SEV Consulting Group

Environmental Baseline Assessment for FOCOL-Shell LNG-to-Power Project, New Providence

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Contents

ENVIRONMENTAL BASELINE ASSESSMENT FOR LNG-TO-POWER PROJECT, PHASE 1, NEW PROVIDENCE, THE BAHAMAS

Executive Summary

The objective of the Environmental Baseline Assessment (EBA) for the LNG-to-Power Project, Phase 1 Eco-Retreat project is three-fold:

1. To evaluate potential environmental impacts of the proposed project;
2. To suggest potential mitigation measures that can be implemented to reduce or eliminate any negative environmental impacts; and
3. To evaluate whether the proposed project can be implemented in a manner that is environmentally sustainable.

The LNG-to-Power Project, Phase 1 project involves the following components:

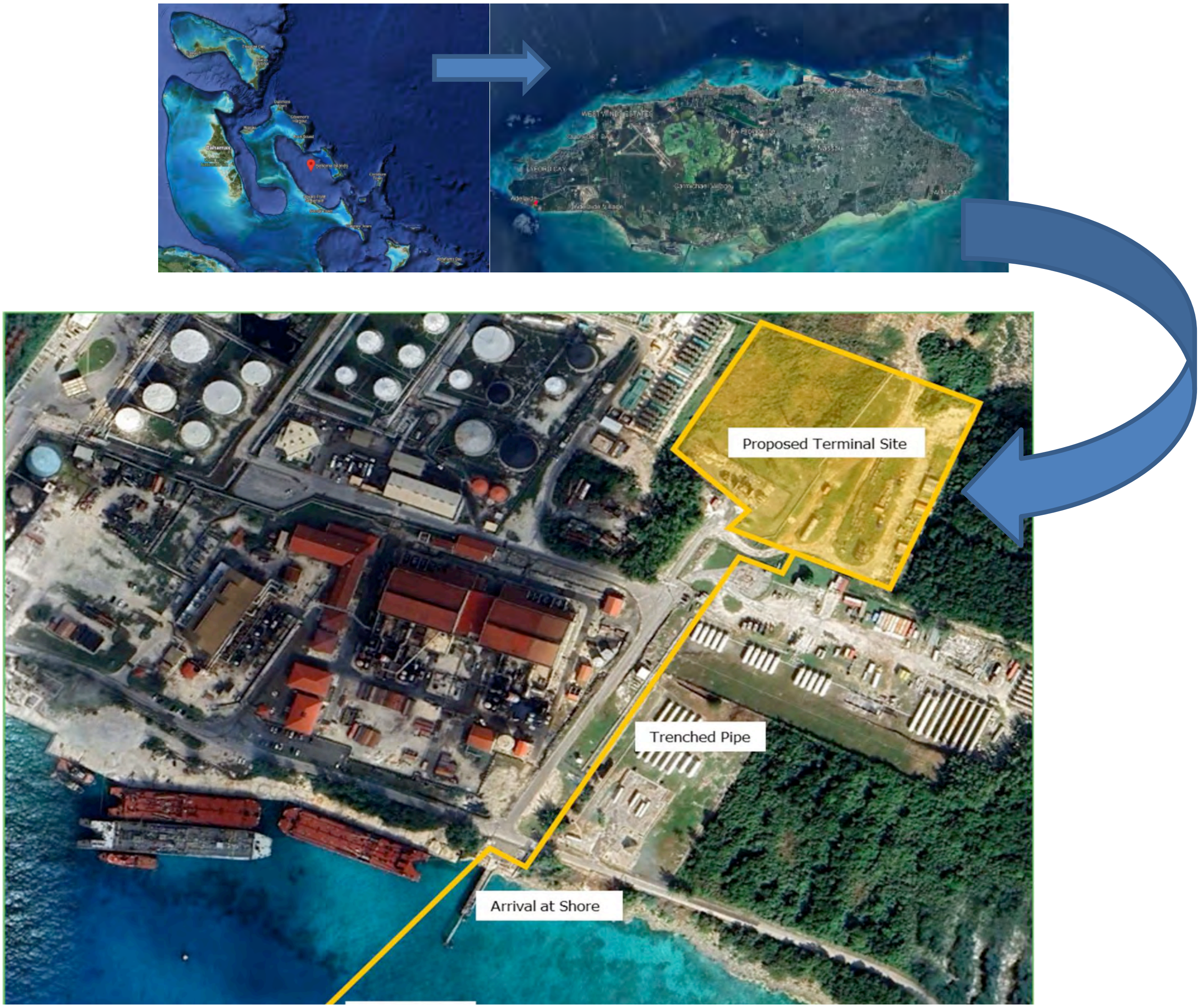
- The commissioning of two (2) TM 2500 GE gas turbines;
- A jetty platform offshore at Clifton Pier with a pipeline to the shoreline;
- A Floating Storage Unit (FSU) which will be stationed at the jetty platform. The FSU will receive LNG from other fuel transport vessels and store the product;
- Fuel transport vessels, ranging in size from 3,000 to 20,000 m^3 tank capacity, which will bring LNG to the FSU;
- The iQuay system La Santa Marina from ECOnnect which will act as the interface platform between the FSU and the land-based terminal until a permanent jetty is built; and
- Cylindrical land-based LNG storage tanks which will be 1,350 m^3 in volume, single-walled, and made of stainless steel (ASME II A240-304 grade).

Phase 1 of the project is being executed by FOCOL Holdings Limited and Shell and will be built at Clifton Pier..

Employment of appropriate design and planning methodologies can result in execution of Phase 1 of the LNG-to-Power Project in a sustainable manner. Utilizing the recommended mitigation measures can eliminate or minimize any negative environmental impacts.

FOCOL and Shell have expressed their commitment to implementing the recommended mitigation measures and executing the project in a manner that respects local communities, neighbouring businesses, the natural resources of the site and is environmentally sustainable.

Map 1: Location of LNG-to-Power Project (Phase 1), New Providence



1.0 Introduction and objectives

1.1 Objective of the EBA

The objective of the Environmental Baseline Assessment (EBA) for Phase 1 of the LNG-to-Power Project is three-fold:

1. To evaluate potential environmental impacts of the proposed project;
2. To suggest potential mitigation measures that can be implemented to reduce or eliminate any negative environmental impacts; and
3. To evaluate whether the proposed project can be implemented in a manner that is environmentally sustainable.

1.2 Scope of the EBA

The EBA involved field surveys (conducted in 2020 and 2021) and research (conducted in 2020, 2021 and 2024) focused on the project site and its environs. Surveys conducted included:

- Terrestrial habitat survey (including avifaunal survey); and
- Marine survey.

2.0 Project description and alternatives

2.1 Description

The LNG-to-Power Project, Phase 1 proposed site plan is shown in Figure 2-1. The LNG-to-Power Project, Phase 1 project involves the initial commissioning of two (2) TM 2500 GE gas turbines, with diesel to be piped from existing fuel storage tanks on BPL's property at Clifton Pier to the turbines. The output of the two new TM2500 turbines will be connected to BPL's 33kV substation via underground high-voltage cables and two 13.8/33kV generator step-up transformers. These works were completed prior to completion of the Environmental Baseline Assessment (EBA). More details about this aspect of Phase 1 are described in section 2.1.1 and Appendix 2.

FOCOL and Shell will then build a jetty platform offshore at Clifton Pier with a pipeline to the shoreline (see Figures 2-2 through 2-4). In the initial phase, a floating jetty-less platform may be used while the permanent jetty is being built. A Floating Storage Unit (FSU) will be stationed at the jetty platform. The FSU will receive LNG from other fuel transport vessels and store the product. Fuel transport vessels bringing LNG to the FSU will range in size from 3,000 to 20,000 m3 tank capacity (see Appendix 3 for more details on fuel transport vessels).

The LNG is discharged to the shore terminal and fed through a vaporizer, converting the LNG into gas vapors. The gas vapors are piped through a regulator and then consumed in the two (2) TM 2500 GE gas turbines located on FOCOL's property on Clifton Pier. Figures 2-5 and 2.6 are process diagrams showing the components of the system. Use of diesel will cease, and the turbines will run on natural gas. The gas turbines convert the gas vapors to electricity, and the electricity is transmitted to the BPL Power substation at Clifton Pier, where the electricity is added to the island's electricity grid. The commissioning of the 2 TM 2500 gas turbines will add 56MW of power to the grid of New Providence.

The Floating Storage Unit (FSU) option enables an LNG terminal that is delivered quickly and for less costs by using a chartered vessel that is permanently moored at Clifton Pier; the FSU will leave prior to severe storms and return quickly to restore gas supply; engines are dual fuel and will run on diesel if an interruption due to adverse weather. The iQuay system La Santa Marina from ECOnnect will act as the interface platform between the FSU and the land-based terminal until the permanent jetty is built (see Appendix 4 for more detailed information on the iQuay system).

Eight (8) to sixteen (16) LNG storage tanks will also be installed on land as a part of Phase 1 of the project. Specifications on the cylindrical tanks include 1,350 m3 volume and single-walled, stainless steel (ASME II A240-304 grade). Examples of tank installation are shown in Figure 2-7. See Appendix 5 for more detailed information about the LNG storage tanks.

Clifton Pier will be the temporary location for the gas turbines as Phase 1 of the LNG-to-Power project. In Phase 2, the turbines will be moved to their permanent location at the BPL Blue Hills Power Plant.

Photos of the current site are provided in Figure 2-8.

Figure 2-1: LNG-to-Power Project, Phase 1 Proposed Site Plan

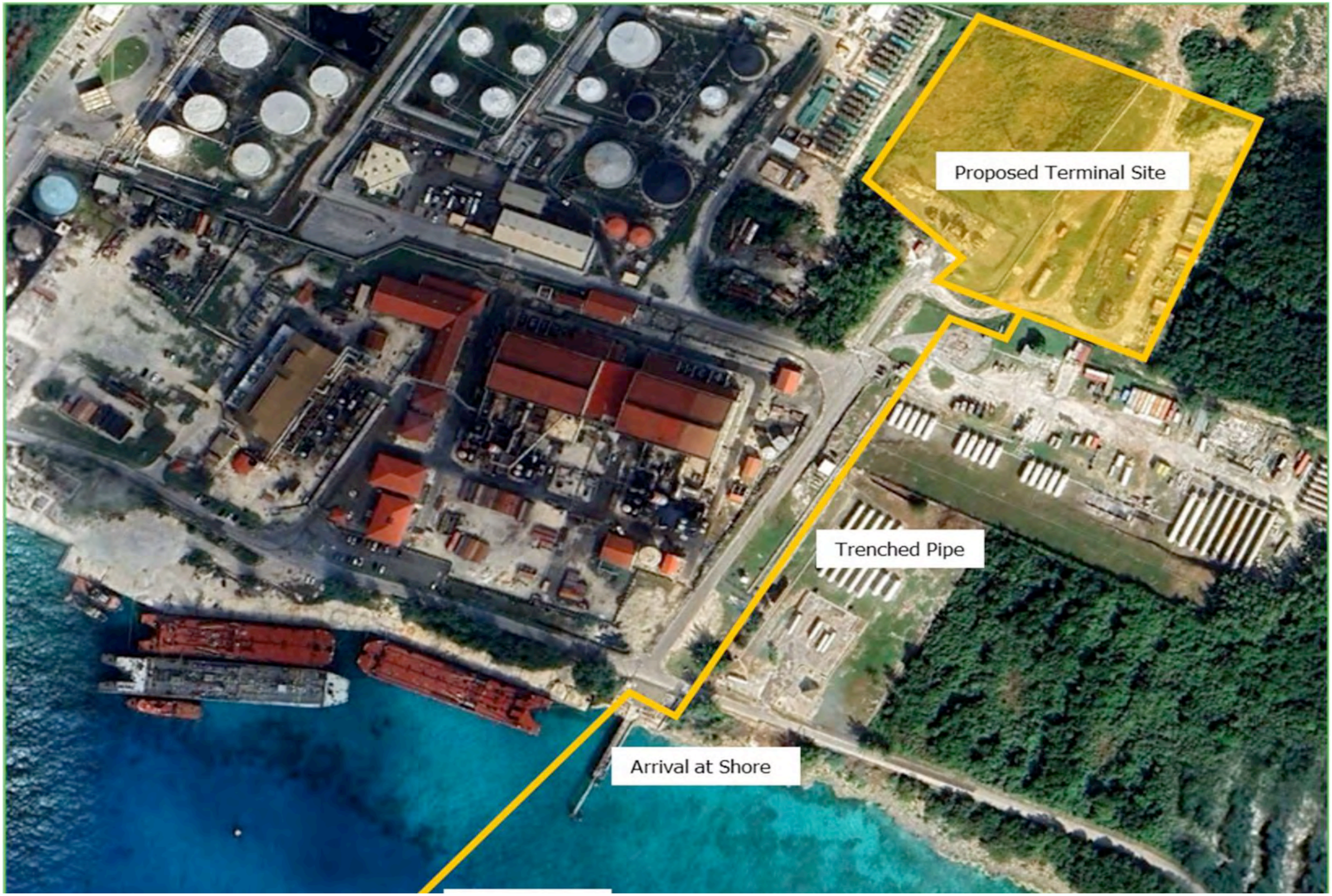


Figure 2-2: Floating econnect system

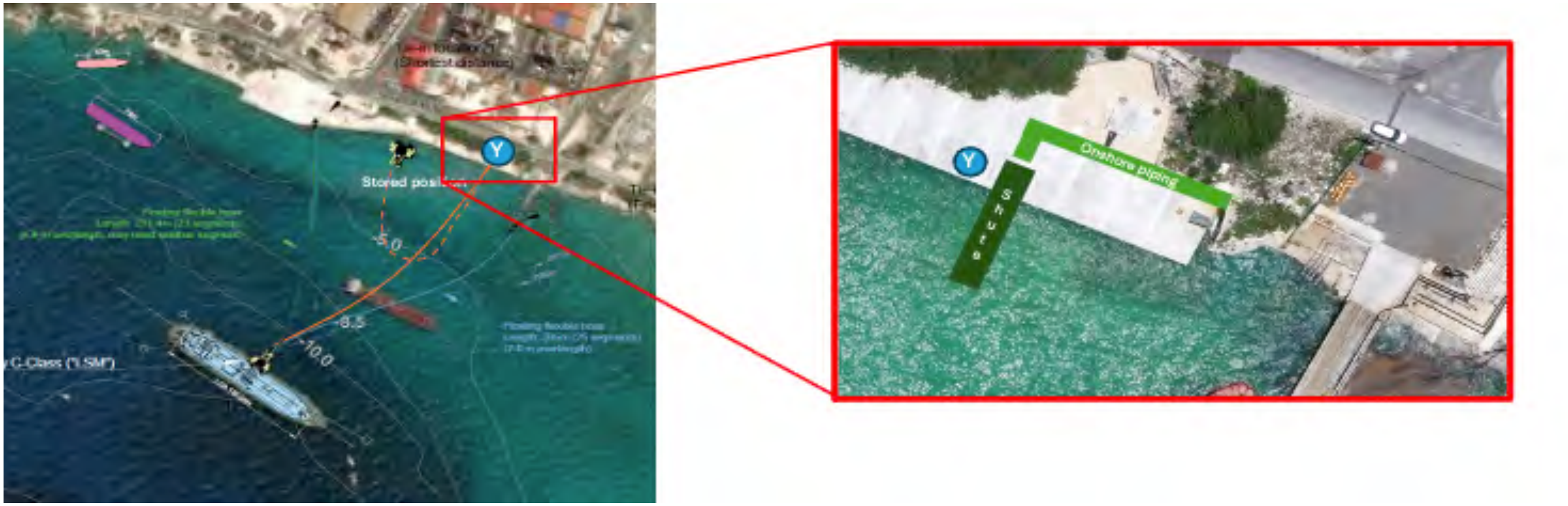


Figure 2-3: Shore-based connection (coastline view)

Figure 2-4: Floating hose

Figure 2-5: LNG process diagram

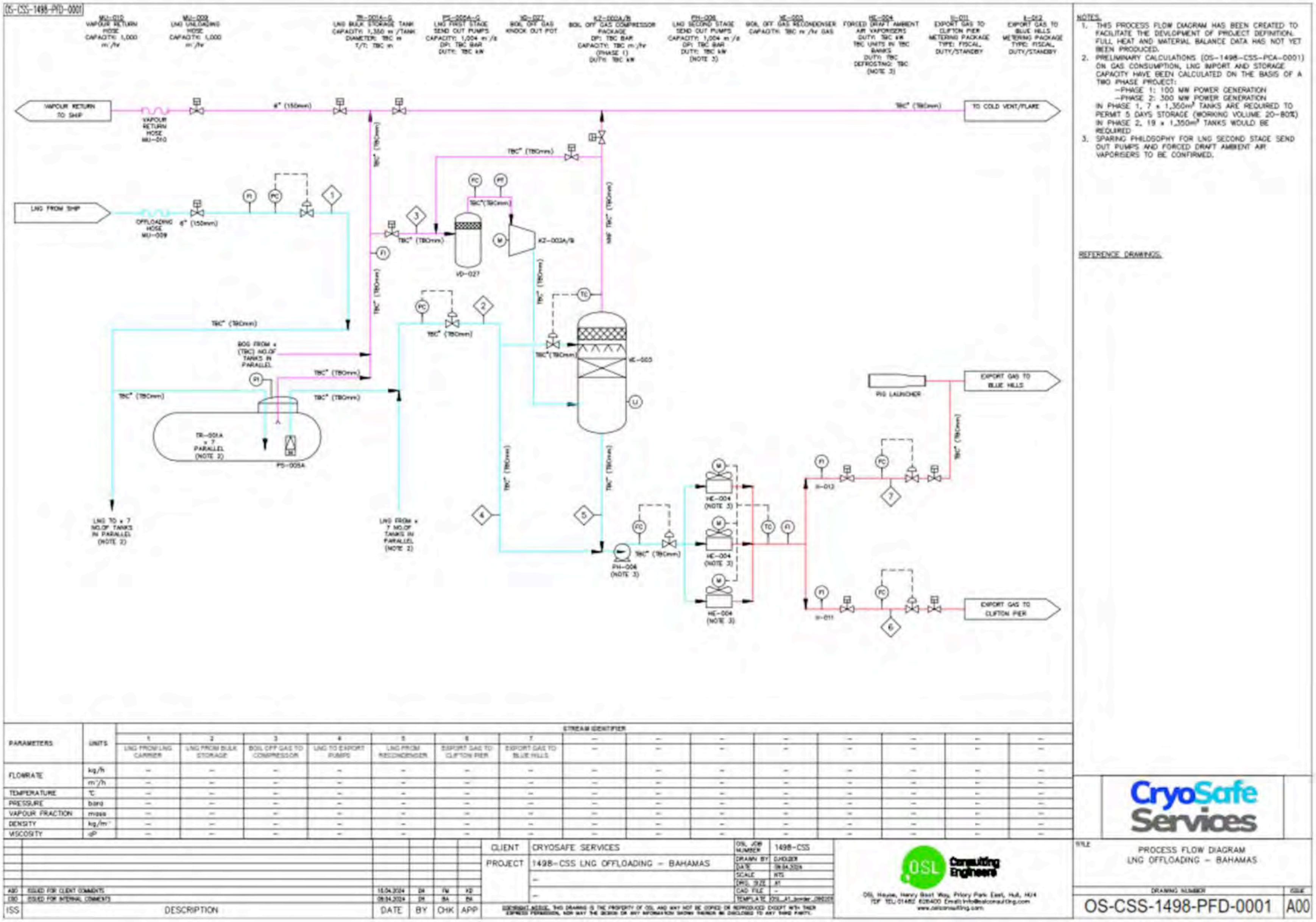


Figure 2-6: LNG storage facility with forced draft vaporization

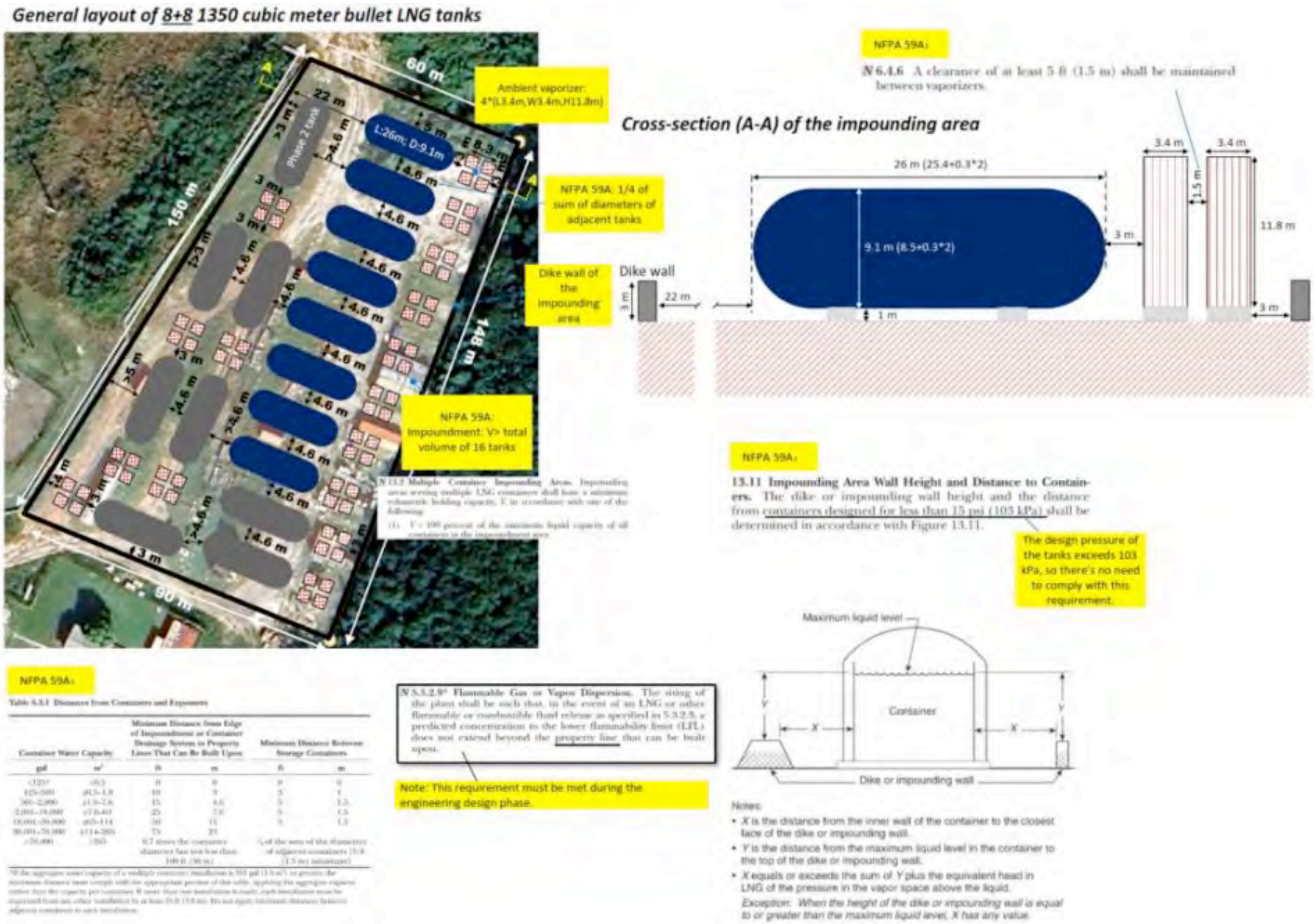


Figure 2.7: Examples of LNG storage tank installation

Figure 2-8: Current LNG-to-Power Project, Phase 1 site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2.1.1 Commissioning of TM 2500 GE gas turbines

Prior to completion of the EBA, two (2) TM 2500 GE gas turbines were installed at the Phase 1 site (see Figure 2-7). Associated infrastructure was also installed inclusive of reverse-osmosis (RO) facility, misting system, transformers, fuel and water lines, purification system and transmission lines to supply power to BPL Clifton facility.

TM 2500 Gas Turbines

The TM2500 Mobile Gas Turbine Generator (GTG) set is a trailer-mounted mobile power package. The trailer system allows for expedited transportation and set up of the package. Table 2-1 summarizes specifications for the turbines.

Table 2-1: TM 2500 Mobile Gas Turbine Generator specifications

Category	Specification
Seismic design criteria	IBC 2015 Site Class: D Risk Category: III Design Category: E Importance Factor: 1.25 Response Modification Factor: 2.5 Spectral Response Acceleration at 0.2 sec-g: 1.3 Spectral Response Acceleration at 1.0 sec-g: 1 G Levels for Base Acceleration: 0.65
Maximum wind speed (wind load)	120 mph (with seismic kit properly installed)
Average near field noise at 3 ft horizontal & 5 ft vertical	90 dB(A)
Operation of Unit	Base loaded when running; approximately 700 hr/month of operation

Each TM2500 GTG consists of three trailers:

1. Turbine Trailer,
2. Generator Trailer, and
3. Control Module Trailer.

The basic scope of supply for each of these trailers is described below.

<u>Turbine Trailer</u>

The main deck of the turbine trailer contains an inlet silencing system for the turbine and the turbine module. Located on the gooseneck of the trailer is the auxiliary skid, which contains the TCP (Turbine Control Panel) along with various package support systems. When the package is fully installed, the turbine trailer assembly is fitted with the air filter modules, the turbine exhaust silencer, and the ventilation fan assembly for the turbine enclosure.

Located at the rear of the turbine trailer is a docking station that provides the female interface required to connect the turbine and generator trailers together for the operational configuration. Table 2-2 outlines the components and assemblies on the turbine trailer.

Table 2-2: Turbine trailer components & assemblies

Gas turbine engine with turbine enclosure	Dual fuel with water injection system
Turbine gauge panel (TGP)	Turbine exhaust
Fire protection aerosol canisters	High speed coupling shaft
Air inlet silencer with enclosure	Ventilation fan assembly skid
Inlet air filter system (when package is fully assembled)	Alignment system
Auxiliary skid including: • Turbine control panel (TCP) • Hydraulic start system • Turbine lube oil (TLO) system (shared) • Off-line water wash system	

A four-axle, air ride suspension **trailer** with two steerable axles is used to transport the turbine trailer components. At the site, the turbine trailer is connected to the generator trailer. Landing legs are provided to support and level the equipment at the Site. The turbine trailer is supplied with a weatherproof, acoustic **enclosure for the turbine** which provides ventilation and fire system containment. The enclosure is designed for noise abatement to an average value of 90 dB(A) for liquid fuel. The enclosure is completely assembled and mounted over the equipment prior to testing and shipment. Provisions for turbine removal and personnel access are included.

Located inside the turbine enclosure is a General Electric **gas turbine engine** (Model LM2500-RC-MDW™), the turbine engine is equipped to operate on liquid fuel or natural gas with or without water injection. The turbine engine is mounted to the turbine trailer which is independent from the generator trailer. This engine is a two-shaft design with the gas generator separate from the power turbine. This mechanically decoupled design allows the power turbine to operate at a continuous speed of either 3,000 rpm (50Hz) or 3,600 rpm (60Hz), regardless of the gas generator speed. Torque developed in the aerodynamically coupled power turbine is transferred to the rotor of the alternating current (AC) generator through a flexible diaphragm coupling. The AC generator operates at a synchronous speed of either 3,000 rpm (50Hz) or 3,600 rpm (60Hz), eliminating the need for a speed reducing gearbox. The inlet section, at the entrance of the silencer, is equipped with a stainless-steel mesh screen in the inlet air stream for protection against foreign object damage to the engine. The engine is shock mounted whenever shipped in position inside the package.

The **turbine gauge panel (TGP)** is located on the right-hand side of the turbine enclosure (with respect to the turbine aft looking forward) beside the turbine enclosure door. The turbine gauge panel provides an enclosure used to house various pressure transmitters. **Fire protection aerosol canisters** are located on top of the turbine enclosure, included as part of the ventilation fan assembly. These canisters are connected to the fire protection system located in the Generator Control Panel (GCP) and provide extinguishing agent in the event of a fire inside the enclosure.

The **auxiliary skid** is a compact installation of several systems and equipment and is positioned on the gooseneck of the turbine trailer. The major items on this skid include a Turbine Control Panel (TCP), the Hydraulic Start System with shared turbine lube oil reservoir, the Turbine Lube Oil System, and the Off-Line Water Wash System. Some of the systems on the skid contain transmitters that provide remote system monitoring. The pressure and pressure differential transmitters have instrument valves in their feed lines to simplify maintenance. Mechanical interconnections between the auxiliary skid and turbine skid are made with hoses as required and come preassembled from the factory on the turbine trailer. Electrical interconnections are provided to allow the required interfacing between the auxiliary skid and the control house as needed, otherwise wiring is factory installed.

The **Turbine Control Panel (TCP)** mounted on the auxiliary skid includes:

- RX3i
- Bently Nevada 3701
- Servo Position Controllers (for variable geometry and compressor discharge)
- VersaMax Controllers
- Jaquet T401

The equipment package is supplied with a **hydraulic starting system**. The hydraulic start system turns the engine and can rotate it for engine start, fuel purging, water wash cleaning, and conducting maintenance. The hydraulic starter system has components located on the auxiliary skid and inside the turbine enclosure. The DC hydraulic starter motor drives a hydraulic pump assembly consisting of a charge pump, pressurized filter, main pump, and variable SOV-actuated valve. The hydraulic start system mounted on the auxiliary skid includes:

- Hydraulic pump and motor,
- Oil reservoir (shared),
- Various temperature elements, pressure gauges and hydraulic filters.

The purpose of the **Tube Lube Oil (TLO) system** is to provide clean, cool oil to lubricate bearings, and to provide pressurized oil for operation of the turbine's variable geometry (VG) actuators. The turbine lube oil system has two separate circuits:

- Supply System – Provides clean, cool oil to the turbine bearings
- Scavenge System – Recovers (scavenges) the lube oil from the bearing drain-sumps, filters and cools the oil, then returns it to the reservoir.

The synthetic lube oil system mounted on the auxiliary skid includes:

- Tank flame arrestor
- Turbine and hydraulic lube oil reservoir
- Tank demister
- Turbine/hydraulic start fin-fan heat exchanger

The equipment package is supplied with an **"off-line" cleaning system, with a water wash reservoir** and all necessary filters and instrumentation supplied. The operator is required to provide purified water which shall not contain particles larger than 100 microns absolute and shall comply with Water Wash Specification (MID-TD-0000-4). The water wash system mounted on the auxiliary skid includes:

- Polyethylene tank
- Water inlet shut-off valve
- Suction pump
- Strainer

The **air filter assembly** contains combustion and ventilation air filtration equipment including pre-filters, high-efficiency filters, a ventilation fan assembly, and a **concentric intake silencer in an enclosure**. The turbine compartment is fully ventilated by a ventilation fan which draws filtered air from the silencer enclosure.

The GTG offers dual fuel (gas and liquid) capabilities for Single Annular Combustor (SAC) combustor through the full load operations and are sequenced and controlled automatically by the control system. The GTG is designed to start up on either gas or liquid fuel. A natural gas fuel system with electronically controlled fuel-metering valve is supplied in the basic package. For full-load operation, the gaseous fuel must be supplied to the main skid unit at an acceptable range depending on engine model and combustor option. Maximum flow and temperature of the operator-supplied gas fuel is monitored and required to be acceptable. The operator shall provide gas fuel in accordance with Specification MID-TD-0000-1. The package is also equipped with a liquid fuel system. For full-load operation, the liquid fuel must be supplied to the package at the specified range. Liquid fuel must arrive filtered to 5 microns. Buyer shall provide clean and filtered Liquid fuel in accordance with Specification MID-TD-0000-2. With some exceptions, all components for the **dual fuel system with water injection** are located on the turbine trailer. All components come preassembled from the factory. Mechanical interconnect locations for liquid fuel and water are provided for connection just below the turbine gauge panel.

GE contractor provides the necessary controls, metering equipment, and interconnecting piping within the turbine enclosure. All piping is stainless steel, and the valves are trimmed with stainless steel. **Water injection** can reduce NOx emissions to 25 ppm (51 mg/Nm3) for gaseous fuel and to 42 ppm (86 mg/Nm3) for liquid fuel (site-specific emissions data is outlined in guarantees for the equipment). The operator shall provide a supply of pressurized water in accordance with the Injection Water Quality Specification MID-TD-0000-3.

The **gas fuel skid** is transported on the gooseneck of the generator trailer and provides the final filtration of gas fuel to the package. When in operation the gas fuel skid is connected to the turbine trailer with a Contractor-provided mechanical interconnect to the package.

The **LM2500-RC-MDW™ gas turbine exhaust** flows through an exhaust collector and roof mounted exhaust silencer. The standard TM2500 exhaust collector exit is oriented in the upright position. The exhaust collector provides a direct path into the turbine exhaust silencer. The exhaust collector consists of an inner and outer duct forming a diffusing passage from the power turbine rear frame.

A **high-speed flexible coupling shaft** connects the low-pressure turbine/power turbine to the generator. It consists of a forward adapter which mates with the power turbine, two flexible couplings, a distance piece, and an aft adapter which mates with the connected load. The flexibility in the coupling allows for minor deviations between the turbine and generator shafts, this flexibility aids in successful connection between the turbine and the generator.

Generator Trailer

The main deck of the generator trailer contains the generator, generator ventilation, generator lube oil system, and switchgear. The gooseneck of the generator trailer may be optionally removed in operational configurations to reduce the overall installed footprint. Located at the rear of the generator trailer is a docking station that provides the male interface required to connect the turbine and generator trailers together for the operational configuration. The Generator Trailer consists of the following components:

- Generator trailer
- Generator ventilation (when package is fully assembled)
- Generator
- Switchgear
- Generator lube oil skid

For transportation purposes, the generator trailer has a **hydraulically steered stinger** intended to be connected during any type of trailer move. The stinger must be connected when transporting the generator trailer at all times. A five-axle, air ride suspension trailer with three tracking axles and a three-axle steerable stinger is used to transport the generator trailer components. At the site, the generator trailer is connected to the turbine trailer. Landing legs are provided to support and level the equipment at the site.

The **AC generator** operates at a synchronous speed of 3,600 rpm (60-Hz applications) or 3,000 rpm (50-Hz applications), eliminating the need for a speed-reducing gearbox during simple-cycle operation. The TM2500 generator is an air-cooled generator with an air filter assembly and exhaust assembly. Generator power factor shown in its nameplate may not match with the provided documentation, since the generator can operate at many power factors. The Generator may be provided without permanent magnet generator rotor and Control Trailer-Control House package battery system will be utilized instead. Dry coupled to the engine, the generator is mounted directly to the generator trailer. This arrangement enables engine/generator shaft alignment to be adjusted with the turbine trailer with the suspension system of the turbine trailer, while the generator remains fixed.

The **Generator Lube Oil (GLO) skid** is a compact installation of generator lube system equipment on the generator trailer and is positioned on the generator end of the generator trailer. The skid contains transmitters that provide remote system monitoring. The pressure transmitters have instrument valves in their feed lines to simplify maintenance. The generator lube oil system will include:

- GLO Filter
- GLO Tank
- DC Lube Oil Pump
- Generator Cooler Vent Valve
- Mechanical Lube Pump
- GLO Fin-Fan Heat Exchanger
- GLO Air/Oil Separator
- GLO Pressure Control Valve

The TM2500 has self-contained, metal-clad **switchgear** which is located on the front portion of the generator trailer. The switchgear houses the following components:

- Generator breaker
- Current transformers
- Buses
- Voltage transformers

The generator is supplied with its own ventilation components to provide cooling air solely for the generator. Shaft mounted fans direct cooling air through the generator unit. The cooling air is then exhausted out of the generator through the exhaust silencer located on top of the generator.

Control Module Trailer

The control module trailer includes a lighted and insulated control house. The control module is equipped with an access door and air conditioner/heater. When in the transport configuration, the control house goose neck provides the storage location for the turbine enclosure ventilation fan while the rear platform of the trailer is storage for the generator exhaust silencer.

Table 2-3 provides a description of the trailer components.

Table 2-3: Control module trailer components

Component	Description
Human-Machine Interface (HMI)	The HMI allows operator interaction to operate and control the package. The HMI is integrated with the control system PLC located in the TCP. A computer with separate workstation and chair is provided for HMI control. Alarm and shutdown events are displayed on the HMI automatically.
Motor Control Center (MCC)	The MCC is a free-standing metal cubicle that houses various low-voltage circuit breakers, motor starters, and their controls. It is installed in the control house and includes a lighting and distribution transformer.
Generator Control Panel (GCP)	The GCP contains the voltage regulator and switches for controlling generator operation. This panel also contains local controls, the Beckwith Integrated Generator Protection System (IGPS) for monitoring the operation of the turbine engine and generator and the fire protection panel and VersaMax modules integrated with the control system PLC. The GCP also houses DC circuit breakers for the distribution of DC voltage throughout the package. The framework of interconnects required for complete package communications are distributed through this panel via interconnect cables.
Batteries & chargers	The TM2500 has a 24 VDC control system battery system and charger, a 24 VDC fire system battery system and charger, and a 125 VDC

	switchgear and backup generator lube pump motor battery system and charger. The battery systems are fully wired and mounted in racks located in a separate ventilated compartment of the control house accessible from outside. The standup charger unit for all these components is located inside the control house for easy accessibility. The 24 VDC distribution circuit breakers for the fire and gas protection system are located in the battery charger cabinet.
Remote Human-Machine Interface (HMI)	Contractor provides an additional HMI system for installation in a separate location. The remote HMI can be placed virtually anywhere a network communication link to the Control House can be installed. For distances of greater than 300 feet, a fiber optic card will be required (by EPC/Others). The standard remote HMI is a desktop computer version of the HMI installed locally in the Control House. The same Cimplicity® HMI application is loaded into both the local HMI and the remote HMI. The ability to configure the remote HMI as a viewer-only is standard. This remote HMI is intended to control only its assigned GTG unit (no multi-unit control provided).

The control module trailer is a two-axle, air ride suspension trailer. At the Site, it is inter-connected electrically to the turbine and generator trailers. Landing legs are provided to support and level the equipment at the site.

The standard TM2500 is designed for sustained winds of 100mph. For this project, the TM2500 **seismic kit** improves the design to 120mph of sustained winds. The kit includes foundation hardware that is mounted to the side of the TM2500 trailer and the concrete foundation supporting the TM2500. In addition, the wind kit includes guide wires to secure the exhaust stack on the TM2500.

The slow roll feature for GE's LM2500 aeroderivative gas turbines helps operator safely reduce or eliminate a common forced four-hour lockout period that can occur after a hot shutdown. Slow roll mode allows the hydraulic start system to automatically re-engage the starter after certain emergency shutdown conditions and slow roll the high-pressure rotor at 80-120 rpm. This gives the operator time to address the trip condition and restore the unit to full power operation.

Generator Step-Up Transformer (GSUT) Model

Main step-up transformer (1A Model), sized to export power from 1xTM2500 generator units, under all ambient conditions. The transformers will come complete with on-load taps, high voltage, low voltage, & neutral bushings, dual CT's per bushing, and lightning arrestors for the high voltage terminals. In addition, the GSU-Transformer shall be factory tested to the applicable codes & standards. The transformer insulating oil shall be mineral oils (Shell GTL S4 ZX). The transformer is shipped without oil filling. The insulating oil shall be shipped in drums or tank trucks.

Table 2-4 outlines configuration for the transformers.

Table 2-4: Transformer configuration

Description	Plant configuration
Electrical standard	IEC
Power rating	42 MVA
Frequency	60 Hz
Primary winding configuration	33 KV-Wye
Secondary winding configuration	12.8 KV-Delta
Tap changer	OLTC
Insulating oil	Mineral oil
Winding material	Copper

Liquid Fuel Filtration Module

The liquid fuel Filtration Module is an advanced combination of different sub-systems in only one module or container. This modular design allows a quicker installation of all of the liquid fuel conditioning equipment. It is composed of:

A. A centrifuge system that cleans and transfers the fuel oil from the raw fuel tanks to the clean fuel tanks. It is a 1 x 120 GPM fuel oil separator fully automatic and self-cleaning with an AC motor drive. It includes a combined control panel. This control panel includes all necessary safety protections as alarm and trip functions of the centrifuge. Centrifuge requires water for automatic bowl cleaning cycle.
B. A pump skid with 2 X 100% forwarding pumps to pump clean fuel oil from the clean fuel tanks to the gas turbine. The pumps are driven by a variable frequency driven motor, that can adjust the flow as needed to the gas turbines. The forwarding pumps send the fuel oil through a set of decreasing micron level filters. The pump fuel flow is rated to supply enough fuel for at least 2 GTs (2 X TM2500).
C. A heavy-duty filtration system composed of two filters in series, a bypass filter and a final coalescing filter.

The first filter downstream the forwarding pump has 20 full depth filter elements with 5 μm filter mesh. The second filter vessel has 12 full depth filter elements with 2 μm filter mesh. To guarantee continuous operation, a bypass line to these two filters vessel is provided with a smaller filter vessel with 2 μm mesh. It is designed to permit the filtration module to work while operator replaces the dirty elements on the main filters. Before leaving the module, the fuel oil passes through a coalescing filter, to remove the remaining free dispersed water down to 15 ppm. A pressure regulating valve keeps pressure constant at GT interface (from 5-60 psig) and discharges the excess fuel oil flow thru the recirculation line back to clean tanks.

All the piping on the fuel oil filtration module is made of stainless steel to increase corrosion resistance and assure the possibility of dismantling the module and delivering to another site, without piping corrosion during the move. The filtration module is equipped with a local PLC controller, that controls all these subsystems and enables start-up and shut down upon initiation by Contractor plant control system. Controls include Ethernet interface with Contractor plant control system via Fiber Optic. The module is designed in a semi open ISO 40-foot container, to permit fast shipment and reduce erection and commissioning time. The fuel oil filtration module classification is non-hazardous.

Additional specifications and drawings for the GTG are provided in Appendix 2.

Reverse Osmosis (RO) System

Envirogen's temporary mobile reverse osmosis (MORO) system consists of:

- One (1) Feed pump skid (150 gpm)
- One (1) GAC pressure vessel skid
- One (1) Chemical feed pump skid for antiscalent
- One (1) Brackish water RO skid (3:2:1 4M)
- Feed water/Supply tank volume: 220,230 gallons
- Permeate/Production tank volume: 25,000 gallons

Calcium phosphate will be used for anti-scalent control. Other chemicals to be used will be determined based on production water quality. Additional treatment might be needed to meet GE specifications.

Permeate recover is 75% with additional specifications as follows:

- Feed to system = 126-130 gpm
- Permeate = 94-98 gpm
- Concentrated stream to drain = 31-33 gpm at 1000 ppm TDS and 7.4 pH

Wastewater includes concentrated stream plus occasional GAC (carbon) filter backwash. No backwash pump is present, so backwashing is done using feed water (provided by Water & Sewerage Corporation).

For each TM 2500 unit, the water consumption rate is 45 gpm at 45 psi.

Drawings for the RO system are provided in Appendix 2.

2.2 Description of alternative to the proposed project

Clifton was selected as a temporary location to operate the machines and provide additional capacity to the BPL grid as soon as possible. In Phase 2 of the LNG-to-Power Project, these machines will be permanently located at the BPL Blue Hills Power Plant. The gas turbines will be repositioned once the natural gas pipeline is approved, constructed, and commissioned.

Wartsila reciprocating engines were considered. However, the gas turbines were selected due to the benefits of operating them in the combined cycle. Also, the complexity and cost of maintenance for gas turbines are lower than that for reciprocating engines.

2.3 "No action" alternative

With development, there is always an alternative of 'no action' which leaves the proposed site unchanged. If the project is not implemented, the property will likely be developed for some method of power generation as it is owned by Bahamas Power & Light (BPL). For decades, BPL (formerly Bahamas Electricity Corporation) has been challenged to meet the demands for electricity in New Providence. Power outages have been common, particularly during the summer months. BPL has indicated that load demands for the summer of 2024 has exceeded their projections by 20 MW (Nassau Guardian, 21 May 2024).

Implications of no action include:

- Continued inability of BPL to meet peak summer demands in New Providence;
- Unreliable power generation;
- Potential higher costs of electricity; and
- No reduction in carbon emissions if diesel continues to be fuel source for power generation.

3.0 Baseline description of the Project Site & Surroundings

The Bahamas is an archipelago in the Atlantic Ocean consisting of 13 major inhabited islands and hundreds of smaller islands and cays. Figure 3-1 shows New Providence Island and other nearby islands. New Providence has the highest population of all the islands in The Bahamas, with more than 70 percent (%) of the total population. Its population as reported in the 2010 Census was 246,329. It is the location of the national capital city of Nassau. According to the Census data, the total population of The Bahamas was 351,461 as of 2010 and projected to be 389,410 in 2020.

Figure 3-1: Map of New Providence and Other Nearby Islands

The project is proposed to be located at the existing Clifton Pier Industrial zone on the southwest point of New Providence Island where the existing Clifton Pier Power Station (CPPS) is located. FOCOL-Shell were granted permission by DEPP to utilize baseline data from the 2020 Shell LNG project as data was collected in the same marine area and adjacent to the same terrestrial areas for the current project. While the terrestrial areas are not exact, the features of the area are assumed to be similar as they are adjacent.

Figure 3-2 shows key sites surrounding the project site.

Figure 3-2: Surroundings of Project Site

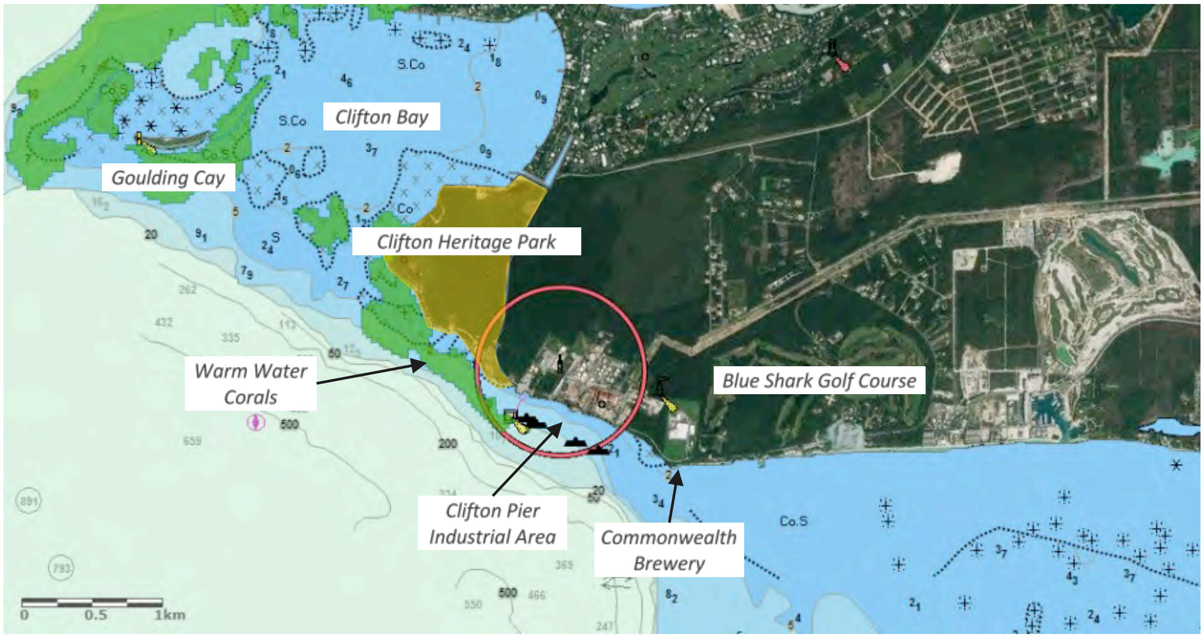


Figure 3-3 below shows the existing onshore industrial facilities currently located at Clifton Pier. These facilities include:

- BPL – power plant stations and heavy fuel oil (HFO) plus diesel storage;
- Sun Oil – Liquified Petroleum Gas (LPG) storage, bunkering and road transport;
- SOL – liquid fuels storage, bunkering and road transport;
- Triton – storage of jet fuel;
- Caribbean Gas – LPG storage and road transport;
- Cement factory – import via the cement Material Offloading Facility (MOF), storage and road transport; and
- Commonwealth Brewery.

Figure 3-3: Existing onshore industrial facilities at Clifton Pier

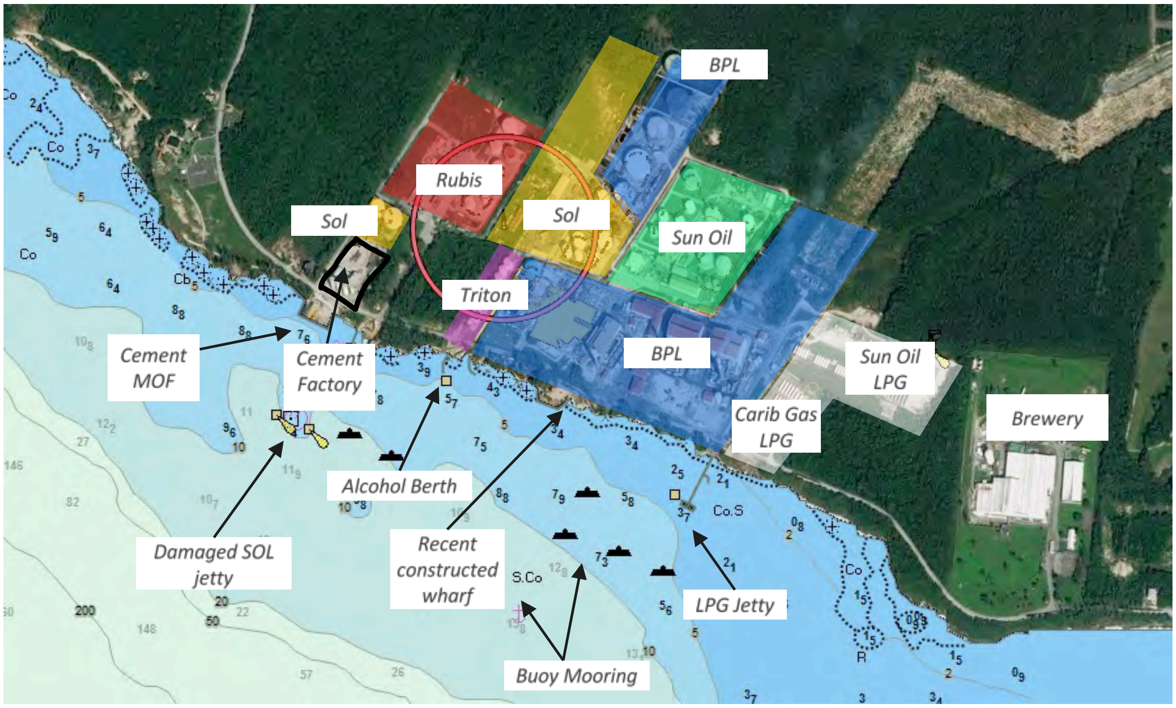


Figure 3-3 also shows several existing marine facilities at Clifton Pier, including:

- offloading facility (cement MOF): in use by the cement factory, which does breakbulk operations for cement;
- SOL jetty: used for unloading distillate, HFO and gasoline. This jetty was heavily damaged during Hurricane Matthew (2016) and a refurbishment is planned by SOL. Presently, the jetty is still used for berthing and a flexible hose is connected to subsea transfer pipelines to offload vessels;
- alcohol berth: exclusively used by the Commonwealth Brewery;
- buoy mooring in approximately 7 m (23 ft) and 15 m (49 ft) water depth: used for HFO and distillate;
- small LPG jetty: used for the import of LPG by Carib Gas and Sun Oil; and
- recently constructed quay wall which also has a roll-off-roll-on facility. This quay wall is part of the remediation works for the oil contamination management across the industrial zone.

There are also a number of operational and abandoned subsea pipelines in the nearshore area at Clifton Pier. These pipelines are all surface laid with no protection structures and have survived several hurricanes including Matthew.

3.1 Physical aspects

3.1.1 Climate

The project area has a subtropical climate, with two distinct seasons: a tropical wet summer season (May to October) and a warm temperate dry winter season (November to April) (Bahamas Department of Statistics, 2020). The climate is influenced by the warm waters of the Gulf Stream, which has the effect of slightly lowering temperatures in the summer and contributing to mild winters. Baseline climatic conditions at the project area are characterized by data from the Bahamas Department of Meteorology and the National Weather Service's Global Forecast System (GFS) model for the period from 1973 to 2020.

Monthly mean, maximum, and minimum temperature data are summarized in Table 3-1. The long-term climatology of the area is characterized by a mean daily temperature of 25.5°C. The hottest months are June, July, and August, while December, January, and February are typically the coolest months in the project area. Monthly maximum temperature is 33.7°C (in July), while monthly minimum temperature is 14.2°C (in December). The lowest recorded temperature was 6.4°C on January 15th, 2018, while the hottest temperature on record was 36.9°C recorded in June 2019.

The monthly distribution of precipitation data Is shown in Table 3-2. The heaviest rainfall occurs during the summer months. The annual average precipitation is about 1,364 mm (53.7 in) and 74% of it falls from May through October. June, August, and September tend to be the wettest months with an annual average of 205 mm, 192 mm, and 183 mm (8.1, 7.6, and 7.2 in), respectively. Maximum monthly rainfall within the period from 1973 to 2020 was 584 mm (23 in), recorded in September.

The climate in the area is influenced by trade winds and high-pressure systems. Trade winds blow in a predominately easterly direction with consistent wind speed, blowing from the tropical high-pressure belts to the low-pressure zone at the equator. The prevailing wind is from the east and northeast, but wind direction ranges from southeast to northeast throughout the year.

Monthly distribution of average wind speed, maximum sustained wind speed, and maximum wind gust are shown in Table 3-3. The average observed wind speed is 13.6 km/h (8.4 mph), with the highest average winds experienced in April. Monthly maximum wind speed recorded is 72 km/h (22 mph). Maximum sustained wind speed on average is 25 km/h (15 mph), with highest recorded of 104 km/h (40 mph).

It should be noted that the Lynden Pindling International Airport is located on the north side of the island and northerly winds might be overrepresented in the above data. The project site is in the lee of New Providence and is more vulnerable to southerly or southeasterly winds, especially during the summer.

Average annual relative humidity is approximately 79%, ranging from 78% in May to 82% in September (Bahamas Department of Meteorology, 2020). Diurnal distribution of relative humidity ranges from about 90% in the early morning hours to 55% in the afternoon.

Table 3-1: Monthly Temperature Distribution for Lynden Pindling International Airport Station, 1973-2019

TEMPERATURE	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean temperature (°C)	21.9	22.1	22.9	24.3	26.1	27.7	28.6	28.6	28.1	26.7	24.6	22.9	25.4
Maximum temperature (°C)	27.2	28.1	28.4	30.4	31.6	33.5	**33.6**	33.4	32.7	31.8	28.6	28	33.6
Minimum temperature (°C)	15.6	16.1	16.7	18.9	20.9	23.1	23.5	23.8	23.3	22.3	18.9	**14.0**	14.0

Note: Bolded value presents extreme value

Source: NOAA, NO DATE

Table 3-2: Monthly Rainfall Distribution for Lynden Pindling International Airport Station, 1973-2019

PRECIPITATION	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average rainfall (mm)	65	48	60	63	119	**201**	145	193	180	136	78	60	1348
Maximum rainfall (mm)	361	272	256	207	317	**546**	290	434	449	366	244	510	546

Note: Bolded value presents extreme value

Source: NOAA, NO DATE

Table 3-3: Monthly Wind Data Distribution for Lynden Pindling International Airport Station, 1973-2019

WIND	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average of wind speed (km/h)	13.9	14.4	**15.3**	15.0	13.6	11.9	11.8	11.4	11.1	13.3	14.6	14.0	13.3
Maximum of wind speed (km/h)	42.0	36.9	39.8	36.1	32.0	34.3	34.4	46.7	**68.9**	48.3	51.9	37.0	68.9
Average of maximum wind speed (MXSPD) (km/h)	24.8	25.6	**26.0**	25.4	23.5	22.5	22.8	22.7	22.0	23.6	24.9	24.5	24.0
Maximum sustained wind speed (km/h)	88.9	94.3	**97.8**	83.2	96.1	75.9	70.2	74.1	94.3	96.1	94.3	87.0	97.8
Maximum of wind gust speed (GUST) (km/h)	103.5	94.3	96.1	84.8	77.8	77.8	77.8	**166.1**	140.8	137.0	140.8	75.9	166.1

Note: Bolded value presents extreme value

Source: NOAA, NO DATE

Tropical Storms & Hurricanes

The Bahamas is located within the Atlantic Tropical Cyclone basin. This basin includes much of the North Atlantic, Caribbean Sea, and the Gulf of Mexico. On average, 6 to 8 tropical storms form within this basin each year. Low-lying islands and cays in The Bahamas are susceptible to high winds, heavy rainfall, storm surges, and flooding caused by these severe weather events, which can result in significant damage.

According to data from the Bahamas Department of Meteorology, a total of 224 hurricanes and 121 tropical storms passed within 160 km (100 mi) of The Bahamas from 1886 to 2022 (137 seasons). The majority of these storms occur in the months of September, October, August, and November, with September being the most frequent month for hurricanes and October being the most frequent month for tropical storms.

Recent data from the National Hurricane Center (NHC) shows that 47 hurricanes, tropical storms, and tropical depressions affected The Bahamas between 2001 and 2022. Of these, six were Category 5 hurricanes on the Saffir-Simpson Hurricane Wind Scale, which categorizes hurricanes based on their sustained wind speed.

In 2016, The Bahamas was impacted by Hurricane Matthew with the islands of New Providence, Andros and Grand Bahama receiving severe damage in some coastal areas. In 2017, The Bahamas was impacted by Hurricane Irma. Significant damage occurred on the island of Great Inagua; Crooked Island was impacted as well. The Bahamas was not hit by any hurricanes in 2018.

In 2019, significant areas of the islands of Abaco and Grand Bahama were devastated by Hurricane Dorian. Estimated damage for these islands is US$3.4 Billion (IDB, 2019). Hurricane Dorian was one of the strongest Atlantic hurricanes on record, with maximum sustained winds of 285 km/h (178 mph) and a minimum central pressure of 910 mbar. Water levels reached up to 2.1 meters (7 feet) above ground level on the western end of Grand Bahama Island, with even higher levels reported farther east on Grand Bahama Island and on the Abaco Islands.

According to official reports, a total of 70 people lost their lives in Hurricane Dorian. Of these, 62 fatalities occurred in Abaco, while 8 were reported in Grand Bahama. The Bahamas Weather Service also reported that there were 245 people missing at the time of their report. The Inter-American Development Bank estimated that Hurricane Dorian left over 29,000 people homeless or jobless.

The Bahamas has not been affected by any hurricanes in 2020 through 2023.

The formation of these storms and possible intensification into mature hurricanes takes place over warm tropical and subtropical waters. Eventual dissipation or modification typically occurs over the colder waters of the North Atlantic or when the storms move over land and away from the sustaining marine environment. The official hurricane season lasts from June 1st to November 30th .

Climate and Sea Level Rise

Climate variability and change is expected to greatly influence the existing weather and environment of The Bahamas. Problems that may be exacerbated in response to climate variability and change are the frequency and intensity of hurricanes and the potential of rising sea levels. Changes in the position and the distribution of fresh, brackish and saline groundwater is anticipated due to any rising sea level, combined with possible reductions in groundwater recharge from changes in rainfall distribution.

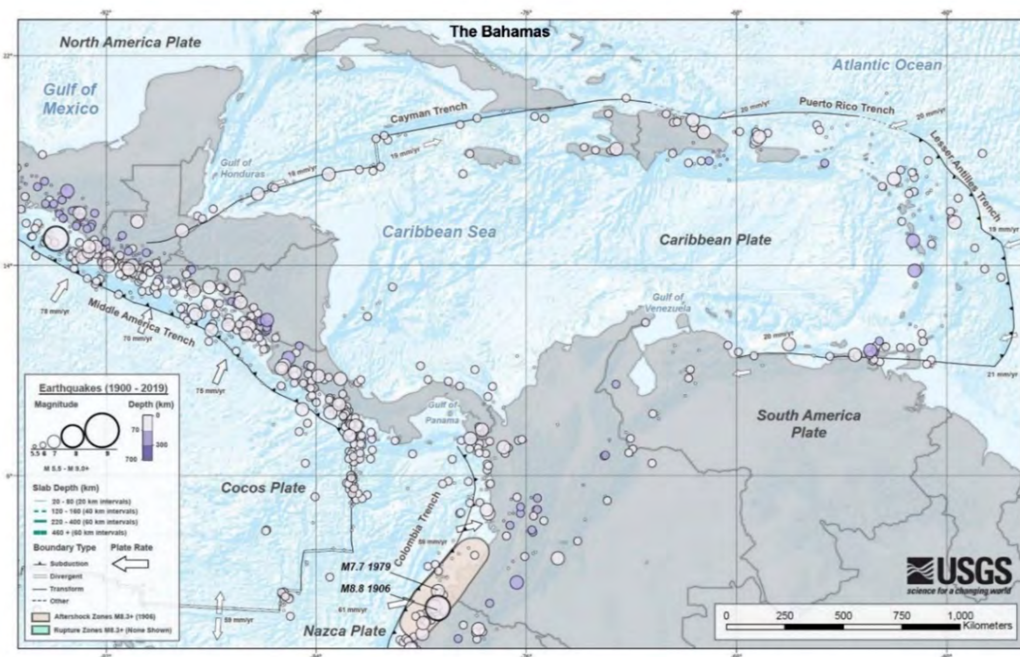
It appears that the sea has been rising at a rate in the order of 6 to 10 inches (152 to 254 mm) per 100 years in The Bahamas, not taking account of possible differences in the rates of uplift or subsidence at these sites. The observations are consistent with the model predictions, and it is generally agreed that the rate of sea level rise in the next century will be 2 to 5 times that in the last 100 years.

In The Bahamas, rising sea levels will lead to considerably less fresh groundwater resources, accelerated erosion of coastal shorelines, and the deeper penetration of storm surges inland.

3.1.2 Seismicity

The Bahamas and the Turks and Caicos Islands are part of the Lucayan Archipelago, a group of islands located in the North American Tectonic Plate, bordering the Caribbean Plate to the south (Dolan and Mann, 2019; see Figure 3-4). The Caribbean Plate is a mostly oceanic tectonic plate that underlies Central America and the Caribbean Sea, while the North American Plate borders it to the north (USGS, 2022).

Figure 3-4: Caribbean Plate Location



The Septentrional-Oriente Fault Zone (SOFZ) is an active fault system that forms the northern boundary of the Gonâve microplate, which is a part of the complex system of microplates that lie between the southern boundary of the North American plate and the northern boundary of the Caribbean plate (Dolan and Mann, 2019; see Figure 3-5). The SOFZ is characterized by left-lateral motion and is responsible for approximately half of the relative motion between the North American and Caribbean plates (Dolan and Mann, 2019).

The Bahamas is located in a region of low seismic activity, with expected maximum earthquake sizes less than 5 on the Modified Mercalli Intensity scale (MMI) for the main islands (see Figure 3-6) (Bahamas Department of Meteorology, 2022). However, as you move south towards the Caicos Islands, the expected maximum intensity increases to exceed 6 MMI (International Seismological Centre, 2022).

According to data from the United States Geological Survey (USGS), there have been several significant earthquakes in the Caribbean region since 2019 (USGS, 2022). These earthquakes have been centered primarily along the SOFZ and have had magnitudes ranging from 6.0 to 7.3.

The horizontal peak ground acceleration (PGA) for The Bahamas is around 0.2 m/s^2 (0.66 ft/s^2 or 20 Gals), which represents a 10% probability of exceedance in any 50-year period (International Seismological Centre, 2022). This value increases to around 1.2 m/s^2 (3.94 ft/s^2 or 120 Gals) towards the south of Turks and Caicos Islands.

Figure 3-5: Gonâve Microplate and Oriente Fault Zone

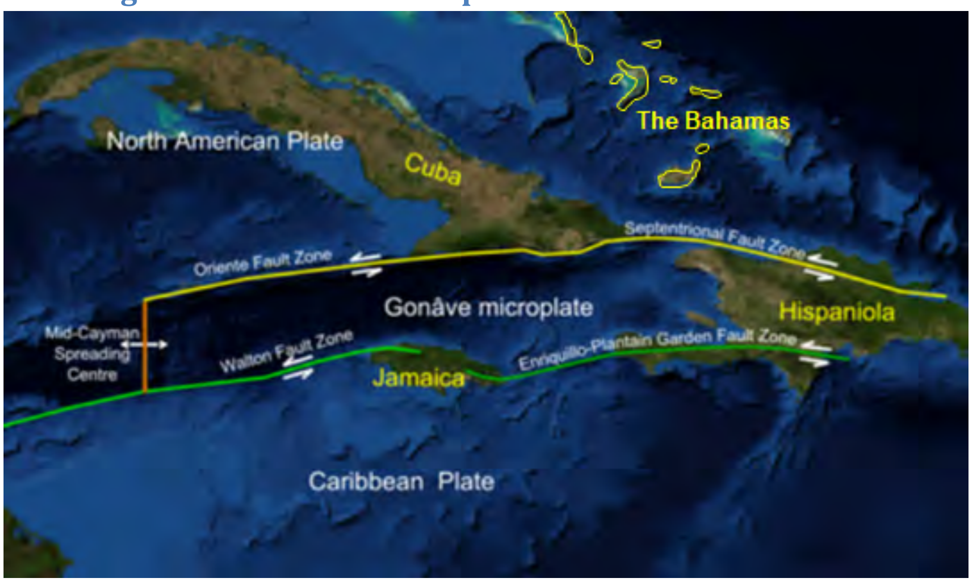
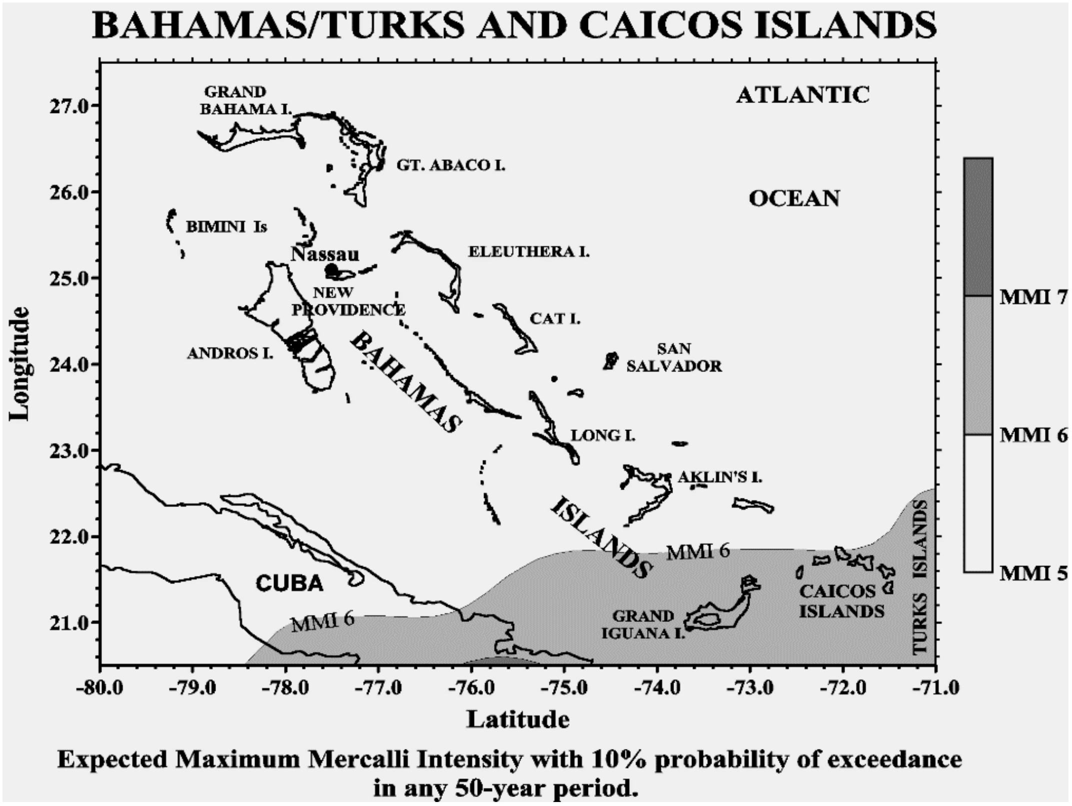


Figure 3-6: Expected Maximum Mercalli Intensity



While large earthquakes at SOFZ can be felt in The Bahamas, there is no recorded history of large earthquakes in the region (Dolan and Mann, 2019). Smaller tremors with magnitudes less than 3 are possible, although uncommon (Bahamas Department of Meteorology, 2022). The southeast Bahamas, particularly Inagua Island, has experienced tremors in the past, and it is possible that Nassau could experience small-magnitude tremors although they would likely be rare.

3.1.3 Topography

Topographically, the islands of The Bahamas are typically flat with elevations of less than 32 feet (10 meters). A higher coastal ridge may occur, usually located along the exposed side of most islands. The topography of the Clifton area is dominated by a ridge that runs northeast to southwest along western New Providence. Clifton Pier is located at the southern end of that ridge and gently slopes down in elevation toward the coastline.

Based on the best available data and information collected during field visits to the proposed project site, the majority of the site is well above sea level. Elevations nearest the coast range from approximately 4.5 to 12.5 m (14.8 to 41 ft) above mean sea level, with higher elevations appearing to the southwest. Generally, the land slopes north from the coast upward towards the Phase 1 site, with elevations ranging from 5 to 12 m (16.4 to 39.4 ft) above mean sea level. Elevations further west along Southwest Road toward CPPS range from approximately 5 to 8 m (16.4 to 26.2 ft) above mean sea level. A topographic survey of the project site is provided in Appendix 1.

Most of Clifton Pier area has been developed, with impervious surfaces, buildings, and storage facilities covering most of the site. The remaining undeveloped land has been cleared or disturbed in some way or another, with areas that have exposed soil and rocky surface, disturbed fill mounds, and some vegetation.

3.1.4 Geology

The Bahamas archipelago is situated in the western North Atlantic and is comprised of extensive carbonate islands and shallow banks. There are 29 large islands, over 600 small cays, and more than 2,000 rocks, all low-lying. The surface deposits of archipelago are of Late Quaternary limestones from a glacioeustatic sea-level high-stand position; a depositional record of platform flooding and carbonate sediment production. Simply put, alternating glacial expansions and retreats created vast changes in sea levels across geologic time, allowing for the formation of the islands. The islands are tectonically stable, consisting of carbonate sediments with interspersed paleosols (Mylroie, 2016).

With geologic origins that are biogenic and completely carbonate, The Bahamas differs from other islands in the region. The islands rest on shallow water banks which are primarily composed of calcium carbonate sediments. These limestone sediments were created from rapidly growing marine life which extracted calcium carbonate from seawater creating voluminous depositions of sand and mud. The Bahamas consists of eight carbonate banks with the north and central islands resting on two of these banks.

Oolitic sands have also contributed to the geologic development of the islands, specifically during the last ice age when sea levels were significantly lower. It was then that oolitic sand dunes hardened and when sea levels rose, the rock ridges formed by these dunes became islands along the edges of the shallow banks. The cliff face along Clifton Bay is characteristic of these oolitic sand deposits.

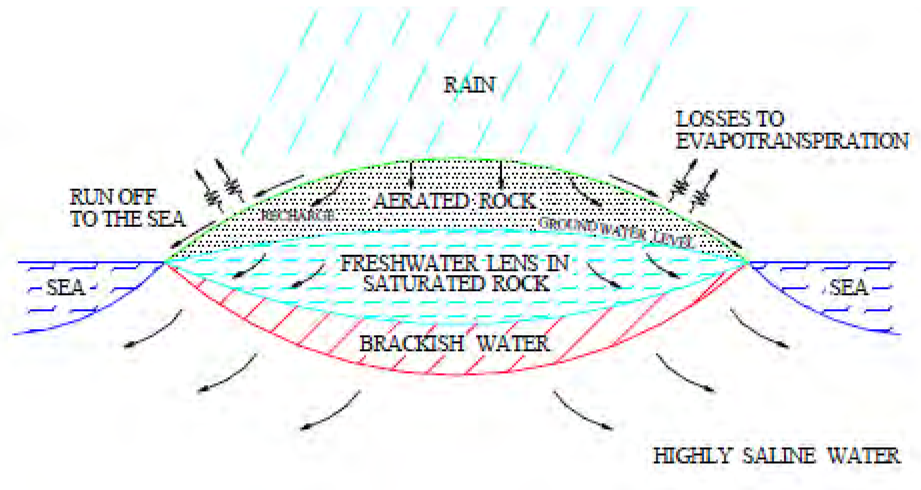
Another source of islands in the archipelago are limestone rocklands, which were formed from the seabed when sea levels were at their highest. As sea level declined, the exposed seabed underwent erosion and weathering. The resulting formation was rocklands. Rocklands make up the broader islands in the archipelago (such as Andros and Grand Bahama) and oolitic sand dunes are represented in thin long islands (including Long Island and Cat Island).

Soil composition in the archipelago consists of organic and inorganic materials and the young age of the soil is reflective of the geologic age (young) of the limestone. Soils layers are typically thin and usually arranged in one or two layers above bedrock. Three soil types are recognized throughout the islands: organic, red clay, and sedimentary soils.

