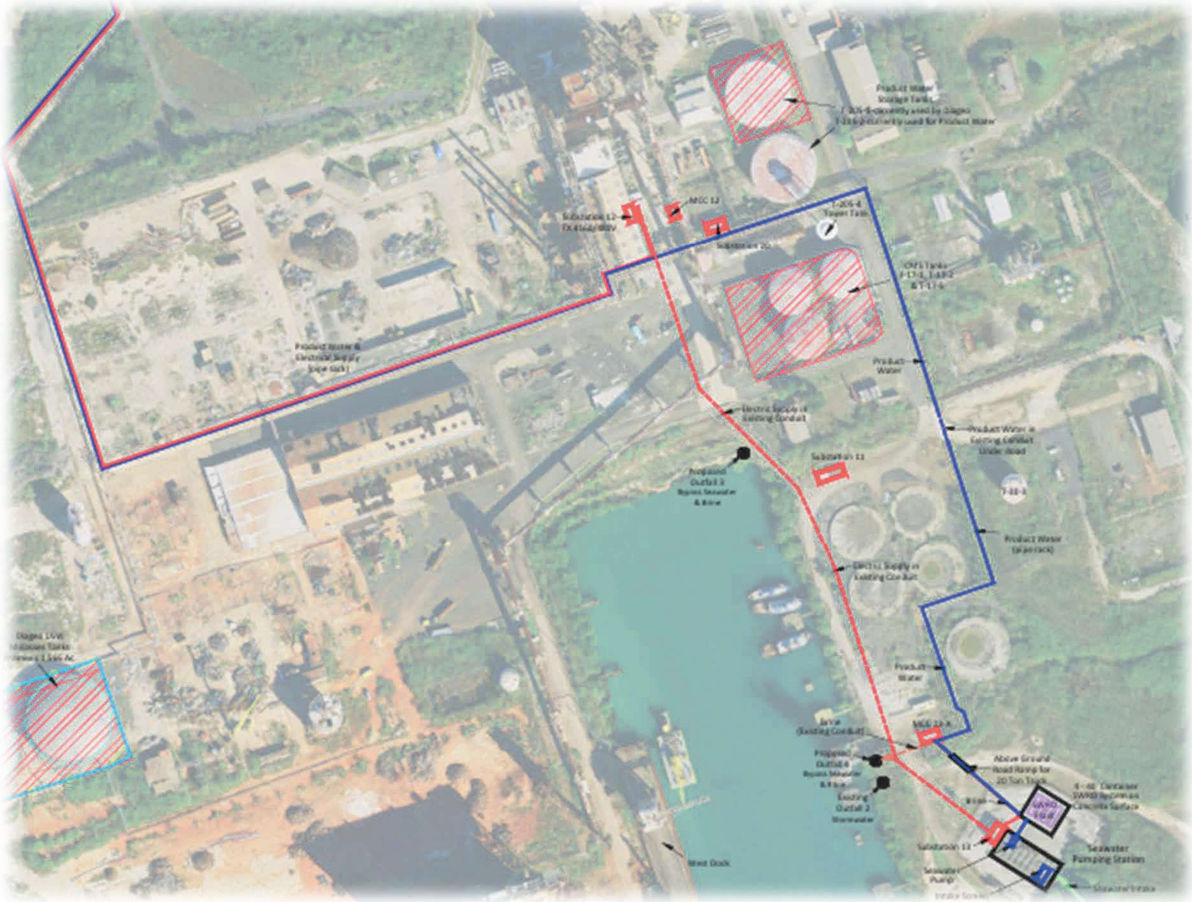

ENVIRONMENTAL ASSESSMENT REPORT

St. Croix Renaissance Group, LLLP

-

Sea Water Reverse Osmosis Installation Permit Application

Prepared by: Tysam Tech. LLC

Tysam Tech, LLC

Table of Contents

Table of Figures

1.00 Name and Address of Applicant

ST. CROIX RENAISSANCE GROUP, LLLP

Mailing Address:

PO Box 1525, Kingshill, VI 00851

Physical Address:

1 Estate Anguilla, St Croix, VI 00820

2.00 Location of Project

The project is located at the following physical address:

Plot #1 Estate Spanish Town Blessing Annaberg & Shannon Grove

St. Croix, USVI

Property ID: 208200030100

St. Croix Renaissance Group is located on the south coast of St. Croix, United States Virgin Islands (USVI) at Plot #1 Estate Spanish Town Blessing Annaberg & Shannon Grove. The property is located to the west of Limetree Bay Terminals and east of the Henry E. Rohlsen Airport at 17.709640 N, -64.770370 W, as illustrated in Figures 2.01.1 and 2.01.2.

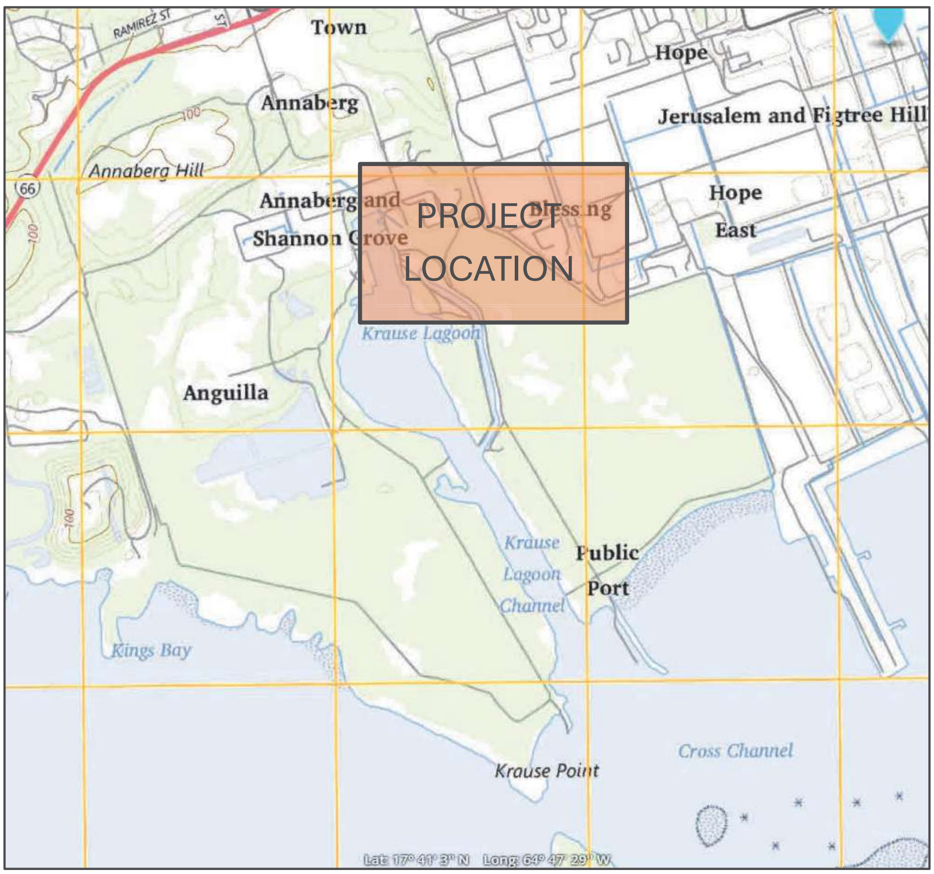

Figure 2.01.1 – Location and Agency Review Map (USGS Quadrangle Map, Christiansted St. Croix, VI, 1958, 1982 ed.)

Figure 2.01.2 – Illustration of the proposed SWRO location adjacent to Krause Lagoon, St. Croix (Earth, 2025).

3.00 Abstract

St. Croix Renaissance Group, LLLP (SCRG) is a limited liability limited partnership organized as a real estate and redevelopment vehicle operating from the former alumina/refinery complex on the south coast of St. Croix, USVI. SCRG is permitted as a Power & Water Supply facility under SIC Codes 4911 (Electric Services) & 4941 (Desalinized Water Supply) through its currently issued environmental and operational permits.

The facility is a large industrial/port complex and mixed industrial park (often referred to as St. Croix Renaissance Park). The site plan reflects the facility's resources, including hundreds of acres of industrial/commercial-zoned land, deep-water port access, dock space, and existing industrial infrastructure.

The scope of this proposed project is to reinstall and upgrade a seawater reverse osmosis (SWRO) system to supply potable and industrial-quality water for the SCRG facility and distribution to the Diageo USVI distillery and other potential customers. The project will utilize existing infrastructure at the seawater intake station on the east side of the Krause Lagoon Channel, with modular SWRO units installed within 40-foot shipping containers

and mounted on an existing concrete slab adjacent to electrical connections and the already installed and permitted seawater intake structure.

The replacement SWRO system will now operate as a double-pass configuration designed to produce ultra-pure water, with a maximum capacity of 350 gallons per minute (GPM) and an average of 180 GPM. Water drawn from the intake station under existing Territorial Pollutant Discharge Elimination System (TPDES) Permit No. VI0050024 will be treated and transferred to an existing 2.6-million-gallon potable water storage tank (T-205-2) before distribution. Brine will be discharged via Outfall 004 through existing pipe sleeves and mounted to a mooring dolphin structure in compliance with permit requirements.

Installation will involve slab-anchoring modular SWRO units, mounting new piping to existing racks and concrete sleeper supports, and completing three short below-ground piping segments. Where digging is not practicable, SCRG will substitute with a surface mounted segment with a steel road-crossing ramp. Electrical connections will be tied into the existing substation and motor control centers, but with updated wiring for SWRO needs. Only minor earth disturbance, expansion, or modification to the site footprint will be required, ensuring minimal environmental impact.

The project is anticipated to be completed within 60 days, providing a fast and efficient return to operation of a critical water treatment system for SCRG permitted use. The long-term operation of the SWRO plant will address rising demand for potable and industrial water, support regional commerce, and ensure reliable supply while reusing and modernizing existing infrastructure to maintain environmental compliance.

4.00 Statement of Objectives Sought by the Proposed Project

The overall project objective is to reinstall and upgrade the seawater reverse osmosis (SWRO) system at the St. Croix Renaissance Group (SCRG) facility, ensuring a reliable source of potable and industrial-quality water while utilizing existing infrastructure and maintaining environmental compliance. The following summarizes several primary objectives to be accomplished upon completion of the SWRO reinstallation project:

- Provide a consistent supply of ultra-pure water for both on-site facility operations and off-site distribution, including potable and industrial uses.
- Reuse and modernize existing infrastructure, including intake structures, pipe racks, and storage tanks, to minimize environmental disturbance and avoid expansion of the facility footprint.

- Ensure environmentally responsible operation through compliance with TPDES Permit No. VI0050024, including regulated seawater intake and controlled brine discharge via Outfall 004.
- Support regional commerce and industrial operations, including the Diageo USVI distillery, by delivering reliable water volumes up to 350 GPM peak production.
- Minimize construction impacts through modular installation methods, minimizing earth disturbance and ensuring a short installation timeframe of approximately 60 days.

5.00 Description of Project

5.01 Summary of Proposed Activity

Purpose of Project

The overall project objective is to reinstall and upgrade the seawater reverse osmosis (SWRO) system at the St. Croix Renaissance Group (SCRG) facility at Plot #1 Estate Spanish Town Blessing Annaberg & Shannon Grove, St. Croix. The project is intended to provide a reliable source of potable and industrial-quality water for on-site use and distribution to nearby commercial partners, including the Diageo USVI distillery. The replacement SWRO will operate as a double-pass modular system, capable of producing up to 350 gallons per minute (GPM), with an average production of 180 GPM, while minimizing environmental impact by using existing infrastructure and adhering to TPDES Permit No. VI0050024.

Presence and Location of any Critical Area(s) and Possible Trouble Spots

The project will be located entirely within the footprint of the existing St. Croix Renaissance Group (SCRG) industrial facility and will not involve vegetation removal, excavation in previously undisturbed areas, grading, or shoreline expansion, thereby mitigating any direct disturbance of terrestrial or aquatic habitats. The project is situated adjacent to the marine waters of the Krause Lagoon Channel, which falls under regulatory oversight for listed species and critical habitats.

Based on the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) tool, the following federally listed species are known to occur in or near this location and may potentially be affected by project activities:

- Mammals: West Indian Manatee (*Trichechus manatus*, Threatened)
- Birds: Roseate Tern (*Sterna dougallii dougallii*, Threatened)

- Reptiles: Green Sea Turtle (*Chelonia mydas*, Threatened); Hawksbill Sea Turtle (*Eretmochelys imbricata*, Endangered); Leatherback Sea Turtle (*Dermochelys coriacea*, Endangered); St. Croix Ground Lizard (*Ameiva polops*, Endangered)

While these species are documented in the region in previous environmental surveys, no designated critical habitats exist within the project area, and project activities will occur solely within previously disturbed areas and existing infrastructure, minimizing potential interaction with these species. Possible trouble spots include construction-related activity during installation of the discharge line at the mooring dolphin and temporary noise or turbidity that could affect sea turtle or manatee presence in nearshore waters. No in-water work is proposed, and all heavy machinery used for pipeline installation will be land-based with no need for in-water vessels or work.

The project area is within plots abutting the South shore of St. Croix and directly adjacent to the shoreline and Caribbean Sea. The closest receiving water body associated with this project is Assessment Unit AU-STC-63, the Krause Lagoon Channel (formerly Martin-Marietta Alumina Harbor), a Class C water as defined by 12 V.I. Rules & Regs. §186. This waterbody has two ambient sampling locations sampled quarterly by VIDPNR, sample stations STC-19 and STC-20. The waterbody is currently considered impaired for Dissolved Oxygen.

SCRG does not anticipate causing any negative impact to this waterbody, as the proposed project will entail very little digging, vegetation removal or construction.

Protective measures, including short digging timelines, good housekeeping and a staged approach to installation will be implemented to minimize potential impacts on listed species.

