MAJOR LAND PERMIT APPLICATION
Environmental Assessment Report

**Applicant:** Toney Laurencin
**Project:** Cassava Gardens Project
5-A & REM-5, Estate Cassava Garden

**September 2021**

Prepared by: Tysam Tech, LLC
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1.00 NAME AND ADDRESS OF APPLICANT

Toney Laurencin

Mailing Address:
P.O. Box 516
Kingshill, VI 00851

Physical Address:
122T Estate Whim
Frederiksted, VI 00840
2.00 LOCATION OF PROJECT

The project is located at the following physical address:

5-A and Remainder Plot 5, Estate Cassava Garden
Christiansted, VI 00820

The 5A&REM5 Cassava Garden Project site is located in southcentral St. Croix, in Estate Cassava Garden. The site is positioned at 17°43'08.3"N 64°44'37.3"W, along Highway 68. The Location and Agency Review Map is presented in Figure 2.00.1 below. Figure 2.00.2 is a vicinity map generated by MapGeo using satellite imagery and identifying individual property parcels related to the project.

![Project Location](image.png)

*Figure 2.00.1 – Location and Agency Review Map (USGS Quadrangle Map, Christiansted, VI, 2013)*
Figure 2.00.2 – Vicinity Map Showing Location of Facility (Map Geo).
3.00 ABSTRACT

The proposed project area is located in the industrialized section of southcentral St. Croix, north of Canegarden Bay. The project seeks to improve and expand upon the existing infrastructure located on the property. Those improvements include renovate and remodel the inside and outside of the existing building, construct a new garage north of the building with loading dock, construct a new storage warehouse on the east side of the building, install a new septic system, install a new guard house, perform improvements to current landscape, repair the north and west fences, install a new fence on the east side of property, and install a new gravel parking lot.

The project will be completed in two phases. Phase 1, which includes framing, erection of the warehouse, and other exterior work of the buildings, has begun and is anticipated to be completed by October 1, 2021.

Phase 2, anticipated to start immediately after Phase 1 and be completed by March 30, 2022, will entail the construction of the main gravel parking lot, septic system, guard gate, repair and installation of security fencing, and completion of interior work on the existing and new buildings.

The project approach will be to develop the site according to safe and environmentally protective methods and requirements, ensuring during construction that any impact to nearby properties and environment is minimized. Long-term design of the entire development has also been considered to ensure minimal impact to the surrounding area for the life of its current use.

A project plan layout as well as a schedule of construction is provided with this document.

Project Assurances

- Employees’ and the public’s health and safety are protected with the best available systems and technologies.
- Environmental impact is considered at all times.
- No significant negative impact to environment.
- Air quality is protected.
- Stormwater quality is protected.
- Nearshore water quality is protected.
4.00 STATEMENT OF OBJECTIVES SOUGHT BY THE PROPOSED PROJECT

The project intends to not only improve functionality of its current use but also the visual appeal of the area. Functionality will be expanded by renovations to the existing building, addition of a new storage shed, new garage with loading dock, new septic system, and a new guard house. Greater aesthetic appeal will be achieved by improved and upgraded landscaping and by the repairs and new installations to the property delineation fencing.

5.00 DESCRIPTION OF PROJECT

5.01 SUMMARY OF PROPOSED ACTIVITY

a) Purpose of Project

The purpose of the project is to improve the conditions of existing infrastructure on the property and to install additional infrastructure that will allow the business to operate more safely and productively.

b) Presence and Location of any Critical Areas and Possible Trouble Spots

The project area is in a highly industrialized section of southcentral St. Croix, along Highway 68. Properties to the east and west are currently occupied and commercially used while the undeveloped land to the south of the property is owned by the USVI government.

Site slope ranges from 2% to 20%, though the majority is below 10% slope and is fairly flat. Site elevation is between 100 and 110 feet above sea level.

A review of the U.S. Fish & Wildlife Information for Planning and Consultation (IPaC) report for the site indicates that there are no endangered species, migratory birds, or sensitive facilities directly in the project area. However, stormwater leaving the property would flow to the Figtree Gut, and follow drainage routes into Canegarden Bay. IPAC does indicate two federally endangered reptile species that are known to swim in the waters of Canegarden Bay, a little over one mile south of the project area. They are the hawksbill sea turtle (Eretmochelys imbricata) and the leatherback sea turtle (Dermochelys coriacea). In addition, the West Indian manatee (Trichechus manatus) is a threatened species and has been found in these offshore waters as well. There are additional species that are indicated on the Environmental Sensitivity Index map discussed in Section 6.07.
Due to the nature of the project’s scope of new buildings construction, albeit small footprint, there exists potential for sedimentation and erosion during project earth movement activities. Appropriate protective Best Management Practices (BMPs) will be employed through the entire project timeline in accordance with design standards of the VI Environmental Protection Handbook (VIEPH) (2002). Stormwater will be appropriately managed as discussed in subsequent sections below.

Air quality is not anticipated to be greatly affected by the construction nor the proposed land use. Dust control methods will be used to manage fugitive dust during construction.

The applicant has considered all potential affects to the surrounding areas, shoreline or wildlife and determined that the clearing of the necessary sections for new construction will not impact these areas.

c) Proposed Method of Land Clearing

Land clearing will only be necessary in the sections of the property where the gravel parking lot and the new septic system will be located. Any brush and debris requiring removal in order to clear those areas will be cut and transported off-site as green waste for disposal at the Waste Management Authority Transfer Station.

d) Plans for Topsoil and Site Disturbance Provisions

Topsoil and site disturbance will be minimized during the construction timeline. The project will focus within the existing footprint of the building, gravel parking lot and support infrastructure as depicted in the site drawings.

e) Erosion and Sediment Control Devices to be Implemented

The following BMPs will be implemented on the site to control runoff and protect natural resources:

Silt Fence – Due to the close proximity to a drainage route, silt fencing shall be used to protect the vegetated areas from runoff and sediment loss. The proposed location for silt fencing placement is indicated on the attached Erosion Control Plan figure.