3.1.5 Hydrology and hydrogeology

In The Bahamas, the physical geology, hydrogeology, and water resources are very directly linked as there are no true rivers in The Bahamas. The sole natural means of recharge for the underlying freshwater resources is via rainfall. The groundwater resources of the Commonwealth of The Bahamas comprise the fresh, brackish, saline and hypersaline waters found in the subsurface and in the lakes and ponds that intercept the land surface. Most of the freshwater resources occur as three-dimensional lens-shaped bodies, which overlie brackish and saline water referred to as Ghyben-Hertzberg lenses.

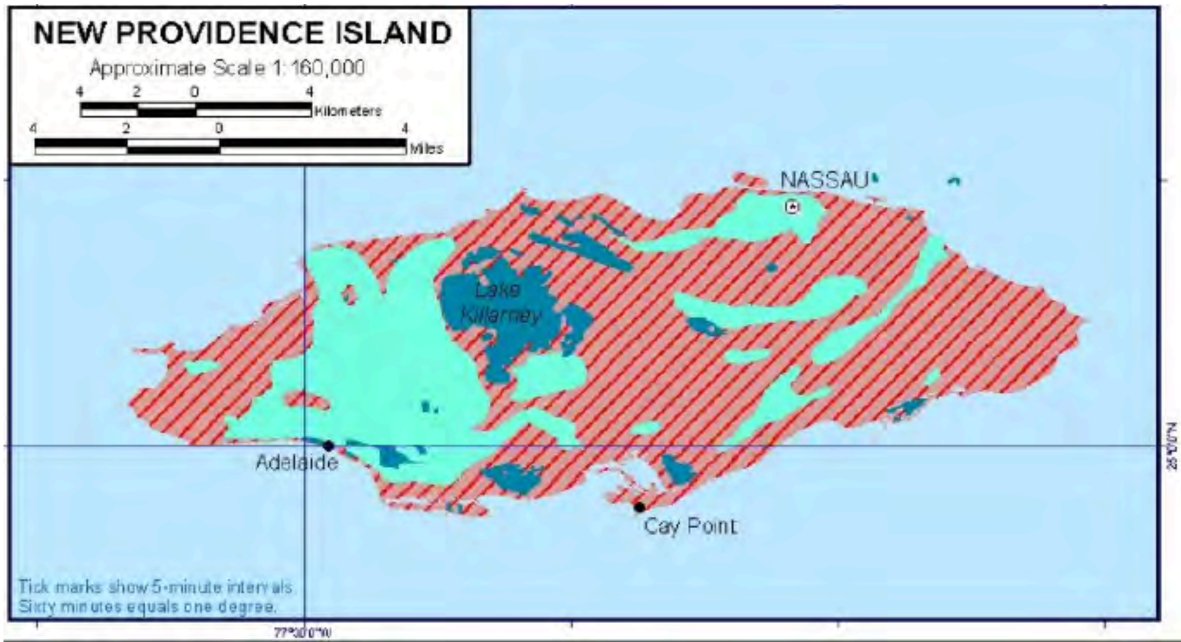
Figure 3-7: Ghyben–Hertzberg Lens



Generally, there is nowhere on the islands of The Bahamas that groundwater cannot be met in holes that penetrate 10 feet (3 meters) below sea level. Water is always met in the range 0 to 3 feet (0 to 0.9 meters) above sea level. Tidal action induces an up and down movement to the entire groundwater table ranging from negligible amounts to about 3 feet (0.9 meters). The effect of tides usually decreases inland, but can be substantial if a well-established cavern or other large opening directly connects the area to the sea. In many places inland, rise and fall of the water table is less than 1 foot (0.3 meters). In karst (limestone) geology like The Bahamas, the groundwater and surface water are highly interconnected. All aquatic coastal karst basins are open systems with subterranean connection to the ocean, unless otherwise empirically proven in individual cases.

Figure 3-8 shows areas throughout New Providence where the fresh water (< 1,500-mg/l chloride) is "locally plentiful" with the water table within 0 to 6 meters (0 to 20 feet) of the surface (USACE, 2004) Thickness of the water lenses in New Providence range from 20 to 50 feet (Cant, n.d.).

Figure 3-8: Diagram of New Providence Freshwater Lenses



Map Legend	
Groundwater resources – Fresh water locally plentiful; unsuitable to large quantities of fresh water from shallow, freshwater lenses within poorly-stratified Pleistocene limestone aquifers. The water table is within 0 to 20 feet of the surface	
Ground water resources – Fresh water scarce or lacking; unsuitable quantities of fresh water from shallow poorly-stratified Pleistocene limestone aquifers.	
Surface water resources – Surface water features including ponds, lakes, creeks and blue holes; unsuitable to meager quantities of brackish to hypersaline water available.	

Source: USACE, 2004.

The upper groundwater is typically brackish (salinity of 1,500 to 3,000 mg/l) on New Providence. Local groundwater conditions indicate a limited availability of freshwater resources in the vicinity of the project area. Any available freshwater resources (salinity < 1,500 mg/l) would be north of the proposed project site and less than 6.09 m (20 ft) in thickness.

Reverse geothermal conditions exist for the Islands of The Bahamas – the greater the drilling depth for wells, the cooler the water source (subsurface inverted geothermal conditions). The conditions of the groundwater at CPPS are indicative of the high degree of exchange with the surrounding ocean. At present, groundwater is utilized for cooling water from CPPS, and then directed for outfall to the marine environment.

Limestone can prove to be highly permeable and thereby easily infiltrated by pollutants. Underground conduits, along with the tidal influence on the groundwater water resources, result in a high estimated range of hydraulic conductivities (movement of water in the subsurface). In addition to their drainage function, unmonitored flows to drainage wells can serve as a pollution receptor.

A hydrogeological survey of the CPPS site was conducted from May 6 through 8, 2020. In addition, Shell retained Geosyntec Consultants and Geosyntec (Bahamas) Limited to undertake a Pre-Construction Environmental Survey of a nearby greenfield site. The environmental survey included soil sampling, soil vapor sampling, and ambient air sampling; it also characterized the hydrogeology of the greenfield site. A final report was submitted to Shell in August 2020 and is included in Appendix 6. The findings for these surveys have implications for the LNG-to-Power project due to their proximity and also give an indication of hydrogeological conditions for the project site covered by this EBA.

Based on its review of results from previous site characterization work at CPPS involving 57 wells completed by CH2M Hill in 2018, Geosyntec assumed that hydrogeology at the greenfield site is similar to that at CPPS. It is noted that groundwater is encountered within the shallow carbonate deposits typically at elevations ranging from approximately -1.8 m to 1.8m (-6 ft to 6 ft) relative to mean sea level. The following general observations were ascertained from the significant groundwater level data collected at CPPS for the CH2M Hill 2018 study:

- Groundwater farther inland tends to be higher than sea level. Near the cliffs along Clifton Bay, groundwater elevations are closer to sea level, indicating a general condition of groundwater discharge to the ocean.
- The carbonate rocks create different water-flow dynamics due to caves and voids (karst features). Although groundwater eventually flows into Clifton Bay, the pathway that the groundwater takes to get there is complex and generally is not expected to be linear (Geosyntec, 2020).

Rainfall

Rainfall is unevenly distributed across The Bahamas. Figure 3-9 shows the distribution of rainfall for The Bahamas.

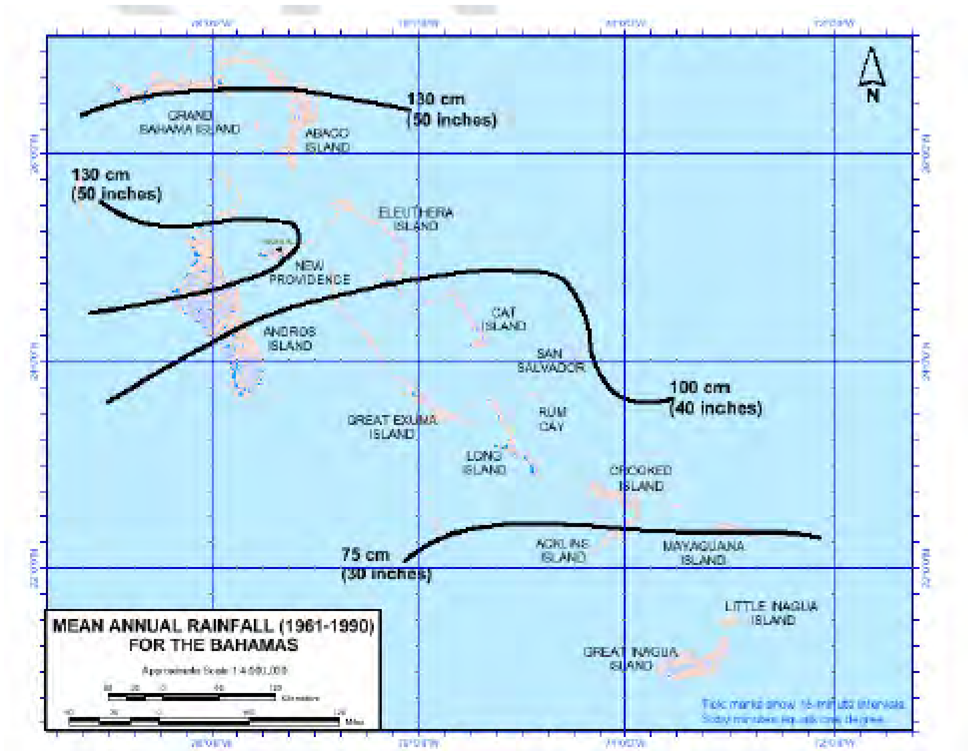
The north and north central Bahamas receives some 50 to 60 inches (1270 to 1524 millimeters) of rainfall annually while in the southeast Bahamas, the rainfall decreases to some 36 inches (914 millimeters) annually (USACE, 2004). There is a distinct dry season (November to April) and a pronounced wet season (May to October). The seasonal effects of tropical cyclones have a pronounced effect on annual rainfalls across The Bahamas. Additionally, winter storms flowing off the North American continent also impact rainfall during the normally dry period. This effect however rarely extends into the central and southern Bahamas.

Surface Water

"Inland water bodies are, in most instances, places where the water table is at or near the same level as the land surface. These bodies are usually saline or brackish in nature. In other cases, ponding of water can occur after a heavy rainfall where the surface rock is impervious enough to retard infiltration. These intermittent freshwater pools may persist for a few hours or for the full length of the wet season. The two most prominent types of surface water bodies in The Bahamas are blue holes and salt ponds." (USACE Water Resources Assessment, 2004)

There are no land-based (rivers, lakes, or ponds) sources of surface water at the proposed project site or in its immediate vicinity. For the Clifton Pier area, there are no specific natural surface water concerns, but natural drainage and surface runoffs are concerns to be addressed.

Figure 3-9: Mean Annual Rainfall for The Bahamas



Source: USACE, 2004.

3.1.6 Soil and Groundwater Contamination

For the purpose of this EBA, various soil investigations conducted at CPPS and a nearby vegetated site (i.e. Shell Greenfield Property) were reviewed. These included investigations completed by CH2M Hill on behalf of BPL and by Geosyntec. The main reference reports included:

- Pre-Construction Environmental Survey, Shell Greenfield Property, Clifton Pier Area, Nassau, The Bahamas – Prepared for Shell Global Solutions (US), Inc. by Geosyntec Consultants and Geosyntec (Bahamas Limited) dated August 2020;
- Powerplant Pre-Construction Environmental Survey, Clifton Pier Power Station, Nassau, The Bahamas – Prepared for Bahamas Power and Light Company Ltd. By Geosyntec Consultants and Geosyntec (Bahamas Limited) dated May 2020;

- Clifton Pier Power Station Product Recovery System, New Providence Island, Bahamas, Pre-Final Design Drawings – Prepared for Bahamas Power and Light Company Ltd. By Geosyntec Consultants dated September 2018;
- Site Characterization, Conceptual Site Model, Clifton Pier Power Station, New Providence, Bahamas – Final Report – Prepared for the Bahamas Ministry of Environment and Housing, Department of Environmental Health Services by CH2M Hill, Inc. dated March 2018; and
- Off-site Characterization Report, Clifton Pier Power Station, New Providence, Bahamas – Prepared for the Department of Environmental Health Services by CH2M Hill, Inc. dated August 2017.

Geosyntec completed a small number of shallow auger holes as well as one deeper borehole which was completed as a groundwater monitoring well within the bedrock. No specific environmental concerns were identified during this investigation regarding the Shell Greenfield Property. However, the Caribbean Gas property, situated immediately between the proposed project site and CPPS is a brownfield site in the immediate vicinity.

CPPS Site Subsurface Conditions

The existing CPPS facility was constructed in 1958. Heavy oil and Bunker C petroleum hydrocarbons were primarily used to fuel the electrical generation power station. Aboveground storage tanks and buried pipelines are all part of the infrastructure installed to operate the facility. It is not known when hydrocarbon losses first occurred, but it was likely not long after the facility opened. The quantity of hydrocarbons lost is not specifically known. At locations on the west side of CPPS, gasoline and diesel fuel is present with the heavy oil and Bunker C as free product in the subsurface. The nonaqueous phase hydrocarbons are present throughout the majority of the site at CPPS and extend to the shoreline in many locations. The presence of karstic bedrock conditions has promoted the migration of the petroleum hydrocarbons.

Extensive environmental investigation work has been done on the CPPS site by CH2M Hill. Recent work is documented in the CH2M Hill 2018 report noted above. The program investigated heavy oil and Bunker C losses, as well as diesel and lubricating oil losses from CPPS.

CPPS is underlain by a variable, but thin typically sandy overburden followed by limestone bedrock. Reference is made to the carbonate rock karst conditions underlying the site. Flank margin caves, along the shoreline of the island, are noted and described as having radiating tubes leading inland that create a maze-like pattern both above and below the water table. These conditions significantly influence groundwater flow and in turn hydrocarbon free product migration. Slower migration occurs through bedrock fractures. Groundwater flow is influenced by tidal fluctuations. Due to the karst conditions groundwater flow is very complicated but ultimately overall groundwater flow is to the shoreline. Light nonaqueous phase liquid (LNAPL) petroleum hydrocarbons have been migrating from CPPS into the bay for many years. LNAPL recovery systems have been operating since 2008 with some systems extracting from caves.

In 2018, CH2M Hill conducted a detailed program of LNAPL monitoring from 57 wells, geophysical surveying, tidal influence monitoring, topographical surveys and marine seep surveys for LNAPL migration into the bay. Some of the key findings of the investigation include:

- 41 of the 57 wells reported LNAPL of sufficient thickness to measure;

- LNAPL thicknesses of up to 3 m (10 ft) were common;
- Micro gravity geophysical surveys identified nine low gravity areas which may be caused by caves, dissolution and weathered zones;
- Multi-channel Analysis of Shear Wave (MASW) geophysical testing identified ten potential cave locations, seven of which matched with the micro gravity identified areas. These are often set back from the shoreline;
- MASW testing confirmed more dense rock at a depth of about 10.7 m (35 ft) below grade which is consistent with the competent reefal limestone reported throughout the island;
- MASW testing compared well with known caves along the shoreline; and
- the marine seep survey indicated that LNAPL migration was at or near the groundwater table. There was no evidence of LNAPL migration from the deeper dense reefal limestone to the bay.

The CH2M Hill report indicated that in 2018 installation of a sheet pile wall, collection trench and a recovery sump were underway for groundwater flow and LNAPL migration control. Installation of these environmental control measures has been completed. CH2M Hill also developed a Conceptual Site Model to demonstrate subsurface conditions, groundwater flow and LNAPL migration which is provided in Figure 3-10.

Geosyntec Consultants has also carried out investigations and analyses at CPPS (Geosyntec 2020b). They have also carried out design work for an extensive LNAPL product recovery system. They prepared a document entitled "Clifton Pier Power Station Product Recovery System, New Providence Island, Bahamas, Pre-Final Drawings" dated September 2018 that includes the drawing presented in Figure 3-11 which provides an overview of the extent of hydrocarbon LNAPL conditions to be addressed at CPPS.

While this information is specific to conditions at CPPS, it has relevance for adjacent properties, including those for the LNG-to-Power project with respect to geology, hydrogeology, subsurface investigation methods, present and future contaminant migration concerns and the level of effort required to fully investigate a site underlain by complex geological conditions. The Geosyntec reports demonstrate the need for the ongoing subsurface free hydrocarbon collection, monitoring and sampling at CPPS.

Figure 3-10: Conceptual site model – CPPS, CH2M Hill (March 2018)

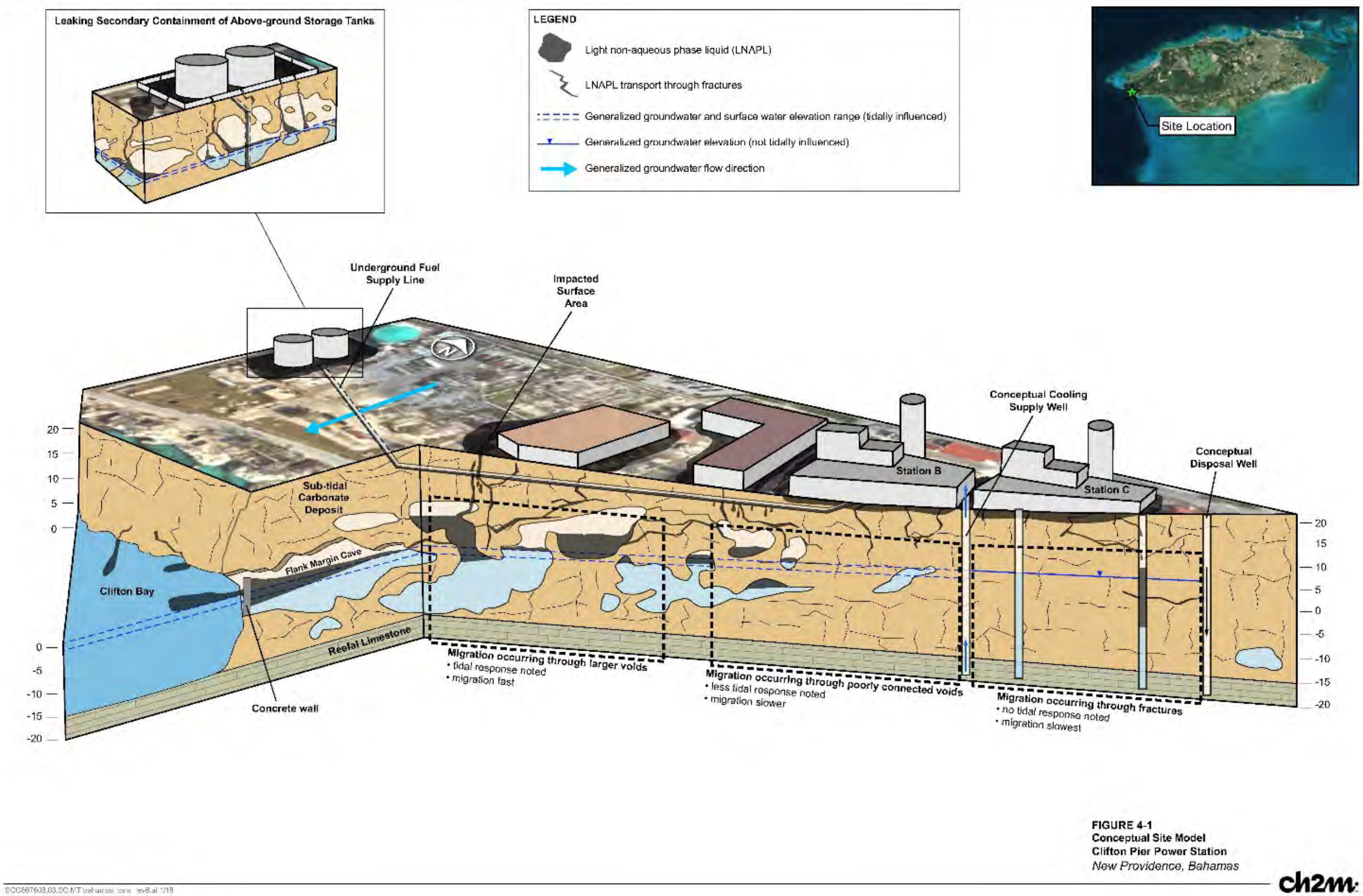
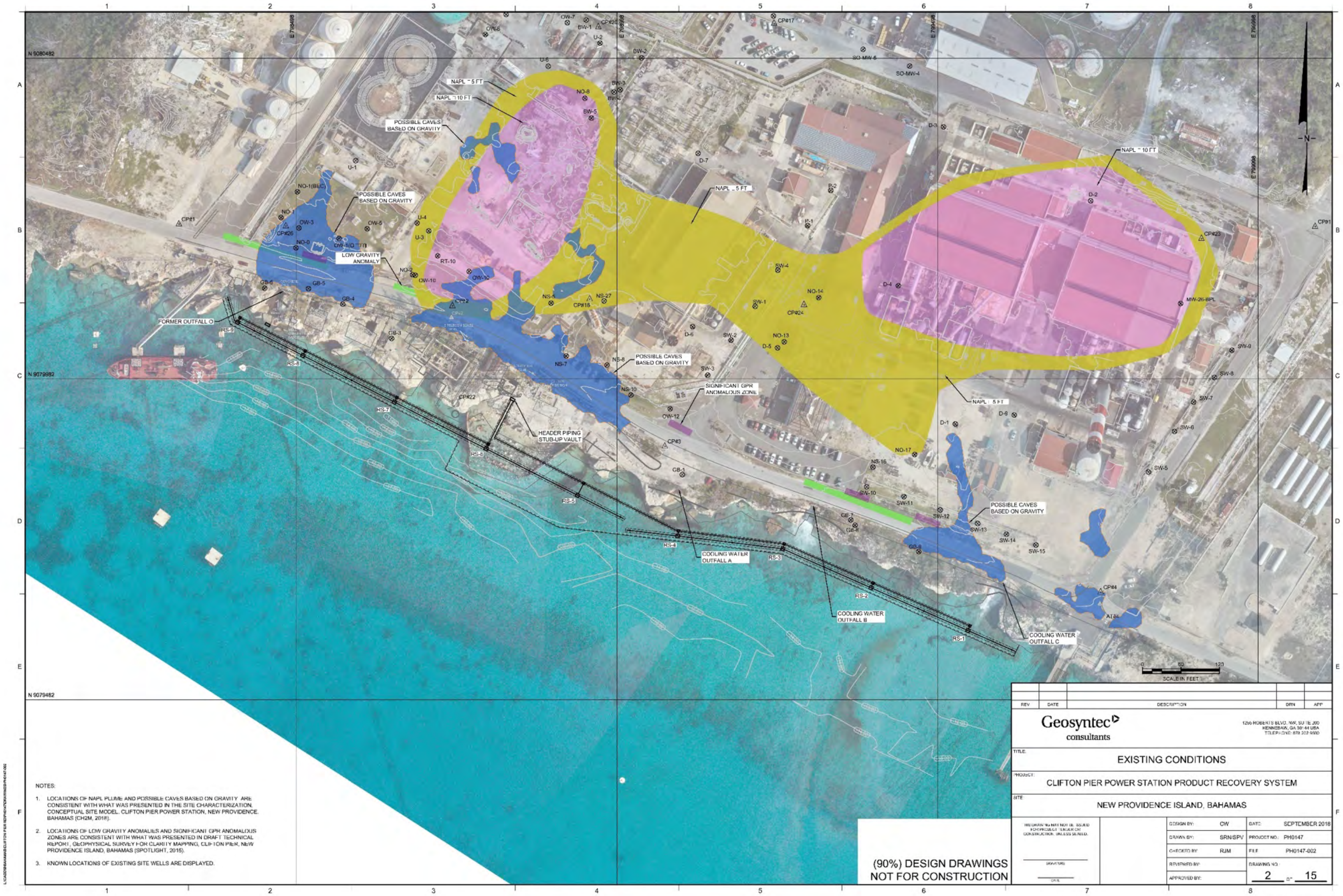


Figure 3-11: Geosyntec Drawing – Site conditions as of Sept 2018



Greenfield Site Subsurface Conditions

The August 2020 Geosyntec investigation was carried out on the greenfield site (for Shell 2020 LNG project) included surface, shallow and deep soil and bedrock sampling, groundwater sampling, soil vapor and head space sampling, ambient air monitoring and recommended remedial actions (see Figure 3-12). Based on surface, shallow and deep soil sample testing, the following were key laboratory findings:

Surface soil sample findings	Shallow soil sample findings	Deep soil sample findings
Metals were below Direct Contact for Industrial (DCI) standards	Metals were below DCI standards	Metals were below DCI standards
TPH ranged from 230 to 1100 mg/kg and were all below DCI standards	TPH 200 mg/kg or lower, all meeting DCI standards	TPH ranged from non-detect to 20 mg/kg and were all below the DCI standards
VOC and pesticides were not detected	Pesticides, PCBs, VOCs and SVOCs not detected	Pesticides, VOCs and SVOCs were not detected

Figure 3-12: Geosyntec greenfield site sample locations

Soil vapour sampling at the greenfield site by Arcadis in December 2020 raised concerns for the potential for petroleum hydrocarbons or other VOCs to have migrated within the subsurface from hydrogeological upgradient industrial properties to the greenfield site (see Figure 3-13). Such migration would have implications for LNG-to-Power project site which is also adjacent to CPPS. Construction of any office space or other functional space would require further evaluation of the locations. The design of passive vapour migrations systems at some locations may be necessary to ensure worker health and safety. A passive vapour migration system could include a sub slab vapour migration barrier and/or a permeable gravel base beneath the floor slab with 49uthed piping to allow passive venting and to prevent vapour accumulation.

Figure 3-13: Soil vapour sample locations

3.1.7 Air quality

The existing air quality in The Bahamas is affected by strong easterly trade winds for most of the year and in general windy conditions during the year that tend to transport emissions from sources located on the Islands out over water, rather than allowing them to accumulate and concentrate in ambient air over areas of population (Arcadis, 2005).

The existing air quality within the project area is characterized in this EBA in order to estimate total potential air quality impact of the proposed project and to demonstrate (evaluate) compliance of the proposed project with ambient air quality standards. Ambient air quality levels values are added to modelled pollutant concentrations to obtain cumulative impacts, which are then compared to applicable ambient air quality standards. Ambient air quality (or "baseline" levels) accounts for pollutant concentrations that are not associated with any of the sources explicitly included in the modelling analysis for the proposed project.

The methodology used by Arcadis to determine (characterize) the general baseline air quality in the area was to use historical ambient air quality monitoring data that are representative of the area at the proposed project site. There are no established ambient air quality monitoring stations to collect data on pollutants levels on New Providence Island (or elsewhere in The Bahamas) that might be used to estimate the existing air quality.

An ambient air quality network was historically operated by Mott Macdonald, Environmental Report 2009, as cited by Golder Associates, 2013 report (on behalf of Bahamas Electricity Corporation) which comprised of three continuous monitoring stations. The three monitoring stations were located at Clifton Pier, Lyford Cay and Blue Hills. Data from Clifton Pier and Lyford Cay air quality monitoring stations are preferable for use in describing ambient air quality for the proposed project due to the proximity of these two stations to proposed project site. Ambient air monitoring data from these stations are only available for certain time periods (from 2000 to 2006 and from 2011 to 2013) and for certain contaminants of interest such as sulphur dioxide (SO_2), nitrogen dioxide (NO_2) and particulate matter <10 μm (PM_{10}).

The baseline concentration of SO_2 is based on the 3-year average of the 99th percentile of daily maximum 1-hour values. The baseline concentration of 1-hour NO_2 is conservatively based on the maximum recorded concentration. Annual NO_2 concentrations monitored at the Clifton Pier monitoring location are higher than those recorded at Lyford Cay and have been selected as baseline concentrations as a more conservative approach. It is noted that PM_{10} levels recorded at Clifton Pier are in general higher than at Lyford Cay. The baseline concentration of PM_{10} is selected as the maximum recorded 99th percentile at the Clifton Pier monitoring location.

In the absence of established Ambient Air Quality Standards (AAQS) in The Bahamas, the baseline air quality levels are compared to the relevant internationally recognized standards/guidelines: The WHO Air Quality Guidelines (enforced by the International Finance Corporation Environment Health and Safety (IFC EHS) General Guideline) and the United States Environmental Protection Agency (US EPA) National Ambient Air Quality Standards (NAAQS). In addition to guideline values, interim targets are given for each pollutant. These are proposed as incremental steps in a progressive reduction of air pollution and are intended for use in areas where air pollution impacts are high. These targets aim to promote a shift from high air pollutant concentrations, which have acute and serious health consequences, to lower air pollutant concentrations. If these targets were to be achieved, one could expect significant reductions in risks for acute and chronic health effects from air pollution. Progress towards the guideline values should, however, be the ultimate objective of air quality management and health risk reduction in all areas. Ambient air quality monitoring collected at the two locations show that no exceedances of the World Health Organization (WHO) and US EPA standards have been recorded for NO_2 (see Table 3-4). The SO_2 monitoring results for both the 1- hour and 24-hour averaging periods are below the WHO Interim targets and WHO guideline. Ambient air quality monitoring data on PM_{10} show a compliance with the US EPA standards and WHO Interim targets while exceeding the WHO guideline. Annual PM_{10} levels at Clifton Pier exceed the interim target level 3 and the guideline.

The baseline concentrations of NO2, SO2 and PM10 selected for use In the air quality assessment for the EIA are presented in Table 3-4. The concentrations are selected based on the 99th percentile of the measurements recorded from 2011 to 2013, as these are the two most recent years representing the existing conditions at the site.

Table 3-4: Estimated Ambient Air Concentrations for Clifton Pier (μg/m³)

Pollutant	Averaging Period	Estimated Baseline Concentrations (ug/m³)	Ambient Air Quality Standard	Source
NO_2	1-hour	42	200	WHO guideline
	1-year	3	40	WHO guideline
SO_2	1-hour[1]	42	196	US EPA NAAQS
	24-hour	17*	125	WHO Interim target-1
			50	WHO Interim target-2
			20	WHO guideline
PM_{10}	1-year	27	70	WHO Interim target-1
			50	WHO Interim target-2
			30	WHO Interim target-3
			20	WHO guideline
	24-hour	87	150	WHO Interim target-1
			100	WHO Interim target-2
			75	WHO Interim target-3
			50	WHO guideline

Using datasets from 2013 was deemed suitable for the purposes of this EBA as land uses at Clifton Pier have changed little since then. It should be noted that as generators in use become more efficient, lower emission rates of criteria air contaminants are expected with a resulting improvement in air quality at Clifton Pier. This can only be confirmed with air quality monitoring over the long-term.

3.1.8 Noise

The baseline/existing sound environment at the project site and its immediate surroundings is characterized by onshore and offshore industrial activities, ocean waves, and light to moderate roadway traffic. The project site is also bounded by CPPS and multiple liquid fuel storage and bunkering facilities to the north and west, multiple marine facilities to the south (jetties), and the Commonwealth Brewery to the east. Southwest Road is located to the south of the terrestrial components of the project and parallel to the shoreline.

For the marine components of the proposed project (e.g., LNG jetty, FSU), baseline underwater noise conditions are the result of naturally occurring sounds as well as from anthropogenic sources (noise generated by human activities). Examples of naturally occurring sounds include wind, wave action, precipitation (rain) falling on the water surface, and sounds produced by marine wildlife (marine mammals, fish, and invertebrates). Vessel noise is a large contributor to noise in the marine environment. Examples of anthropogenic noises in the project area include commercial shipping, commercial and recreational fishing, and recreational boating.

3.1.9 Marine water quality

The marine waters of New Providence are recognized to be of high quality and highly productive. The shallow waters of the study area are bordered to the west by the Tongue of the Ocean, a deepwater channel separating New Providence from neighbouring Andros Island. The study area, located on the southwestern tip of the island is an area of industrial shipping and navigation, with several existing businesses including a brewery and refinery. The area is regularly traversed by commercial vessels and there are two freshwater/effluent outfall in the vicinity of the offshore study area.

Investigations were undertaken to establish baseline water quality in the marine environment in the vicinity of the proposed project site. Investigations included marine surveys, field data collection and collection of water and sediment quality samples in the nearshore area of Clifton Pier.

A Project Execution Plan (PEP) was developed to delineate the area of investigation and to guide survey procedures and data collection. In addition to outlining marine water and sediment sampling procedures, the PEP included procedures for conducting benthic surveys. Sample testing focused on hydrocarbons, oil, grease and bacteriological parameters, as well as physical parameters, such as temperature, salinity, dissolved oxygen, turbidity and sediment grain size. Details of sampling methodology and a summary of results are provided in the subsections below. The sampling plan was finalized in consultation with DEPP.

A survey to establish marine water quality was undertaken from September 25 through 28, 2020 by SEV for the 2020 Shell LNG project. During that survey, 30 water samples were collected in the survey area offshore of CPPS. Fifteen (15) of the sites were focused around two freshwater outfall areas from CPPS as well as along the proposed jetty construction site (Figure 3-14). The remaining 15 sites were selected by random number generator (Figure 3-15). The first freshwater outfall is closest to sampling station F1 (Figure 3-16) and the second outfall is closest to sampling station F3 (Figure 3-17). The sites where samples were collected were marked using GPS coordinates as provided in Table 3-5.

Figure 3-14: Location of Focused Water and Sediment Sampling Stations

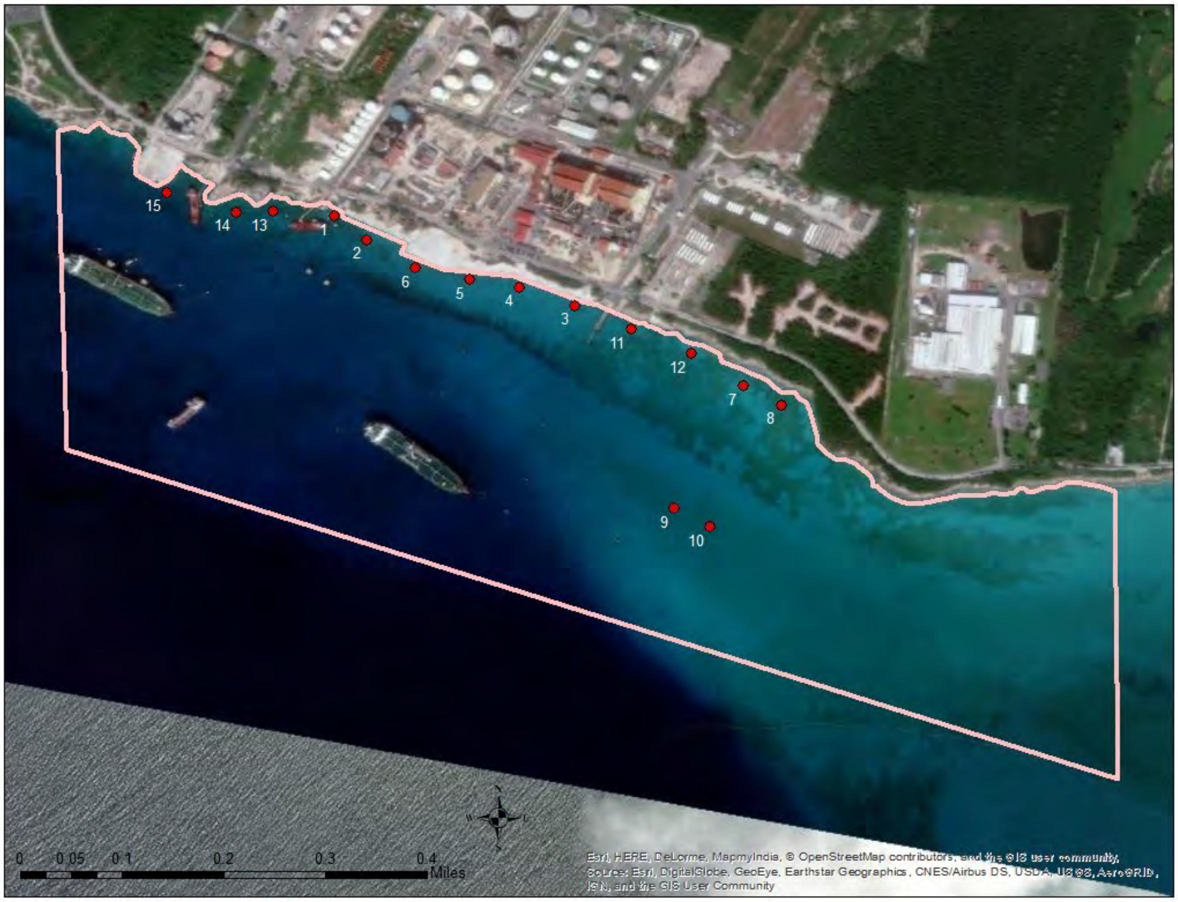


Figure 3-15: Location of Random Water and Sediment Sampling Stations

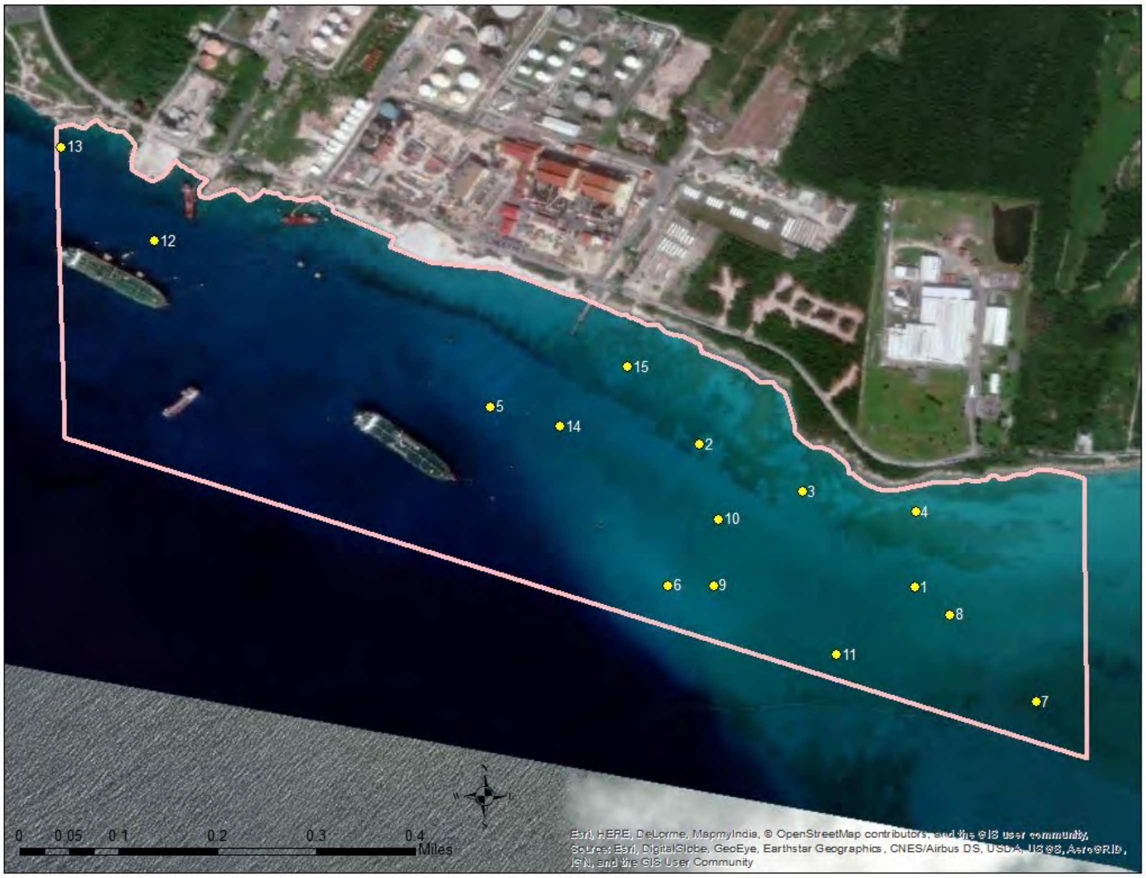


Figure 3-16: Freshwater Outfall Near Water and Sediment Sampling Station F1

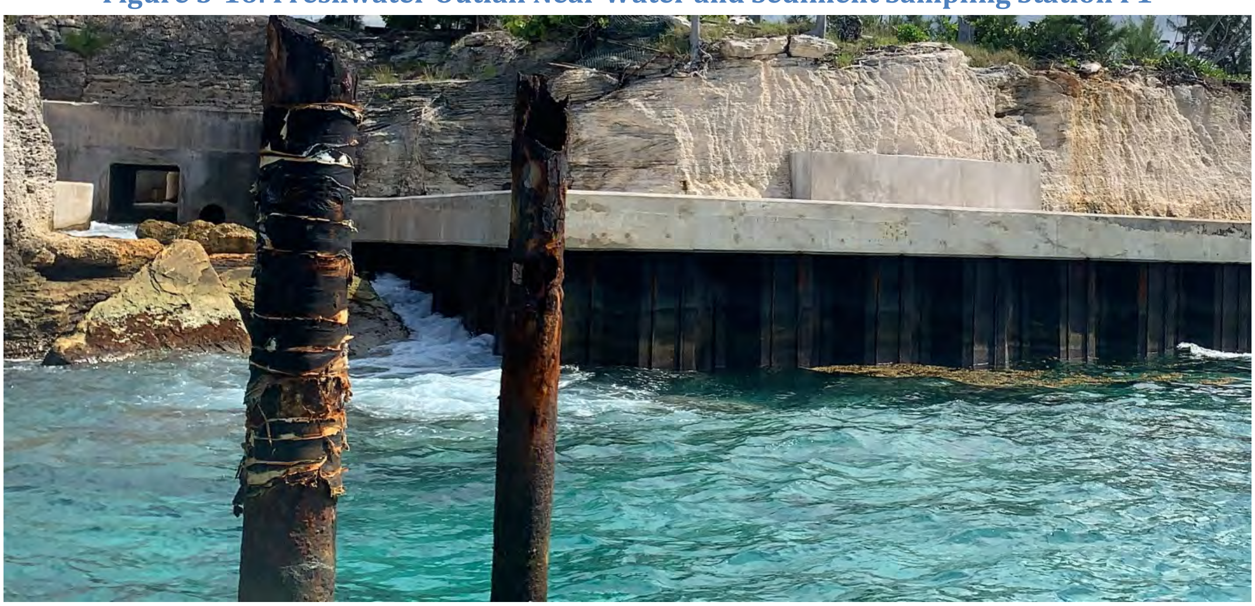


Figure 3-17: Freshwater Outfall Near Water and Sediment Sampling Station F3

Table 3-5: GPS Coordinates of focused and random sample sites

Focused Sample ID	GPS Coordinates		Random Sample ID	GPS Coordinates	
	Latitude	Longitude		Latitude	Longitude
F1	25.003928	-77.542494	**R1**	24.998412	-77.533857
F2	25.003593	-77.542024	**R2**	25.000506	-77.537004
F3	25.002651	-77.539068	**R3**	24.999814	-77.535505
F4	25.002919	-77.53985	**R4**	24.999515	-77.533838
F5	25.003022	-77.540568	**R5**	25.001053	-77.540064
F6	25.003186	-77.541335	**R6**	24.998435	-77.537467
F7	25.001507	-77.536669	**R7**	24.996734	-77.532078
F8	25.001237	-77.536129	**R8**	24.998009	-77.533338
F9	24.99976	-77.537649	**R9**	24.998441	-77.536802
F10	24.999504	-77.537138	**R10**	24.999409	-77.536737
F11	25.002317	-77.538266	**R11**	24.997425	-77.534996
F12	25.001973	-77.5374	**R12**	25.003484	-77544988
F13	25.003998	-77.54336	**R13**	25.004857	-77.546353
F14	25.003985	-77.543895	**R14**	25.000764	-77.53906
F15	25.004266	-77.544876	**R15**	25.001643	-77.538066

Marine water samples were collected and stored in sterile containers in the field and placed on ice in a cooler. The containers and cooler were provided by the certified laboratory conducting the analyses and samples collected and shipped as stipulated by the laboratory for handling and transport of samples. Samples for hydrocarbon analysis were shipped to Florida Spectrum Environmental Services in Fort Lauderdale, US. The samples for bacteriological analysis were analysed separately by Adka Laboratories in Nassau, The Bahamas.

Marine sediment samples were collected during the same survey as the water quality survey described above. Sediment sampling attempts were made at the same sites used for marine water samples (Figures 3-14 and 3-15 and Table 3-5 above) including the 15 random and 15 focused sample sites. Sediment samples were collected using a weighted Van Veen grab deployed from the side of the boat, which was stationary during sampling at each sampling site. Three attempts were made at each specified site to collect sediment with the deployed grab sampler. For sites where refusal occurred or when insufficient sample volume was obtained, additional attempts were made within 5 m (16.4 ft). Of the 30 sample sites, sediment samples could not be collected at three of the Focused sites (F6, F14 and F15) and one Random site (R7), despite repeated attempt, due to rocky benthic habitat. In total, 12 focused sediment samples and 14 random sediment samples were collected.

Sediment samples were collected and stored in sterile containers in the field and placed on ice in a cooler. The containers and cooler were provided by the laboratory conducting the analyses and samples collected and shipped as stipulated by the laboratory for handling and transport of samples. Samples for hydrocarbon analysis were shipped to Florida Spectrum Environmental Services in Fort Lauderdale, United States. Sediment grain size analysis was conducted by ATC Laboratory in Miami.

The tests performed by the certified laboratories noted above for hydrocarbon and bacteriological parameters are identified in Table 3-6.

Table 3-6: Marine water and sediment quality sampling parameters

Water Analysis	Sediment Analysis
BTEX-MTBE – EPA (VOC) 8260	BTEX-MTBE – EPA (VOC) 8260
EPA 8100F Petroleum Fingerprint	EPA 8100F Petroleum Fingerprint
TRPHs by FL-PRO method (with Petroleum Fraction and Hydrocarbon Range (Carbon Chain Range) detected)	TRPHs by FL-PRO method (with Petroleum Fraction and Hydrocarbon Range (Carbon Chain Range) detected)
Coliform bacteria	PCBs – EPA 8082

BTEX = Benzene, Toluene, Ethylbenzene and Xylenes
FL-PRO = Florida Petroleum Residual Organic analysis
MTBE = Methyl tert-butyl ether
PCBs = Polychlorinated biphenyls
TRPH = Total Recoverable Petroleum Hydrocarbons

Physical parameters were also measured in the field by SEV using a multiparameter sonde (YSI). Specific physical parameters collected at each sample site included: Barometric pressure; Chlorophyll; Conductivity; Depth; Optical Dissolved Oxygen (ODO); Phycoerythrin; Pressure; Resistivity; Salinity; Sigma; Sigma-T; Specific conductivity; Temperature; Total Dissolved Solids (TDS); Total Suspended Solids (TSS); Turbidity; and Vertical position.

Hydrocarbon and Bacteriological Sample Results

The following petroleum related VOCs were assessed from sediment and water samples obtained at the 30 sampling sites: Benzene, Toluene, Ethyl Benzene, m,p-Xylene, and o-Xylene (BTEX) and methyl-tert-butyl ether (MTBE).

Surface water concentrations were compared with Florida Department of Environmental Protection (FLDEP) Marine Surface Water Quality Criteria. No exceedances of the applicable criteria were noted and all parameters were reported at concentrations below the laboratory reportable detection limit (RDL) with the exception of m,p-xylene which was detected in one sample (0.960 µg/L), o-xylene detected in one sample (0.370 µg/L) and toluene detected in 10 samples at a maximum concentration of 1.5 µg/L.

Sediment concentrations were compared with FLDEP Sediment Quality guidelines. There were no parameters detected at concentrations above the applicable guidelines. Toluene was the only parameter whose concentration was reported to be above RDLs at 12 locations sampled.

All polychlorinated biphenyl (PCB) congeners were reported at concentrations below the RDL with the exception of PCB-1016 which was detected at 2 locations marginally above the RDL.

Total petroleum hydrocarbons (C8-C40) concentrations in surface water and sediment were analysed using the Florida Petroleum Residual Organic analytical method and compared with the relevant guidelines. All surface water and sediment concentrations were reported as being below the RDL. Petroleum hydrocarbons were also analysed as a petroleum fingerprint consisting of diesel, gasoline, heavy oil range hydrocarbon, kerosene and mineral spirits in both sediment and surface water. There were no detections of any parameter in sediment and surface water above the RDL.

Faecal coliform samples were assessed from the water samples obtained at the 30 sampling sites. The highest level was 31 CFU/100 mL. The Florida Bureau of Environmental Health – Healthy Beaches program also categorizes water quality as "good" when faecal coliforms are measured at 0 to 35 Enterococci per 100 mL of marine water. In addition, US EPA recreational water quality criteria is set at a geomean (GM) of 35 cfu/100mL and a statistical threshold value (STV) of 130 cfu/100 mL for an illness rate of 36 in 1000 receptors or a GM of 30 cfu/100mL and a STV of 110 cfu/100 mL for an illness rate of 32 per 1000 receptors (US EPA, 2012).

Physical Parameter Sample Results

Table 3-7 provides the results of each sampled physical parameter as a range of values as measured across all random and focussed sample locations. Reported values were taken at mid-water column depth.

Table 3-7: Physical Parameter Sample Results

Physical Parameter	Range Across Focused Sample Sites	Range Across Random Sample Sites
Barometer (mmHg)	759.6 – 759.9	759.6 – 760
Optical Dissolved Oxygen (% air saturation)	88.8 – 94.5	87.8 – 96.3

Physical Parameter	Range Across Focused Sample Sites	Range Across Random Sample Sites
Optical Dissolved Oxygen (mg/L)	5.54 – 5.90	5.46 – 6.0
Turbidity (FNU)	0.0 – 9.07	.05 -13.73
Conductivity (µS/cm)	58,991.1 – 59,810.7	58,982.3 – 60,174.2
Specific Conductivity (µS/cm)	53,907.0 – 54,492.9	53,764.3 – 54,529.8
Salinity (psu)	35.59 – 35.91	35.37 – 35.93
Non-linear Function Conductivity (nLFCond) (µS/cm)	53,505.3 – 53,959.6	53,183.5 -53,883.8
Total Dissolved Solids (TDS) (mg/L)	35,180.0 – 35,420.0	34,947.0 – 35,418.0
Temperature (°F)	85.2 – 85.8	85.4 – 86.7
Resistivity (ohms-cm)	16.7 – 17	16.0 -17.0
Sigma-T (s t)	22.2 – 22.6	22.0 -22.5
Sigma (seconds)	22.3 – 22.6	22.0 -22.6
Chlorophyll (RFU)	0.02 – 0.06	0.02 - .21
Chlorophyll (µg/L)	0.09 – 0..27	.08 -.82
Phycoerythrin (RFU)	3.0– 3.36	1. 32 – 3.16
Phycoerythrin (µg/L)	8.39 – 9.58	3.7 -8.85
Pressure (psi a)	1.1 – 4.3	1.55 – 6.06
Depth (m)	0.8 – 3	1.6 – 4.17
Vertical position (m)	0.07 – 3.2	0.8 -3.7

µg/L = micrograms per litre

µS/cm = microsiemens per centimetre

FNU = Formazin Nephelometric Unit (similar to Nephelometric Turbidity Unit (NTU), but FNU is measures with an infrared light source)

mg/L = milligrams per litre

mmHg = millimetre of mercury

nLFCond = Applicable for the temperature compensation of electrolytic conductivity in natural waters

ohms-cm = ohms centimetre or volume of resistivity of a semiconductive material

psi a = pounds per square inch (absolute)

psu = practical salinity units

RFU = Relative Fluorescence Unit; phycoerythrin is a pigment in blue-green algae

Sigma (s) = a unit of time; 1 sigma = one microsecond (1 µs) or 10^{-6} seconds

Sigma-T (s t) = seawater density at a given temperature

Based on the results of the field observations, the water within the study area appears to be of high quality. Water quality measurements indicate that within the study area the waters are highly oxygenated with moderate levels of turbidity. Uniform salinity and temperature readings were found throughout the site, indicating that the water throughout the study area is well mixed.

The results of the baseline marine water quality monitoring studies were compared to Florida Department of Environmental Protection (FLDEP) Criteria for Surface Water Quality Classifications for Class V, Navigation, Utility, and Industrial Uses. (FLDEP, 2016). The results taken from the marine waters during the baseline monitoring events fell within these established water quality standards. The main physical parameters outlined within the FL Class V Guidelines include turbidity (not to exceed 29 NTU above background conditions), pH (not lower than 5, not greater than 9.5), specific conductance (not greater than 4,000 micromhos/cm (mhos/cm)), and dissolved oxygen (shall not be less than 0.3, fifty percent of the time on an annual basis for flows greater than or equal to 250 cubic feet per second and shall never be less than 0.1. Normal daily and seasonal fluctuations above these levels shall be maintained).

Sediment grain size analysis results

Estimation of erosion potential and sediment transport requires a baseline understanding of the sediments existing at the site. A sampling methodology for sediment grain size analysis was included in the marine sediment survey. As noted previously, of the 30 sample sites, sediment samples could not be collected at three of the Focused sites (F6, F14 and F15) and one Random site (R7), despite repeated attempts, due to rocky benthic habitat.

Table 3-8: Sediment grain size analysis results

Sample ID	% +3"	% Gravel		% Sand			% Fines	Material Description
		Coarse	Fine	Coarse	Medium	Fine	Silt / Clay	
F1	0.0	0.0	19.1	11.4	34.2	30.4	4.9	Gray Sand with Shell
F2	0.0	0.0	2.2	3.8	29.8	60.6	3.6	Gray Sand with Shell
F3	0.0	0.0	0.2	1.0	19.2	74.8	4.8	Gray Sand with Shell
F4	0.0	0.0	0.4	0.5	6.8	86.4	5.9	Gray Sand with Shell
F5	0.0	0.0	0.00	0.1	5.7	88.0	6.2	Gray Sand with Shell
F6	NS	NS	NS	NS	NS	NS	NS	NS
F7	0.0	0.0	0.0	0.2	7.4	88.5	3.9	Gray Sand with Shell
F8	0.0	0.0	0.0	0.0	4.0	68.1	27.9	Gray Sand with Shell
F9	0.0	0.0	0.0	0.7	34.2	62.1	3.0	Gray Sand with Shell
F10	0.0	0.0	0.1	0.5	31.7	65.2	2.5	Gray Sand with Shell
F11	0.0	0.0	0.0	0.3	5.7	86.7	7.3	Gray Sand with Shell
F12	0.0	0.0	0.0	0.2	4.2	79.8	15.8	Gray Sand with Shell
F13	0.0	0.0	12.1	4.0	10.3	67.9	5.7	Gray Sand with Shell & Gravel
F14	NS	NS	NS	NS	NS	NS	NS	NS
F15	NS	NS	NS	NS	NS	NS	NS	NS
R1	0.0	0.0	0.1	0.4	26.6	70.0	2.9	Gray Sand with Shell
R2	0.0	0.0	0.2	0.5	26.6	66.2	6.5	Gray Sand with Shell
R3	0.0	0.0	0.2	1.6	37.3	58.6	2.3	Gray Sand with Shell
R4	0.0	0.0	0.3	0.9	22.2	73.7	2.9	Gray Sand with Shell
R5	0.0	0.0	0.0	0.9	21.4	56.7	21.0	Gray Sand with Shell
R6	0.0	0.0	0.2	0.8	47.8	49.4	1.8	Gray Sand with Shell
R7	NS	NS	NS	NS	NS	NS	NS	NS

R8	0.0	0.0	0.2	0.9	42.8	51.3	4.8	Gray Sand with Shell
R9	0.0	0.0	0.2	0.7	35.0	61.6	2.5	Gray Sand with Shell
R10	0.0	0.0	0.4	0.6	26.0	65.1	7.9	Gray Sand with Shell
R11	0.0	0.0	0.0	1.3	53.3	40.9	4.5	Gray Sand with Shell
R12	0.0	0.0	0.7	1.7	29.3	54.5	13.8	Gray Sand with Shell
R13	0.0	0.0	29.0	31.0	21.1	14.0	4.9	Gray Sand with Shell & Gravel
R14	0.0	0.0	0.0	0.9	35.0	58.5	5.6	Gray Sand with Shell
R15	0.0	0.0	0.2	1.0	21.1	69.3	8.4	Gray Sand with Shell

3.1.10 Oceanographic conditions

Per the 2004 USACE Report on The Bahamas, "*both hurricanes and waves from the Atlantic Ocean, generally during high tide combined with storm surge, generate extreme wave conditions. Flooding and erosion typically occur during these wave conditions. The waves erode protective beaches and dunes and cause surge and flood damage to the adjacent lands, buildings, infrastructure, and groundwater especially significant since eighty percent of the country's land mass is only 1.5 m (5 ft) above mean sea level and more than 90% of the freshwater resources are within 1.52 m (5 ft) of the surface*."

In the general vicinity of the island of New Providence, the tides are semi-diurnal with an average range of 2.46 ft (0.75 m) and a tidal period of approximately 12.4 hours. The anticipated Mean High Water Spring (MHWS) Tide is +1.30 ft (+0.40 m), Mean Sea Level is +0.00 ft (+0.00 m), and Mean Low Water Spring (MLWS) Tide is -1.64 ft (-0.50 m).

The Intergovernmental Panel on Climate Change (IPCC) sea level rise projections for The Bahamas are approximately 1 m (3.3 ft) by 2100.

Per the National Hurricane Center (NHC), the Central Bahamas is ranked a having a high probability to receive hurricanes with 157+ mile/hour (mph) winds. Of specific concern to New Providence are storms greater than Category 2 entering the Central Bahamas directly from the south (north projected path between Eleuthera and Andros) – on similar paths as Hurricane Matthew (2016) – with resulting projected surge. CPPS experienced the force of 74+ mph hurricane force winds from October 5-6, 2016 due to Hurricane Matthew.

A coastal engineering analysis at the proposed project site was undertaken in 2021 by Cummins Cederberg and Integrated Building Services. As part of this analysis, a numerical model was developed to understand the hydrodynamic and wave conditions at the proposed project site and to evaluate the potential oil spill trajectory during normal conditions. In addition, the model was used to evaluate the potential for local changes in sediment transport due to the proposed jetty structure. This section summarizes the modeling results for currents and waves under existing conditions prior to implementation of the proposed project.

A coupled hydrodynamic and wave model of the proposed project site was created using the state-of-the-art DHI MIKE21 suite of numerical modeling tools. The analysis of the proposed project makes use of the Flow Model (HD) and Spectral Wave (SW) components. Both models make use of the same finite element mesh which was created specifically for this proposed project. The model covers the proposed project site and the greater region of the Bahamas as applicable to capture regional to local scale dynamics of flow and waves.

A nested mesh paradigm was used for the proposed project to reduce computational cost while maintaining high model resolution near the proposed project site. The regional computational mesh utilized in the hydrodynamic model is an unstructured flexible mesh measuring approximately 5,000 km in the east-west direction and 3,400 km in the north-south direction. The computational mesh is bound by the Atlantic Ocean to the west and a portion of North and Central America to the West, and Central and South America to the south. The nested computational mesh measures approximately 29 km in the east-west direction and 25 km in the north-south direction. The nested computational mesh is bound by New Providence Island and the Great Bahama Bank to the east, while at the north, south, and west, the computational mesh is bounded by the deep water within the Tongue of the ocean. Both meshes are constructed using unstructured mesh elements, with triangular elements used in the regional mesh and a mix of triangular and rectangular elements in the nested mesh. The mesh resolution and the location of the nodes were modified to achieve the best representation of the bathymetry. Available bathymetry and shoreline boundary and publicly available water depth data were used to finalize the geometry of both meshes.

Hydrodynamic Model

Hydrodynamics are computed on both the regional and nested mesh using the MIKE 21 hydrodynamics module which simulates two-dimensional water levels and currents in response to a variety of forcing mechanisms. For the proposed project, the models were forced with wind fields and hydrographic boundary conditions at the boundary of the regional model. The time series of water levels required for boundary conditions on the regional mesh were obtained from the MIKE 21 Global Tide Model (GTM). The GTM provides data for the tidal prediction of water levels derived from 17 years of multi-mission satellite altimeter data, validated with coastal tide gauges around the globe. The nested computational mesh was defined with a Flather boundary condition at the north, south, east, and west extents of the domain. The Flather boundary condition utilizes the velocity components and water level as inputs, both of which were extracted from the results of the regional hydrodynamic model. Wind data for the numerical model was extracted from the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Prediction (NCEP) Climate Forecast System Reanalysis and Reforecast (CFSRR) dataset of hourly high-resolution winds. Data was extracted at a point approximately 8-miles west of the proposed project site. The wind forcing in the computational domain was specified as varying in time but constant across the domain.

Calibration of the hydrodynamic model was conducted by adjusting the boundary conditions, the introduction of wind forcing and wind friction coefficients, and by refinement of the computational mesh. Performance of the numerical model was evaluated based on comparison of model results to available published tide prediction data and current hindcast data. Tide prediction data was extracted from NOAA's Center for Operational Oceanographic Products and Services (CO-OPS) tidal stations near the proposed project site. The current hindcast data available for this proposed project was derived from an 88-year tropical storm dataset ranging from 1930 to 2019 from Oceanweather's Inc. GROW-FINE Caribbean-2 hindcast. It is anticipated that the proposed LNG terminal is not likely to be in operation during severe weather conditions, thus three timeframes were identified in the GROW-FINE data set to reflect normal conditions prior to the influence of tropical storm activity. The timeframes were further selected to include some variability in the wind speed magnitude and direction to evaluate the sensitivity of the proposed project site to varying normal conditions.

The selected time frames were:

- September 19, 2017 to September 24, 2017;
- September 15, 2010 to September 21, 2010; and
- November 16, 2005 to November 20, 2005.

The NOAA tide stations at Nassau and Fresh Creek were selected as reference stations to verify the accuracy of the water levels simulated by the numerical model. Simulations of the hydrodynamics were carried out, and the water level elevations were extracted at the locations of the calibration data. The extracted water level elevations were scaled to support water levels within the domain that more closely resembled the tidal data provided by NOAA tide stations. Furthermore, the boundary water levels were shifted to match the selected vertical datum used for the proposed project. With these adjustments, the numerical model appeared to be in agreement with the water level calibration data. The water levels matched the tidal amplitude and phase for the different selected time frames and provided a good representation of regional sea surface response.

Modelled flow velocities were also compared to the hindcast current speeds and current directions. For the regional model, the current speeds and directions from the numerical model were extracted at the hindcast location and a comparison of the values was conducted. For the nested model, however, the same extraction location computed greater water depths compared to the hindcast model. The difference in water depths for the same extraction point may be attributed to the finer resolution of the nested model compared to the hindcast model. Variations in depth can have an impact on computed currents, thus for calibration purposes, the extraction point for the nested model was shifted to a location with similar water depth as in the hindcast extraction point. Both the hindcast and numerical models present depth-averaged current speeds.

Based on the comparisons of the current speeds, the simulated current speeds and directions appear to be within the same order of magnitude and in phase, with some minor differences in the peak values. To quantify the model performance relative to current speeds and current directions, a quantitative approach was undertaken by calculating the root-mean-square-error (RMSE) between the simulated and hindcast current speeds and directions. The UK Foundation for Water Research (1993) has published the following performance limits for hydraulic models:

- Tidal water level RMSE < 0.1 m (0.33 ft);
- Current speed RMSE < 0.1 m/s (0.33 ft/s);
- Current direction RMSE < 10-20 deg.

The RMSE was calculated for the current speed and current direction for the different selected simulation timeframes and is presented on two tables in Appendix B (see Tables 4 and 5) for the regional and nested computational meshes, respectively. Based on the RSME calculations undertaken for the simulations conducted, the numerical model falls within the published performance limits.

The calibrated nested model can be used to provide insight to local flow dynamics near the proposed project site. While the results of all the selected time frames show a similar trend, the magnitude of the current speed changes due to the change in wind conditions and tide amplitudes. The tidal currents at the Project site can be characterized as reversing currents, meaning the ebb and flood currents flow in opposite directions with a period of low velocity (slack water).

The flood flow at the proposed project site flows from north of Clifton Bay towards the southeast direction. As mentioned previously, at the north and south portions of the proposed project site, the bathymetry is relatively shallow due to the submerged carbonate platform. As the currents approach the proposed project site, there is a drop-off in the water depths in the surrounding area, resulting in a reduction of the current speeds before increasing in speed once shallow water is reached again at the south.

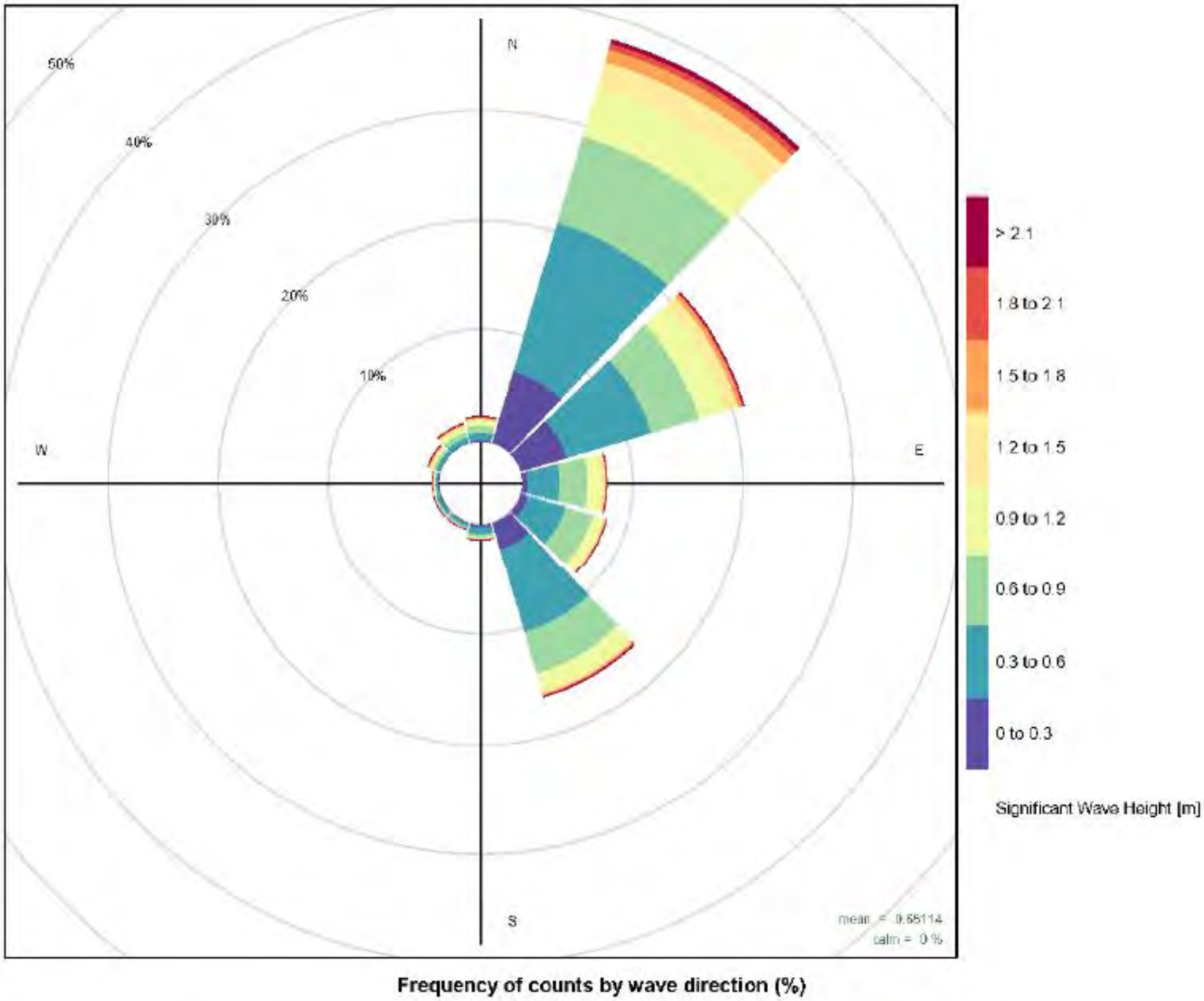
The ebb flow at the proposed project site is lower in magnitude than the flood flow and approaches from the southeast towards the north with the same reduction of the current speeds due to the drop-off in water depths.

Spectral Wave Model

To investigate the effect of site-specific wave conditions on the hydrodynamics at the proposed project site, the MIKE 21 Spectral Wave Model (SW) was used. MIKE 21 SW is a spectral wind-wave model that uses unstructured meshes for the prediction and analysis of wave climates in offshore and coastal areas. Wave conditions of incoming waves are specified at the offshore boundary of the model, and the model will compute the growth, decay, and transformation of wind-generated waves and swell waves.

The boundary conditions for the proposed project were derived from a statistical analysis of the wave climate using data extracted from NOAA WAVEWATCH III 30-year Hindcast Phase 2, which is based on the WAVEWATCH III model and was validated using archived buoy data containing both wind and wave information. The offshore wave data was collected at a point located approximately 8 miles west of the proposed project site. The data was grouped into multiple wave heights and angle intervals and is shown in Figure 5.15 as a wave rose plot. A wave rose plot is a directional bar plot, with its angles representing the direction of waves (traveling toward the center of the plot) with bar lengths representing the percent occurrences to scale and colors representing the magnitude of wave height.

Figure 3-18: Offshore wind rose plot



Based on the presented rose plot, most waves enter the area from the northeast and southeast, and a small fraction of the waves approach from the remaining locations. The waves approaching from the southeast direction are generally characterized with a maximum wave period of 6 s, whereas the waves approaching from the northeast direction are longer, with a maximum period of 12 s. Analysis of the potential waves within the vicinity of the proposed project site indicates 91% of the offshore wave heights are below 1.2 m (4 ft) during normal conditions. Based on the wave transformation analysis, wave heights at the proposed project site are generally low, with an annual average total significant wave height of 0.2 m (0.7 ft), with 99% of the waves occurring below 1 m (3.3 ft). The proposed project site is also exposed to large offshore waves resulting from extreme events such as tropical storms.

The island of New Province shelters the proposed project site from waves approaching from the east direction; however, these waves are captured at the selected offshore data extraction point. A wave transformation analysis was carried out to evaluate the nearshore wave data at the proposed project site (Shell, 2020). While waves frequently propagate into the nearshore region from the northeast and southeast directions, the waves propagating to the northeast typically diffract at the proposed project site resulting in an incoming northwest wave direction.

Based on conducted statistical wave analysis, the majority of waves enter the proposed project area from the northeast and southeast directions with a wave height of 0.6-0.9 m and a wave period of 4 s, which is in agreement with the data provided by Metocean Reference Document (Shell, 2020). Thus, to represent normal operating conditions at the proposed project site, two cases with the following boundary conditions were investigated with the SW model:

- waves approaching from the northeast direction with a wave height of 0.75 m and a wave period of 4 s; and
- waves approaching from the southeast direction with a wave height of 0.75 m and a wave period of 4 s.

The model computed the effects of wave transformation and attenuation as these imposed wave conditions propagate into the nearshore in the project area.

In general, the proposed project site is sheltered from waves incoming from the northeast direction. As the northeast waves approach the proposed project site, they refract and diffract around the shallow waters of the Great Bahama Bank and around Lyford Cay, resulting in a reduced wave height when compared to the incoming southeast waves. The waves approaching from the southeast direction do not experience a similar reduction in the order of magnitude as the proposed project site is not as sheltered in this approach. The significant wave height at the proposed project site for the incoming southeast waves reaches up to 0.3 m. The results of the SW model are presented in Figure 3-19 for the northeast direction and in Figure 3-20 for the southeast direction.