Proposed Method of Construction

The SWRO system will be constructed in modular 40-foot containerized units, which will be delivered to the site and anchored to an existing concrete slab at the seawater intake station. Installation will involve the placement of containerized treatment modules and intake skids at the intake structure, as well as the mounting of intake, product, and brine piping to existing pipe racks, supports, and sleeper mounts. Three piping segments where they cross an existing road will be installed underground, encompassing the only earth moving activity planned for the project. Where digging may not be feasible or more difficult, surface-mounted segments will instead be installed across the road surface and secured with ground anchors to include a steel road-crossing ramp to protect the line from vehicle traffic. Electrical tie-ins will connect to the existing substation and MCC units, and the system will be finalized with connections to the potable water storage tank (T-205-2) and the Diageo USVI distribution network. All construction activities will remain within the footprint of existing facilities, eliminating the need for excavation or site expansion.

Provisions to Limit Site Disturbance

Given that the project involves work both in and adjacent to the waterline, site disturbance from construction will be carefully minimized to reduce the potential for runoff. To achieve this, the proposed work timeline will be structured to allocate the minimum time required for each step. To further reduce building footprint, presence and time of construction, the project has been designed to limit disturbance by reusing existing slabs, pipe racks, and intake/discharge structures while avoiding any excavation or alteration of undeveloped land. The only excavation done will be on previously developed land at three specific road crossing sections, and the trench will be no wider than 2 feet to accommodate the new piping and electrical conduit. Construction activities will be limited to modular installation and pipe and supporting equipment anchoring or installation only, with all traffic restricted to existing access roads and designated laydown areas.

Water activities such as installing brine discharge piping mounts and restoring the sea water intake station and piping will be executed on ground and above water in a manner that minimizes the potential for sediment or sand plumes in the water. No in-water work is proposed for this project.

Erosion and Sedimentation Control Methods to be Implemented

Sediment and erosion control measures will be installed, as appropriate, adjacent to all areas where site disturbance will occur. Standards and best management practices will be employed in accordance with the US Virgin Islands Environmental Protection Handbook (USVI EPH 2022 Update).

As the only earth disturbance planned is for 3 short road crossings (trench excavations of 2x20 foot areas each), the risk of erosion or sedimentation is considered low, precautionary measures will still be implemented. Silt fencing installed by hand and in accordance with the USVI EPH 2022 will be installed along downstream sections of the road crossings where the trenching is done, and temporary ground stabilization and anchoring will be used to prevent soil displacement.

The site will focus on non-structural Best Management Practices (BMPs) to manage runoff and safeguard natural resources, including minimizing stockpiling at the site.

Upon final completion of installation of any part of the project that is on land, stabilization techniques may be employed to cover exposed soils with either vegetation, gravel, mulch or other materials used to combat erosion and sediment loss.

Schedule for Construction Activities and Implementation of Sediment Control Measures

The construction period is anticipated to last approximately 60 days from mobilization to commissioning. The schedule will begin with installation of structural BMPs and the delivery and placement of modular SWRO units during Weeks 1–2, followed by the mounting of intake, product, and brine piping in Weeks 2–4. Electrical and substation connections will occur during Weeks 3–5, and testing, commissioning, and final tie-in to the existing storage and distribution system will take place during Weeks 6–8. All sediment and erosion control measures, including silt fencing and turbidity curtains, will be installed prior to construction and will remain in place until the project is complete.

If final stabilization is necessary, it will be implemented concurrently with completion in Weeks 6-8 during commissioning of the SWRO unit.

Maintenance of Sediment and Siltation Control Measures

Erosion and sediment control measures will be inspected regularly and maintained throughout construction. Silt fencing will be checked weekly and after rain events, repaired as necessary, and removed only after stabilization is achieved. Furthermore, the site will be maintained free of litter, debris, and materials such as paper, wood, and concrete to prevent trash or construction materials from entering the water.

Method of Stormwater Management

The proposed project will not introduce new impervious surfaces or expand the existing site footprint, as all construction will be confined to previously developed industrial infrastructure, including existing slabs, pipe racks, and access roads. Consequently, stormwater impacts are expected to be minimal. During construction, best management practices will be employed to control stormwater runoff, including the use of silt fencing along the three road crossing trenches to minimize erosion.

In post-construction conditions, stormwater management will rely on the existing topography and infrastructure, which are already designed to handle runoff from industrial operations. Overall, stormwater will continue to flow in accordance with existing drainage patterns without creating additional impacts to the site or adjacent shoreline.

Maintenance Schedule for Stormwater Facilities

No new stormwater facilities will be constructed or modified as part of this project. Stormwater controls will be limited to temporary measures implemented during construction, such as silt fencing and ground stabilization. These measures will be inspected on a weekly basis and following significant rainfall events to ensure effectiveness. Any damaged or ineffective controls will be repaired or replaced immediately. Once construction is complete and the site is stabilized, temporary measures will be removed. Long-term stormwater management will rely on existing drainage systems and natural sheet flow around the facility, requiring no additional maintenance beyond routine inspection of stabilized areas to ensure that erosion or sedimentation does not occur.

5.02 Site Plans (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 Stormwater Drainage (See Attached: Engineer/Surveyor drawings)

5.02.07 Erosion and Sediment Control Plan (See Attached: Detail Sheets)

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

Proposed construction activities will be conducted upon receipt of all required permits and are anticipated to take approximately 60 days for installation and commissioning of the seawater reverse osmosis (SWRO) system. Because the project reuses existing slabs, pipe racks, and infrastructure and no clearing, grubbing, or excavation is required except for three road crossings, site disturbance will be minimal.

The installation of structural best management practices (BMPs), such as silt fencing along road shoulders will occur during the first 0–5 days prior to mobilization of equipment. The placement of containerized SWRO units, intake skids, and anchoring to the existing concrete slab at the seawater intake structure will follow. Mounting of intake, product, and brine piping to existing pipe racks and sleeper mounts will be completed concurrently, along with trenching for three road crossings. Electrical connections to the existing substation and MCC units will occur simultaneously with piping activities.

Final phases of construction will include connection of the SWRO plant to the existing potable water storage tank (T-205-2) and the Diageo USVI distribution system, followed by testing, commissioning, and water quality verification. All disturbed areas will be stabilized immediately upon completion of installation, and temporary BMPs will be removed after site stabilization has been confirmed.

The overall schedule of activities is anticipated to begin in January 2026 and be completed by April 2026, with the following phases:

Pre-Construction

January 2026 (0–5 days): Scheduling of material delivery, contractor coordination, and mobilization. Installation of BMPs including silt fencing and turbidity controls at work areas.

Construction

January 2026 – February 2026 (Days 5–30): Delivery and placement of modular SWRO units and intake skids. Mounting of intake, product, and brine piping to pipe racks, sleeper supports, and surface-mounted segments. Installation of road trenches and initiation of electrical tie-ins.

March 2026 (Days 30–45): Completion of electrical connections, continuation of piping tie-ins, and stabilization of ground-disturbed areas with gravel or compacted fill.

Post-Construction

Late March 2026 – April 2026 (Days 45–60): Final tie-in to potable water storage tank and Diageo USVI distribution line. Testing, commissioning, and performance verification of the SWRO system. Removal of temporary BMPs and final inspection of stabilized areas.

The phased approach ensures that stormwater, erosion, and sedimentation control measures remain active throughout construction, with stabilization and protection measures implemented immediately following each stage of disturbance.

6.00 Ecological Setting & Probable Impact on the Natural Environment

6.01 Climate & Weather

Climate

The climate of St. Croix, and the broader Virgin Islands territory, is typified by generally fair, tropical weather. This tropical climate is characterized by two key features – Consistent wind speed and direction, and Narrow temperature swings. The USVI experiences usually consistent trade winds, primarily from the northeast and east, contributing to steady and predictable wind patterns throughout the year. Both seasonal and diurnal temperature variations are minimal resulting in a stable and warm climate with temperatures that do not fluctuate significantly, ensuring a relatively constant warm weather pattern year-round. These climatic conditions create an environment that is typically warm, with gentle breezes and a stable temperature, contributing to the appealing tropical climate of St. Croix and the Virgin Islands.

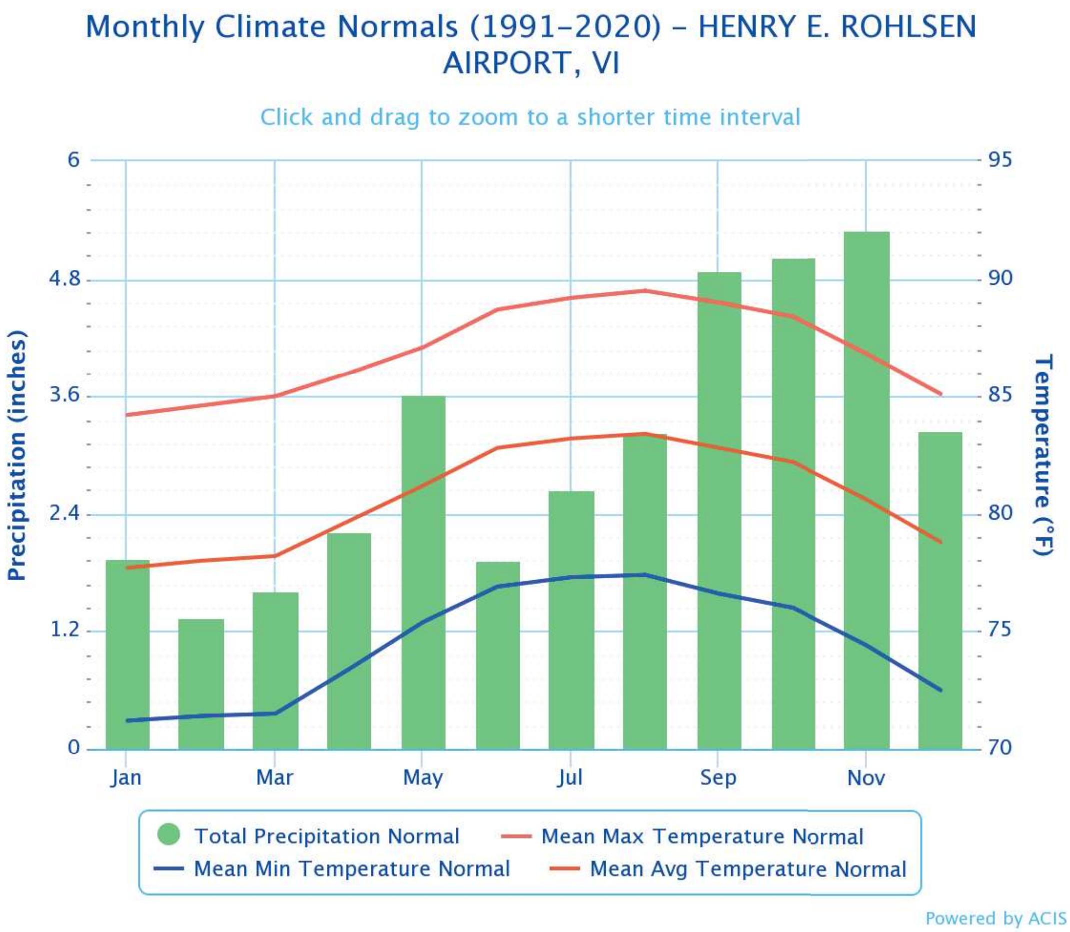

Figure 6.01.1 – Summary of Monthly Climate Normals from 1991-2020 at HER Airport, St. Croix, VI (https://www.weather.gov/sju/climo_pr_usvi_normals)

Rainfall in St. Croix, US Virgin Islands, varies throughout the year. According to NOAA, the rainy season from May to October sees an average of 3-4 inches of rain per month, while the drier season from November to April averages 2-3 inches per month. The island's average annual temperature is a moderate 80.7°F. During the warmest months (May to October), temperatures average around 81-84°F (27-29°C), and during the cooler months, they average around 71-81°F.

The closest NOAA National Ocean Service Weather Station is situated in Christiansted AP, St. Croix, with the Meteorological Station ID VQW00011624 and can be found below in Figures 6.01.2 and 6.01.3.

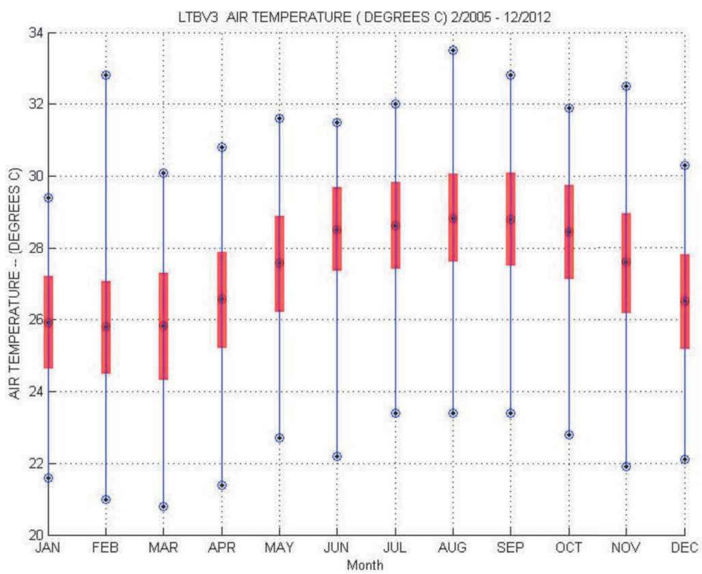

Figure 6.01.2 – Average Air Temperature – Limetree Bay, St. Croix, VI (NOAA)

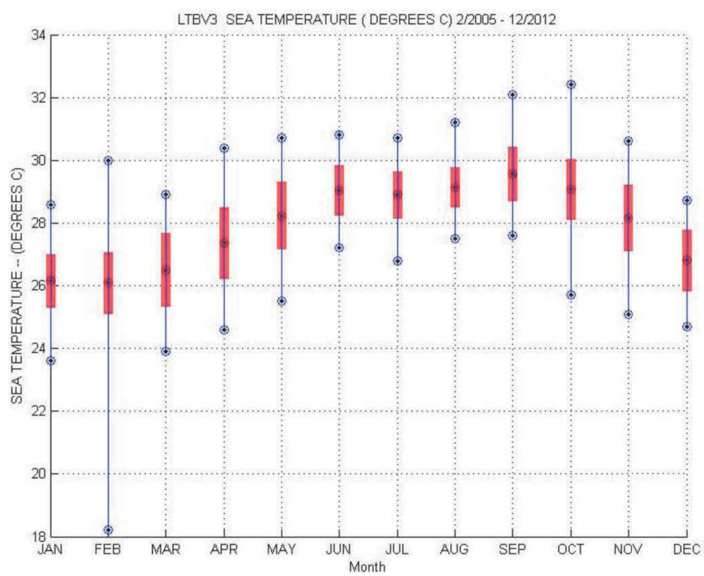

Figure 6.01.3 – Water Temperature –Limetree Bay, St. Croix, VI (NOAA)

Impact on the Proposed Project

The project and proposed SWRO will be minimally affected by the general climate, made of materials appropriate for the marine environment, temperature scales and rainfall typical of the area.