Containment Berms– A containment berm will be constructed, if needed, to support the silt fencing in containing stormwater runoff and retaining sediment.

Design of these BMPs will follow the minimum standards of the VI EPH (2002).
f) Schedule for Earth Changing Activities & Implementation of Erosion/Sediment Control Measures

The project, currently in Phase 1, has completed earth change activities for this first phase. Upon entering Phase 2 of the project, Remainder Plot 5E will be cleared of vegetation and graded for placement of the gravel parking lot.

Removed soil will be stockpiled and stabilized while the gravel parking lot is being installed. Excess soil material will be used to level areas onsite.

No earth change activities will take place until BMPs are installed at the site. Erosion and sediment control schedule for the project construction will be managed as follows:

1. Ensure silt fencing and other BMPs are setup before work begins.

2. Minimize earth work in land clearing and vegetation removal. If stockpiling is needed, it will be kept to a minimum and stabilized to prevent erosion and fugitive dust emissions.


g) Maintenance of Erosion and Sediment Control

Sediment control devices, including silt fencing, berms and swales, will be inspected every 14 calendar days and after any heavy rainfall of 0.25 inches or more. If defects or damage are noted in the measures, the defect or damage will be immediately noted and repaired. If the measures prove to be inadequate to control erosion, changes will be made to the design and additional measures will be added as necessary.

Accumulated sediment will be removed when it reaches 40% of the height of the silt fencing or volume of sedimentation pond. Worn, torn or otherwise damaged silt fencing will be fixed or replaced.

The site will be cleaned on a daily basis of litter, debris and materials such as paper, wood, concrete, etc.

h) Stormwater Management

Management of stormwater for the duration of the project will be limited to ensuring no discharge of contaminated stormwater from the site boundaries, and prevention of erosion of project areas through controlled release from site discharge points.

All stormwater control devices will be inspected every 14 calendar days and after all heavy rainfall of 0.25 inches or more. If defects or damage are noted in the measures, the defect or damage will be immediately reported and repaired. If the measures prove to be inadequate to control stormwater flow, changes will be made to the design and additional measures will be added as necessary.
i) **Maintenance Schedule of Stormwater Facilities**

Sediment control devices, including silt fencing, berms, and swales, will be inspected every 14 calendar days and after any heavy rainfall of 0.25 inches or more. If defects or damage are noted in the measures, the defect or damage will be immediately reported and repaired. If the measures prove to be inadequate to control erosion, changes will be made to the design and additional measures will be added as necessary.

Accumulated sediment will be removed when it reaches 40% of the height of the silt fencing or volume of catchment basin. Worn, torn or otherwise damaged silt fencing will be fixed or replaced. The site will be cleaned on a daily basis of litter, debris and materials such as paper, wood, concrete, etc.

j) **Sewage Disposal**

The current method of sewage disposal is on-site portable restrooms with proper disposal pickup. The existing septic system is not in use due to it not functioning correctly and will be properly abandoned as part of the proposed project. The new septic system will be installed just south of the existing system. During project duration, the portable restrooms will continue to be utilized until the new septic system is completely installed and functioning properly. At that time, the portable restrooms will be removed.

5.02 **SITE PLANS (See Attached Drawings)**

5.02.01 Lot Layout (See Attached Engineer/Surveyor drawings)
5.02.02 Road Layouts (See Attached Engineer/Surveyor drawings)
5.02.03 Position of Structures (See Attached Engineer/Surveyor drawings)
5.02.04 Septic System/Wastewater Treatment (See Attached Engineer/Surveyor drawings)
5.02.05 Stormwater Drainage (See Attached Engineer/Surveyor drawings)
5.02.06 Stormwater Facilities (See Attached Engineer/Surveyor drawings)
5.02.07 Erosion and Sediment Control Plan (See Attached Spec Sheets)
5.02.08 Landscaping Plan (See Attached Engineer/Surveyor drawings)
5.02.09 Other Required Drawings (See Attached Engineer/Surveyor drawings)
5.02.10 Required Maps (See Attached: Official Zoning Map, Parcel Map, FIRM)
5.03 PROJECT WORKPLAN

The proposed project entails the renovation and remodeling of the inside and outside of the existing building, construction of a new garage north of the building with loading dock, construction of a new storage warehouse on the east side of the building, installation of a new septic system, installation of a new guard house, landscape improvements, repair of the north and west fences, installation of a new fence on the east side of property, and installation of a new gravel parking lot.

The project will be completed in two phases. Phase 1, which includes framing, erection of the warehouse, and other exterior work of the buildings, has begun and is anticipated to be completed by October 1, 2021.

Schedule of Events – Phase 1

- Exterior infrastructure (electrical, plumbing, communications) installation – 7 days
- Exterior framing and structure erection – 7 days

Phase 2, anticipated to start immediately after Phase 1 and be completed by March 30, 2022, will entail the construction of the main parking lot, septic system, guard gate, repair and installation of security fencing, and completion of interior work on the existing and new buildings.

Schedule of Events – Phase 2

- Silt fencing and other stormwater BMPs installed according to the project management map – 7 days
- Parking Lot Grading and clearing – 30 days
- Installation of gravel parking lot – 60 days
- Installation of septic system and leach field – 7 days
- Installation of guard gate and safety fence – 30 days
- Landscaping and finish work – 60 days
6.00 SETTING AND PROBABLE PROJECT IMPACT ON THE NATURAL ENVIRONMENT

6.01 CLIMATE AND WEATHER

**Prevailing Winds**

The Virgin Islands lie in the "Easterlies" or "Trade Winds" that traverse the southern part of the "Bermuda High" pressure area, and the predominant winds are usually from the east-northeast and east (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), and based on U.S. Naval Oceanographic Office data.

*Figure 6.01.1 – Wind Direction and Speed Frequency, Central Caribbean, January - June.*
**December – February**

During the winter, the trade winds reach a maximum and blow with great regularity from the east-northeast. Wind speeds range from 11 to 21 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. They are created by strengthening of high-pressure cells over the North American continent, which, in turn, allow weak cold fronts to move southeastward over the entire Caribbean region. These storms are accompanied by intermittent rains, clouds and low visibility.