Figure 3-19: Simulated significant wave heights for NE direction

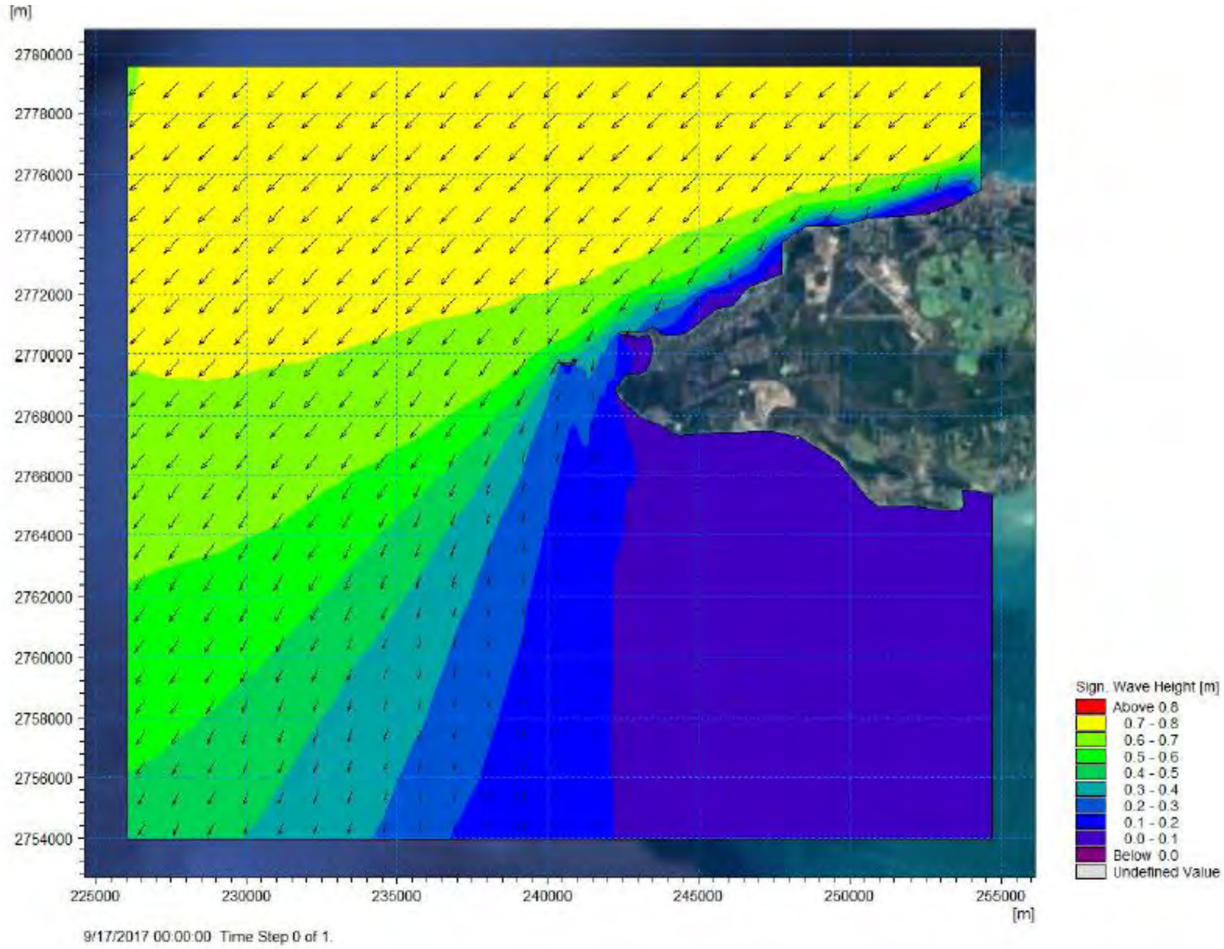
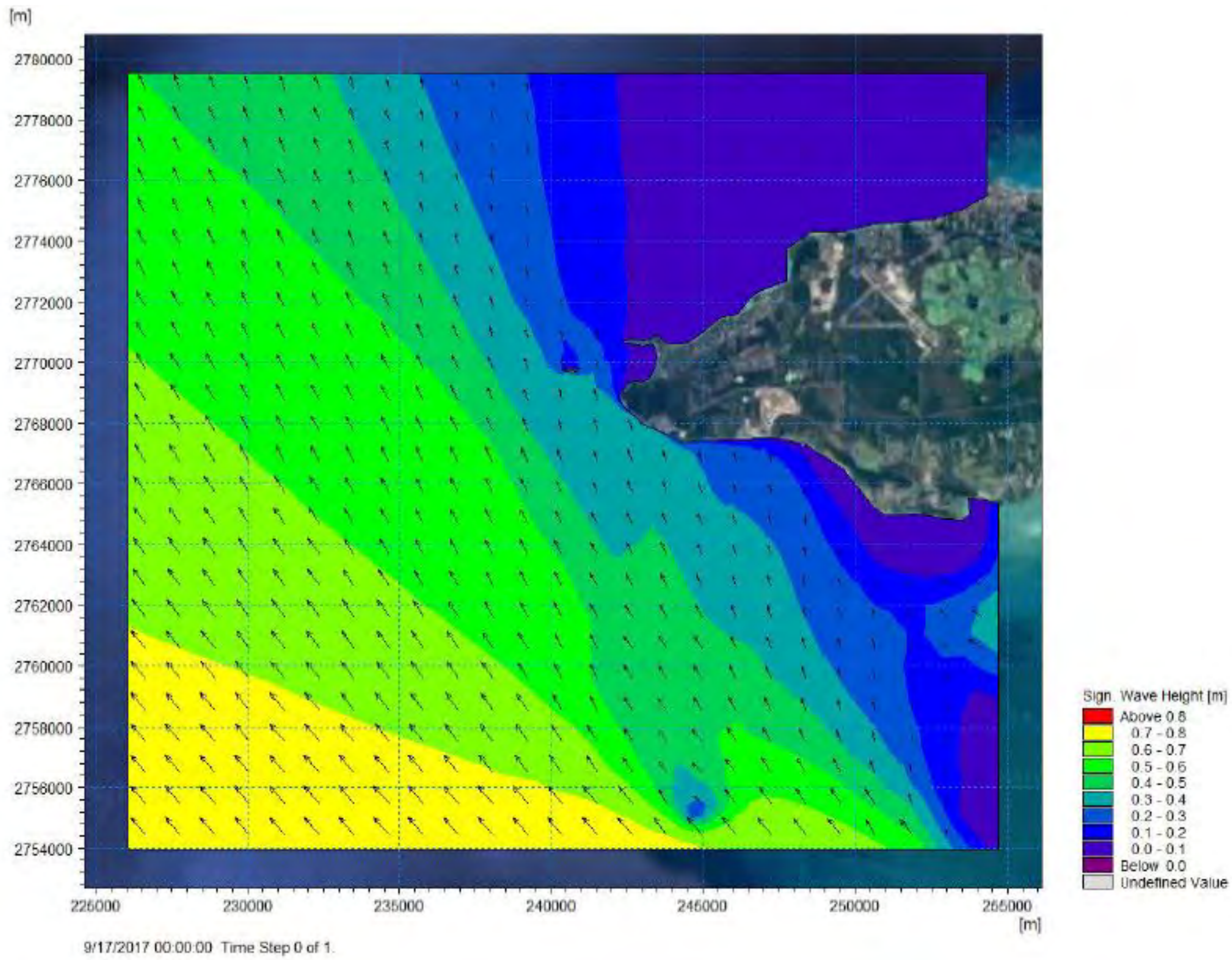


Figure 3-20: Simulated significant wave heights for SE direction



3.2 Biological aspects – Terrestrial

3.2.1 Terrestrial plants

The Clifton area where the project is proposed is industrialized, with large areas of cleared and paved land. Terrestrial habitats identified include Dry Broadleaf Evergreen Forest, also known as coppice. All trees identified during surveys in May 2020 were listed and classified as Native (NA), Non-native (NN), or Invasive (IN), based on information in Currie et al. (2019) and the Global Invasive Species Database (www.iucngisd.org). A total of fifty (50) plant species were identified in the study area (see Table 3-9).

Most native plants located on the site are relatively abundant in the surrounding area and are not currently of high conservation concern. Five (5) invasive plant species identified were Brazilian Pepper, Casuarina, Hawaiian Seagrape, Noni, and West Indian-Almond. All of the listed invasive species have significant impact on native biodiversity when allowed to proliferate. In general, they do not provide meaningful benefit to native birds or other wildlife and should be removed and destroyed where possible and feasible.

The native trees listed all have significant importance for wildlife use and in traditional or folkloric medicine. Three (3) protected species were identified – Brasiletto (*Caesalpinia vesicaria*), Mahogany (*Swietenia* *mahagoni*) and Narrow Leaved Blolly (*Guapira discolor*). The removal of these trees would require a Forestry Permit.

Table 3-9: Plant species observed

Species	Scientific Name	Status
Bahama sage	*Lantana bahamensis*	NA
Bamboo grass	*Lasiacis divaricata*	NA
Big leaf blolly	*Guapira obtusata*	NA
Black torch	*Erithalis fruticose*	NA
Brasiletto	*Caesalpinia vesicaria*	NA
Brazilian pepper	*Schinus terebinthifolius*	IN
Buttonsage	*Lantana involucrata*	NA
Carpet daisy (Wedelia)	*Sphagneticola trilobata*	IN
Castor plant	*Ricinus communis*	NA
Casuarina	*Casuarina sp.*	IN
Cinnecord	*Acacia choriophylla*	NA
Clusia	*Clusia rosea*	NA
Cycad palm	unknown	NN
Five finger	*Tabebuia bahamensis*	NA
Golden wild fig	*Ficus aurea*	NA
Granny bush	*Croton linearis*	NA
Guana berry	*Byrsonima lucida*	NA
Gum elemi (Gumbo limbo)	*Bursera simaruba*	NA
Hawaiian seagrape	*Scaevola taccada*	IN
Joe wood	*Jacquinia keyensis*	NA
Jumbay	*Leucaena leucocephala*	NA
Love vine	*Cassytha filiformis*	NA
Mahogany	*Swietenia mahagoni*	NA
Mastic	*Sideroxylon foetidissimum*	NA
Narrow leaved blolly	*Guapira discolor*	NA
Noni	*Morinda citrifolia*	IN
Ornamental palm tree	Unknown	NN
Papaya	*Carica papaya*	NN
Pigeon plum	*Coccoloba diversifolia*	NA
Poisonwood	*Metopium toxiferum*	NA
Ram's horn	*Pithecellobium keyense*	NA
Sapodilla	*Manilkara zapota*	NN
Satin leaf	*Chrysophyllum oliviforme*	NA
Seagrape	*Coccoloba uvifera*	NA
Seaside mahoe	*Thespesia populnia*	NA
Short leaf fig	*Ficus citrifolia*	NA
Silver buttonwood	*Conocarpus erectus*	NA
Snake root	*Picramnia pentandra*	NA

Species	Scientific Name	Status
Snow berry	*Chiococca alba*	NA
Strong back	*Bourreria succulenta*	NA
Tabebuia sp. (ornamental)	*Tabebuia*	NN
Tamarind	*Tamarindus indica*	NN
Thatch palm	*Leucothrinax morrisii*	NA
Trema	*Trema lamarckianum*	NA
West Indian-almond	*Terminalia catappa*	IN
White stopper	*Eugenia axillaris*	NA
White torch	*Amyris elemifera*	NA
Wild guava	*Tetrazygia bicolor*	NA
Wild lime	*Zanthoxylum fagara*	NA
Willow bustic	*Sideroxylon salicifolium*	NA

Figure 3-21: Plant species photos

Hawaiian Seagrape **Gum Elemi**

3.2.2 Birds

Avian surveys were conducted on April 2nd and May 6th through 8th, 2020 to identify the presence, abundance and habitat utilization of avian species within the boundaries of the proposed project site and the nearby environment with potential habitat. The assessment comprised six (6) hours total of active avian and ecological observations. Morning and afternoon surveys were conducted between 7:00 AM and 3:00 PM. The number of individuals birds counted was combined and species names and numbers of detected individuals were recorded in the abundance categories – Single (1), Few (2-10) and Many (11-100). Taxonomy is based on The Clements Checklist of Birds of the World, August 2019 edition. Conservation status (e.g., threatened, endangered, extinct, etc.) is based on the International Union for Conservation of Nature (IUCN) Red List. The survey results are based on a relatively small sample size and do not represent the total expected diversity at the site. In particular, many migrant warbler species that reside in The Bahamas over the winter were not detected during these surveys.

The birds are described based on their range of occurrence, conservation and management status and how frequently they were detected during the study. Range is described as follows:

- Permanent Resident Breeding (PRB) – birds that remain in The Bahamas throughout the year and reproduce;
- Resident Non-Breeding (RNB) – birds that occur within The Bahamas throughout the year with the exception of their breeding period;
- Summer Resident Breeding (SRB) – birds that only occur in The Bahamas during their breeding season which is during the summer;
- Winter Resident (WR) – birds that occur in The Bahamas throughout the winter months from October to May and leave to breed in North America; and
- Endemic I – birds that occur only within The Bahamas or Caribbean.

Conservation status is based on the IUCN classifications and specific regulations of the species in the Laws of The Bahamas. IUCN classifications include:

- Species of Least Concern (LC) for whom no conservation intervention or management is required and the species is not expected to decline or be lost in the foreseeable future;
- Near Threatened (NT) species whose populations may decline drastically without significant protection or constant management;
- Vulnerable (VU) species are likely to become endangered if the risks facing the species in the wild are not addressed; and
- Unassessed (UA) species have not received a formal evaluation from the IUCN and are generally not considered species of conservation concern.

In addition to the IUCN categories, species that are specified in the Wild Birds Protection Act (1952) (Chapter 249 of the Statute Laws of The Bahamas) are designated as Managed (MA). All wild birds in The Bahamas are considered protected species under this Act.

A total of thirty (32) species were recorded during the surveys (see Table 3-10). The majority of recorded species were Permanent Resident species which breed in the islands of The Bahamas and are of low conservation concern.

Table 3-10: Bird species observed

Common Name	Scientific Name	Range	Status	Observations
American Kestrel	*Falco sparverius*	PRB	LC	S
American Redstart	*Setophaga ruticilla*	WR	LC	S
Antillean Nighthawk	*Chordeiles gundlachii*	SRB	LC	S
Bananaquit	*Coereba flaveola*	PRB	LC	S
Black Whiskered Vireo	*Vireo altiloquus*	SRB	LC	F
Cape May Warbler	*Setophaga tigrina*	WR	LC	S
Caribbean Dove	*Leptotila jamaicensis*	PRB	LC	S
Cattle Egret	*Bubulcus ibis*	PRB	LC	S
Common Ground-dove	*Columbina passerine*	PRB	LC	M
Common Yellowthroat	*Geothlypis trichas*	WR	LC	F
Glossy Ibis	*Plegadis falcinellus*	RNB	LC D	F
Gray Kingbird	*Tyrannus dominicensis*	SRB	LC	F
Greater Antillean Bullfinch	*Melopyrrha violacea*	PRB	LC	M
Green Heron	*Butorides virescens*	PRB	UA	F
Hairy Woodpecker	*Dryobates villosus*	PRB	LC	S
House Sparrow	*Passer domesticus*	PRB	LC	M
Indian Peafowl	*Pavo cristatus*	PRB	LC	F
Killdeer	*Charadrius vociferous*	PRB	LC	F
La Sagra's Flycatcher	*Myiarchus sagrae*	PRB	LC	S
Laughing Gull	*Leucophaeus atricilla*	PRB	LC	F
Mourning Dove	*Zenaida macroura*	PRB	LC MA	F
Northern Mockingbird	*Mimus polyglottos*	PRB	LC	M
Osprey	*Pandion haliaetus*	PRB	LC	S
Palm Warbler	*Setophaga palmarum*	WR	LC	S
Prairie Warbler	*Setophaga discolor*	WR	LC	S
Red-legged Thrush	*Turdus plumbeus*	PRB	LC	F
Rock Pigeon	*Columba liva*	PRB	LC	F
Smooth-billed Ani	*Crotophaga ani*	PRB	LC	F
Thick-billed Vireo	*Vireo crassirostris*	PRB-E	LC	F
Western Spindalis	*Spindalis zena*	PRB-E	LC	F
White-crowned Pigeon	*Patagioenas leucocephala*	PRB	NT MA	M
Yellow-rumped Warbler	*Setophaga coronate*	WR	LC	S
Table Key:				
Range	**Status**		**Observations**	
PRB = Permanent Resident Breeding	**LC** = Least Concern (IUCN)		**S** = Single (1)	
RNB = Resident Non-Breeding	**NT** = Near Threatened (IUCN)		**F** = Few (2-10)	

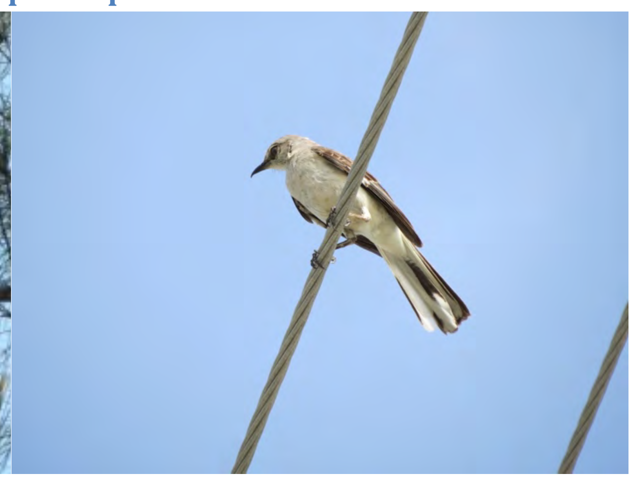
Common Name	Scientific Name	Range	Status	Observations
SRB = Summer Resident Breeding	**VU** = Vulnerable (IUCN)		**M** = Many (>10)	
WR = Winter Resident	**MA** = Managed (Regulated – Bahamas)			
E = Endemic (Distribution)	**D** = Declining			
	UA = Unassessed			

White-crowned Pigeons (*Patagioenas leucocephala*) are designated a Near-threatened species by IUCN and are managed as a hunted species in The Bahamas. Hunting is allowed with a permit and limits and regulations are determined by the Government of The Bahamas.

In terms of habitat utilization, birds are using the area for feeding and foraging and some species are nesting (including House Sparrow and Antillean Nighthawk).

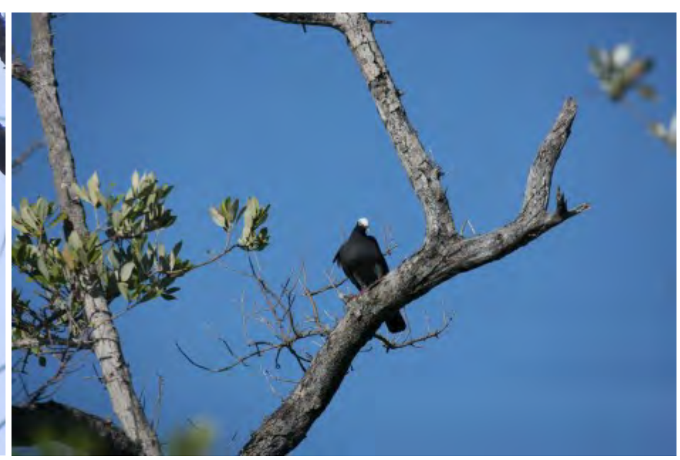
Figure 3-22: Bird species photos

Gray Kingbird



Northern Mockingbird

Hairy Woodpecker



White-crowned Pigeon

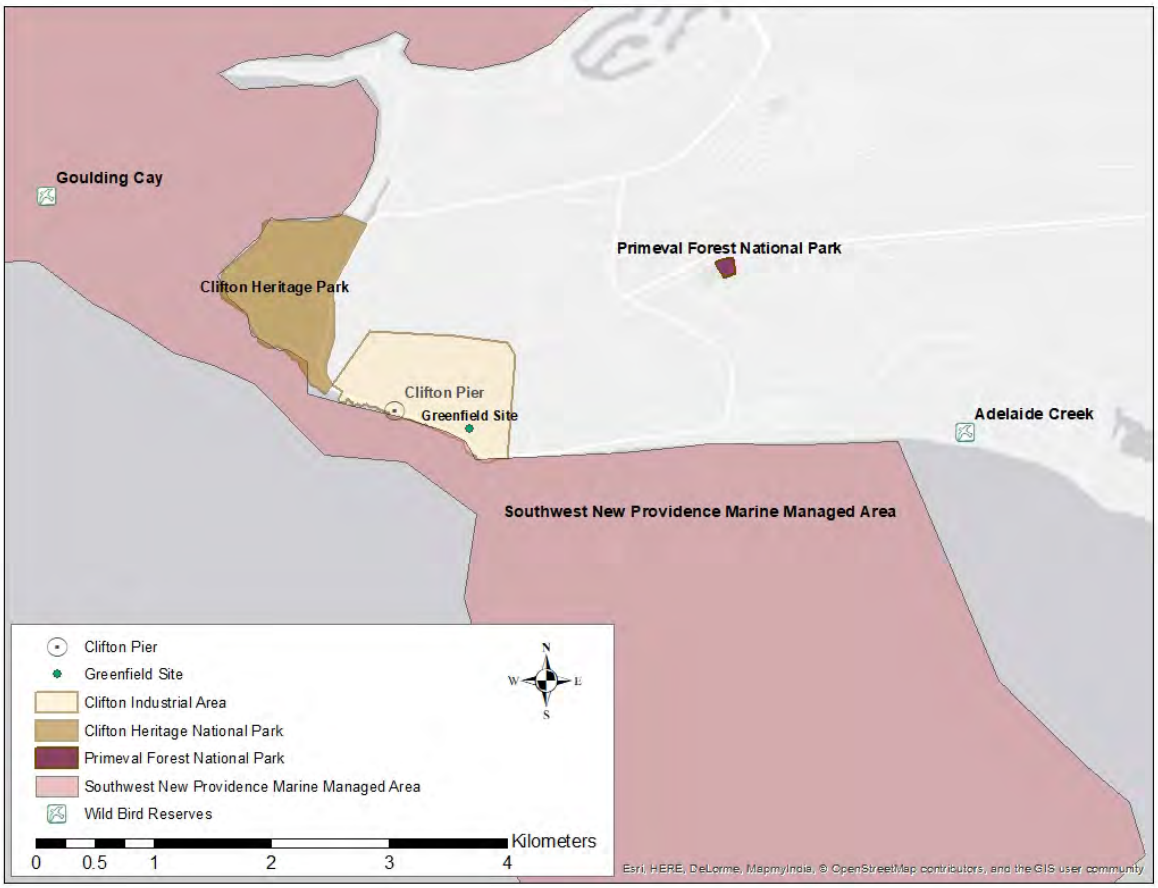
3.2.3 National parks and protected areas – Terrestrial & Marine

Five protected areas exist within 4 km (2.49 mi) of the proposed project site:

1. Adelaide Creek Wild Bird Reserve;
2. Clifton Heritage National Park;
3. Goulding Cay Wild Bird Reserve;
4. Primeval Forest National Park; and
5. Southwest New Providence Marine Managed Area (SWMMA).

The protected areas identified above are shown in Figure 3-23.

Figure 3-23: Protected areas in the vicinity of Clifton Pier



Clifton Heritage National Park

Clifton Heritage National Park is located to the west of Clifton Pier at Clifton Point (stretching from Clifton Point west to Lyford Cay). It was established in 2004 to protect, promote, and preserve the archaeological, historic, and cultural resources present on the approximately 84 ha (208 acre) site. Clifton Point shares the same irregular shaped rocky coastline as Clifton Pier, with elevations at Clifton Point up to 12.2 m (40 ft). The Clifton Heritage National Park is managed by the Clifton Park Authority.

The Park encompasses what was once a booming plantation and the home to three unique cultures spanning centuries – The Lucayans, The Loyalists and The Africans. The Clifton plantation has the distinction of being the only complete remaining plantation on the island of New Providence. It includes:

- remnants of the slave walls which acted as dividers for locally harvested crops;
- the Great House (The Master's Quarters);
- the Slave Village (The Slave Quarters); and
- the Johnston ruins (Former quarters of Lewis Johnston).

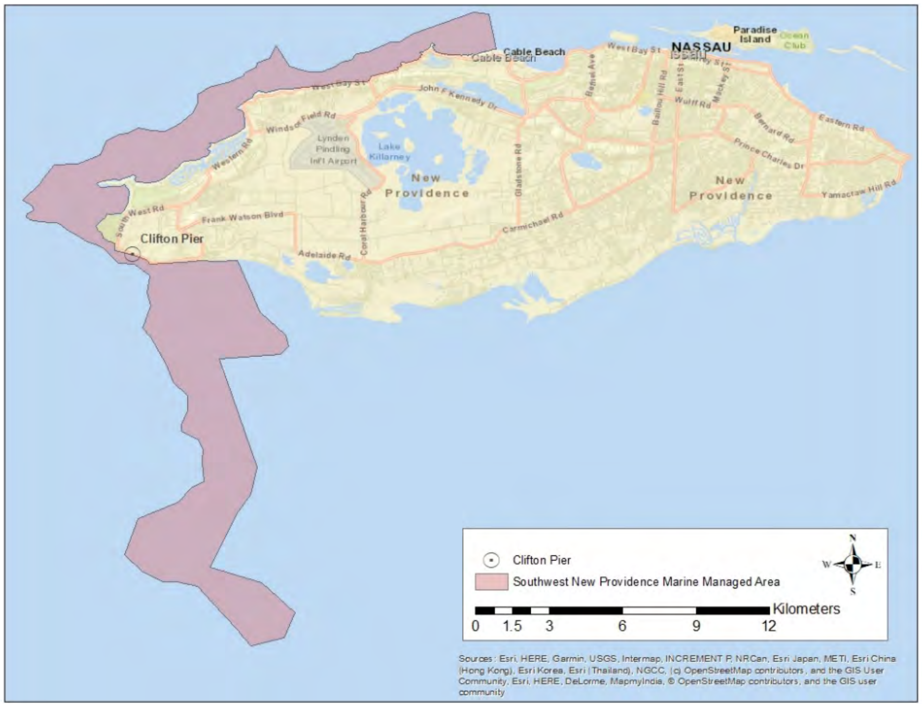
There is also an underwater sculpture garden as a part of the Park which was installed in 2014.

Figure 3-24: Clifton Heritage National Park

Southwest New Providence Marine Managed Area

The Southwest New Providence managed marine area (MMA) is 73.84 sq km (28.51 sq mi) and was established by the Government of The Bahamas in 2015. While the MMA does not have a marine management plan as yet, the intent is that it will be a multi-use site with zones for permitted activities, such as sustainable fishing, tourism, transport and development. The area will also ensure a higher level of protection for sensitive or important marine habitats, by serving as a replenishment zone. Zoning will ensure better management of potentially conflicting activities. The Government of The Bahamas has not indicated when this zoning will be established.

Figure 3-25: Southwest New Providence Marine Managed Area Boundary



Primeval Forest National Park

The Primeval Forest National Park is situated about 2.3 km (1.43 mi) northeast of the proposed project site. It is managed by The Bahamas National Trust. It spans approximately 3 hectares (ha) (7.5 acres) and boasts undisturbed geological and botanical features that are a rarity on present-day New Providence. Its ancient hardwood forest boasts the best preserved old-growth woodlands on the island. Impressive limestone caverns, some up to approximately 15.2 m (50 ft wide) and 9 m (30 ft) deep, are scattered throughout the park in an impressive geologic network. The park has a small visitors center and numerous trails, boardwalks, and bridges.

Wild Bird Reserves

There are two Wild Bird Reserves near the proposed project site – Goulding Cay and Adelaide Creek. Goulding Cay Wild Bird Reserve is located 3 km off the westernmost end of New Providence. Goulding Cay is an uninhabited offshore rocky cay with low coastline vegetation, such as bay cedar and sea purslane (Moore and Gape, 2009). This reserve is home to a seabird colony with regionally significant numbers of Bridled Tern (*Terna anaethetus*) and Brown Noddy (*Anous stolidus*).

Adelaide Creek Wild Bird Reserve is a 370-acre protected area managed by the Ministry of Environment and Housing. The reserve spans a creek and wetland system.

3.3 Biological aspects – Coastal & Marine

An inter-tidal survey along the coast opposite CPPS and the adjacent vegetated area was conducted on November 14th, 2020. The survey involved walking along the length of the coast and documenting plant and animal species observed.

Marine benthic surveys were undertaken by SEV on behalf of Shell from September 25 through 28, 2020. Surveys were completed using a Trident underwater drone (see Figure 3-26) as Shell safety protocols did not allow scuba diving of the proposed project vicinity. The objective of the roving survey of marine benthic habitat was to confirm the location of any corals and seagrasses. Any fish or other marine organisms observed during this survey were identified.

Figure 3-27 shows the area surveyed outlined in pink as well as the path of the roving survey. The drone was also piloted along three transects corresponding to the proposed location of the 2020 Shell LNG terminal and trestle. The transects had the following lengths:

- Transect 1 – 100 m (328 ft);
- Transect 2 – 610 m (2,001 ft); and
- Transect 3 – 100 m (328 ft).

Figure 3-28 shows the locations where the transects were done. GPS coordinates, vessel heading, length of the tether upon sample collection and depth of the vessel were documented at each sample location to assist in capturing the sample position.

Figure 3-26: Trident underwater drone

Figure 3-27: Drone roving survey

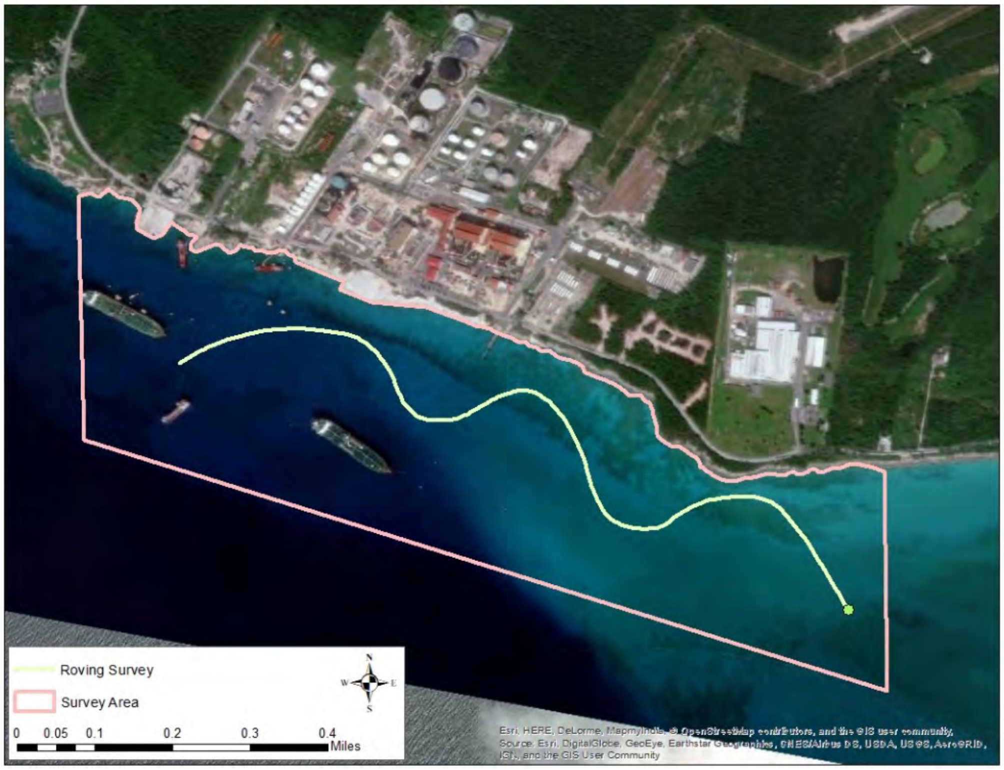
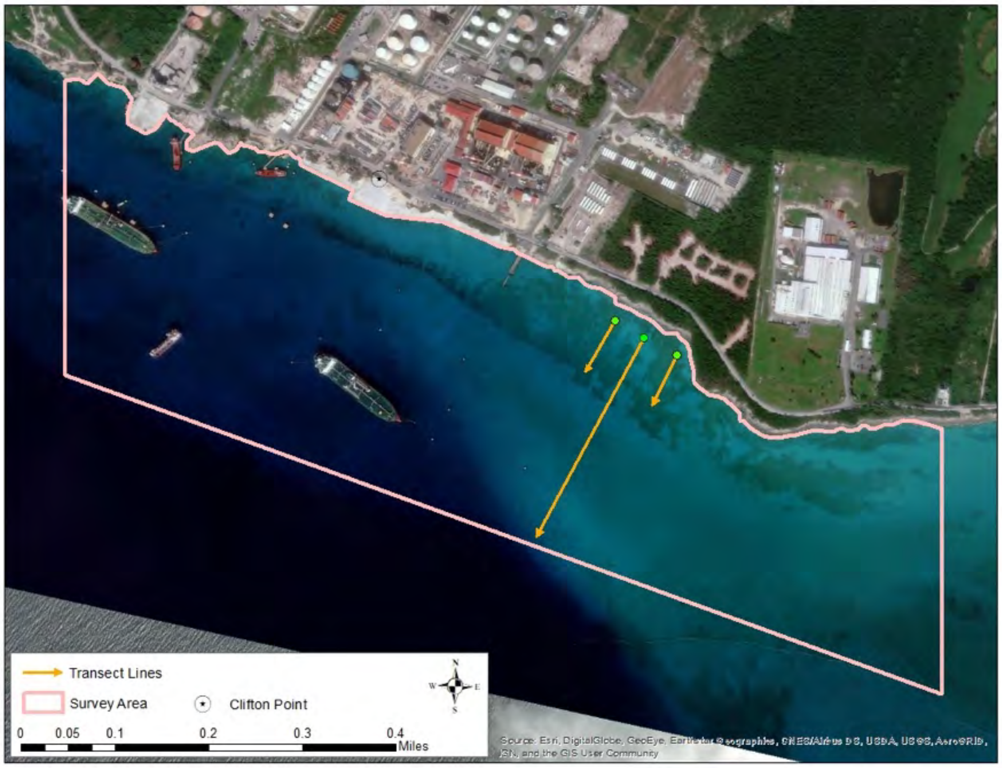


Figure 3-28: Drone transects



3.3.1 Coastal and marine habitat

The coast zone opposite CPPS consists of rocky shore habitat, with modified man-made seawalls and docks.

Marine habitats observed included sand flats, patch reefs and rocky bottom.

Figure 3-29: Rocky shore opposite vegetated area

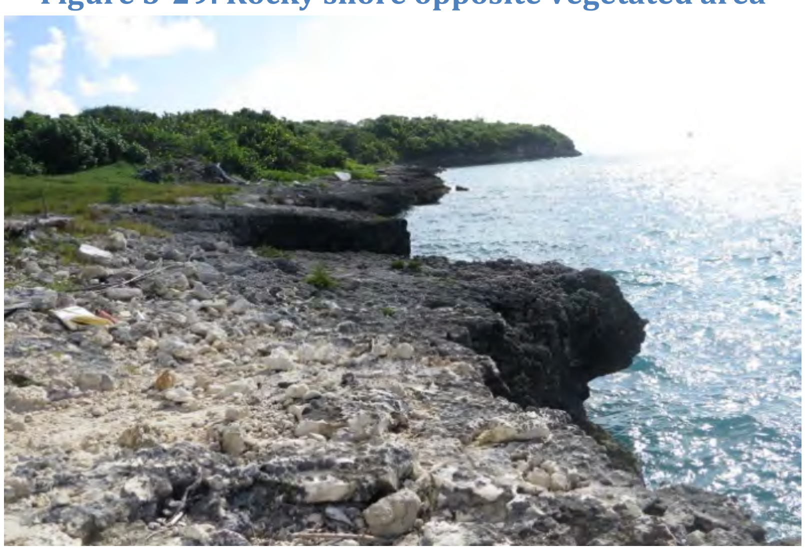


Figure 3-30: Man-made structures in the coastal zone of CPPS

3.3.2 Coastal and marine organisms

Species observed in coastal and marine habitats are listed in tables below.

Table 3-11: Plant species observed during coastal survey

Common Name	Scientific Name
Australian pine (invasive)	*Casuarina equisetifolia*
Hawaiian inkberry	*Scaevola taccada*
Seagrape	*Coccoloba uvifera*
Red mangrove seedling	*Rhizophora mangle*
Silver buttonwood	*Conocarpus erectus*
Bahama vervain	*Stachytarpheta fruticose*
Bay cedar	*Suriana maritima*
Bay bean	*Canavalia rosea*

Figure 3-31: Seagrape

Figure 3-32: Red Mangrove seedling

Figure 3-33: Bay Bean

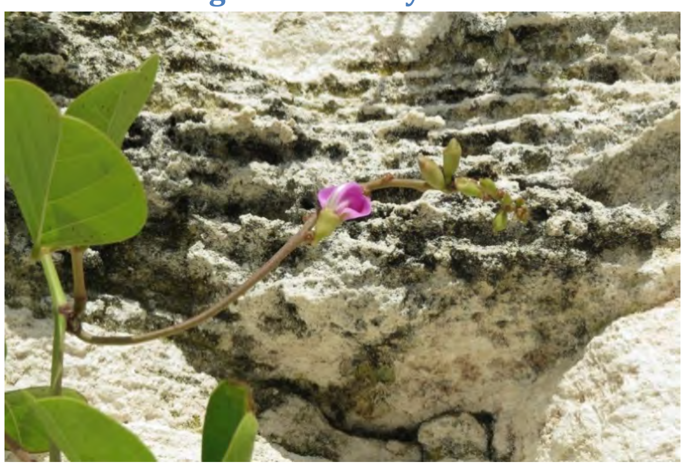


Table 3-12: Animal species observed during coastal survey

Common Name	Scientific Name
Laughing gull	*Leucophaeus atricilla*
Killdeer	*Charadrius vociferus*
Great egret	*Ardea alba*
Osprey	*Pandion haliaetus*
Four-toothed nerite	*Nerita versicolor*

Table 3-13: Marine species observed

Common Name	**Scientific Name**
Giant manta ray	*Manta birostris*
Squirrelfish	*Holocentrus adscensionis*

Common Name	Scientific Name
French grunt	*Haemulon flavolineatum*
Mustard hill coral	*Porites astreoides*
Finger coral	*Porites porites*
Starlet coral	*Siderastrea radians*
Star coral	*Siderastrea siderea*
Soft corals (gorgonians)	-
Sergeant major	*Abudefduf saxatilis*
Boulder brain coral	*Colpophyllia natans*
Sea whip	*Pterogorgia anceps*
Doctorfish (adult & juvenile)	*Acanthurus chirurgus*
Ocean surgeonfish	*Acanthurus bahianus*
Blue tang	*Acanthurus coeruleus*
Princess parrotfish (juvenile)	*Scarus taeniopterus*
Yellow jack	*Caranx bartholomaei*
Bar jack	*Caranx ruber*
Mahogany snapper (young adult)	*Lutjanus mahogani*
Almaco jack	*Seriola rivoliana*
Porkfish	*Anisotremus virginicus*
Great barracuda	*Sphyraena barracuda*
Beaugregory (juvenile)	*Stegastes leucostictus*
Bluehead wrasse (adult and initial phase)	*Thalassoma bifasciatum*
Blue chromis	*Chromis cyanea*
Flat-top bristle brush algae	*Penicillus pyriformis*
Calcareous algae (various species)	Halimeda spp.
Sea lettuce	*Ulva fasciata*
Encrusting sponges (various species)	-

Based on local and professional knowledge, species known to frequent the area, but not observed during the survey are outlined in Table 3-14.

Table 3-14: Species common to marine area off southwest New Providence

Common Name	Scientific Name
Atlantic bottle-nosed dolphin	*Tursiops truncatus*

Common Name	Scientific Name
Yellowtail snapper	*Ocyurus chrysurus*
White margate	*Haemulon album*
Juvenile groupers (various species)	-
Caribbean reef shark	*Carcharhinus perezii*
Bull shark	*Carcharhinus leucas*
Yellow stingray	*Urolophus jamaicensis*
Nurse shark	*Ginglymostoma cirratum*

3.4 Socioeconomic aspects

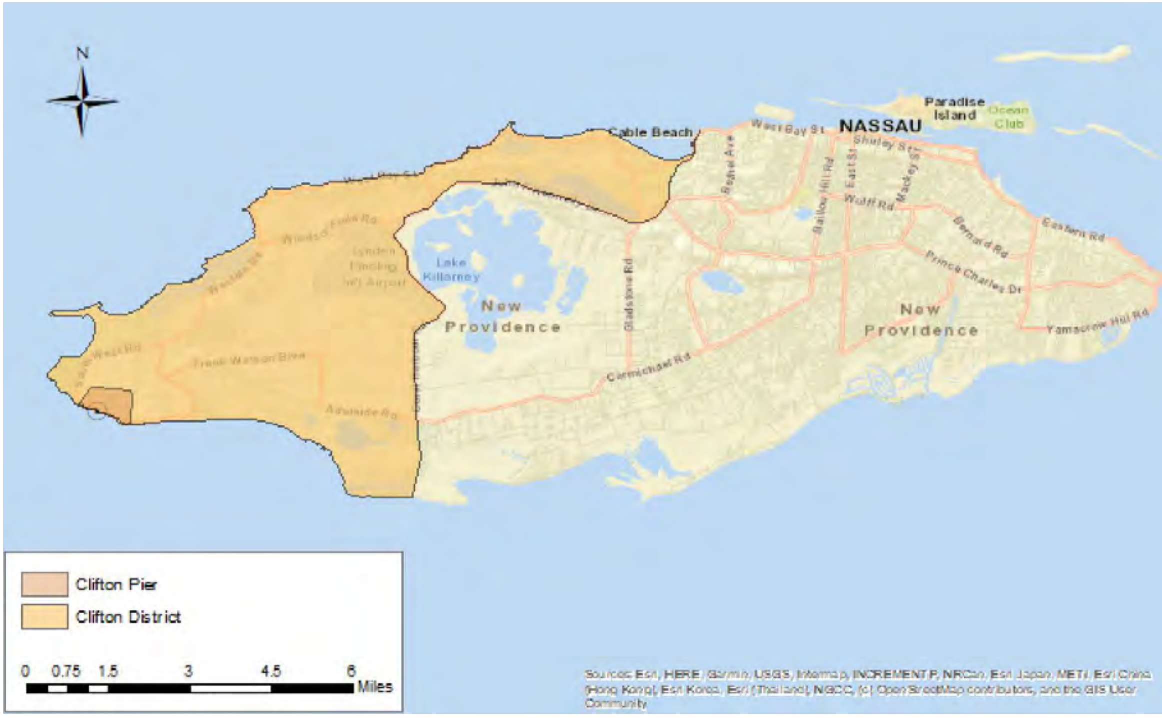
3.4.1 Demography

The population of The Bahamas in 2016 was reported at 391,000 (WHO, 2020a) and in 2020 was approximately 393,000 (World Population Review, 2020). Over 70% of the population reside on New Providence. Between the 2000 and 2010 Census, the population has grown by almost 16%, the lowest increase since the 1950's. At just 207 km2 (80 square mi) and 3,070 persons per 2.59 km2 (1 square mi), New Providence is the most densely populated island in the archipelago (Department of Statistics, 2012).

Clifton is widely recognized as the southwestern-most community on New Providence. The constituency is described in the 2010 Census Report for New Providence as "Bounded on the North by the Sea; on the East by an imaginary line that extends to West Bay Street, an Unnamed Road, Westridge Drive, Atlantic Drive, an Unnamed Road, John F Kennedy Drive, International Airport Road, Coral Harbour Road Adelaide Road, Carmichael Road and Coral Harbour Road; on the South by the Sea; on the West by the Sea (Clifton Bluff, Lyford Cay)" (Department of Statistics, 2012).

The Clifton district (see Figure 3-34) has a population of 9,323, with the largest age group being 40-49 (19%) of households. The District has 2,868 households and over a third of dwellings are owned (in full) and over a third are vacant. The average household income is $102,593.30 and the average household size is 3.25. Over 4,600 persons over 15 years of age are employed in the Clifton District. The largest occupational group in the District is Managers, Chief Executives, Senior Officials and Legislators, representing 23% of the employed population. Professionals in Science and Engineering, as well as Technicians/Associate Professionals make up 19% and 16%, respectively. Thirty-seven (37) percent of the District's population has at secondary education and almost 40% has a college/university degree (Department of Statistics, 2012).

Figure 3-34: Map of Clifton District on New Providence

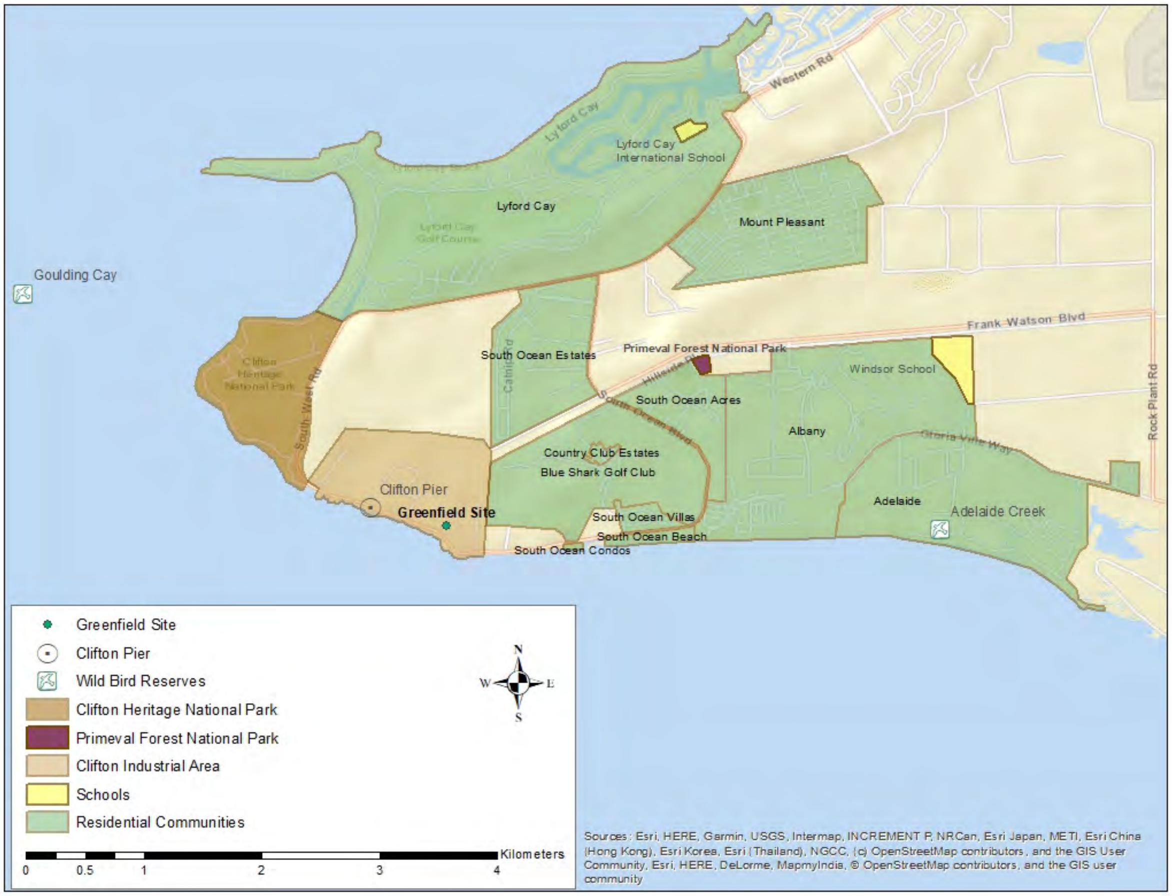


In 2020, a stakeholder survey was undertaken by SEV on behalf of Shell in support of an LNG project. Almost half of respondents surveyed have lived in the Clifton district for over ten years and 25% have lived there 6-10 years. Eighty-nine (89) percent of those surveyed are employed and 47% of those employed are employed in the Clifton district. More than two-thirds of those employed in the District, are employed full time and have been employed for over 10 years.

There are ten residential areas within 3.2 km (2 mi) of Clifton Pier (see Figure 3-35). They are:

- Adelaide (historic settlement)
- Albany (gated community)
- Country Club Estates (at Blue Shark Golf Club)
- Lyford Cay (gated community)
- Mount Pleasant
- South Ocean Acres
- South Ocean Beach
- South Ocean Condos
- South Ocean Estates
- South Ocean Villas

Figure 3-35: Residential areas and schools near Clifton Pier



Enrolment in school is mandatory in The Bahamas for youth between the age of 5 and 16. Approximately 75,120 students are enrolled at the preschool school to secondary school levels and between 8,000 – 9,000 students enrolled at the tertiary level. Over 3,000 residents of the Clifton District are under the age of 19 (Department of Statistics, 2012).

There are two schools located approximately 4 km (2.49 mi) from the proposed project site: Lyford Cay International School and Windsor School, Albany Campus (see Figure 3-33 above). Lyford Cay International School is located within the gated Lyford Cay community and has a school population of 385 students. Windsor School at Albany has a student population of over 400.

3.4.2 Economy

Compared to other countries in the Western Hemisphere, The Bahamas has the third highest per-capita gross domestic product (GDP). However, the majority of the GDP is dependent on the tourism industry. The epicenter of the economy emerges from New Providence, the only island offering employment in every sector listed in the 2010 Census.

3.4.3 Employment

Tourism is the number one industry in The Bahamas, accounting for a large portion of the labour force, and contributing 60% of the GDP. Financial services sector is the second major industry in The Bahamas and includes commercial and private banking institutions. Employment in agriculture, forestry, and fishing make up 1.45% of the total industries that employ Bahamians. Other related industries that employ Bahamians are listed in Table 3-15.

Table 3-15: Employment Statistics for The Bahamas – Smaller Industries

Industry	Number of Persons Employed
Fishing	1,597
Manufacturing of beverages	756
Manufacturing of refined petroleum products	29
Electricity Power Generation Transmission and Distribution	1,386
Manufacture of Gas; Distribution of Gaseous Fuels Through Mains	27
Transport Via Pipeline	6
Sea and Coastal Water Transport	945

Source: Department of Statistics, 2012

As noted earlier, Clifton Pier is a predominantly industrial area and employment within Clifton Pier is primarily related to the existing industries. Employment outside of Clifton Pier is predominantly in the tourism industry. Primary employment comes from the Clifton Heritage National Park, Lyford Cay Development, Stuart Cove's Dive Bahamas, Albany Development, various restaurants, and several other small businesses in the Mount Pleasant Community.

There are several businesses and industries that generate economic activity in the areas surrounding Clifton Pier, attracting local and international clients and customers. They include:

- banking;
- building and trade Vendors;
- educational services;
- governmental offices;
- legal services;
- merchant and domestic services;
- stores, restaurants, and other commodities;
- tour and site operators (Clifton Heritage National Park, Underwater Sculptures Garden, Primeval Forest National Park, Jaws Beach, Dive Sites, Birdwatching, Goulding Cay Bird Reserve and Adelaide Creek Wild Bird Reserve);
- transportation services; and
- warehousing and storage facilities.

High-end residential areas that provide employment and contribute to the local economy include Lyford Cay (the oldest gated community on New Providence), Old Fort Bay, and Albany (most recently established). Lyford Cay and Albany both feature private 18-hole golf courses, clubhouses, and marinas.

3.4.4 Land and Marine Use

Clifton Pier is home to several industrial operations including Sun Oil Limited (SOL) Bahamas (north and west), Rubis Bahamas Limited (to the west), and BPL. Other industrial companies adjacent to the power and oil companies are Caribbean Gas Company and Commonwealth Brewery Limited. The locations of these industrial facilities were previously shown in Chapter 3.0 (Baseline Description) on Figure 3-3. CPPS is operated by BPL, which supplies electricity to the island of New Providence.

Historically, large quantities of heavy fuel oil (HFO or Bunker C) for power generation have been stored at Clifton Pier. At the BPL tank farm to the north, ADO, lubricating oil, and HFO or Bunker C are stored. Outside of the BPL storage facility, gasoline, aviation fuel, and jet fuel are being stored by other facilities.

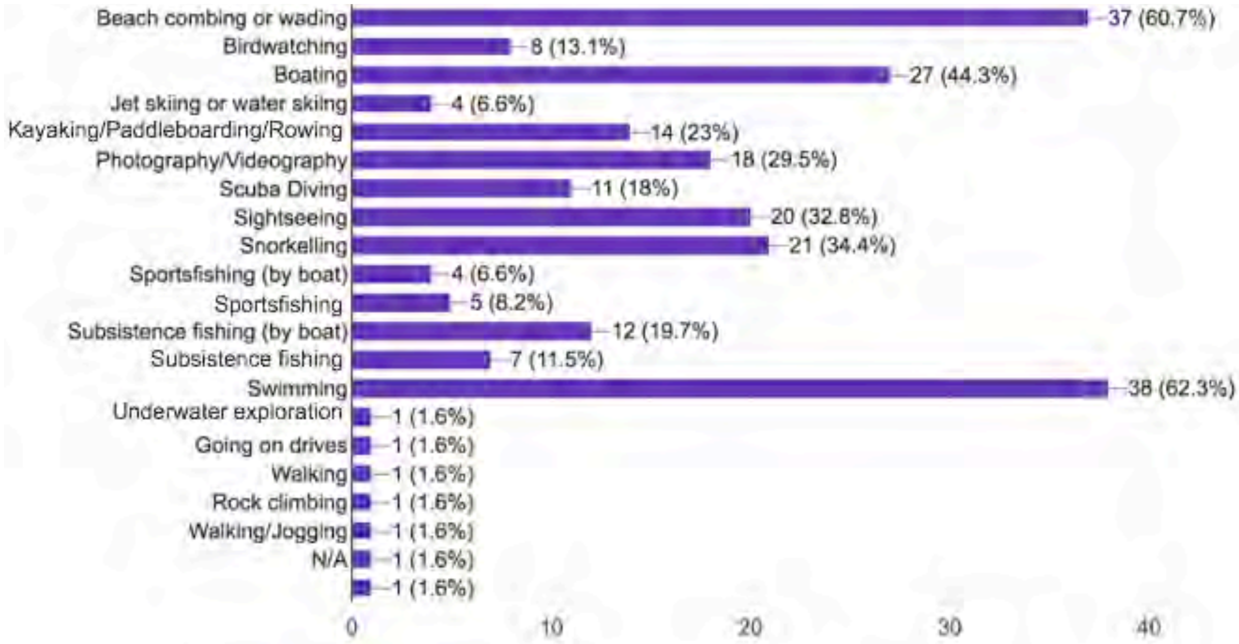
There are several key uses of the area surrounding the industrial properties at CPPS. Marine traffic is by far the largest category of use in the Clifton Pier area. This includes shipping traffic related to the operations of BPL, Rubis Bahamas Limited, SOL, and Caribbean Gas. Other vessels are typically engaged in leisure, recreational, snorkeling, scuba diving, sightseeing or fishing (subsistence and commercial).

The shoreline area at Clifton has been modified over the years to accommodate industry. There are several outfalls, sheet pilings, and other related structures. There is also a cave on the shoreline adjacent to the BPL Oil Recovery Storage Area. The marine environment at Clifton extends from the shallow waters of the shoreline and beaches out to the marine shelf 12.2 m to 18.3 m (40 ft to 60 ft) and plunges down in excess of 1,000 m (3,280 ft).

Coral reef, fish, and other marine species attract a broad group of uses. Fishermen frequent the southwest New Providence area primarily via boat as fishing from shore is very limited in recent times. Subsistence fishing is most popular during mutton fish spawning seasons. Local vessels can be observed along the marine shelf where fish aggregations form and can be harvested. Residents can also be observed fishing from the shoreline, coast, and pier on any given day.

The 2020 stakeholder survey showed 74% of respondents use the bay area for recreation, work, or in transit to other areas. Seventy-two (72) percent of respondents use the bay area for recreation, 21% for work, and 46% in transit to other areas. Recreation accounts for the highest use of the bay area adjacent to Clifton Pier by respondents. Over 64% of the respondents using the bay area for recreation do so by swimming, beach combing, or wading. Forty-eight (48) percent use the bay area for recreational fishing; subsistence fishing (32.7%) and sportfishing (15.5%). Scuba diving and birdwatching represent 19% and 14% of the recreational activity, respectively.

Figure 3-36: Stakeholder survey responses by use of Clifton Bay for recreation



21% of all respondents to the 2020 stakeholder survey use the bay area adjacent to Clifton Pier for work (at a frequency of weekly and biweekly (8.5% and 6.8%, respectively)) and 16% of those users reside in the Clifton District. For work purposes, respondents use the bay area to access the Clifton Heritage National Park (45%), Lyford Cay (30%), and Albany (30%).

Almost 30% of respondents conduct boat tours and sightseeing trips for clients/guests and 30% use the bay area for educational purposes (school tours, research, etc). Underwater tour operators (including scuba diving) and marine transportation services each represent 18% of work-related use of the bay area. Sportfishing activities and commercial fishing represent 12% and 6% respectively.

Sixty-five (65) percent of respondents use the bay area to access gated communities, including Albany, Clifton, and Lyford Cay.

The stakeholder survey also revealed that almost 50% of respondents use the bay area adjacent to Clifton Pier while in transit to other locations. These locations include Southside New Providence (62%), Western New Providence (51%), Northside New Providence (19%), Eastern New Providence (19%) and Goulding Cay (11%).

There are 20 known dive sites within 4 km (2.49) of the proposed project site. Dive operators use these locations for snorkeling, scuba diving, shark feeding experiences, and other underwater activities. Many of the dive sites offer unique geologic features (caverns, shoots, wall dives) and numerous wrecks (many installed for famous Hollywood films).

The land and marine features identified are provided in Figures 3-37 and 3-38 respectively.

Figure 3-37: Land use areas in the vicinity of Clifton Pier

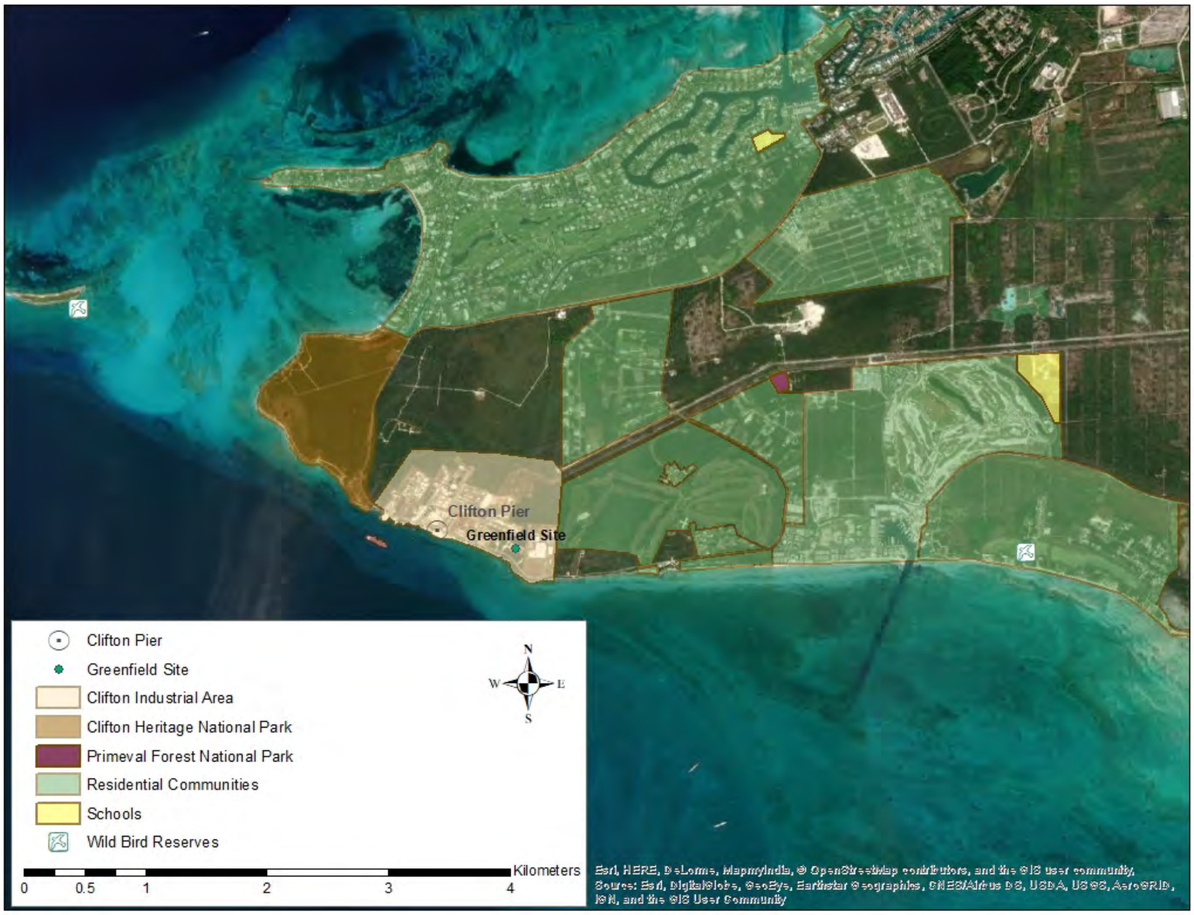


Figure 3-38: Marine use areas in the vicinity of Clifton Pier

Several feature films have been filmed on land and in the waters around Clifton, including Thunderball (1965), Never Say Never (1983), Jaws: The Revenge (1987), Flipper (1992), After the Sunset (2004), and Into the Blue (2005).

Sportfishing by local and visiting vessels is also common in the Clifton Pier area. Commercial fishing is known to occur in the area, but the extent of this activity cannot be established through existing literature at this time. The consultants will engage the Department of Marine Resources for more information once the Global Pandemic Emergency Orders have been lifted.

Scuba diving, snorkeling, recreational swimming and other leisure and sightseeing activities occur in the area surrounding Clifton Pier. As noted above there are numerous dive sites sprawled in the waters less than a quarter mile from Clifton Point stretching all the way to Goulding Cay. These sites fall within and outside the Southwest New Providence MMA and are used for scuba diving, snorkeling, and swimming. Dive operators including Stuart Cove's Bahamas, Bahama Divers, and other private vessels offer trips to areas near and around Clifton.

The first underwater sculpture garden in the Bahamas is a popular attraction for visitors to New Providence. It is located in the shallow waters of Clifton, near the Clifton Heritage National Park, and includes 65 reef balls and 3 sculptures. It attracts swimmers (from Clifton Heritage National Park), snorkelers and scuba divers who access the site by boat or from shore. Birdwatching also occurs at the nearby Clifton Heritage National Park, Primeval Forest National Park, Goulding Cay Wild Bird Reserve, and Adelaide Creek Wild Bird Reserve.

Private vessels that utilize marinas and dock facilities around New Providence and primarily at Albany and Lyford Cay are known to traverse and recreate in the areas surrounding Clifton. Guests travel primarily by bus, taxi or private rental car to the various tourist sites.

Thirty-eight percent of homeowners in the Clifton district fully own their homes and 37% own their homes by way of mortgage. 20% rent their homes in Clifton and less than 1% lease the properties on which they reside (Department of Statistics, 2012).

3.4.5 Provision of services

New Providence offers the full spectrum of transportation services offered throughout the archipelago, with air, land, and sea options barring none. Regular domestic and international air transportation is available from the Lynden Pindling International Airport (LPIA), approximately 12 km (7.46 mi) from the proposed project site. LPIA provides routine direct flights to North America, the Caribbean, and Europe. There are domestic flights to every major island in The Bahamas. Private domestic and international flights are facilitated at two Fixed Base Operator (FBO) facilities (Million Air and the Jet Center), at LPIA.

Transportation and storage of bulk fuel via large vessels occurs at Clifton Pier. Outside of Clifton Pier, boat transportation activity primarily occurs on the north side of New Providence. At Potters Cay, fishing, cargo, and mailboats dock; servicing interisland marine transport and shipment of goods. West of Potters Cay, cruise ships dock at the secured Prince George Wharf. Further west, the Arawak Port Development is home to the Nassau Container Port and Gladstone Freight Terminal, which facilitates international commercial shipping and houses the Bahamas Customs Department. These areas represent the hub of economic activity and transportation in The Bahamas. Numerous marinas on New Providence, both private and public, accommodate hundreds of private yachts and marine vessels. These include:

- Albany Marina
- Atlantis Marina Village
- Bay Street Marina
- Coral Harbour
- Harbour Bay Marina
- Harbour Central
- John Alfred Wharf
- Lyford Cay Marina
- Nassau Yacht Club
- Old Fort Bay Marina
- Palm Cay
- Port New Providence
- Sea Breeze Estates
- TPA Marina
- Venice Bay
- Woodes Rodgers Walk

Transportation on land is facilitated via a complex network of roads. These roads on New Providence are primarily two-lane, with major thoroughfares having four lanes. These include Prince Charles Drive, Tonique-Darling Highway, and John F. Kennedy Drive. Heading west from LPIA the main road is Windsor Field Road, a two-lane road which transitions to the Western Road and ends at the roundabout at Lyford Cay.

Further west, the road meanders into Southwest Road, which leads to Clifton Pier. Southwest Road is the only road access to and from Clifton Pier, running west to Clifton Heritage National Park and Lyford Cay east to South Ocean and Albany.

New Providence offers a wide variety of services to its population including education (at all levels), medical, banking, insurance, and transportation. Power generation for New Providence is by oil-powered generators and is provided by BPL at Clifton Pier. There are three telecommunications companies on the island; Bahamas Telecommunications Company, ALIV, and Cable Bahamas.

Potable water and centralized sewerage collection are managed by the WSC. The main water supply for 62% of private households in the Clifton district is WSC, 32% is privately sourced, and 2% from rainwater (Department of Statistics, 2012). Sewerage service is limited to about one fifth of the island through the WSC sewerage system and systems set up by housing subdivisions. All other locations use on-plot disposal devices including septic tanks. Major hotels and resorts use their own treatment facilities. Waste is generally treated to primary or secondary levels then disposed of through deep well injection systems.

Clifton is the primary point of importation of oil, gas, and other fuel into the island. The pier and its associated network of lines and storage containers is home to BPL, Rubis Ltd., SOL Bahamas Limited, SOL, Commonwealth Brewery Limited, and a cement storage facility.

3.5 Cultural aspects

The historical resources within the project area of influence are protected at the Clifton Heritage National Park. There are no archaeological and historic resources at the proposed project site.

3.6 Legal and regulatory

3.6.1 Bahamian laws and regulations

Relevant Bahamian laws and regulations that will need to be considered for Phase 1 of the LNG-to-Power Project include:

Antiquities, Monuments and Museum Regulations 1999 and Antiquities, Monuments and Museum (Underwater Cultural Heritage) Regulations 2012

The 1999 regulations outline permits that may be granted with respect to archaeological and cultural resources. It also contains the forms for licenses and permits issued with respect to such resources. The 2012 Regulations specifically outline the processes for accessing archaeological and cultural resources that may be found underwater, inclusive of shipwrecks. These regulations also outline the licensing process for this type of exploration and recovery.

Any discovery of historical, archaeological or cultural resources are to be reported to the Antiquities, Monuments and Museum Corporation (AMMC). AMMC will visit the site and provide guidance on managing excavation and/or management of such resources.

Bahamas Building Code 2003

The Third Edition of the Bahamas Building Code issued by the Ministry of Works and Utilities provides minimum standards as well as provisions and requirements for safe and stable buildings. These include Chapter 20 on design loads, Chapter 21 on excavations, footings and foundations, and other chapters on reinforced concrete, steel and iron.

Coast Protection Act 1968

This Act serves to regulate construction or alteration of the coastline for the purpose of the protection of land. It also provides for protection against encroachment and erosion by the sea.

Conservation and Protection of the Physical Landscape of The Bahamas Act 1997

This Act prohibits all significant excavation, landfill operation, quarry mining or mining of physical natural resources (such as sand) without permission of the Director of Physical Planning. The Act also gives the Director the authority to request an Environmental Impact Assessment (EIA) for any excavation or land reclamation activities.

Environmental Health Services Act 1987

This Act promotes conservation and maintenance of the environment and also addresses the control of contaminants and pollutants that may adversely affect the environment and human health. The Act also outlines regulations with respect to water supplies, solid and liquid waste, beaches, seaports, harbours and marinas. This Act requires all projects with associated emissions, depositions, or discharges of any regulated air contaminant to obtain a permit approval by the Director of the Department of Environmental Health Services (DEHS) prior to initiating discharges to ambient air.

Environmental Health Services (Collection and Disposal of Waste) Regulations 2004

These regulations provide for the collection and disposal of domestic, commercial and construction waste. Commercial waste includes ashes, refuse and rubbish. Construction waste includes any waste materials from construction, renovation, repairs and demolition.

Environmental Impact Assessment Regulations 2020

These regulations were developed under the Environmental Planning and Protection Act 2019. They provide guidance on the EIA process for The Bahamas including the Certificate of Environmental Clearance (CEC) application and review process and what information should be included in an EIA and an EMP.

Environmental Planning and Protection Act 2019

This Act provides a legal framework for the protection, enhancement and conservation of the environment. It also provides for the prevention and mitigation of pollution in order to maintain the quality of the environment. It establishes a Department of Environmental Planning and Protection to regulate and oversee the review of Environmental Impact Assessments and Environmental Management Plans. Until the Department is formally established, this latter role is being fulfilled by the BEST Commission, Ministry of Environment and Housing.

The Act authorizes DEPP to develop regulations that prevent and control air pollution, such as objectives and quality standards with respect to environmental protection, including bodies of water, air and soil. In particular, the Act authorizes the DEPP to establish ambient air quality standards.

The Act also identifies measures deemed necessary to minimise any resulting threat to human health or the environment, such as the requirement for a development to have an environmental contingency plan, the duty to notify of spills and accidental releases, recovery of the costs for any emergency response actions, and guidelines for environmental emergency responses.

Forestry Act 2010

This Act provides for the:

- Setting of royalty fees, permits, leases, and licence fees for utilization of forest produce and non–timber forest produce from the forest estate;
- Management, conservation, control and development of forests, and the promotion and regulation of forest industries;
- Promotion of the conservation and management of wildlife and wildlife habitat in forest reserves, protected forests and conservation forests; and
- Protection of trees that are rare and of historical significance.

Health and Safety At Work Act 2002

The Act provides for:

- Securing the health, safety and welfare of persons at work;
- Protecting persons other than persons at work against risks to health or safety arising out of the activities of persons at work; and
- Controlling the keeping and use of explosive, highly flammable or other dangerous substances and preventing the unlawful acquisition, possession and use of such substances.

Penal Code 1927

This Act provides for the prohibition of airborne noise, but it does not include any numerical limits or standards that can be used to assess and manage airborne noise.

Water and Sewerage Corporation Act 1976

This Act establishes the Corporation. Functions of this organization include the application of appropriate standards and techniques for investigation, use, control, protection, management and administration of water. The Corporation is also mandated to oversee waste disposal, water treatment and water quality. WSC utilizes WHO standards for water quality.

Wild Animals (Protection) Act 1968

This Act prevents the taking, capture or export of any wild animal without the permission of the Minister of Agriculture & Fisheries. These animals include wild horses, the hutia and iguanas.

Wild Birds Protection Act 1952

This Act provides for the protection of wild birds. The Act lists several species including the White-Crowned Pigeon, Whistling Duck and Yellow-Crowned Night Heron.

3.6.2 International standards and guidelines

The project will also adhere to relevant internationally recognized standards/guidelines from entities such as the International Finance Corporation (IFC), the World Bank Group (WBG), US EPA (Environmental Protection Agency), as well as Shell's HSSE & SP Control Framework, as appropriate. These standards and guidelines include:

- IFC/WBG General Environmental, Health, and Safety Guidelines (2007) (IFC/WBG General Environmental, Health and Safety (EHS) Guidelines) including air emissions and air quality guidelines, day and night airborne noise guidelines for different receptor categories, and wastewater and ambient water quality guidelines;
- IFC/WBG Environmental, Health, and Safety Guidelines for Liquefied Natural Gas Facilities (2017) (IFC/WBG EHS Guidelines for LNG Facilities) and associated general EHS guidelines);
- applicable International Organization for Standardization (ISO) standards governed by ISO/TC67/SC9 – Liquefied natural gas installations and equipment:
    - ISO/TS 16901:2015 "Guidance on performing risk assessment in the design of onshore LNG installations including the ship/shore interface" – This standard discusses Safety & Health Risks to surrounding persons and communities;
    - ISO/TS 18683:2015 "Guidelines for systems and installations for the supply of LNG as fuel to ships" – This applies as Shell intends to fuel ships with LNG at infrastructure associated with the Project;
    - ISO 28460:2010I "Petroleum and natural gas industries — Installation and equipment for liquefied natural gas — Ship-to-shore interface and port operations" – This standard discusses safety in facilities operations;
- US EPA Standards including National Ambient Air Quality Standards (NAAQS) and best practices for assessing socio-economic impacts;
- NOAA Fisheries Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (2016, 2018) - used to assess the potential impacts of underwater sound sources on species-specific marine mammals; and
- World Health Organization (WHO) Guidelines including those for air quality and assessing human health impacts.

The proposed project will comply with the International Convention for the Prevention of Pollution from Ships (MARPOL) (International Marine Organization (IMO), 1973). This Convention is the main international convention covering prevention of pollution of the marine environment by ships from routine operations or accidents. The Bahamas became a signatory to MARPOL on 16 February 1979, and the Convention came into force on 25 May 1980. Annex IV on Sewage Pollution and Prevention provides guidance on discharge from ships. Annex VI Prevention of Air Pollution from Ships (entered into force 19 May 2005) (IMO, 2005) sets limits on sulphur oxide (Sox) and nitrogen oxide (Nox) emissions from ship exhausts and prohibits deliberate emissions of ozone depleting substances; designated emission control areas (ECAs) set more stringent standards for Sox, Nox and particulate matter.

The US EPA has developed Regional Screening Level (RSL) generic tables most recently updated November 2019 for a very broad range of soil contaminants. In addition, the Florida Department of Environmental Protection has developed target levels for soil and groundwater contaminant levels. These were originally developed in 2005.

Shell's Health Safety, Security, Environment and Social Performance Control Framework

Shell has developed a Control Framework that defines the Health, Safety, Security, Environment and Social Performance (HSSE & SP) policies and objectives for all of its projects throughout the world, including the proposed project. This Framework sets out the HSSE standards against which the project will evaluate its decisions. It also establishes the need to adhere to applicable standards, regulations, and guidelines. The project has adopted the Shell HSSE & SP Control Framework.

The overall HSSE & SP premise and objectives require that the proposed project complies with:

- legal obligations including relevant Bahamian laws;
- Shell International Trading and Shipping Company Limited (STASCo) Marine codes and standards;
- classification rules;
- Shell's HSSE & SP Control Framework, HSE Golden Rules and Life Saving Rules;
- international agreements and protocols to which The Bahamas is a party;
- all relevant BPL policies, standards and guidelines; and
- project specific standards.