Storm and Hurricanes

Each year, the region experiences a variety of storm events, including squalls, thunderstorms, and hurricanes. Standard rain events are most frequent in the summer, usually lasting only a few hours and not significantly altering the trade winds. A tropical cyclone with winds over 74 miles per hour is called a hurricane in the northern hemisphere. Hurricanes can vary in severity, from causing minimal damage to being highly destructive. They are most common between August and mid-October, with peak activity in September.

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

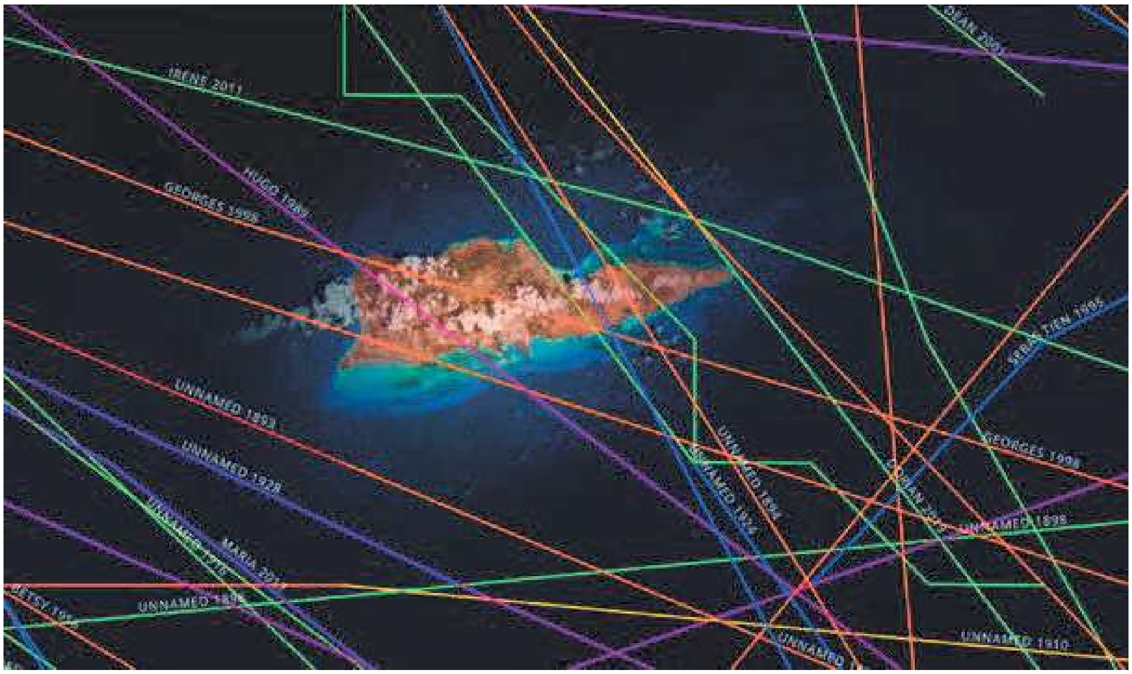

Figure 6.01.4 – Historic Tracks of Hurricanes and Tropical Storms for St. Croix (NOAA)

Impact on the Proposed Project

The proposed project will be minimally affected by severe weather due to its containerized construction. It can adjust in moderate to severe weather systems as removal is not required and the containers are rated for typical hurricane systems in the area.

6.02 Landform Geology, Soils and Historic Use

Landform 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.

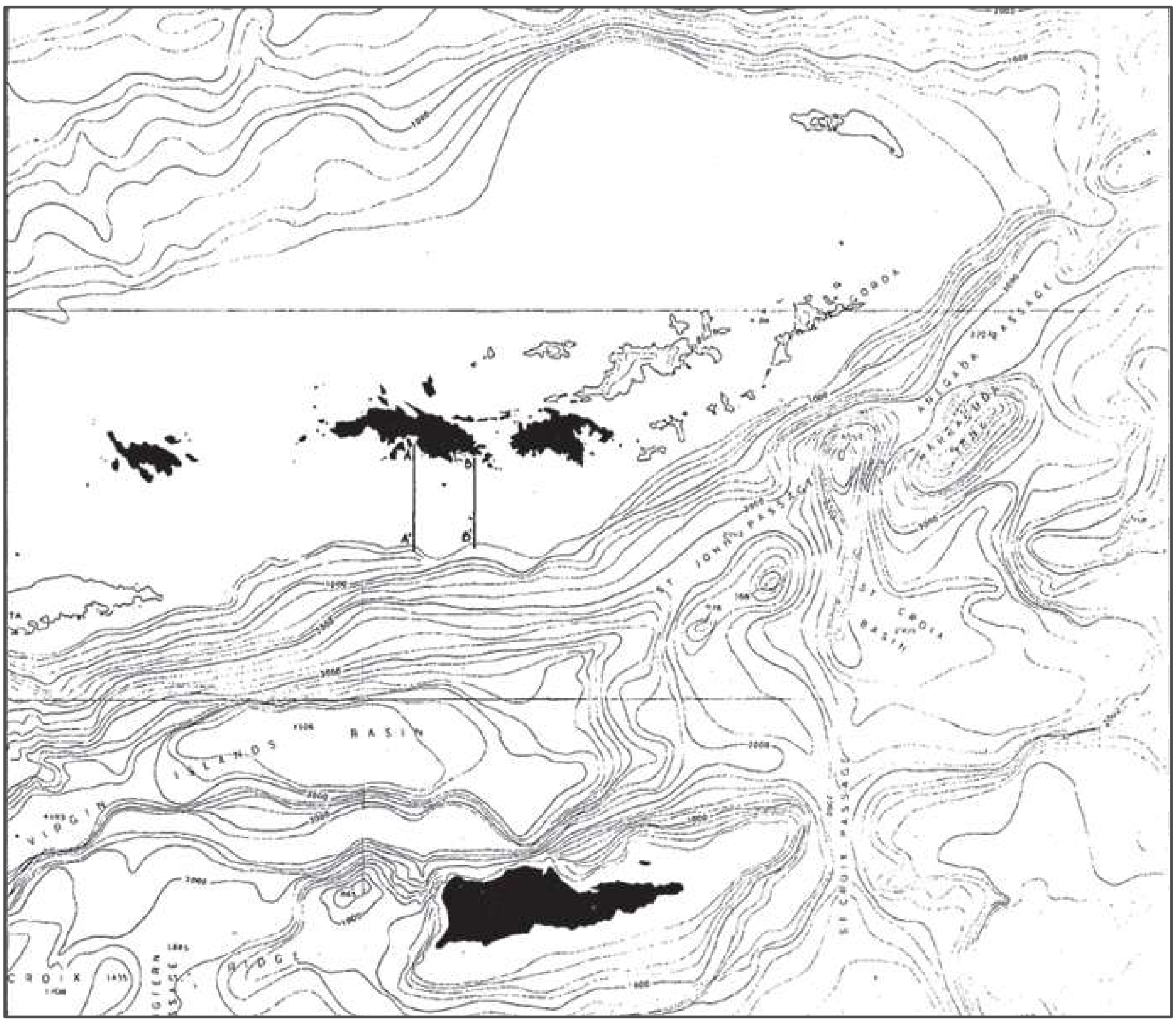

Figure 6.02.1 – Bathymetry of USVI basins and plateaus. From van Eepoel, et al, 1971

The Virgin Islands are located near the northeastern edge of the Caribbean Plate, a relatively small, trapezoidal-shaped plate that moves eastward in relation to the North and

South American continents, which are part of the American Plate. The Lesser Antilles arc is a volcanic arc formed above a subduction zone where the Atlantic oceanic crust of the American Plate is being pushed down beneath 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 features a subduction zone where the Cocos Plate is being pushed northeastward and underneath the Caribbean Plate, situated to the 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.

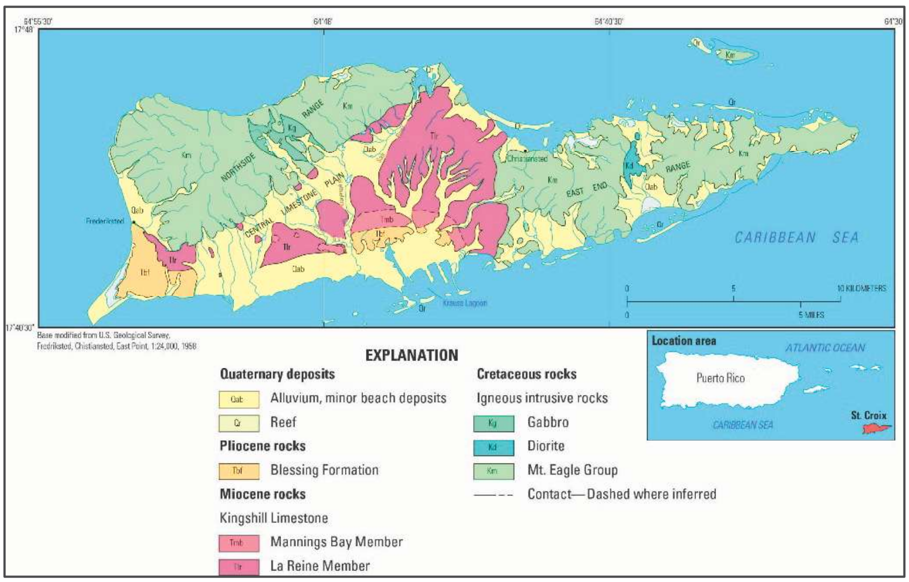

Figure 6.02.2 – Frederiksted, Christiansted, East Point 1:24,000, 1958 (U.S. Geological Survey)

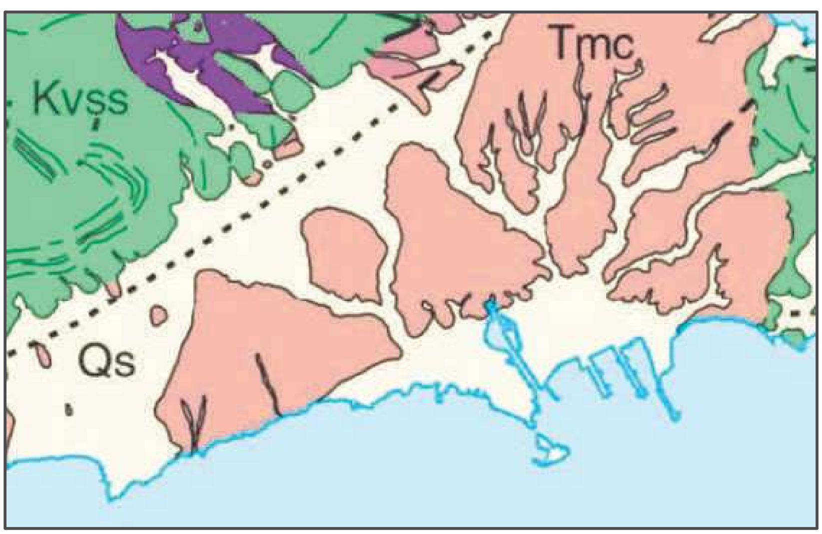

Figure 6.02.3 – Preliminary geologic map of the Greater Antilles and the Virgin Islands in vicinity of project site, St. Croix (Wilson, F.H., Orris, Gretta, and Gray, Floyd, 2020)

Geology of the Project Location

The proposed project lies at 17°44’41.76” N, 64°42’16.23” W along Melvin H Evans Highway West in Estate Anguilla, St Croix. The Custom Soil Survey by the National Resource Conservation Service (NRCS) identifies the main soil type for the project area as Aquents (AqA). However, the area to the southeast and northeast are classified as Urban land (UbD).

Aquents are widely distributed, poorly drained soils commonly found on tidal flats, or along Atlantic and gulf coasts. They have a variable soil profile from 0 to 60 inches, after which it turns to bedrock. AqA soils are often ponded, and slopes vary from 0 to 2 percent.

Urban land soils are found in developed areas, including residential, commercial, and industrial areas. They can have impervious or pervious surfaces, and do not have a classified hydrologic rating. UbD slopes vary from 20 to 40 percent.

Elevation at the project site varies from 0 to approximately 30 feet above sea level.

Impact on the Proposed Project

The proposed project will be minimally affected by the soil type as the majority of the project is above-ground. Only three trenches approximately 2 feet wide by 20-30 feet in length will be excavated for road crossings, with no other earth change proposed.

