. A waste oil transporter approved by DPNR will periodically pick up the used oil for transport and disposal off island.

A maximum of five employees will occupy the site at any one time and provisions have been made to construct a septic system with a lined drain field. Given that a single person generates approximately 40 gallons of wastewater per day, the maximum of wastewater generated at the site will be approximately 200 gallons per day.

7.09 Accidental Spills

In general, releases will be contained immediately, collected and stored in an appropriate container. Used oil or unused oils that may become contaminated from coming in contact with soil or other foreign materials will be managed according to 40 Code of Federal Regulations Part 279 "Standards for the Management of Used Oil".

7.10 Potential Adverse Effects which Cannot be Avoided

Emission products of combustion from the bulldozer and excavator and noise generated during construction cannot be avoided but these activities will not cause any new potential adverse effects on human health or the environment. Project activities will also generate dust which if not addressed according to procedures outlined in the SWPPP, can become airborne and become, at a minimum, a nuisance. However, all procedures to minimize dust generated from site activities will be controlled with use of climatological information and techniques minimize the amount of exposed surfaces throughout the project.

8.00 MITIGATION

To prevent runoff or dispersion of particles in the air, techniques to minimize or prevent soil dispersion or erosion have been incorporated throughout this project. As part of the plan and to the extent practicable, every effort will be made to ensure that no material left exposed and to utilize climatological information to optimize the most appropriate time to conduct earth moving activities. If unusual circumstances occur, such as a failure for equipment to function after the workday has commence, any exposed temporary piles will be covered by an impermeable liner and moistened to prevent a release of particulate matter. The following procedures below will be implemented:

- ❑ Collecting and managing excavated soils in an appropriate manner; and
- ❑ Keeping available impermeable polyethylene liners to cover soils just dug up in the event of an unexpected immediate downpour of rain.

Other control measures to prevent the release of particulate matter and soil stabilization of techniques will be implemented.

9.00 ALTERNATIVES TO PROPOSED ACTION

This property is zoned R-1 which would allow for primarily for low density residential housing. Further residential development of this particular area is limited due to the amount and proximity of the site the industrial activities nearby and the fact that the Bovoni Landfill.

10.00 RELATIONSHIP BETWEEN SHORT & LONG TERM USES OF MAN'S ENVIRONMENT

Future site improvement include energy supplies by solar panels for the entire site including offices and storage trailers. This investment is anticipated to lead to other sustainable activities such as composting on a small scale and collection of recyclables to reduce and encourage other facilities to join in a move towards a more sustainable future.

11.00 REFERENCES (Organizations and/or Persons Consulted, Documents etc.)

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Vegetation of Parcel 18-M2 Estate Bovoni, St. Thomas, Virgin Islands May 6, 2021 Prepared by Eleanor Gibney, PO Box 93, St. John, 00831

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