**March – May**

During the spring, the trade winds are reduced in speed and blow mainly from the east. Winds exceed twenty knots only thirteen percent of the time in April. The change in speed and direction is the result of a decrease of the Equatorial Trough.
June – August

Trade winds reach a secondary maximum during this period and blow predominantly from the east to east-southeast. Speeds exceed 20 knots twenty-three percent of the time during July. The trend for increasing winds results from the strengthening of the Bermuda High and a concurrent lowering of the pressure in the Equatorial Trough. Trade winds during this period are interrupted by occasional hurricanes.

September – November

During the fall, winds blow mainly from the east or southeast and speeds reach an annual minimum. Only seven percent of the winds exceed 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, the normal trade wind regime is often broken down by easterly waves, tropical storms and hurricanes.

Storms and Hurricanes

There are numerous storm events each year, from squalls and thunderstorms to hurricanes. Standard rain events occur most frequently during the summer, lasting only a few hours and causing no pronounced change in the trade winds.

A tropical cyclone, whose winds exceed 74 miles per hour, is termed a hurricane in the northern hemisphere. These hurricanes can range in strength from causing little to no damage to destroying infrastructure. These hurricanes occur most frequently between August and mid-October with their peak activity occurring in September.

Figure 6.01.3 depicts NOAA data on historic Hurricanes and Tropical Storms in the vicinity of St. Croix.

![Figure 6.01.3 – Historic Tracks of Hurricanes and Tropical Storms for St. Croix](image-url)
Climate

The climate of St. Croix, as well as that of the Territory, is characterized by generally fair, tropical weather, with usually consistent wind speed and direction. Temperature swings are narrow, both seasonally and diurnally.

The closest weather station to the facility is located at the Henry E. Rohlsen Airport. Climate data from this station is found below in Table 6.01.1.

Table 6.01.1 – Average Temperatures in Christiansted, St. Croix

The nearest NOAA National Ocean Service Weather Station is located in Christiansted Harbor, St. Croix (Station CHSV3 – 9751364; ndbc.noaa.gov/station_page.php?station=chsv3). Climate data from this station is found below in Tables 6.01.2 and 6.01.3 below.
Table 6.01.2 – Average Wind Speed, St. Croix

Table 6.01.3 – Average Air Temperature, St. Croix
The average annual rainfall on St. Croix is about 40 inches, ranging from about 30 inches in the east to more than 50 inches in the mountains of the northwest. Average annual temperature is a moderate 79°F, with an average low in winter of 76°F and an average high in summer of 84°F; temperatures are 2 to 3 degrees lower at altitudes of 800 to 1,000 feet. Occasionally, maximum daily temperatures will exceed 90°F and minimum temperatures will be less than 70°F. Prevailing wind direction is from the east or northeast.

Rain generally occurs in brief, intense showers of less than a few tenths of an inch. Rains exceeding 1 inch in 48 hours occur about 7 or 8 times a year in the central part of the island; they are slightly more frequent in the mountains of the northwest and less frequent in the eastern part. February and March are the driest months and September is the wettest. Nearly half the average annual rain falls from August through November. Large storms can occur in any month although more likely during July to November, the hurricane season. (Jordan, 1975).

**Impact on the Proposed Project**

The applicant has carefully analyzed both climate and weather. The proposed structures have been designed according to current building codes outlined in Title 29 V.I.C. and it is not anticipated that there will be any impact from climate or weather on the proposed design, neither from routine events nor extreme weather events such as hurricanes.
6.02 LANDFORM, GEOLOGY, SOILS AND HISTORIC LAND USE

Geology of St. Croix

St. Croix is the southernmost island of the U.S. Virgin Islands, lying 40 miles south St. Thomas and separated from it by an ocean trench 3,600 meters deep. It lies about 95 miles southeast of San Juan, Puerto Rico. St. Croix is the largest island in the USVI, with a total area of 82 square miles. The island is approximately 22 miles long, east to west and is about 7 miles in width. St. Croix is geographically located in the Lesser Antilles and lies completely within the Caribbean Sea.

![Figure 6.02.1 - Bathymetry of USVI basins and plateaus. From van Eepoel, et al, 1971.](image)

The Virgin Islands are near the northeastern corner of the present Caribbean Plate, a relatively small trapezoidal-shaped plate which is moving eastward relative to the North and South American continents carried on the American Plate. The arc of the Lesser Antilles is an active volcanic arc above a subduction zone in which Atlantic oceanic crust of the American Plate is carried downward under the Caribbean Plate. The Caribbean Plate is sliding past North and South American plates along east-west trending northern and southern boundaries. The western boundary is a subduction zone in which the Cocos Plate is being driven northeastward and down under the edge of the Caribbean Plate west of Central America (Rogers, 1988).
St. Croix lies on a somewhat isolated, submerged ridge separated from the Puerto Rico Bank by the Virgin Islands Basin. Geologically it is related to the islands of the Puerto Rico Bank. If St. Croix was ever connected to the northern Virgins, it may have been separated from that group by either block (Meyerhoff 1927, Whetten 1966) or shear faulting (Adey 1977, Turner 1971).

The oldest rocks exposed on St. Croix are epiclastic volcanic sandstone and mudstone of the Caledonia Formation (Whetten 1966). These weakly metamorphosed, uplifted, folded and faulted rocks were derived from volcanic and other narrow-trench sediments originally deposited by turbidity currents on the deep ocean floor about 70 to 80 million years ago (Adey 1977). Buck Island is an emergent part of the St. Croix shelf.

Somewhat later in the Cretaceous, one or more volcanoes formed on the sea floor to the south or southeast of St. Croix. Volcanic debris was shed northward to form the Judith Fancy formation, composed of tuffaceous sedimentary rocks, which occur on St. Croix but not on Buck Island.