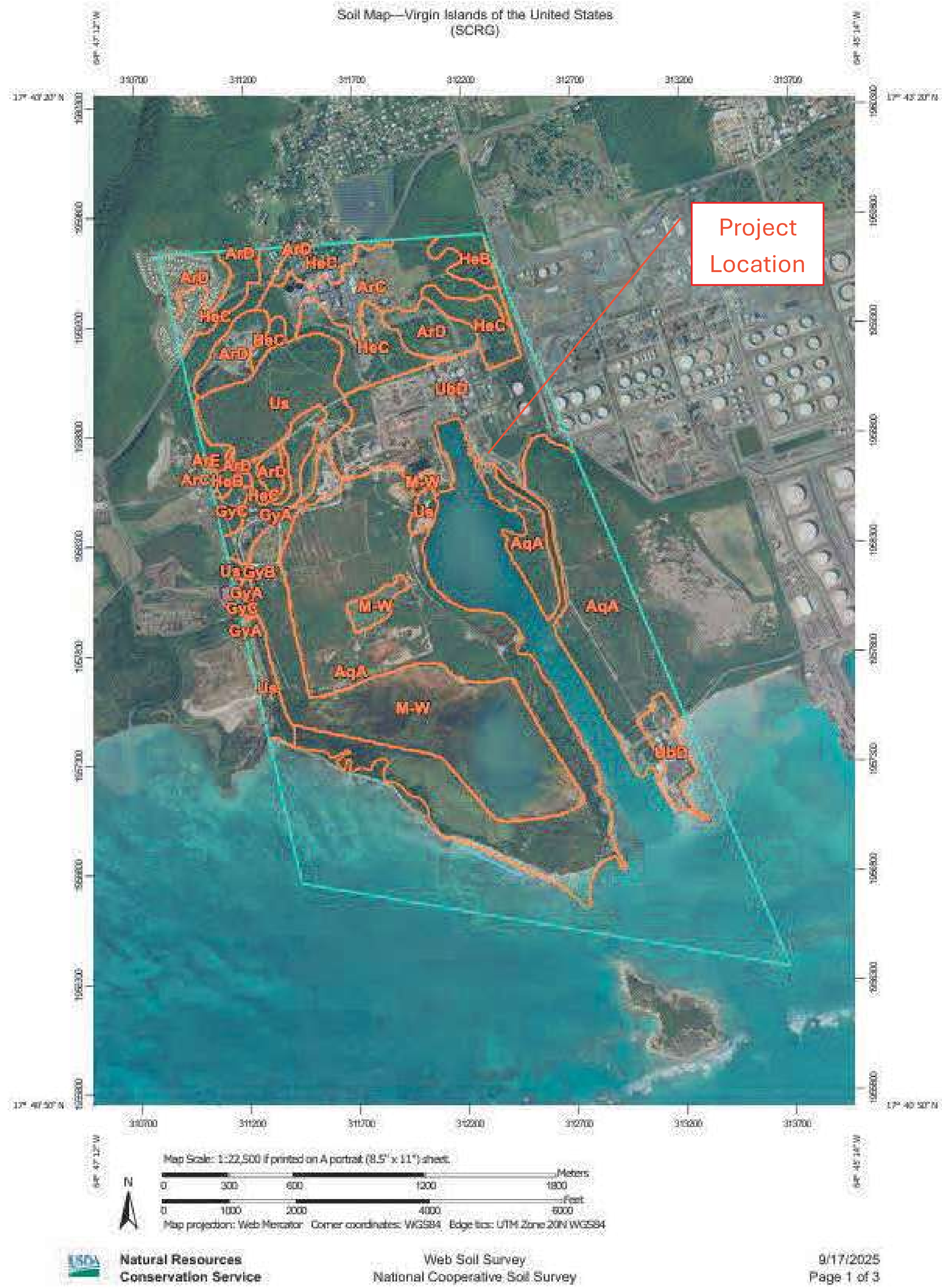

Figure 6.02.4 – Soil Map of Project Area (USDA/NRCS)

Historic Use

The St. Croix Renaissance Group property has a rich history of development. The property was originally developed in 1962 by Harvey Aluminum Corporation in collaboration with the Government of the U.S. Virgin Islands for alumina refining. This process involved extracting alumina from imported bauxite. Along with the industrial complex, Harvey constructed Port St. Croix by blasting a channel through the coastal caliche. Extending more than a mile offshore, the port became one of the most protected deep-water harbors in the Caribbean.

The land within the project footprint has been used as an alumina refinery, once capable of producing approximately 600,000 tons of aluminum product from bauxite annually at its peak. Harvey Aluminum, Inc. (HAI) purchased the property from the GVI in 1962 and constructed the refinery in the same year. The refinery was then sold to Martin Marietta Alumina (MMA) in 1968, and continued alumina production at the Site until 1985 (Weston, 2012).

Refining operations were discontinued from 1985 to 1989. Virgin Islands Aluminum Company (VIALCO) purchased the property from MMA in 1989 and resumed refining operations from 1989 until 1995. St. Croix Alumina, LLC (SCA), a subsidiary of Aluminum Company of America (ALCOA), purchased the property from VIALCO in 1995, though refining operations were suspended from 1995 to 1998. ALCOA resumed refining operations in 1998, which continued through December 2000. In June 2002, SCRG purchased the property from Alcoa with the goal of environmental remediation and repositioning the site for new commercial and industrial opportunities, both locally and regionally.

Pre-Industrial Uses

Prior to the development of the alumina refinery, this area was a natural lagoon, called the Krause Lagoon, home to a significant ecosystem comprised of a saltwater lagoon, mangrove network and shoreline tidal flats.

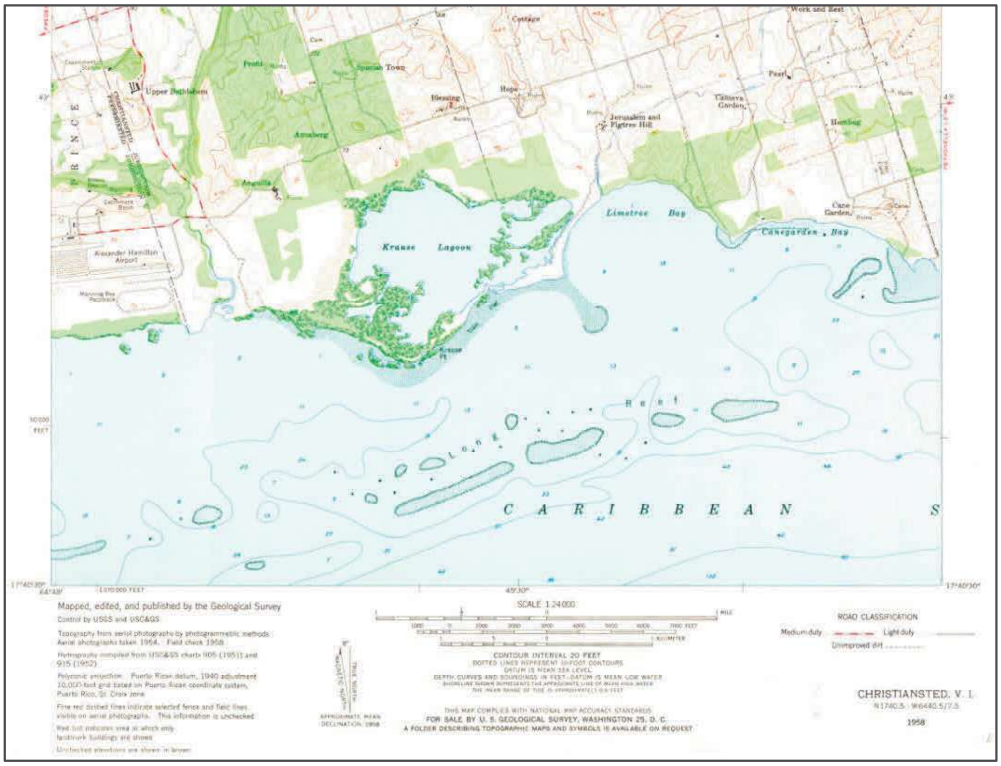

Figure 6.02.5 – 1958 Historical Map, South Shore, (USGS Quadrangle Map, Frederiksted, VI, 1958, 1966 ed.)

Figure 6.02.6 – 1954 Historical Photo, South Shore, (USGS 1954)

Colonial and Pre-Colonial Uses and Significance

Due to the presence of the Lagoon, and water resources in the area, this region was heavily colonized in pre-colonial and colonial periods.

Historically, portions of the Site were used for sugar cane production, as evidenced by pre-1900 ruins in the western and northeastern portions of the property, and the subject property had various owners prior to construction of the alumina refinery. In 1937, the property was transferred from West Indian Sugar Factory, Inc. to private ownership. The U.S government took over the property in 1942, and subsequently transferred it to the GVI in 1949 (Weston, 2012).

Documented historical resources on and near the property include the Fairplain Archaeological District and a Colonial Period site in the Borrow Area 1 location (West of Area A Red Mud Pile), the Annaberg Cemetery north of Area A adjacent to Borrow Area 2 which contained pre-colonial pottery shards and shells, and the Spanish Town Plantation Settlement site, which is in close proximity to Borrow Area 6 along the Eastern border of the SCRG property.

In addition to the four areas of concern identified in Borrow Areas 1, 2, and 6, ruins and a grave site between Area A and the Upper Cooling Pond were previously mapped and identified in past reports. Locations of the existing ruins and existing grave site will be avoided during the course of the project but will be fenced off with orange construction fence if activity gets within 50 feet of the ruins edge, to protect them from construction activity.

No historical resources or findings are recorded as being in the UCP area, or along the pathway for construction of the pipeline. Borrow Area 4 was surveyed as part of the remediation efforts by Alcoa in 2013, and SHPO found no objection to use of the site based on the Phase IA&B Archaeological Surveys.

6.03 Drainage, Flooding & Erosion Control

Drainage of the project area will not change as a result of the project. The existing Seawater Pumping Station with water intake structure has all existing infrastructure needed to retrofit a modular intake pumping skid or container and be able to draw seawater for use as feedstock for the SWRO plant. The intake piping will connect to the existing seawater station and modular pumping unit and run above ground to the SWRO Plant for a very short distance of approximately 100 feet. The first 220 feet of the product line route will be surface-mounted until it reaches an existing pipe rack except for a road crossing where it will be buried for approximately 30 feet. An additional 2 locations will need pipeline trenching for road crossings, but these are the only parts of the project with potential for changes to land cover for this project, but as the pipeline will be very narrow, the total acreage is extremely small compared to the project scale. Stormwater runoff can be controlled by Installation of BMPs including silt fencing at earthwork areas.

Stormwater flow runs to the west and southwest, with mostly sheet flow and shallow concentrated flow characteristics. As the stormwater flows downgradient of the site, it concentrates more and channels to the shoreline via manmade impervious swales.

b. Relationship of the Project to the Coastal Flood Plain

Review of Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) for U.S. Virgin Islands Index indicate that the project area is within flood Zone AE. See below in Figure 6.03.1 which is a portion of FIRM Panel 0080G, depicting site location relative to flood zones. Project location rated Zone AE is known as a high risk coastal flood zone with velocity hazard (wave action) and a base flood (100-year flood) elevation of 11 feet.

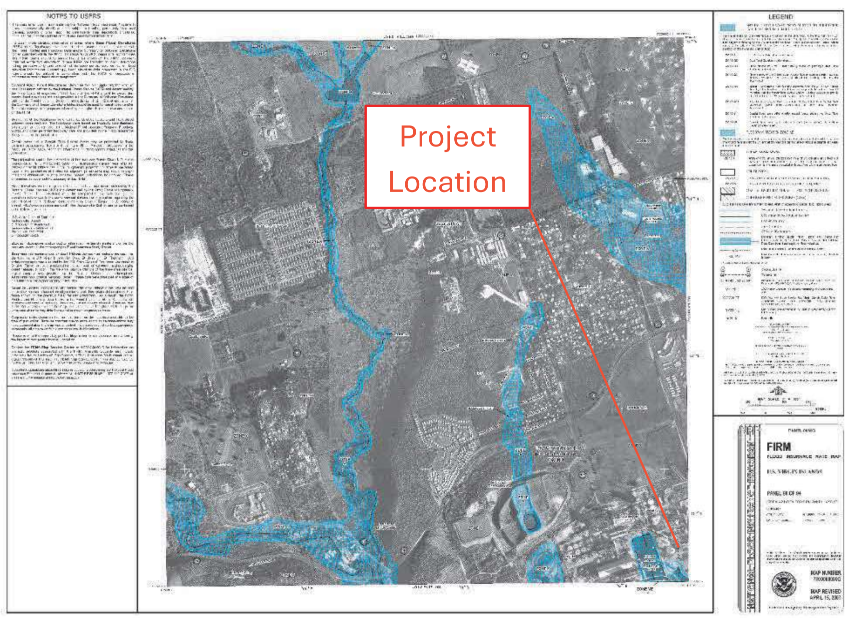

Figure 6.03.1 - Flood Insurance Rate Map (FIRM) Panel 0080G, 80 of 94. April 16, 2007.

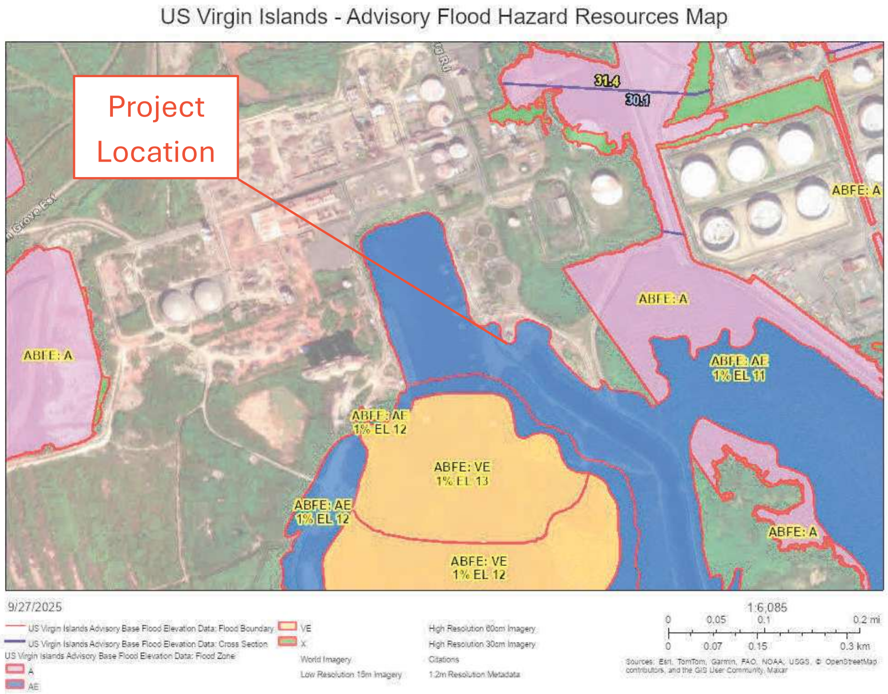

Figure 6.03.2 – Flood Zones at Project Area, 2018.