The HSSE & SP objectives are to:

- prevent/minimise injuries, ill health, damage to assets and the (natural and social) environment by appropriate management of risks;
- avoid/eliminate liabilities in the future; and
- take advantage of opportunities to improve the working environment for staff and contractors.

3.7 Government agencies

Government agencies that will be involved with aspects of approval and permitting of this component of the project include:

Department of Environmental Planning and Protection (DEPP)

Formerly the BEST Commission, the Department of Environmental Planning and Protection (DEPP) is responsible for developing the Government of The Bahamas' (GOB) environmental and natural resource management policies. As mandated under the 2019 Environmental Planning and Protection Act and 2020 EIA Regulations, DEPP is responsible for the administration of the EIA process, overseeing the technical review of EIAs, coordinating the public review of EIAs, and various national plans for natural resource management.

DEPP is responsible for various environmental matters, including biodiversity, climate change, wetlands, land degradation, and persistent organic pollutants. In this role, DEPP has established committees, drawing on appropriate staff from different government agencies, for promoting actions to implement the specific requirements of the various multilateral environmental conventions of which The Bahamas is a Party.

Department of Environmental Health Services (DEHS)

Under the *Environmental Health Act* of 1987, and the Environmental Health Regulations, the DEHS mandate is to promote and protect public health and ensure conservation and maintenance of the environment. One role of the DEHS is to regulate, monitor, and control actual and likely contamination and pollution of the environment and establish minimum standards required for a clean, healthy, and pleasing environment.

For proposed projects, the DEHS evaluates the effectiveness of pollution control measures and initiatives to protect the health and safety of workers, and the natural environment. DEHS also issues the necessary effluent discharge and emissions permits.

Department of Labour

The Department of Labour oversees labour relations and occupational health and safety. The Department is the lead agency for regulating occupational health and safety under the *Health and Safety at Work Act* (2002). Through its Inspection Unit, the Department also conducts inspections to ensure adequate worker safety and compliance with regulations.

Department of Physical Planning

The Department authorizes activities such as dredging, filling, harvesting or removal of protected trees, and any work that will affect coastlines. It also administers the new Planning and Subdivision Act of 2010, which includes ensuring the preparation of land use plans and other physical planning activities.

Ministry of the Environment and Housing

The Ministry of the Environment and Housing oversees conservation of wild animals, birds, and plants, as well as forests. It administers the Wild Birds and Wild Animals Protection Acts.

Ministry of Public Works

The Ministry oversees and maintains physical infrastructure in the country. It is entrusted with the administration of the Building Control Act (BCA) and Regulations.

Water and Sewerage Corporation (WSC)

The WSC, with its Water Resources Management Unit (WRMU), has responsibility for optimal development of the country's water resources and the control of water quality. It shares (with DEHS) the responsibility for monitoring water quality. WSC issues water supply franchises to developers in areas where the supply of water is impractical for the GOB or its agencies to undertake.

3.8 Non-governmental organizations

Non-governmental organizations (NGOs) that are active in New Providence include:

Bahamas National Trust (BNT)

The BNT was established by an Act of Parliament in 1959, which makes it unique in the Non-Governmental Organization community. It represents a unique collaboration of governmental, private sector and scientific interests dedicated to the conservation of the natural and historic resources of The Bahamas for the enjoyment and benefit of the Bahamian people. The primary mandate of the Trust is management of the National Parks System of The Bahamas. BNT manages the Southwest New Providence Marine Managed Area and the Primeval Forest National Park.

Bahamas Reef Environment Educational Foundation (BREEF)

BREEF is concerned primarily with coral reef education and fund-raising for the protection of marine resources of The Bahamas. Its mission is to strengthen the symbiosis between the Bahamian people and the reefs, which protect, nourish, and enrich us, by focusing Bahamian and allied minds on this relationship. The Foundation's raison d'etre is the restoration of the reefs of The Bahamas to their former glory and abundance. BREEF installed the underwater sculpture garden near Clifton Heritage National Park.

Save the Bays

Save the Bays was established in 2013 with an initial effort to preserve and protect Clifton Bay and other marine environments surrounding New Providence. They were involved in the establishment of the Southwest New Providence MMA. They are now a member of the Waterkeepers Alliance and have projects on other islands of The Bahamas including Grand Bahama.

reEarth

Established in 1990, reEarth is a non-profit, community based environmental watch group dedicated to increasing public awareness and understanding of environmental issues. reEarth is primarily an environmental advocacy group and champions issues related to environmental protection and renewable energy. The group has long advocated for the country to move away from use of fossil fuels.

4.0 Environmental impacts – Terrestrial

The impacts assessed for Phase 1 of the LNG-to-Power project were done so based on the following criteria:

- **Nature** of the impact (direct/indirect) – direct impacts are potential impacts that are a result of the proposed project activities or decisions. On the other hand, indirect impacts are those that are not a direct result of the proposed project, but are more likely to be produced away from or as a result of a complex impact pathway;
- **Spatial extent** (localized/widespread) – localized means that the potential impact is limited to the proposed project site or in its immediate vicinity, namely within Clifton Pier, or widespread means that the potential impact may occur beyond Clifton Pier to the residential areas and further afield;
- **Duration** (short-, medium- or long-term) – short-term refers to potential impacts that are likely to last for a matter of hours, a few days, up to one month (e.g., an impact which occurs during a specific, construction activity). Medium-term refers to potential impacts that are likely to last for up to six months, and long-term refers to potential impacts that are likely to last for more than six months; and
- **Magnitude/severity** (low/moderate/high) – low/minor means potential impacts that are not expected to change the baseline/existing conditions, moderate refers to potential impacts that are observable but are reversable through mitigation, high/major refers to potential impacts that are irreversible and for which compensation (e.g. revegetation at an alternate site), and monitoring may be required.

Table 4-1 below summarizes the terrestrial environmental impacts that can result from construction during Phase 1 of the LNG-to-Power project. Table 4-2 summarizes the terrestrial environmental impacts that can occur during the operational phase.

The most significant terrestrial environmental impact from the LNG-to-Power Project, Phase 1 project will be land clearing for construction.

Impacts associated with air quality and greenhouse gas emissions are detailed in sections 4.1 and 4.2.

Table 4-1: Summary of Terrestrial Environmental Impacts – Construction Phase

Potential Impact	Nature	Spatial Extent	Duration	Magnitude
Potential onshore erosion and sedimentation associated with site clearing, civil underground works, construction of the LNG terminal and buildings, and internal site roads.	Direct	Localized	Short-term	Minor
Hydrological impacts expected from construction of onshore pipeline due to existing site elevation.	Direct	Localized	Short-term	Low
Culvert installation below Southwest Road not expected to disrupt hydrology due to existing site elevation.	Direct	Localized	Short-term	No to minor
Construction of LNG spill trench and impounding basin not expected to disrupt hydrology due to existing site elevation.	Direct	Localized	Short-term	No to minor

Potential Impact	Nature	Spatial Extent	Duration	Magnitude
Construction of onshore facilities not expected to disrupt hydrology as activities will occur on elevated parcel of land limiting impact to water resources.	Direct	Localized	Short-term	Minor
Drilled boreholes will establish surface water and groundwater contaminant migration pathways to groundwater table and/or underlying high hydraulic conductivity karstic zones in the bedrock.	Direct	Localized	Long-term	No to minor
Installation of surface drainage or wastewater disposal wells could be conduits for contaminant migration into the groundwater.	Direct	Localized	Long-term	No to minor
Installation of water supply wells could provide new migration conduits to groundwater.	Direct	Localized	Long-term	No to minor
Granular backfill from pipeline and culvert excavation trench could become a conduit for migration of contaminated surface water within the site.	Direct	Localized	Long-term	No to minor
Improper disposal of construction related wash-water to ground surface could lead to infiltration of contaminate water into the subsurface.	Direct	Localized	Long-term	No to minor
Excavation or foundation installation methods may significantly fracture underlying limestone to depth, could increase subsurface hydraulic conductivity and increase the potential for migration of surficial contaminants to the subsurface.	Direct	Localized	Long-term	No to minor
Heavy construction equipment re-fueling or lubrication activities have the potential for spillage of petroleum hydrocarbons, glycol, hydraulic fluid, engine oil or other contaminants and impact the soil, bedrock and underlying groundwater.	Direct	Localized	Short-term	Moderate
Spills involving solvents, chemicals, paints, coating etc. during construction, could impact the subsurface.	Direct	Localized	Short-term	No to minor
Construction related debris accumulated on the ground surface and mixed with soil could lead to soil and groundwater impacts (metal cuttings, insulation materials, welding scale, etc. could all contribute).	Direct	Localized	Short-term	No to minor
Importation of fill soils to raise or alter grades could be a potential source of soil contamination.	Direct	Localized	Long-term	No to minor
Existing contamination in the surficial soil and upper bedrock to be excavated along the proposed pipeline route, and potentially at other	Direct	Localized	Short-term	Moderate

Potential Impact	Nature	Spatial Extent	Duration	Magnitude
locations, could be a health and safety concern to construction workers and other people on site.				
If contaminated excess soil is stockpiled or disposed offsite there is a potential for contamination at the final placement location.	Direct	Localized	Long-term	No to minor
Solid waste such as domestic waste, spilled construction material or construction debris, could cause tripping hazard risk from debris or infestation of vermin/insects.	Direct	Localized	Short-term	No
Hazardous waste associated with improper handling during construction activities (e.g., contaminated soil and hydrocarbon fluids) could pose a health risk to construction workers (such as dermatitis) and to the environment including contaminating groundwater.	Direct	Localized	Short-term	No to minor
There is a fire and explosion risk, including potential smoke inhalation, injury and death to workers associated with the presence of fuel and other hydrocarbons and the accumulation of vapor within congested areas in close vicinity to the release location.	Direct	Localized	Short-term	Minor to major
Gasoline storage tanks used for refueling construction equipment onsite pose a risk of explosion followed by accumulation of vapor within congested areas in close vicinity to the release location, resulting in fire and potential smoke inhalation to local residents and the public.	Direct	Localized	Short-term	Minor
Severe weather conditions and associated winds and potential for storm surges and water height conditions, such as those during a hurricane, have the potential to damage structures (including compromising safe mooring operations/navigation etc.), and inundate areas (including flooding or roads), causing injuries/fatalities and contamination.	Direct	Localized	Short term	Low to high
Site clearing for the construction of proposed onshore project components such as the LNG terminal and associated buildings, the LNG storage tank, parking lot, etc. will require the permanent removal of coppice on the Greenfield Site.	Direct	Localized	Long-term	Moderate
Construction-related noise may cause birds to leave the proposed project site temporarily.	Direct	Localized	Short-term	Minor
Removal of trees could impact birds and their habitat.	Direct	Localized	Short-term (if	Minor (if vegetated

Potential Impact	Nature	Spatial Extent	Duration	Magnitude
			vegetated wildlife corridors left on the site); Long-term (if all trees and coppice removed)	wildlife corridors left on the site); Major (if all trees and coppice removed)

Table 4-2: Summary of Terrestrial Environmental Impacts – Operational Phase

Potential Impact	Nature	Spatial Extent	Duration	Magnitude
Disposal of operations cleaning wastewater to ground surface could lead to soil and groundwater impacts.	Direct	Localized	Long-term	No to minor
Vehicle or equipment refuelling with diesel or gasoline, as well as lubrication, could result in spills and ultimately soil and/or groundwater contamination.	Direct	Localized	Long-term	No to minor
Collection of waste oils and chemicals or storage and use of such new products (e.g., paints, solvents, coolants, heat exchanger fluids, etc.) and subsequent leakage or losses have the potential to impact on the soil or groundwater quality.	Direct	Localized	Long-term	No to minor
Improper operation of wastewater treatment facilities and sanitary waste facilities could lead to surficial spills or subsurface leakage and contaminant migration.	Direct	Localized	Long-term	No to minor
Operation of drainage or disposal wells, if permitted on the site, could result in impacts to groundwater quality.	Direct	Localized	Long-term	No to minor
Improperly managed solid waste such as domestic waste or maintenance related waste could potentially have adverse environmental and health impacts.	Direct	Localized	Short-term	Minor
Improper handling of hazardous wastes onshore could potentially pose a health risk to on-site employees (such as dermatitis) and to the environment including groundwater.	Direct	Localized	Short-term	No to minor
The presence of highly flammable gases and liquids used in operational activities (i.e., flammable inventories in the LNG terminal which are LNG, Boil-off gas, and low-pressure gas being	Direct	Localized		Minor to moderate

Potential Impact	Nature	Spatial Extent	Duration	Magnitude
sent via pipeline to CPPS) is a potential source of fire and explosion to workers.				
The presence of fuel (diesel, gasoline) or other hydrocarbons (e.g., hydraulic or engine oil) in storage tanks, vehicles, or heavy machinery, and transformers is a potential source of fire and explosion to workers.	Direct	Localized		Minor
The presence of highly flammable gases and liquids used in operational activities (i.e., flammable inventories in the LNG terminal which are LNG, Boil-off gas, and low-pressure gas being sent via pipeline to CPPS) and in storage tanks, vehicles, or heavy machinery, and transformers is a potential source of fire and explosion to offsite residences and the general public.	Direct	Localized		Minor to moderate
Collection of flammable materials within drainage systems and within the potential on-site congested area is a potential source of explosion to workers.	Direct	Localized		Minor
Collection of flammable materials within drainage systems and within the potential on-site congested area is a potential source of explosion to offsite residences and the general public.	Direct	Localized		No to minor
Severe weather conditions and associated winds and potential for storm surges and water height conditions, such as those during a hurricane, may damage structures (including compromising safe mooring operations/navigation etc.), inundate areas (including flooding or roads), cause injuries/fatalities and contamination, and loss of operation/production and power.	Direct	Localized to Widespread	Short- to long-term	Low to high

4.1 Air quality impacts

The primary air quality concern from construction activities is dust generation due to material handling and transfer processes and combustion exhaust emissions from the operations of heavy construction equipment and vehicles.

Dust is composed of particulate matter (PM) in the range of 0 to 44 micrometers (µm). Two specific size ranges of particulate matter are documented to be associated with adverse health effects: PM_{10}, which are those particles 10 µm in diameter and smaller; and $PM_{2.5}$, which are those particles 2.5 µm in diameter and smaller. In general, construction activities will produce particulate matter with a particle size greater than 10µm (i.e., dust) as the most visually observable impact contributing to nuisance effects in the form of dust deposition/accumulation on surfaces within the proposed project area. Dust generation is also dependent on soil type and silt content. However, dust generated during construction activities will include some PM_{10} and $PM_{2.5}$ fractions produced through construction equipment and vehicle exhaust from the combustion of diesel fuel.

Activities involving the mobilization and handling of soils, or materials with contaminant constituents require specific mitigation measures to ensure the impact to ambient air quality and human health is controlled.

Potential impacts can also be driven by atmospheric conditions as weather plays a significant role in dust generation during construction activities. Wind and dry conditions (i.e., low precipitation or low moisture content materials) contribute to the generation of dust which can migrate offsite and affect overall air quality beyond the proposed project area. In addition, during warmer months of the year, heat and sunlight can react with gases and fine particles in the air around the proposed project area which may contribute to the local air quality background concentrations.

Although wet weather conditions serve to suppress dust generation during construction, the associated increased potential for erosion of soils can create conditions that contribute to dust generation once dry conditions return. For example, increased transport of mud onto streets or creation of ruts that increase the surface area of disturbed areas may result in greater dust generation potential under dry conditions.

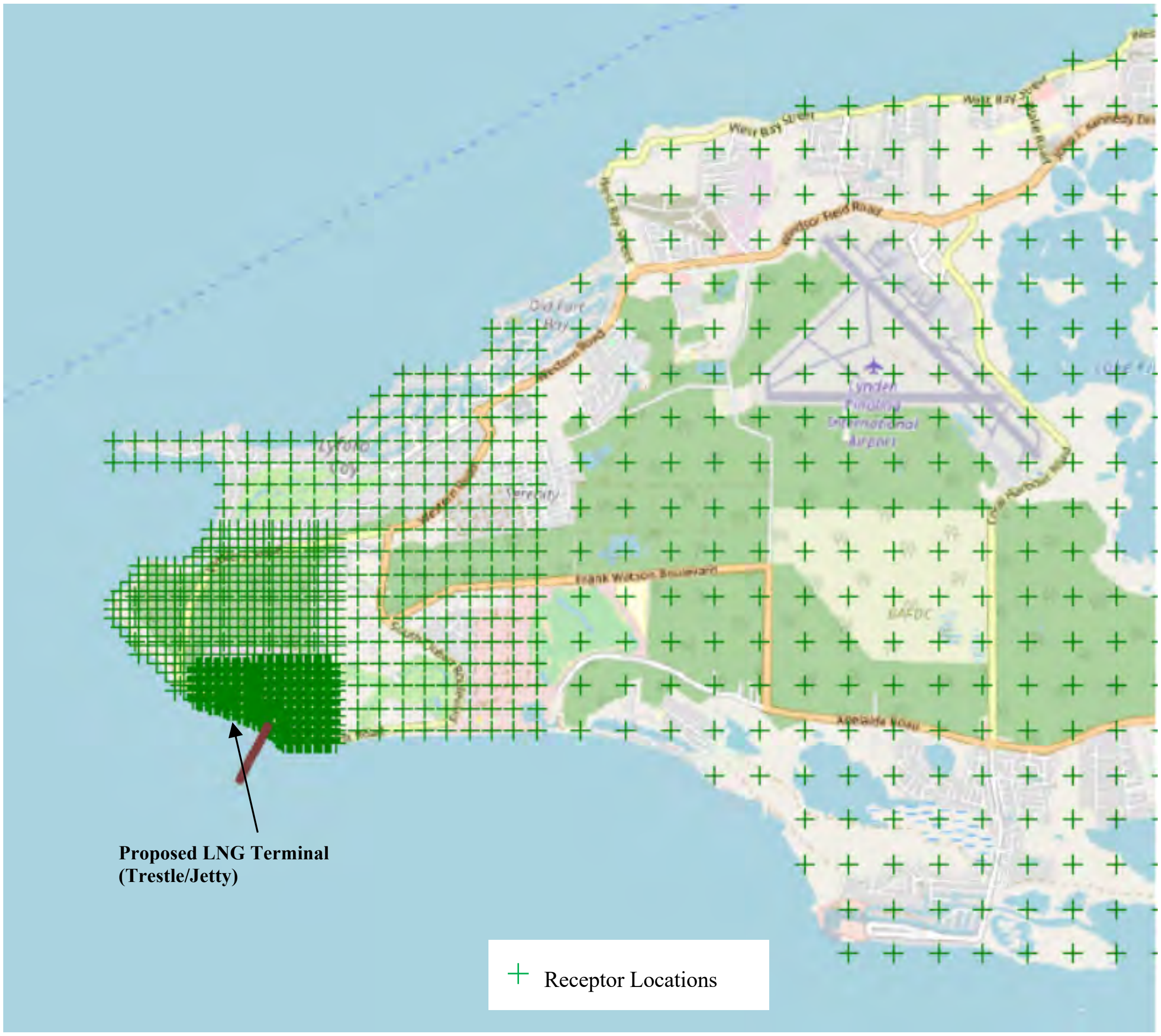
Air quality could also be potentially impacted by exhaust emissions from excavation equipment and haulage trucks; and exhaust emissions from stationary combustion equipment, including generators. Such exhaust emissions are typical air pollutants that are combustion by-products, i.e., diesel particulate matter (DPM), NO_x, SO_x and carbon monoxide (CO). Emissions resulting from combustions of diesel fuel can also include VOCs and PAHs which are expected to be in relatively negligible amounts.

An air dispersion modelling analysis was conducted by Arcadis for the 2020 Shell LNG project to estimate the potential air quality impacts from activities during the construction of the LNG terminal and regasification facility. To demonstrate (evaluate) compliance of the proposed project with ambient air quality criteria, background air quality concentrations must be added to these pollutant-specific modelled concentrations to obtain the cumulative impacts. These cumulative impacts are then compared to applicable air quality criteria and guidelines. Currently, The Bahamas do not have established AAQS. The Environmental Planning and Protection Act 2019 for the Bahamas was passed in December 2019. Two of the key elements of the Act entail: development of a national policy framework to establish a National Air Quality Management Policy as per Section 15 (3)I; and provisions to allow the Minister to establish ambient air quality standards and monitoring system in Section 65 (g). The current background air quality conditions in the area surrounding the LNG terminal are dictated by a combination of emissions from sources in the area (other industrial operations and traffic) plus a component that is transported from other areas within and surrounding the island.

As noted above, when an air modelling assessment is completed, these other "background" sources that are not included in the model must be accounted for in order to obtain a full representation of the air quality during the construction activities. Hence, available background concentrations for NO_2, SO_2 and PM_{10} derived from historical datasets were added to model-predicted concentrations, commonly referred to as "predicted air quality impacts", to capture the contribution of nearby background sources to determine the cumulative impacts. There are no available background $PM_{2.5}$ monitoring concentrations. Therefore, the concentrations presented in this report include potential effects from the background emission sources surrounding the LNG terminal as well as other nearby sources.

The potential impacts of the emissions on air quality in the vicinity of construction were evaluated through dispersion modelling using a variable spaced receptor grid to determine maximum predicted ambient air concentrations of NO_2, SO_2, inhalable particulate matter (PM_{10}), respirable particulate matter ($PM_{2.5}$) and VOCs, particularly benzene, toluene, ethylbenzene, and xylenes. The receptor grid covered the western half of New Providence Island to approximately 13 km (8 mi) out from the LNG terminal. The modelling domain and receptor locations are presented in Figure 4-1 (Arcadis, 2020).

Figure 4-1: Modelling Domain with Receptor Locations



Emission inventories were created for the above-noted contaminants for both onshore construction activities and offshore marine vessel operating scenarios.

The US EPA American Meteorological Society/EPA Regulatory Model (AERMOD) version 19191 regulatory air dispersion model was used with the projected emissions to predict ambient concentrations from the proposed construction activities.

Meteorology

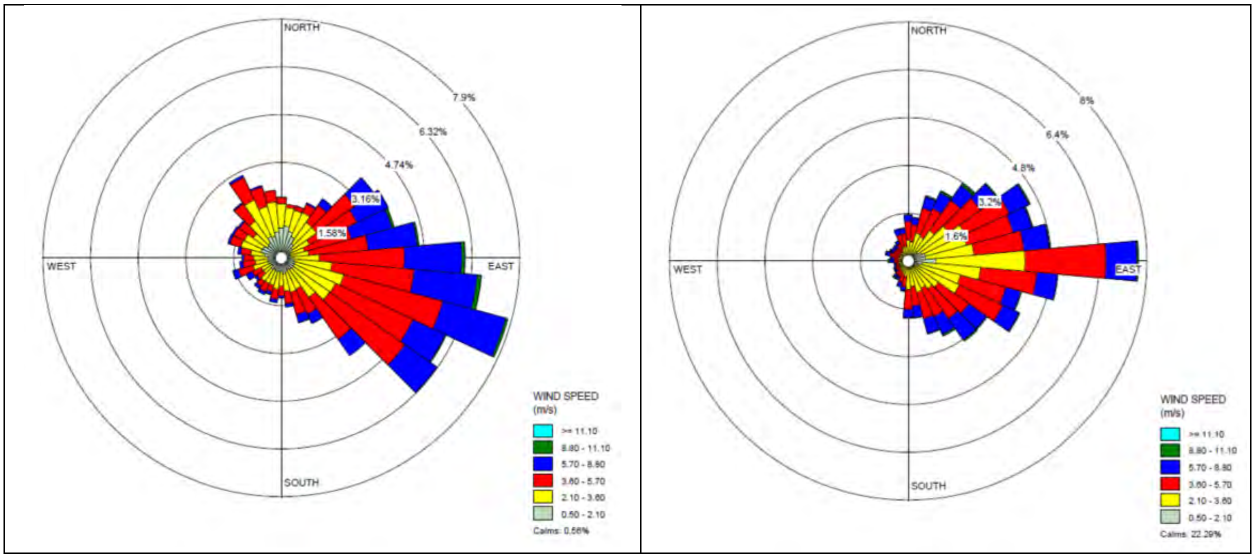
The AERMOD model uses pre-processed hourly meteorological data records to define the conditions for plume rise, transport and dispersion. The model estimates a concentration or deposition concentration for each source-receptor combination, for each hour of meteorological data, and calculates short-term averages, such as one-hour, eight-hour and 24-hour averages. The hourly averages can also be combined to determine longer averaging periods (1-month, monthly, annual, or period).

Wind is the primary driver that carries air pollutants away from a source towards a receptor. The direction and speed of the wind dictates the location and distance from the source that a pollutant may travel, and the receptors that may be impacted. Higher wind speeds disperse gases and particulates throughout the atmosphere more effectively and as a result, concentrations generally decrease with increasing wind speed due to dilution. In contrast, low wind speeds or calm wind conditions can lead to high pollutant concentrations at ground level. Wind speed also induces mechanical turbulence (which affects dispersion) as a result of flows around obstacles on the surface (topography, buildings, etc.). The amount of mechanical turbulence created depends on the roughness of the surface and the wind speed and direction.

A review of available meteorological data was conducted. Data from nearby Nassau International Airport (Lynden Pindling Airport) was found to have significant gaps and thus did not meet completeness requirements to be considered acceptable for use in AERMOD. A wind rose was developed from the available data and used to determine an alternate data source. Therefore, in this assessment, AERMOD was run using five (5) years of meteorological data set from 2015 to 2019 (obtained from https://floridadep.gov/air/air-business-planning/content/aermet-datasets-map) for three (3) alternative meteorological stations – Miami, Florida Keys-Marathon, and Key West that showed prevailing wind representative of the northern Caribbean area. All three data sets were measured at Automated Surface Observing System (ASOS) sites and pre-processed using AERMET v19191 by Florida Department of Environmental Protection (FL DEP). Each weather station location showed predominant wind direction was from the east. These easterlies (winds from the east) are similar to what is present on New Providence Island but the wind roses also showed a strong south-easterly component (from the ESE and SE). After reviewing the wind roses and the preliminary modelled predicted impacts over the range of applicable pollutant's averaging periods, the Miami meteorological dataset resulted in the most conservative impacts for most averaging periods and therefore was chosen for the analysis.

Figure 4-2 presents the wind rose from Miami, Florida and Nassau that show the frequency of the direction for which the winds blow from for the 5-year period of hourly meteorological data used in this assessment. The figure shows the predominant wind directions are from the east and southeast toward the west and northwest. As stated above, the Miami data shows more of a south-easterly component present in the Western Caribbean as shown in the other two alternative meteorological data sites.

Figure 4-2: Miami (L) and Nassau I Wind Roses 2015-2019



Modelling Terrain

The AERMOD model can utilize terrain information through applying elevation heights to all receptors and sources. National Elevation Dataset (NED), Digital Elevation Model (DEM) or equivalent terrain datasets were not readily available for the island for pre-processing using AERMAP. Due to lack of a consistent dataset and given the fact that the topography of the island is predominantly flat terrain, it was assumed that the terrain in the modelling analysis was flat.

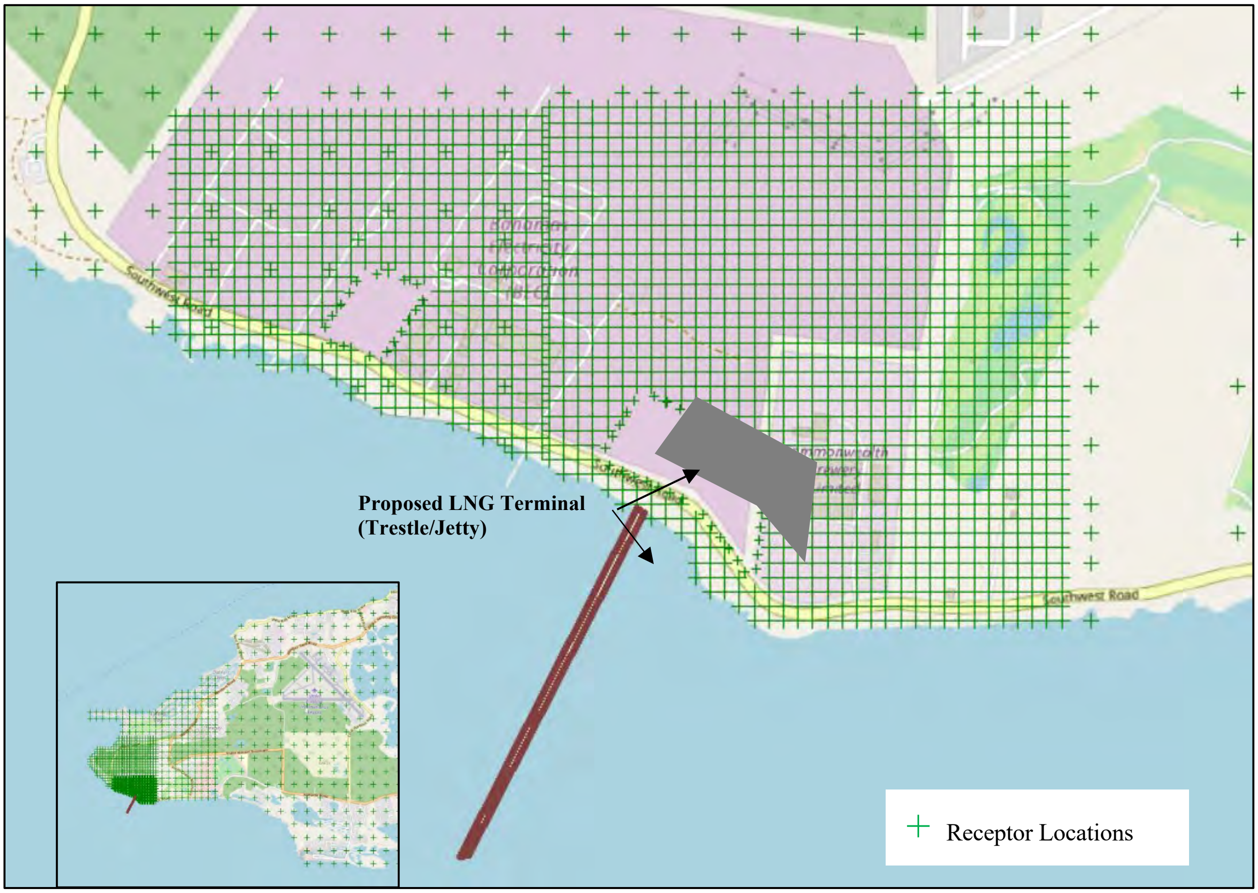
Receptor Grid

The AERMOD model calculates predicted ambient concentrations at a series of receptors set up in the model inputs. A variable spaced grid with grid spacing increasing with distance from the LNG terminal footprint was used in the assessment based on typical regulatory guidance associated with modelling analyses conducted in the US and Canada. The receptor grid spacing in the model setup was as follows:

- Fenceline receptors were set with a 25 m (82 ft) spacing interval along the 2020 Shell LNG project greenfield property boundary;
- fine grid receptors were placed at 25 m (82 ft) spaced intervals out to approximately 500 m (1,640 ft) from the LNG terminal boundary;
- a 100 m (328 ft) spaced receptor interval was used to cover the southwest tip of the island (Please note: distance varies due to the geographical setting of the coastline: 1,200 m (3,937 ft) to the east, 1,800 m (5,905 ft) to the north and 1,600 m (5,249 ft) to the northwest);
- a 250-meter (820 ft) spaced receptor interval (varies) extended out to approximately 3,500 meters (11,483 ft) to the east and approximately 3000 meters (9,843 ft) to the north; and
- a 500-meter (1,640 ft) spaced receptor interval was used out to approximately 13 km (8 mi) to the east of the LNG terminal.

Figure 4-3 presents the receptor grid configuration within AERMOD.

Figure 4-3: Proposed Terminal and Fine Resolution Receptor Grid



Emission Estimations

To be conservative, a scenario was developed to capture expected worst-case maximum emissions from the construction phase of the LNG terminal and regasification facility, for both short-term (1-hour, 24-hour) and long-term (construction period) averaging periods. Emissions rates were estimated for the anticipated activities using a combination of published emission factor data provided in US EPA AP-42 (Compilation of Air Emission Factors) and ICF International Report "Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories", April 2009.

The Arcadis modelling analysis assumed the following for the construction phase of the 2020 Shell LNG project:

- construction schedule for onshore site preparation of six (6) months;
- equipment operating schedule of 10-hour daily, represented as weekday from 7:00 AM to 5:00 PM;
- a total of heavy construction equipment operating onshore for the entire 10-hour period:
  - (2) front-end loaders;
  - one (1) bulldozer;
  - one (1) excavator;
  - two (2) dump trucks;
  - one (1) soil compactor; and

    - one (1) temporary genset;
- construction Area Disturbance and Staging Plan includes:
    - 1.2 hectares (ha) (3 acres) of equipment storage area;
    - two (2) ha (5 acres) of bulk materials in storage area;
    - approximately 33,100 m^2 (356,285 ft^2) will be disturbed during construction;
    - 3,700 m^2 (39,826 ft^2) for the pipeline laydown area; and
    - approximately 30,000 m^3 (39,238 yd^3) of estimate soil volume being disturbed and redistributed over the proposed project site;
- construction of offshore jetty and interconnecting trestle:
    - construction duration – 12 months;
    - daily schedule of 24 hours/day, 7 days per week; and
    - key equipment utilized – one (1) marine lift boat/crane barge for the installation of jetty and trestle pilings and top-side construction activities. Jack-barge for installation of piles, supply barge for materials, small craft for personnel, heavy lift of roadways and piping sections with marine lift boat/crane barge, and tugboats.

These assumptions highlight the conservative nature of the assessment, as the construction activities are unlikely to occur at maximum levels on a continuous basis. It was also assumed that the potential short-term emission rates for NO_2/NO_x were in terms of NO_x. Therefore, the ambient ratio method (ARM2) option to convert NO_X to NO_2 was chosen in AERMOD.

Modelling Results

Predicted impacts were estimated from air dispersion modelling for the following three scenarios:
1) from the combustion of heavy equipment operating onshore (Table 6.8),
2) of the fugitive emissions from handling of materials onshore (Table 6.9), and
3) operation of offshore equipment (Table 6.10). For the tabular results, all point of impingement (POI) values (maximum ground-levels concentrations) that are greater than the applicable comparison criteria are shown in **bolded text**.

Table 4-3 shows the modelling results for offsite impacts from the combustion of fuel from operating onshore heavy equipment.

Table 4-3: Modelling Results – Onshore Heavy Equipment Fuel Combustion

(Construction Activities)

Pollutants	Averaging Period	Guideline Value	Predicted Modelled Concentration
		µg/m³	µg/m³
Sulfur Dioxide (SO_2)	24-hour	125 (Interim target-1)	0.23
		50 (Interim target-2)	
		20 (guideline)	
	1-hour	196 (US EPA 99th%tile)	3.3
	10-minute	500 (guideline)	5.4

Pollutants	Averaging Period	Guideline Value	Predicted Modelled Concentration
		μg/m³	μg/m³
Nitrogen Dioxide (NO_2)	1-year	40 (guideline)	9.4
	1-Hour	200 (guideline)	**299** [117.2][1]
Particulate Matter (PM_{10})	1-year	70 (Interim target-1)	0.46
		50 (Interim target-2)	
		30 (Interim target-3)	
		20 (guideline)	
	24-hour	150 (Interim target-1)	1.9
		100 (Interim target-2)	
		75 (Interim target-3)	
		50 (guideline)	
Particulate Matter ($PM_{2.5}$)	1-year	35 (Interim target-1)	0.46
		25 (Interim target-2)	
		15 (Interim target-3)	
		10 (guideline)	
	24-hour	75 (Interim target-1)	1.83
		50 (Interim target-2)	
		37.5 (Interim target-3)	
		25 (guideline)	
Carbon Monoxide (CO)	8-hour	10,000	74.7
	1-hour	40,000	598

[1]Predicted impact at the nearest residential receptor (UTM 244499 E, 2767400 N) are shown in brackets.

As shown in the table above, the modelling results from the proposed use of heavy equipment during the onshore construction activities indicate all pollutants, with the exception of NO_2, are below the guideline comparison criteria values. The predicted NO_2 concentration exceeded the comparison criteria by 99 μg/m³ at the fence line of the property; however, the predicted concentration at the nearest residential dwelling is well below the criteria. These pollutant emissions are due to the combustion of fuel during the operations of the proposed heavy equipment.

Similar to Table 4-3, Table 4-4 below shows the modelling results for offsite impacts from the fugitive emissions of onshore activities due to the material handling during the proposed project site preparation period. The table shows that all the predicted impacts from the fugitive emissions of onshore activities are well below the corresponding guideline comparison criteria values.

Table 4-4: Modelling Results – Onshore Activity Fugitive Emissions

(Construction Activities)

Pollutants	Averaging Period	Guideline Value	Predicted Modelled Concentration
		µg/m³	µg/m³
Particulate Matter (PM_{10})	1-year	70 (Interim target-1)	3.6
		50 (Interim target-2)	
		30 (Interim target-3)	
		20 (guideline)	
	24-hour	150 (Interim target-1)	15.8
		100 (Interim target-2)	
		75 (Interim target-3)	
		50 (guideline)	
Particulate Matter ($PM_{2.5}$)	1-year	35 (Interim target-1)	1.6
		25 (Interim target-2)	
		15 (Interim target-3)	
		10 (guideline)	
	24-hour	75 (Interim target-1)	6.7
		50 (Interim target-2)	
		37.5 (Interim target-3)	
		25 (guideline)	

Table 4-5 shows modelling results for onshore impacts from offshore jetty and trestle construction activities. The results indicate that sulphur dioxide, nitrogen dioxide and particulate matter exceed the guideline comparison criteria values both at the fence line as well as the nearest residential receptor. These emissions are due to the combustion of fuel during the offshore construction activities.

Table 4-5: Modelling Results – Offshore Jetty and Trestle Construction Activities

(Construction Activities)

Pollutants	Averaging Period	Guideline Value	Predicted Modelled Concentration
		µg/m³	µg/m³
Sulphur Dioxide (SO_2)	24-hour	125 (Interim Target – 1)	**99.5 [43.8][1]**
		50 (Interim Target – 2)	
		20 (guideline)	
	1-hour	196 (US EPA 99th%tile)	**428 [316][1]**

Pollutants	Averaging Period	Guideline Value	Predicted Modelled Concentration
		μg/m³	μg/m³
	10-minute	500 (guideline)	**858 [570]**[1]
Nitrogen Dioxide (NO_2)	1-year	40 (guideline)	30.7
	1-hour	200 (guideline)	**1888 [1299]**[1]
Particulate Matter (PM_{10})	1-year	70 (Interim target-1)	2.2
		50 (Interim target-2)	
		30 (Interim target-3)	
		20 (guideline)	
	24-hour	150 (Interim target-1)	47.2
		100 (Interim target-2)	
		75 (Interim target-3)	
		50 (guideline)	
Particulate Matter ($PM_{2.5}$)	1-year	35 (Interim target-1)	2.2
		25 (Interim target-2)	
		15 (Interim target-3)	
		10 (guideline)	
	24-hour	75 (Interim target-1)	**46.1** [20.3][1]
		50 (Interim target-2)	
		37.5 (Interim target-3)	
		25 (guideline)	
Carbon Monoxide (CO)	8-hour	10,000	730
	1-hour	40,000	1931

[1]Predicted impact at the nearest residential receptor (UTM 244499 E, 2767400 N) are shown in brackets.

Background Air Quality Conditions

Background air quality conditions in the study area can be characterized with recent historical air quality monitoring data. As stated in section 5.1.2 of Chapter 5, there are no established ambient air quality monitoring stations currently collecting background concentration data for air pollutants on New Providence Island (or elsewhere in The Bahamas) that might be used to estimate the current existing air quality. An ambient air quality network was historically operated by Golder Associates (on behalf of Bahamas Electricity Corporation) which was comprised of three continuous monitoring stations, located at Clifton Pier, Lyford Cay and Blue Hills. Of the three stations, Clifton Pier air quality monitoring station was used for the assessment of the air quality impacts. Ambient air monitoring data from this station were only available for certain time periods (from 2000 to 2006 and from 2011 to 2013) and for the pollutants of interest which include SO_2, NO_2 and PM_{10}. Table 4-6 provides a summary of the background data that were added to the maximum modelled concentrations for the – worst-case ambient air impact analysis. The estimated existing air quality concentrations are compared to their associated AAQS and WHO interim target values in Table 4-6 and compared to AAQS (i.e., WHO guideline values, US EPA NAAQS) in Table 4-7. These background concentrations represent baseline condition and were derived from the 10 years of available monitoring data.

Table 4-6: Air Quality Standards and Background (Baseline) Concentrations

Pollutants	Averaging Period	Estimated Baseline Concentrations (µg /m³)	Ambient Air Quality Standard	Source
NO_2	1-hour	42	200	WHO guideline
	1-year / Annual	3	40	WHO guideline
SO_2	1-hour[1]	42	196	US EPA NAAQS
	24-hour	17*	125	WHO Interim target-1
			50	WHO Interim target-2
			20	WHO guideline
PM_{10}	1-year / Annual	**27**	70	WHO Interim target-1
			50	WHO Interim target-2
			30	WHO Interim target-3
			20	WHO guideline
	24-hour	**87**	150	WHO Interim target-1
			100	WHO Interim target-2
			75	WHO Interim target-3
			50	WHO guideline

Source: WHO, 2005
NO_2 = nitrogen dioxide
PM_{10} = Particulate matter <10 micrograms (µm)
SO_2 = sulfur dioxide
µg/m³= micrograms per cubic meter
Note: 1 99th percentile averaged over 3-year;
*24-hour SO_2 concentrations calculated from 1-hour SO_2 concentration using formula C 24 hr = C 1 hr x (1 hr/24 hr) 0.28 (MOECC, 2016)

Table 4-7: Adopted Background (Baseline) Concentrations and % of AAQS

Pollutants	Averaging Period	Adopted Background Value µg/m³	Ambient Air Quality Standard (AAQS) µg/m³	% of AAQS
NO_2	1-hour	42	200	21%
	Annual	3	40	7.5%
SO_2	1-hour	42	196	21%
	24-hour	17	20	85%
PM_{10}	24-hour	87	50	174%

Pollutants	Averaging Period	Adopted Background Value µg/m³	Ambient Air Quality Standard (AAQS) µg/m³	% of AAQS
	Annual	27	20	135%

Note: For each pollutant, 10 years of available data were used to calculate an average background value to represent existing background conditions. The 1-hour and 24-hour values in the table above were calculated based on the maximum concentrations averaged over the available years. The values for the annual averaging period were calculated using the annual concentration averaged over the available years. (Source: WHO, 2005)

Tables 4-8 and 4-9 show the predicted maximum cumulative offsite concentrations for both the onshore and offshore construction activity scenarios. Both scenarios show that the highest predicted concentrations above the applicable pollutant thresholds (in **bold**) are typically associated with combustion emissions. In addition, other instances in the table showing cumulative concentrations above their respective thresholds (i.e., PM_{10}) are the result of historical background concentrations (PM data prior to 2014). These values were already above the threshold prior to any additional contribution from the proposed activities estimated by the modelled impacts. For NO_2, the maximum predicted short-term concentrations from the modelling showed significant contribution above the applicable threshold primarily due to the combustion of diesel of heavy construction equipment and the conservative method of “AREA” and “VOLUME” modelling approach since specific vessel engine and exhaust information were unknown and other conservative assumptions were used. The potential for exceedance is most likely when heavy construction activities are occurring, based on the conservative scenarios described above, and during the operation of the vessels.

However, it should also be noted that the combustion by-products emissions are variable depending on the construction activities and the types of heavy equipment and fuel type that will be used. It should be further noted that these potential emissions are temporary in nature and the emission sources will be removed once the construction stage is complete. Hence, the potential effects of these combustion emissions are expected to be localized in nature.

Therefore, the overall potential impact is rated as **moderate**, **short-term**.

Table 4-8: Summary of Cumulative Ambient Air Concentrations from Onshore Construction Activities

Pollutants	Averaging Period	Adopted Background Concentrations	Guideline Value	Predicted Modelled Concentration	Cumulative Concentrations (with Background)
		µg/m³	µg/m³	µg/m³	µg/m³
Sulfur Dioxide (SO_2)	24-hour	17	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)	0.23	17.3
	1-hour	42	196 (US EPA 99th%tile)	1.5	43.5
	10-minute	42	500 (guideline)	5.4	49.4
Nitrogen Dioxide (NO_2)	Annual	3	40 (guideline)	9.4	12.4
	1-hour	42	200 (guideline)	**299** [117.2][1]	**341** [159.2][1]
Particulate Matter (PM_{10})	1-year	27	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)	4.1	**31.1**
	24-hour	87	150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)	17.0	**104**
Particulate Matter ($PM_{2.5}$)	1-year	N/A	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline)	8.2	N/D
	24-hour	N/A	75 (Interim target-1) 50 (Interim target-2)	2.1	N/D

Pollutants	Averaging Period	Adopted Background Concentrations	Guideline Value	Predicted Modelled Concentration	Cumulative Concentrations (with Background)
		µg/m³	µg/m³	µg/m³	µg/m³
			37.5 (Interim target-3)		
			25 (guideline)		
Carbon Monoxide (CO)	8-hour	N/A	10,000	66	N/D
	1-hour	N/A	40,000	530	N/D

[1]Predicted concentrations at the nearest residential receptor (UTM 244499 E, 2767400 N) are shown in brackets.
N/A – Not Available; N/D – Not Determined

Table 4-9: Cumulative Ambient Air Concentrations from Jetty/Trestle Construction Activities

Pollutants	Averaging Period	Adopted Background Concentrations	Guideline value	Predicted Modelled Concentration	Cumulative Concentrations (with Background)
		µg/m³	µg/m³	µg/m³	µg/m³
Sulfur Dioxide (SO_2)	24-hour	17	125 (Interim target-1)	**99.5 [43.8][1]**	**116.5 [60.8][1]**
			50 (Interim target-2)		
			20 (guideline)		
	1-hour	42	196 (US EPA 99th%tile)	**428 [316][1]**	**470 [358][1]**
	10-minute	42	500 (guideline)	**858 [570][1]**	**900 [612][1]**
Nitrogen Dioxide (NO_2)	1-year	3	40 (guideline)	30.7	33.7
	1-hour	42	200 (guideline)	**1888 [1299][1]**	**1930 [1341][1]**
Particulate Matter (PM_{10})	1-year	27	70 (Interim target-1)	2.2	**29.2**
			50 (Interim target-2)		
			30 (Interim target-3)		
			20 (guideline)		
	24-hour	87	150 (Interim target-1)	47.2	**134.2**
			100 (Interim target-2)		
			75 (Interim target-3)		
			50 (guideline)		
Particulate Matter ($PM_{2.5}$)	1-year	N/A	35 (Interim target-1)	2.2	N/D
			25 (Interim target-2)		
			15 (Interim target-3)		
			10 (guideline)		
	24-hour	N/A	75 (Interim target-1)	**46.1** [20.3][1]	N/D
			50 (Interim target-2)		

Pollutants	Averaging Period	Adopted Background Concentrations	Guideline value	Predicted Modelled Concentration	Cumulative Concentrations (with Background)
		µg/m³	µg/m³	µg/m³	µg/m³
			37.5 (Interim target-3)		
			25 (guideline)		
Carbon Monoxide (CO)	8-hour	N/A	10,000	730	N/D
	1-hour	N/A	40,000	1931	N/D

[1]Predicted concentrations at the nearest residential receptor (UTM 244499 E, 2767400 N) are shown in brackets.
N/A – Not Available; N/D – Not Determined

For the estimation of occupant and worker exposure to VOCs due to fugitive emissions associated with material moving and handling during construction, soil vapor concentration data from the air quality study conducted in December 2020 were used. The predicted offsite concentrations were compared to the current US EPA RSLs. The RSLs are risk-based concentrations derived from standardized equations combining exposure information assumptions with US EPA toxicity data. These screening level values are considered by the Agency to be protective for humans (including sensitive groups) over a lifetime. The modelling results for benzene, toluene, ethylbenzene and xylenes are shown in Table 4-10.

Table 4-10: Summary of Modelling Results for BTEX from Onshore Construction Activities

		Resident (Multiple)		Worker (Multiple)	
Compound	**Annual Predicted Concentration**	**Long-term Annual Standard**	**Long-term Annual Standard**	**Long-term Annual Standard**	**Long-term Annual Standard**
	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
Benzene	4.64E-06	3.60E-01	3.1	1.6	13
Ethylbenzene	3.52E-06	1.1	10	4.9	440
o-xylene	4.91E-06	--	1	--	44
p & m xylene	1.09E-05	--	1	--	44
Toluene	2.00E-05	--	520	--	2200
p-Isopropyl toluene	3.10E-05	--	--	--	--
tert-Butyl alcohol	2.68E-06	--	--	--	--
		Carcinogen	Non-Cancer	Carcinogen	Non-Cancer

Table 4-10 shows that the predicted short-term and long-term offsite concentrations from the disturbed soil during site preparation activities are below the US EPA RSLs.

In March 2020, Geosyntec collected surficial soil samples across the site for metals analysis (Geosytec, 2020a). Metal concentrations were all below the applicable criteria. Therefore, the estimation of occupant and worker exposure to the metals from the material moving and handling are not required and are not included in the assessment.

The onshore LNG storage tanks are proposed on an already-impacted plot of land adjacent to the existing CPPS (see Figure 2-1). The surrounding area is mostly industrial, with BPL's upgraded Station A power plant and multiple liquid fuel storage and bunkering facilities to the west, multiple marine facilities/jetties to the south and the Commonwealth Brewery to the east. Southwest Road is located directly to the south of the Greenfield Site. There are no residences adjacent to the proposed project site. There are residential areas located to the southeast and east, with the closest residence being less than 400 m (1,312 ft) from the project site. The existing air quality at the proposed project site and its immediate surroundings is influenced by the heavy industrial operations at Clifton Pier as well as light to moderate roadway traffic in close proximity. The offshore operations will consist of the multifuel jetty including loading platform with loading arms and associated top sides, mooring, and berthing dolphins.

To determine (characterize) the baseline air quality in the area, historical ambient air quality monitoring data representative of the proposed project site area was used by Arcadis in 2020. There are no ambient air quality monitoring stations currently collecting pollutant concentrations on New Providence Island (or elsewhere in The Bahamas) that could be used to estimate the existing air quality.

In the past, an ambient air quality network was operated by Golder Associates (Macdonald, 2009) (on behalf of Bahamas Electricity Corporation) which comprised of three continuous monitoring stations. The three monitoring stations were located at Clifton Pier, Lyford Cay and Blue Hills. Tables 4-6 and 4-7 show the estimated baseline concentrations from the ambient air quality network compared to relevant internationally recognized standards/guidelines: These include the WHO Air Quality Guidelines (enforced by the International Finance Corporation Environment Health and Safety (IFC EHS) General Guideline) and US EPA NAAQS.

Onshore operations at the proposed project site will include: the storage and piping interface area containing connection to/from the jetty, LNG storage tanks and associated in-tank LNG pumps, and connection point to BPL's Upgraded Station A. It is also expected that the process area will house the LNG ambient air vaporizers, BOG management system, gas send-out system, LNG impounding basin, heat transfer system, and other components. Ancillary operations will include utilities area containing air system, nitrogen system, water systems, firefighting equipment, emergency diesel generator, and emergency/upset vent. Administrative components of the facility operations will include: an administrative/CR building, electrical substations, workshop/warehouse, and security gatehouse. The proposed vent will be strictly used to burn excess LNG during emergency and upset events and not anticipated to be employed during normal operations of the terminal. Best management practices will be utilized to ensure reducing the likelihood of any upset conditions at the proposed project site. Therefore, no emissions from the vent during routine operation or other significant onshore emission sources and thus no adverse impacts to ambient air are expected.

Since the estimated baseline concentrations for PM_{10} from historical air quality monitoring is exceeding the guideline value as presented above in Table 4-7, the air quality at the Site is already impacted without any contribution from potential particulate emissions due to the proposed project. Though from the perspective of the listed operations as noted above, it is expected that there are no adverse ambient air quality impacts from normal facility operations. Therefore, any potential offsite impacts from the operational phase of the onshore activities will not add to the existing PM_{10} air quality burden in the proposed project area. However, there can be potential fugitive vapor emissions at the LNG terminal from cold vents, leaking pipes and tubing, valves, connections, flanges, packings, open-ended lines, pump seals, compressor seals, pressure relief valves, and unloading operations at the jetty. The fugitive emissions from LNG leaks include mostly CH_4, and the emissions are estimated at 95 metric tons annually based on the anticipated total number of connectors associated with the proposed onshore equipment. The emission factors were based on data provided in Table 13 from the reference document: LNG Operations: Consistent Methodology for Estimating Greenhouse Gas Emissions (version 1.0, May 2015). Based on the estimated potential emissions, the maximum modelled impacts for CH_4 for the 1-hour averaging period is 2965 μg/m³ while for the 8-hour averaging period is 421.22 μg/m³. Given that these fugitive emissions of methane identified as a worst-case, mitigation measures such as the selection of suitable connectors, valves, flanges, fittings, seals, and packings should significantly reduce gas leaks as well as fugitive emissions with the implementation of a leak detection and repair program; hence, **no adverse air quality impact** is expected from fugitive emissions.

The World Bank guidance recommends that the accounting of air emissions from onshore LNG unloading activities should include exhaust emissions from LNG vessels and tugboats if the emissions are near the shore and may affect the air quality. The jetty for unloading activities is proposed to extend approximately 625 m (2,050 ft) from shore. Dispersion modelling was conducted to determine potential effects from the estimated vessel exhaust emission while positioning and hoteling during LNG vessel unloading operations. Table 4-11 presents the predicted impacts from the unloading operations. The predicted concentration of NO_2 exceeds the ambient air quality standard for the 1-hour averaging period. Therefore, there is the potential for **short-term** offsite impacts from offshore operations during limited periods when onshore winds are blowing from the south. The wind rose presented in Figure 4-2 above shows that the winds primarily flow east to west with limited periods coming from the south. Given the fact that the predicted impacts for NO_2 for the 1-year averaging period is significantly lower (i.e., 0.01% of the applicable guideline), the potential offsite impacts are considered to be **moderate and short-term**.

Table 4-11: Modelling Results – Offshore unloading operations

Pollutants	Averaging Period	Estimated Baseline Concentrations	Predicted Modelled Concentration	Ambient Air Quality Standards	Cumulative Concentrations (with Background)
		μg/m³	μg/m³	μg/m³	μg/m³
Sulfur dioxide (SO_2)	24-hour	17	20	125 (Interim target-1) 50 (Interim target-2)	**37**

				20 (guideline)	
	1-hour	42	82.4	196 (US EPA 99th%tile)	124.4
	10-minute	N/A	218	500 (guideline)	N/D
Nitrogen dioxide (NO_2)	1-year	3	3.5E-04	40 (guideline)	3.00
	1-hour	42	**497.3 [332]**[1]	200 (guideline)	**539.3 [374]**[1]
Particulate Matter (PM_{10})	1-year	27	0.76	70 (Interim target-1)	**27.76**
				50 (Interim target-2)	
				30 (Interim target-3)	
				20 (guideline)	
	24-hour	87	9.54	150 (Interim target-1)	**96.54**
				100 (Interim target-2)	
				75 (Interim target-3)	
				50 (guideline)	
Particulate Matter ($PM_{2.5}$)	1-year	N/A	0.74	35 (Interim target-1)	N/D
				25 (Interim target-2)	
				15 (Interim target-3)	
				10 (guideline)	
	24-hour	N/A	9.54	75 (Interim target-1)	N/D
				50 (Interim target-2)	
				37.5 (Interim target-3)	
				25 (guideline)	
Carbon Monoxide (CO)	8-hour	N/A	163	10,000	N/D
	1-hour	N/A	508	40,000	N/D

4.2 Climate change and potential impact to National Development Goals

Climate change analyses are composed of several factors, including but not limited to GHGs, land use management practices, and the albedo effect. Albedo (solar reflectivity) is the measurement of the earth surface that reflects or absorbs incoming solar radiation. Increased or higher albedo (i.e., snow cover) can cause a cooling effect in specific areas of the earth surface whereas other landcover types (i.e., dark pavement) can absorb more solar radiation resulting in a warming effect. The analysis for the purpose of the 2020 Shell LNG project was limited to disclosing of potential contributing factors to climate change.

Climate change and potential global warming impacts are expressed in carbon dioxide equivalent (CO_2e) from the anticipated GHG emissions. A CO_2e is a metric measure used to compare the emissions from various GHGs on the basis of their Global-Warming Potential (GWP). The GWP was developed to allow comparisons of the global warming impacts of different gases based on the potential impact from an equivalent amount of carbon dioxide. The GWP is a measure of how much energy (e.g., heat) that the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of CO_2. The larger the GWP, the more that a given gas warms the Earth compared to CO_2 over that time period. The time period typically used is 100 years. The GWP values used in the analysis are: 1 for CO_2, 25 for CH_4, and 298 for N^2O.

Construction activities, both onshore and offshore, that would contribute to GHG emissions (as mostly CO_2) include direct combustion of fossil fuels (dominated by diesel) by heavy equipment such as excavators, front loaders, bull dozers, dump trucks, and the marine construction vessels and ancillary equipment. In addition, it is reasonable to expect vehicles such as tandems and trailers to haul material in and out of the proposed project site will also contribute to the project related GHG emissions during the construction phase (referred to as mobile sources).

Using the CO2e emission factor, a metric measure used to compare the emissions from various GHGs based on their GWP, the total annual quantities released for each assessment scenario were estimated as follows for the 2020 Shell LNG project:

- onshore construction: 257 metric tonnes (283 tons); and,
- jetty/trestle construction: 38,375 metric tonnes (42,306 tons).

These estimated emissions were expected to occur only during the one-year period for the construction of the 2020 project which included an LNG terminal and associated jetty/trestle.

According to European Commission's Emission Database for Global Atmospheric Research (EDGAR), The Bahamas' total GHG emissions were 2,449 kilo tonnes (kt) in 2019 (Crippa *et al*, 2020). Table 4-12 shows a breakdown of the total GHG emissions by sector.

Table 4-12: Breakdown of Bahamas' Total GHG Emissions

Buildings (tonnes)	Non-combustion (tonnes)	Other Industrial Combustion (tonnes)	Power Industry (tonnes)	Transport (tonnes)	Total CO_2 per capita (tonnes)
297,130	14,480	106,213	1,211,548	819,904	6.08

Although the 2020 Shell LNG project was expected to slightly increase emissions of GHG in the specific study area, the incremental CO2e was estimated to be approximately 1.615% of the 2019 total for The Bahamas. Furthermore, it should be noted that due to the temporary nature of GHG emissions from the construction phase, the potential impacts related to the activities would remain only for a **short duration with a minor impact** on climate change.

Climate change analyses for the operational phase of the 2020 Shell LNG project include various GHG emission sources that can be broken down into two categories by the Greenhouse Gas Protocol in order to better understand each of the contributors:

- Category/Scope 1 – All Direct Emissions from the onshore and offshore LNG regasification operations including fuel combustion on site at BPL Power Station A and the proposed BPL Power Station D as well as facility usage such as fleet vehicles.
- Category/Scope 2 – Indirect Emissions from the LNG fuel unloaded at the facility and electricity purchased by the end-user. These emissions are created during the production of the energy (electricity from power station) and eventually expected to be used in the LNG terminal operations via the use of the electricity generated from the power station (e.g., the utility provider).

The Greenhouse Gas Protocol establishes comprehensive global standardized frameworks to measure and manage GHG emissions from private and public sector operations, value chains and mitigation actions.

The direct GHG emissions from the operational phase for the 2020 Shell LNG project were expected to be minimal with fugitive emissions (as CH_4) emitted from piping and associated connector types both at the onshore LNG regasification facility, the trestle and jetty, as well as the unloading operations at the jetty. Measures for controlling and reducing fugitive emissions should be considered for the current LNG-to-Power project and implemented in the design, operation, and maintenance of the LNG terminal. In the design stage, valves, flanges, fittings, seals, and packings will be selected based on their capacity to reduce any vapor leaks and fugitive emissions. The implementation of a leak detection and repair program should further minimize the potential for fugitive emissions.

The potential impacts of CO2e from the indirect sources of GHG emissions are moreover expected to be from the consumption of the electricity to operate various processes at the facility. A reduction in GHGs at the neighbouring Power Station is expected with the use of LNG in lieu of the fuel oils that are currently used as a fuel source. The potential GHG emissions were estimated based on the 2020 Shell LNG project information. The emissions estimate includes the potential fugitives (emitted mostly as CH_4) as well as the contribution from the fuel combustion (as CO_2) from the vessels (LNGC, bunker vessels and tugboats) during the unloading process. The estimated annual GHG emissions (as CO2e) from normal operations were estimated to be 2,536 metric tonnes (2,794 tons). This total includes the estimated annual CH_4 fugitives of approximately 95 metrics tons (CO2e 104.8 metric tons) from the proposed onshore LNG terminal piping and equipment. The combined potential annual GHG emissions from the proposed terminal were expected to be a small percentage of the annual GHG emissions for The Bahamas as a whole, which was approximately 2,449 kilo tonnes (2,699,560 tons) in 2019. Given the small percentage of operational GHG emissions in relation to overall GHG contributions for The Bahamas, it is expected that potential **impacts would be minor and long-term** (i.e., on an annual basis).

5.0 Environmental impacts – Marine

Table 5-1 below summarizes the marine environmental impacts that can result from the LNG-to-Power Project, Phase 1 project during the construction phase. Table 5-2 summarizes the marine environmental impacts that can occur during the operational phase.

The most significant potential marine environmental impact from the LNG-to-Power Project, Phase 1 project would be spills of hydrocarbons or other hazardous substances into the marine environment during construction or operational phase.

Table 5-1: Summary of Marine Environmental Impacts – Construction Phase

Potential Impact	Nature	Spatial Extent	Duration	Magnitude
Limited potential offshore for sediment suspension from anticipated construction activities to affect adjacent marine resources.	Direct	Localized	Short-term	Minor
Contaminated runoff and spills from offshore construction activities may degrade marine water quality.	Direct	Localized	Short-term	Minor
Liquid spills from construction activities (e.g., from spills, firefighting or site cleaning and machinery washing activities) could result in deterioration of marine water and ground water quality.	Direct	Localized	Short-term	Minor
Liquid spills from construction activities could result in harm to marine species and marine habitat.	Direct	Localized	Long-term	Major
Severe weather conditions and associated winds and potential for storm surges and water height conditions, such as those during a hurricane, have the potential to damage structures (including compromising safe mooring operations/navigation etc.), and inundate areas (including flooding or roads), causing injuries/fatalities and contamination.	Direct	Localized	Short term	Low to high
Potential impact to corals, algae and sponges due to jetty construction related sedimentation (e.g., from pile driving).	Direct	Localized	Short-term	Minor
Vessels involved in the construction, operational and decommissioning activities pose a potential risk of collision with marine animals.	Direct	Localized	Short to long term	Minor
Spill of hydrocarbons or hazardous substances during construction of the jetty may impact marine habitats, such as coral reefs and seagrass beds.	Direct	Localized	Long-term	Major

Table 5-2: Summary of Marine Environmental Impacts – Operational Phase

Potential Impact	Nature	Spatial Extent	Duration	Magnitude
Accidental spills may occur offshore associated with operational discharge, vessel collision, pipeline-breaks, blowouts, and human error.	Direct	Localized to Widespread	Long-term	Moderate to Major
Runoff from onshore spills, firefighting, machinery washing activities, hydrostatic testing releases, and maintenance activities could potentially find its way to the ocean, or groundwater if not contained and quickly remediated resulting in deterioration of marine water and groundwater quality.	Direct	Localized	Short-term	No to minor
Spills of liquid wastes resulting from offshore operational activities could potentially harm marine species and marine habitat.	Direct	Localized	Long-term	Major
Offshore hazardous waste (i.e., recovered released hydrocarbons and other hazardous liquid waste from ships and those generated during operation of offloading activities) could impact the marine environment.	Direct	Localized	Short-term	Minor
Severe weather conditions and associated winds and potential for storm surges and water height conditions, such as those during a hurricane, may damage structures (including compromising safe mooring operations/navigation etc.), inundate areas (including flooding or roads), cause injuries/fatalities and contamination, and loss of operation/production and power.	Direct	Localized to Widespread	Short- to long-term	Low to high
Spill of hydrocarbons and other hazardous substances during operation can pollute marine habitats and cause death of marine organisms.	Direct	Localized	Long-term	Major

6.0 Socio-economic impacts

Table 6-1 summarizes potential socio-economic impacts during construction and operational phases.

Table 6-1: Summary of potential socio-economic impacts

Potential Socio-economic Impact	Nature	Spatial Extent	Duration	Magnitude
Construction Phase				
Increased traffic volume due to construction vehicle/heavy equipment movement along Southwest Road and on/off the proposed project site (including for the pipeline along the road) may cause interruptions and delays in traffic flow during peak periods, affecting all road users.	Direct	Localized	Short-term	Minor to moderate
Operations and access to/from existing industrial facilities in the vicinity, may be interrupted/restricted by construction-related vehicle movement and pipeline corridor excavation.	Direct	Localized	Short-term	Minor
Construction-related noise that discourages wildlife, the loss of vegetated areas, and restricted access to areas used for commercial/tourism and recreational activities (i.e., birdwatching, access to the shoreline, fishing, and tours operations etc.) may render areas unsuitable for these activities.	Direct	Localized	Short-term	Minor to moderate
Construction activities may result in temporary or permanent loss of access to shoreline areas and impaired views of the sea.	Direct	Localized	Long-term	Moderate
An increase in the number of temporary residents in the district from increased construction-related employment may affect the use of public infrastructure, housing and social services.	Direct	Localized	Short-term	Minor
Increased spending at local businesses and employment opportunities during construction,	Direct	Localized	Short-term	Positive and moderate

Potential Socio-economic Impact	Nature	Spatial Extent	Duration	Magnitude
as well as contracting of local firms to provide catering, communications, transportation and other support services during construction will have beneficial economic impacts in the Clifton district.				
Offshore construction may temporarily interrupt or restrict normal marine operations of other industrial facilities at Clifton Pier.	Direct	Localized	Short-term	Minor
Offshore construction may temporarily interrupt marine operators who are not based at Clifton Pier, but who use the bay area near Clifton for commercial purposes (e.g., commercial fishermen and marine tour/charter companies such as underwater tour or dive operations).	Direct	Localized	Short-term	Moderate
Marine transportation along popular navigational routes (e.g., to western and northern New Providence) may be interrupted temporarily during marine infrastructure installation.	Direct	Widespread	Short-term	Major
Loss of vegetative communities during construction will displace wildlife and render the areas unsuitable for activities such as birdwatching.	Direct	Localized	Long-term	Moderate to Major
Loss of access to shoreline for subsistence fishing and recreational purposes may discourage bird watching.	Direct	Localized	Short-term	Major
Access to the shoreline for the purposes of boat launch may be impacted.	Direct	Localized	Short-term	Minor to moderate
Construction activities may impair views of the sea.	Direct	Localized	Short-term	Moderate
Temporary disruption to traffic during movement of heavy equipment and transport of large size facility components.	Direct	Localized	Short-term	Minor

Potential Socio-economic Impact	Nature	Spatial Extent	Duration	Magnitude
Operational Phase				
A new operation at this previously undeveloped location will result in additional vehicular traffic moving on/off site and may increase traffic volume along Southwest Road during peak hours.	Direct	Localized	Long-term	Minor
Loss of access to the shoreline by stakeholders for economic and recreational purposes.	Direct	Localized	Long-term	Minor to major (depending on provision of areas of access)
Operation of the proposed project may increase overall noise levels at the project site.	Direct	Localized	Long-term	Minor
Operation of the proposed project may increase overall noise levels associated with marine vessels.	Direct	Localized	Short-term	No to minor
Onshore Operations pose increased potential hazards (e.g., due to failure of primary containments etc.) to stakeholders and the normal operations of surrounding facilities.	Direct	Localized	Short- to Long-term	Minor to moderate
Permanent loss of vegetative cover or restricted access may negatively affect business activities and result in economic loss to businesses located outside of Clifton Pier but that operate attractions at Clifton pier.	Direct	Widespread	Long-term	Minor to moderate
Onshore operations expected to result in loss of access to portions of the shoreline (to be fenced in) and create impaired views of the sea. Large LNGC vessels will likely adversely impact views of the ocean when in port.	Direct	Localized	Long-term	Moderate
Potential increase in the number of residents in the district and an increase in the use of public infrastructure, housing and other social services.	Direct	Localized	Long-term	Minor

Potential Socio-economic Impact	Nature	Spatial Extent	Duration	Magnitude
Anticipated continued increased spending at local businesses, employment opportunities, and local firms will be contracted to provide catering, communications, transportation and other support services during operations.	Direct	Localized	Long-term	Positive and minor
Operations will contribute to a more stable and reliable power supply, benefiting residential and commercial power users.	Direct	Widespread	Long-term	Positive and major
Potential impact of Marine Exclusion Zone (MEZ) to impact marine navigation in the project area of recreational and commercial vessels.	Direct	Widespread	Long-term	Major
Potential impact of MEZ to impact recreational and fishing activities.	Direct	Localized	Long-term	Major
Potential impact from spills on other offshore industrial operations, non-industrial businesses operating in the area (including dive and tour operations, marine education, marine transportation, and commercial fishing).	Direct	Localized	Long-term	Moderate to major
Complete loss of vegetative communities will displace wildlife and render the areas unsuitable for activities such as birdwatching.	Direct	Localized	Long-term	Major
LNG terminal and associated infrastructure will alter the visual landscape although visually compatible with existing industrial area.	Direct	Localized	Long-term	Minor to moderate
Permanent fencing at the pipeline landfall point will restrict access to traditional recreational and subsistence fishing users or the sea and shoreline.	Direct	Localized	Long-term	Major
Positive impact to the New Providence power grid.	Direct	Widespread	Long-term	Positive and major

7.0 Proposed mitigation measures

Table 7-1 below summarizes the mitigation measures that are recommended to minimize or eliminate any negative environmental and socio-economic impacts from the project.

Table 7-1: Summary of Environmental Mitigation Measures

	Mitigation Measures for Construction	**Mitigation Measures for Operations**
Erosion and sedimentation	1. Development of a detailed erosion and sediment control plan prior to the start of construction. 2. All construction activities will be implemented in accordance with best construction practices at that time. 3. Installing straw bales, erosion mating, erosion control rolls or similar materials where needed to control sediment transport. This may be most applicable along the pipeline corridor. 4. Activities will not be undertaken during adverse weather conditions in order to avoid the potential for soil erosion associated with stormwater runoff.	• None should be required.
Hydrology	1. No independent cooling water supply wells will be constructed for the proposed project. The LNG vaporizer unit will use a water/glycol heating medium. 2. No liquid discharges will be directed to disposal or drainage wells and FOCOL-Shell will ensure that fuel contaminants are contained and are not discharged to the groundwater during the construction phase.	1. Gravity drainage shall be used for all the collection systems. Lift pumps shall be provided where required. 2. Bunded areas, drip trays or spill trays with connection and access for vacuum trucks shall be applied for catching accidental drips and leaks of hydraulic oil, diesel or other hydrocarbons other than LNG. 3. Contaminated water from these collection areas will be removed by vacuum truck and sent to slops oil tank / facility for further off-site processing the contaminated water. The final proposed design shall be aligned with any regulatory expectations.

	Mitigation Measures for Construction	Mitigation Measures for Operations
		4. Sanitary and chemical waste will be collected, using lift stations as necessary and transferred to a sewage treatment package (HOLD [22.]) or other appropriate facility where it will be treated. 5. Local containment such as bunds and drip trays are used for oil containing equipment (any hydraulics, transformers, lubricants, diesel tank). Local containment will be designed and located to avoid rainwater/spray ingress. 6. An impounding basin and accompanying LNG drainage system will be provided in line with the US-based NFPAs 59A (Standard for the Production, Storage, and Handling of LNG).
Soil and groundwater quality	1. All well installations will be properly grouted and sealed, as well as provided with a robust protective casing to minimize potential for groundwater contamination. 2. The installation of any new surface drainage or disposal wells will be avoided. 3. The design of the remote surface water and spillage impounding basin will ensure that is constructed to remain watertight over the long term. This may necessitate the installation of a high-density polyethylene (HDPE) liner, or a similar material, beneath concrete surfacing so that water loss does not occur through the eventual development of cracks in the concrete. 4. All water supply wells will be professional installed and have all required cement grout/bentonite seals and protective casings. This could require the installation of low permeability	1. A system of catch basins, drains, and sumps will be established during operation to collect wastewater for treatment, rather than disposing of untreated water at ground surface. 2. All surface water and spill collection basins will be properly designed so as to have low permeability base and walls constructed of a long-lasting material, such as high-density polyethylene, and a program of regular inspection and maintenance will be carried out to ensure that untreated water is not discharged to the subsurface. 3. Establish a properly engineered and constructed vehicle and equipment refueling facility to minimize the potential for fuel losses to the environment. 4. FOCOL-Shell will ensure that new chemical products are properly handled to minimize

	Mitigation Measures for Construction	Mitigation Measures for Operations
	backfill or clay cut-offs at regular interval along the pipeline route. 5. Ensure that new pipeline installation backfill does not become a conduit for the migration of contaminated surface water throughout the proposed project site. This could require the use of low permeability backfill or the installation of clay cut-offs, keyed into the trench base and sidewalls at regular intervals along the length of the pipeline. 6. Establish a plan to properly collect, treat as necessary and dispose of construction wash-water. 7. Review construction excavation requirements and utilize construction methods which minimized bedrock fracturing and the potential development of bedrock infiltration pathways. 8. A minimum number of heavy equipment refueling areas will be established within the proposed project site. The construction contractor will establish and follow best refueling practices which will include monitoring the environmental condition of refueling areas and immediately reporting and cleaning up any spills which occur. 9. Best practices will be followed for use of paints, solvents and other potentially contaminating products and handling their associated waste including frequent collection of surplus or waste liquids for offsite disposal, use of purpose specific storage containers, appropriate use of secondary containment and proper training of personnel using these materials.	potential for spills and losses. FOCOL-Shell will utilize best practices for the collection, disposal and/or treatment of waste oils, chemicals, coolant, heat exchanger fluids etc., including proper training of personnel handling these materials, utilization of secondary containment where appropriate volumes are present, and frequent collection of surplus chemicals. 5. Proper sanitary waste treatment and/or disposal systems will be installed and maintained. 6. FOCOL-Shell will monitor and maintain all wastewater treatment systems including associated piping so losses to the environment are minimized. 7. The use of drainage and disposal wells will be eliminated or minimized to the greatest extent possible.