St. Croix was uplifted above sea level in the Oligocene (Whetten 1974), originally as two islands. The East End Range (including proto-Buck Island) and the Northside Range were separated by a trough several miles wide. The trough was subsequently filled in by the deposition of the Kingshill marl formation. There then followed a period of mild deformation, post-Miocene uplift, and erosion to form the present-day topographic features (Rogers and Teytaud, 1988). Therefore, the island of St. Croix consists geologically of two predominant mountainous areas (the North side and the East End ranges), with a central sediment filled valley in between.

The limestone and marls that overlay the Jealousy formation are known as the Kingshill formation. After these formations were deposited, the area underwent another period of uplifting, the two islands became connected by the newly emergent filled-in area, and the island of St. Croix was formed. Since that time, geologic activity has been limited primarily to the erosion of sediments and the formation of ponds, beaches, reefs, and beach rock coast.

Two large basins, the Virgin Islands Basin and the St. Croix Basin, separate St. Croix from the other Virgin Islands. Within the distance between St. Croix and St. Thomas, about 40 nautical miles, hydrographic charts show that the ascent from the sea floor north of St. Croix is as much as 70º. Frasetto and Northrop (1057) indicate that this northern topographic slope extends downward to the Virgin Islands Basin at a gradient up to 43º. There is an ascent of 13,656 feet within a horizontal distance of 25,800 feet, terminating with the steep north coast in the vicinity of Hams Bluff. The area has been described as the south side of the Anegada Trough and its related fault scarp (Taber 1922). Meyerhoff (1927) suggested that this block faulting took place during the late Pliocene or early Pleistocene, prior to which St. Croix was physically attached to the northern Virgin Islands.
Figure 6.02.2 – General Geological formations of St. Croix (Atlas of Ground-Water Resources in Puerto Rico and the U.S. Virgin Islands)

Figure 6.02.3 – Geological formations in vicinity of project site, St. Croix. Donnelly, 1959.
Geology of the Facility/Site

The project site is located at 17°43’08.3”N 64°44’37.3”W, along Highway 68, in southcentral St. Croix, Estate Cassava Garden. The Custom Soil Survey by the National Resource Conservation Service (NRCS) identifies the two main soil types for the project area as Arawak gravelly loam (ArD) and Hesselberg clay (HeC). However, a small portion of the property contains soils also classified as Hesselberg clay, but with the HeB distinction. See Figure 6.02.4 and Table 6.02.1 below.

Arawak gravelly loam are very stony soils found on summits and side slopes of hills and mountains underlain by limestone. These soils are well-drained with slow permeability and have severe hazard of erosion (USDA Soil Survey of the United States Virgin Islands). ArD slopes vary from 12 to 20 percent.

Hesselberg clay are shallow soils that have a clayey subsoil and usually found on alkaline marine terraces that are adjacent to the sea. These soils are well-drained with slow permeability. HeB soils have a moderate hazard of erosion while HeC soils have severe hazard of erosion (USDA Soil Survey of the United States Virgin Islands). HeB slopes vary from 2 to 5 percent while HeC slopes vary from 5 to 12 percent.

Elevation at the project site is between 100 and 110 feet above sea level.
Figure 6.02.4 – USDA Natural Resource Conservation Service Soil Map
### Table 6.02.1 – USDA Web Soil Survey classification percentages at project site

<table>
<thead>
<tr>
<th>Map Unit Symbol</th>
<th>Map Unit Name</th>
<th>Acres in AOI</th>
<th>Percent of AOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ArD</td>
<td>Arawak gravelly loam, 12 to 20 percent slopes, very stony</td>
<td>0.8</td>
<td>46.6%</td>
</tr>
<tr>
<td>HeB</td>
<td>Hesselberg clay, 2 to 5 percent slopes</td>
<td>0.0</td>
<td>2.6%</td>
</tr>
<tr>
<td>HeC</td>
<td>Hesselberg clay, 5 to 12 percent slopes</td>
<td>0.9</td>
<td>50.8%</td>
</tr>
<tr>
<td><strong>Totals for Area of Interest</strong></td>
<td></td>
<td><strong>1.8</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

**Historic Use**

The land has been used commercially for as long as records have been kept on historic uses.

**Seismic Activity**

The Puerto Rico/Virgin Islands region is located at the northeastern corner of the Caribbean plate where motions are complex. The westward-moving North American plate is being driven under the Antilles Arc where volcanism is active. On the north side of the plate corner, the North American plate slides past the Caribbean but irregularities in the plate boundaries cause stresses that result in a complicated under thrusting of plate fragments. The interaction of plates causes the volcanism of the Antilles Arc on the eastern boundary of the Caribbean plate and creates major stresses all along the northern boundary (Nealon & Dillon, 2001).

Since the 1867 Virgin Islands Tsunami cause by a magnitude 7.5 earthquake in the Anegada trough (USC Tsunami Research Center), there has been continuous low intensity activity all below 6.0 Richter. Over the last several years, numerous minor tremors have been felt on the island. This increased activity is associated with the volcanic eruptions that have been occurring to the southeast on the island of Montserrat.

The project structures will be built to meet or exceed earthquake load requirements referenced in 29 V.I.C § 311.
Impact of Geology on Proposed Project

The applicant has carefully considered landform, geology, soils and historic land use. The project has been designed to be consistent with these conditions, to improve the landform as it exists now and to cause minimal to no impact on the surrounding area and geology.

6.03 DRAINAGE, FLOODING, AND EROSION CONTROL

a) Existing Drainage Patterns
The site is mostly cleared of debris and vegetation, except those areas which will be cleared for project construction. Stormwater runoff generally flows to the west, then into a major gut, Figtree gut, where is then flows directly to Canegarden Bay to be discharged.

b) Proposed Alterations to Drainage Patterns
There are no proposed alternations to drainage patterns at the site. Any increased runoff due to infrastructure construction or the installation of the gravel parking lot is negligible.

c) Relationship of Project to Coastal Floodplain
Review of Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) for U.S. Virgin Islands Index indicate that the project area is not within nor in close proximity to a flood zone (Zone X). See FIRM Panel 0081G below in Figure 6.03.1, depicting exact site location (red star) relative to flood zones.
d) **Peak Stormwater Flow Calculations**

As the project scope will not alter the flow of storm water in any way, no hydrologic & hydraulic study was performed for this project site.