Impact on the Proposed Project

There are no anticipated changes to water runoff that would cause any noticeable change to flood conditions for the area, either upstream or downstream of the project site. The SWRO unit is containerized and will be bolted down and made storm surge ready for any storms or flooding.

6.04 Fresh Water Resources

The proposed location for the SWRO lacks water sources such as wells, freshwater basins, and underground springs. Some areas are marked as freshwater ponds based on the National Wetland Inventory database as can be seen in Figure 6.08.1 below, but these are either ephemeral or unusable as freshwater sources due to the industrial nature of their construction.

Freshwater is not anticipated to be used in any significant amount for the construction of the system, or the operation of the any units, and the project will not hinder access to any freshwater sources. The presence of the structures will not produce contaminants that could leach into the water table under normal conditions. There is no intended use of freshwater resources in the area for the construction or operation of this project.

6.05 Oceanography

Seabed Alteration

The construction of the SWRO will have no impact on the seabed and its contours. The brine discharge route will route due west through an existing pipe sleeve and mount to the existing mooring dolphin that is adjacent to the TPDES permit proposed Outfall 004. There will be no direct excavation or dredging of seafloor material.

Tides and Current

The Caribbean Current moves westward through the Caribbean Sea. This current is primarily driven by the North Equatorial Current. The warm Caribbean Current flows at an average speed of 38 to 43 centimeters (15 to 17 inches) per second and carries about 27.5 million cubic meters (approximately 1 billion cubic feet) of water per second (Britannica, 2007).

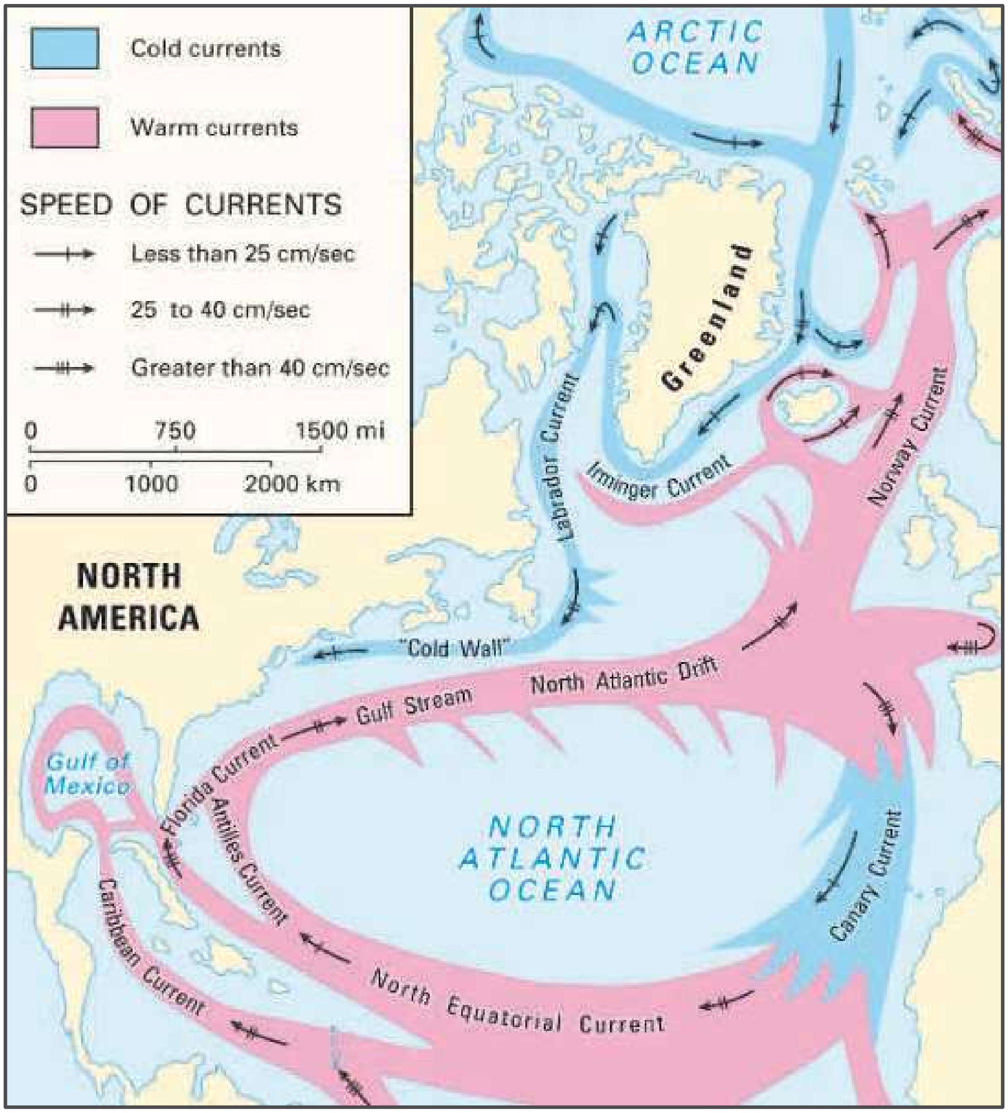

Figure 6.05.1 – Major currents, North Atlantic Ocean (LaMourie, 2021)

These currents change very little from season to season with the currents coming more from the south during the summer months (Figure 6.05.2). As the figure illustrates, there is usually a westerly current observed between St. Croix Island and St. Thomas Island (NOAA – BookletChart).

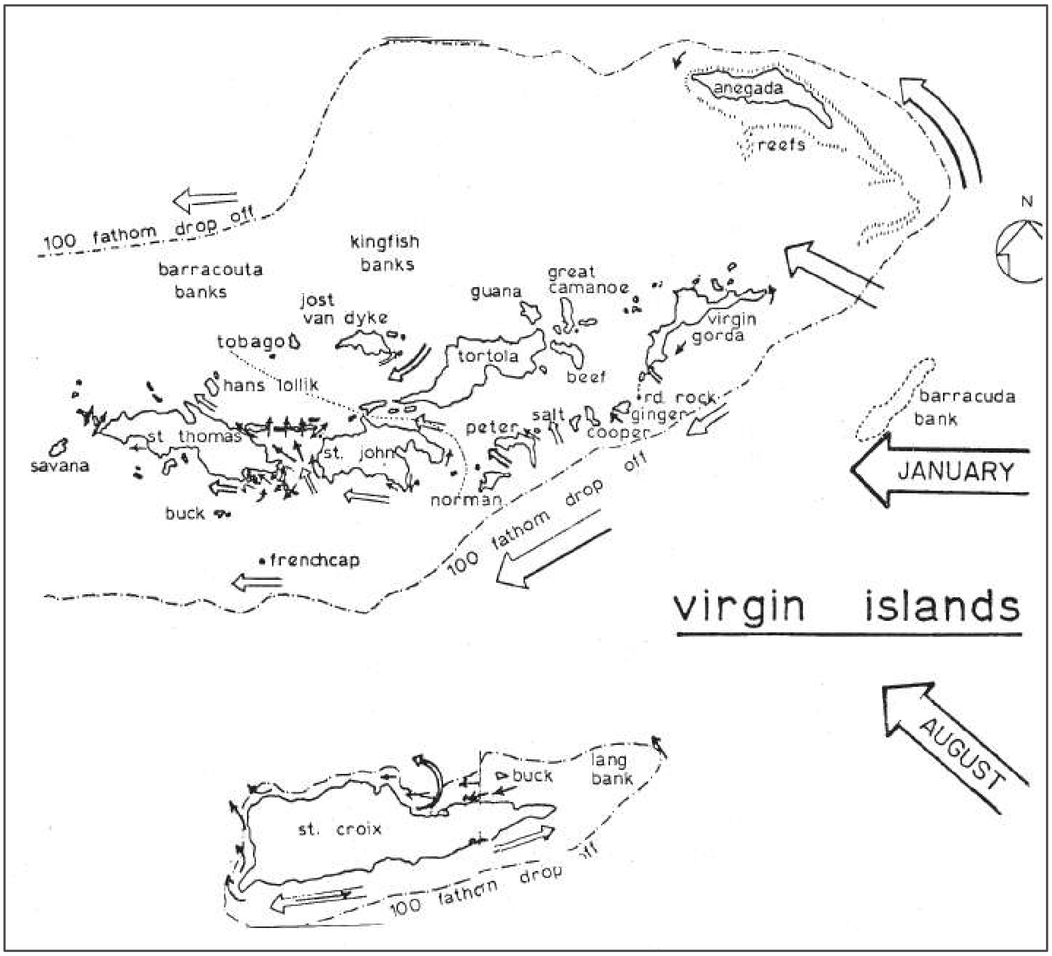

Figure 6.05.2 – General current patterns on the island platforms (Dammann, 1969)

Because of different exposures to open ocean water on one side and modified circulation of Caribbean water on the other, the north and south coasts of St. Thomas and St. John experience different tidal activities. On the north, tides are similar to the north coast of Puerto Rico, being semidiurnal (two cycles of high and low water per 24 hours). The time of tide stages in the Virgin Islands are earlier than in Puerto Rico, however. On the south coasts of St Thomas and St. John, tides typically exhibit two (bi-modal) 'peaks' during the diurnal period (24-hour day), with the second (lesser) 'peak' having 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).

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. Furthermore, 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. 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).

The closest NOAA tidal station is located in Limetree Bay, St. Croix, VI and is 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. A snapshot of tidal data from the station is shown below.

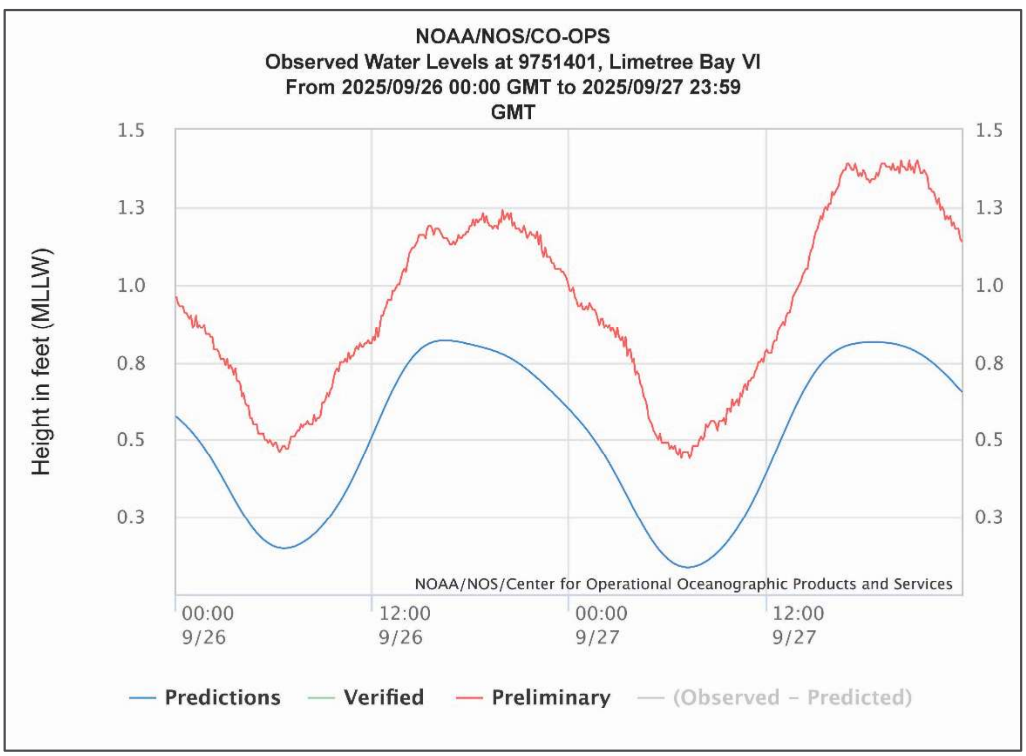

Figure 6.05.3 – Observed Water Levels in Limetree Bay, St. Croix (NOAA)

Waves and Wind Impacts

The Virgin Islands are situated within the "Easterlies" or "Trade Winds" that move across the southern section of the "Bermuda High" pressure area. As a result, the predominant winds in this region are typically from the east-northeast and east, as documented by the Island Resources Foundation in 1977.

These trade winds exhibit seasonal variations, which can be categorized into four distinct time periods:

December to February, has generally consistent and strong trade winds, influenced by the stronger pressure gradient associated with the Bermuda High.

March to May marks the transition phase where the winds weaken slightly as the pressure gradient starts to drop.

June to August, the summer months, where trade winds are increasingly weaker and less predictable due to the movement and strength of the Bermuda High, leading to varying wind patterns.

September to November completes the cycle where the trade winds strengthen as the Bermuda High re-establishes, allowing more consistent easterly winds like those of December to February. The location of the proposed dock relative to the wind patterns experienced in the USVI would be advantageous as the frequency of wind influence on both water surface and floating dock conditions would be minimal.