	Mitigation Measures for Construction	Mitigation Measures for Operations
	10. The construction contractor will collect and manage construction debris, waste, and cuttings to minimize impact on site soils. 11. The environmental quality of imported fill soils will be thoroughly tested, as required, and only soils which are compliant with applicable standards will be accepted. 12. FOCOL-Shell will ensure that proper health and safety measures are in place to protect construction workers and other persons in contact with potentially impacted soils or rock excavated along pipeline routes or at other locations. 13. All potentially impacted excavated soil will be chemically tested and properly disposed either on site or at an approved offsite location.	
Air quality	1. On-site vehicle and equipment idling will be discouraged and where practical, limited to no more than three minutes to reduce emissions such as NO_2. 2. Daily inspections of heavy equipment will be completed by the operators to ensure all equipment operated is in good working order and following the approved maintenance program to reduce emissions such as NO_2. 3. Construction crews will monitor visible emissions. When excessive emissions from equipment are observed, the operators will conduct one of the following: a. schedule the vehicle to undergo repair, or b. provide records showing the vehicle has been tuned and maintained in accordance	1. A leak detection and repair program to ensure the equipment are operating and maintained in a safe manner. 2. Best operational management practices will also be strictly adhered to during the offshore unloading activities at the jetty. The marine vessels, including the LNGC and bunker vessels, will minimize engine and generator use and only use essential equipment while hotelling during unloading operations.

	Mitigation Measures for Construction	Mitigation Measures for Operations
	with preventative maintenance programs following manufacturers requirements. 4. Dust generation from construction and demolition activities such as drilling, use of breakers, jack hammers, storage stockpiles of exposed soils/surfaces will be controlled using water sprays or will be covered with tarpaulins, soil binders or similar preventative techniques. However, chemical dust suppressants will not be used in areas where plants, wetlands, or other aquatic organisms could potentially be harmed. 5. Unpaved travel routes and parking areas will be watered as needed during dry weather periods to minimize dust. 6. Tracking of earth or soil from the construction site by trucks to adjacent roadways will be minimized by using mechanical means such as mud mats (e.g., granular pads located at site entrance), and/or street sweeping on paved areas and the physical removal of earth from vehicles (e.g., wheel washing), as needed; 7. Vehicles hauling soil, aggregates or fine or dusty material will be covered to minimize the generation of dust. 8. Soil handling activities will be limited during periods in which high winds are predicted or occurring to reduce offsite transport. 9. Scheduling and planning of construction activities in order to minimize the areas of soil exposed at any given time.	
Climate change	1. GHG reduction strategies for onshore activities will include, among other measures, lowering the	GHG reduction strategies for operation of the LNG terminal will be developed and incorporated in

	Mitigation Measures for Construction	Mitigation Measures for Operations
	consumption of fuel, using newer more fuel efficient and/or well-tuned heavy equipment, and developing construction operating policies. 2. For the offshore construction activities, GHG reduction strategies will include, among other measures: usage of newer cleaner burning marine construction vessels (i.e., jack-up barge, lift boat/crane barge, supply barges, etc.) and equipment; and maximizing the usage of vessels from a location in The Bahamas region to minimize transit emissions coming to and from the proposed project site.	facility operating procedures. Strategies to reduce potential climate change impacts will include, but not be limited to: • planning and usage of energy-efficient systems for operation, • increase fuel efficiency in transportation and logistics including supply chain; and • a well-managed leak detection and repair program to limit any potential fugitive emissions.
Noise – Onshore	1. All construction activities will be limited to daytime hours (7:00 AM to 5:00 PM) during which the ambient sound is already elevated from existing adjacent industrial activities and other human activities, thus resulting in less potential for disturbance and annoyance at the NSRs. 2. Construction will be staged such that only a portion of the construction equipment would operate concurrently at any given time. 3. All construction related equipment will be maintained and operated in accordance with manufacturers specifications and will be equipped with appropriate noise mufflers, as required. 4. Internal haul route will be properly maintained to avoid potholes and ruts that could result in noise generated by heavy equipment and vehicles travelling along uneven road surfaces.	1. To mitigate the potential night-time noise exceedance, the project design will ensure that the boil-off gas engine exhaust stacks are equipped with silencers. 2. The emergency diesel power generator and other emergency sources (e.g., fire water pump and ignited vent system) will only run for brief periods and will be designed with acoustic controls such as enclosure and silencing for the emergency diesel power generator, and silencers on the ignited vent. Testing of such emergency equipment will also be limited to daytime hours to avoid the potential night-time noise disturbance.
Noise – Offshore	Marine animals are at greatest risk to noise exposure from offshore construction. To mitigate the potential offshore construction noise impact to marine animals	1. Noise level reduction is expected during operations. LNG import is on average once every 8 to 11 days and oil tanker import is

	Mitigation Measures for Construction	Mitigation Measures for Operations
	that may be present in the vicinity of impact pile driving, the following is proposed: • implement a "soft start" procedure for pile driving, which involves ramping up the intensity of the hammer strikes prior to operating at full capacity. The gradual increase in intensity of pile driving allows free-swimming marine life to leave the area; and • utilize Protected Species Observers (PSOs) to observe (and record sightings of) the presence of marine mammals and sea turtles within proximity of the impact pile drivers prior to starting; and • cease work until any observed marine animal moves away from the work area.	expected once every three months. This frequency of LNG and diesel (or HFO) supply is low to medium, which further reduces marine animal's long-term exposure to noise produced by the vessels during transit and berthing. 2. Offshore noise will be further reduced by: • limiting night-time operational activities to the greatest extent possible; and • strict enforcement of vessel speed and idling in accordance with safety requirements which in turns can reduce noise levels by reducing engine noise.
Solid, liquid and hazardous waste	1. Preparation of a Waste Management Plan for the collection, classification, segregation, characterization, handling, storage, transportation, and disposal of various waste streams to comply with The Bahamas Environmental Health Services Act 1987, Part IV. The Waste Management Plan will provide for monitoring and testing the waste streams, if required, to identify if any hazardous waste is present. The Waste Management Plan will also outline the requirement for collection, handling, transportation, storage, and disposal of various waste types. 2. Project's emergency response plan will ensure the safe and legal removal and disposal of any waste generated during and following an emergency response, and where environmental measures	1. Utilize same mitigation measures as during construction phase. 2. Additionally, during operational phase: • consideration will be given to the use of corrosion resistance glass-reinforced plastic (GRP) piping, as appropriate, to prevent usage of certain chemicals such as corrosion inhibitor; and • using environmentally friendly foam for firefighting.

	Mitigation Measures for Construction	Mitigation Measures for Operations
	have failed or spills occurred, provide for the restoration and clean-up of the environment following a major accident. 3. Provision of personal protection equipment (PPE) as per HSSE requirements and as described in the health and safety plans developed to reduce the exposure of employees to waste materials. The PPE will be suitable for use related to the type of hazardous waste and its characteristics as identified by the waste survey. 4. Provision of required area for storage and classification of solid waste as well as hazardous waste during construction activities. The area will be suitably equipped for any anticipated material to be sorted and stored in a secure, segregated manner prior to recycling / disposal by a local licensed waste contractor in the most appropriate locally available method, in compliance with local regulation and site permit requirements. 5. Confirm the capacity and operating standards of available authorized landfills for acceptance of solid or hazardous waste from construction and decommissioning activities. 6. Preparation of an environmental contingency plan for generated hazardous wastes. 7. Monitoring and testing of hazardous liquid waste to meet the standards for wastewater discharge. 8. Development of a Water Management Plan and provision of retention volume with adequate capacity for liquid water for the purpose of monitoring and treatment, if required.	

	Mitigation Measures for Construction	Mitigation Measures for Operations
	9. Sanitary waste will be collected, using lift stations as necessary and transferred to a sewage treatment plant or other appropriate authorized facility where it will be treated before discharge into the clean water outfall.	
Fire and explosion	1. Diesel fuel and gasoline will be stored in double-walled storage tanks to provide secondary containment. 2. Housekeeping will comply with the safe storage of chemicals requirements stipulated in the HSSE manual. 3. Safety training will be provided to all on-site personnel responsible for refueling activities at the proposed project site. 4. All construction personnel will be trained in emergency response procedures and relevant documentation on these procedures will be maintained at all times at the construction site. 5. Portable fire extinguishers will be placed throughout the construction site to allow for easy access in the unlikely event of a construction-related fire.	1. Installation of infra-red cameras to detect a fire at the LPG facilities. 2. Installation of flame detectors and gas detectors to detect the presence of an explosive atmosphere. 3. Manholes will be vented to prevent build-up of flammable gases. 4. Southwest Road will be included in emergency response planning as it may need to be closed in the unlikely event of a major incident occurring at the facility. 5. Implementation of an Emergency Response Plan 6. Establishing safe distances between the proposed multifuel jetty and the existing LPG jetty currently used by Carib Gas and Sun Oil. LPG transfer operations could potentially impact safe operation of the multifuel jetty (e.g., ships maneuvering towards the LPG jetty losing control and causing collision or a malfunction during LPG transfer leading to release of flammables). A QRA has established the MEZ for the jetty. Safety distances between the multifuel jetty and LPG jetty will minimize the risk of the operation of both jetties. 7. Construction of an earth mound wall (i.e., berm) along northern and western fence line

	Mitigation Measures for Construction	Mitigation Measures for Operations
		perimeter to mitigate impacts to personnel / LNG Storage Tank/ process facility from an incident at either Sun Oil or CaribOil LPG storage facilities. An additional blast wall will be constructed between Shell's LNG facility and the LPG bullet tanks at sun Oil facility as further protection for the LNG Tank. 8. Using a full containment LNG tank. A full containment tank is a double containment tank in which the annular gap between the outer and inner tanks is sealed. 9. Employing an active firefighting system (and training employees in its use) such as fire extinguishers, fire water system, CO_2, powder, foam, blanketing, and halon system. Flame detectors and gas detectors will be placed at appropriate locations to detect leaks and prevent the creation of an explosive atmosphere. 10. Applying safety distances as per International standards such as NFPA 59A. Separation between the tank and other LNG facilities is significant and exceeds NFPA 59A requirements. Incorporate Shell DEP (e.g., apply MEZ around the jetty when offloading LNG or fuel). Undertake ALARP Assessment for risk of escalation from/to the LPG tank farm.
Hurricanes	1. Design the project's infrastructure to withstand extreme metocean conditions. For example, requiring a minimum air gap between the water's surface and the underside of the jetty topside will	Utilize same mitigation measures as during construction phase.

	Mitigation Measures for Construction	Mitigation Measures for Operations
	be followed to protect the jetty from maximum wave height during storms. 2. Implement weather monitoring and use weather forecasts to plan activities. 3. Develop Adverse Weather Guidelines for operations including a Transfer Operations Checklist which will include weather requirements. 4. Apply Stop Work Policy which allows employees to stop work under circumstances which may threaten their health and safety. 5. Utilize the Manual of Permitted Operations (MOPO) to control working in a dangerous environment (e.g., during high wind or storm). This manual provides guidance on the activities that are permitted and prohibited under different conditions. 6. Applying HFO and diesel fuel spill containment strategies and clean-up using the potential spill trajectories predicted by the Cummins Cederberg and Integrated Building Services, 2021 report. 7. Designing emergency shutdown systems to stop operations rapidly during emergencies. This will reduce the likelihood for release of martials of concern such as liquid wastes. 8. Assessing the current operational practices within the industrial area, including procedures for response to severe weather conditions. 9. Ensuring that infrastructure provided for the selected design concept allows timely implementation of severe weather response procedures.	

	Mitigation Measures for Construction	Mitigation Measures for Operations
	10. Implementing a storm drain system as per design premise. 11. Implementing the flooding considerations in the civil design basis. 12. Investigating options to protect the proposed project site from flooding with potential for outflow of contaminated water from adjacent sites (e.g., the earthen boundary wall). 13. Provision of a shelter on the jetty for personnel in case of poor weather, including lightning.	
Terrestrial habitats	1. To limit the potential adverse impacts of vegetation clearing, retain some of the coppice on the proposed project site to serve as a vegetated wildlife corridor for use by birds and other small animals to traverse the site to get to other coppice forests in the Clifton area. 2. All invasive trees and plants will be removed from the proposed project site as these are detrimental to biodiversity.	No negative impacts expected during operational phase, so no mitigation measures should be required.
Marine habitats	Operators of vessels involved in the construction and operational activities will also receive training in sighting and avoiding collisions with marine animals.	1. All offshore facilities will be designed to withstand Category 5 hurricanes. 2. Vendor standard equipment/package design will be used. Vendor guarantees will be used to ensure critical requirements are met by equipment. 3. The jetty will be designed to ensure safe navigation. 4. The jetty will be designed with ESDVs designed to stop the flow of LNG in the event of an emergency such as an LNG leak at any point on or offshore.

	Mitigation Measures for Construction	Mitigation Measures for Operations
		5. The three liquid fuel MLAs will be designed and constructed according to OCIMF specifications with ERS and ESDVs to accommodate liquid fuel offloading. 6. Presence of an oil drain drum to address drainage requirements and oily water drum for contaminated jetty water drainage. 7. LNG drain system including connecting piping lines and valving to be used following a loading or unloading operation to safely drain LNG from the loading arms when they are not in use. 8. Firefighting system which is integrated with the onshore firefighting/firewater system, including hydrants, monitors, and foam generation package for LNG pool fire. 9. SSL – the link will carry Emergency Shutdown signals to and from the jetty and carry voice and data communications between the vessel and the LNG terminal. 10. Availability of spill clean-up equipment on site to enable immediate clean-up of small spills. 11. For larger spills, the procedures detailed in The Bahamas' National Oil Spill Contingency Plan will be followed. 12. All pipelines carrying fuel will have secondary containment. If the event, that secondary containment fails, the pipeline must have automatic shut-off valves to prevent more fuel entering the pipeline.
Biodiversity (protected species of plants, birds and animals)	1. Protected trees on the proposed project site will be preserved. Care will be taken to not damage them during use of heavy equipment as damage to their	Mitigation measured implemented during construction will be maintained.

	Mitigation Measures for Construction	Mitigation Measures for Operations
	bark could result in them contracting diseases and eventual death. 2. A buffer zone will be established around protected trees during construction. The size of buffer zones will be determined based on the extent of the root system for each tree. 3. Vegetated corridors will remain on the proposed project site for use by birds and small animals to traverse the proposed project site to the extent possible. The location, extent, configuration, etc. of the corridor will be determined as part of the Construction Plan. 4. Construction staff will receive advance instructions on behaviour during encounters with wildlife and there will be a strict prohibition on interference with birds and other wildlife. Interference includes killing, harming or feeding them. Staff will be trained in appropriate actions to be taken when interacting with wildlife. These actions will be detailed in the EMP for the project.	
Socio-economic aspects	1. Minimize the amount of land cleared and vegetation removed to reduce potential erosion, impacts on wildlife and on the aesthetic value of the areas still vegetated and undeveloped. 2. Traffic control measures will be established to control traffic onsite, as well as traffic leaving and entering the proposed project site, and to mitigate impacts to traffic along Southwest Road. 3. Endeavour to limit the transport of heavy equipment and large-size facility components to late night, or other off-peak traffic volume hours,	1. To minimize impacts to residents and tourists with respect to accessing the area when tankers are in port, Shell will post the schedule for LNGCs on the company's website and/or share them with tourism providers and neighbourhood associations. This will ensure these stakeholders are aware of times when access may be restricted and avoid user conflicts. 2. Continue to engage with stakeholders in the Clifton area as well as the general public.

	Mitigation Measures for Construction	**Mitigation Measures for Operations**
	to the greatest extent possible in order to avoid conflict with other users of Southwest Road. 4. Limit the potential for off-site dust and noise issues by employing preassembled, prefabricated and modularized construction components. For example, many of the components of the LNG storage tank would only require placement and connections at Clifton Pier. 5. Potential adverse impacts to stakeholders, including businesses, communities, and other industrial operations at Clifton Pier will be addressed through direct consultation prior to construction through establishment of open lines of communication, providing advance notice of future construction activities, and sharing information on what mitigation measures have been established. 6. FOCOL-Shell will also seek opportunities to mitigate in areas outside of the proposed project site, that would have positive impacts on the local economy and community on New Providence. Such mitigation opportunities may include corporate sponsorship of local or national events, including national parks, mangrove planting or coral restoration initiatives. 7. The general public will also be consulted to ensure transparency and that all impacts are considered. FOCOL-Shell will disseminate relevant construction information by way of the company's website, appropriate notices and signage at and adjacent to the proposed project site, public service announcements, and information sharing	

	Mitigation Measures for Construction	Mitigation Measures for Operations
	on any other public platforms. Information sharing on social media platforms will also be leveraged to reach the Bahamian public.	

8.0 Conclusions

Employment of appropriate design and planning methodologies can result in execution of the LNG-to-Power Project, Phase 1 project in a sustainable manner. Utilizing the recommended mitigation measures can eliminate or minimize any negative environmental impacts.

The LNG-to-Power Project, Phase 1 has expressed its commitment to implementing the recommended mitigation measures and executing the project in a manner that respects neighbouring businesses and communities, the natural resources of the site and is environmentally sustainable.

The Shell Commitment and Policy on Health, Security, Safety, the Environment and Social Performance includes to:

- pursue the goal of no harm to people;
- protect the environment;
- use material and energy efficiently to provide our products and services; and
- respect our neighbours and contribute to the societies in which we operate.

The project shares these commitments and also has the following specific objectives:

- achieving Goal Zero for project implementation;
- design for zero continuous flaring from regassification unit;
- incident-free start-up through use of Flawless Project Delivery; and
- positive and transparent engagement with the local community.

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Appendix 1: Topographic Survey

Appendix 2: TM2500 Mobile GTG Specifications & Drawings

The GTG **gas fuel system** major components include:

- Gas Fuel Strainer
- Gas Fuel Vent Valve
- Gas Fuel Purge & Bleed Ball Valve
- Woodward Gas Fuel Valve
- Gas Fuel Purge Check Valve
- Purge Valve
- Gas detectors

The **liquid fuel system** major components include:

- Liquid Fuel Y-strainer
- Purge & Bleed Valve
- Liquid Fuel Pump/Motor
- Primary & Secondary Shut-off Valve
- Liquid Fuel Ball Valve
- Fuel Manifold Liquid Fuel Relief Valve
- 30 Fuel Nozzles
- Liquid Fuel Duplex Filter Assembly
- Return Check Valve
- Liquid Fuel Control Valve

For continuous dual fuel operation, GE recommends the following solutions (not included in base scope): The primary recommended solution to maintain fuel transfer capability with extended liquid fuel operation is to include the optional CDP purge system. This system provides automatic, continuous purge flow to the gas circuit to ensure the system is always available for a seamless fuel change over and subsequent gas fuel operation without shutting down or manual intervention. The CDP Purge System Kit would, when operating on liquid fuel for extended periods of time, prevent and preserve coking of the gas fuel nozzles and avoid liquid fuel migration (fuel backflow) issues.

In case CDP purge system is not selected and extended liquid fuel operation is expected, the secondary solution to maintain fuel switching capability with liquid fuel operation is to manually inspect the gas fuel circuit and engine nozzles. If any contamination is found, cleaning and/or replacement of nozzles and fuel circuit equipment will be necessary prior to resuming operation to ensure the system is available for a fuel change over and subsequent gas fuel operation. This inspection interval is contingent on compliance to the appropriate fuel specification. Any deviation will require an increased frequency of inspection. Upon operator’s request, GE Contractor can provide an option to clean/change the gas fuel nozzles, add the CDP Purge System Kit, and/or remove the gas caps (if needed).

Installation and Commissioning Tools
This comprehensive tool set provides tools such as adjustable wrenches, torque wrenches, slings, shackles, drum pump, hoist, storage cabinet, process calibrators, grease guns, ladders, hand tools, measurement equipment, and fittings. There are also testing items, measurement tools, and fittings. It includes tube fittings, hydraulic pumps and jacks, hex keys, feeler gages, and calipers. This tool kit provides the majority of tools needed to support package I&C and maintenance. One set of Installation and Commissioning Tools is included for the project.

Stairs and Platforms
This consists of a preassembled set of stairs and platforms used for ingress/egress of the aux skid, left-hand turbine enclosure door, right-hand turbine enclosure door, control room and battery room. The platform surface is made of anti-slip grating and/or self-draining checkered plate.

Lifting equipment
This consists of the lifting equipment listed below for assembly at Site or for facilitating specific transportation methods. Configurations include:
1. Field Lift - Field Lift Equipment is the set of tools, slings, bars and shackles required for the initial installation of the TM2500 Package. It is required to assemble shipped loose components, such as Exhaust Silencer, Air Filter Panels and others to the Package.
2. Two Point Package Lift - To lift complete TM2500 Package Trailer with two cranes Two Point Package Lift Equipment is required. It allows to load and unload complete trailers on vessels or final positioning of the trailer if transport on wheels is not possible. It consists of spreader bars and shackles. The Two Point Package Lift is not considered to be part of the Units and may ship separately.
3. One set of Lifting equipment is included for the project.

Lube Oil Filtration Cart Kit
The kit consists of the filtration cart for mineral and synthetic oils as well as Water Meter for initial sampling of the oil. It is recommended to filter the oil before filling up the tanks. Oil sampling is a step of the I&C procedure. One (1) cart is provided by Contractor.

Factory Testing
In addition to the supply of the equipment, for each unit Contractor conducted component and package testing as follows:

Every new gas turbine is performance tested under load in a Contractor Test Cell, using procedures developed for flight turbine reliability. The generator is tested to IEEE C50.13 standards at its factory of manufacture. All gas turbine generator sets receive a static test including:
- Switch State (N.O. or N.C., actuation, wiring, and set point)
- Temperature element output, and wiring
- Transmitter range, output, and wiring
- Solenoid operation
- Control valve torque motor, excitation, and return signal
- Fire system continuity, and device actuation
- System flushing verification
- Tubing integrity (not plugged)

BOP Power Control Module (BOP-PCM)
Walk-in, pre-fabricated Power Control Module (PCM's) for the equipment designed for the installation of the combustion turbine package BoP electrical control gear. The interior of the PCM shall be air conditioned and the exterior shall be weatherproof to withstand climatic conditions for protection of the interior equipment. The PCM will come complete with an emergency lighting system, interior cable tray, lighting and convenience

receptacles. Equipment will be pre-installed and wired prior to the arrival at the jobsite. PCM should be installed within 300 wire feet (98.5 wire meters) of unit connection. Contractor will provide a 125V DC battery system that includes batteries, chargers, disconnect/breakers and control/monitoring device that are installed in freestanding, ventilated, indoor-rated cabinets for installation in the PCM. (Note: This PCM does not have CE or UL marking) Major interior components are:

- Medium voltage switchgear
- MV/LV auxiliary transformer
- 480V LV switchgear
- Automatic transfer control system
-
- Balance of plant controller
- 125VDC DC system
- Protection relay panel
- Fire extinguishers

Medium Voltage Switchgear

SecoGear, IP4x, indoor rated medium voltage switchgear for each set of 2xTM2500, to protect the auxiliary transformers and downstream equipment from abnormal circuit conditions. Minimum rating as follows:

- Rates voltage: 17.5 kV
- Rate Current: 1250 A
- Short circuit current: 40kA for 3sec

Auxiliary Transformer

GE Wavecast, Indoor-rated medium voltage, dry type, auxiliary transformer for each set of 2xTM2500 to step down the generator output voltage of the TM2500 from medium voltage down to low voltage to power the motor control center and associated auxiliary equipment. Equipped with +/-2 steps 2.5% off-load taps to raise or lower the nominal voltage rating.

Technical Information:

Power Rating	2000kVA (60Hz)
Frequency	60Hz
Primary HV Winding – Configuration	13.8kV, DELTA
Secondary LV Winding – Configuration	480V, WYE
Insulating Medium – Cooling	DRY – AN
Insulation Class	180°C (H)
Vector Group	Dyn11

LV Switchgear

GE QuiXtra LV switchgear panels shall be equipped with 4 busbar conductors (3P + N). The system neutral will be solidly grounded. The maximum continuous current available from the associated feeder transformer will define the switchboard bus bar ratings.

- Rigid self-supporting metal-enclosed structure for indoor installation
- Front access only
- MCCB and MCB feeder unit
- Microprocessor-based protection release/relays for incoming breaker

The following LV switchgears are included:

- Aux Switchboard – 2000A, 480V,
- Aux Panel Board 1 - 400A, 480V,
- Aux Panel Board 1 - 250A, 230V/127V.

Automatic Transfer Control System
The MX350 is a modular control and monitoring system designed specifically for low voltage transfer switch application. The automatic transfer control system shall be utilized to switch power to and from the black-start diesel generator (emergency) and the power feed from the unit auxiliary transformer (normal).

DC System
125V DC battery system includes batteries, chargers, disconnect/breakers and control/monitoring device that are installed in freestanding ventilated indoor rated cabinet. DC system provides control supply to electrical switchgear, protection relays and transformers.

Balance of Plant Controller
Standalone controller to monitor and control the electrical and mechanical Balance of Plant (BOP) equipment listed within the Contractor scope of supply. The PLC System shall be included inside the PCM and is utilized for the integration of the TM2500, MBOP and EBOP scope of supply. Contractor shall include an HMI and/or laptop for the supervisory control and data acquisition (SCADA) of associated BOP equipment listed in the scope of supply. The Control system will be the GE RX3i.

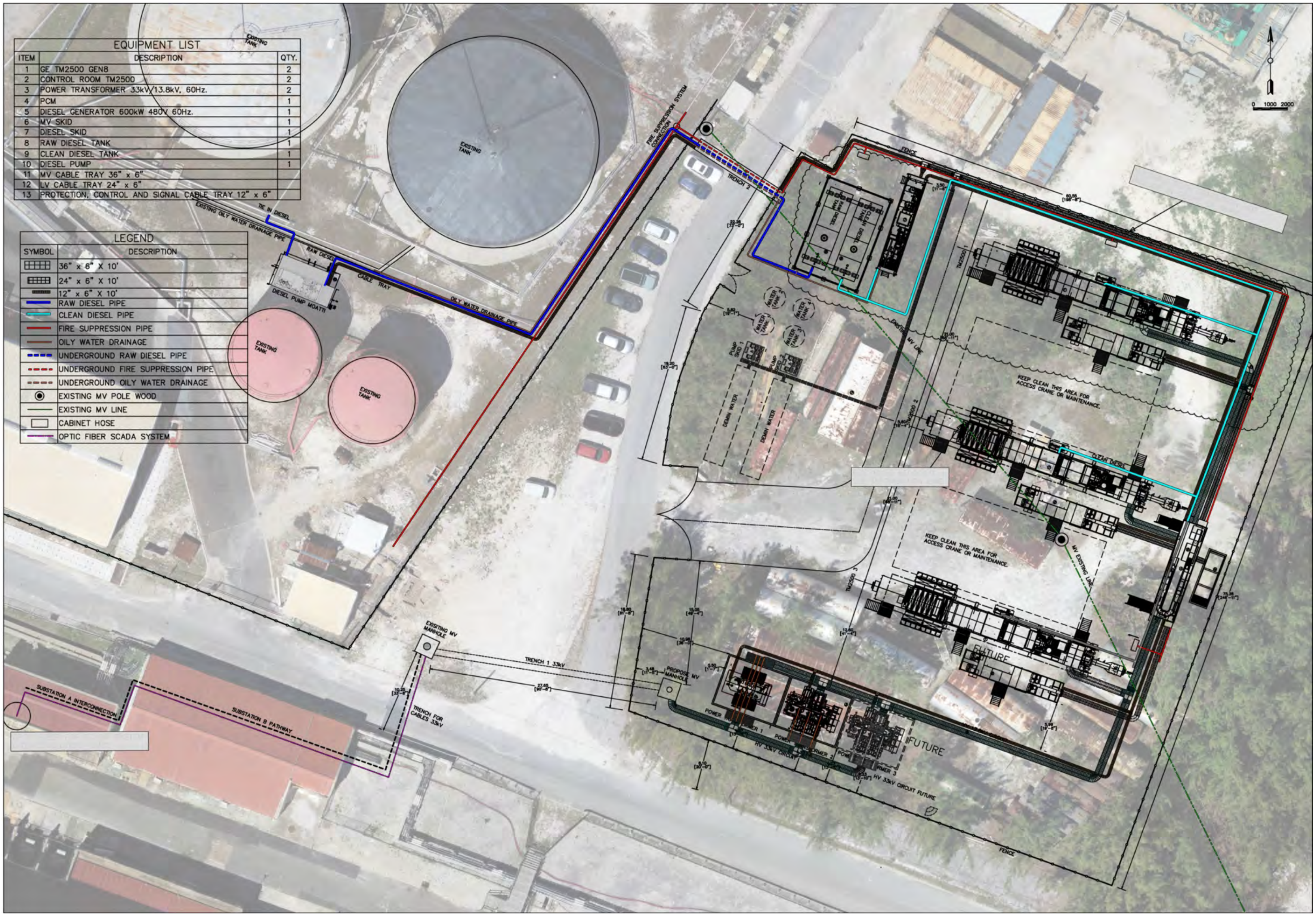
Protection Relay Panel
Contractor will provide two (2) GSUT differential & overall protection panels. The overall protection system will contain GE Multilin T60 transformer protection relay, GE Multilin F60 Feeder protection relay and GE Power Quality Meter, which shall include test switches for CT, VT and trip circuits, and two (2) lock-out relay (per protection relay) to provide adequate protection functions for two separate main step-up and auxiliary transformer zone of protection as primary protection relay and feeder protection. The relay panel shall include a multilink Ethernet switch to communicate with associated GTG TM2500 plant equipment. Relay panels will be supplied in indoor rated NEMA 1 cabinet for which shall be installed in the Power Control Module.

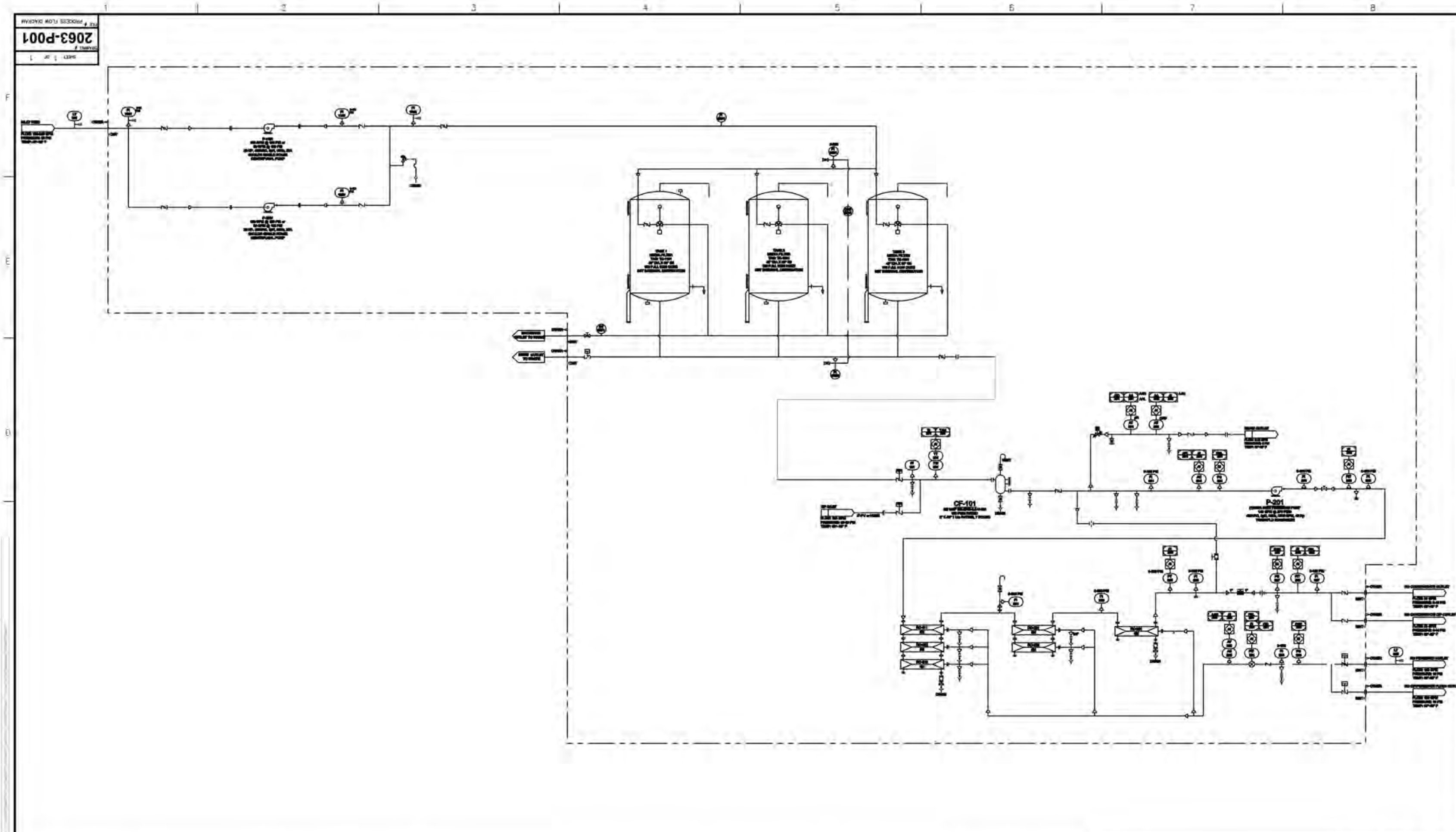
Fire extinguishing system
Includes handheld fire extinguishers.

Liquid Fuel Unloading Module
This module consists of two pumps and a self-cleaning filter where the fuel can be transferred from fuel tankers to raw fuel storage tanks. This module is capable of transferring 170 gpm of fuel while it is being filtered to <20 microns. The pump is redundant so that there is always a backup. The self-cleaning filter is also redundant and auto cleaning and the filter elements are washable. The pump/filtration skid is already connected to the raw fuel tank via piping, so the operator just needs to connect the supply truck via a flexible hose and start the pump. All internal operations are automatic.

Gas Fuel Filter/Coalescing Skid (Duplex)
Gas fuel coalescing filter skids with duplex (2 x 100%) coalescing filtering capability. One (1) filter skid will be needed per GT. The gas fuel coalescing filter skid is typically placed close to the GT so that the gas is filtered just before entering the package. The gas fuel coalescing filter skid is not enclosed, but is built for outdoor use. Fuel gas piping will consist of carbon steel upstream of the duplex coalescing filter skids, and stainless steel (304) downstream of the skids. The fuel gas filter vessels are also in stainless steel. Each skid will come complete with following design features:

- Vessel to be ASME Section 8 Div. 1 designed
- Vessel to include separator and coalescent element designed for removal of 99.9% of liquids and solid particles (0.3 micron or larger)
- Instrumentation to include pressure transmitters, level gauges, and pressure safety relief valves
- Isolation manual valves for maintenance purposes and line isolation


EQUIPMENT LIST
ITEM DESCRIPTION QTY.
1 GE TM2500 GEN8 2
2 CONTROL ROOM TM2500 2
3 POWER TRANSFORMER 33kV/13.8kV, 60Hz. 2
4 PCM 1
5 DIESEL GENERATOR 600kW 480V 60Hz. 1
6 MV SKID 1
7 DIESEL SKID 1
8 RAW DIESEL TANK 1
9 CLEAN DIESEL TANK 1
10 DIESEL PUMP 1
11 MV CABLE TRAY 36" x 6"
12 LV CABLE TRAY 24" x 6"
13 PROTECTION, CONTROL AND SIGNAL CABLE TRAY 12" x 6"
LEGEND
SYMBOL DESCRIPTION
36" x 6" X 10'
24" x 6" X 10'
12" x 6" X 10'
RAW DIESEL PIPE
CLEAN DIESEL PIPE
FIRE SUPPRESSION PIPE
OILY WATER DRAINAGE
UNDERGROUND RAW DIESEL PIPE
UNDERGROUND FIRE SUPPRESSION PIPE
UNDERGROUND OILY WATER DRAINAGE
EXISTING MV POLE WOOD
EXISTING MV LINE
CABINET HOSE
OPTIC FIBER SCADA SYSTEM
EXISTING TANK
EXISTING OILY WATER DRAINAGE PIPE
TIE IN DIESEL
RAW DIESEL
CABLE TRAY
DIESEL PUMP MOATS
OILY WATER DRAINAGE PIPE
FIRE SUPPRESSION SYSTEM
TRENCH 2
FENCE
KEEP CLEAN THIS AREA FOR ACCESS CRANE OR MAINTENANCE.
FUTURE
EXISTING MV MANHOLE
TRENCH 1 33kV
TRENCH FOR CABLES 33kV
SUBSTATION A INTERCONNECTION
SUBSTATION B PATHWAY
HV 33kV CIRCUIT FUTURE



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ENVIROGEN TECHNOLOGIES

A Veolia Performance Company

REV	DATE	DESCRIPTION OF REVISION	REVISED BY	CHECKED BY
A	06-05-24	ISSUE FOR REVIEW	RR	RL

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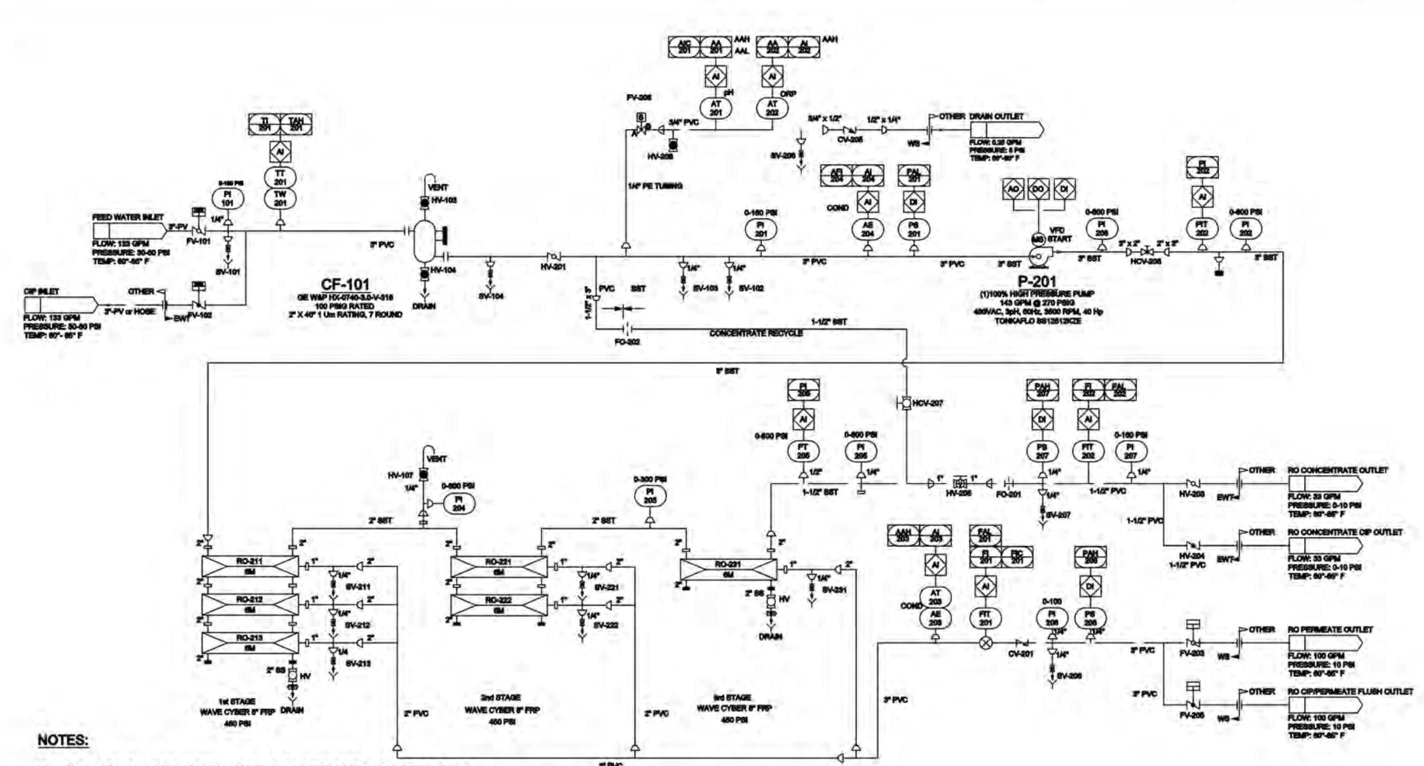
BAHAMA TURBINES LTD.
NASSAU BAHAMAS

RENTAL EQUIPMENT
PROCESS FLOW DIAGRAM

RO RENTAL

DRAWING SCALE	NTS
DESIGNED BY/DATE	RR 06-05-24
DRAWN BY/DATE	RR 06-05-24
CHECKED BY/DATE	RL 06-25-24
SHEET SIZE	D
REVISION	A
SHEET	1 OF 1
DRAWING #	2063-P001
FILE #	PROCESS FLOW DIAGRAM



NOTES:

1. VALVES CLOSED WHEN UNIT IS IN SERVICE INDICATED BY .
2. VALVES OPEN WHEN UNIT IS IN SERVICE INDICATED BY .
3. ALL HIGH PRESSURE PIPING IS 316 SCH 10 / 40 SST INDUSTRIAL PIPING UNLESS NOTED OTHERWISE.
4. ALL ITEMS ON THIS SHEET ARE BY WATERSURPLUS EXCEPT WHERE NOTED.

THIS DRAWING IS A VISUAL REPRESENTATION OF THE EQUIPMENT AND/OR SYSTEM PROPOSED. IT IS NOT INTENDED FOR CONSTRUCTION PURPOSES.

ENVIROGEN TECHNOLOGIES

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BAHAMA TURBINES LTD.
NASSAU BAHAMAS

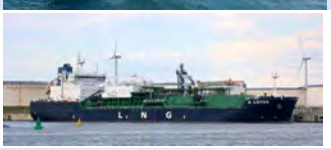
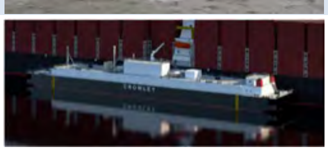
RO SYSTEM
PIPING & INSTRUMENTATION DIAGRAM

RO RENTAL

DRAWING SCALE: NTS
DESIGNED BY/DATE: RR 06-05-24
DRAWN BY/DATE: RR 06-05-24
CHECKED BY/DATE: RL 06-25-24
SHEET SIZE: D
REVISION: A
SHEET 1 OF 1
DRAWING #: 2063-P030
FILE #: P030 RO SYSTEM

Appendix 3: Fuel Transport Vessels Specifications

Shell's Global Bunker vessel Portfolio

Vessel Name		Owner (IMO #)	Status & Description	Trade Region
New Frontier 1		Pan Ocean (97650790)	• Long Term Time Charter • 6,500 m3 Tank Capacity • Operating for Shell since 2018	Northwestern Europe
LNG London		LNG Shipping (9888194)	• Long Term Time Charter • 3,000 m3 Tank Capacity • Operating for Shell since 2019	Rotterdam & ARA Region
Coral Methane		Anthony Veder (9404584)	• Long Term Time Charter • 7,500 m3 Tank Capacity • Operating for Shell since 2019	Mediterranean
Barge: Q-LNG 4000 Tug: Q-Ocean Service		Q-LNG Transport (9850197 tug)	• Long Term Time Charter • 4,000 m3 Tank Capacity • US Flag, Jones Act Vessel • Operating for Shell since 2021	USA East Coast
FueLNG Bellina		FuelNG (9859636)	• Joint Venture Ownership by Shell/Keppel • 7,500 m3 Tank Capacity • Operating for Shell since 2021	Singapore
K-Lotus		Korea Line Corp. (KLC) (9901362)	• Long Term Time Charter • 18,000 m3 Tank Capacity • Operating for Shell since 2022	Europe
New Frontier 2		PanOcean (Under Construction)	• Long Term Time Charter • 18,000 m3 Tank Capacity • Under construction at HMD • Ready for Service 2023	USA - Caribbean
Haugesund Knutsen		Knutsen (Under Construction)	• Long Term Time Charter • 5,000 m3 Tank Capacity • Delivery Q4 2022	Barcelona
Avenir Achievement		Avenir LNG (9886768)	• Long Term Time Charter • 20,000m3 Tank Capacity • Delivered to owner May 2022 • On charter to Shell Q1 2023	USA - Caribbean
Powering Progress (Barge)		Crowley Maritime (Under Construction)	• Long Term Time Charter • 12,000 m3 Tank Capacity • Jones Act Unmanned Barge • Ready for Service 2023	Savannah

New Frontier 1 Bunker – 2017

New Frontier 1 is owned by PanOcean, technically operated by Wilhelmsen and on long term charter to Shell for LNG bunkering and small-scale distribution services, primarily operating in the European northwest region and available for worldwide deployment.

New Frontier 1 OVERVIEW

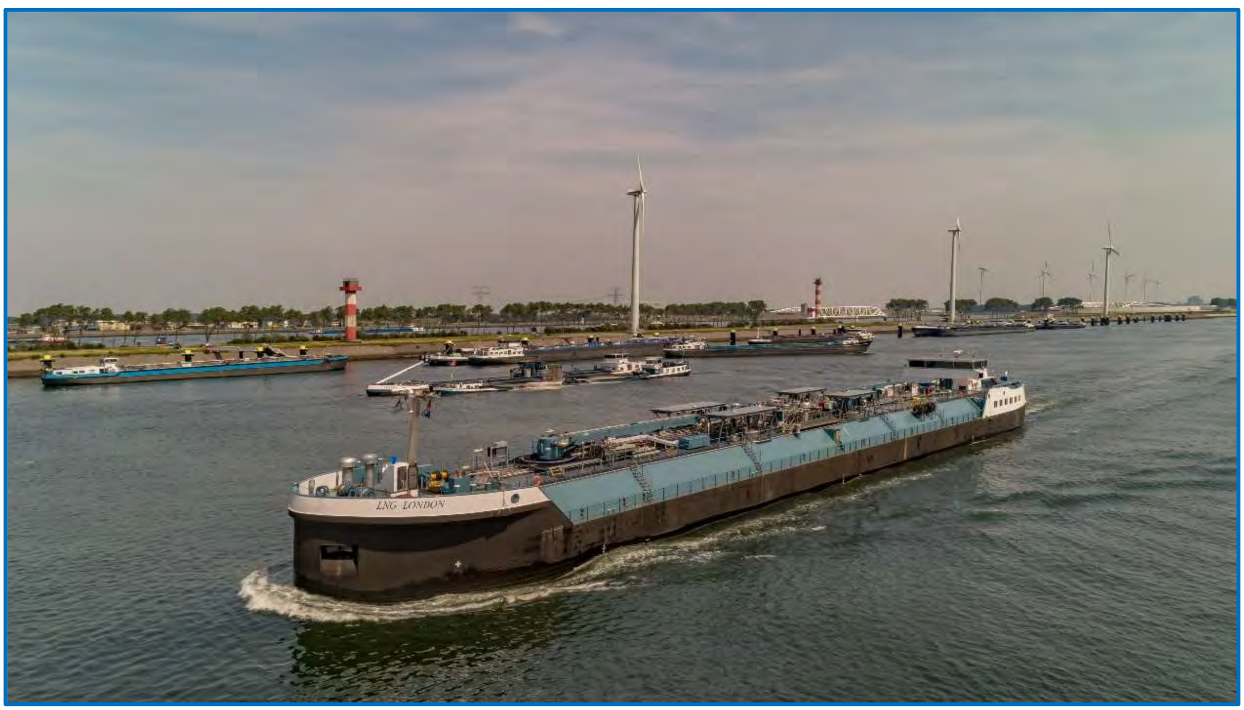
Length Overall:	119.9 m	Draft (loaded):	5.8 m
Breadth:	19.4 m	Displacement (summer):	10,578.3 MT
Cargo Tanks:	2 Type-C x 3,250 m^3 (total gross 6,500 m^3)		
LNG Transfer:	Liquid: 6" (ANSI 150) 650 m^3/h Vapour: 6" (ANSI 150) 2 x 18m (6") cryogenic hoses available	Upper and lower manifold located on port and starboard with upper manifold flange size of 16" with various reducer sized available	
BOG and Vapour Return Managment:	GCU 1,050 (kg/h) and ALAT subcooler available along with normal onboard consumption and tank pressure build-up		
ESD Link:	Trelleborg: 5-pin SIGTTO (primary), 2-pin fibre optic, pneumatic Manual ESD pendant available		
Emergency Release System:	KLAW 8" ERC with reducer to 6" on liquid and vapour lines (located on bunker vessel side). Vessel separation device and hose fall arrest system		
Fenders:	2 x 2m diameter (davit)		
Propulsion & maneverability:	Diesel electric propulsion with twin screws, high lift flap rudders and a bow thruster		

LNG London Bunker Barge – 2019

LNG London is owned by LNG Shipping (a joint venture between Victrol and CFT), technically managed by Victrol and on long term charter to Shell operating in the Port of Rotterdam and available for operation in the Amsterdam-Rotterdam-Antwerp (ARA) region per ADN classification as a European inland waterway barge.

LNG LONDON OVERVIEW

Length Overall:	110 m	Draft (loaded):	2.8 m
Breadth:	15 m	Displacement (summer):	1,703 MT
Cargo Tanks:	4 Type-C (vacuum insulated) x 750 m^3 (total gross 3,000 m^3)		
LNG Transfer:	Liquid: 6" (ANSI 150) 660 m^3/h Vapour: 6" (ANSI 150) Various cryogenic hose lengths available	Bunker boom (Kanon) and mid-ship manifolds on port and starboard (2" small scale forward and mid manifold)	
BOG and Vapour Return Managment:	3 x StirLNG subcoolers available along with normal onboard consumption and tank pressure build-up		
ESD Link:	Mampaey: 5-pin SIGTTO (primary), pneumatic and 2-pin ADN Manual ESD pendant available		
Emergency Release System:	Manntek 6" ERC on liquid and vapour lines (located on bunker vessel side) Vessel separation device and hose fall arrest system		
Fenders:	4 x 1.2m diamter (adjustable)		
Propulsion & maneverability:	diesel propulsion 360° azipod thruster and a 4-way bow thruster		



Coral Methane – 2009 (bunker capability modifications in 2018)

Coral Methane is owned and technically operated by Anthony Veder and on long term charter to Shell for LNG bunkering and small-scale distribution services primarily operating in the western Mediterranean region and available for worldwide deployment.

MAIN CHARACTERISTICS

Length Overall:	117.8m	Depth (mld)	10.6m
Breadth:	18.6m	Draft (loaded):	6.3m
GRT	7,833 MT	Draft (ballast)	5.4m
Displacement (summer):	10,842 MT		
Propulsion & maneverability:	Diesel electric propulsion with azipods and bow thruster		

LNG Containment and Bunker Transfer Systems

LNG Tank Configuration	2 x 3,750 m3	Total Capacity (100%)	7,500 m3
Tank Type	Spherical Type-C Tanks		
LNG Transfer System	Liquid: 1 x 6" (ANSI 150) , Vapour: 1 x 4" (ANSI 150) (midship manifold HTS)		
Bunker Rate (max)	650m3/hr	Crane Outreach	5.0 m
Hose Length	2 x 15.0m	ERS Type	Manntek 6"
ESD Link	Trelleborg: SIGTTO 5 pin and Pneumatic ESD		
Fendering	2 x pneumatic Yokohama	Fender Size (d x l)	2.0m x 3.5m (fixed)
GCU capacity	N/A	Subcooler	ALAT TBF-350

Marine LNG Measurement, Analysis and Calculation

Tank tables	Calibrated and certified tank tables
Metering	Tank CTMS
Gas Analyzer	N/A

Q-LNG 4000 LNG Bunker Barge – 2020

Q-LNG 4000 is a Jones Act compliance articulated tug and barge (ATB) constructed by VT Halter Marine in Pascagoula, Mississippi. The owner and technical operator is Q-LNG and is on long term charter to Shell for bunkering on the United States primarily on the east coast with potential to extend to the Gulf of Mexico and Caribbean.

MAIN CHARACTERISTICS

Length Overall:	125.7m	Depth (mld)	9.9m
Breadth:	12.8m	Draft (loaded):	5.5m (Tug), 3.7m (barge)
GRT	5,464 MT	Draft (ballast)	3.7m (barge)
Displacement (summer):	7,923 MT		
Propulsion & maneverability:	2x Z Drive (1500kW each)	1xBow thruster (900kw)	

LNG Containment and Bunker Transfer Systems

LNG Tank Configuration	4 x 1,000 m3	Total Capacity (100%)	4,000 m3
Tank Type	Spherical Type-C Tanks		
LNG Transfer System	Liquid: 1 x 6" (ANSI 150) , Vapour: 1 x 4" (ANSI 150)		
Bunker Rate (max)	600m3/hr	Crane Outreach	14.9 m
Hose Length	14.5m, 17.7m, 26.4m	ERS Type	KLAW 6", KLAW 4"
ESD Link	Trelleborg: Fibre Optic, Electrical Plye National/Miyake connector, SIGTTO 5 pin and Pneumatic ESD		
Fendering	4 x pneumatic Yokohama	Fender Size (d x l)	2.5m x 3.5m (fixed)
GCU capacity	N/A	Subcooler	ALAT TBF-350

Marine LNG Measurement, Analysis and Calculation

Tank tables	Calibrated and certified tank tables
Metering	On-Line Metering CTMS
Gas Analyzer	Raman RXN4 Spectrometer

FueLNG Bellina LNG Bunker Barge – 2020

FueLNG Bellina was constructed by Keppel Marine in Nantong, China and delivered in late 2020 to owner FueLNG, a joint venture between Keppel and Shell. The bunker barge is technically operated by K-Line primarily in Singapore and available for worldwide deployment. Shell utilises the vessel through a Pay Per Use (PPU) model.

MAIN CHARACTERISTICS

Length Overall:	119.5 m	Draft (loaded):	5.7 m
Breadth:	19.5 m	Displacement (summer):	10880 tonnes
Cargo Tanks:	2 Type-C x 3,750 m^3 (total gross 7,500 m^3)		
LNG Transfer:	Liquid: 8″ (ANSI 150) 1,000 m^3/h Vapour: 6″ (ANSI 150) Various cryogenic hose lengths available	Bunker boom (Kanon) and mid-ship manifolds on port and starboard	
BOG and Vapour Return Managment:	GCU fitted, 450 kg/h plus normal onboard consumption and tank pressure build-up (vapour return to be assessed on case-by-case basis)		
ESD Link:	Trelleborg: 5-pin SIGTTO, pneumatic, fibre optic, 37 pin Manual ESD pendant available		
Emergency Release System:	Arta 8″ & 6″ ERC on liquid and vapour lines (located on bunker vessel side) Vessel separation device and hose fall arrest system Manntek 8″ & 6″ ERC on liquid and vapour lines (located on bunker boom)		
Fenders:	3 x 4.5m diameter		
Propulsion & maneverability:	Diesel electric propulsion with azi thrusters and bow thruster		

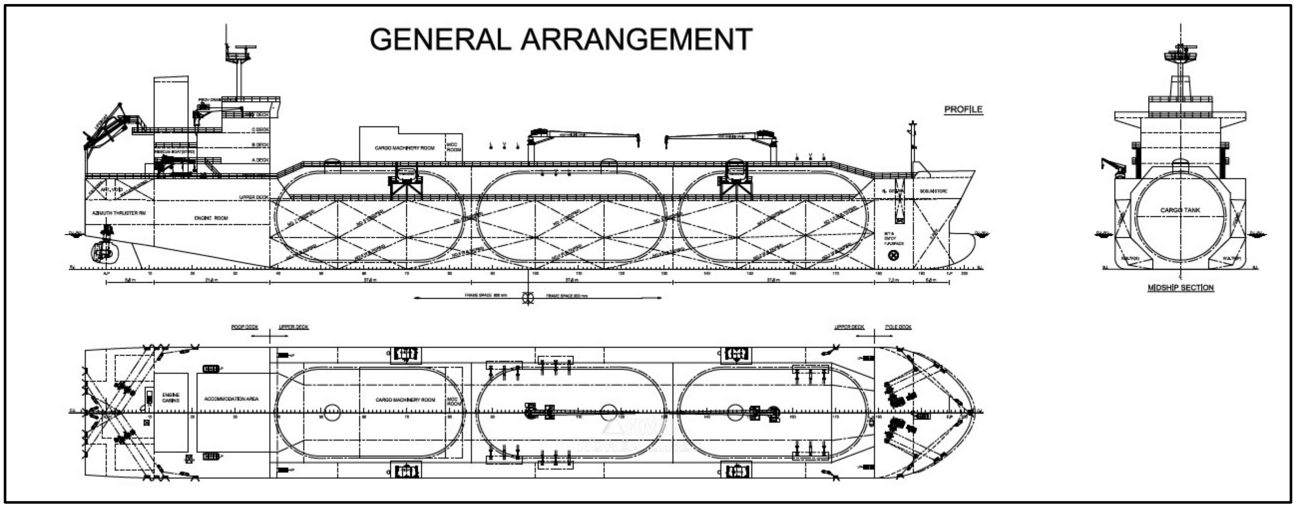
K.Lotus LNG Bunker Vessel – 2022

K.Lotus is under construction with Hyundai Mipo Dockyard (HMD) in Ulsan, South Korea and delivered in March 2022 to owner Korea Line Corporation (KLC). The bunker vessel will be technically operated by KLC's internal ship management company, KLCSM. The bunker vessel is available for worldwide deployment and is expected to initially operate in northwest Europe.

MAIN CHARACTERISTICS

Length Overall:	166.08m	Draft (loaded):	6.814
Breadth:	24.4m	Displacement (summer):	19,979 MT
Cargo Tanks:	3 Type-C x 6,000 m^3 (total gross 18,000 m^3)		
LNG Transfer:	Liquid: 2 x 8" (ANSI 150) 1,800 m^3/h Vapour: 8" (ANSI 150) 3 x 16.5m x 8" hose lengths	Bunker boom (JLA) and mid-ship manifolds on port and starboard	
BOG and Vapour Return Managment:	GCU 800(kg/h) and ALAT subcooler available along with normal onboard consumption and tank pressure build-up		
ESD Link:	Trelleborg: Fibre Optic, Electrical Plye National/Miyake connector, SIGTTO 5 pin and Pneumatic ESD		
Emergency Release System:	Arta 8" ERC on liquid and vapour lines (located on bunker vessel side) Vessel separation device and hose fall arrest system		
Fenders:	3 x 3.3m diameter X 4.5m length		
Propulsion & maneverability:	Diesel electric propulsion with two aft azimuth thrusters and bow thruster		

New Frontier 2 LNG Bunker Vessel – 2023



New Frontier 2 is under construction with Hyundai Mipo Dockyard (HMD) in Ulsan, South Korea and due for delivery in May 2023 to owner Pan-Ocean. The bunker vessel will be technically operated by Pan-Ocean. The bunker vessel is available for worldwide deployment and is expected to initially operate in Gulf of Mexico and has been designed to operate in US waters.

MAIN CHARACTERISTICS

Length Overall:	166.08m	Depth (mld)	12.9
Breadth:	24.4m	Draft (loaded):	6.814
GRT	18900 MT	Draft (ballast)	4.9
Displacement (summer):	19,979 MT		
Propulsion & maneverability:	Diesel electric propulsion with two aft azimuth thrusters and two bow thrusters		

LNG Containment and Bunker Transfer Systems

LNG Tank Configuration	3 x 6,000 m3	Total Capacity (100%)	18,000 m3
Tank Type	Spherical Type-C Tanks		
LNG Transfer System	Liquid: 2 x 8" (ANSI 150) , Vapour: 1 x 8" (ANSI 150)		
Bunker Rate (max)	1,800m3/hr	Crane Outreach	25.5 m
Hose Length	3 x 18m	ERS Type	KLAW 8"
ESD Link	Trelleborg: Fibre Optic, Electrical Plye National/Miyake connector, SIGTTO 5 pin and Pneumatic ESD		
Fendering	4 x pneumatic Yokohama	Fender Size (d x l)	3.3m x 4.5m
GCU capacity	1000(kg/h)	Subcooler	ALAT TBF-700

Marine LNG Measurement, Analysis and Calculation

Tank tables	Calibrated and certified tank tables
Metering	On-Line Metering CTMS
Gas Analyzer	Raman RXN4 Spectrometer

‘Gaudi’ 5k Project LNG Bunker Barge – 2022 (under construction)

The 5,000 m^3 bunker barge is being constructed by Armon Shipyard in Turkey and will be delivered to owner and technical operator Knutsen in 2022. The LNG bunker barge will operate out of Barcelona port primarily targeting cruise customers.

MAIN CHARACTERISTICS

Length Overall:	92.75m	Draft (loaded):	4.25m
Breadth:	16.90m	Displacement (summer):	TBD
Cargo Tanks:	2 Type-C bi-lobe x 2,500 m^3 (total gross 5,000 m^3)		
LNG Transfer:	Liquid: 8” (ANSI 150) 1,000 m^3/h Vapour: 6” (ANSI 150)	Mid-ship and aft manifolds on port and starboard	
BOG and Vapour Return Managment:	StirLNG subcoolers available along with normal onboard consumption and tank pressure build-up (vapour return to be assessed on case-by-case basis)		
ESD Link:	TBD		
Emergency Release System:	[vendor] 8” & 6” ERC on liquid and vapour lines (located on bunker vessel side) Vessel separation device and hose fall arrest system		
Fenders:	4 x 2.5 m diameter (adjustable)		
Propulsion & maneverability:	diesel electric propulsion with two aft azimuth thrusters and bow thruster		

Avenir Achievement LNG Bunker Vessel – 2022

Avenir Achievement is an LBV which was built my Nantong CIMC Sinopacific offshore and Engineering (CIMC SOE) and delivered in 2022. The vessel is under technical management to Avenir and will be on Charter to Shell in Q1 2023. The vessel is foreign going Ocean vessel and expected to operate in the Caribbean.

MAIN CHARACTERISTICS

Length Overall:	159.90m	Depth (mld)	16.74
Breadth:	24.0m	Draft (loaded):	8.10m
GRT	18360 MT	Draft (ballast)	
Displacement (summer):	19,979 MT		
Propulsion & maneverability:	Duel Fuel Diesel electric propulsion with twin CPP's, 1 stern and 1 bow thruster		

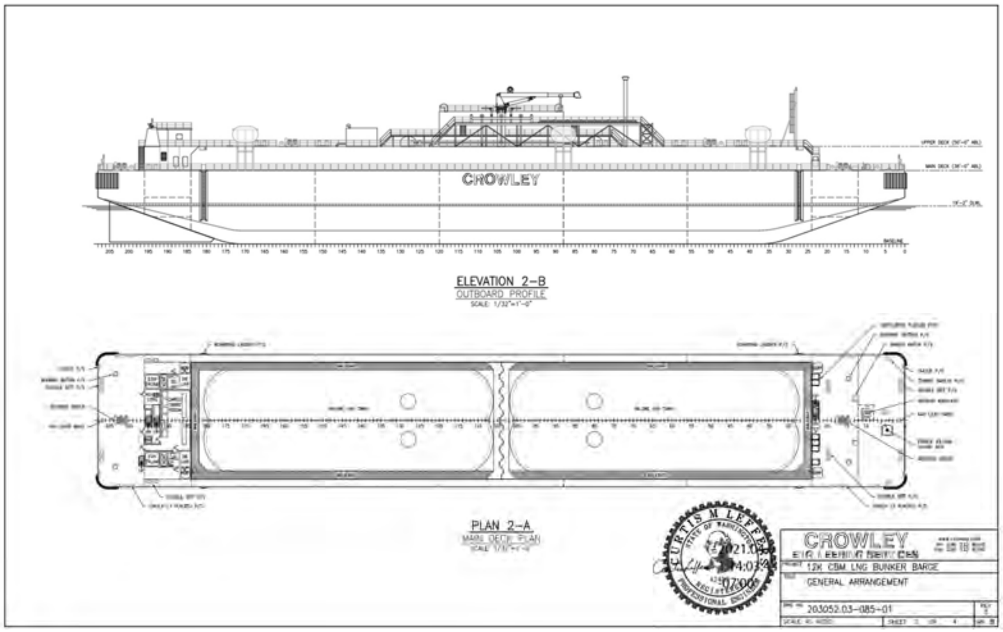
LNG Containment and Bunker Transfer Systems

LNG Tank Configuration	3 (2x 6000m3, 1x 7000m3)	Total Capacity (100%)	20,000 m3
Tank Type	Spherical Type-C Tanks		
LNG Transfer System	Liquid: 2 x 8" (ANSI 150) , Vapour: 1 x 8" (ANSI 150) (Midship and fwd manifolds)		
Bunker Rate (max)	1,800m3/hr	Crane Outreach	25.5 m
Hose Length	3 x 25m	ERS Type	KLAW 8"
ESD Link	Trelleborg: Fibre Optic, Electrical Plye National/Miyake connector, SIGTTO 5 pin and Pneumatic ESD		
Fendering	4 x pneumatic Yokohama	Fender Size (d x l)	3.3m x 4.5m
GCU capacity	1200(kg/h)	Subcooler	ALAT TBF-700

Marine LNG Measurement, Analysis and Calculation

Tank tables	Calibrated and certified tank tables
Metering	On-Line Metering CTMS
Gas Analyzer	Gas Chromatograph

CROWLEY 12K BARGE



Crowley's 12,000CBM barge is currently under construction in Fincantieri Bay shipyard and is due for delivery in Early 2024. This will be an unmanned barge with a dedicated tug for movements and is designed to load and operate in the Savannah river.

MAIN CHARACTERISTICS

Length Overall:	127.79m	Depth (mld)	11.58m
Breadth:	20.73m	Draft (loaded):	5.84m
GRT	TBC MT	Draft (ballast)	3.61m
Displacement (summer):	12,212 MT		
Propulsion & maneverability:	No propulsion on board (Dumb Barge)		

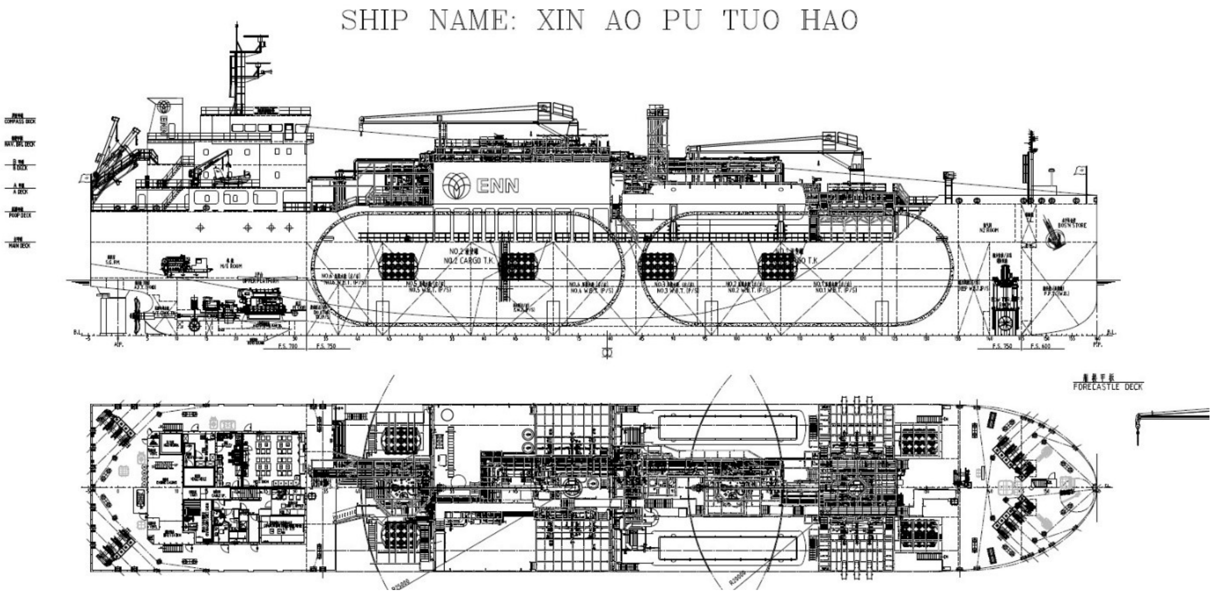
LNG Containment and Bunker Transfer Systems

LNG Tank Configuration	2x 6000m3	Total Capacity (100%)	12,000 m3
Tank Type	Bi-lobe Type-C Tanks		
LNG Transfer System	Liquid: 2 x 8" (ANSI 150) , Vapour: 1 x 8" (ANSI 150) (Midship Stbd side)		
Bunker Rate (max)	1,500m3/hr	Crane Outreach	60 feet
Hose Length	TBC	ERS Type	Manntek 8"
ESD Link	Trelleborg: Fibre Optic, Electrical Plye National/Miyake connector, SIGTTO 5 pin and Pneumatic ESD		
Fendering	3 x pneumatic Yokohama	Fender Size (d x l)	2.5m x 4.0m
GCU capacity	1,000kg/hr	Subcooler	ALAT TBF-700

Marine LNG Measurement, Analysis and Calculation

Tank tables	Calibrated and certified tank tables
Metering	On-Line Metering CTMS, Coriolis Flow meter
Gas Analyzer	Raman Spectrometer

XIN AO PU TUO HAO – 2022



Xin Ao Pu You Hao is under construction and due to be delivered later this year. The vessel is built in Dalian Shipbuilding Industry Co Lt.

MAIN CHARACTERISTICS

Length Overall:	119.3m	Depth (mld)	11.0m
Breadth:	19.8m	Draft (loaded):	6.5m
GRT	9,401 MT	Draft (ballast)	
Displacement (summer):	11,119 MT		
Propulsion & maneverability:	DF Diesel electric propulsion with one bow thruster		

LNG Containment and Bunker Transfer Systems

LNG Tank Configuration	2 x 4100m3	Total Capacity (100%)	8,200 m3
Tank Type	Spherical Type-C Tanks		
LNG Transfer System	Liquid: 2 x 12" (DN 300), Vapour: 1 x 10" (DN 250) - Midship Liquid: 2 x 8" (DN 200), Vapour: 1 x 8" (DN 200) – Forward (ANSI spool pieces available)		
Bunker Rate (max)	1,500m3/hr	Crane Outreach	10.1m (F) 15.1m (M)
Hose Length	8" x 20m	ERS Type	Manntek
ESD Link	Trelleborg: Fibre Optic, Electrical Plye National		
Fendering	4 x pneumatic Yokohama	Fender Size (d x l)	3.3m x 4.5m
GCU capacity	1200(kg/h)	Subcooler	ALAT TBF-1050

Marine LNG Measurement, Analysis and Calculation

Tank tables	Calibrated and certified tank tables
Metering	On-Line Metering CTMS & Coriolis
Gas Analyzer	TBC

Appendix 4: iQuay System

Background
To enable LNG import into New Providence, Bahamas in 2024, it was decided to lease or buy the existing iQuay system La Santa Maria from ECOnnect.

Figure 1: iQuay C-class of transfer by ECONNECT (Courtesy ECONNECT)

Objectives
This document provides the overview of risks and mitigations for application of LSM at Clifton Pier. This document uses as basis the Technical Screening for the iQuay C-Class SRN-05745 which was based on the initial review that was performed of the system in 2021 led by Christophe T'Joen.