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e) **Existing Stormwater Disposal Structures**

There are no known existing stormwater disposal structures currently at the site.
f) Proposed Stormwater Control Facilities

No proposed changes to stormwater flows, quantities or direction are proposed for this project. Management of stormwater for the duration of the project will be limited to ensuring no discharge of contaminated stormwater from the site boundaries, and prevention of erosion of project areas through controlled release from site discharge points.

g) Maintenance Schedule for Stormwater Facilities

During construction, sediment control devices, including silt fencing, berms, swales and outlets will be inspected every 14 calendar days and after any heavy rainfall of 0.25 inches or more. If defects or damage are noted in the measures, the defect or damage will be immediately reported and repaired. The designs of any measures that prove to be inadequate to control erosion, will be changed and additional measures will be added as necessary.

Accumulated sediment will be removed when it reaches 40% of the height of the silt fencing. Worn, torn or otherwise damaged silt fencing will be fixed or replaced. The site will be cleaned on a daily basis of litter, debris and materials such as paper, wood, concrete, etc.

Design of these BMPs will follow minimum standards of the VIEPH and will be strengthened to prevent any erosion or degradation. Inspections after major rain events will be routine to ensure there are no damages or wear to the structures, allowing them to function as designed.

h) Proposed Method of Land Clearing

As discussed in Section 5.01, land clearing will only be necessary in the sections of the property where the gravel parking lot and the new septic system will be located. Any brush and debris requiring removal in order to clear those areas will be cut and transported off-site as green waste for disposal at the Waste Management Authority Transfer Station.

i) Provisions to Preserve Topsoil and Limit Site Disturbance

Topsoil and site disturbance will be minimized during the construction timeline. The project will focus within the existing footprint of the building, parking lot and support infrastructure as depicted in the site drawings.

j) Critical Areas and Possible Trouble Spots

The project area is in a highly industrialized section of southcentral St. Croix, along Highway 68. Properties to the east and west are currently occupied and commercially used while the undeveloped land to the south of the property is owned by the USVI government.

Site slope ranges from 2% to 20%. Site elevation is between 100 and 110 feet above sea level.
A review of the U.S. Fish & Wildlife Information for Planning and Consultation (IPaC) indicate that there are no endangered species, migratory birds, or sensitive facilities directly in the project area. However, stormwater leaving the property would flow to the Figtree Gut, and follow drainage routes into Canegarden Bay. IPAC does indicate two federally endangered reptile species that are known to swim in the waters of Canegarden Bay, a little over one mile south of the project area. They are the hawksbill sea turtle (Eretmochelys imbricata) and the leatherback sea turtle (Dermochelys coriacea). In addition, the West Indian manatee (Trichechus manatus) is a threatened species and has been found in these offshore waters as well. There are additional species that are indicated on the Environmental Sensitivity Index map as discussed in Section 6.07.

Due to the nature of the project’s scope of new buildings construction, albeit small footprint, there exists potential for sedimentation and erosion during project earth movement activities. Appropriate protective Best Management Practices (BMPs) will be employed through the entire project timeline in accordance with design standards of the VI Environmental Protection Handbook (VIEPH) (2002). Stormwater will be appropriately managed as discussed in subsequent sections below.

Air quality is not anticipated to be greatly affected by the construction nor the proposed land use. Dust control methods will be used to manage fugitive dust during construction.

The applicant has considered all potential affects to the surrounding areas, shoreline or wildlife and determined that the clearing of the necessary sections for new construction will not impact these areas.

k) Erosion and Sediment Control Devices to be Implemented

The following BMPs will be implemented on the site to control runoff and protect natural resources:

Silt Fence – Due to the close proximity to a drainage route, silt fencing shall be used to protect the vegetated areas from runoff and sediment loss. The proposed location for silt fencing placement is indicated on the attached Erosion Control Plan figure.

Containment Berms– A containment berm will be constructed, if needed, to support the silt fencing in containing stormwater runoff and retaining sediment.

Design of these BMPs will follow the minimum standards of the VI EPH (2002). Phase B will be larger in scope and require similar BMPs, though with some reinforced design for stronger control of both onsite runoff, as well as additional flow from Phase A plots.

Design of these BMPs will follow the minimum standards of the VI EPH (2002).
l) **Maintenance of Erosion and Sediment Control Devices**

Sediment control devices, including silt fencing, berms and swales, will be inspected every 14 calendar days and after any heavy rainfall of 0.25 inches or more. If defects or damage are noted in the measures, the defect or damage will be immediately reported and repaired. If the measures prove to be inadequate to control erosion, changes will be made to the design and additional measures will be added as necessary.

Accumulated sediment will be removed when it reaches 40% of the height of the silt fencing or volume of sedimentation pond. Worn, torn or otherwise damaged silt fencing will be fixed or replaced.

The site will be cleaned on a daily basis of litter, debris and materials such as paper, wood, concrete, etc.

m) **Impacts to Terrestrial and Shoreline Erosion**

The project area is in an industrial section of St. Croix, north of Canegarden Bay. The property is not directly adjacent to the shoreline, as the Canegarden Bay shoreline is over one mile from the project site. Currently, the project areas are open, grassy spaces, with a building situated at the southernmost property boundary with approximately 65% permeable or semi-permeable surfaces. Site slope is between 2-20%.

The proposed development includes a gravel parking, which will greatly reduce the amount of grassy area left on the property. Since the parking lot will be installed using gravel and not concrete, the increased runoff is considered negligible.