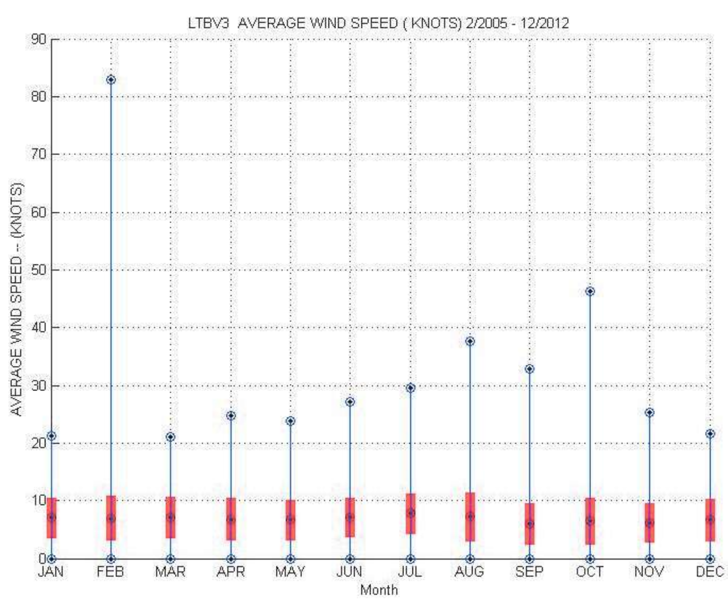

Figure 6.05.4 – Wind Speed, Limetree Bay, St. Croix, VI (NOAA)

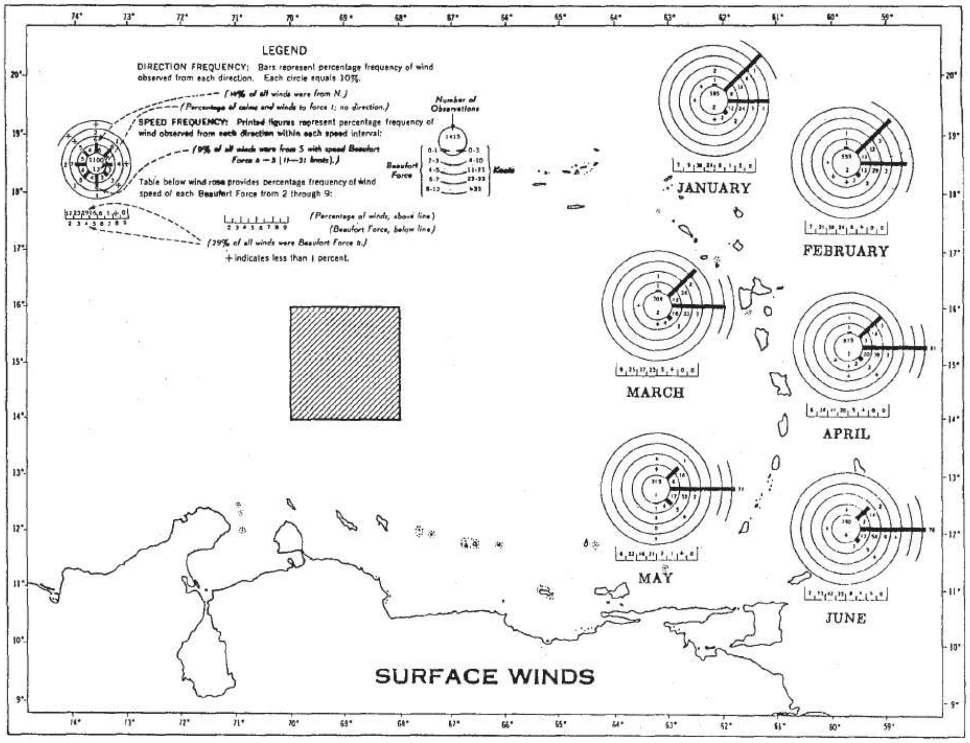

Figure 6.05.5 – Wind Direction and Speed Frequency, Central Caribbean, January - June. (IRF, 1977)

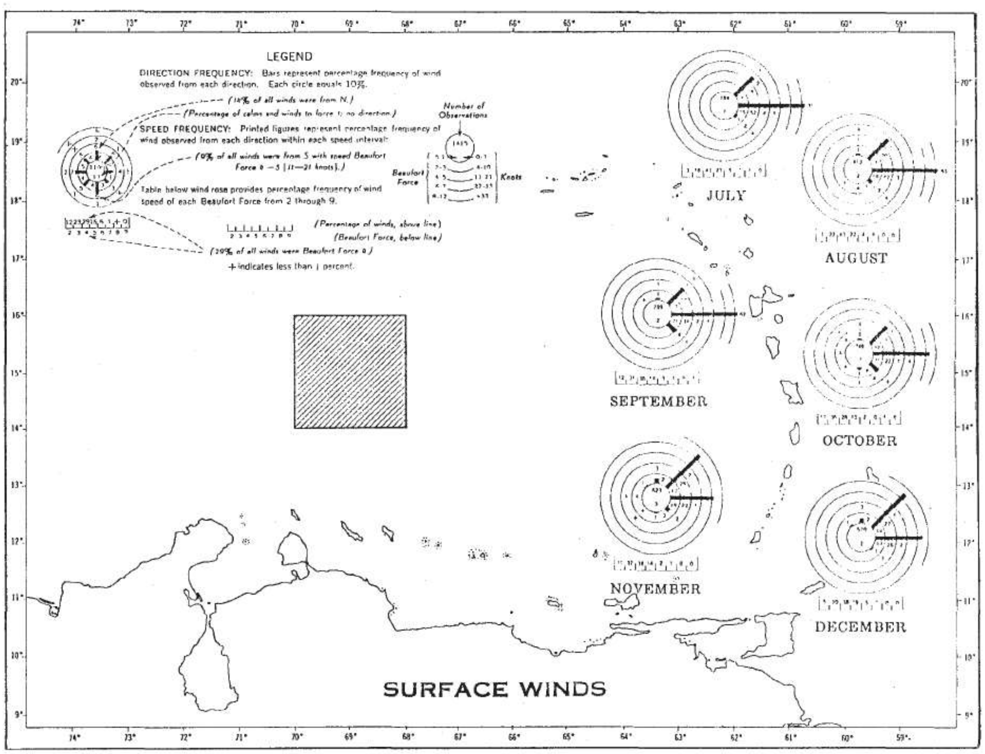

Figure 6.05.6 – Wind Direction and Speed Frequency, Central Caribbean, July - December. (IRF, 1977)

Marine Water Quality

The water surrounding the site is classified as Class C as specified in the Amended V.I. Water Quality Standards of 12VIRR186. Class C waters have a designated use of Maintenance and propagation of desirable species of wildlife and aquatic life (including any threatened or endangered species), primary contact recreation, industrial water supplies, shipping, navigation and for use as potable water sources for those waters being used currently or that could be used in the future as potable water sources.

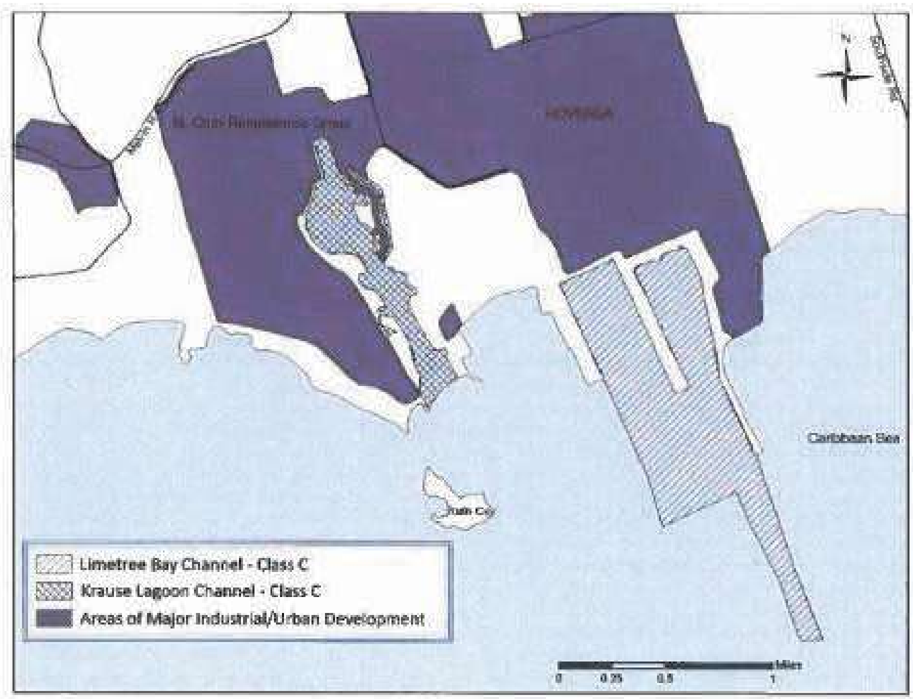

Figure 6.05.7 – Designated Class C waters around South Shore of St. Croix, USVI (12 V.I. Rules & Regs. §186)

Water quality criteria include dissolved oxygen not less than 5.0 mg/l, exception if cause is natural forces. The pH must not be extended at any location by more than plus or minus 0.1 pH unit, and at no time may the pH be less than 6.7 or greater than 8.5. Temperature not to exceed 32°C at any time, nor as a result of waste discharge to be greater than 1.0°C above natural conditions. Areas where coral reef ecosystems are located shall not exceed 25-29°C at any time, nor as a result of waste discharge to be greater than 1.0°C above natural conditions. Bacteria (enterococci) cannot exceed 30 CFU/100ml (30-day geometric mean), Phosphorus as total P shall not exceed 50 µg/L in marine and coastal waters, Nitrogen as total N shall not exceed 207 µg/L in more than 10 percent of samples over a three-year period in estuarine, marine and coastal waters. Radioactivity gross beta is limited to 1000 picocuries per liter, in the absence of Sr 90 and alpha emitters, Radium-226 is limited to 3 picocuries per liter, and Strontium-90 is limited to 10 picocuries per liter. Turbidity readings cannot exceed 3 NTUs, and in coral reef ecosystems areas, a maximum nephelometric turbidity unit reading of one (1) shall be permissible. Clarity may not exceed a level where a Secchi disc cannot be visible at a minimum depth of one meter, and in coral reef ecosystems areas, a secchi disc shall be visible at a minimum depth of fifteen (15) meters.

VI DPNR performs routine water quality measurements at select locations around the USVI as part of a comprehensive Ambient Water Quality Monitoring Program. The subject waterbody has five associated Water Quality Monitoring Stations as noted below:

Waterbody	Location	Sample Station Number
VI-STC-63	Krause Lagoon Channel	STC-19 Krause Lagoon Channel, STC-20 Alumina Plant Dock

According to VI DPNR's 2020 Integrated Report (IR), which entails CWA Section 305(b) water status report and the CWA 303(d) list, the VI-STC-63 waterbody, Krause Lagoon Channel, is established as being impaired for Dissolved Oxygen, pH and Turbidity since 2008, 2020, and 2020, respectively. In the most recent draft 2022 CWA 303(d) these impairments are still present.

As of 2022, Krause Lagoon Channel is a low priority target for addressing these pollutants, and EPA in conjunction with DPNR intends to establish a Total Maximum Daily Load (TMDL) for this waterbody, indicated to be completed by 2033.

6.06 Marine Resources and Habitat Assessment

Existing shoreline near the site is mostly composed of shipping and port facilities with large areas of impervious land cover. The project site is located on the south-southwest quadrant of the island of St. Croix. The area is primarily commercial, light and heavy industrial zoning and the majority of water quality is Class C waters.

The area was designated as the Southshore Area of Particular Concern (APC) and designated for management intervention in the 2014 United States Virgin Islands' Coral Reef Management Priorities document. The Southshore Industrial APC was established to reduce the negative impact that industrial pollution has on the marine environment. Figure 6.06.1 below indicates the locations of the APCs on St. Croix.

According to the most recent USVI Coral Reef Management Priorities document for 2020-2025, the Sourthshore Industrial APC has fallen to a lower ranking for management intervention needs, though does remain a part of the priority list. This project is anticipated to create no negative effects of soil erosion and sedimentation with the proposed improvements to the site, and the applicant anticipates no negative effect from the project activities or long-term design.

During construction, SCRG will mitigate the effects of soil erosion, sedimentation and trash by following an Erosion & Sediment Control Plan addressing those issues and will ensure no negative effect during the work schedule.

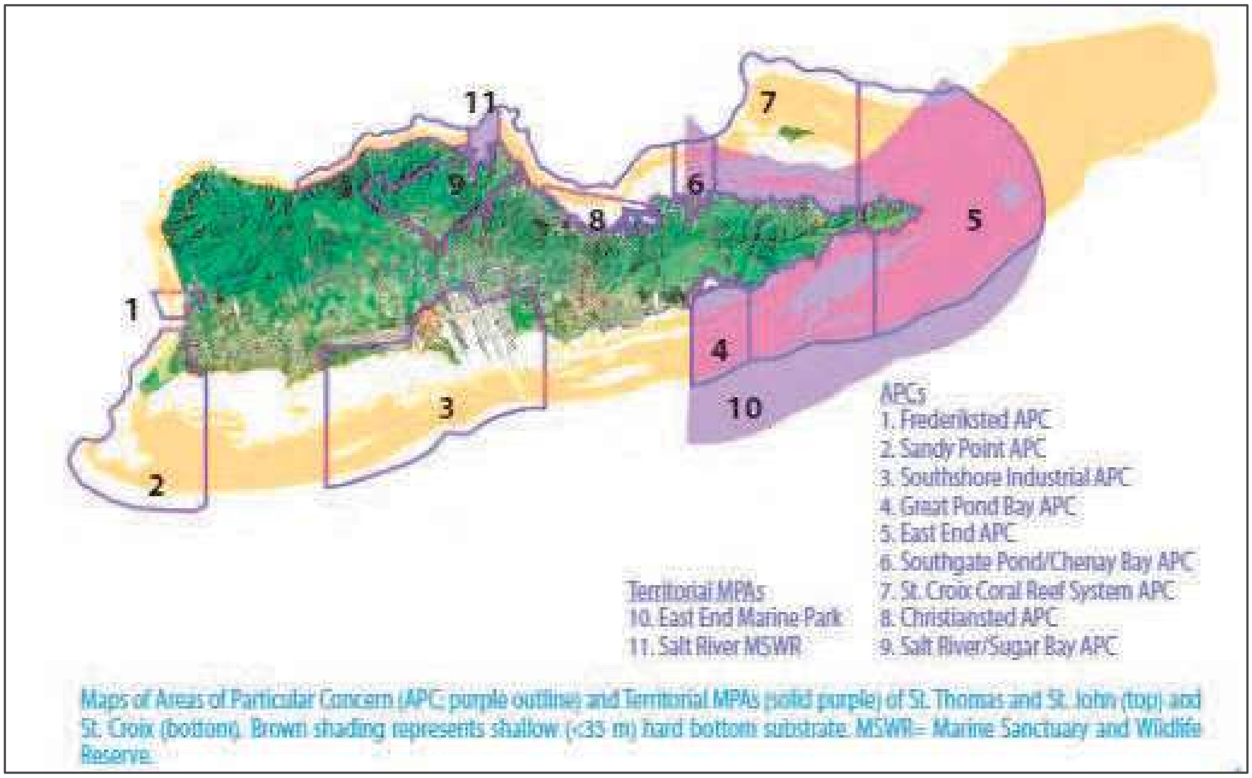

Figure 6.06.1 Map of Areas of Particular Concern – Marine Protected Areas of the United States Virgin Islands, 2014

A review of the 2002 NOAA Benthic Habitat Maps shows the majority of the surrounding habitat is a majority of seagrass (70-90% coverage) and a sliver of Reef/Colonized Bedrock. No negative impact to either of these types of marine habitat are anticipated as part of this project.