Abbreviations

Abbreviation	**Full form**
CAPEX	CAPital EXpenditure
CBM	Conventional Buoy Mooring also known as MBM
C&E	Cause and Effect
ESD	Emergency Shutdown
ERC	Emergency Release Coupler

HAZOP	Hazard and Operability
LNG	Liquified Natural Gas
LNGC	Liquified Natural Gas Carrier
LOPA	Layers of Protection Analysis
MBM	Multiple Buoy Mooring
OPEX	OPerational EXpenditure
P&ID	Piping and Instrumentation Diagram
PFS	Process Flow Scheme
RAM	Risk Assessment Matrix
SIF	Safety Instrumented Function
SIL	Safety Integrity Level
SOW	Scope of Work
SSL	Ship to Shore Link
STS	Ship to Ship Transfer
UTS	Universal Transfer System

Terminology
The following terminology is applied:

- ECONNECT – name of the company
- iQuay C-Class – It is used to describe the jettyless LNG transfer solution comprising of a floating platform with cryogenic aerial hoses and cryogenic submerged or floating hoses. It has a vacuum mooring system to moor it to an LNGC. For the purpose of this document, it is shortened to iQuay
- LSM – La Santa Maria, the name of the existing iQuay

Overall System Description
iQuay is jettyless LNG transfer system which consists of a floating semi-submersible structure along with cryogenic aerial hoses and cryogenic floating or submerged hoses. It provides normally un-manned floating LNG transfer capability.

For offloading of LNG, the platform with hoses is moved into position using tugboats. Once in place, it connects to the LNGC through vacuum mooring system. iQuay manifold, cargo headers and hoses are cooled down prior to starting LNG transfer. Aerial hoses are used to transfer LNG between the vessel and the iQuay manifold.

Floating hoses are used for transfer of LNG from iQuay manifold to shore. After the LNG transfer is completed, LNG in both aerial and floating hoses is displaced and these hoses are purged. After the purging is complete, aerial hoses are warmed up in preparation of the disconnection. Once the aerial hoses are completely purged and warmed up, they are disconnected from the iQuay and iQuay is disconnected from LNGC and LNGC is free to depart.

iQuay is powered from shore through a floating power cable which also provides a signal interface to the shore side control room.

A top view of the floating platform LSM for iQuay system is shown in Figure 2.

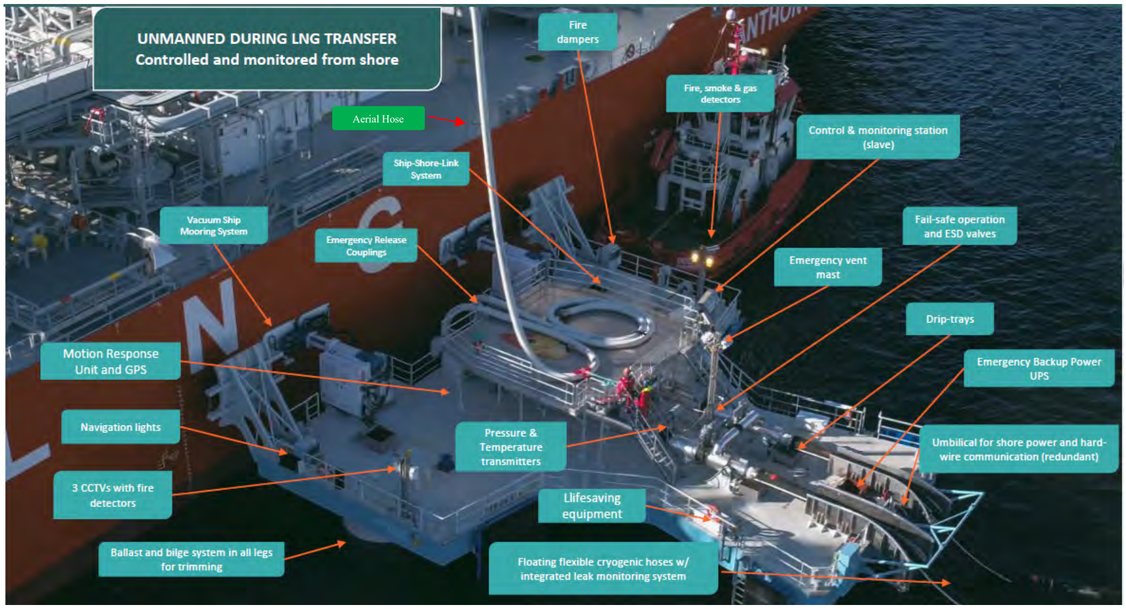


Figure 2: Top view of iQuay platform (Courtesy ECONNECT)

Transfer system - iQuay
iQuay floating structure is a tripod semi-submersible hull concept intended to provide buoyancy while still reducing iQuay motions. iQuay response and motion analysis before connecting to an LNGC have not been analysed in detail by Shell and the sea state in which the system can operate needs to be clarified / analysed on a project per project basis.

iQuay may be susceptible to specific wave height / period combinations but is mainly unmanned during its use. So only during (dis)embarking and equipment handling is motion of iQuay a concern; once connected to the LNGC, the motion becomes a combined body problem in which the LNGC dominates any response to sea state.

The top deck of the platform shows the equipment to connect the typical Gutteling LNG aerial transfer hoses (refer Figure 2). On the lower deck, LNG piping, valves and associated safeguarding equipment can be found. This lower deck also presents the connection towards the floating hoses. The piping system is designed to allow for various operation modes including purging and draining of the aerial and floating hoses separately.

The submersible platform with floating hose to shore can be seen in Figure 3 below.

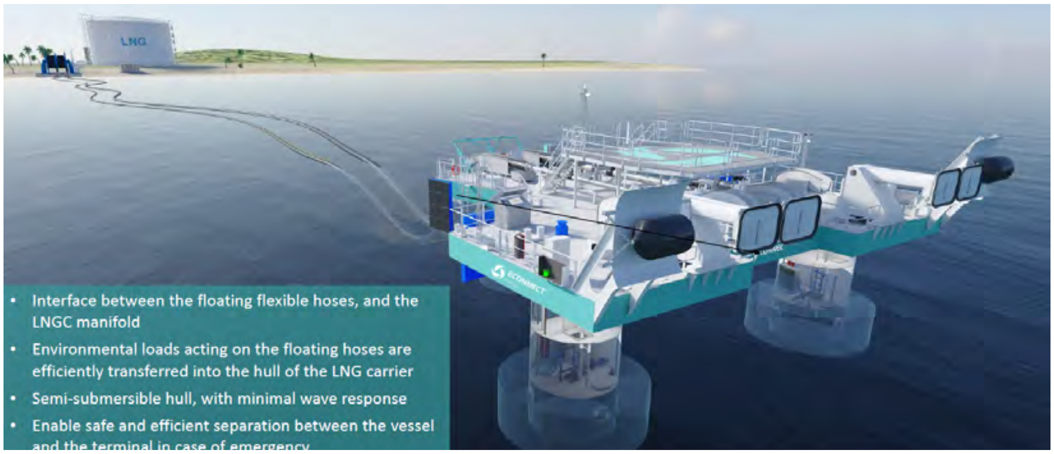


Figure 3: Submersible Platform with floating hoses to shore (Courtesy ECONNECT)

Mooring system at Clifton Pier
To complete the concept, a mooring system is required for the LNGC. The Conventional Buoy Mooring System (CBM) mooring system is selected for application at Clifton Pier. Key reason for this selection is the fact that use can be made of the existing CBM system and existing permitting.

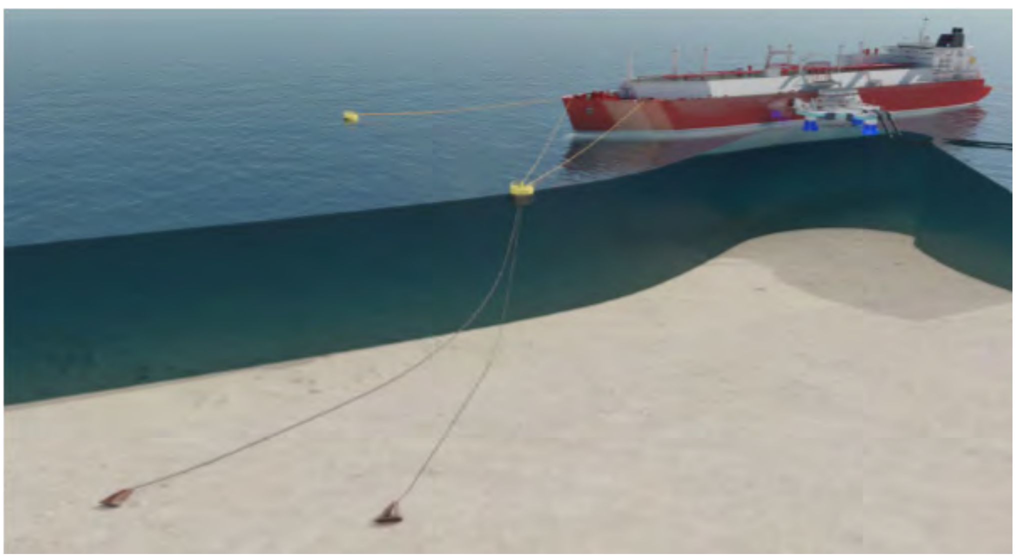


Figure 4: Conventional Buoy Mooring System (CBM) or Multi Buoy Mooring System (MBM)

Appendix 5: LNG Storage Tanks Specifications

Document Title : **Technical Specification For 1350cbm LNG Land Tank**

Document No : **CLNG-ENG-SPE-6500**

Equipment : **LNG LAND TANK**

A	2024-2-13	Issued for RFQ	ZRJ	SDW	SDW
R	Date	Description	Prepared	Checked	Approved

C-LNG

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C-LNG

1. General

This technical specification covers 6+12(option) LNG land tanks.

The delivered tanks shall comply with this document and ASME.

This technical specification covers steel plates for LNG land tanks. The following SS304 stainless steel shall be used for tank plates. SS304 acc. to ASME II A SA240.

1.1 Design condition

Tank Inner geometric volume includes dome @ ambient temperature (Calculated)	1350 m^3/per tank
No. of tanks	6+12(option)
Tank shape	Cylinder
Design pressure	5.6 bar g
Tank design external pressure	0.3 bar (approximately)
Min. LNG design temperature	-165 ℃
Density for tank structural design	700 kg/m^3
Tank material	Stainless steel ASME II A240-304 grade
Rules	ASME
Additional requirement	ASME U stamp
Tank welds	100% X-rayed

1.2 Classification, Rule& Regulations to be applied

- ASME Boiler and Pressure Vessel Code Section VIII-1 or VIII-2

- The tanks are to be designed and constructed in accordance with ASME Boiler and Pressure Vessel Code Section VIII-1 with U stamp.

2. Basic data

2.1 General

The information of tanks are as follows:

	LNG Land Tank
Quantity	6+12(option)
Type	Single wall
Tank Shape	Cylindrical
Heads	Dish Head
Diameter [mm] inside	8500
Total length [mm] inside	25400
Geometric volume includes dome [m^3] abt.	1350
Boil Off Rate [%/day]/LNG	≤0.383
Holding time (LNG fuel): day	≧15
Maximum filling level	92%

2.2 Tank structure

LNG land tank is insulated and equipped with one (1) dome on the top and two (2) sumps at the bottom. Stiffen rings and anti-sloshing plate are arranged inside the tank.

2.3 Tank Foundations

To ensure free movement of the tanks due to temperature changes, one support is to be designed as a fixed bearing and the other as a slide bearing. The supports are equipped with special impregnated and laminated press wood. For the slide bearing, wooden blocks are installed on tank side as well on ship side. Stainless steel sheets are installed between the wood blocks.

2.4 Tank Insulation

The outer surface of the tanks is to be insulated with polymeric coating. Outer surface of foam insulation to be protected with polymeric coating (FRP or equal). The outside surface of insulation shall be sprayed with paint and logo that are specified by C-LNG.

The insulation thickness shall base on holding time calculation results. The requirement of holding time is that tank inner pressure reaching the LNG tank set point of 4.4 bar g for 15 days with no engines or boiler in operation-- minimum 380mm thick.

Data for tank insulation

λ -value	~0.023 W/m ℃
Thickness	⩾350 mm
Foam density	~ 40 kg/m^3
B.O.R.(filling 92%) /LNG	⩽ 0.383 %/day

NOTE:

Detailed insulation calculation including B.O.R and holding time to be made by insulation maker.

2.4 Tank Internal Ladder

Ladder and platform are arranged in the tank.

2.5 Tank Filling Limit Curves and Calibration Tables

Curves showing the maximum allowable filling limits are to be supplied by C-LNG. Parameters for the curves are the set pressure for the fuel tank safety relief valve and corresponding reference temperature for the cargo.

Calibration of the tank will be carried out by Computer calculations based on as-built measurements. Level/volume tables will be supplied which also include correction factors for temperature, pressure and density. The calibration will be carried out by a sworn society such as SGS.

The calibration tables will cover:

level/volume on even keel

temperature correction tables for temperature range -165°C to +45°C for level gauge correction and tank shell correction

2.6 Maker List of Main Material

No.	Main Material	Maker or Brand
1	304 Steel Plate	TISCO
2	Welding Consumables	TIENTAI, Gintune, EASB
3	Wooded Block	Dehonit, Roechling, RANCAN
4	Insulation	Ti Marine, Passer Lanyu, FINETEC, Nantong GMS, CoolTech
5	Mastic	ITW USA, Jinmao

2.6.1. Materials of plates, forgings shall meet ASME requirement.

2.7 Fabrication basic requirement

Tanks shall be fully welded and completed, including all tests and evidences required by the ASME.

Dome: The wall thickness the basic drawings are minimum wall thicknesses.

Sump: Complete draining of cargo towards the sump must be guaranteed.

Ladders and platform: Each tank shall be equipped with ladders and platform.

Externals and internals: The tank lifting lugs shall be designed to satisfy the tank manufacturer lifting capability.

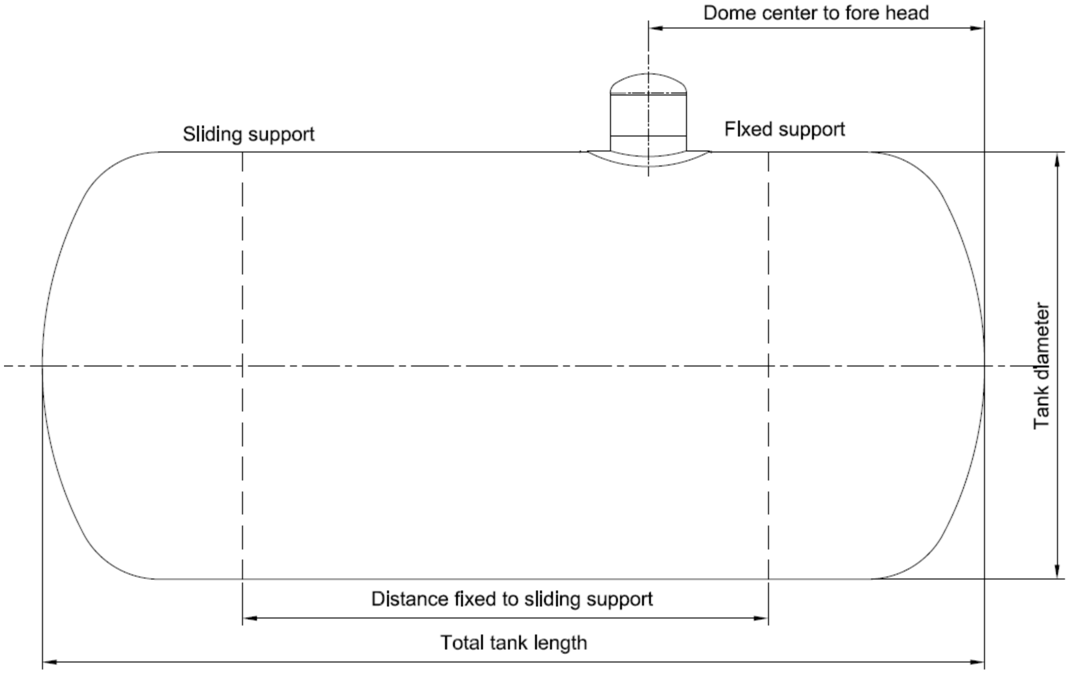
Doubling plates (pads) shall be invariably placed where steel structures are welded to tank shell. Internal bolts and nuts must be secured by means of tack welds.

After tank construction finished, dry the tank completely by means of dry air.

2.8 Structure overall tolerance

Tolerances of tank dimensions in accordance with qualified drawings shall be decided.

- Tank diameter +15mm/-0 mm
- Dome center to fore head ± 20mm
- Total tank length +40mm /- 0 mm
- Distance fixed to sliding support ± 10 mm
- Positions of saddle supports (Deviation from 90° angle, perpendicular to saddle length):
- Fixed support ± 5 mm
- Sliding support ± 10 mm
- The shape and the dimension of the ship foundation have to be confirmed that shall be in accordance with the tank out-roundness and tolerance.



2.9 Tanks Finishing and delivery

2.9.1 General

1). The surface treatment prior to insulation is performed according to supplier's procedure. Any action should not cause corrosion on tank.

2). The surfaces have to be smooth and clean without any grinding/welding residuals.

3). The fuel tanks shall be clean, dry, without grease, rust and mill scale and free from residues of welding and fabrication, ready to receive cargoes and prepared for storage and transportation.

4). After pressure test & draining, dry the tank and fill the tank with 0.5barg of dry air at humidity 30% (at 15℃), then immediately seal the tank.

5). Related documentation and ASME certificates shall be handed over.

2.9.2 Final documents list (with date)

The final documentation consists of:

1	Material certificates	D+4
2	Calibration tables by third party	D+4
3	Certificates of internal condition (cleanness, dryness, air humidity)	D+4
4	Certificates of ASME U	D+4

Legend

D	Date of tank delivery	D + X	X weeks after tank deliver

Note: Tank to be loaded out from fabrication yard and transported to conversion yard by barge, to be witnessed by third party safety survey for load out, lifting, lashing and transportation including procedure. Third party shall be approved by C-LNG and vendor.

Appendix 6: 2020 Geosyntec Pre-Construction Environmental Survey

Pre-Construction Environmental Survey

SHELL GREENFIELD PROPERTY
CLIFTON PIER AREA | NASSAU, THE BAHAMAS

Prepared by:

Geosyntec
(Bahamas) Limited

Prepared for:

Geosyntec
(bahamas) limited

PRE-CONSTRUCTION ENVIRONMENTAL SURVEY

Shell Greenfield Property

Clifton Pier Area
Nassau, The Bahamas

Prepared for

Shell Global Solutions (US), Inc.
3333 Highway 6 South, R-2
Houston, TX 77082

Prepared by

Geosyntec Consultants

& Geosyntec (Bahamas) Limited

Project PH0249

August 2020

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APPENDICES

1. INTRODUCTION

Geosyntec (Bahamas) Limited and Geosyntec Consultants, Inc. (Geosyntec) have prepared this Report of Findings (ROF) on behalf of Shell Global Solutions (US), Inc. (Shell) to describe the methods and results of the pre-construction environmental survey near the Bahamas Power and Light (BPL) Clifton Pier Power Station (CPPS). The environmental survey included soil sampling, soil vapor (SV) sampling, and ambient air sampling. The results will be used to address human health exposure concerns during the construction and full-time operation of a Liquified Natural Gas terminal and regasification process facility and pipeline on multiple properties in the Clifton Pier area. The pre-construction environmental activities discussed in this report were conducted on a Greenfield area located adjacent to the CPPS property (the “Site”) (**Figure 1**).The proposed natural gas pipeline will run from the Greenfield property to the BPL property (designated as the Brownfield property).

The site is located within the Clifton Pier industrial region of New Providence Island in The Bahamas. Neighboring properties include bulk oil storage facilities, a power plant, and other industrial facilities. Due to decades of industrial operations and fossil fuel storage and use, historical environmental issues in some parts of the Clifton Pier industrial region include hydrocarbon impacts in soil and groundwater (including free-phase oil). Air quality issues may be present in the region due to discharges to the atmosphere from current neighboring industrial use.

1.1 Purpose and Objectives

The purpose of this ROF is as follows:

- present the methodology used for collecting the soil samples, SV samples and ambient air samples;
- present and document the results of surface, shallow and deep soil sampling;
- present and document the results of soil vapor and headspace sampling;
- present and document the results of ambient air monitoring; and
- describe the conceptual components of any recommended remedial actions, including conceptual remediation approaches, engineering controls, and institutional controls.

1.2 Applicable Screening Levels

Monitoring and analytical data obtained during the field investigation were compared to the following regulatory standards

- Florida Department of Environmental Protection (FLDEP) Direct Contact for Industrial (DCI) standards will be used as a comparison to evaluate soil quality;
- United States Department of Environmental Protection (EPA) 2018 Drinking Water Standards will be used as a comparison to evaluate groundwater quality;
- USEPA Vapor Intrusion Screening Levels (VISLs) will be used to evaluate near-source soil gas;

- USEPA Industrial Air Regional Screening Levels (RSLs), California Division of Occupational Safety and Health (Cal/OSHA) 8-hour Time Weighted Average (TWA) Permissible Exposure Limits (PELs), American Conference of Governmental Industrial Hygienists (ACGIH®) 2020 Threshold Limit Values (TLVs®) 8-hour time weighted averages (TWAs), and Shell internal Occupational Exposure Limits (OELs) will be used as a comparison to evaluate the ambient air monitoring.

2. BACKGROUND AND SITE HISTORY

2.1 History and Site Use

The Site is located approximately 0.25 miles east of the BPL CPPS in an area of industrial development in the southwest corner of New Providence Island. The local industrial area consists of multiple industrial properties which have stored large quantities of heavy fuel oil. Between the Site and the BPL CPPS is a property owned by Sun Oil Limited. To the east of the Site is the Commonwealth Brewery. The Site is currently unoccupied and wooded, with the exception of some pre-construction clearing, and does not appear to have been used for industrial purposes in the past. In the future, the Site will include a natural gas jetty and associated trestle with pipeline running to shore, a natural gas terminal and regassification processing facility, and a pipeline to transport natural gas from the processing facility on the Greenfield to a new power generation station on the Brownfield property.

2.2 Regional Geology

The geology of New Providence Island was described in detail in the *Site Characterization, Conceptual Site Model* (CH2M, 2018). Geology is generally composed of young subtidal and eolian carbonate rock deposits lithified near the surface overlying reefal limestone. Sea level change has alternately flooded and exposed the Bahamian platforms, subjecting them to cycles of carbonate deposition and dissolution. The uppermost geologic unit consists of eolian carbonates that were formed as windblown dunes. These eolian deposits are characterized by relatively well sorted, fine-grained oolitic sands and large-scale cross-bedding. The eolian deposits overlie subtidal carbonates, which are characterized by cross-bedded oolitic sands, shells and shell fragments, and root structures, which can be seen in the cliff face along Clifton Bay. These subtidal deposits, formed at or just below sea level, are present above current mean sea level (msl). Below the younger subtidal deposits, a competent reefal limestone is present between 35 feet and 75 feet below ground surface (bgs).

2.3 Regional Hydrogeology

Hydrogeology information at the nearby BPL CPPS property was obtained from gauging 57 wells during CH2M's Site characterization in 2018. It is assumed that hydrogeology at the Site is similar to that at BPL CPPS. Groundwater is encountered within the shallow carbonate deposits typically at elevations ranging from approximately -6 feet to 6 feet relative to msl. The following general observations were ascertained from the significant groundwater level data collected at the CPPS site:

- Groundwater farther inland tends to be higher than sea level. Near the cliffs along Clifton Bay, groundwater elevations are closer to sea level, indicating a general condition of groundwater discharge to the ocean.
- The carbonate rocks create different water-flow dynamics due to caves and voids (karst features). Although groundwater eventually flows into Clifton Bay, the pathway that the groundwater takes to get there is complex and generally is not expected to be linear.

2.4 Regional Environmental Conditions

Environmental conditions in the region were documented in the *Preliminary Activities Summary Report* (CH2M, 2016), which was prepared on behalf of the Bahamas Ministry of Environment. The report indicates that light non-aqueous phase liquid (LNAPL) has been observed in the subsurface at and near the BPL CPPS. However, there is no existing data regarding the environmental conditions at the Greenfield property. The data collected in March 2020 by Geosyntec and described in this report will serve as the baseline data for establishing environmental conditions. Other nearby neighboring facilities, including bulk oil storage and industrial operations, also have potential sources of atmospheric air discharges and potential subsurface contaminants in soil and groundwater. Many industrial facilities have utilized subsurface disposal wells over the years.

3. ENVIRONMENTAL SURVEY

3.1 Environmental Survey Methodology

Geosyntec conducted sampling activities in March 2020. Details of these investigation activities are provided below.

3.1.1 Surface Soil Sampling

On March 16, 2020 Geosyntec collected four surficial soil samples (G-SS-01 through G-SS-04) on the Greenfield property. The soil samples were collected from 0 to 0.5 feet below ground surface (ft bgs) using a shovel. Soil samples were placed into a bag and sealed to allow for soil vapor headspace measurements using a photo ionization detector (PID). A grab sample for volatile organic compounds (VOCs) via method 8260 was collected and the soil was then composited for the laboratory analysis of:

- Semi-volatile organic compounds (SVOCs), including polycyclic aromatic hydrocarbons (PAHs) via method 8270D;
- pesticides via method 8081;
- Resource Conservation and Recovery Act (RCRA) 8 metals including copper via method 6010D;
- total petroleum hydrocarbons (TPH) via method FLPRO;
- mercury via method 7471A; and
- percent moisture.

Samples were placed on ice and shipped under proper chain of custody procedures to Test America in Tampa, Florida.

3.1.2 Shallow Soil Sampling

On March 19, 2020, Geosyntec supervised the advancement of four shallow soil borings (G-SB-01 and G-SB-02 on the Greenfield property, and P-SB-04 and P-SB-05 along the pipeline route).The soil borings were drilled by Sentinel Drilling Specialists (Sentinel Drilling), a local driller who has performed significant drilling in the Clifton Pier area. Prior to drilling activities, utilities in the roadway were located and marked. Based on this information, the pipeline route soil borings (P-SB-04 and P-SB-05) were shifted north in order to be safely drilled outside of the utilities. The shallow soil borings were advanced to a depth of 6 ft bgs or refusal, whichever was encountered first. Sentinel Drilling utilized a truck-mounted rig with augers to advance 1-ft intervals at a time. After each 1-ft interval was advanced, the augers were removed from the ground and material was collected directly from the augers and placed into plastic bags. At soil boring P-SB-04, refusal was encountered at 2 ft bgs due to large rocks which were moved there during recent clearing activities. Sentinel Drilling moved to alternate locations on three attempts but encountered the same issue each time, therefore, deeper intervals were not drilled. At soil boring P-SB-05, refusal was encountered at a depth of 5 ft bgs, so a 5-6 ft sample interval was not collected.

Rock was encountered throughout the extent of drilling. There was normally no more than a thin veneer of surficial sand or soil in some locations, but typically rock outcrops characterized the ground surface. Competent rock was drilled, and the rock was ground by the augers. Therefore, the material that was brought to the surface was sand-like in nature. Soil boring logs are presented in **Appendix A** and it should be noted that while “sand” was observed in the cuttings and “sand” was placed in bags for screening and soil sampling, the formation of sand is a result of the grinding and drilling of the rock.

The soil samples were logged and the head space in each bag was screened using a PID. Soil samples were collected for laboratory analyses from the 0-1 ft soil boring interval of each boring location, as well as the deeper interval with the highest PID reading Once the deeper interval was selected for sampling, based on the PID readings, a grab sample for VOCs via method 8260 was collected. The soil was then composited for the laboratory analysis of:

- SVOCs including PAHs via method 8270D;
- pesticides via method 8081;
- RCRA 8 metals including copper via method 6010D;
- mercury via method 7471A;
- TPH via method FLPRO;
- polychlorinated biphenyls (PCBs) via method 8082A (the 0-1 ft interval of the pipeline soil borings only); and
- percent moisture.

Samples from the deeper interval were held for analysis of pesticides, metals and mercury i.e. samples were collected, but the analysis was not run unless samples from shallower intervals warranted deeper analyses. Total TPH was analyzed for all samples, and detailed fractionation sampling via method TPHCWG was also held. Fractionation was only run on select samples based on the total TPH concentration. Samples were placed on ice and shipped under proper chain of custody procedures to Test America in Tampa, Florida. Following sampling, excess borehole cuttings/material was placed back into the borehole from which the sample was collected.

3.1.3 Deep Soil Sampling

On March 19, 2020, Geosyntec oversaw the advancement of one deep soil boring (G-DB-01), drilled by Sentinel Drilling. The deep soil boring was advanced until to the interval where groundwater was observed, which was 30 ft bgs. Sentinel Drilling used augers on a truck-mounted rig to drill the following discrete intervals: 0-1 ft bgs, 1-5 ft bgs, 5-10 ft bgs, 10-15 ft bgs, 15-20 ft bgs and 25-30 ft bgs. After each of the specified intervals was drilled, the augers were removed from the borehole, and material was collected directly from the augers and placed into plastic bags for headspace measurements via the PID. Rock was encountered throughout the drill interval, from ground surface to the total depth of the boring.

Soil samples were logged and the head space in each bag was screened using a PID. Soil boring logs are presented in **Appendix A**. Analytical samples were collected from the 0-1 ft interval of each soil boring location, as well as two deeper intervals with the highest PID readings. Once the deeper intervals were selected for sampling, based on the PID readings, a grab sample for VOCs via method 8260 was collected. The soil was then composited for the laboratory analysis of:

- SVOCs including PAHs via method 8270D;
- pesticides via method 8081;
- RCRA 8 metals including copper via method 6010D;
- mercury via method 7471A;
- TPH via method FLPRO; and
- percent moisture.

A duplicate sample was collected from soil boring G-DB-01 at the 25-30 ft sample depth. Soil samples from the deeper intervals were held for pesticides, metals and mercury. Total TPH was analyzed for all soil samples, and detailed fractionation sampling via TPHCWG was also held. Samples were placed on ice and shipped under proper chain of custody procedures to Test America in Tampa, Florida. Following sampling, excess borehole cuttings/material was placed back into the borehole from which the sample was collected.

3.1.4 Groundwater Sampling

After installation of the deep soil boring, Geosyntec collected a depth to water reading. Water was encountered at 24.10 ft bgs, verifying that there was adequate water column to collect a groundwater sample. Geosyntec collected the groundwater sample with a field-constructed bailer. No oil, LNAPL or vapors were encountered during gauging or sampling. Groundwater was sampled for the laboratory analysis of:

- VOCs via method 8260,
- SVOCs including PAHs via method 8270D;
- RCRA 8 metals including copper via method 6010D;
- mercury via method 7471A; and
- TPH via method FLPRO.

Groundwater sample containers were placed on ice and shipped under proper chain of custody procedures to Test America in Tampa, Florida.

3.1.5 Soil Vapor Sampling

On March 19, 2020, Geosyntec collected a soil vapor (SV) sample from one location. A sample was collected from shallow soil boring G-SB-02, in which a soil vapor sampling probe (SVSP) was installed by Geosyntec and Sentinel Drilling. The SV sample was collected for laboratory analysis of VOCs, including naphthalene, via method TO-15. SV samples were collected as described below:

- A vacuum shut-in test was completed to assess whether there were leaks in the aboveground fittings of the sample train. A vacuum of approximately 20 inches of water column (in-H_2O) was applied to the lines, and then valves at both ends were shut to seal in the vacuum. The vacuum was then monitored for at least one minute, and if visible change in vacuum was observed, the fittings were tightened, and the test was repeated. The shut-in tests passed, eliminating the likelihood of leaks between the fittings.

- A pneumatic test was then conducted to obtain flow rate and vacuum readings. These readings are used to estimate the permeability of the geologic materials surrounding the SVSP.

- The SVSP was purged using the lung box. The purged SV filled a Tedlar sample bag, and the Tedlar bag was field-screened for oxygen (O_2), carbon dioxide (CO_2), and methane (CH_4) using a landfill gas meter, and total VOCs using a PID. The field screening was conducted to characterize SV before collecting samples for laboratory analysis. SV samples were collected after the O_2, CO_2, CH_4, and VOC readings stabilized.

- SV laboratory analytical samples were collected in batch-certified 1-L Summa™ canisters. To document that the canister did not leak during shipment from the laboratory, the initial vacuum in the canisters was measured and recorded before being used. Once sampling was complete, the final vacuum was also measured and recorded on both the

field forms and the laboratory identification label. At sampling location G-SB-02, the Summa™ canisters were equipped with 5-micrometer (µm) filters and laboratory calibrated and certified 200-mL/min flow controllers.

- The Summa™ canisters were shipped to Test America in Tampa, Florida at ambient temperature under chain-of-custody control. Upon receipt of the canisters at the laboratory, the vacuum was measured again to ensure that the canister did not leak during shipment.
- A final shut-in test was conducted by Geosyntec to retest for leaks in the sampling train.
- At the completion of SV sampling, the SVSP was removed from the ground. Immediately thereafter, hydrating cement was used to backfill the hole.

3.1.6 Ambient Air Monitoring

On March 19, 2020, Geosyntec conducted above-ground ambient air monitoring at two locations (G-AM-01 and G-AM-02). The purpose of the above-ground ambient air monitoring was to assess background levels of Site contaminants of interest (COIs).

Ambient air monitoring included qualitative continuous air monitoring using a PID and Dustrak for VOCs and PM10 dust, respectively, and quantitative sampling for laboratory analysis. The dust monitors and PID were set to automatically log data for the entire time that ambient air sampling occurred. Once air monitoring was completed for the day, the data was downloaded to a laptop with ProRAE Studio II and TrakPro.

Quantitative samples were collected using an air pump connected to a laboratory-provided filter. Samples were analyzed for:

- PCBs (PM10) via method TO-10A;
- RCRA 8 metals and copper via method 7300; and
- mercury via method 6009.

For PCBs and RCRA metals/copper, filters were connected to a SKC Leland Legacy pump and set to a flow rate between 2.5 and 3.5 liters per minute (L/min). For mercury, filters were connected to a Gilian GilAir pump and set to a flow rate between 0.17 and 0.20 L/min. The calibration and operating procedures used for the quantitative sampling were specific to the instrument used. Each pump ran for at least 7.5 hours. After the quantitative samples were collected, the filters were sealed with laboratory-provided caps and labeled with the location ID, start time, stop time, and sampler initials. The total volume of air that passed through the filters during the sample period was calculated and provided on the chain of custody. The filters were submitted via proper chain of custody procedure for laboratory analysis.

Quantitative samples for VOCs were collected at each location using a batch-certified 1-L Summa™ canister equipped with an 8-hr flow controller. Each Summa™ canister was filled to a

final field-measured vacuum of approximately 5 inches of mercury (in Hg) over the course of 7.5 hours with the exception of the VOC sample collected at G-AM-02. At G-AM-02 the initial Summa™ flow controller failed and the residual vacuum in the canister was measured at zero. Therefore, an additional sample was collected for at least 5 hours. To document that the canister did not leak during shipment from the laboratory, the initial vacuum in the canisters was measured and recorded before being used. Once sampling was complete, the final vacuum was also measured and recorded on both the field forms and the laboratory identification label.

Local weather data from Bahamas international airport will be used to perform data analysis.

3.2 Environmental Survey Results

Details of the March 2020 field investigation and sampling program are provided below.

3.2.1 Surface Soil Sampling

Analytical results for the surface soil samples collected in March 2020 are shown in **Table 1** and summarized below:

- Surface sample PID screening measurements ranged from 2 parts per million (ppm) to 10 ppm. The highest PID reading (10 ppm) was at location G-SS-01 (**Figure 1**).
- Concentrations of metals, including arsenic, selenium, barium, cadmium, chromium, copper, lead mercury, are below DCI standards in surface samples.
- TPH concentrations in surface samples ranged from 230 mg/kg to 1100 mg/kg and are all below the DCI standard. The results were analyzed outside of hold time and were thus qualified in the reporting. TPH speciation was completed for the samples with the two highest TPH readings, at sampling locations G-SS-01 and G-SS-02. All TPH speciation results were non-detect for the individual TPH ranges. This is likely because:
    - Several different hydrocarbons could present at concentrations below the detection limit.
    - Hydrocarbons in the C35-C40 range could be present, which could not be measured by the speciation method.
    - The laboratory control sample (LCS) and matrix spike/matrix spike duplicate (MS/MSD) recovery were outside the acceptable limits during the speciation tests. Besides the analyses outside of hold time, no analytical or quality issues were noted for the combined TPH analysis.

  To evaluate whether the bulk TPH concentrations or speciated TPH concentrations are more representative of the soil, Geosyntec recommends the collection of additional samples and additional TPH speciation.

- Pesticides were not detected in surface samples.
- VOCs were not detected in surface samples.
- SVOCs were not detected in surface samples.

3.2.2 Shallow Soil Sampling

Analytical results for the shallow soil samples collected in March 2020 are shown in **Table 2** and summarized below:

- PID values in shallow soil head space samples ranged from 1 ppm to 14 ppm. The highest PID reading (14 ppm) was at location P-SB-05 in the 0-1 ft interval.
- Concentrations of metals, including arsenic, barium, cadmium, chromium, copper, lead and mercury were below the DCI standards at all shallow sampling locations.
- TPH concentrations in shallow samples ranged from not detected to 200 mg/kg and were all below the DCI standard. TPH speciation was completed for the sample with the highest TPH reading, P-SB-04-0-1, and indicated that all individual TPH ranges were not detected. The rational for the non-detect individual TPH results are the same as those listed above.
- Pesticides were not detected in shallow samples.
- PCBs were not detected in shallow samples.
- VOCs were not detected in shallow samples.
- SVOCs were not detected in shallow samples.

3.2.3 Deep Soil Sampling

Analytical results for deep soil samples collected in March 2020 are shown in **Table 3** and summarized below:

- PID values from the deep boring ranged from 2 ppm to 27 ppm. The highest PID reading (27 ppm) was collected from soil boring G-DB-01 at the 0-1 ft interval.
- Concentration of metals including arsenic, barium, cadmium, chromium, copper, lead and mercury were below the DCI standards.

- TPH concentrations in the deep soil samples ranged from not detected to 20 mg/kg and were below the DCI standard.
- Pesticides were not detected in deep samples.
- VOCs were not detected in deep samples.
- SVOCs were not detected in deep samples

3.2.4 Groundwater Sampling

Analytical results for samples collected in March 2020 are shown in **Table 4** and summarized below:

- Concentrations of metals, including arsenic, barium, cadmium, chromium and copper were below the drinking water standards.
- TPH was not detected in the groundwater sample.
- VOCs were not detected in groundwater sample.
- SVOCs were not detected in groundwater sample.

3.2.5 Soil Vapor Sampling

Permeabilities calculated based on pneumatic testing results indicate that the soils are consistent with a limestone formation. These permeable subsurface conditions allowed for soil vapor sampling to be conducted without any restrictions or limitations to the flow rate and purging volume. The results of the pneumatic testing are summarized in **Table 5.**

The soil vapor oxygen (O_2) measurements ranged from 20.3 to 21.3 percent. Carbon dioxide (CO_2) measurements ranged from 0.1 to 0.4 percent, with methane (CH_4) readings at 0.0 percent. PID readings ranged from 10.4 to 13.7 ppm. The results of field screening measurements are summarized in **Table 6.**

Analytical results for samples collected in March 2020 are shown in **Table 7.** Analytical results were compared to USEPA's risk-based screening levels for near-source soil gas with a nonresidential exposure scenario. A target cancer risk (TR) of 10^{-6} and a target hazard quotient (THQ) of 1.0 were used. A summary of the analytical results are provided below:

- Benzene was detected at a concentration of 140 micrograms per meter cubed ($\mu g/m^3$) at sample location G-SB-02. For comparison the USEPA VISL is 52 $\mu g/m^3$.

While benzene was not detected in the soil, it is quite possible that benzene exists in the subsurface soil gas due to large regional subsurface oil plumes and the highly porous, weathered bedrock formation. It is unlikely that the benzene in the soil vapor is a result of an ambient air leak when

comparing the concentrations of other contaminants. For example, toluene was detected in the soil vapor sample at 24 $\mu g/m^3$ but only 23 $\mu g/m^3$ in one ambient air sample and non-detect in the other ambient air sample. If there was a leak in the soil vapor sample train, we would expect a much lower soil vapor concentration of toluene. It is more likely that the source of the BTEX compounds is the soil gas itself. Since a large volume of LNAPL and hydrocarbon impacts are present at neighboring sites, it is possible that the subsurface vapor benzene concentration is from source material located at a neighboring property. Rapid water table elevation rises due to tidal influence could result in soil gas movement from off-site hydrocarbon sources. We recommend additional soil gas sampling to understand the distribution of benzene in soil gas, the potential of migration from off-site sources, and further comparison to atmospheric air quality.

In addition to comparing near-source soil gas results to USEPA VISLs, theoretical indoor air concentrations were calculated by multiplying the analytical results by a USEPA Office of Solid Waste and Emergency Response (OSWER) default attenuation factor of 0.03, for near-source exterior soil gas. As stated in the USEPA OSWER guidance document, near-source soil gas is typically biased low compared to sub-slab soil gas results and these theoretical calculations should only be used as a general metric for establishing theoretical indoor air concentrations. Theoretical indoor air concentrations were then compared to USEPA VISLs for indoor air with a nonresidential exposure scenario, a TR of 10^{-6} and a THQ of 1.0. None of the calculated theoretical indoor air concentrations exceeded the USEPA VISL for indoor air.

3.2.6 Ambient Air Monitoring

Ambient air monitoring results are compared to USEPA Industrial Air RSLs with TR of 10^{-6} and a THQ of 1.0. The RSLs are generic risk-based concentrations derived from exposure information assumptions and USEPA toxicity data. The industrial air RSLs are conservative by nature and are intended to be protective for humans over a 25-year occupational exposure duration. Ambient air monitoring results were also compared to the California Division of Occupational Safety and Health (Cal/OSHA) 8-hour Time Weighted Average (TWA) Permissible Exposure Limits (PELs), American Conference of Governmental Industrial Hygienists (ACGIH®) 2020 Threshold Limit Values (TLVs®) 8-hour time weighted averages (TWAs), and Shell internal Occupational Exposure Limits (OELs).

Analytical results for samples collected in March 2020 are shown in **Table 8** and summarized below:

- Acetone was detected at a concentration of 340 $\mu g/m^3$ at sample location GM-AM-01. For comparison, the USEPA industrial air RSL established for acetone is 140,000 $\mu g/m^3$, the Cal/OSHA TWA PEL established for acetone is 500 ppm or 1,187,730.06 $\mu g/m^3$ and the ACGIH® 2020 TLV® TWA established for acetone is 250 ppm or 593,865.03 $\mu g/m^{3.}$
- Benzene was detected at a concentration of 2,700 $\mu g/m^3$ at sample location GM-AM-01 and 2,200 $\mu g/m^3$ at sample location GM-AM-02A. For comparison, the USEPA industrial air RSL established for benzene is 1.6 $\mu g/m^3$, the Cal/OSHA TWA PEL established for

benzene is 1 ppm or 3,194.68 µg/m^3 and the ACGIH® 2020 TLV® TWA and Shell internal Occupational Exposure Limit (OEL) established for benzene is 0.5 ppm or 1,597.34 µg/m^3.

- Chlorobenzene was detected at a concentration of 110 µg/m^3 at sample location GM-AM-01 and 62 µg/m^3 at sample location GM-AM-02A. For comparison, the USEPA industrial air RSL established for chlorobenzene is 220 µg/m^3, the Cal/OSHA TWA PEL and ACGIH® 2020 TLV® TWA established for chlorobenzene is 10 ppm or 46,053.17 µg/m^3.
- Methyl ethyl ketone was detected at a concentration of 260 µg/m^3 at sample location GM-AM-02A. For comparison, the USEPA industrial air RSL established for methyl ethyl ketone is 22000 µg/m^3, the Cal/OSHA TWA PEL and the ACGIH® 2020 TLV® TWA established for methyl ethyl ketone is 200 ppm or 589,856.85 µg/m^3.
- Trichloroethene was reported as an estimated result at G-AM-01 and was reported as non-detectable at G-AM-02A. The estimated result of 26J µg/m^3 and detection limit of 38U µg/m^3 exceed the USEPA Industrial Air RSL of 3 µg/m^3. These results do not exceed the Cal/OSHA TWA PEL of 134,355.83 µg/m^3 or the ACGIH® 2020 TLV® TWA of 53,742.33 µg/m^3.
- Vinyl bromide (bromoethene) was reported as an estimated result at G-AM-01 and was reported as non-detectable at G-AM-02A. The estimated result of 29J µg/m^3 and detection limit of 31U µg/m^3 exceed the USEPA Industrial Air RSL of 0.38 µg/m^3. There is no Cal/OSHA TWA PEL or ACGIH® 2020 TLV® TWA established for vinyl bromide.
- Vinyl Chloride was reported as an estimated result at G-AM-01 and was reported as non-detectable at G-AM-02A. The estimated result of 30J µg/m^3 and detection limit of 18U µg/m^3 exceed the USEPA Industrial Air RSL of 2.8 µg/m^3. These results do not exceed the Cal/OSHA TWA PEL of 2556.24 µg/m^3 or the ACGIH® 2020 TLV® TWA of 2556.24 µg/m^3.
- Metals, PCBs and SVOCs were not detected in the ambient air monitoring samples.
- The following compounds were reported as non-detectable at G-AM-01 and G-AM-02A; however, the associated detection limits exceed the their respective USEPA Industrial Air RSL. The same detection limits do not exceed the corresponding Cal/OSHA TWA PEL or ACGIH® 2020 TLV® TWA values:
    - Arsenic
    - Cadmium
    - 1,1,2,2-Tetrachloroethane
    - 1,1,2-Trichloroetheane
    - 1,1-Dichloroethane
    - 1,2,4-Trichlorobenzene
    - 1,2-Dibromoethane
    - 1,2-Dichloroethane
    - 1,2-Dichloropropane
    - 1,4-Dichlorobenzene
    - 1,4-Dioxane
    - Benzyl Chloride
    - Bromodichloromethane

- Bromoform
- Bromomethane
- Carbon Tetrachloride
- Chloroform
- Methyl tert butyl ether (G-AM-02A only)
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Dibenzo(a,h)anthracene
- Hexachlorobutadiene
- Indeno(1,2,3-cd)pyrene
- Naphthalene

The VOC results are not surprising given heavy industrial use in the Clifton Pier Industrial Region and the lack of air monitoring and treatment requirements in the Bahamas. Understanding the potential sources and variability of regional air quality at Clifton Pier would require a more extensive ambient air study. Geosyntec recommends further air and wind monitoring to more fully understand potential sources of observed concentrations, air quality variability across the Site and at different times, and to identify a correlation between soil gas and atmospheric air quality.

Continuous air monitoring results for VOCs and PM10 dust are provided in **Table 9** and summarized below:

- At air monitoring location G-AM-01, no VOCs were detected throughout the day. PM10 detections ranged from 0-0.05 mg/m^3.
- At air monitoring location G-AM-02, no VOCs were detected throughout the day. PM10 detections ranged from 0-0.009 mg/m^3.

It should be noted that a negative DustTrak reading was observed at G-AM-01. Prior to sampling, a calibration was completed to zero the electronics and photodetector against any background scatter that may occur in the optics chamber. However, a zero drift sometimes occurs as a result of temperature or humidity changes that take place during the sampling event. It is likely that a change in temperature caused zero drift on this unit. While the negative reading is suspect, it is still likely that PM10 values in the area where G-AM-01 was reporting were low.

Additionally, while the PID did not detect VOCs, it should be noted that PIDs are only field screening tools and analytical data is the best indicator of contaminants. Therefore, we developed recommendations based on the ambient air analytical sample results, rather than the PID results.

<u>Weather Data</u>

Local weather data from the Grand Bahama International Airport was evaluated to provide further analyses. Based on weather data obtained from the Grand Bahama International Airport Station, the primary wind directions recorded from March 16th through March 20th, 2020, and on March 19th, 2020 were from the east and southeast (weatherunderground.com, 2020).

4. CONCEPTUAL REMEDIATION PLANNING

4.1 Soil Remediation

Since soil sampling analytical results did not indicate exceedances above action levels, we do not recommend any remediation for surficial or shallow soil. Surficial and shallow soils do not require remediation prior to construction for foundations/footers nor for long-term operations at the site. Based on the soil sampling analytical results, direct soil contact is not an exposure pathway that presents a risk to human health.

4.2 Construction Air Monitoring

In consideration of baseline air monitoring and soil results, the project team should confer with Shell's internal Health Subject Matter Expert to determine an appropriate quantitative and qualitative air monitoring program as part of the overall site management plan to safeguard construction workers and Site operators. Compounds which exceed EPA Industrial Air RSLs should be designated as a Site COI. These compounds warrant further investigation and evaluation. Benzene concentrations (which exceed the ACGIH® 2020 TLV®) could pose a risk to onsite workers and should be a focus of the program. Geosyntec recommends the following path forward:

- Due to the elevated concentrations of benzene detected in ambient air, Geosyntec recommends further evaluation of this constituent. Additional scrutiny may include additional data collection to establish a basis to characterize consistent average worker exposure scenarios. Collection of additional onsite data to delineate impacts and support an evaluation of temporal and spatial variability of ambient air concentrations is also recommended.

- Due to the regional ambient air impacts, Geosyntec recommends Shell establish defensible background values through characterization of an upgradient monitoring point outside the influence of the regionally impacted area.
- Shell should develop a monitoring plan for onsite construction workers and long-term worker exposure. A long-term program could include permanent monitoring stations with real-time VOC data collection and devices that speciate total VOC concentrations into BTEX concentrations. Collection of these data will support a real time evaluation of benzene concentrations.
- Geosyntec recommends advanced occupational training and coordination with the local Bahamian workforce. Much of the local population is not accustomed to the use of respirators which may be indicated due to elevated benzene concentrations. An advanced, robust training program and public outreach is recommended to mitigate construction delay possibilities.

4.3 Vapor Intrusion Remediation

A soil vapor sample was collected from G-SB-02, which was co-located with the proposed location of the administrative building. Based on the USEPA Technical Guidance (USEPA 2015a), a vapor intrusion investigation should be initiated at worker-occupied buildings within 100 feet of a subsurface vapor source (including the administrative building) where concentrations are detected in exceedance of USEPA VISLs. Furthermore, the investigator should evaluate subsurface preferential pathways including utilities which have the possibility to increase the migration pathway of vapors into buildings.

As defined in the Technical Guidance (USEPA 2015a), vapor intrusion is a potential human exposure pathway that is complete only if the following five conditions are met.

- A subsurface source of vapor-forming chemicals is present (e.g., in the soil or in groundwater) underneath or near the building(s);
- Vapors form and have a route along which to migrate (be transported) toward the occupied building;
- The occupied building(s) is(are) susceptible to soil gas entry, which means openings exist for the vapors to enter the building and driving 'forces' (e.g., air pressure differences between the building and the subsurface environment) exist to draw the vapors from the subsurface through the openings into the building(s);
- One or more vapor-forming chemicals comprising the subsurface vapor source(s) is(are) present in the occupied indoor environment; and
- The building(s)[1] is(are) occupied by one or more individuals when the vapor-forming chemical(s) is(are) present indoors." (USEPA 2015a).

[1] "Building" refers to a structure that is intended for occupancy and use by humans. This would include, for instance, homes, offices, stores, commercial and industrial buildings, etc., but would not normally include sheds, carports, pump houses, or other structures that are not intended for human occupancy.

Based on the detected near-source soil gas concentrations and theoretical indoor air concentrations, there is future risk for building occupants if buildings are constructed in the vicinity of the sampling locations. Additionally, it is likely that impacts exist beyond the sampling location due to regional contamination in the subsurface and in the ambient air. The impacts could be delineated with supplemental subsurface air sampling. The source of the hydrocarbon (benzene) concentration in the soil gas sample could be from off-site source material (LNAPL and/or soil impact) that migrates through the porous/weathered limestone, especially during rising water table events from tidal fluctuations. Additional soil gas sampling over an extended period is recommended to further understand the potential distribution and migration of hydrocarbons in the subsurface soil gas and how they compare to ambient air concentrations above grade.

Due to the soil gas concentrations detected and suspected regional contamination, it is recommended that Shell Health evaluate any confined space entry via excavations or trenches for concentrations of COCs identified in the soil gas study.

Due to these concentrations of site COCs, a passive vapor mitigation system is recommended to mitigate the potential migration of site COCs into newly constructed buildings which will be occupied by workers. A conceptual design of the passive mitigation system may include the following:

- a vapor barrier to mitigate the potential migration of COCs into onsite occupied buildings by providing a barrier to prevent upward migration of vapors into the building; and/or
- gravel material beneath building slabs with slotted piping to allow for passive venting and to prevent vapor accumulation.

To protect construction worker exposure during construction of onsite buildings, passive vapor mitigations systems should be commissioned prior to advanced building stages of the interior of the building. System commissioning would include collected of indoor air samples to confirm levels of site COCs are below applicable screening levels and concentrations are safe for continued worker exposure. Following initial commissioning of the system, a long-term performance monitoring program would be implemented to confirm the system is effective at mitigating the vapor intrusion pathway.

5. REFERENCES

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WeatherUnderground.com, 2020.https://www.wunderground.com/history/daily/MYGF/date/2020-3-18

TABLES

Table 1: Surface Soil Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CAS Number	Reporting Units	FL DEP - Industrial Direct Contact	G-SS-01	G-SS-02	G-SS-03	G-SS-04
Sample Date				3/16/2020	3/16/2020	3/16/2020	3/16/2020
Field Sample ID				G-SS-01	G-SS-02	G-SS-03	G-SS-04
Sample Matrix				Soil	Soil	Soil	Soil
Sample Depth				0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Field Measurments							
PID Reading	N/A	ppm	N/A	10.331	2.811	2.081	2.247
Metals							
Arsenic	7440-38-2	mg/kg	12	5	1.7	4.9	2.9
Selenium	7782-49-2	mg/kg	11000	1.2 J	1.8 J	1.2 J	<4.8
Silver	7440-22-4	mg/kg	8200	<2.4	<1.4	<2.6	<2.4
Barium	7440-39-3	mg/kg	130000	40	26	52	39
Cadmium	7440-43-9	mg/kg	1700	0.27 J	0.3 J	0.47 J	0.25 J
Chromium (Total)	7440-47-3	mg/kg	470	28	13	34	23
Copper	7440-50-8	mg/kg	89000	10	16	8.7	3.5 J
Lead	7439-92-1	mg/kg	1400	11	16	11	5.5
Mercury	7439-97-6	mg/kg	17	0.023	0.6	0.051	0.25
Hydrocarbon							
Total Petroleum Hydrocarbons	TPH	mg/kg	2700	630H	1100H	350H	230H
Pesticides							
4,4-DDD	72-54-8	mg/kg	22	<0.0024	<0.0026	<0.0025	<0.0024
4,4-DDE	72-55-9	mg/kg	15	<0.002	<0.0022	<0.0021	<0.002
4,4-DDT	50-29-3	mg/kg	15	<0.002	<0.0022	<0.0021	<0.002
Aldrin	309-00-2	mg/kg	0.3	<0.002	<0.0022	<0.0021	<0.002
Alpha-BHC	319-84-6	mg/kg	0.6	<0.002	<0.0022	<0.0021	<0.002
Alpha-Chlordane	5103-71-9	mg/kg	N/A	<0.002	<0.0022	<0.0021	<0.002
Beta-BHC	319-85-7	mg/kg	2.4	<0.002	<0.0022	<0.0021	<0.002
Chlordane (technical)	12789-03-6	mg/kg	N/A	<0.03	<0.032	<0.031	<0.03
Delta-BHC	319-86-8	mg/kg	490	<0.002	<0.0022	<0.0021	<0.002
Dieldrin	60-57-1	mg/kg	0.3	<0.002	<0.0022	<0.0021	<0.002
Endosulfan I	959-98-8	mg/kg	N/A	<0.002	<0.0022	<0.0021	<0.002
Endosulfan II	33213-65-9	mg/kg	N/A	<0.002	<0.0022	<0.0021	<0.002
Endosulfan Sulfate	1031-07-8	mg/kg	N/A	<0.002	<0.0022	<0.0021	<0.002
Endrin	72-20-8	mg/kg	510	<0.002	<0.0022	<0.0021	<0.002
Endrin Aldehyde	7421-93-4	mg/kg	N/A	<0.002	<0.0022	<0.0021	<0.002
Endrin Ketone	53494-70-5	mg/kg	N/A	<0.002	<0.0022	<0.0021	<0.002
Gamma-BHC	58-89-9	mg/kg	2.5	<0.002	<0.0022	<0.0021	<0.002
Gamma-Chlordane	5103-74-2	mg/kg	N/A	<0.002	<0.0022	<0.0021	<0.002
Heptachlor	76-44-8	mg/kg	1	<0.002	<0.0022	<0.0021	<0.002
Heptachlor Epoxide	1024-57-3	mg/kg	0.5	<0.002	<0.0022	<0.0021	<0.002
Methoxychlor	72-43-5	mg/kg	8800	<0.002	<0.0022	<0.0021	<0.002
Toxaphene	8001-35-2	mg/kg	4.5	<0.12	<0.13	<0.12	<0.12

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Sample Date				3/16/2020	3/16/2020	3/16/2020	3/16/2020
Field Sample ID				G-SS-01	G-SS-02	G-SS-03	G-SS-04
Sample Matrix				Soil	Soil	Soil	Soil
Sample Depth				0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
VOCs							
1,1,1-Trichloroethane	71-55-6	mg/kg	3900	<0.027	<0.037	<0.021	<0.015
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	1.2	<0.013	<0.019	<0.011	<0.0076
1,1,2-Trichloroethane	79-00-5	mg/kg	2	<0.013	<0.019	<0.011	<0.0076
1,1-Dichloroethane	75-34-3	mg/kg	2100	<0.027	<0.037	<0.021	<0.015
1,1-Dichloroethene	75-35-4	mg/kg	510	<0.027	<0.037	<0.021	<0.015
1,2,3-Trichlorobenzene	87-61-6	mg/kg	8200	<0.013	<0.019	<0.011	<0.0076
1,2,4-Trichlorobenzene	120-82-1	mg/kg	8500	<0.027	<0.037	<0.021	<0.015
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	3.8	<0.04	<0.056	<0.032	<0.023
1,2-Dibromoethane	106-93-4	mg/kg	0.2	<0.013	<0.019	<0.011	<0.0076
1,2-Dichlorobenzene	95-50-1	mg/kg	5000	<0.013	<0.019	<0.011	<0.0076
1,2-Dichloroethane	107-06-2	mg/kg	0.7	<0.013	<0.019	<0.011	<0.0076
1,2-Dichloropropane	78-87-5	mg/kg	0.9	<0.027	<0.037	<0.021	<0.015
1,3-Dichlorobenzene	541-73-1	mg/kg	2200	<0.027	<0.037	<0.021	<0.015
1,4-Dichlorobenzene	106-46-7	mg/kg	9.9	<0.027	<0.037	<0.021	<0.015
2-Hexanone	591-78-6	mg/kg	130	<0.13	<0.19	<0.11	<0.076
4-Methyl-2-pentanone	108-10-1	mg/kg	44000	<0.13	<0.19	<0.11	<0.076
Acetone	67-64-1	mg/kg	68000	<0.13	<0.19	<0.11	<0.076
Benzene	71-43-2	mg/kg	1.7	<0.027	<0.037	<0.021	<0.015
Bromodichloromethane	75-27-4	mg/kg	2.2	<0.013	<0.019	<0.011	<0.0076
Bromoform	75-25-2	mg/kg	93	<0.027	<0.037	<0.021	<0.015
Bromomethane	74-83-9	mg/kg	16	<0.04	<0.056	<0.032	<0.023
Carbon disulfide	75-15-0	mg/kg	1500	<0.04	<0.056	<0.032	<0.023
Carbon tetrachloride	56-23-5	mg/kg	0.7	<0.04	<0.056	<0.032	<0.023
Chlorobenzene	108-90-7	mg/kg	650	<0.027	<0.037	<0.021	<0.015
Chloroethane	75-00-3	mg/kg	5.4	<0.027	<0.037	<0.021	<0.015
Chloroform	67-66-3	mg/kg	0.6	<0.027	<0.037	<0.021	<0.015
Chloromethane	74-87-3	mg/kg	5.7	<0.027	<0.037	<0.021	<0.015
cis-1,2-Dichloroethene	156-59-2	mg/kg	180	<0.027	<0.037	<0.021	<0.015
cis-1,3-Dichloropropene	10061-01-5	mg/kg	N/A	<0.013	<0.019	<0.011	<0.0076
Dibromochloromethane	124-48-1	mg/kg	2.3	<0.027	<0.037	<0.021	<0.015
Dichlorodifluoromethane	75-71-8	mg/kg	410	<0.027	<0.037	<0.021	<0.015
Ethylbenzene	100-41-4	mg/kg	9200	<0.027	<0.037	<0.021	<0.015
Isopropylbenzene	98-82-8	mg/kg	1200	<0.027	<0.037	<0.021	<0.015
Methyl ethyl ketone (2-Butanone)	78-93-3	mg/kg	110000	<0.16	<0.22	<0.13	<0.091
Methyl tert butyl ether	1634-04-4	mg/kg	24000	<0.027	<0.037	<0.021	<0.015
Methylene chloride	75-09-2	mg/kg	26	<0.19	<0.26	<0.15	<0.11
Styrene	100-42-5	mg/kg	23000	<0.027	<0.037	<0.021	<0.015
Tetrachloroethene	127-18-4	mg/kg	18	<0.027	<0.037	<0.021	<0.015
Toluene	108-88-3	mg/kg	60000	<0.04	<0.056	<0.032	<0.023
trans-1,2-Dichloroethene	156-60-5	mg/kg	290	<0.04	<0.056	<0.032	<0.023

Table 1: Surface Soil Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CAS Number	Reporting Units	FL DEP - Industrial Direct Contact	G-SS-01	G-SS-02	G-SS-03	G-SS-04
Sample Date				3/16/2020	3/16/2020	3/16/2020	3/16/2020
Field Sample ID				G-SS-01	G-SS-02	G-SS-03	G-SS-04
Sample Matrix				Soil	Soil	Soil	Soil
Sample Depth				0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
trans-1,3-Dichloropropene	10061-02-6	mg/kg	N/A	<0.04	<0.056	<0.032	<0.023
Trichloroethene	79-01-6	mg/kg	9.3	<0.027	<0.037	<0.021	<0.015
Trichlorofluoromethane	75-69-4	mg/kg	1500	<0.027	<0.037	<0.021	<0.015
Vinyl Chloride	75-01-4	mg/kg	0.8	<0.027	<0.037	<0.021	<0.015
Xylene (Total)	1330-20-7	mg/kg	700	<0.04	<0.056	<0.032	<0.023
SVOCs							
1-Methylnaphthalene	90-12-0	mg/kg	1800	<0.4	<0.42	<0.41	<0.4
2,4,5-Trichlorophenol	95-95-4	mg/kg	130000	<0.4	<0.42	<0.41	<0.4
2,4,6-Trichlorophenol	88-06-2	mg/kg	230	<0.4	<0.42	<0.41	<0.4
2,4-Dichlorophenol	120-83-2	mg/kg	2400	<0.4	<0.42	<0.41	<0.4
2,4-Dimethylphenol	105-67-9	mg/kg	18000	<0.4	<0.42	<0.41	<0.4
2,4-Dinitrophenol	51-28-5	mg/kg	1200	<2	<2.2	<2.1	<2
2,4-Dinitrotoluene	121-14-2	mg/kg	4.3	<0.4	<0.42	<0.41	<0.4
2,6-Dinitrotoluene	606-20-2	mg/kg	3.8	<0.4	<0.42	<0.41	<0.4
2-Chloronaphthalene	91-58-7	mg/kg	61000	<0.4	<0.42	<0.41	<0.4
2-Chlorophenol	95-57-8	mg/kg	860	<0.4	<0.42	<0.41	<0.4
2-Methylnaphthalene	91-57-6	mg/kg	2100	<0.4	<0.42	<0.41	<0.4
2-Methylphenol	95-48-7	mg/kg	31000	<0.4	<0.42	<0.41	<0.4
2-Nitrophenol	88-75-5	mg/kg	N/A	<0.4	<0.42	<0.41	<0.4
3,3-Dichlorobenzidine	91-94-1	mg/kg	9.9	<0.79	<0.84	<0.82	<0.79
3,4-Methylphenol	m&p-Cresol	mg/kg	N/A	<0.4	<0.42	<0.41	<0.4
4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	180	<2	<2.2	<2.1	<2
4-Bromophenyl-phenylether	101-55-3	mg/kg	N/A	<0.4	<0.42	<0.41	<0.4
4-Chloro-3-methylphenol (p-Chlorocresol)	59-50-7	mg/kg	8000	<0.4	<0.42	<0.41	<0.4
4-Chloroaniline	106-47-8	mg/kg	3700	<0.79	<0.84	<0.82	<0.79
4-Chlorophenyl-phenylether	7005-72-3	mg/kg	N/A	<0.4	<0.42	<0.41	<0.4
4-Nitrophenol	100-02-7	mg/kg	7900	<2	<2.2	<2.1	<2
Acenaphthene	83-32-9	mg/kg	20000	<0.4	<0.42	<0.41	<0.4
Acenaphthylene	208-96-8	mg/kg	20000	<0.4	<0.42	<0.41	<0.4
Anthracene	120-12-7	mg/kg	300000	<0.4	<0.42	<0.41	<0.4
Benzo(a)anthracene	56-55-3	mg/kg	N/A	<0.4	<0.42	<0.41	<0.4
Benzo(a)pyrene	50-32-8	mg/kg	0.7	<0.4	<0.42	<0.41	<0.4
Benzo(b)fluoranthene	205-99-2	mg/kg	N/A	<0.4	<0.42	<0.41	<0.4
Benzo(g,h,i)perylene	191-24-2	mg/kg	52000	<0.4	<0.42	<0.41	<0.4
Benzo(k)fluoranthene	207-08-9	mg/kg	N/A	<0.4	<0.42	<0.41	<0.4
bis(2-Chloroethoxy)methane	111-91-1	mg/kg	5700	<0.4	<0.42	<0.41	<0.4
bis(2-Chloroethyl)ether	111-44-4	mg/kg	0.5	<0.4	<0.42	<0.41	<0.4
bis(2-Chloroisopropyl)ether	108-60-1	mg/kg	N/A	<0.4	<0.42	<0.41	<0.4
bis(2-Ethylhexyl)phthalate	117-81-7	mg/kg	390	<0.4	<0.42	<0.41	<0.4
Butyl benzyl phthalate	85-68-7	mg/kg	380000	<0.4	<0.42	<0.41	<0.4
Carbazole	86-74-8	mg/kg	240	<1.2	<1.3	<1.2	<1.2

Table 1: Surface Soil Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CAS Number	Reporting Units	FL DEP - Industrial Direct Contact	G-SS-01	G-SS-02	G-SS-03	G-SS-04
Sample Date				3/16/2020	3/16/2020	3/16/2020	3/16/2020
Field Sample ID				G-SS-01	G-SS-02	G-SS-03	G-SS-04
Sample Matrix				Soil	Soil	Soil	Soil
Sample Depth				0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Chrysene	218-01-9	mg/kg	N/A	<0.4	<0.42	<0.41	<0.4
Dibenzo(a,h)anthracene	53-70-3	mg/kg	N/A	<0.4	<0.42	<0.41	<0.4
Dibenzofuran	132-64-9	mg/kg	6300	<0.4	<0.42	<0.41	<0.4
Diethylphthalate	84-66-2	mg/kg	N/A	<0.4	<0.42	<0.41	<0.4
Dimethyl phthalate	131-11-3	mg/kg	N/A	<0.4	<0.42	<0.41	<0.4
Di-N-Butyl phthalate	84-74-2	mg/kg	N/A	<0.4	<0.42	<0.41	<0.4
Di-N-Octyl phthalate	117-84-0	mg/kg	39000	<0.4	<0.42	<0.41	<0.4
Fluoranthene	206-44-0	mg/kg	59000	<0.4	<0.42	<0.41	<0.4
Fluorene	86-73-7	mg/kg	33000	<0.4	<0.42	<0.41	<0.4
Hexachlorobenzene	118-74-1	mg/kg	1.2	<0.4	<0.42	<0.41	<0.4
Hexachlorobutadiene	87-68-3	mg/kg	13	<0.4	<0.42	<0.41	<0.4
Hexachlorocyclopentadiene	77-47-4	mg/kg	50	<0.4	<0.42	<0.41	<0.4
Hexachloroethane	67-72-1	mg/kg	87	<0.4	<0.42	<0.41	<0.4
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	N/A	<0.4	<0.42	<0.41	<0.4
Isophorone	78-59-1	mg/kg	1200	<0.4	<0.42	<0.41	<0.4
m-Nitroaniline	99-09-2	mg/kg	130	<2	<2.2	<2.1	<2
Naphthalene	91-20-3	mg/kg	300	<0.4	<0.42	<0.41	<0.4
Nitrobenzene	98-95-3	mg/kg	140	<0.4	<0.42	<0.41	<0.4
N-Nitroso-di-N-propylamine	621-64-7	mg/kg	0.2	***<0.4***	***<0.42***	***<0.41***	***<0.4***
N-Nitrosodiphenylamine	86-30-6	mg/kg	730	<0.4	<0.42	<0.41	<0.4
o-Nitroaniline	88-74-4	mg/kg	130	<2	<2.2	<2.1	<2
Pentachlorophenol	87-86-5	mg/kg	28	<2	<2.2	<2.1	<2
Phenanthrene	85-01-8	mg/kg	36000	<0.4	<0.42	<0.41	<0.4
Phenol	108-95-2	mg/kg	220000	<0.4	<0.42	<0.41	<0.4
p-Nitroaniline	100-01-6	mg/kg	96	<2	<2.2	<2.1	<2
Pyrene	129-00-0	mg/kg	45000	<0.4	<0.42	<0.41	<0.4

Notes:

J - Estimated value

H - Sample was prepped or analyzed beyond the specified holding time

< - Non-detectable

-- Not analyzed

N/A - Not applicable

Analyte concentration exceeds the standard for:

FL DEP - Industrial Direct Contact Soils

Table 2: Shallow Soil Boring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CAS Number	Reporting Units	FL DEP - Industrial Direct Contact	G-SB-01		G-SB-02		P-SB-04		P-SB-05	
Sample Date				3/19/2020	3/19/2020	3/19/2020	3/19/2020	3/19/2020	3/19/2020	3/19/2020	3/19/2020
Field Sample ID				G-SB-01 0-1	G-SB-01 5-6	G-SB-02 0-1	G-SB-02 2-3	P-SB-04 0-1	P-SB-04 1-2	P-SB-05 0-1	P-SB-05 4-5
Sample Matrix				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Depth				0 - 1 ft	5 - 6 ft	0 - 1 ft	2 - 3 ft	0 - 1 ft	1 - 2 ft	0 - 1 ft	4 - 5 ft
Field Measuremnts											
PID Reading	N/A	ppm	N/A	9.532	3.322	6.241	5.275	6.13	1.029	14.41	8.621
Metals											
Arsenic	7440-38-2	mg/kg	12	<6.6	--	0.78 J	--	2.8 J	2.9	2 J	1.3 J
Selenium	7782-49-2	mg/kg	11000	<13	--	<11	--	<12	<2.2	<11	<11
Silver	7440-22-4	mg/kg	8200	<6.6	--	<5.6	--	<5.8	<1.1	<5.7	<5.7
Barium	7440-39-3	mg/kg	130000	9.7	--	18	--	29	32	21	21
Cadmium	7440-43-9	mg/kg	1700	<3.3	--	<2.8	--	<2.9	0.17 J	<2.9	0.16 J
Chromium (Total)	7440-47-3	mg/kg	470	1.7 J	--	5.8	--	25	23	11	7.6
Copper	7440-50-8	mg/kg	89000	<13	--	1.2 J	--	6.6 J	5	3.6 J	2.4 J
Lead	7439-92-1	mg/kg	1400	<6.6	--	2.7 J	--	14	16	3.6 J	3.7 J
Mercury	7439-97-6	mg/kg	17	0.036 B	--	0.07 B	--	0.14 B	0.19 B	0.17 B	0.099 B
Hydrocarbon											
Total Petroleum Hydrocarbons	TPH	mg/kg	2700	<25	<26	45	<22	200	200	150	120
Pesticides											
4,4-DDD	72-54-8	mg/kg	22	<0.0026	--	<0.0022	--	<0.0023	<0.0023	<0.0023	<0.0022
4,4-DDE	72-55-9	mg/kg	15	<0.0022	--	<0.0019	--	<0.002	<0.002	<0.0019	<0.0019
4,4-DDT	50-29-3	mg/kg	15	<0.0022	--	<0.0019	--	<0.002	<0.002	<0.0019	<0.0019
Aldrin	309-00-2	mg/kg	0.3	<0.0022	--	<0.0019	--	<0.002	<0.002	<0.0019	<0.0019
Alpha-BHC	319-84-6	mg/kg	0.6	<0.0022	--	<0.0019	--	<0.002	<0.002	<0.0019	<0.0019
Alpha-Chlordane	5103-71-9	mg/kg	N/A	<0.0022	--	<0.0019	--	<0.002	<0.002	<0.0019	<0.0019
Beta-BHC	319-85-7	mg/kg	2.4	<0.0022	--	<0.0019	--	<0.002	<0.002	<0.0019	<0.0019
Chlordane (technical)	12789-03-6	mg/kg	N/A	<0.032	--	<0.027	--	<0.029	<0.029	<0.029	<0.028
Delta-BHC	319-86-8	mg/kg	490	<0.0022	--	<0.0019	--	<0.002	<0.002	<0.0019	<0.0019
Dieldrin	60-57-1	mg/kg	0.3	<0.0022	--	<0.0019	--	<0.002	<0.002	<0.0019	<0.0019
Endosulfan I	959-98-8	mg/kg	N/A	<0.0022	--	<0.0019	--	<0.002	<0.002	<0.0019	<0.0019
Endosulfan II	33213-65-9	mg/kg	N/A	<0.0022	--	<0.0019	--	<0.002	<0.002	<0.0019	<0.0019
Endosulfan Sulfate	1031-07-8	mg/kg	N/A	<0.0022	--	<0.0019	--	<0.002	<0.002	<0.0019	<0.0019
Endrin	72-20-8	mg/kg	510	<0.0022	--	<0.0019	--	<0.002	<0.002	<0.0019	<0.0019
Endrin Aldehyde	7421-93-4	mg/kg	N/A	<0.0022	--	<0.0019	--	<0.002	<0.002	<0.0019	<0.0019
Endrin Ketone	53494-70-5	mg/kg	N/A	<0.0022	--	<0.0019	--	<0.002	<0.002	<0.0019	<0.0019
Gamma-BHC	58-89-9	mg/kg	2.5	<0.0022	--	<0.0019	--	<0.002	<0.002	<0.0019	<0.0019
Gamma-Chlordane	5103-74-2	mg/kg	N/A	<0.0022	--	<0.0019	--	<0.002	<0.002	<0.0019	<0.0019
Heptachlor	76-44-8	mg/kg	1	<0.0022	--	<0.0019	--	<0.002	<0.002	<0.0019	<0.0019
Heptachlor Epoxide	1024-57-3	mg/kg	0.5	<0.0022	--	<0.0019	--	<0.002	<0.002	<0.0019	<0.0019
Methoxychlor	72-43-5	mg/kg	8800	<0.0022	--	<0.0019	--	<0.002	<0.002	<0.0019	<0.0019
Toxaphene	8001-35-2	mg/kg	4.5	<0.13	--	<0.11	--	<0.12	<0.12	<0.11	<0.11
PCBs											
Aroclor-1016	12674-11-2	mg/kg	N/A	--	--	--	--	<0.077	--	<0.077	--
Aroclor-1221	11104-28-2	mg/kg	N/A	--	--	--	--	<0.12	--	<0.11	--
Aroclor-1232	11141-16-5	mg/kg	N/A	--	--	--	--	<0.077	--	<0.077	--
Aroclor-1242	53469-21-9	mg/kg	N/A	--	--	--	--	<0.099	--	<0.098	--
Aroclor-1248	12672-29-6	mg/kg	N/A	--	--	--	--	<0.077	--	<0.077	--
Aroclor-1254	11097-69-1	mg/kg	N/A	--	--	--	--	<0.038	--	<0.038	--
Aroclor-1260	11096-82-5	mg/kg	N/A	--	--	--	--	<0.052	--	<0.051	--