In addition, the project will not alter the existing drainage patterns of the site. Stormwater currently sheet flows across the property, concentrating to shallow channel flow off the property to the west. These shallow channel flow paths concentrate into Figtree Gut, then straight to Canegarden Bay. Silt Fencing will be set up with reinforcing berms as needed along the west (dowlslope) side of the property to ensure catchment of sediment runoff from the project area, as well as slowing flow velocity thereby minimizing potential impact to the shoreline and receiving waters (Canegarden Bay, Class B waters).

No major increase in impervious area is anticipated, and any increase in runoff will be controlled to ensure no impact to shoreline or terrestrial erosion.

All standard sediment and erosion control devices and BMPs will be implemented when performing any site work and will be maintained throughout the life of the facility.

These erosion control devices combined with routine inspections, maintenance and repairs, will ensure no negative impact either during construction or during long-term operations.
6.04 FRESH WATER RESOURCES

St. Croix, USVI is limited in the number of freshwater resources to a few wells located around the island and mostly intermittent and ephemeral streams and ponds which dry up during periods of limited rainfall. Some perennial streams and freshwater ponds/basins do exist, but not as a reliable source of freshwater. The majority of potable water is either captured by rooftops and stored in cisterns or is desalinated seawater.

The project will use freshwater only for grading, compaction and general dust control needs. The project will have no negative impact on the availability of freshwater resources.

6.05 OCEANOGRAPHY

a) Seabed Alteration

No alteration or impact to the existing seabed is anticipated as part of this project and operation.

b) Tides and Currents

The surface currents throughout the Caribbean are driven by the North Equatorial Current that runs through the islands west-northwest and then joins the Gulf Stream (Figure 6.05.2). These currents change very little from season to season with the currents coming more from the south during the summer months. Because of the shallowness of the Caribbean basin, less than 3200 feet, mainly surface water from the Atlantic flows through the islands (Figure 6.05.1). Currents have been observed at Christiansted Harbor ranging between 1 and 3 knots, depending on weather conditions (IRF 1977).

St. Croix’s tides typically exhibit two (bi-modal) ‘peaks’ during the diurnal period (24-hour day), with the second (lesser) ‘peak’ with relatively small ebbs and flows. The mean tides range from 0.8 feet to 1.0 feet and the spring tidal ranges reach up to 1.3 feet (IRF 1977).
Figure 6.05.1 – Annual prevailing currents in the Caribbean. US Naval Oceanographic Office (1963)

Figure 6.05.2 – General current patterns on the island platforms. From Dammann, et al (1969)
In the Virgin Islands, tidal ranges and tidal currents, except in some inshore localities, are not significant. The small islands, lacking complex shoreline physiography, do not restrict changes in water level. The sea flows around the islands relatively unimpeded, resulting in tidal fluctuations of only a few inches to a foot. Further, the steep slopes of the islands rising out of the water means that the intertidal zone – the part of the shoreline regularly covered and uncovered by the tides - is very narrow. Therefore, there are no large areas of tidal flats uncovered at low tides as in other places in the world, especially along continental coastal zones.

One of the consequences of this small tidal action is that water exchange in bays due to tidal action is usually very small. For example, it is estimated that 24 to 40 tidal cycles alone would be necessary to exchange all the water in the main part of St. Thomas harbor (Percious, et al, 1972). Fortunately, waves, swells and oceanic currents are generally successful at flushing most bays. However, these forces are considerably reduced by the time they reach the heads of deep embayments.

As a result, circulation may be poor in the inner reaches of some larger embayments. The innermost portions of the mangrove lagoon on St. Thomas, Salt River of St. Croix and Coral Bay of St. John are examples of this. To a lesser extent, similar conditions have been observed at the head of Vessup Bay (Redhook), St. Thomas and Cruz Bay, St. John, and most likely occur in other similar locations (IRF, 1977).

![Figure 6.05.3](image)

*Figure 6.05.3 – Variations in the character of the tide displayed in time-height curves, from predicted tables and from observed tides in Christiansted harbor, June 29 - July 19, 1971. From Nichols, et. at, 1972.*
The closest NOAA tidal station is located in Lime Tree Bay, VI, Station ID: 9751401. The NOAA tidal station is located at Latitude: 17° 41.7 N and Longitude: 64° 45.2 W. The mean range is 0.69 ft. and the diurnal range is 0.71 ft. Tidal data from the station is shown below.

![Tidal Data Chart](image)

*Figure 6.05.4 – Observed Water Levels in Lime Tree Bay, St. Croix*

c) Wave and Wind Impacts

Due to the location and elevation, there are no anticipated wave or wind impacts for this project or operation.

d) Marine Water Quality

The closest waterbody to the site is Canegarden Bay, classified as Class B water. As specified in the Amended V.I. Water Quality Standards of 12VIRR186, Class B waters have a designated use of propagation of desirable species of wildlife and aquatic life and primarily contact recreation such as swimming, fishing, etc. Water quality criteria include dissolved oxygen not less than 5.5 mg/l, exception if cause is natural forces. The pH must not vary by more than 0.1 pH unit from ambient, and at no time may the pH be less than 7.0 or greater than 8.3. Bacteria (enterococci) cannot exceed 30 CFU/100ml (30-day geometric mean), turbidity readings cannot exceed 3 NTUs, and clarity may not exceed a level where a Secchi disc cannot be visible at a minimum depth of one meter.

VI DPNR performs routine water quality measurements at up to 138 Water Quality Monitoring Stations. The following is the nearest station to the project site:

<table>
<thead>
<tr>
<th>Waterbody</th>
<th>Location</th>
<th>Sample Station Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>VI-STC-59</td>
<td>Canegarden Bay</td>
<td>STC-15</td>
</tr>
</tbody>
</table>

In VI DPNR’s 2018 Integrated Report (IR), which entails CWA Section 305(b) water status report and the CWA 303(d) list, the subject waterbody has been indicated as being impaired for dissolved oxygen and turbidity. Additionally, Total Maximum Daily Load (TMDL) has not been established for this waterbody.
Impact of the Proposed Project

The applicant has carefully considered operations onsite and how it could affect water quality. Existing operations has been setup carefully to control storm water runoff from the site, and direct all of it to regulated and controlled discharge points.