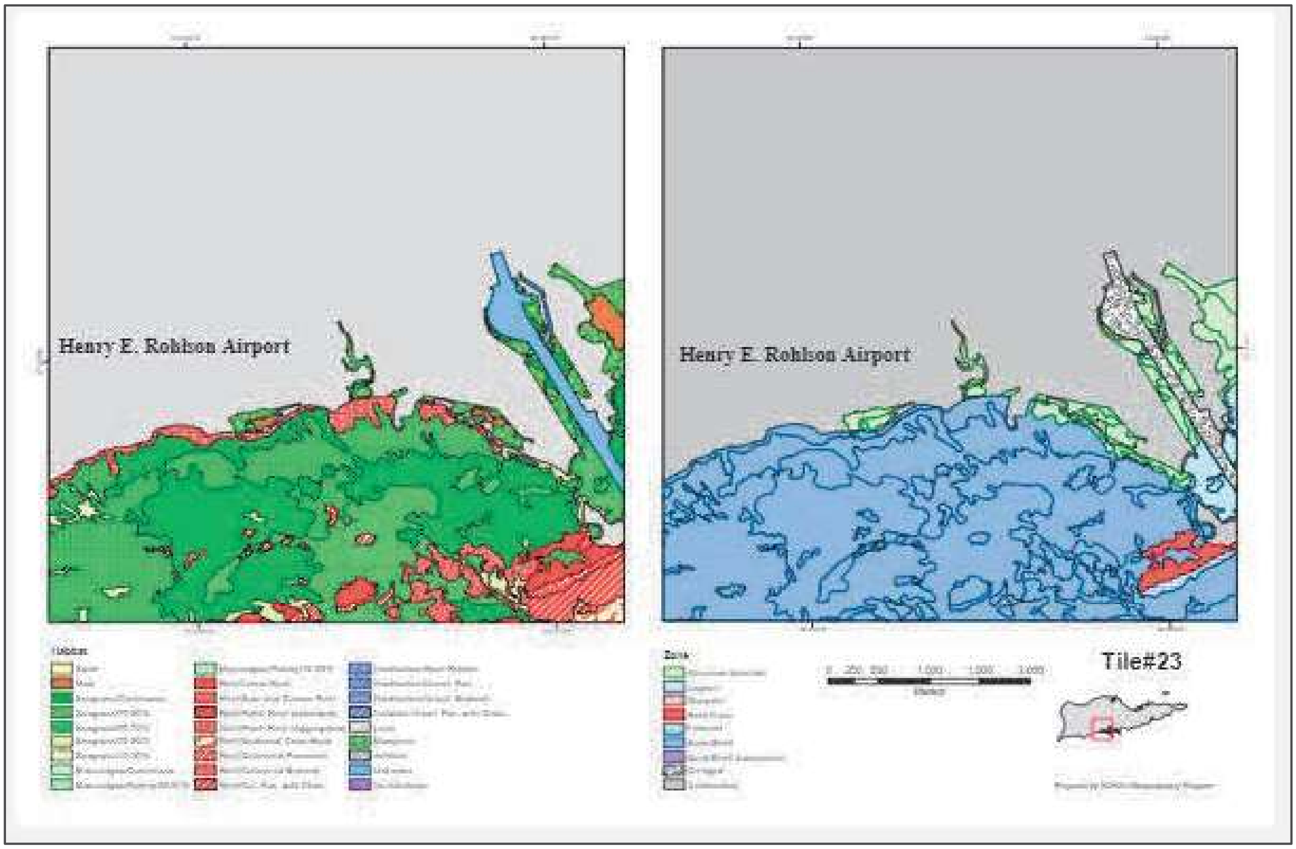

Figure 6.06.2 – 2002 NOAA Benthic Habitat Maps, South Shore St. Croix, USVI.

A review of Endangered Species in the area, through the IPaC Tool, indicates there are no endangered marine species within the proposed project site but identifies two federal endangered sea turtle species that are known to swim in the offshore waters, less than one hundred feet north of the project area. These include:

- Mammals: West Indian Manatee (*Trichechus manatus*, Threatened)
- Birds: Roseate Tern (*Sterna dougallii dougallii*, Threatened)
- Reptiles: Green Sea Turtle (*Chelonia mydas*, Threatened); Hawksbill Sea Turtle (*Eretmochelys imbricata*, Endangered); Leatherback Sea Turtle (*Dermochelys coriacea*, Endangered)

No negative impacts to these noted threatened or endangered species or to the marine environment in which they can be found is anticipated as a result of the proposed project.

6.07 Terrestrial Resources

Previous assessments within the property and facility areas showed no specific terrestrial species or habitat of particular concern, though a review of Endangered Species in the area, through the IPaC Tool, indicates that some of the SCRG property is known to be home to the St. Croix Ground Lizard (*Ameiva polops*). A preliminary site assessment did not reveal the project location to be current habitat by the St. Croix Ground Lizard, due mostly to the existing industrial infrastructure and lack of vegetation through the intended pathways for the new equipment and piping.

Any issues concerning presence of species that arise during the project will be brought to the attention of VIDPNR Fish & Wildlife Division as well as USFWS.

The Environmental Sensitivity Index (ESI) Map for the St. Croix island notes no specific habitat of particular sensitivity in the specific project area. However, there is indication that the LCP, particularly the southeastern side of the LCP, is used as habitat for certain bird species such as the Brown Pelican, Laughing gull, Least tern, Osprey and other shorebirds and wading birds, as show in Figure 6.07.1 below.

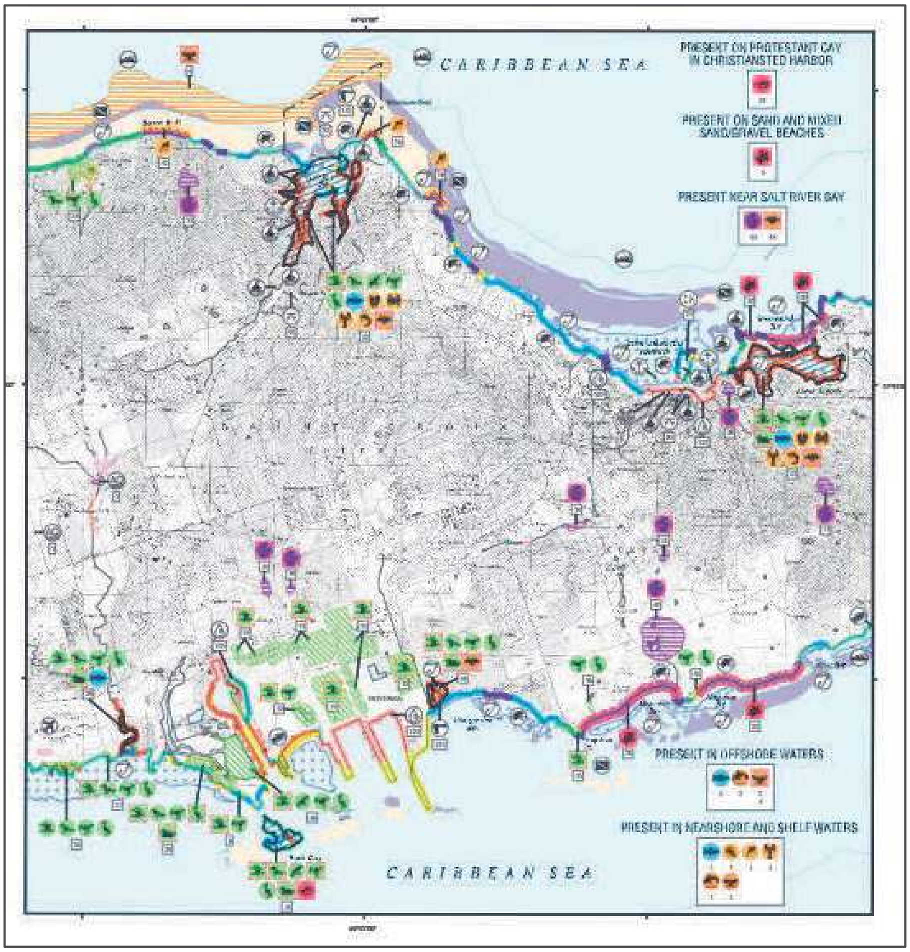

Figure 6.07.1 – Environmental Sensitivity Index Map, St. Croix, USVI.

Several species of birds were noted during the site survey, and the existing LCP has been a perpetual source of habitat to various migratory birds as noted in the ESI Map in Figure 6.07.1. As the project site is located to the north east of the LCP, there is some potential for these species of birds to be present near the project area.

Through the project scope, long term design and use, and perpetual site maintenance, SCRG will minimize the likelihood of any interaction with bird species.

Impact of the Proposed Project

SCRG will minimize the footprint of work to the greatest extent possible.

Relating to stormwater, the site will see very little impact beyond the initial trench work required. As compliance with both stormwater and process water (i.e. RO brine) will be ensured under the issued TPDES permit throughout the life of the project, there are no anticipated negative impacts to these species or their habitat, neither in the nearshore waters nor on land.

6. 08 Wetlands and Freshwater Resources

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

Per the USFWS National Wetlands Inventory, illustrated in Figure 6.08.1 below, much of the southern portion of the SCRG property is designated as Estuarine and Marine Deepwater habitat (E1UBL) within the channel itself. It is encircled by Estuarine and Marine Deepwater habitat (E1AB3L) and includes Estuarine and Marine Wetland habitat (E2SS3N3).

A large section of freshwater wetland (PSS1C) is noted to the east of the project area in property also owned by SCRG. However, this wetland area and border is highly influenced by rainfall and season, with a significant area being ephemeral. Additionally, this area is part of a different drainage pathway, and the proposed project will not influence any stormwater that drains through this area.

There are mangroves within the Estuarine and Marine Wetland area at the channel edge, and some were documented close to the location for Outfall 004. However, all proposed piping installation or improvements will be on existing man-made structures only, and not expand the footprint of development into the mangrove area. No impacts are anticipated to any wetlands or mangrove plants.

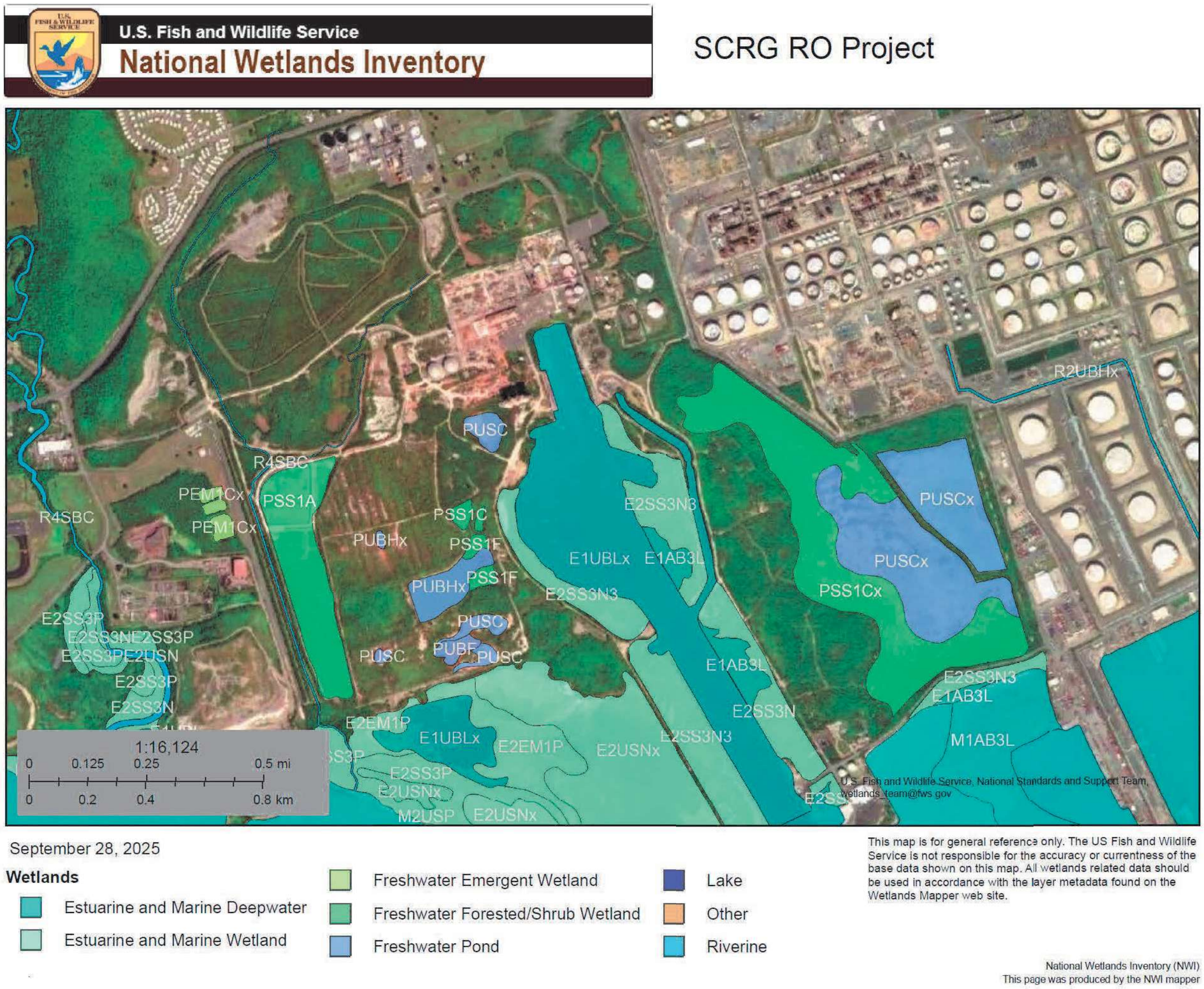

Figure 6.08.1 - Wetlands within the SCRG property (USFWS).