Table 2: Shallow Soil Boring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CAS Number	Reporting Units	FL DEP - Industrial Direct Contact	G-SB-01		G-SB-02		P-SB-04		P-SB-05	
Sample Date				3/19/2020	3/19/2020	3/19/2020	3/19/2020	3/19/2020	3/19/2020	3/19/2020	3/19/2020
Field Sample ID				G-SB-01 0-1	G-SB-01 5-6	G-SB-02 0-1	G-SB-02 2-3	P-SB-04 0-1	P-SB-04 1-2	P-SB-05 0-1	P-SB-05 4-5
Sample Matrix				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Depth				0 - 1 ft	5 - 6 ft	0 - 1 ft	2 - 3 ft	0 - 1 ft	1 - 2 ft	0 - 1 ft	4 - 5 ft
VOCs											
1,1,1-Trichloroethane	71-55-6	mg/kg	3900	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	1.2	<0.0073	<0.0073	<0.0069	<0.0057	<0.0062	<0.0059	<0.0066	<0.006
1,1,2-Trichloroethane	79-00-5	mg/kg	2	<0.0073	<0.0073	<0.0069	<0.0057	<0.0062	<0.0059	<0.0066	<0.006
1,1-Dichloroethane	75-34-3	mg/kg	2100	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
1,1-Dichloroethene	75-35-4	mg/kg	510	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
1,2,3-Trichlorobenzene	87-61-6	mg/kg	8200	<0.0073	<0.0073	<0.0069	<0.0057	<0.0062	<0.0059	<0.0066	<0.006
1,2,4-Trichlorobenzene	120-82-1	mg/kg	8500	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	3.8	<0.022	<0.022	<0.021	<0.017	<0.019	<0.018	<0.02	<0.018
1,2-Dibromoethane	106-93-4	mg/kg	0.2	<0.0073	<0.0073	<0.0069	<0.0057	<0.0062	<0.0059	<0.0066	<0.006
1,2-Dichlorobenzene	95-50-1	mg/kg	5000	<0.0073	<0.0073	<0.0069	<0.0057	<0.0062	<0.0059	<0.0066	<0.006
1,2-Dichloroethane	107-06-2	mg/kg	0.7	<0.0073	<0.0073	<0.0069	<0.0057	<0.0062	<0.0059	<0.0066	<0.006
1,2-Dichloropropane	78-87-5	mg/kg	0.9	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
1,3-Dichlorobenzene	541-73-1	mg/kg	2200	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
1,4-Dichlorobenzene	106-46-7	mg/kg	9.9	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
2-Hexanone	591-78-6	mg/kg	130	<0.073	<0.073	<0.069	<0.057	<0.062	<0.059	<0.066	<0.06
4-Methyl-2-pentanone	108-10-1	mg/kg	44000	<0.073	<0.073	<0.069	<0.057	<0.062	<0.059	<0.066	<0.06
Acetone	67-64-1	mg/kg	68000	<0.073	<0.073	<0.069	<0.057	<0.062	<0.059	<0.066	<0.06
Benzene	71-43-2	mg/kg	1.7	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
Bromodichloromethane	75-27-4	mg/kg	2.2	<0.0073	<0.0073	<0.0069	<0.0057	<0.0062	<0.0059	<0.0066	<0.006
Bromoform	75-25-2	mg/kg	93	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
Bromomethane	74-83-9	mg/kg	16	<0.022	<0.022	<0.021	<0.017	<0.019	<0.018	<0.02	<0.018
Carbon disulfide	75-15-0	mg/kg	1500	<0.022	<0.022	<0.021	<0.017	<0.019	<0.018	<0.02	<0.018
Carbon tetrachloride	56-23-5	mg/kg	0.7	<0.022	<0.022	<0.021	<0.017	<0.019	<0.018	<0.02	<0.018
Chlorobenzene	108-90-7	mg/kg	650	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
Chloroethane	75-00-3	mg/kg	5.4	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
Chloroform	67-66-3	mg/kg	0.6	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
Chloromethane	74-87-3	mg/kg	5.7	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
cis-1,2-Dichloroethene	156-59-2	mg/kg	180	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
cis-1,3-Dichloropropene	10061-01-5	mg/kg	N/A	<0.0073	<0.0073	<0.0069	<0.0057	<0.0062	<0.0059	<0.0066	<0.006
Dibromochloromethane	124-48-1	mg/kg	2.3	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
Dichlorodifluoromethane	75-71-8	mg/kg	410	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
Ethylbenzene	100-41-4	mg/kg	9200	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
Isopropylbenzene	98-82-8	mg/kg	1200	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
Methyl ethyl ketone (2-Butanone)	78-93-3	mg/kg	110000	<0.088	<0.088	<0.083	<0.069	<0.074	<0.071	<0.079	<0.072
Methyl tert butyl ether	1634-04-4	mg/kg	24000	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
Methylene chloride	75-09-2	mg/kg	26	<0.1	<0.1	<0.096	<0.08	<0.087	<0.083	<0.092	<0.084
Styrene	100-42-5	mg/kg	23000	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
Tetrachloroethene	127-18-4	mg/kg	18	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
Toluene	108-88-3	mg/kg	60000	<0.022	<0.022	<0.021	<0.017	<0.019	<0.018	<0.02	<0.018
trans-1,2-Dichloroethene	156-60-5	mg/kg	290	<0.022	<0.022	<0.021	<0.017	<0.019	<0.018	<0.02	<0.018
trans-1,3-Dichloropropene	10061-02-6	mg/kg	N/A	<0.022	<0.022	<0.021	<0.017	<0.019	<0.018	<0.02	<0.018
Trichloroethene	79-01-6	mg/kg	9.3	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
Trichlorofluoromethane	75-69-4	mg/kg	1500	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
Vinyl Chloride	75-01-4	mg/kg	0.8	<0.015	<0.015	<0.014	<0.011	<0.012	<0.012	<0.013	<0.012
Xylene (Total)	1330-20-7	mg/kg	700	<0.022	<0.022	<0.021	<0.017	<0.019	<0.018	<0.02	<0.018

Table 2: Shallow Soil Boring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CAS Number	Reporting Units	FL DEP - Industrial Direct Contact	G-SB-01		G-SB-02		P-SB-04		P-SB-05	
Sample Date				3/19/2020	3/19/2020	3/19/2020	3/19/2020	3/19/2020	3/19/2020	3/19/2020	3/19/2020
Field Sample ID				G-SB-01 0-1	G-SB-01 5-6	G-SB-02 0-1	G-SB-02 2-3	P-SB-04 0-1	P-SB-04 1-2	P-SB-05 0-1	P-SB-05 4-5
Sample Matrix				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Depth				0 - 1 ft	5 - 6 ft	0 - 1 ft	2 - 3 ft	0 - 1 ft	1 - 2 ft	0 - 1 ft	4 - 5 ft
SVOCs											
1-Methylnaphthalene	90-12-0	mg/kg	1800	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
2,4,5-Trichlorophenol	95-95-4	mg/kg	130000	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
2,4,6-Trichlorophenol	88-06-2	mg/kg	230	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
2,4-Dichlorophenol	120-83-2	mg/kg	2400	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
2,4-Dimethylphenol	105-67-9	mg/kg	18000	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
2,4-Dinitrophenol	51-28-5	mg/kg	1200	<2.1	<2.2	<1.9	<1.9	<10	<19	<9.6	<9.6
2,4-Dinitrotoluene	121-14-2	mg/kg	4.3	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
2,6-Dinitrotoluene	606-20-2	mg/kg	3.8	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
2-Chloronaphthalene	91-58-7	mg/kg	61000	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
2-Chlorophenol	95-57-8	mg/kg	860	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
2-Methylnaphthalene	91-57-6	mg/kg	2100	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
2-Methylphenol	95-48-7	mg/kg	31000	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
2-Nitrophenol	88-75-5	mg/kg	N/A	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
3,3-Dichlorobenzidine	91-94-1	mg/kg	9.9	<0.83	<0.86	<0.73	<0.74	<3.9	<7.5	<3.7	<3.7
3,4-Methylphenol	m&p-Cresol	mg/kg	N/A	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	180	<2.1	<2.2	<1.9	<1.9	<10	<19	<9.6	<9.6
4-Bromophenyl-phenylether	101-55-3	mg/kg	N/A	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
4-Chloro-3-methylphenol (p-Chlorocresol)	59-50-7	mg/kg	8000	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
4-Chloroaniline	106-47-8	mg/kg	3700	<0.83	<0.86	<0.73	<0.74	<3.9	<7.5	<3.7	<3.7
4-Chlorophenyl-phenylether	7005-72-3	mg/kg	N/A	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
4-Nitrophenol	100-02-7	mg/kg	7900	<2.1	<2.2	<1.9	<1.9	<10	<19	<9.6	<9.6
Acenaphthene	83-32-9	mg/kg	20000	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Acenaphthylene	208-96-8	mg/kg	20000	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Anthracene	120-12-7	mg/kg	300000	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Benzo(a)anthracene	56-55-3	mg/kg	N/A	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Benzo(a)pyrene	50-32-8	mg/kg	0.7	<0.41	<0.43	<0.36	<0.37	***<1.9***	***<3.8***	***<1.9***	***<1.9***
Benzo(b)fluoranthene	205-99-2	mg/kg	N/A	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Benzo(g,h,i)perylene	191-24-2	mg/kg	52000	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Benzo(k)fluoranthene	207-08-9	mg/kg	N/A	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
bis(2-Chloroethoxy)methane	111-91-1	mg/kg	5700	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
bis(2-Chloroethyl)ether	111-44-4	mg/kg	0.5	<0.41	<0.43	<0.36	<0.37	***<1.9***	***<3.8***	***<1.9***	***<1.9***
bis(2-Chloroisopropyl)ether	108-60-1	mg/kg	N/A	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
bis(2-Ethylhexyl)phthalate	117-81-7	mg/kg	390	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Butyl benzyl phthalate	85-68-7	mg/kg	380000	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Carbazole	86-74-8	mg/kg	240	<1.3	<1.3	<1.1	<1.1	<5.9	<11	<5.7	<5.6
Chrysene	218-01-9	mg/kg	N/A	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Dibenzo(a,h)anthracene	53-70-3	mg/kg	N/A	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Dibenzofuran	132-64-9	mg/kg	6300	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Diethylphthalate	84-66-2	mg/kg	N/A	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Dimethyl phthalate	131-11-3	mg/kg	N/A	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Di-N-Butyl phthalate	84-74-2	mg/kg	N/A	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Di-N-Octyl phthalate	117-84-0	mg/kg	39000	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Fluoranthene	206-44-0	mg/kg	59000	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Fluorene	86-73-7	mg/kg	33000	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Hexachlorobenzene	118-74-1	mg/kg	1.2	<0.41	<0.43	<0.36	<0.37	***<1.9***	***<3.8***	***<1.9***	***<1.9***
Hexachlorobutadiene	87-68-3	mg/kg	13	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Hexachlorocyclopentadiene	77-47-4	mg/kg	50	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Hexachloroethane	67-72-1	mg/kg	87	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	N/A	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Isophorone	78-59-1	mg/kg	1200	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
m-Nitroaniline	99-09-2	mg/kg	130	<2.1	<2.2	<1.9	<1.9	<10	<19	<9.6	<9.6
Naphthalene	91-20-3	mg/kg	300	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9

Table 2: Shallow Soil Boring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CAS Number	Reporting Units	FL DEP - Industrial Direct Contact	G-SB-01		G-SB-02		P-SB-04		P-SB-05	
Sample Date				3/19/2020	3/19/2020	3/19/2020	3/19/2020	3/19/2020	3/19/2020	3/19/2020	3/19/2020
Field Sample ID				G-SB-01 0-1	G-SB-01 5-6	G-SB-02 0-1	G-SB-02 2-3	P-SB-04 0-1	P-SB-04 1-2	P-SB-05 0-1	P-SB-05 4-5
Sample Matrix				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Depth				0 - 1 ft	5 - 6 ft	0 - 1 ft	2 - 3 ft	0 - 1 ft	1 - 2 ft	0 - 1 ft	4 - 5 ft
Nitrobenzene	98-95-3	mg/kg	140	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
N-Nitroso-di-N-propylamine	621-64-7	mg/kg	0.2	***<0.41***	***<0.43***	***<0.36***	***<0.37***	***<1.9***	***<3.8***	***<1.9***	***<1.9***
N-Nitrosodiphenylamine	86-30-6	mg/kg	730	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
o-Nitroaniline	88-74-4	mg/kg	130	<2.1	<2.2	<1.9	<1.9	<10	<19	<9.6	<9.6
Pentachlorophenol	87-86-5	mg/kg	28	<2.1	<2.2	<1.9	<1.9	<10	<19	<9.6	<9.6
Phenanthrene	85-01-8	mg/kg	36000	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
Phenol	108-95-2	mg/kg	220000	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9
p-Nitroaniline	100-01-6	mg/kg	96	<2.1	<2.2	<1.9	<1.9	<10	<19	<9.6	<9.6
Pyrene	129-00-0	mg/kg	45000	<0.41	<0.43	<0.36	<0.37	<1.9	<3.8	<1.9	<1.9

Notes:

J - Estimated value

< - Non-detectable

-- Not analyzed

N/A - Not applicable

Analyte concentration exceeds the standard for:

FL DEP - Industrial Direct Contact Soils

Table 3: Deep Soil Boring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CAS Number	Reporting Units	FL DEP - Industrial Direct Contact	G-DB-01			
Sample Date				3/19/2020	3/19/2020	3/19/2020	3/19/2020
Field Sample ID				G-DB-01 0-1	G-DB-01 10-15	G-DB-01 25-30	DUP 01
Sample Matrix				Soil	Soil	Soil	Soil
Sample Depth				0 - 1 ft	10 - 15 ft	25 - 30 ft	25 - 30 ft
Field Measurements							
PID Reading	N/A	ppm	N/A	27.52	2.202	2.372	2.372
Metals							
Arsenic	7440-38-2	mg/kg	12	<5.2	--	2.1	--
Selenium	7782-49-2	mg/kg	11000	<10	--	<2.6	--
Silver	7440-22-4	mg/kg	8200	<5.2	--	<1.3	--
Barium	7440-39-3	mg/kg	130000	10	--	5.2	--
Cadmium	7440-43-9	mg/kg	1700	<2.6	--	0.083 J	--
Chromium (Total)	7440-47-3	mg/kg	470	1.7 J	--	2.5	--
Copper	7440-50-8	mg/kg	89000	<10	--	0.8 J B	--
Lead	7439-92-1	mg/kg	1400	1.1 J	--	0.96 J	--
Mercury	7439-97-6	mg/kg	17	0.023 B	--	0.024 B	--
Hydrocarbon							
Total Petroleum Hydrocarbons	TPH	mg/kg	2700	19 J	<26	20 J	<23
Pesticides							
4,4-DDD	72-54-8	mg/kg	22	<0.0022	--	<0.0027	--
4,4-DDE	72-55-9	mg/kg	15	<0.0019	--	<0.0023	--
4,4-DDT	50-29-3	mg/kg	15	<0.0019	--	<0.0023	--
Aldrin	309-00-2	mg/kg	0.3	<0.0019	--	<0.0023	--
Alpha-BHC	319-84-6	mg/kg	0.6	<0.0019	--	<0.0023	--
Alpha-Chlordane	5103-71-9	mg/kg	N/A	<0.0019	--	<0.0023	--
Beta-BHC	319-85-7	mg/kg	2.4	<0.0019	--	<0.0023	--
Chlordane (technical)	12789-03-6	mg/kg	N/A	<0.028	--	<0.033	--
Delta-BHC	319-86-8	mg/kg	490	<0.0019	--	<0.0023	--
Dieldrin	60-57-1	mg/kg	0.3	<0.0019	--	<0.0023	--
Endosulfan I	959-98-8	mg/kg	N/A	<0.0019	--	<0.0023	--
Endosulfan II	33213-65-9	mg/kg	N/A	<0.0019	--	<0.0023	--
Endosulfan Sulfate	1031-07-8	mg/kg	N/A	<0.0019	--	<0.0023	--
Endrin	72-20-8	mg/kg	510	<0.0019	--	<0.0023	--
Endrin Aldehyde	7421-93-4	mg/kg	N/A	<0.0019	--	<0.0023	--
Endrin Ketone	53494-70-5	mg/kg	N/A	<0.0019	--	<0.0023	--
Gamma-BHC	58-89-9	mg/kg	2.5	<0.0019	--	<0.0023	--
Gamma-Chlordane	5103-74-2	mg/kg	N/A	<0.0019	--	<0.0023	--
Heptachlor	76-44-8	mg/kg	1	<0.0019	--	<0.0023	--
Heptachlor Epoxide	1024-57-3	mg/kg	0.5	<0.0019	--	<0.0023	--
Methoxychlor	72-43-5	mg/kg	8800	<0.0019	--	<0.0023	--
Toxaphene	8001-35-2	mg/kg	4.5	<0.11	--	<0.13	--

Table 3: Deep Soil Boring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CAS Number	Reporting Units	FL DEP - Industrial Direct Contact	G-DB-01			
Sample Date				3/19/2020	3/19/2020	3/19/2020	3/19/2020
Field Sample ID				G-DB-01 0-1	G-DB-01 10-15	G-DB-01 25-30	DUP 01
Sample Matrix				Soil	Soil	Soil	Soil
Sample Depth				0 - 1 ft	10 - 15 ft	25 - 30 ft	25 - 30 ft
VOCs							
1,1,1-Trichloroethane	71-55-6	mg/kg	3900	<0.012	<0.01	<0.012	<0.013
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	1.2	<0.0061	<0.0052	<0.0061	<0.0063
1,1,2-Trichloroethane	79-00-5	mg/kg	2	<0.0061	<0.0052	<0.0061	<0.0063
1,1-Dichloroethane	75-34-3	mg/kg	2100	<0.012	<0.01	<0.012	<0.013
1,1-Dichloroethene	75-35-4	mg/kg	510	<0.012	<0.01	<0.012	<0.013
1,2,3-Trichlorobenzene	87-61-6	mg/kg	8200	<0.0061	<0.0052	<0.0061	<0.0063
1,2,4-Trichlorobenzene	120-82-1	mg/kg	8500	<0.012	<0.01	<0.012	<0.013
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	3.8	<0.018	<0.016	<0.018	<0.019
1,2-Dibromoethane	106-93-4	mg/kg	0.2	<0.0061	<0.0052	<0.0061	<0.0063
1,2-Dichlorobenzene	95-50-1	mg/kg	5000	<0.0061	<0.0052	<0.0061	<0.37
1,2-Dichloroethane	107-06-2	mg/kg	0.7	<0.0061	<0.0052	<0.0061	<0.0063
1,2-Dichloropropane	78-87-5	mg/kg	0.9	<0.012	<0.01	<0.012	<0.013
1,3-Dichlorobenzene	541-73-1	mg/kg	2200	<0.012	<0.01	<0.012	<0.37
1,4-Dichlorobenzene	106-46-7	mg/kg	9.9	<0.012	<0.01	<0.012	<0.37
2-Hexanone	591-78-6	mg/kg	130	<0.061	<0.052	<0.061	<0.063
4-Methyl-2-pentanone	108-10-1	mg/kg	44000	<0.061	<0.052	<0.061	<0.063
Acetone	67-64-1	mg/kg	68000	<0.061	<0.052	<0.061	<0.063
Benzene	71-43-2	mg/kg	1.7	<0.012	<0.01	<0.012	<0.013
Bromodichloromethane	75-27-4	mg/kg	2.2	<0.0061	<0.0052	<0.0061	<0.0063
Bromoform	75-25-2	mg/kg	93	<0.012	<0.01	<0.012	<0.013
Bromomethane	74-83-9	mg/kg	16	<0.018	<0.016	<0.018	<0.019
Carbon disulfide	75-15-0	mg/kg	1500	<0.018	<0.016	<0.018	<0.019
Carbon tetrachloride	56-23-5	mg/kg	0.7	<0.018	<0.016	<0.018	<0.019
Chlorobenzene	108-90-7	mg/kg	650	<0.012	<0.01	<0.012	<0.013
Chloroethane	75-00-3	mg/kg	5.4	<0.012	<0.01	<0.012	<0.013
Chloroform	67-66-3	mg/kg	0.6	<0.012	<0.01	<0.012	<0.013
Chloromethane	74-87-3	mg/kg	5.7	<0.012	<0.01	<0.012	<0.013
cis-1,2-Dichloroethene	156-59-2	mg/kg	180	<0.012	<0.01	<0.012	<0.013
cis-1,3-Dichloropropene	10061-01-5	mg/kg	N/A	<0.0061	<0.0052	<0.0061	<0.0063
Dibromochloromethane	124-48-1	mg/kg	2.3	<0.012	<0.01	<0.012	<0.013
Dichlorodifluoromethane	75-71-8	mg/kg	410	<0.012	<0.01	<0.012	<0.013
Ethylbenzene	100-41-4	mg/kg	9200	<0.012	<0.01	<0.012	<0.013
Isopropylbenzene	98-82-8	mg/kg	1200	<0.012	<0.01	<0.012	<0.013
Methyl ethyl ketone (2-Butanone)	78-93-3	mg/kg	110000	<0.073	<0.062	<0.073	<0.075
Methyl tert butyl ether	1634-04-4	mg/kg	24000	<0.012	<0.01	<0.012	<0.013
Methylene chloride	75-09-2	mg/kg	26	<0.085	<0.073	<0.086	<0.088
Styrene	100-42-5	mg/kg	23000	<0.012	<0.01	<0.012	<0.013
Tetrachloroethene	127-18-4	mg/kg	18	<0.012	<0.01	<0.012	<0.013
Toluene	108-88-3	mg/kg	60000	<0.018	<0.016	<0.018	<0.019
trans-1,2-Dichloroethene	156-60-5	mg/kg	290	<0.018	<0.016	<0.018	<0.019

Table 3: Deep Soil Boring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CAS Number	Reporting Units	FL DEP - Industrial Direct Contact	G-DB-01			
Sample Date				3/19/2020	3/19/2020	3/19/2020	3/19/2020
Field Sample ID				G-DB-01 0-1	G-DB-01 10-15	G-DB-01 25-30	DUP 01
Sample Matrix				Soil	Soil	Soil	Soil
Sample Depth				0 - 1 ft	10 - 15 ft	25 - 30 ft	25 - 30 ft
trans-1,3-Dichloropropene	10061-02-6	mg/kg	N/A	<0.018	<0.016	<0.018	<0.019
Trichloroethene	79-01-6	mg/kg	9.3	<0.012	<0.01	<0.012	<0.013
Trichlorofluoromethane	75-69-4	mg/kg	1500	<0.012	<0.01	<0.012	<0.013
Vinyl Chloride	75-01-4	mg/kg	0.8	<0.012	<0.01	<0.012	<0.013
Xylene (Total)	1330-20-7	mg/kg	700	<0.018	<0.016	<0.018	<0.019
SVOCs							
1-Methylnaphthalene	90-12-0	mg/kg	1800	<0.36	<0.42	<0.44	<0.37
2,4,5-Trichlorophenol	95-95-4	mg/kg	130000	<0.36	<0.42	<0.44	<0.37
2,4,6-Trichlorophenol	88-06-2	mg/kg	230	<0.36	<0.42	<0.44	<0.37
2,4-Dichlorophenol	120-83-2	mg/kg	2400	<0.36	<0.42	<0.44	<0.37
2,4-Dimethylphenol	105-67-9	mg/kg	18000	<0.36	<0.42	<0.44	<0.37
2,4-Dinitrophenol	51-28-5	mg/kg	1200	<1.9	<2.1	<2.3	<1.9
2,4-Dinitrotoluene	121-14-2	mg/kg	4.3	<0.36	<0.42	<0.44	<0.37
2,6-Dinitrotoluene	606-20-2	mg/kg	3.8	<0.36	<0.42	<0.44	<0.37
2-Chloronaphthalene	91-58-7	mg/kg	61000	<0.36	<0.42	<0.44	<0.37
2-Chlorophenol	95-57-8	mg/kg	860	<0.36	<0.42	<0.44	<0.37
2-Methylnaphthalene	91-57-6	mg/kg	2100	<0.36	<0.42	<0.44	<0.37
2-Methylphenol	95-48-7	mg/kg	31000	<0.36	<0.42	<0.44	<0.37
2-Nitrophenol	88-75-5	mg/kg	N/A	<0.36	<0.42	<0.44	<0.37
3,3-Dichlorobenzidine	91-94-1	mg/kg	9.9	<0.72	<0.83	<0.88	<0.75
3,4-Methylphenol	m&p-Cresol	mg/kg	N/A	<0.36	<0.42	<0.44	<0.37
4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	180	<1.9	<2.1	<2.3	<1.9
4-Bromophenyl-phenylether	101-55-3	mg/kg	N/A	<0.36	<0.42	<0.44	<0.37
4-Chloro-3-methylphenol (p-Chlorocresol)	59-50-7	mg/kg	8000	<0.36	<0.42	<0.44	<0.37
4-Chloroaniline	106-47-8	mg/kg	3700	<0.72	<0.83	<0.88	<0.75
4-Chlorophenyl-phenylether	7005-72-3	mg/kg	N/A	<0.36	<0.42	<0.44	<0.37
4-Nitrophenol	100-02-7	mg/kg	7900	<1.9	<2.1	<2.3	<1.9
Acenaphthene	83-32-9	mg/kg	20000	<0.36	<0.42	<0.44	<0.37
Acenaphthylene	208-96-8	mg/kg	20000	<0.36	<0.42	<0.44	<0.37
Anthracene	120-12-7	mg/kg	300000	<0.36	<0.42	<0.44	<0.37
Benzo(a)anthracene	56-55-3	mg/kg	N/A	<0.36	<0.42	<0.44	<0.37
Benzo(a)pyrene	50-32-8	mg/kg	0.7	<0.36	<0.42	<0.44	<0.37
Benzo(b)fluoranthene	205-99-2	mg/kg	N/A	<0.36	<0.42	<0.44	<0.37
Benzo(g,h,i)perylene	191-24-2	mg/kg	52000	<0.36	<0.42	<0.44	<0.37
Benzo(k)fluoranthene	207-08-9	mg/kg	N/A	<0.36	<0.42	<0.44	<0.37
bis(2-Chloroethoxy)methane	111-91-1	mg/kg	5700	<0.36	<0.42	<0.44	<0.37
bis(2-Chloroethyl)ether	111-44-4	mg/kg	0.5	<0.36	<0.42	<0.44	<0.37
bis(2-Chloroisopropyl)ether	108-60-1	mg/kg	N/A	<0.36	<0.42	<0.44	<0.37
bis(2-Ethylhexyl)phthalate	117-81-7	mg/kg	390	<0.36	<0.42	0.095 J	<0.37
Butyl benzyl phthalate	85-68-7	mg/kg	380000	<0.36	<0.42	<0.44	<0.37
Carbazole	86-74-8	mg/kg	240	<1.1	<1.3	<1.3	<1.1

Table 3: Deep Soil Boring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CAS Number	Reporting Units	FL DEP - Industrial Direct Contact	G-DB-01			
Sample Date				3/19/2020	3/19/2020	3/19/2020	3/19/2020
Field Sample ID				G-DB-01 0-1	G-DB-01 10-15	G-DB-01 25-30	DUP 01
Sample Matrix				Soil	Soil	Soil	Soil
Sample Depth				0 - 1 ft	10 - 15 ft	25 - 30 ft	25 - 30 ft
Chrysene	218-01-9	mg/kg	N/A	<0.36	<0.42	<0.44	<0.37
Dibenzo(a,h)anthracene	53-70-3	mg/kg	N/A	<0.36	<0.42	<0.44	<0.37
Dibenzofuran	132-64-9	mg/kg	6300	<0.36	<0.42	<0.44	<0.37
Diethylphthalate	84-66-2	mg/kg	N/A	<0.36	<0.42	<0.44	<0.37
Dimethyl phthalate	131-11-3	mg/kg	N/A	<0.36	<0.42	<0.44	<0.37
Di-N-Butyl phthalate	84-74-2	mg/kg	N/A	<0.36	<0.42	<0.44	<0.37
Di-N-Octyl phthalate	117-84-0	mg/kg	39000	<0.36	<0.42	<0.44	<0.37
Fluoranthene	206-44-0	mg/kg	59000	<0.36	<0.42	<0.44	<0.37
Fluorene	86-73-7	mg/kg	33000	<0.36	<0.42	<0.44	<0.37
Hexachlorobenzene	118-74-1	mg/kg	1.2	<0.36	<0.42	<0.44	<0.37
Hexachlorobutadiene	87-68-3	mg/kg	13	<0.36	<0.42	<0.44	<0.37
Hexachlorocyclopentadiene	77-47-4	mg/kg	50	<0.36	<0.42	<0.44	<0.37
Hexachloroethane	67-72-1	mg/kg	87	<0.36	<0.42	<0.44	<0.37
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	N/A	<0.36	<0.42	<0.44	<0.37
Isophorone	78-59-1	mg/kg	1200	<0.36	<0.42	<0.44	<0.37
m-Nitroaniline	99-09-2	mg/kg	130	<1.9	<2.1	<2.3	<1.9
Naphthalene	91-20-3	mg/kg	300	<0.36	<0.42	<0.44	<0.37
Nitrobenzene	98-95-3	mg/kg	140	<0.36	<0.42	<0.44	<0.37
N-Nitroso-di-N-propylamine	621-64-7	mg/kg	0.2	***<0.36***	***<0.42***	***<0.44***	***<0.37***
N-Nitrosodiphenylamine	86-30-6	mg/kg	730	<0.36	<0.42	<0.44	<0.37
o-Nitroaniline	88-74-4	mg/kg	130	<1.9	<2.1	<2.3	<1.9
Pentachlorophenol	87-86-5	mg/kg	28	<1.9	<2.1	<2.3	<1.9
Phenanthrene	85-01-8	mg/kg	36000	<0.36	<0.42	<0.44	<0.37
Phenol	108-95-2	mg/kg	220000	<0.36	<0.42	<0.44	<0.37
p-Nitroaniline	100-01-6	mg/kg	96	<1.9	<2.1	<2.3	<1.9
Pyrene	129-00-0	mg/kg	45000	<0.36	<0.42	<0.44	<0.37

Notes:

J - Estimated value

< - Non-detectable

-- Not analyzed

N/A - Not applicable

Analyte concentration exceeds the standard for:

FL DEP - Industrial Direct Contact Soils

Table 4: Groundwater Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CASNumber	ReportingUnits	US EPA 2018 Drinking Water Standards	G-DB-01
Sample Date				3/19/2020
Field Sample ID				G-DB-01.GW
Sample Matrix				Groundwater
Metals				
Arsenic	7440-38-2	µg/L	10	9 J
Selenium	7782-49-2	µg/L	50	<20
Silver	7440-22-4	µg/L	N/A	<10
Barium	7440-39-3	µg/L	2000	25
Cadmium	7440-43-9	µg/L	5	0.81 J
Chromium (Total)	7440-47-3	µg/L	100	3.1 J
Copper	7440-50-8	µg/L	1300	4 J
Lead	7439-92-1	µg/L	15	<10
Mercury	7439-97-6	µg/L	2	<0.2
Hydrocarbon				
Total Petroleum Hydrocarbons	TPH	mg/l	N/A	<1
VOCs				
1,1,1-Trichloroethane	71-55-6	µg/L	200	<1
1,1,2,2-Tetrachloroethane	79-34-5	µg/L	N/A	<1
1,1,2-Trichloroethane	79-00-5	µg/L	5	<1
1,1-Dichloroethane	75-34-3	µg/L	N/A	<1
1,1-Dichloroethene	75-35-4	µg/L	7	<1
1,2,3-Trichlorobenzene	87-61-6	µg/L	N/A	<2
1,2,4-Trichlorobenzene	120-82-1	µg/L	70	<2
1,2-Dibromo-3-chloropropane	96-12-8	µg/L	0.2	***<10***
1,2-Dibromoethane	106-93-4	µg/L	0.05	***<1***
1,2-Dichlorobenzene	95-50-1	µg/L	600	<1
1,2-Dichloroethane	107-06-2	µg/L	5	<1
1,2-Dichloropropane	78-87-5	µg/L	5	<2
1,3-Dichlorobenzene	541-73-1	µg/L	N/A	<1
1,4-Dichlorobenzene	106-46-7	µg/L	75	<1
2-Hexanone	591-78-6	µg/L	N/A	<15
4-Methyl-2-pentanone	108-10-1	µg/L	N/A	<15
Acetone	67-64-1	µg/L	N/A	<20
Benzene	71-43-2	µg/L	5	<1
Bromodichloromethane	75-27-4	µg/L	N/A	<1
Bromoform	75-25-2	µg/L	N/A	<5
Bromomethane	74-83-9	µg/L	N/A	<10
Carbon disulfide	75-15-0	µg/L	N/A	<2
Carbon tetrachloride	56-23-5	µg/L	5	<1
Chlorobenzene	108-90-7	µg/L	100	<1
Chloroethane	75-00-3	µg/L	N/A	<10
Chloroform	67-66-3	µg/L	N/A	<1
Chloromethane	74-87-3	µg/L	N/A	<2
cis-1,2-Dichloroethene	156-59-2	µg/L	70	<1
cis-1,3-Dichloropropene	10061-01-5	µg/L	N/A	<2

Table 4: Groundwater Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CASNumber	ReportingUnits	**US EPA 2018 Drinking Water Standards**	G-DB-01
Sample Date				3/19/2020
Field Sample ID				G-DB-01.GW
Sample Matrix				Groundwater
Dibromochloromethane	124-48-1	µg/L	N/A	<3
Dichlorodifluoromethane	75-71-8	µg/L	N/A	<10
Ethylbenzene	100-41-4	µg/L	700	<1
Isopropylbenzene	98-82-8	µg/L	N/A	<2
Methyl ethyl ketone (2-Butanone)	78-93-3	µg/L	N/A	<10
Methyl tert butyl ether	1634-04-4	µg/L	N/A	<2
Methylene chloride	75-09-2	µg/L	5	***<10***
Styrene	100-42-5	µg/L	100	<2
Tetrachloroethene	127-18-4	µg/L	5	<2
Toluene	108-88-3	µg/L	1000	<1
trans-1,2-Dichloroethene	156-60-5	µg/L	100	<2
trans-1,3-Dichloropropene	10061-02-6	µg/L	N/A	<1
Trichloroethene	79-01-6	µg/L	5	<2
Trichlorofluoromethane	75-69-4	µg/L	N/A	<5
Vinyl Chloride	75-01-4	µg/L	2	<1
Xylene (Total)	1330-20-7	µg/L	10000	<4
SVOCs				
1-Methylnaphthalene	90-12-0	µg/L	N/A	<15
2,4,5-Trichlorophenol	95-95-4	µg/L	N/A	<10
2,4,6-Trichlorophenol	88-06-2	µg/L	N/A	<10
2,4-Dichlorophenol	120-83-2	µg/L	N/A	<10
2,4-Dimethylphenol	105-67-9	µg/L	N/A	<10
2,4-Dinitrophenol	51-28-5	µg/L	N/A	<50
2,4-Dinitrotoluene	121-14-2	µg/L	N/A	<15
2,6-Dinitrotoluene	606-20-2	µg/L	N/A	<15
2-Chloronaphthalene	91-58-7	µg/L	N/A	<10
2-Chlorophenol	95-57-8	µg/L	N/A	<10
2-Methylnaphthalene	91-57-6	µg/L	N/A	<15
2-Methylphenol	95-48-7	µg/L	N/A	<10
2-Nitrophenol	88-75-5	µg/L	N/A	<10
3,3-Dichlorobenzidine	91-94-1	µg/L	N/A	<25
3,4-Methylphenol	m&p-Cresol	µg/L	N/A	<10
4,6-Dinitro-2-methylphenol	534-52-1	µg/L	N/A	<50
4-Bromophenyl-phenylether	101-55-3	µg/L	N/A	<10
4-Chloro-3-methylphenol (p-Chlorocresol)	59-50-7	µg/L	N/A	<10
4-Chloroaniline	106-47-8	µg/L	N/A	<50
4-Chlorophenyl-phenylether	7005-72-3	µg/L	N/A	<10
4-Nitrophenol	100-02-7	µg/L	N/A	<50
Acenaphthene	83-32-9	µg/L	N/A	<10
Acenaphthylene	208-96-8	µg/L	N/A	<10
Anthracene	120-12-7	µg/L	N/A	<10
Benzo(a)anthracene	56-55-3	µg/L	N/A	<10

Table 4: Groundwater Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CASNumber	ReportingUnits	**US EPA 2018 Drinking Water Standards**	G-DB-01
Sample Date				3/19/2020
Field Sample ID				G-DB-01.GW
Sample Matrix				Groundwater
Benzo(a)pyrene	50-32-8	µg/L	0.2	***<10***
Benzo(b)fluoranthene	205-99-2	µg/L	N/A	<10
Benzo(g,h,i)perylene	191-24-2	µg/L	N/A	<10
Benzo(k)fluoranthene	207-08-9	µg/L	N/A	<10
bis(2-Chloroethoxy)methane	111-91-1	µg/L	N/A	<10
bis(2-Chloroethyl)ether	111-44-4	µg/L	N/A	<10
bis(2-Chloroisopropyl)ether	108-60-1	µg/L	N/A	<10
bis(2-Ethylhexyl)phthalate	117-81-7	µg/L	6	3.3 J
Butyl benzyl phthalate	85-68-7	µg/L	N/A	<15
Carbazole	86-74-8	µg/L	N/A	<70
Chrysene	218-01-9	µg/L	N/A	<10
Dibenzo(a,h)anthracene	53-70-3	µg/L	N/A	<10
Dibenzofuran	132-64-9	µg/L	N/A	<10
Diethylphthalate	84-66-2	µg/L	N/A	<10
Dimethyl phthalate	131-11-3	µg/L	N/A	<15
Di-N-Butyl phthalate	84-74-2	µg/L	N/A	<10
Di-N-Octyl phthalate	117-84-0	µg/L	N/A	<15
Fluoranthene	206-44-0	µg/L	N/A	<10
Fluorene	86-73-7	µg/L	N/A	<10
Hexachlorobenzene	118-74-1	µg/L	1	***<4***
Hexachlorobutadiene	87-68-3	µg/L	N/A	<15
Hexachlorocyclopentadiene	77-47-4	µg/L	50	<40
Hexachloroethane	67-72-1	µg/L	N/A	<20
Indeno(1,2,3-cd)pyrene	193-39-5	µg/L	N/A	<10
Isophorone	78-59-1	µg/L	N/A	<10
m-Nitroaniline	99-09-2	µg/L	N/A	<50
Naphthalene	91-20-3	µg/L	N/A	<30
Nitrobenzene	98-95-3	µg/L	N/A	<10
N-Nitroso-di-N-propylamine	621-64-7	µg/L	N/A	<10
N-Nitrosodiphenylamine	86-30-6	µg/L	N/A	<10
o-Nitroaniline	88-74-4	µg/L	N/A	<50
Pentachlorophenol	87-86-5	µg/L	1	***<20***
Phenanthrene	85-01-8	µg/L	N/A	<10
Phenol	108-95-2	µg/L	N/A	<5
p-Nitroaniline	100-01-6	µg/L	N/A	<50
Pyrene	129-00-0	µg/L	N/A	<10

Notes:

J - Estimated value

< - Non-detectable

-- Not analyzed

N/A - Not applicable

Analyte concentration exceeds the standard for US EPA 2018 Drinking Water

Table 5 -- On-Site Pneumatic Testing Results
Greenfield Property - Clifton Pier, New Providence, The Bahamas

Probe ID	**Date**	**Initial Pressure (in H_2O)**	**Well Head Vacuum (in H_2O) 1 min @ 0.1**	**Well Head Vacuum (in H_2O) 2 min @ 0.2 L/min**	**Well Head Vacuum (in H_2O) 3 min @ 0.5 L/min**	**Calculated Permeability[1] (m^2)**
G-SB-02	19-Mar-20	0.02	0.05	0.10	0.25	2.41E-12

Notes
min - minutes
L/min - liters per minute
m^2 - square meters

Source: Johnson, P.C., M.W. Kemblowski, and J.D. Colthart. 1990. *Quantitative Analysis for the Cleanup of Hydrocarbon-Contaminated Soils by In-situ Soil Venting.* Ground Water, 28(3):413-429.

Gas permeability calculated using the following parameters:

[1] Permeability was calculated using the following equation (Johnson, P.C., M.W. Kemblowski, and J.D. Colthart. 1990. Quantitative Analysis for the Cleanup of Hydrocarbon-Contaminated Soils by In-situ Soil Venting. Ground Water, 28(3):413-429.):

$$k = (\mu/\pi) * (Q/H) * [\ln(R_W/R_I)] / [P_W * [1 - (P_{atm} / P_W)^2]]$$

Where:
k - Permeability
vapor viscosity(μ) = 0.000182 g/cm-s
π - 3.14
Q - actual vapor flow rate at wellhead
H - well screen length (calculated as half probe radius)
R_W - radius of the well
R_I - radius of influence
P_w - Gauge vacuum at wellhead
P_{atm} - atmospheric pressure (406.8 in. H_20)

Table 6 - Sub-Slab Probe Purging Results

Greenfield Property - Clifton Pier, New Providence, The Bahamas

Sub-Slab Probe ID	Date	Elapsed Time (min)	Sample Flow Rate (L/min)	Cumulative Volume Purged (L)	Parameters			VOC (ppm_v)	Sample Identification			
					CH_4 (%)	CO_2 (%)	O_2 (%)		Sample ID	Summa Canister Number	Initial Vacuum (in.Hg)	Final Vacuum (in.Hg)
G-SB-02	3/19/2020	5	0.200	2.0	0.0	0.3	20.6	13.7	G-SB-02	11616	-30.04	-5.30
		5	0.200	3.0	0.0	0.1	21.0	12.5				
		5	0.200	4.0	0.0	0.1	21.3	10.4				
		5	0.200	5.0	0.0	0.4	20.4	NM				
		5	0.200	6.0	0.0	0.4	20.3	10.6				

Notes

L/min - liters per minute

in. Hg - inches of mercury vacuum

ppm_v - parts per million by volume

NM - not monitored

Table 6 - Subsurface Air Sampling Results
Brownfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CAS Number	USEPA Near Source Soil Gas VISLs	USEPA Target Indoor Air Concentartion VISLs	B-SB-01		B-SB-04		B-SB-08		NO - 2	
Sample Date				3/18/2020	Theoretical IA Concentration	3/18/2020	Theoretical IA Concentration	3/18/2020	Theoretical IA Concentration	3/19/2020	Theoretical IA Concentration
Field Sample ID				B-SB-01		B-SB-04		B-SB-08		NO - 2	
Sample Matrix				Air		Air		Air		Air	
VOCs (ug/m^3)											
1,1,1-Trichloroethane	71-55-6	730000	21900	200 U	-	11 U	-	230 U	-	240 U	-
1,1,2,2-Tetrachloroethane	79-34-5	7	0.211	260 U	-	14 U	-	290 U	-	300 U	-
1,1,2-Trichloroethane	79-00-5	26	0.767	200 U	-	11 U	-	230 U	-	240 U	-
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	730000	21900	290 U	-	15 U	-	330 U	-	330 U	-
1,1-Dichloroethane	75-34-3	256	7.67	150 U	-	8.1 U	-	**1000**	**30**	23 J	-
1,1-Dichloroethene	75-35-4	29200	876	150 U	-	7.9 U	-	170 U	-	170 U	-
1,2,4-Trichlorobenzene	120-82-1	292	8.76	2800 U	-	150 U	-	3100 U	-	3200 U	-
1,2,4-Trimethylbenzene	95-63-6	8760	263	180 U	-	**21**	**0.63**	210 U	-	**17000**	**510**
1,2-Dibromoethane	106-93-4	1	0.0204	290 U	-	15 U	-	330 U	-	330 U	-
1,2-Dichlorobenzene	95-50-1	29200	876	220 U	-	12 U	-	260 U	-	260 U	-
1,2-Dichloroethane	107-06-2	16	0.472	150 U	-	8.1 U	-	170 U	-	180 U	-
1,2-Dichloropropane	78-87-5	110	3.31	170 U	-	9.2 U	-	200 U	-	200 U	-
1,2-Dichlorotetrafluoroethane (Freon-114)	76-14-2	-		260 U	-	14 U	-	300 U	-	300 U	-
1,3,5-Trimethylbenzene	108-67-8	8760	263	180 U	-	6.9 J	-	210 U	-	6100 U	-
1,3-Dichlorobenzene	541-73-1	-		220 U	-	12 U	-	260 U	-	260 U	-
1,4-Dichlorobenzene	106-46-7	37	1.11	220 U	-	12 U	-	260 U	-	260 U	-
1,4-Dioxane	123-91-1	82	2.45	3400 U	-	180 U	-	3800 U	-	3900 U	-
4-Methyl-2-pentanone	108-10-1	438000	13100	380 U	-	**33**	**0.99**	430 U	-	440 U	-
Acetone	67-64-1	4510000	135000	2200 U	-	**2400**	**72**	2500 U	-	2600 U	-
Benzene	71-43-2	52	1.57	**160**	**4.8**	**68**	**2.04**	**2700**	**81**	5600 U	-
benzyl chloride	100-44-7	8	0.25	770 U	-	41 U	-	880 U	-	900 U	-
Bromodichloromethane	75-27-4	11	0.331	250 U	-	13 U	-	280 U	-	**6100**	**183**
Bromoform	75-25-2	372	11.1	390 U	-	21 U	-	440 U	-	450 U	-
Bromomethane	74-83-9	730	21.9	150 U	-	7.8 U	-	160 U	-	170 U	-
Carbon disulfide	75-15-0	102000	3070	**590**	**17.7**	**29**	**0.87**	320 J	-	310 J	-
Carbon tetrachloride	56-23-5	68	2.04	230 U	-	13 U	-	270 U	-	270 U	-
Chlorobenzene	108-90-7	7300	219	170 U	-	9.2 U	-	110 J	-	200 U	-
Chloroethane	75-00-3	1460000	43800	390 U	-	21 U	-	450 U	-	460 U	-
Chloroform	67-66-3	18	0.533	180 U	-	2.1 J	-	210 U	-	210 U	-
Chloromethane	74-87-3	13100	394	190 U	-	10 U	-	220 U	-	160 J	-
cis-1,2-Dichloroethene	156-59-2	-	-	150 U	-	7.9 U	-	170 U	-	32 J	-
cis-1,3-Dichloropropene	10061-01-5	-	-	170 U	-	9.1 U	-	190 U	-	200 U	-

Table 6 - Subsurface Air Sampling Results
Brownfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CAS Number	USEPA Near Source Soil Gas VISLs	USEPA Target Indoor Air Concentartion VISLs	B-SB-01		B-SB-04		B-SB-08		NO - 2	
Sample Date				3/18/2020	Theoretical IA Concentration	3/18/2020	Theoretical IA Concentration	3/18/2020	Theoretical IA Concentration	3/19/2020	Theoretical IA Concentration
Field Sample ID				B-SB-01		B-SB-04		B-SB-08		NO - 2	
Sample Matrix				Air		Air		Air		Air	
Cyclohexane	110-82-7	876000	26300	**12000**	**360**	**22**	**0.66**	**19000**	**570**	**28000**	**840**
Dibromochloromethane	124-48-1	-	-	320 U	-	17 U	-	360 U	-	370 U	-
Dichlorodifluoromethane	75-71-8	14600	438	460 U	-	2.7 J	-	520 U	-	540 U	-
Ethylbenzene	100-41-4	164	4.91	32 J	-	**19**	**0.57**	93 J	-	**17000**	**510**
Hexane (n-Hexane)	110-54-3	102000	3070	**14000**	**420**	**61**	**1.83**	**14000**	**420**	**27000**	**810**
Isopropyl Alcohol	67-63-0	29200	876	2300 U	-	100 J	-	2600 U	-	2700 U	-
Isopropylbenzene	98-82-8	58400	1750	**820**	**24.6**	4.7 J	-	**1100**	**33**	**3700**	**111**
Methyl ethyl ketone (2-Butanone)	78-93-3	730000	21900	180 J	-	**500**	**15**	260 J	-	360 J	-
Methyl tert butyl ether	1634-04-4	1570	47.2	670 U	-	36 U	-	220 J	-	220 J	-
Methylene chloride	75-09-2	40900	1230	650 U	-	35 U	-	740 U	-	750 U	-
Styrene	100-42-5	146000	4380	160 U	-	8.5 U	-	87 J	-	71 J	-
Tetrachloroethene	127-18-4	1570	47.2	250 U	-	5.5 J	-	290 U	-	290 U	-
Tetrahydrofuran	109-99-9	292000	8760	2800 U	-	6.5 J	-	3100 U	-	3200 U	-
Toluene	108-88-3	730000	21900	140 U	-	**740**	**22.2**	160 U	-	**2200**	**66**
trans-1,2-Dichloroethene	156-60-5	-	-	150 U	-	7.9 U	-	21 J	-	170 U	-
trans-1,3-Dichloropropene	10061-02-6	-	-	170 U	-	9.1 U	-	190 U	-	200 U	-
Trichloroethene	79-01-6	100	2.99	200 U	-	1 J	-	230 U	-	230 U	-
Trichlorofluoromethane	75-69-4	-	-	210 U	-	2.6 J	-	240 U	-	240 U	-
Vinyl Acetate	108-05-4	29200	876	3300 U	-	180 U	-	3700 U	-	3800 U	-
Vinyl Bromide (Bromoethene)	593-60-2	13	0.383	160 U	-	8.7 U	-	190 U	-	190 U	-
Vinyl Chloride	75-01-4	93	2.79	39 J	-	5.1 U	-	**720**	**21.6**	**230**	**6.9**
Xylene (m,p)	179601-23-1	14600	438	83 J	-	**44**	**1.32**	170 J	-	**17000**	**510**
Xylene (o)	95-47-6	14600	438	160 U	-	**21**	**0.63**	140 J	-	**2600**	**78**
SVOCs (ug/m^3)											
Hexachlorobutadiene	87-68-3	18.6	0.557	400 U	-	21 U	-	450 U	-	460 U	-
Naphthalene	91-20-3	12	0.361	490 U	-	26 U	-	560 U	-	**2400**	**72**

Notes:

µg/m3 - micrograms per cubic meter

Bold - detected concentration

J - estimated concentration

U - Not detected, associated value is the reporting limit

- No Screening level

Concentrations detected in exceedance of USEPA Near Source Soil Gas VISLs are highlighted in orange

EPA OSWER Attenuation Factor ("Near Source" exterior soil gas to Indoor Air) - 0.03

Table 7 - Subsurface Air Sampling Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CAS Number	USEPA Near Source Soil Gas VISLs	USEPA Target Indoor Air Concentartion VISLs	G-SB-02	
Sample Date				3/19/2020	Theoretical IA Concentration
Field Sample ID				G-SB-02	
Sample Matrix				Air	
VOCs (ug/m^3)					
1,1,1-Trichloroethane	71-55-6	730000	21900	11 U	-
1,1,2,2-Tetrachloroethane	79-34-5	7	0.211	14 U	-
1,1,2-Trichloroethane	79-00-5	26	0.767	11 U	-
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	730000	21900	15 U	-
1,1-Dichloroethane	75-34-3	256	7.67	8.1 U	-
1,1-Dichloroethene	75-35-4	29200	876	7.9 U	-
1,2,4-Trichlorobenzene	120-82-1	292	8.76	150 U	-
1,2,4-Trimethylbenzene	95-63-6	8760	263	**12**	0.36
1,2-Dibromoethane	106-93-4	1	0.0204	15 U	-
1,2-Dichlorobenzene	95-50-1	29200	876	12 U	-
1,2-Dichloroethane	107-06-2	16	0.472	8.1 U	-
1,2-Dichloropropane	78-87-5	110	3.31	9.2 U	-
1,2-Dichlorotetrafluoroethane (Freon-114)	76-14-2	-		14 U	-
1,3,5-Trimethylbenzene	108-67-8	8760	263	3.2 J U	-
1,3-Dichlorobenzene	541-73-1	-		12 U	-
1,4-Dichlorobenzene	106-46-7	37	1.11	12 U	-
1,4-Dioxane	123-91-1	82	2.45	180 U	-
4-Methyl-2-pentanone	108-10-1	438000	13100	5.6 J U	-
Acetone	67-64-1	4510000	135000	**150**	4.5
Benzene	71-43-2	52	1.57	**140**	4.2
benzyl chloride	100-44-7	8	0.25	41 U	-
Bromodichloromethane	75-27-4	11	0.331	13 U	-
Bromoform	75-25-2	372	11.1	5.3 J U	-
Bromomethane	74-83-9	730	21.9	7.8 U	-
Carbon disulfide	75-15-0	102000	3070	**27**	0.81
Carbon tetrachloride	56-23-5	68	2.04	13 U	-
Chlorobenzene	108-90-7	7300	219	0.97 J U	-
Chloroethane	75-00-3	1460000	43800	21 U	-
Chloroform	67-66-3	18	0.533	2.1 J U	-
Chloromethane	74-87-3	13100	394	3.5 J U	-
cis-1,2-Dichloroethene	156-59-2	-	-	7.9 U	-
cis-1,3-Dichloropropene	10061-01-5	-	-	9.1 U	-
Cyclohexane	110-82-7	876000	26300	6.6 J U	-
Dibromochloromethane	124-48-1	-	-	17 U	-
Dichlorodifluoromethane	75-71-8	14600	438	2.2 J U	-
Ethylbenzene	100-41-4	164	4.91	6 J U	-
Hexane (n-Hexane)	110-54-3	102000	3070	12 J U	-
Isopropyl Alcohol	67-63-0	29200	876	120 U	-
Isopropylbenzene	98-82-8	58400	1750	**64**	1.92
Methyl ethyl ketone (2-Butanone)	78-93-3	730000	21900	29 J U	-
Methyl tert butyl ether	1634-04-4	1570	47.2	36 U	-

Table 7 - Subsurface Air Sampling Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CAS Number	USEPA Near Source Soil Gas VISLs	USEPA Target Indoor Air Concentartion VISLs	G-SB-02	
Sample Date				3/19/2020	Theoretical IA Concentration
Field Sample ID				G-SB-02	
Sample Matrix				Air	
Methylene chloride	75-09-2	40900	1230	35 U	-
Styrene	100-42-5	146000	4380	8.5 U	-
Tetrachloroethene	127-18-4	1570	47.2	14 U	-
Tetrahydrofuran	109-99-9	292000	8760	150 U	-
Toluene	108-88-3	730000	21900	**24**	0.72
trans-1,2-Dichloroethene	156-60-5	-	-	7.9 U	-
trans-1,3-Dichloropropene	10061-02-6	-	-	9.1 U	-
Trichloroethene	79-01-6	100	2.99	11 U	-
Trichlorofluoromethane	75-69-4	-	-	11 U	-
Vinyl Acetate	108-05-4	29200	876	180 U	-
Vinyl Bromide (Bromoethene)	593-60-2	13	0.383	8.7 U	-
Vinyl Chloride	75-01-4	93	2.79	5.1 U	-
Xylene (m,p)	179601-23-1	14600	438	12 J U	-
Xylene (o)	95-47-6	14600	438	5.4 J U	-
SVOCs (ug/m^3)					
Hexachlorobutadiene	87-68-3	18.6	0.557	21 U	-
Naphthalene	91-20-3	12	0.361	26 U	-

Notes:

µg/m3 - micrograms per cubic meter

Bold - detected concentration

J - estimated concentration

U - Not detected, associated value is the reporting limit

- No Screening level

Concentrations detected in exceedance of USEPA Near Source Soil Gas VISLs are highlighted in orange

EPA OSWER Attenuation Factor ("Near Source" exterior soil gas to Indoor Air) - 0.03

Table 8: ATSDR Inhalatation MRLs
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Consituents of Concern	CAS Numbers	ATSDR Inhalation MRL [(a)]						
		Acute		Intermediate		Chronic		
		mg/m^3	ppm	mg/m^3	ppm	mg/m^3	$\mu g/m^3$	ppm
1,1,1-Trichloroethane	71556		2.00E+00		7.00E-01	--	--	--
1,1,2-Trichloroethane	79005		3.00E-02		2.00E-03	--	--	--
1,1-Dichloroethane	75343	--	--	--	--	--	--	--
1,1-Dichloroethene	75354	--	--		1.00E-03			6.00E-04
1,2,3-Trichlorobenzene	87616	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120821	--	--	--	--	--	--	--
1,2,4-Trimethylbenzene	95636	--	--	--	--	--	--	--
1,2-Dichlorobenzene	95501	--	--	--	--	--	--	--
1,2-Dichloroethane	10762	--	--	--	--			6.00E-01
1,2-Dichloropropane	78875		2.00E-02		2.00E-03	--	--	--
1,3-Dichlorobenzene	541731	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106467		2.00E+00		2.00E-01			1.00E-02
1,4-Dioxane	123911		2.00E+00		2.00E-01			3.00E-02
2,4-Dimethylphenol	105679	--	--	--	--	--	--	--
2-Methylnaphthalene	91576	--	--	--	--	--	--	--
2-Methylphenol	95487	--	--	--	--	--	--	--
3,4-Methylphenol	15831104	--	--	--	--	--	--	--
Acenaphthene	83329	--	--	--	--	--	--	--
Acenaphthylene	208968	--	--	--	--	--	--	--
Acetone [(c)]	67641	6.18E+01	2.60E+01		1.30E+01	3.09E+01		1.30E+01
Aluminum	7429905	--	--	--	--	--	--	--
Anthracene	120127	--	--	--	--	--	--	--
Antimony	7440360	1.00E-03		1.00E-03		3.00E-04		
Aroclor-1254	11097691	--	--	--	--	--	--	--
Aroclor-1260	11096825	--	--	--	--	--	--	--
Arsenic	7440382	--	--	--	--	--	--	--
Barium	7440393	--	--	--	--	--	--	--
Benzene	71432		9.00E-03		6.00E-03			3.00E-03
Benzo(a)anthracene	56553	--	--	--	--	--	--	--
Benzo(a)pyrene	50328	--	--	--	--	--	--	--
Benzo(b)fluoranthene	205992	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	191242	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207089	--	--	--	--	--	--	--
Beryllium	7440417	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	117817	--	--	--	--	--	--	--
Bromomethane	74839	--	--	--	2.00E-02			1.00E-03
Cadmium	7440439	3.00E-05		--	--	1.00E-05		
Calcium	7440702	--	--	--	--	--	--	--
Carbazole	86748	--	--	--	--	--	--	--
Carbon disulfide	75150	--	--	--	--			3.00E-01
Carbon tetrachloride	56235	--	--		3.00E-02			3.00E-02
Chlorobenzene	108907	--	--	--	--	--	--	--
Chloroethane	75003		1.50E+01	--	--	--	--	--
Chloroform	67663		1.00E-01		5.00E-02			2.00E-02
Chloromethane	74873		5.00E-01		2.00E-01			5.00E-02
Chromium (Total) [(b)]	7440473	--	--	3.00E-04		--	--	--
Chrysene	218019	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	156592	--	--	--	--	--	--	--
Cobalt	7440484	--	--	--	--	1.00E-04		
Copper	7440508	--	--	--	--	--	--	--
Cyclohexane	110827	--	--	--	--	--	--	--

Table 8: ATSDR Inhalatation MRLs
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Consituents of Concern	CAS Numbers	ATSDR Inhalation MRL [(a)]						
		Acute		Intermediate		Chronic		
		mg/m^3	ppm	mg/m^3	ppm	mg/m^3	$\mu g/m^3$	ppm
Cyclohexane, Methyl-	108872	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	53703	--	--	--	--	--	--	--
Dibenzofuran	132649	--	--	--	--	--	--	--
Di-N-Butyl phthalate	84742	--	--	--	--	--	--	--
Ethylbenzene	100414		5.00E+00		2.00E+00			6.00E-02
Fluoranthene	206440	--	--	--	--	--	--	--
Fluorene	86737	--	--	--	--	--	--	--
Hexane (N-Hexane)	110543	--	--	--	--			6.00E-01
Indeno(1,2,3-cd)pyrene	193395	--	--	--	--	--	--	--
Iron	7439896	--	--	--	--	--	--	--
Isopropylbenzene	98828	--	--	--	--	--	--	--
Lead	7439921	--	--	--	--	--	--	--
Magnesium	7439954	--	--	--	--	--	--	--
Manganese	68186903	--	--	--	--		3.00E-01	
Mercury	7439976	--	--	--	--	2.00E-04		
Methyl tert butyl ether	1634044		2.00E+00		7.00E-01			7.00E-01
Methylene chloride	75092		6.00E-01		3.00E-01			3.00E-01
Naphthalene	91203	--	--	--	--			7.00E-04
Nickel	7440020	--	--	2.00E-04		9.00E-05		
Particle Size		--	--	--	--	--	--	--
Pentachlorophenol	87865	--	--	--	--	--	--	--
Phenanthrene	85018	--	--	--	--	--	--	--
Phenol	108952	--	--	--	--	--	--	--
Potassium	7440097	--	--	--	--	--	--	--
Pyrene	129000	--	--	--	--	--	--	--
Selenium	7782492	--	--	--	--	--	--	--
Silver	7440224	--	--	--	--	--	--	--
Sodium	7440265	--	--	--	--	--	--	--
Styrene	100425		5.00E+00	--	--	--		2.00E-01
Tetrachloroethene	127184		6.00E-03		6.00E-03			6.00E-03
Thallium	7440280	--	--	--	--	--	--	--
Toluene	108883	--	2.00E+00	--	--	--	--	1.00E+00
Total EPH (C9-C40)		--	--	--	--	--	--	--
Total PCBs	1336363	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons		--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156605		2.00E-01		2.00E-01	--	--	--
Trichloroethene	79016	--	--	--	4.00E-04			4.00E-04
Vanadium	7440622	8.00E-04		--	--	1.00E-04		
Vinyl Acetate	108054	--	--		1.00E-02	--	--	--
Vinyl Chloride	75014		5.00E-01		3.00E-02	--	--	--
Xylene (m,p)	179601231	--	--	--	--	--	--	--
Xylene (o)	95476	--	--	--	--	--	--	--
Xylene (Total)	1330207		2.00E+00		6.00E-01		5.00E-02	
Zinc	7440666	--	--	--	--	--	--	--

Notes:

"--" Not Available

$m^3/\mu g$ = cubic meters per microgram

mg/m^3 = milligrams per cubic meters

ppm = part per million

$\mu g/m^3$ = microgramer per cubic meters

[(a)] Agency for Toxic Substances and Disease Registry (ATSDR) Mininmal Risk Levels (MRLs) for inhalation, July 2020. (http://www.atsdr.cdc.gov/mrls/mrllist.asp)

[(b)] The ATSDR Inhalation MRL for Chromium (total) was conservatively assumed to be Chromium (IV), particulates.

[(c)] The MRL in mg/m^3 for acetone was calculated using the following formula:

Concentration (mg/m3) = Concentration (ppm) X (molecular mass (g/mol)) / molar volume (L))

Table 9: Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CAS Number	ATSDR Chronic Inhalation MRLs[(a)(d)]	Cal/OSHA TWA PELs[(b)(d)]	ACGIH® 2020 TLV® TWAs[(c)(d)]	G-AM-01	G-AM-02A
Sample Date					3/19/2020	3/19/2020
Field Sample ID					G-AM-01	G-AM-02A
Sample Matrix					Air	Air
Units		ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3
Metals						
Arsenic	7440-38-2	--	10.00	10.00	0.25 U	0.25 U
Selenium	7782-49-2	--	200.00	200.00	0.25 U	0.25 U
Silver	7440-22-4	--	10.00	10.00	0.1 U	0.1 U
Barium	7440-39-3	--	500.00	500.00	0.125 U	0.125 U
Cadmium	7440-43-9	0.01	5.00	2.00	0.025 U	0.025 U
Chromium (Total)[(f)]	7440-47-3	0.30[(e)]	5.00	0.20	5 U	5 U
Copper	7440-50-8	--	100.00	200.00	0.125 U	0.125 U
Lead	7439-92-1	--	50.00	50.00	0.125 U	0.125 U
Mercury	7439-97-6	0.20	25.00	25.00	0.0106 U	0.0106 U
PCBs						
Aroclor-1016	12674-11-2	--	--	--	1 U	1 U
Aroclor-1221	11104-28-2	--	--	--	1 U	1 U
Aroclor-1232	11141-16-5	--	--	--	1 U	1 U
Aroclor-1242	53469-21-9	--	1000.00	1000.00	1 U	1 U
Aroclor-1248	12672-29-6	--	--	--	1 U	1 U
Aroclor-1254	11097-69-1	--	500.00	500.00	1 U	1 U
Aroclor-1260	11096-82-5	--	--	--	1 U	1 U
VOCs						
1,1,1-Trichloroethane	71-55-6	3819.22	1909611.45	1909611.45	22 U	38 U
1,1,2,2-Tetrachloroethane	79-34-5	--	6867.08	6867.08	27 U	48 U
1,1,2-Trichloroethane	79-00-5	10.91[(e)]	54560.33	54560.33	22 U	38 U
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	--	7664621.68	7664621.68	31 U	54 U
1,1-Dichloroethane	75-34-3	--	404744.38	404744.38	16 U	28 U
1,1-Dichloroethene	75-35-4	2.38	--	--	16 U	28 U
1,2,4-Trichlorobenzene	120-82-1	--	--	--	300 U	520 U
1,2,4-Trimethylbenzene	95-63-6	--	--	--	20 U	34 U
1,2-Dibromoethane	106-93-4	--	--	--	31 U	54 U
1,2-Dichlorobenzene	95-50-1	--	150306.75	150306.75	24 U	42 U
1,2-Dichloroethane	107-06-2	2428.47	4047.44	40474.44	16 U	28 U
1,2-Dichloropropane	78-87-5	9.24[(e)]	346625.77	46216.77	18 U	32 U
1,2-Dichlorotetrafluoroethane (Freon-114)	76-14-2	--	6989775.05	6989775.05	28 U	49 U
1,3,5-Trimethylbenzene	108-67-8	--	--	--	20 U	34 U
1,3-Dichlorobenzene	541-73-1	--	--	--	24 U	42 U
1,4-Dichlorobenzene	106-46-7	60.12	60122.7	60122.7	24 U	42 U
1,4-Dioxane	123-91-1	108.11	1008.98	72070.35	360 U	630 U
4-Methyl-2-pentanone	108-10-1	--	204908.98	81963.19	41 U	72 U
Acetone	67-64-1	30880.98	1187730.06	593865.03	**340**	400 J
Benzene	71-43-2	9.58	3194.68	1597.34	**2700**	**2200**
benzyl chloride	100-44-7	--	155.31	5177.1	83 U	140 U
Bromodichloromethane	75-27-4	--	--	--	27 U	47 U
Bromoform	75-25-2	--	5169.73	5169.73	41 U	72 U
Bromomethane	74-83-9	3.88	3883.03	3883.03	16 U	27 U
Carbon disulfide	75-15-0	934.23	3114.11	3114.11	31 U	54 U
Carbon tetrachloride	56-23-5	188.71	12580.78	31451.94	25 U	44 U
Chlorobenzene	108-90-7	--	46053.17	46053.17	**110**	**62**
Chloroethane	75-00-3	39582.82[(e)]	263885.48	263885.48	42 U	74 U
Chloroform	67-66-3	97.67	9766.87	48834.36	20 U	34 U
Chloromethane	74-87-3	103.25	103251.53	103251.53	21 U	36 U
cis-1,2-Dichloroethene	156-59-2	--	--	--	16 U	28 U
cis-1,3-Dichloropropene	10061-01-5	--	--	--	18 U	32 U
Cyclohexane	110-82-7	--	1032638.04	344212.68	34 U	60 U
Dibromochloromethane	124-48-1	--	--	--	34 U	60 U

Table 9: Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Station ID	CAS Number	ATSDR Chronic Inhalation MRLs(a)(d)	Cal/OSHA TWA PELs(b)(d)	ACGIH® 2020 TLV® TWAs(c)(d)	G-AM-01	G-AM-02A
Sample Date					3/19/2020	3/19/2020
Field Sample ID					G-AM-01	G-AM-02A
Sample Matrix					Air	Air
Units		ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3
Dichlorodifluoromethane	75-71-8	--	4944785.28	4944785.28	49 U	87 U
Ethylbenzene	100-41-4	260.61	21717.79	86871.17	14 J	6.8 J
Hexane (n-Hexane)	110-54-3	2114.60	176216.77	176216.77	56 U	99 U
Isopropyl Alcohol	67-63-0	--	983165.64	491582.82	15 J	430 U
Isopropylbenzene	98-82-8	--	245797.55	245797.55	16 J	140 U
Methyl ethyl ketone (2-Butanone)	78-93-3	--	589856.85	589856.85	17 J	**260**
Methyl tert butyl ether	1634-04-4	2523.72	--	--	18 J	130 U
Methylene chloride	75-09-2	1042.21	173701.43	173701.43	19 J	120 U
Styrene	100-42-5	851.53	212883.44	42576.69	20 J	30 U
Tetrachloroethene	127-18-4	40.69	169529.65	169529.65	21 J	47 U
Tetrahydrofuran	109-99-9	--	589832.31	147458.08	22 J	520 U
Toluene	108-88-3	3768.51	37685.07	75370.14	23 J	26 U
trans-1,2-Dichloroethene	156-60-5	792.97(e)	--	--	24 J	28 U
trans-1,3-Dichloropropene	10061-02-6	--	--	--	25 J	32 U
Trichloroethene	79-01-6	2.15	134355.83	53742.33	26 J	38 U
Trichlorofluoromethane	75-69-4	--	--	--	27 J	39 U
Vinyl Acetate	108-05-4	35.21(e)	--	--	28 J	620 U
Vinyl Bromide (Bromoethene)	593-60-2	--	--	--	29 J	31 U
Vinyl Chloride	75-01-4	--	2556.24	2556.24	30 J	18 U
Xylene (m,p)	179601-23-1	--	--	--	31 J	120 U
Xylene (o)	95-47-6	--	--	--	32 J	30 U
Xylene (Total)	1330207	217.18	434355.83	434355.83	--	--
SVOCs						
Acenaphthene	83-32-9	--	--	--	10 U	10 U
Acenaphthylene	208-96-8	--	--	--	10 U	10 U
Anthracene(g)	120-12-7	--	200.00	200.00	10 U	10 U
Benzo(a)anthracene(g)	56-55-3	--	200.00	200.00	10 U	10 U
Benzo(a)pyrene	50-32-8	--	--	--	10 U	10 U
Benzo(b)fluoranthene	205-99-2	--	--	--	10 U	10 U
Benzo(g,h,i)perylene	191-24-2	--	--	--	10 U	10 U
Benzo(k)fluoranthene	207-08-9	--	--	--	10 U	10 U
Chrysene(g)	218-01-9	--	200.00	200.00	10 U	10 U
Dibenzo(a,h)anthracene	53-70-3	--	--	--	10 U	10 U
Fluoranthene	206-44-0	--	--	--	10 U	10 U
Fluorene	86-73-7	--	--	--	10 U	10 U
Hexachlorobutadiene	87-68-3	--	--	--	43 U	75 U
Indeno(1,2,3-cd)pyrene	193-39-5	--	--	--	10 U	10 U
Naphthalene	91-20-3	3.67	524.23	52422.90	52 U	92 U
Phenanthrene(g)	85-01-8	--	200.00	200.00	10 U	10 U
Pyrene(g)	129-00-0	--	200.00	200.00	10 U	10 U

Notes:

Bold - detected concentration

Grey - detected concetration or detection limit exceeds ATSDR Chronic Inhalation MRL only

Blue - detected concentration or detection limit exceeds ATSDR Chronic Inhalation MRL and ACGIH® TLV TWA® only

Purple - detected concentration or detection limit exceeds ATSDR Chronic Inhalation MRL and CAL/OSHA PEL only

Red - detected concentration or detection limit exceeds ATSDR Chronic Inhalation MRL, CAL/OSHA PEL and ACGIH® TLV TWA®

J - Estimated value

U - Non-detectable

-- Not available

$\mu g/m^3$ = microgram per cubic meter

ppm = part per million

(a) Agency for Toxic Substances and Disease Registry (ATSDR) Mininmal Risk Levels (MRLs) for inhalation, July 2020. (http://www.atsdr.cdc.gov/mrls/mrllist.asp)

(b) California Division of Occupational Safety and Health (Cal/OSHA) 8-hr Time Weighted Average (TWA) Permissible Exposure Limits (PELs), October 2019. (https://www.osha.gov/dsg/annotated-pels/tablez-1.html)

(c) American Conference of Governmental Industrial Hygienists (ACGIH®) 2020 Threshold Limit Values (TLVs®) 8-hr time weighted averages (TWAs), 2020. (https://www.osha.gov/dsg/annotated-pels/tablez-1.html)

(d)ATSDR Chronic Inhalation MRLs, Cal/OSHA TWA PELs and ACGIH® 2020 TLV TWAs® given in ppm were converted to ug/m^3 using the following formula:

Concentration (ug/m^3) = (1000 X Concentration (ppm) X molecular mass (g/mol)) / (molar volume (L))

(e) ATSDR Chronic Inhalation MRL is not available. ATSDR Intermediate or Acute Inhalation MRL provided instead.