6.06 MARINE RESOURCES AND HABITAT ASSESSMENT

The existing shoreline in closest proximity to the site is composed of vegetation leading to sandy shores in some areas while others consist of small rocky beaches. The project site is located in southcentral St. Croix, which is highly industrialized and consists of mostly commercial properties in the area.

NOAA and DPNR have established the area in and around the project site as an Area of Particular Concern (APC). Figure 6.06.1 below depicts APCs of St. Croix, including the Southshore Industrial APC (#3).

![Figure 6.06.1 – Prioritized Sites for Intervention and Protection, United States Virgin Islands’ Coral Reef Management Priorities 2020-2025](image-url)
There are several marine species that inhabit the area near Canegarden Bay. These species are illustrated in the Environmental Sensitivity Index Map below (Figure 6.06.2). A portion of this map has been enlarged below the original to easily identify the project site and the potentially affected species within that area.

Figure 6.06.2 – Environmental Sensitivity Index Map, VI-2, with enlarged area of interest (Canegarden Bay) beneath, St. Croix, USVI.
Bird species identified around Canegarden Bay include the blue-winged teal, brown pelican, common moorhen, gulls, least tern, neotropical migrants, shorebirds, terns, wading birds, and white-cheeked pintail. Of these, the brown pelican, least tern, and the white-cheeked pintail are listed as endangered on the state (USVI) list and the brown pelican is listed on both the state and federal (U.S.) list. Concentration estimates which would indicate the abundance of the referenced species is not available.

Although not identified on the ESI Map above, a review of endangered species in the area through the IPaC Tool indicate two federally endangered reptile species that are known to swim in the waters of Canegarden Bay, a little over one mile south of the project area. They are the hawksbill sea turtle (*Eretmochelys imbricata*) and the leatherback sea turtle (*Dermochelys coriacea*). In addition, the West Indian manatee (*Trichechus manatus*) is a threatened species and has been found in these offshore waters as well.

![Figure 6.06.3 – 2002 NOAA Benthic Habitat Maps, Tile #22, St. Croix, USVI.](image)

A review of the 2002 NOAA Benthic Habitat Map above (Figure 6.06.3) shows the majority of shoreline at Canegarden Bay consists of varying coverage of Seagrass with limited areas of Reef/Colonized Pavement or Bedrock. The entire bay is considered Bank/shelf zone. No negative impact to these types of marine habitat is anticipated as part of this project.
6.07 TERRESTRIAL RESOURCES

As seen in Figure 6.06.2, the only terrestrial animal of particular sensitivity noted in the project vicinity is the fishman bat. This species is indicated as endangered on the state list and concentration estimates are not available.

A site assessment through the IPaC Tool provided by USFWS showed no terrestrial species or habitat of particular concern, though any issues concerning presence of species that arise during work will be brought to the attention of VIDPNR Fish & Wildlife Division as well as USFWS.

Impact of the Proposed Project

The applicant will minimize the footprint of work to the greatest extent possible and will ensure protection of downstream plants and animals through control of stormwater and sediment loss.

There are no anticipated negative impacts to these species or their habitat, neither in the nearshore waters nor on land.

6.08 WETLANDS

The U.S. Army Corps of Engineers (ACOE) defines wetlands as "those areas that are periodically inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, bogs, marshes and similar areas." (U.S. Army Corps of Engineers, 1986).

While there are no terrestrial wetlands directly within the project area, inland sections of Canegarden Bay do exhibit wetland features as defined by ACOE and is indicated by the U.S. Geological Survey in Figure 6.08.1 below as being predominantly wetland.

![Figure 6.08.1 – Wetlands and Deepwater Habitats, U.S. Geological Survey Water Supply paper 2425.](image-url)
These areas are not anticipated to be affected by the project as all sedimentation and erosion protective measures will be implemented throughout the life of the project as detailed in Section 5.01.

6.09 RARE AND ENDANGERED SPECIES

Marine and terrestrial endangered species are outlined in Sections 6.06 and 6.07. They include the brown pelican (state and federal), least tern (state), the white-cheeked pintail (state), fisherman bat (state), hawksbill sea turtle (state and federal), and the leatherback sea turtle (state and federal). In addition, the West Indian Manatee is a threatened species which inhabits the downstream waterbody.

6.10 AIR QUALITY

No air quality issues are anticipated for this project. Dust control measures to prevent fugitive dust emissions will include having a water truck on-site.
7.00 IMPACT OF THE PROPOSED PROJECT ON THE HUMAN ENVIRONMENT

7.01 LAND AND WATER USE PLANS

The project area is currently a commercial building on a property zoned I-1. Plans for future use of the site include industrial and commercial business related to heavy machinery storage, maintenance and deployment for use in construction, repair and industrial operations.

The adjacent properties to the east and west are also zoned I-1. The parcels to the north of Hope Road are zoned I-2. The proposed construction is consistent and appropriate in this zoning category and will not entail any land use changes.

No effects on water use in the area are anticipated.

7.02 VISUAL IMPACTS

The proposed renovations, improvements and additions to the property will greatly improve the visual appeal and overall aesthetics of the property as well as the new and existing infrastructure. It will not only be a more functional use of the land, it will be visually pleasing to employees, visitors and passersby.

7.03 IMPACTS ON PUBLIC SERVICES AND UTILITIES

Water

The project will not affect water demand for the area in the long-term. During project execution, a water truck will be used on-site as needed for dust control. Potable water during construction as well as operation will be provided by purchasing through a commercial source.

A cistern onsite will provide potable water for daily use during long-term use of the developed site.

Sewage Treatment and Disposal

Currently, there is a non-functioning septic system on-site. For this reason, portable restrooms are being utilized and will continue to be during project construction. As part of the proposed project, a new septic system will be installed. The new system will be located west of the garage, just south of the old system.
Design of the new septic system will include a 1,500 gallon dual-chamber concrete septic tank, with three drain field branches. Each branch will be 75 feet long and be comprised of linked sections of Infiltrator Quick4 Chambers. A distribution box will link all three branches and provide even distribution of treated sewage.