6.09 Rare and Endangered Species

While the St. Croix Ground Lizard (Ameiva polops, Endangered) is documented in the region in previous environmental surveys, no designated critical habitats exist within the project area, and project activities will occur solely within previously disturbed areas and existing infrastructure, minimizing potential interaction with these species. There are no rare or endangered species noted directly within the project area, and is not critical habitat.

The construction will have no anticipated impact on rare or endangered species. As such, the permitting of this project will not displace any rare, endangered, or threatened species from any critical habitat. Any issues concerning presence of species that arise during the project will be brought to the attention of VIDPNR Fish & Wildlife Division as well as USFWS.

6.10 Air Quality

No effects on air quality are anticipated because of the proposed project. The extent of equipment installation will not create noticeable fugitive dust, and use of large equipment or machinery will be minimal during installation. Additionally, there are no permanent air pollutant emitting units proposed for this project.

7.00 Impact of the Proposed Project on the Human Environment

7.01 Land and Water use Plans

Using the existing site infrastructure reduces the need for making large-scale alterations to area. This allows for a reduction in the ecological footprint from inhibiting loss of natural habitats and biodiversity than when earth-change and heavy construction is needed.

SCRG is zoned as an industrial site and major port, and the operation proposed for this project are in line with anticipated uses for the property. SCRG has industrial boat traffic, moorings, and shoreline access for vessels doing business within the St. Croix Renaissance Park. Allocating existing infrastructure to purify water will allow this project to provide a service for tenants and site users without affecting other activities in the area or neighboring properties.

7.02 Visual Impacts

This project will provide a clean and simple layout for the SWRO system, aligning with the existing development in the St. Croix Renaissance Park. Existing infrastructure will be either used or followed when installing new components and not change the existing landscape of the facility or shoreline.

7.03 Impacts on Public Services and Utilities

Water

The project will not utilize or impact substantial quantities of water, whether from public sources or otherwise, and it will not adversely affect the availability of freshwater resources. This project has the opposite effect, providing an opportunity to increase water availability to potential customers.

As Diageo USVI, the largest potential customer for this project, uses a significant amount of potable water, the shift to water being provided by the SWRO unit will reduce the burden on the municipal WAPA water distribution system.

Sewage Treatment and Disposal

There will be no flow to the municipal sewerage system or required sewer disposal resulting from this project's implementation.

Solid Waste Disposal

During construction of the project, domestic solid waste will be managed with onsite waste bins. It will be trucked out by a licensed waste hauler as necessary and disposed of in accordance with solid waste requirements.

During operation of the SWRO system, there will be expected maintenance and consumable part replacements. Disposal will be in line with solid waste disposal requirements.

Roads, Traffic, and Parking

There are no anticipated adverse effects on public roads, traffic, and parking, either during construction or for long-term operations.

Electricity

The SWRO system will be installed adjacent to existing electrical infrastructure on-site (Facility substation). Installation will require a new service meter and connection near the SWRO installation location. The system will require 3-phase 460V power from the municipal service as prime power, though existing generators owned by SCRG will be used as backup power only.

Power demand from the grid will increase as a result of this project, but not significantly enough to be a burden to the power grid.

Schools

There are no anticipated adverse effects on the local educational system during project implementation or in the long term.

Fire and Police Protection

Charles A. Seales Fire Station is located in Grove Place, approximately 4.9 miles from the St. Croix Renaissance Park using the main roads. The Ann Schrader Command Police Station is located in Estate La Reine, 1.1 miles north on the main roads. There are very little anticipated scenarios where fire or police services will be required. The St. Croix Renaissance Group has its own fire protection system on-site and SWRO operation does not require flammable material or fuels in operations so poses very little risk for fire. The SCRG facility is a designated major port facility, and as such is required to maintain 24-hour security and a full fenced and gated property. This requirement means the facility will be covered under security monitoring and therefore police support for the operations is minimized.

Public Health

The project is not expected to cause any documented negative impact on public health or result in increased utilization of public health services.

7.04 Social Impacts

There are no anticipated social impacts, either positive or negative, as a result of this project.

7.05 Economic impacts

The presence of an on-site SWRO system provides economic benefits for the St. Croix Renaissance Group. A similar system was once active on the property, and now the demand for on-site water sources has increased. The increased reliability will be attractive to property tenants, and surrounding businesses.

7.06 Impacts on Historical and Archaeological Resources

The project will be limited to areas that have been previously assessed and determined to lack significant archaeological resources or findings, thus minimizing any potential negative impact on the historical or archaeological resources of the US Virgin Islands (USVI). Further, construction will be solely in previously disturbed areas, and the only trenching required will be for three road crossings in already disturbed soils.

In the event that suspected or known resources or artifacts are uncovered during site development, developers will promptly notify the State Historical Preservation Offices for further evaluation.

7.08 Waste Disposal

Sewage Treatment and Disposal

The project will have no impact on the volume of sewage generated in the vicinity, neither during construction nor in the long-term operations.

Solid Waste Disposal

Domestic solid waste will be handled through onsite waste bins and will be transported as needed by the landowner for proper disposal in accordance with solid waste regulations.

7.09 Accidental Spills

Given the nature of the project, spill incidents are possible but not anticipated during construction of the SWRO system. Major equipment or machinery may be used for unit installation, however no need for chemicals, paints, solvents or other liquids will be onsite during. The concrete slab for the containerized SWRO is already in place. During operation, use of anti-scalants and other chemicals will be common, but any container used to store these chemicals will be placed either indoors or within secondary containment and will be inspected routinely by SWRO unit operators.

7.10 Potential Adverse Effects Which Cannot be Avoided

In a natural setting, a containerized SWRO unit can disrupt the natural beauty of their surroundings, leading to both visual and ecological consequences. However, this typical focus on aesthetics is not relevant, as the site is within an already developed industrial park and will use existing infrastructure.

Discharge from a SWRO will always be required to separate the salts, minerals and other contaminants from the seawater source and product stream. However, to ensure no negative effects to the environment, waterbody or the persons or marine life that use it, SCRG will follow the requirements set forth in the current and future issued TPDES permits.

8.00 Mitigation Plans

An Operations and Maintenance plan will be developed to help mitigate effects that arise from material delivery and placement. Maintenance of the facility will be required to ensure no buildup of waste, spills, or damage occurs to the immediate environment.

9.00 Alternatives to Proposed Action

There are several alternatives to the proposed project to install, operate and maintain a SWRO system in SCRG. However, each alternative has been evaluated and determined to be less desirable for SCRG and potential clients.

Alternative 1. Demand Management & Conservation

The most cost-effective "new water source" is reducing existing demand. By implementing water conservation and efficiency measures, the total community demand can be lowered. Demand reduction can be achieved through retrofits such as low-flow fixtures, leak detection programs, and process optimization in industrial facilities. These actions directly reduce both potable water consumption and strain on sewer systems.

However, the primary client for the SWRO is Diageo USVI, which already has demand reduction programs in place, does water audits at least yearly, and has a continuous improvement approach to further reductions. The nature of the rum distillery requires water and is already at optimized levels, so current demand is in line with operational needs and cannot be further reduced by any significant margin.

Alternative 2. Brackish Groundwater Reverse Osmosis (RO)

If available, brackish groundwater represents a far more energy-efficient and cost-effective feed source than seawater. Total dissolved solids (TDS) in brackish aquifers typically range from 1,000–10,000 mg/L, compared to ~35,000 mg/L for seawater. This lower salinity translates to lower RO pressures, higher recoveries, and reduced energy consumption, often making brackish RO a fraction of the cost of seawater RO per gallon produced.

However, the existing facility is currently under a USVI consent decree to remediate the site through evaluation and control of pollutants in existing groundwater, thereby making the use of groundwater in the area as a source of freshwater a significant liability for any company or organization.

Alternative 3. Rainwater Harvesting & Storage

In an island environment with high annual rainfall, rainwater harvesting is a natural complement to other supply solutions. Rooftop catchments, paved surfaces, and purpose-built collection areas can feed cisterns or reservoirs, providing significant volumes of water during the wet season. When combined with first-flush systems and basic treatment
(filtration, disinfection), harvested rainwater can supply potable or non-potable needs, depending on end use.

The primary challenge lies in variability and storage. To sustain a continuous 350 gpm demand, very large storage volumes would be required to buffer dry periods. Capital costs would be higher than those for the primary option, a SWRO, and would take years if not decades to have realized Return on Investment (ROI). Additionally, rainwater, especially an amount that must be kept in reserve to meet demand, will require its own treatment that will have high cost and result in similar challenges as a SWRO.

Rainwater harvesting can be designed as a supplemental source, in tandem with another alternative or SWRO operation, by offsetting peak demand, reducing dependence on desalination, and improving overall resilience. However, the degree it can supplement is not commensurate of the large capital investment required.

Alternative 4. Water Reuse (Advanced Reclamation)

Water reuse, or advanced treated wastewater, offers a highly reliable alternative when consistent wastewater flows are available. Using treatment trains such as microfiltration, reverse osmosis, and advanced oxidation/UV disinfection, wastewater effluent can be purified to meet or exceed drinking water standards.

However, the largest potential client, Diageo USVI, already recycles all its wastewater by these technologies, and any water that Diageo USVI must dispose of is a byproduct of the wastewater treatment for reuse, so no further improvements to this approach are feasible.

Alternative 5. Bulk Water Importation (Barging)

Importing freshwater by barge is a rapid, flexible way to meet short-term or emergency needs. Many Caribbean islands have relied on this option in the past during droughts or infrastructure outages, with tankers delivering freshwater from nearby islands or mainland sources. This approach avoids the large capital investment of new treatment facilities and can be mobilized quickly, making it valuable as an interim solution.

However, barge deliveries come with high and unpredictable operating costs, as they depend on vessel availability, fuel prices, and weather conditions. Logistics must also ensure port access, pumping, and distribution connections. For continuous high-volume needs, barging becomes economically unsustainable and is not a feasible alternative for any anticipated long-term operation.

Alternative 6. Other Desalination Techniques (MSF, MED, or MD)

Thermal desalination processes such as Multi-Stage Flash (MSF), Multi-Effect Distillation (MED), or Membrane Distillation (MD) are robust and proven methods for producing potable water from seawater. They are particularly effective when low-cost or waste heat is available, as in power-plant cogeneration settings. Thermal systems handle high salinity and fouling better than membranes, offering high reliability and long operational lifespans in harsh marine environments.

However, thermal desalination requires significant capital outlay and is highly energy-intensive when operated independently. For island communities without cheap fuel or integrated power plants, this approach is generally less attractive than RO, as it is the case for St. Croix at this time.

In consideration of these 6 alternatives, SCRG has determined that the current proposed SWRO system project will be the most effective from a cost and operational perspective. It will allow the cost per gallon product to remain within market value, will be reliable with easily operated and maintained components, and can be serviced by both on-island and mainland specialists. SWRO technology is robust enough to be very reliable when properly maintained, and the existing TPDES permit is set up and established to ensure any discharges from the RO operation meet quality to be protective of the environment, marine life, and human health.

10.00 Relationship Between Short- & Long-Term Uses of Man’s Environment

The containerized SWRO unit and system is unlikely to have any impact on marine life, environmental resources, and recreational activities. Most of the impacts are expected to be temporary and short-term during the line placement and installation process, including delivery of equipment.

Once installed, the system will require minimal maintenance and is not expected to have any effect on existing or future marine or terrestrial habitats in the project area due to the technology’s predictable discharge streams. This project will lead to a substantial enhancement of existing infrastructure while imposing minimal impact on the island's existing natural, cultural, or functional resources.

11.00 References

Government of the US Virgin Islands, Geospatial Information Systems Division, MapGeo: Property - US Virgin Islands - MapGeo

Horsley Witten Group. 2022. Virgin Islands Environmental Protection Handbook: A Guide to Stormwater Management Standards and Control Measures. Prepared for VI Department of Planning and Natural Resources, Division of Environmental Protection.

Island Resources Foundation (IRF). 1977. Marine environments of the Virgin Islands. Technical Supplement No.1 1976. Prepared for the Virgin Islands Planning Office.

National Weather Service. (n.d.). Climate Normals for Puerto Rico and USVI. National Oceanic and Atmospheric Administration. https://www.weather.gov/sju/climo_pr_usvi_normals

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

NOAA – Environmental Sensitivity Index Maps, Office of Response and Restoration, Hazardous Materials Response Division, July 2000

NOAA. (n.d.). Historical Hurricane Tracks. National Oceanic and Atmospheric Administration. https://coast.noaa.gov/hurricanes/#map=4/32/-80

NOAA. (n.d.). Tide and Current Station 9751381 - San Juan, PR. National Oceanic and Atmospheric Administration. https://tidesandcurrents.noaa.gov/stationhome.html?id=9751381

NOAA USVI Active COOP Stations, 1991-2020 Normals for Puerto Rico and the U.S. Virgin Islands ArcGIS - 1991-2020 Normals for Puerto Rico and the U.S. Virgin Islands

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

https://www.ndbc.noaa.gov/station_page.php?station=ltbv3

https://tidesandcurrents.noaa.gov/met.html?id=9751364

NOAA USVI Active COOP Stations, 1991-2020 Normals for Puerto Rico and the U.S. Virgin Islands https://www.arcgis.com/home/webmap/viewer.html?webmap=bebcdebdc654474faca21a9a0d4446b4&extent=-68.1149,17.0491,-64.0582,19.2906

NRCS Web Soil Survey

US Fish and Wildlife. National Wetlands Inventory. National Wetlands Inventory (usgs.gov)

USACE Field Manual (FM) 5-134

US Virgin Islands TCRMP Annual Report 2020

Weston Solutions, Inc., *Expanded Site Inspection and Removal Assessment Report St. Croix Alumina (Renaissance Park) Site St. Croix, U.S. Virgin Islands*. Document Control No. 1455-2A-ATIW. May 2012