**Solid Waste Disposal**

Construction waste will be collected and trucked out as necessary and disposed of in accordance with solid waste requirements. Any regulated waste, including e-waste, used oil or other typical residential waste generated, will be managed by a qualified and licensed handler.

Business and commercial activity at the site will produce additional solid waste which will be managed through on-site bins, set in designated storage areas. Scheduling for garbage pickup will be setup through a local waste management business, for disposal at the VI WMA Anguilla landfill.

**Roads, Traffic and Parking**

The project site currently has a gated driveway leading off of Highway 68. This driveway will be maintained and connected to a new parking area, as depicted in the attached figures. The new parking area will provide 56 individual parking spots. The project will not greatly affect traffic in the area as the entry/exit provides ample space to exit the main road and not cause any backups.

**Electricity**

The property is set up with infrastructure to be connected to the local power grid (WAPA). The service is not currently active but will be initiated once Phase 1 of the project is complete. Any electricity needs to complete the project will be met with portable generators.

**Schools**

There are no anticipated adverse effects on the local educational system during project implementation. Ultimately, there will be no effect to the schools in the long term.

**Fire and Police Protection**

The buildings will be equipped with smoke detectors and extinguishers.

In the case of an emergency, Fire Chief Herbet L. Canegata Fire Station and the Virgin Islands Police Department are both located approximately three miles (driving distance) from the project site. Surrounding roads, access areas and the site itself all have ample space to allow fire truck access during emergencies.

**Health**

The property will not have any adverse effects on the public health, nor increase the use of public health facilities.
7.04 SOCIAL IMPACTS

There are no anticipated negative social impacts to the area. The immediate area is solely industrial or commercial activities and operations, and no effect on social activities or areas is anticipated.

7.05 ECONOMIC IMPACTS

There are several economic benefits to completing the project. The proposed additions and upgrades would ultimately raise the property value of the parcel, which would produce higher appraisal for property taxes, which would benefit the local government. The construction itself would produce labor jobs in the short term but more permanent positions would also be created. The new guard house would allow for a guard to be hired on the property. Upgraded landscaping would require upkeep as well as the building would require cleaning personnel. These positions are in addition to the employees that will be occupying the main building.

7.06 IMPACTS ON HISTORICAL AND ARCHEOLOGICAL RESOURCES

This project site shows no indication of historical resources or any historical structures.

7.07 RECREATIONAL USE

As this area of St. Croix is solely industrial and commercial, the project will have no adverse impact on recreational activities.

7.08 WASTE DISPOSAL

Construction waste will be collected and trucked out as necessary and disposed of in accordance with solid waste requirements. Any regulated waste, including e-waste, used oil or other typical residential waste generated, will be managed by a qualified and licensed handler.

Business and commercial activity at the site will produce additional solid waste which will be managed through on-site bins, set in designated storage areas. Scheduling for garbage pickup will be setup through a local waste management business, for disposal at the VIWMA Anguilla landfill.
The current method of sewage disposal is on-site portable restrooms with proper disposal pickup. During project duration, the portable restrooms will continue to be utilized until the new septic system is completely installed and functioning properly. At that time, the portable restrooms will be removed.

### 7.09 ACCIDENTAL SPILLS

Spills are not anticipated during construction, however, any spills that may occur will be cleaned up immediately. Any contaminated soil will be cleaned up and put into approved containers for disposal by a licensed waste handler.

A spill kit will be kept on-site in accessible locations for daily construction staff, and training will be provided to ensure timely response to unexpected spills.

### 7.10 POTENTIAL ADVERSE EFFECTS WHICH CANNOT BE AVOIDED

The project has been designed to avoid sensitive areas to the greatest extent possible and impacts minimized through use of adequate BMPs during construction.

As discussed above, a potential adverse effect may be a slight increase in traffic along Highway 68 and within the property. This will be minimized by providing an appropriate entrance and two-way traffic upon entrance and exit of the property.

### 8.00 MITIGATION PLANS

No mitigation plans are needed for this project and operation.

### 9.00 ALTERNATIVES TO PROPOSED ACTION

Alternatives to the project include not developing the existing industrial site. The site as is can be used for industrial operations, but without a parking lot properly constructed, parking on grassy or earthen areas will eventually cause erosion to those heavily trafficked areas. The existing building was damaged in the hurricanes and repairs are proposed to reinforce and protect the existing structures from future hurricanes.

Another alternative is to use an adjacent site. However, the site is currently developed to function well with the business plan for the development and using an adjacent property or industrial area would not change long-term use or activities.
10.00 RELATIONSHIP BETWEEN SHORT & LONG TERM USES OF MAN’S ENVIRONMENT

The project is not large in scale and does not commit a great number of resources which would require future generations to maintain current land use indefinitely. The short- and long-term benefits outweigh the potential changes caused by the development as discussed above.

Long term effects from increased burden, such as from solid waste production, increased traffic and governmental services such as fire and police will be minimal, and significantly offset by the increase in property value and taxes paid by the business owners, as well as the improved industrial services this development can support.
11.00 REFERENCES


Nealon & Dillon, 2001 Earthquakes and Tsunamis in Puerto Rico and the U.S. Virgin Islands USGS Fact Sheet FS–141–00, April 2001


NOAA Historical Hurricane Tracks https://coast.noaa.gov/hurricanes

FEMA Flood Map Service Center: https://msc.fema.gov/portal/home

NOAA Tides and Currents: https://tidesandcurrents.noaa.gov/map/index.shtml?id=9751364

U.S. Annual/Seasonal Climate Normals (1981-2010) NCEI Climate Data Online Data Search https://www.ncei.noaa.gov/metadata/geoportal

NOAA National Data Buoy Center https://www.ndbc.noaa.gov/

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NOAA Center for Coastal Monitoring and Assessment, Biogeography Team. 2002. Benthic Habitat Atlas of Puerto Rico and the U.S. Virgin Islands

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