(f) The ATSDR Chronic Inhalation MRL, Cal/OSHA TWA PEL and ACGIH® 2020 TLV TWA® for Chromium (total) were conservatively assumed to be Chromium (IV) particulates.

(g)Cal/OSHA TWA PELs and ACGIH® 2020 TLV TWAs are derived from values for Coal tar pitch volatiles (benzene soluble fraction, anthracene, benzo(a)pyrene, phenanthrene, acridine, chrysene, pyrene).

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-01			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m^3)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	7:22:52	0.05	-	-	-	-
3/19/2020	7:23:52	0.014	-	-	-	-
3/19/2020	7:24:52	0.013	-	-	-	-
3/19/2020	7:25:52	0.014	-	-	-	-
3/19/2020	7:26:52	0.015	-	-	-	-
3/19/2020	7:27:52	0.013	-	-	-	-
3/19/2020	7:28:52	0.014	-	-	-	-
3/19/2020	7:29:52	0.014	-	-	-	-
3/19/2020	7:30:52	0.014	-	-	-	-
3/19/2020	7:31:52	0.014	-	-	-	-
3/19/2020	7:32:52	0.013	-	-	-	-
3/19/2020	7:33:52	0.015	-	-	-	-
3/19/2020	7:34:52	0.014	-	-	-	-
3/19/2020	7:35:52	0.014	-	-	-	-
3/19/2020	7:36:52	0.013	-	-	-	-
3/19/2020	7:37:52	0.013	-	-	-	-
3/19/2020	7:38:52	0.013	-	-	-	-
3/19/2020	7:39:52	0.013	-	-	-	-
3/19/2020	7:40:52	0.013	-	-	-	-
3/19/2020	7:41:52	0.013	-	-	-	-
3/19/2020	7:42:52	0.012	-	-	-	-
3/19/2020	7:43:52	0.013	-	-	-	-
3/19/2020	7:44:52	0.013	-	-	-	-
3/19/2020	7:45:52	0.014	-	-	-	-
3/19/2020	7:46:52	0.013	-	-	-	-
3/19/2020	7:47:52	0.013	-	-	-	-
3/19/2020	7:48:52	0.013	-	-	-	-
3/19/2020	7:49:52	0.013	-	-	-	-
3/19/2020	7:50:52	0.013	-	-	-	-
3/19/2020	7:51:52	0.013	-	-	-	-
3/19/2020	7:52:52	0.013	-	-	-	-
3/19/2020	7:53:52	0.013	-	-	-	-
3/19/2020	7:54:52	0.014	-	-	-	-
3/19/2020	7:55:52	0.013	-	-	-	-
3/19/2020	7:56:52	0.013	-	-	-	-
3/19/2020	7:57:52	0.013	-	-	-	-
3/19/2020	7:58:52	0.013	-	-	-	-
3/19/2020	7:59:52	0.012	-	-	-	-
3/19/2020	8:00:52	0.012	-	-	-	-
3/19/2020	8:01:52	0.012	-	-	-	-
3/19/2020	8:02:52	0.012	-	-	-	-
3/19/2020	8:03:52	0.014	-	-	-	-

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-01			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m³)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	8:04:52	0.012	-	-	-	-
3/19/2020	8:05:52	0.012	-	-	-	-
3/19/2020	8:06:52	0.012	-	-	-	-
3/19/2020	8:07:52	0.012	-	-	-	-
3/19/2020	8:08:52	0.013	-	-	-	-
3/19/2020	8:09:52	0.014	-	-	-	-
3/19/2020	8:10:52	0.012	-	-	-	-
3/19/2020	8:11:52	0.011	-	-	-	-
3/19/2020	8:12:52	0.012	-	-	-	-
3/19/2020	8:13:52	0.012	-	-	-	-
3/19/2020	8:14:52	0.013	-	-	-	-
3/19/2020	8:15:52	0.014	-	-	-	-
3/19/2020	8:16:52	0.012	-	-	-	-
3/19/2020	8:17:52	0.011	-	-	-	-
3/19/2020	8:18:52	0.011	-	-	-	-
3/19/2020	8:19:52	0.011	-	-	-	-
3/19/2020	8:20:52	0.012	-	-	-	-
3/19/2020	8:21:52	0.012	-	-	-	-
3/19/2020	8:22:52	0.012	-	-	-	-
3/19/2020	8:23:52	0.013	-	-	-	-
3/19/2020	8:24:52	0.013	-	-	-	-
3/19/2020	8:25:52	0.013	-	-	-	-
3/19/2020	8:26:52	0.018	-	-	-	-
3/19/2020	8:27:52	0.021	-	-	-	-
3/19/2020	8:28:52	0.014	-	-	-	-
3/19/2020	8:29:52	0.014	-	-	-	-
3/19/2020	8:30:52	0.012	-	-	-	-
3/19/2020	8:31:52	0.011	-	-	-	-
3/19/2020	8:32:52	0.011	-	-	-	-
3/19/2020	8:33:52	0.011	-	-	-	-
3/19/2020	8:34:52	0.011	-	-	-	-
3/19/2020	8:35:52	0.01	-	-	-	-
3/19/2020	8:36:52	0.012	-	-	-	-
3/19/2020	8:37:52	0.011	-	-	-	-
3/19/2020	8:38:52	0.01	-	-	-	-
3/19/2020	8:39:52	0.01	-	-	-	-
3/19/2020	8:40:52	0.01	-	-	-	-
3/19/2020	8:41:52	0.01	-	-	-	-
3/19/2020	8:42:52	0.01	-	-	-	-
3/19/2020	8:43:52	0.01	-	-	-	-
3/19/2020	8:44:52	0.01	-	-	-	-
3/19/2020	8:45:52	0.01	-	-	-	-

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-01			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m³)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	8:46:52	0.009	0	0	0	0
3/19/2020	8:47:52	0.01	0	0	0	0
3/19/2020	8:48:52	0.011	0	0	0	0
3/19/2020	8:49:52	0.009	0	0	0	0
3/19/2020	8:50:52	0.01	0	0	0	0
3/19/2020	8:51:52	0.01	0	0	0	0
3/19/2020	8:52:52	0.009	0	0	0	0
3/19/2020	8:53:52	0.009	0	0	0	0
3/19/2020	8:54:52	0.008	0	0	0	0
3/19/2020	8:55:52	0.009	0	0	0	0
3/19/2020	8:56:52	0.008	0	0	0	0
3/19/2020	8:57:52	0.009	0	0	0	0
3/19/2020	8:58:52	0.008	0	0	0	0
3/19/2020	8:59:52	0.008	0	0	0	0
3/19/2020	9:00:52	0.008	0	0	0	0
3/19/2020	9:01:52	0.007	0	0	0	0
3/19/2020	9:02:52	0.006	0	0	0	0
3/19/2020	9:03:52	0.007	0	0	0	0
3/19/2020	9:04:52	0.007	0	0	0	0
3/19/2020	9:05:52	0.007	0	0	0	0
3/19/2020	9:06:52	0.006	0	0	0	0
3/19/2020	9:07:52	0.006	0	0	0	0
3/19/2020	9:08:52	0.006	0	0	0	0
3/19/2020	9:09:52	0.006	0	0	0	0
3/19/2020	9:10:52	0.006	0	0	0	0
3/19/2020	9:11:52	0.006	0	0	0	0
3/19/2020	9:12:52	0.006	0	0	0	0
3/19/2020	9:13:52	0.006	0	0	0	0
3/19/2020	9:14:52	0.006	0	0	0	0
3/19/2020	9:15:52	0.008	0	0	0	0
3/19/2020	9:16:52	0.007	0	0	0	0
3/19/2020	9:17:52	0.006	0	0	0	0
3/19/2020	9:18:52	0.006	0	0	0	0
3/19/2020	9:19:52	0.007	0	0	0	0
3/19/2020	9:20:52	0.005	0	0	0	0
3/19/2020	9:21:52	0.005	0	0	0	0
3/19/2020	9:22:52	0.005	0	0	0	0
3/19/2020	9:23:52	0.007	0	0	0	0
3/19/2020	9:24:52	0.022	0	0	0	0
3/19/2020	9:25:52	0.01	0	0	0	0
3/19/2020	9:26:52	0.006	0	0	0	0
3/19/2020	9:27:52	0.005	0	0	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-01			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m³)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	9:28:52	0.005	0	0	0	0
3/19/2020	9:29:52	0.004	0	0	0	0
3/19/2020	9:30:52	0.004	0	0	0	0
3/19/2020	9:31:52	0.004	0	0	0	0
3/19/2020	9:32:52	0.004	0	0	0	0
3/19/2020	9:33:52	0.004	0	0	0	0
3/19/2020	9:34:52	0.004	0	0	0	0
3/19/2020	9:35:52	0.003	0	0	0	0
3/19/2020	9:36:52	0.003	0	0	0	0
3/19/2020	9:37:52	0.002	0	0	0	0
3/19/2020	9:38:52	0.002	0	0	0	0
3/19/2020	9:39:52	0.002	0	0	0	0
3/19/2020	9:40:52	0.012	0	0	0	0
3/19/2020	9:41:52	0.002	0	0	0	0
3/19/2020	9:42:52	0.002	0	0	0	0
3/19/2020	9:43:52	0.001	0	0	0	0
3/19/2020	9:44:52	0.002	0	0	0	0
3/19/2020	9:45:52	0.001	0	0	0	0
3/19/2020	9:46:52	0.001	0	0	0	0
3/19/2020	9:47:52	0.001	0	0	0	0
3/19/2020	9:48:52	0.001	0	0	0	0
3/19/2020	9:49:52	0.001	0	0	0	0
3/19/2020	9:50:52	0.001	0	0	0	0
3/19/2020	9:51:52	0.001	0	0	0	0
3/19/2020	9:52:52	0.001	0	0	0	0
3/19/2020	9:53:52	0.001	0	0	0	0
3/19/2020	9:54:52	0	0	0	0	0
3/19/2020	9:55:52	0	0	0	0	0
3/19/2020	9:56:52	0	0	0	0	0
3/19/2020	9:57:52	0	0	0	0	0
3/19/2020	9:58:52	0	0	0	0	0
3/19/2020	9:59:52	0	0	0	0	0
3/19/2020	10:00:52	0	0	0	0	0
3/19/2020	10:01:52	0	0	0	0	0
3/19/2020	10:02:52	0	0	0	0	0
3/19/2020	10:03:52	0	0	0	0	0
3/19/2020	10:04:52	0	0	0	0	0
3/19/2020	10:05:52	-0.001	0	0	0	0
3/19/2020	10:06:52	-0.001	0	0	0	0
3/19/2020	10:07:52	0	0	0	0	0
3/19/2020	10:08:52	-0.001	0	0	0	0
3/19/2020	10:09:52	-0.001	0	0	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-01			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m³)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	10:10:52	-0.001	0	0	0	0
3/19/2020	10:11:52	-0.002	0	0	0	0
3/19/2020	10:12:52	-0.002	0	0	0	0
3/19/2020	10:13:52	-0.003	0	0	0	0
3/19/2020	10:14:52	-0.003	0	0	0	0
3/19/2020	10:15:52	-0.004	0	0	0	0
3/19/2020	10:16:52	-0.005	0	0	0	0
3/19/2020	10:17:52	-0.006	0	0	0	0
3/19/2020	10:18:52	-0.005	0	0	0	0
3/19/2020	10:19:52	-0.006	0	0	0	0
3/19/2020	10:20:52	-0.006	0	0	0	0
3/19/2020	10:21:52	-0.006	0	0	0	0
3/19/2020	10:22:52	-0.006	0	0	0	0
3/19/2020	10:23:52	-0.007	0	0	0	0
3/19/2020	10:24:52	-0.007	0	0	0	0
3/19/2020	10:25:52	-0.007	0	0	0	0
3/19/2020	10:26:52	-0.007	0	0	0	0
3/19/2020	10:27:52	-0.008	0	0	0	0
3/19/2020	10:28:52	-0.009	0	0	0	0
3/19/2020	10:29:52	-0.009	0	0	0	0
3/19/2020	10:30:52	-0.008	0	0	0	0
3/19/2020	10:31:52	-0.009	0	0	0	0
3/19/2020	10:32:52	-0.009	0	0	0	0
3/19/2020	10:33:52	-0.009	0	0	0	0
3/19/2020	10:34:52	-0.009	0	0	0	0
3/19/2020	10:35:52	-0.01	0	0	0	0
3/19/2020	10:36:52	-0.011	0	0	0	0
3/19/2020	10:37:52	-0.011	0	0	0	0
3/19/2020	10:38:52	-0.011	0	0	0	0
3/19/2020	10:39:52	-0.011	0	0	0	0
3/19/2020	10:40:52	-0.011	0	0	0	0
3/19/2020	10:41:52	-0.011	0	0	0	0
3/19/2020	10:42:52	-0.011	0	0	0	0
3/19/2020	10:43:52	-0.012	0	0	0	0
3/19/2020	10:44:52	-0.012	0	0	0	0
3/19/2020	10:45:52	-0.011	0	0	0	0
3/19/2020	10:46:52	-0.012	0	0	0	0
3/19/2020	10:47:52	-0.013	0	0	0	0
3/19/2020	10:48:52	-0.015	0	0	0	0
3/19/2020	10:49:52	-0.015	0	0	0	0
3/19/2020	10:50:52	-0.014	0	0	0	0
3/19/2020	10:51:52	-0.013	0	0	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-01			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m³)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	10:52:52	-0.014	0	0	0	0
3/19/2020	10:53:52	-0.016	0	0	0	0
3/19/2020	10:54:52	-0.014	0	0	0	0
3/19/2020	10:55:52	-0.014	0	0	0	0
3/19/2020	10:56:52	-0.014	0	0	0	0
3/19/2020	10:57:52	-0.014	0	0	0	0
3/19/2020	10:58:52	-0.012	0	0	0	0
3/19/2020	10:59:52	-0.014	0	0	0	0
3/19/2020	11:00:52	-0.016	0	0	0	0
3/19/2020	11:01:52	-0.017	0	0	0	0
3/19/2020	11:02:52	-0.016	0	0	0	0
3/19/2020	11:03:52	-0.015	0	0	0	0
3/19/2020	11:04:52	-0.014	0	0	0	0
3/19/2020	11:05:52	-0.014	0	0	0	0
3/19/2020	11:06:52	-0.014	0	0	0	0
3/19/2020	11:07:52	-0.014	0	0	0	0
3/19/2020	11:08:52	-0.014	0	0	0	0
3/19/2020	11:09:52	-0.015	0	0	0	0
3/19/2020	11:10:52	-0.015	0	0	0	0
3/19/2020	11:11:52	-0.016	0	0	0	0
3/19/2020	11:12:52	-0.017	0	0	0	0
3/19/2020	11:13:52	-0.018	0	0	0	0
3/19/2020	11:14:52	-0.019	0	0	0	0
3/19/2020	11:15:52	-0.019	0	0	0	0
3/19/2020	11:16:52	-0.016	0	0	0	0
3/19/2020	11:17:52	-0.016	0	0	0	0
3/19/2020	11:18:52	-0.016	0	0	0	0
3/19/2020	11:19:52	-0.017	0	0	0	0
3/19/2020	11:20:52	-0.017	0	0	0	0
3/19/2020	11:21:52	-0.018	0	0	0	0
3/19/2020	11:22:52	-0.019	0	0	0	0
3/19/2020	11:23:52	-0.02	0	0	0	0
3/19/2020	11:24:52	-0.018	0	0	0	0
3/19/2020	11:25:52	-0.018	0	0	0	0
3/19/2020	11:26:52	-0.019	0	0	0	0
3/19/2020	11:27:52	-0.019	0	0	0	0
3/19/2020	11:28:52	-0.018	0	0	0	0
3/19/2020	11:29:52	-0.021	0	0	0	0
3/19/2020	11:30:52	-0.02	0	0	0	0
3/19/2020	11:31:52	-0.019	0	0	0	0
3/19/2020	11:32:52	-0.02	0	0	0	0
3/19/2020	11:33:52	-0.02	0	0	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-01			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m³)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	11:34:52	-0.02	0	0	0	0
3/19/2020	11:35:52	-0.02	0	0	0	0
3/19/2020	11:36:52	-0.02	0	0	0	0
3/19/2020	11:37:52	-0.02	0	0	0	0
3/19/2020	11:38:52	-0.012	0	0	0	0
3/19/2020	11:39:52	-0.02	0	0	0	0
3/19/2020	11:40:52	-0.021	0	0	0	0
3/19/2020	11:41:52	-0.021	0	0	0	0
3/19/2020	11:42:52	-0.021	0	0	0	0
3/19/2020	11:43:52	-0.018	0	0	0	0
3/19/2020	11:44:52	-0.02	0	0	0	0
3/19/2020	11:45:52	-0.021	0	0	0	0
3/19/2020	11:46:52	-0.022	0	0	0	0
3/19/2020	11:47:52	-0.021	0	0	0	0
3/19/2020	11:48:52	-0.021	0	0	0	0
3/19/2020	11:49:52	-0.022	0	0	0	0
3/19/2020	11:50:52	-0.022	0	0	0	0
3/19/2020	11:51:52	-0.022	0	0	0	0
3/19/2020	11:52:52	-0.023	0	0	0	0
3/19/2020	11:53:52	-0.022	0	0	0	0
3/19/2020	11:54:52	-0.022	0	0	0	0
3/19/2020	11:55:52	-0.022	0	0	0	0
3/19/2020	11:56:52	-0.02	0	0	0	0
3/19/2020	11:57:52	-0.021	0	0	0	0
3/19/2020	11:58:52	-0.023	0	0	0	0
3/19/2020	11:59:52	-0.023	0	0	0	0
3/19/2020	12:00:52	-0.023	0	0	0	0
3/19/2020	12:01:52	-0.024	0	0	0	0
3/19/2020	12:02:52	-0.024	0	0	0	0
3/19/2020	12:03:52	-0.025	0	0	0	0
3/19/2020	12:04:52	-0.025	0	0	0	0
3/19/2020	12:05:52	-0.025	0	0	0	0
3/19/2020	12:06:52	-0.025	0	0	0	0
3/19/2020	12:07:52	-0.025	0	0	0	0
3/19/2020	12:08:52	-0.025	0	0	0	0
3/19/2020	12:09:52	-0.026	0	0	0	0
3/19/2020	12:10:52	-0.026	0	0	0	0
3/19/2020	12:11:52	-0.026	0	0	0	0
3/19/2020	12:12:52	-0.026	0	0	0	0
3/19/2020	12:13:52	-0.026	0	0	0	0
3/19/2020	12:14:52	-0.026	0	0	0	0
3/19/2020	12:15:52	-0.027	0	0	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-01			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m³)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	12:16:52	-0.026	0	0	0	0
3/19/2020	12:17:52	-0.027	0	0	0	0
3/19/2020	12:18:52	-0.027	0	0	0	0
3/19/2020	12:19:52	-0.026	0	0	0	0
3/19/2020	12:20:52	-0.027	0	0	0	0
3/19/2020	12:21:52	-0.027	0	0	0	0
3/19/2020	12:22:52	-0.027	0	0	0	0
3/19/2020	12:23:52	-0.027	0	0	0	0
3/19/2020	12:24:52	-0.027	0	0	0	0
3/19/2020	12:25:52	-0.026	0	0	0	0
3/19/2020	12:26:52	-0.026	0	0	0	0
3/19/2020	12:27:52	-0.025	0	0	0	0
3/19/2020	12:28:52	-0.026	0	0	0	0
3/19/2020	12:29:52	-0.027	0	0	0	0
3/19/2020	12:30:52	-0.026	0	0	0	0
3/19/2020	12:31:52	-0.026	0	0	0	0
3/19/2020	12:32:52	-0.024	0	0	0	0
3/19/2020	12:33:52	-0.025	0	0	0	0
3/19/2020	12:34:52	-0.023	0	0	0	0
3/19/2020	12:35:52	-0.023	0	0	0	0
3/19/2020	12:36:52	-0.024	0	0	0	0
3/19/2020	12:37:52	-0.024	0	0	0	0
3/19/2020	12:38:52	-0.024	0	0	0	0
3/19/2020	12:39:52	-0.024	0	0	0	0
3/19/2020	12:40:52	-0.025	0	0	0	0
3/19/2020	12:41:52	-0.025	0	0	0	0
3/19/2020	12:42:52	-0.024	0	0	0	0
3/19/2020	12:43:52	-0.024	0	0	0	0
3/19/2020	12:44:52	-0.024	0	0	0	0
3/19/2020	12:45:52	-0.024	0	0	0	0
3/19/2020	12:46:52	-0.024	0	0	0	0
3/19/2020	12:47:52	-0.025	0	0	0	0
3/19/2020	12:48:52	-0.024	0	0	0	0
3/19/2020	12:49:52	-0.024	0	0	0	0
3/19/2020	12:50:52	-0.023	0	0	0	0
3/19/2020	12:51:52	-0.022	0	0	0	0
3/19/2020	12:52:52	-0.021	0	0	0	0
3/19/2020	12:53:52	-0.021	0	0	0	0
3/19/2020	12:54:52	-0.022	0	0	0	0
3/19/2020	12:55:52	-0.022	0	0	0	0
3/19/2020	12:56:52	-0.021	0	0	0	0
3/19/2020	12:57:52	-0.022	0	0	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-01			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m³)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	12:58:52	-0.022	0	0	0	0
3/19/2020	12:59:52	-0.021	0	0	0	0
3/19/2020	13:00:52	-0.021	0	0	0	0
3/19/2020	13:01:52	-0.02	0	0	0	0
3/19/2020	13:02:52	-0.021	0	0	0	0
3/19/2020	13:03:52	-0.021	0	0	0	0
3/19/2020	13:04:52	-0.021	0	0	0	0
3/19/2020	13:05:52	-0.02	0	0	0	0
3/19/2020	13:06:52	-0.021	0	0	0	0
3/19/2020	13:07:52	-0.021	0	0	0	0
3/19/2020	13:08:52	-0.021	0	0	0	0
3/19/2020	13:09:52	-0.021	0	0	0	0
3/19/2020	13:10:52	-0.021	0	0	0	0
3/19/2020	13:11:52	-0.021	0	0	0	0
3/19/2020	13:12:52	-0.021	0	0	0	0
3/19/2020	13:13:52	-0.021	0	0	0	0
3/19/2020	13:14:52	-0.021	0	0	0	0
3/19/2020	13:15:52	-0.021	0	0	0	0
3/19/2020	13:16:52	-0.021	0	0	0	0
3/19/2020	13:17:52	-0.021	0	0	0	0
3/19/2020	13:18:52	-0.021	0	0	0	0
3/19/2020	13:19:52	-0.022	0	0	0	0
3/19/2020	13:20:52	-0.022	0	0	0	0
3/19/2020	13:21:52	-0.023	0	0	0	0
3/19/2020	13:22:52	-0.024	0	0	0	0
3/19/2020	13:23:52	-0.024	0	0	0	0
3/19/2020	13:24:52	-0.024	0	0	0	0
3/19/2020	13:25:52	-0.023	0	0	0	0
3/19/2020	13:26:52	-0.023	0	0	0	0
3/19/2020	13:27:52	-0.023	0	0	0	0
3/19/2020	13:28:52	-0.024	0	0	0	0
3/19/2020	13:29:52	-0.024	0	0	0	0
3/19/2020	13:30:52	-0.024	0	0	0	0
3/19/2020	13:31:52	-0.023	0	0	0	0
3/19/2020	13:32:52	-0.024	0	0	0	0
3/19/2020	13:33:52	-0.024	0	0	0	0
3/19/2020	13:34:52	-0.024	0	0	0	0
3/19/2020	13:35:52	-0.024	0	0	0	0
3/19/2020	13:36:52	-0.024	0	0	0	0
3/19/2020	13:37:52	-0.023	0	0	0	0
3/19/2020	13:38:52	-0.023	0	0	0	0
3/19/2020	13:39:52	-0.024	0	0	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-01			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m^3)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	13:40:52	-0.023	0	0	0	0
3/19/2020	13:41:52	-0.023	0	0	0	0
3/19/2020	13:42:52	-0.024	0	0	0	0
3/19/2020	13:43:52	-0.024	0	0	0	0
3/19/2020	13:44:52	-0.024	0	0	0	0
3/19/2020	13:45:52	-0.024	0	0	0	0
3/19/2020	13:46:52	-0.026	0	0	0	0
3/19/2020	13:47:52	-0.027	0	0	0	0
3/19/2020	13:48:52	-0.026	0	0	0	0
3/19/2020	13:49:52	-0.024	0	0	0	0
3/19/2020	13:50:52	-0.023	0	0	0	0
3/19/2020	13:51:52	-0.024	0	0	0	0
3/19/2020	13:52:52	-0.024	0	0	0	0
3/19/2020	13:53:52	-0.024	0	0	0	0
3/19/2020	13:54:52	-0.024	0	0	0	0
3/19/2020	13:55:52	-0.024	0	0	0	0
3/19/2020	13:56:52	-0.024	0	0	0	0
3/19/2020	13:57:52	-0.024	0	0	0	0
3/19/2020	13:58:52	-0.024	0	0	0	0
3/19/2020	13:59:52	-0.024	0	0	0	0
3/19/2020	14:00:52	-0.023	0	0	0	0
3/19/2020	14:01:52	-0.023	0	0	0	0
3/19/2020	14:02:52	-0.023	0	0	0	0
3/19/2020	14:03:52	-0.024	0	0	0	0
3/19/2020	14:04:52	-0.023	0	0	0	0
3/19/2020	14:05:52	-0.023	0	0	0	0
3/19/2020	14:06:52	-0.023	0	0	0	0
3/19/2020	14:07:52	-0.023	0	0	0	0
3/19/2020	14:08:52	-0.023	0	0	0	0
3/19/2020	14:09:52	-0.023	0	0	0	0
3/19/2020	14:10:52	-0.023	0	0	0	0
3/19/2020	14:11:52	-0.023	0	0	0	0
3/19/2020	14:12:52	-0.023	0	0	0	0
3/19/2020	14:13:52	-0.023	0	0	0	0
3/19/2020	14:14:52	-0.023	0	0	0	0
3/19/2020	14:15:52	-0.023	0	0	0	0
3/19/2020	14:16:52	-0.026	0	0	0	0
3/19/2020	14:17:52	-0.025	0	0	0	0
3/19/2020	14:18:52	-0.023	0	0	0	0
3/19/2020	14:19:52	-0.023	0	0	0	0
3/19/2020	14:20:52	-0.022	0	0	0	0
3/19/2020	14:21:52	-0.022	0	0	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-01			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m³)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	14:22:52	-0.022	0	0	0	0
3/19/2020	14:23:52	-0.021	0	0	0	0
3/19/2020	14:24:52	-0.021	0	0	0	0
3/19/2020	14:25:52	-0.021	0	0	0	0
3/19/2020	14:26:52	-0.02	0	0	0	0
3/19/2020	14:27:52	-0.021	0	0	0	0
3/19/2020	14:28:52	-0.02	0	0	0	0
3/19/2020	14:29:52	-0.02	0	0	0	0
3/19/2020	14:30:52	-0.019	0	0	0	0
3/19/2020	14:31:52	-0.019	0	0	0	0
3/19/2020	14:32:52	-0.02	0	0	0	0
3/19/2020	14:33:52	-0.02	0	0	0	0
3/19/2020	14:34:52	-0.019	0	0	0	0
3/19/2020	14:35:52	-0.02	0	0	0	0
3/19/2020	14:36:52	-0.019	0	0	0	0
3/19/2020	14:37:52	-0.02	0	0	0	0
3/19/2020	14:38:52	-0.019	0	0	0	0
3/19/2020	14:39:52	-0.02	0	0	0	0
3/19/2020	14:40:52	-0.02	0	0	0	0
3/19/2020	14:41:52	-0.019	0	0	0	0
3/19/2020	14:42:52	-0.02	0	0	0	0
3/19/2020	14:43:52	-0.019	0	0	0	0
3/19/2020	14:44:52	-0.018	0	0	0	0
3/19/2020	14:45:52	-0.019	0	0	0	0
3/19/2020	14:46:52	-0.003	0	0	0	0
3/19/2020	14:47:52	-0.016	0	0	0	0
3/19/2020	14:48:52	-0.019	0	0	0	0
3/19/2020	14:49:52	-0.014	0	0	0	0
3/19/2020	14:50:52	-0.018	0	0	0	0
3/19/2020	14:51:52	-0.016	0	0	0	0
3/19/2020	14:52:52	-0.017	0	0	0	0
3/19/2020	14:53:52	-0.018	0	0	0	0
3/19/2020	14:54:52	-0.019	0	0	0	0
3/19/2020	14:55:52	-0.014	0	0	0	0
3/19/2020	14:56:52	-0.017	0	0	0	0
3/19/2020	14:57:52	-0.018	0	0	0	0
3/19/2020	14:58:52	-0.018	0	0	0	0
3/19/2020	14:59:52	-0.018	0	0	0	0
3/19/2020	15:00:52	-0.018	0	0	0	0
3/19/2020	15:01:52	-0.018	0	0	0	0
3/19/2020	15:02:52	-0.017	0	0	0	0
3/19/2020	15:03:52	-0.017	0	0	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-01			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m^3)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	15:04:52	-0.017	0	0	0	0
3/19/2020	15:05:52	-0.017	0	0	0	0
3/19/2020	15:06:52	-0.017	0	0	0	0
3/19/2020	15:07:52	-0.016	0	0	0	0
3/19/2020	15:08:52	-0.016	0	0	0	0
3/19/2020	15:09:52	-0.014	0	0	0	0
3/19/2020	15:10:00	0	0	0	0	0
3/19/2020	15:11:00	-	0	0	0	0
3/19/2020	15:12:00	-	0	0	0	0
3/19/2020	15:13:00	-	0	0	0	0
3/19/2020	15:14:00	-	0	0	0	0
3/19/2020	15:15:00	-	0	0	0	0
3/19/2020	15:16:00	-	0	0	0	0
3/19/2020	15:17:00	-	0	0	0	0
3/19/2020	15:18:00	-	0	0	0	0
3/19/2020	15:19:00	-	0	0	0	0
3/19/2020	15:20:00	-	0	0	0	0
3/19/2020	15:21:00	-	0	0	0	0
3/19/2020	15:22:00	-	0	0	0	0
3/19/2020	15:23:00	-	0	0	0	0
3/19/2020	15:24:00	-	0	0	0	0
3/19/2020	15:25:00	-	0	0	0	0
3/19/2020	15:26:00	-	0	0	0	0
3/19/2020	15:27:00	-	0	0	0	0
3/19/2020	15:28:00	-	0	0	0	0
3/19/2020	15:29:00	-	0	0	0	0
3/19/2020	15:30:00	-	0	0	0	0
3/19/2020	15:31:00	-	0	0	0	0
3/19/2020	15:32:00	-	0	0	0	0
3/19/2020	15:33:00	-	0	0	0	0
3/19/2020	15:34:00	-	0	0	0	0
3/19/2020	15:35:00	-	0	0	0	0
3/19/2020	15:36:00	-	0	0	0	0
3/19/2020	15:37:00	-	0	0	0	0
3/19/2020	15:38:00	-	0	0	0	0
3/19/2020	15:39:00	-	0	0	0	0
3/19/2020	15:40:00	-	0	0	0	0
3/19/2020	15:41:00	-	0	0	0	0
3/19/2020	15:42:00	-	0	0	0	0
3/19/2020	15:43:00	-	0	0	0	0
3/19/2020	15:44:00	-	0	0	0	0
3/19/2020	15:45:00	-	0	0	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-01			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m³)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	15:46:00	-	0	0	0	0
3/19/2020	15:47:00	-	0	0	0	0
3/19/2020	15:48:00	-	0	0	0	0
3/19/2020	15:49:00	-	0	0	0	0
3/19/2020	15:50:00	-	0	0	0	0
3/19/2020	15:51:00	-	0	0	0	0
3/19/2020	15:52:00	-	0	0	0	0
3/19/2020	15:53:00	-	0	0	0	0
3/19/2020	15:54:00	-	0	0	0	0
3/19/2020	15:55:00	-	0	0	0	0
3/19/2020	15:56:00	-	0	0	0	0
3/19/2020	15:57:00	-	0	0	0	0
3/19/2020	15:58:00	-	0	0	0	0
3/19/2020	15:59:00	-	0	0	0	0
3/19/2020	16:00:00	-	0	0	0	0
3/19/2020	16:01:00	-	0	0	0	0
3/19/2020	16:02:00	-	0	0	0	0
3/19/2020	16:03:00	-	0	0	0	0
3/19/2020	16:04:00	-	0	0	0	0
3/19/2020	16:05:00	-	0	0	0	0
3/19/2020	16:06:00	-	0	0	0	0
3/19/2020	16:07:00	-	0	0	0	0
3/19/2020	16:08:00	-	0	0	0	0
3/19/2020	16:09:00	-	0	0	0	0
3/19/2020	16:10:00	-	0	0	0	0
3/19/2020	16:11:00	-	0	0	0	0
3/19/2020	16:12:00	-	0	0	0	0
3/19/2020	16:13:00	-	0	0	0	0
3/19/2020	16:14:00	-	0	0	0	0
3/19/2020	16:15:00	-	0	0	0	0
3/19/2020	16:16:00	-	0	0	0	0
3/19/2020	16:17:00	-	0	0	0	0
3/19/2020	16:18:00	-	0	0	0	0
3/19/2020	16:19:00	-	0	0	0	0
3/19/2020	16:20:00	-	0	0	0	0
3/19/2020	16:21:00	-	0	0	0	0
3/19/2020	16:22:00	-	0	0	0	0
3/19/2020	16:23:00	-	0	0	0	0
3/19/2020	16:24:00	-	0	0	0	0
3/19/2020	16:25:00	-	0	0	0	0
3/19/2020	16:26:00	-	0	0	0	0
3/19/2020	16:27:00	-	0	0	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-01			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m^3)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	16:28:00	-	0	0	0	0
3/19/2020	16:29:00	-	0	0	0	0
3/19/2020	16:30:00	-	0	0	0	0
3/19/2020	16:31:00	-	0	0	0	0
3/19/2020	16:32:00	-	0	0	0	0
3/19/2020	16:33:00	-	0	0	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-02			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m³)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	7:03:19	0.009	-	-	-	-
3/19/2020	7:04:19	0.007	-	-	-	-
3/19/2020	7:05:19	0.007	-	-	-	-
3/19/2020	7:06:19	0.007	-	-	-	-
3/19/2020	7:07:19	0.007	-	-	-	-
3/19/2020	7:08:19	0.005	-	-	-	-
3/19/2020	7:09:19	0.005	-	-	-	-
3/19/2020	7:10:19	0.005	-	-	-	-
3/19/2020	7:11:19	0.005	-	-	-	-
3/19/2020	7:12:19	0.005	-	-	-	-
3/19/2020	7:13:19	0.005	-	-	-	-
3/19/2020	7:14:19	0.006	-	-	-	-
3/19/2020	7:15:19	0.006	-	-	-	-
3/19/2020	7:16:19	0.005	-	-	-	-
3/19/2020	7:17:19	0.005	-	-	-	-
3/19/2020	7:18:19	0.005	-	-	-	-
3/19/2020	7:19:19	0.005	-	-	-	-
3/19/2020	7:20:19	0.006	-	-	-	-
3/19/2020	7:21:19	0.006	-	-	-	-
3/19/2020	7:22:19	0.005	-	-	-	-
3/19/2020	7:23:19	0.006	-	-	-	-
3/19/2020	7:24:19	0.006	-	-	-	-
3/19/2020	7:25:19	0.006	-	-	-	-
3/19/2020	7:26:19	0.005	-	-	-	-
3/19/2020	7:27:19	0.005	-	-	-	-
3/19/2020	7:28:19	0.005	-	-	-	-
3/19/2020	7:29:19	0.005	-	-	-	-
3/19/2020	7:30:19	0.005	-	-	-	-
3/19/2020	7:31:19	0.005	-	-	-	-
3/19/2020	7:32:19	0.007	-	-	-	-
3/19/2020	7:33:19	0.007	-	-	-	-
3/19/2020	7:34:19	0.006	-	-	-	-
3/19/2020	7:35:19	0.005	-	-	-	-
3/19/2020	7:36:19	0.005	-	-	-	-
3/19/2020	7:37:19	0.005	-	-	-	-
3/19/2020	7:38:19	0.005	-	-	-	-
3/19/2020	7:39:19	0.005	-	-	-	-
3/19/2020	7:40:19	0.005	-	-	-	-
3/19/2020	7:41:19	0.005	-	-	-	-
3/19/2020	7:42:19	0.004	-	-	-	-
3/19/2020	7:43:19	0.004	-	-	-	-
3/19/2020	7:44:19	0.004	-	-	-	-
3/19/2020	7:45:19	0.004	-	-	-	-
3/19/2020	7:46:19	0.004	-	-	-	-

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-02			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m^3)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	7:47:19	0.004	-	-	-	-
3/19/2020	7:48:19	0.004	-	-	-	-
3/19/2020	7:49:19	0.004	-	-	-	-
3/19/2020	7:50:19	0.004	-	-	-	-
3/19/2020	7:51:19	0.004	-	-	-	-
3/19/2020	7:52:19	0.004	-	-	-	-
3/19/2020	7:53:19	0.004	-	-	-	-
3/19/2020	7:54:19	0.004	-	-	-	-
3/19/2020	7:55:19	0.005	-	-	-	-
3/19/2020	7:56:19	0.004	-	-	-	-
3/19/2020	7:57:19	0.004	-	-	-	-
3/19/2020	7:58:19	0.004	-	-	-	-
3/19/2020	7:59:19	0.004	-	-	-	-
3/19/2020	8:00:19	0.004	-	-	-	-
3/19/2020	8:01:19	0.003	-	-	-	-
3/19/2020	8:02:19	0.003	-	-	-	-
3/19/2020	8:03:19	0.003	-	-	-	-
3/19/2020	8:04:19	0.003	-	-	-	-
3/19/2020	8:05:19	0.003	-	-	-	-
3/19/2020	8:06:19	0.003	-	-	-	-
3/19/2020	8:07:19	0.003	-	-	-	-
3/19/2020	8:08:19	0.003	-	-	-	-
3/19/2020	8:09:19	0.003	-	-	-	-
3/19/2020	8:10:19	0.004	-	-	-	-
3/19/2020	8:11:19	0.004	-	-	-	-
3/19/2020	8:12:19	0.003	0	-	0	0
3/19/2020	8:13:19	0.003	0	-	0	0
3/19/2020	8:14:19	0.003	0	-	0	0
3/19/2020	8:15:19	0.003	0	-	0	0
3/19/2020	8:16:19	0.003	0	-	0	0
3/19/2020	8:17:19	0.004	0	-	0	0
3/19/2020	8:18:19	0.003	0	-	0	0
3/19/2020	8:19:19	0.003	0	-	0	0
3/19/2020	8:20:19	0.003	0	-	0	0
3/19/2020	8:21:19	0.003	0	-	0	0
3/19/2020	8:22:19	0.003	0	-	0	0
3/19/2020	8:23:19	0.003	0	-	0	0
3/19/2020	8:24:19	0.003	0	-	0	0
3/19/2020	8:25:19	0.004	0	-	0	0
3/19/2020	8:26:19	0.003	0	-	0	0
3/19/2020	8:27:19	0.003	0	-	0	0
3/19/2020	8:28:19	0.003	0	-	0	0
3/19/2020	8:29:19	0.004	0	-	0	0
3/19/2020	8:30:19	0.004	0	-	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			**G-AM-02**			
Device		**DustTrak II 8530**	**ppbRAE 3000(PGM-7340)**			
Date	**Time**	**Mass Conc. Total (mg/m³)**	**VOC Min (ppb)**	**VOC Avg (ppb)**	**VOC Max (ppb)**	**VOC Real (ppb)**
3/19/2020	8:31:19	0.003	0	-	0	0
3/19/2020	8:32:19	0.003	0	-	0	0
3/19/2020	8:33:19	0.002	0	-	0	0
3/19/2020	8:34:19	0.003	0	-	0	0
3/19/2020	8:35:19	0.002	0	-	0	0
3/19/2020	8:36:19	0.002	0	-	0	0
3/19/2020	8:37:19	0.003	0	-	0	0
3/19/2020	8:38:19	0.003	0	-	0	0
3/19/2020	8:39:19	0.002	0	-	0	0
3/19/2020	8:40:19	0.002	0	-	0	0
3/19/2020	8:41:19	0.002	0	-	0	0
3/19/2020	8:42:19	0.002	0	-	0	0
3/19/2020	8:43:19	0.002	0	-	0	0
3/19/2020	8:44:19	0.002	0	-	0	0
3/19/2020	8:45:19	0.002	0	-	0	0
3/19/2020	8:46:19	0.002	0	-	0	0
3/19/2020	8:47:19	0.002	0	-	0	0
3/19/2020	8:48:19	0.002	0	-	0	0
3/19/2020	8:49:19	0.002	0	-	0	0
3/19/2020	8:50:19	0.002	0	-	0	0
3/19/2020	8:51:19	0.002	0	-	0	0
3/19/2020	8:52:19	0.002	0	-	0	0
3/19/2020	8:53:19	0.002	0	-	0	0
3/19/2020	8:54:19	0.002	0	-	0	0
3/19/2020	8:55:19	0.002	0	-	0	0
3/19/2020	8:56:19	0.002	0	-	0	0
3/19/2020	8:57:19	0.002	0	-	0	0
3/19/2020	8:58:19	0.002	0	-	0	0
3/19/2020	8:59:19	0.002	0	-	0	0
3/19/2020	9:00:19	0.002	0	-	0	0
3/19/2020	9:01:19	0.002	0	-	0	0
3/19/2020	9:02:19	0.002	0	-	0	0
3/19/2020	9:03:19	0.002	0	-	0	0
3/19/2020	9:04:19	0.002	0	-	0	0
3/19/2020	9:05:19	0.002	0	-	0	0
3/19/2020	9:06:19	0.002	0	-	0	0
3/19/2020	9:07:19	0.002	0	-	0	0
3/19/2020	9:08:19	0.002	0	-	0	0
3/19/2020	9:09:19	0.002	0	-	0	0
3/19/2020	9:10:19	0.002	0	-	0	0
3/19/2020	9:11:19	0.002	0	-	0	0
3/19/2020	9:12:19	0.002	0	-	0	0
3/19/2020	9:13:19	0.001	0	-	0	0
3/19/2020	9:14:19	0.002	0	-	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-02			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m³)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	9:15:19	0.002	0	-	0	0
3/19/2020	9:16:19	0.002	0	-	0	0
3/19/2020	9:17:19	0.002	0	-	0	0
3/19/2020	9:18:19	0.002	0	-	0	0
3/19/2020	9:19:19	0.001	0	-	0	0
3/19/2020	9:20:19	0.002	0	-	0	0
3/19/2020	9:21:19	0.002	0	-	0	0
3/19/2020	9:22:19	0.002	0	-	0	0
3/19/2020	9:23:19	0.001	0	-	0	0
3/19/2020	9:24:19	0.002	0	-	0	0
3/19/2020	9:25:19	0.002	0	-	0	0
3/19/2020	9:26:19	0.006	0	-	0	0
3/19/2020	9:27:19	0.003	0	-	0	0
3/19/2020	9:28:19	0.002	0	-	0	0
3/19/2020	9:29:19	0.002	0	-	0	0
3/19/2020	9:30:19	0.002	0	-	0	0
3/19/2020	9:31:19	0.002	0	-	0	0
3/19/2020	9:32:19	0.002	0	-	0	0
3/19/2020	9:33:19	0.001	0	-	0	0
3/19/2020	9:34:19	0.001	0	-	0	0
3/19/2020	9:35:19	0.001	0	-	0	0
3/19/2020	9:36:19	0.001	0	-	0	0
3/19/2020	9:37:19	0.001	0	-	0	0
3/19/2020	9:38:19	0.001	0	-	0	0
3/19/2020	9:39:19	0.001	0	-	0	0
3/19/2020	9:40:19	0.001	0	-	0	0
3/19/2020	9:41:19	0.001	0	-	0	0
3/19/2020	9:42:19	0.001	0	-	0	0
3/19/2020	9:43:19	0.001	0	-	0	0
3/19/2020	9:44:19	0.001	0	-	0	0
3/19/2020	9:45:19	0.001	0	-	0	0
3/19/2020	9:46:19	0.001	0	-	0	0
3/19/2020	9:47:19	0.001	0	-	0	0
3/19/2020	9:48:19	0.001	0	-	0	0
3/19/2020	9:49:19	0.002	0	-	0	0
3/19/2020	9:50:19	0.002	0	-	0	0
3/19/2020	9:51:19	0.002	0	-	0	0
3/19/2020	9:52:19	0.002	0	-	0	0
3/19/2020	9:53:19	0.002	0	-	0	0
3/19/2020	9:54:19	0.002	0	-	0	0
3/19/2020	9:55:19	0.001	0	-	0	0
3/19/2020	9:56:19	0.001	0	-	0	0
3/19/2020	9:57:19	0.001	0	-	0	0
3/19/2020	9:58:19	0.001	0	-	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			**G-AM-02**			
Device		**DustTrak II 8530**	**ppbRAE 3000(PGM-7340)**			
Date	**Time**	**Mass Conc. Total (mg/m³)**	**VOC Min (ppb)**	**VOC Avg (ppb)**	**VOC Max (ppb)**	**VOC Real (ppb)**
3/19/2020	9:59:19	0.001	0	-	0	0
3/19/2020	10:00:19	0.001	0	-	0	0
3/19/2020	10:01:19	0.001	0	-	0	0
3/19/2020	10:02:19	0.001	0	-	0	0
3/19/2020	10:03:19	0.001	0	-	0	0
3/19/2020	10:04:19	0.001	0	-	0	0
3/19/2020	10:05:19	0.001	0	-	0	0
3/19/2020	10:06:19	0.001	0	-	0	0
3/19/2020	10:07:19	0.001	0	-	0	0
3/19/2020	10:08:19	0.001	0	-	0	0
3/19/2020	10:09:19	0.001	0	-	0	0
3/19/2020	10:10:19	0.001	0	-	0	0
3/19/2020	10:11:19	0.001	0	-	0	0
3/19/2020	10:12:19	0.001	0	-	0	0
3/19/2020	10:13:19	0.001	0	-	0	0
3/19/2020	10:14:19	0.001	0	-	0	0
3/19/2020	10:15:19	0.001	0	-	0	0
3/19/2020	10:16:19	0.001	0	-	0	0
3/19/2020	10:17:19	0.001	0	-	0	0
3/19/2020	10:18:19	0.001	0	-	0	0
3/19/2020	10:19:19	0.001	0	-	0	0
3/19/2020	10:20:19	0.001	0	-	0	0
3/19/2020	10:21:19	0	0	-	0	0
3/19/2020	10:22:19	0.001	0	-	0	0
3/19/2020	10:23:19	0.001	0	-	0	0
3/19/2020	10:24:19	0	0	-	0	0
3/19/2020	10:25:19	0	0	-	0	0
3/19/2020	10:26:19	0.001	0	-	0	0
3/19/2020	10:27:19	0.001	0	-	0	0
3/19/2020	10:28:19	0.001	0	-	0	0
3/19/2020	10:29:19	0	0	-	0	0
3/19/2020	10:30:19	0	0	-	0	0
3/19/2020	10:31:19	0	0	-	0	0
3/19/2020	10:32:19	0.001	0	-	0	0
3/19/2020	10:33:19	0.001	0	-	0	0
3/19/2020	10:34:19	0.001	0	-	0	0
3/19/2020	10:35:19	0	0	-	0	0
3/19/2020	10:36:19	0	0	-	0	0
3/19/2020	10:37:19	0	0	-	0	0
3/19/2020	10:38:19	0	0	-	0	0
3/19/2020	10:39:19	0	0	-	0	0
3/19/2020	10:40:19	0	0	-	0	0
3/19/2020	10:41:19	0	0	-	0	0
3/19/2020	10:42:19	0	0	-	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			**G-AM-02**			
Device		**DustTrak II 8530**	**ppbRAE 3000(PGM-7340)**			
Date	**Time**	**Mass Conc. Total (mg/m^3)**	**VOC Min (ppb)**	**VOC Avg (ppb)**	**VOC Max (ppb)**	**VOC Real (ppb)**
3/19/2020	10:43:19	0	0	-	0	0
3/19/2020	10:44:19	0	0	-	0	0
3/19/2020	10:45:19	0	0	-	0	0
3/19/2020	10:46:19	0	0	-	0	0
3/19/2020	10:47:19	0	0	-	0	0
3/19/2020	10:48:19	0	0	-	0	0
3/19/2020	10:49:19	0	0	-	0	0
3/19/2020	10:50:19	0	0	-	0	0
3/19/2020	10:51:19	0	0	-	0	0
3/19/2020	10:52:19	0	0	-	0	0
3/19/2020	10:53:19	0	0	-	0	0
3/19/2020	10:54:19	0	0	-	0	0
3/19/2020	10:55:19	0	0	-	0	0
3/19/2020	10:56:19	0	0	-	0	0
3/19/2020	10:57:19	0	0	-	0	0
3/19/2020	10:58:19	0	0	-	0	0
3/19/2020	10:59:19	0	0	-	0	0
3/19/2020	11:00:19	0	0	-	0	0
3/19/2020	11:01:19	0	0	-	0	0
3/19/2020	11:02:19	0	0	-	0	0
3/19/2020	11:03:19	0	0	-	0	0
3/19/2020	11:04:19	0	0	-	0	0
3/19/2020	11:05:19	0	0	-	0	0
3/19/2020	11:06:19	0	0	-	0	0
3/19/2020	11:07:19	0	0	-	0	0
3/19/2020	11:08:19	0	0	-	0	0
3/19/2020	11:09:19	0	0	-	0	0
3/19/2020	11:10:19	0	0	-	0	0
3/19/2020	11:11:19	0	0	-	0	0
3/19/2020	11:12:19	0	0	-	0	0
3/19/2020	11:13:19	0	0	-	0	0
3/19/2020	11:14:19	0	0	-	0	0
3/19/2020	11:15:19	0	0	-	0	0
3/19/2020	11:16:19	0	0	-	0	0
3/19/2020	11:17:19	0	0	-	0	0
3/19/2020	11:18:19	0	0	-	0	0
3/19/2020	11:19:19	0	0	-	0	0
3/19/2020	11:20:19	0	0	-	0	0
3/19/2020	11:21:19	0	0	-	0	0
3/19/2020	11:22:19	0	0	-	0	0
3/19/2020	11:23:19	0	0	-	0	0
3/19/2020	11:24:19	0	0	-	0	0
3/19/2020	11:25:19	0	0	-	0	0
3/19/2020	11:26:19	0	0	-	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			**G-AM-02**			
Device		**DustTrak II 8530**	**ppbRAE 3000(PGM-7340)**			
Date	**Time**	**Mass Conc. Total (mg/m³)**	**VOC Min (ppb)**	**VOC Avg (ppb)**	**VOC Max (ppb)**	**VOC Real (ppb)**
3/19/2020	11:27:19	0	0	-	0	0
3/19/2020	11:28:19	0	0	-	0	0
3/19/2020	11:29:19	0	0	-	0	0
3/19/2020	11:30:19	0	0	-	0	0
3/19/2020	11:31:19	0	0	-	0	0
3/19/2020	11:32:19	0	0	-	0	0
3/19/2020	11:33:19	0	0	-	0	0
3/19/2020	11:34:19	0	0	-	0	0
3/19/2020	11:35:19	0	0	-	0	0
3/19/2020	11:36:19	0	0	-	0	0
3/19/2020	11:37:19	0	0	-	0	0
3/19/2020	11:38:19	0	0	-	0	0
3/19/2020	11:39:19	0	0	-	0	0
3/19/2020	11:40:19	0	0	-	0	0
3/19/2020	11:41:19	0	0	-	0	0
3/19/2020	11:42:19	0	0	-	0	0
3/19/2020	11:43:19	0.002	0	-	0	0
3/19/2020	11:44:19	0.001	0	-	0	0
3/19/2020	11:45:19	0.001	0	-	0	0
3/19/2020	11:46:19	0	0	-	0	0
3/19/2020	11:47:19	0	0	-	0	0
3/19/2020	11:48:19	0	0	-	0	0
3/19/2020	11:49:19	0	0	-	0	0
3/19/2020	11:50:19	0	0	-	0	0
3/19/2020	11:51:19	0	0	-	0	0
3/19/2020	11:52:19	0	0	-	0	0
3/19/2020	11:53:19	0	0	-	0	0
3/19/2020	11:54:19	0	0	-	0	0
3/19/2020	11:55:19	0	0	-	0	0
3/19/2020	11:56:19	0	0	-	0	0
3/19/2020	11:57:19	0.002	0	-	0	0
3/19/2020	11:58:19	0	0	-	0	0
3/19/2020	11:59:19	0.004	0	-	0	0
3/19/2020	12:00:19	0	0	-	0	0
3/19/2020	12:01:19	0	0	-	0	0
3/19/2020	12:02:19	0	0	-	0	0
3/19/2020	12:03:19	0	0	-	0	0
3/19/2020	12:04:19	0	0	-	0	0
3/19/2020	12:05:19	0	0	-	0	0
3/19/2020	12:06:19	0	0	-	0	0
3/19/2020	12:07:19	0	0	-	0	0
3/19/2020	12:08:19	0	0	-	0	0
3/19/2020	12:09:19	0	0	-	0	0
3/19/2020	12:10:19	0	0	-	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-02			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m³)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	12:11:19	0	0	-	0	0
3/19/2020	12:12:19	0	0	-	0	0
3/19/2020	12:13:19	0	0	-	0	0
3/19/2020	12:14:19	0	0	-	0	0
3/19/2020	12:15:19	0	0	-	0	0
3/19/2020	12:16:19	0	0	-	0	0
3/19/2020	12:17:19	0	0	-	0	0
3/19/2020	12:18:19	0	0	-	0	0
3/19/2020	12:19:19	0	0	-	0	0
3/19/2020	12:20:19	0	0	-	0	0
3/19/2020	12:21:19	0	0	-	0	0
3/19/2020	12:22:19	0	0	-	0	0
3/19/2020	12:23:19	0	0	-	0	0
3/19/2020	12:24:19	0	0	-	0	0
3/19/2020	12:25:19	0	0	-	0	0
3/19/2020	12:26:19	0	0	-	0	0
3/19/2020	12:27:19	0	0	-	0	0
3/19/2020	12:28:19	0	0	-	0	0
3/19/2020	12:29:19	0	0	-	0	0
3/19/2020	12:30:19	0	0	-	0	0
3/19/2020	12:31:19	0	0	-	0	0
3/19/2020	12:32:19	0	0	-	0	0
3/19/2020	12:33:19	0.002	0	-	0	0
3/19/2020	12:34:19	0.004	0	-	0	0
3/19/2020	12:35:19	0.001	0	-	0	0
3/19/2020	12:36:19	0	0	-	0	0
3/19/2020	12:37:19	0	0	-	0	0
3/19/2020	12:38:19	0.001	0	-	0	0
3/19/2020	12:39:19	0	0	-	0	0
3/19/2020	12:40:19	0	0	-	0	0
3/19/2020	12:41:19	0	0	-	0	0
3/19/2020	12:42:19	0	0	-	0	0
3/19/2020	12:43:19	0.001	0	-	0	0
3/19/2020	12:44:19	0	0	-	0	0
3/19/2020	12:45:19	0	0	-	0	0
3/19/2020	12:46:19	0	0	-	0	0
3/19/2020	12:47:19	0	0	-	0	0
3/19/2020	12:48:19	0	0	-	0	0
3/19/2020	12:49:19	0	0	-	0	0
3/19/2020	12:50:19	0	0	-	0	0
3/19/2020	12:51:19	0	0	-	0	0
3/19/2020	12:52:19	0	0	-	0	0
3/19/2020	12:53:19	0	0	-	0	0
3/19/2020	12:54:19	0	0	-	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			**G-AM-02**			
Device		**DustTrak II 8530**	**ppbRAE 3000(PGM-7340)**			
Date	**Time**	**Mass Conc. Total (mg/m^3)**	**VOC Min (ppb)**	**VOC Avg (ppb)**	**VOC Max (ppb)**	**VOC Real (ppb)**
3/19/2020	12:55:19	0.001	0	-	0	0
3/19/2020	12:56:19	0	0	-	0	0
3/19/2020	12:57:19	0	0	-	0	0
3/19/2020	12:58:19	0	0	-	0	0
3/19/2020	12:59:19	0	0	-	0	0
3/19/2020	13:00:19	0	0	-	0	0
3/19/2020	13:01:19	0	0	-	0	0
3/19/2020	13:02:19	0	0	-	0	0
3/19/2020	13:03:19	0	0	-	0	0
3/19/2020	13:04:19	0	0	-	0	0
3/19/2020	13:05:19	0	0	-	0	0
3/19/2020	13:06:19	0	0	-	0	0
3/19/2020	13:07:19	0	0	-	0	0
3/19/2020	13:08:19	0	0	-	0	0
3/19/2020	13:09:19	0	0	-	0	0
3/19/2020	13:10:19	0	0	-	0	0
3/19/2020	13:11:19	0	0	-	0	0
3/19/2020	13:12:19	0	0	-	0	0
3/19/2020	13:13:19	0	0	-	0	0
3/19/2020	13:14:19	0	0	-	0	0
3/19/2020	13:15:19	0	0	-	0	0
3/19/2020	13:16:19	0	0	-	0	0
3/19/2020	13:17:19	0	0	-	0	0
3/19/2020	13:18:19	0	0	-	0	0
3/19/2020	13:19:19	0	0	-	0	0
3/19/2020	13:20:19	0	0	-	0	0
3/19/2020	13:21:19	0	0	-	0	0
3/19/2020	13:22:19	0	0	-	0	0
3/19/2020	13:23:19	0	0	-	0	0
3/19/2020	13:24:19	0.001	0	-	0	0
3/19/2020	13:25:19	0.001	0	-	0	0
3/19/2020	13:26:19	0	0	-	0	0
3/19/2020	13:27:19	0	0	-	0	0
3/19/2020	13:28:19	0	0	-	0	0
3/19/2020	13:29:19	0.001	0	-	0	0
3/19/2020	13:30:19	0.003	0	-	0	0
3/19/2020	13:31:19	0.002	0	-	0	0
3/19/2020	13:32:19	0	0	-	0	0
3/19/2020	13:33:19	0	0	-	0	0
3/19/2020	13:34:19	0	0	-	0	0
3/19/2020	13:35:19	0	0	-	0	0
3/19/2020	13:36:19	0	0	-	0	0
3/19/2020	13:37:19	0	0	-	0	0
3/19/2020	13:38:19	0	0	-	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-02			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m³)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	13:39:19	0	0	-	0	0
3/19/2020	13:40:19	0	0	-	0	0
3/19/2020	13:41:19	0	0	-	0	0
3/19/2020	13:42:19	0	0	-	0	0
3/19/2020	13:43:19	0	0	-	0	0
3/19/2020	13:44:19	0.008	0	-	0	0
3/19/2020	13:45:19	0	0	-	0	0
3/19/2020	13:46:19	0	0	-	0	0
3/19/2020	13:47:19	0	0	-	0	0
3/19/2020	13:48:19	0	0	-	0	0
3/19/2020	13:49:19	0	0	-	0	0
3/19/2020	13:50:19	0	0	-	0	0
3/19/2020	13:51:19	0	0	-	0	0
3/19/2020	13:52:19	0	0	-	0	0
3/19/2020	13:53:19	0	0	-	0	0
3/19/2020	13:54:19	0	0	-	0	0
3/19/2020	13:55:19	0	0	-	0	0
3/19/2020	13:56:19	0	0	-	0	0
3/19/2020	13:57:19	0	0	-	0	0
3/19/2020	13:58:19	0	0	-	0	0
3/19/2020	13:59:19	0	0	-	0	0
3/19/2020	14:00:19	0	0	-	0	0
3/19/2020	14:01:19	0	0	-	0	0
3/19/2020	14:02:19	0	0	-	0	0
3/19/2020	14:03:19	0	0	-	0	0
3/19/2020	14:04:19	0	0	-	0	0
3/19/2020	14:05:19	0	0	-	0	0
3/19/2020	14:06:19	0	0	-	0	0
3/19/2020	14:07:19	0	0	-	0	0
3/19/2020	14:08:19	0	0	-	0	0
3/19/2020	14:09:19	0	0	-	0	0
3/19/2020	14:10:19	0	0	-	0	0
3/19/2020	14:11:19	0	0	-	0	0
3/19/2020	14:12:19	0	0	-	0	0
3/19/2020	14:13:19	0	0	-	0	0
3/19/2020	14:14:19	0	0	-	0	0
3/19/2020	14:15:19	0	0	-	0	0
3/19/2020	14:16:19	0	0	-	0	0
3/19/2020	14:17:19	0	0	-	0	0
3/19/2020	14:18:19	0	0	-	0	0
3/19/2020	14:19:19	0	0	-	0	0
3/19/2020	14:20:19	0	0	-	0	0
3/19/2020	14:21:19	0	0	-	0	0
3/19/2020	14:22:19	0	0	-	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-02			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m³)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	14:23:19	0	0	-	0	0
3/19/2020	14:24:19	0	0	-	0	0
3/19/2020	14:25:19	0	0	-	0	0
3/19/2020	14:26:19	0	0	-	0	0
3/19/2020	14:27:19	0	0	-	0	0
3/19/2020	14:28:19	0	0	-	0	0
3/19/2020	14:29:19	0	0	-	0	0
3/19/2020	14:30:19	0	0	-	0	0
3/19/2020	14:31:19	0	0	-	0	0
3/19/2020	14:32:19	0	0	-	0	0
3/19/2020	14:33:19	0	0	-	0	0
3/19/2020	14:34:19	0	0	-	0	0
3/19/2020	14:35:19	0	0	-	0	0
3/19/2020	14:36:19	0	0	-	0	0
3/19/2020	14:37:19	0	0	-	0	0
3/19/2020	14:38:19	0	0	-	0	0
3/19/2020	14:39:19	0	0	-	0	0
3/19/2020	14:40:19	0	0	-	0	0
3/19/2020	14:41:19	0.001	0	-	0	0
3/19/2020	14:42:19	0	0	-	0	0
3/19/2020	14:43:19	0	0	-	0	0
3/19/2020	14:44:19	0	0	-	0	0
3/19/2020	14:45:19	0.003	0	-	0	0
3/19/2020	14:46:19	0.001	0	-	0	0
3/19/2020	14:47:19	0	0	-	0	0
3/19/2020	14:48:19	0	0	-	0	0
3/19/2020	14:49:19	0	0	-	0	0
3/19/2020	14:50:19	0	0	-	0	0
3/19/2020	14:51:19	0	0	-	0	0
3/19/2020	14:52:19	0	0	-	0	0
3/19/2020	14:53:19	0	0	-	0	0
3/19/2020	14:54:19	0	0	-	0	0
3/19/2020	14:55:19	0	0	-	0	0
3/19/2020	14:56:19	0	0	-	0	0
3/19/2020	14:57:19	0.001	0	-	0	0
3/19/2020	14:58:19	0.001	0	-	0	0
3/19/2020	14:59:19	0.001	0	-	0	0
3/19/2020	15:00:19	0	0	-	0	0
3/19/2020	15:01:19	0	0	-	0	0
3/19/2020	15:02:19	0	0	-	0	0
3/19/2020	15:03:19	0	0	-	0	0
3/19/2020	15:04:19	0.001	0	-	0	0
3/19/2020	15:05:19	0.001	0	-	0	0
3/19/2020	15:06:19	0	0	-	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			**G-AM-02**			
Device		**DustTrak II 8530**	**ppbRAE 3000(PGM-7340)**			
Date	**Time**	**Mass Conc. Total (mg/m^3)**	**VOC Min (ppb)**	**VOC Avg (ppb)**	**VOC Max (ppb)**	**VOC Real (ppb)**
3/19/2020	15:07:19	0	0	-	0	0
3/19/2020	15:08:19	0.001	0	-	0	0
3/19/2020	15:09:19	0.001	0	-	0	0
3/19/2020	15:10:19	0.001	0	-	0	0
3/19/2020	15:11:19	0	0	-	0	0
3/19/2020	15:12:19	0.001	0	-	0	0
3/19/2020	15:13:19	0.001	0	-	0	0
3/19/2020	15:14:19	0	0	-	0	0
3/19/2020	15:15:19	0	0	-	0	0
3/19/2020	15:16:19	0	0	-	0	0
3/19/2020	15:17:19	0.001	0	-	0	0
3/19/2020	15:18:19	0	0	-	0	0
3/19/2020	15:19:19	0	0	-	0	0
3/19/2020	15:20:19	0	0	-	0	0
3/19/2020	15:21:19	0.004	0	-	0	0
3/19/2020	15:22:19	0	0	-	0	0
3/19/2020	15:23:19	0.001	0	-	0	0
3/19/2020	15:24:19	0	0	-	0	0
3/19/2020	15:25:19	0	0	-	0	0
3/19/2020	15:26:19	0	0	-	0	0
3/19/2020	15:27:19	0	0	-	0	0
3/19/2020	15:28:19	0	0	-	0	0
3/19/2020	15:29:19	0	0	-	0	0
3/19/2020	15:30:19	0.001	0	-	0	0
3/19/2020	15:31:19	0	0	-	0	0
3/19/2020	15:32:19	0.001	0	-	0	0
3/19/2020	15:33:19	0	0	-	0	0
3/19/2020	15:34:19	0.001	0	-	0	0
3/19/2020	15:35:19	0	0	-	0	0
3/19/2020	15:36:19	0.001	0	-	0	0
3/19/2020	15:37:19	0.001	0	-	0	0
3/19/2020	15:38:19	0.001	0	-	0	0
3/19/2020	15:39:19	0.001	0	-	0	0
3/19/2020	15:40:19	0.001	0	-	0	0
3/19/2020	15:41:19	0.001	0	-	0	0
3/19/2020	15:42:19	0.001	0	-	0	0
3/19/2020	15:43:19	0.001	0	-	0	0
3/19/2020	15:44:19	0.001	0	-	0	0
3/19/2020	15:45:19	0.001	0	-	0	0
3/19/2020	15:46:19	0.001	0	-	0	0
3/19/2020	15:47:19	0.001	0	-	0	0
3/19/2020	15:48:19	0.001	0	-	0	0
3/19/2020	15:49:19	0	0	-	0	0
3/19/2020	15:50:19	0.001	0	-	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			**G-AM-02**			
Device		**DustTrak II 8530**	**ppbRAE 3000(PGM-7340)**			
Date	**Time**	**Mass Conc. Total (mg/m³)**	**VOC Min (ppb)**	**VOC Avg (ppb)**	**VOC Max (ppb)**	**VOC Real (ppb)**
3/19/2020	15:51:19	0.001	0	-	0	0
3/19/2020	15:52:19	0.001	0	-	0	0
3/19/2020	15:53:19	0.001	0	-	0	0
3/19/2020	15:54:19	0.001	0	-	0	0
3/19/2020	15:55:19	0.001	0	-	0	0
3/19/2020	15:56:19	0.001	0	-	0	0
3/19/2020	15:57:19	0.002	0	-	0	0
3/19/2020	15:58:19	0.001	0	-	0	0
3/19/2020	15:59:19	0.001	0	-	0	0
3/19/2020	16:00:19	0.001	0	-	0	0
3/19/2020	16:01:19	0.003	0	-	0	0
3/19/2020	16:02:19	0.001	0	-	0	0
3/19/2020	16:03:19	0.001	0	-	0	0
3/19/2020	16:04:19	0.002	0	-	0	0
3/19/2020	16:05:19	0.001	0	-	0	0
3/19/2020	16:06:19	0.001	0	-	0	0
3/19/2020	16:07:19	0.001	0	-	0	0
3/19/2020	16:08:19	0.001	0	-	0	0
3/19/2020	16:09:19	0.001	0	-	0	0
3/19/2020	16:10:19	0.001	0	-	0	0
3/19/2020	16:11:19	0.001	0	-	0	0
3/19/2020	16:12:19	0.001	0	-	0	0
3/19/2020	16:13:19	0.002	0	-	0	0
3/19/2020	16:14:19	0.001	0	-	0	0
3/19/2020	16:15:19	0.001	0	-	0	0
3/19/2020	16:16:19	0.002	0	-	0	0
3/19/2020	16:17:19	0.002	0	-	0	0
3/19/2020	16:18:19	0.002	0	-	0	0
3/19/2020	16:19:19	0.002	0	-	0	0
3/19/2020	16:20:19	0.002	0	-	0	0
3/19/2020	16:21:19	0.002	0	-	0	0
3/19/2020	16:22:19	0.002	0	-	0	0
3/19/2020	16:23:19	0.002	0	-	0	0
3/19/2020	16:24:19	0.002	0	-	0	0
3/19/2020	16:25:19	0.002	0	-	0	0
3/19/2020	16:26:19	0.002	0	-	0	0
3/19/2020	16:27:19	0.003	0	-	0	0
3/19/2020	16:28:19	0.002	0	-	0	0
3/19/2020	16:29:19	0.002	0	-	0	0
3/19/2020	16:30:19	0.003	0	-	0	0
3/19/2020	16:31:19	0.003	0	-	0	0
3/19/2020	16:32:19	0.003	0	-	0	0
3/19/2020	16:33:19	0.002	0	-	0	0
3/19/2020	16:34:19	0.003	0	-	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-02			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m³)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	16:35:19	0.003	0	-	0	0
3/19/2020	16:36:19	0.003	0	-	0	0
3/19/2020	16:37:19	0.003	0	-	0	0
3/19/2020	16:38:19	0.003	0	-	0	0
3/19/2020	16:39:19	0.003	0	-	0	0
3/19/2020	16:40:19	0.003	0	-	0	0
3/19/2020	16:41:19	0.003	0	-	0	0
3/19/2020	16:42:19	0.003	0	-	0	0
3/19/2020	16:43:19	0.003	0	-	0	0
3/19/2020	16:44:19	0.002	0	-	0	0
3/19/2020	16:45:19	0.002	0	-	0	0
3/19/2020	16:46:19	0.003	0	-	0	0
3/19/2020	16:47:19	0.004	0	-	0	0
3/19/2020	16:48:19	0.002	0	-	0	0
3/19/2020	16:49:19	0.002	0	-	0	0
3/19/2020	16:50:19	0.002	0	-	0	0
3/19/2020	16:51:19	0.002	0	-	0	0
3/19/2020	16:52:19	0.002	0	-	0	0
3/19/2020	16:53:19	0.002	0	-	0	0
3/19/2020	16:54:19	0.002	0	-	0	0
3/19/2020	16:55:19	0.002	0	-	0	0
3/19/2020	16:56:19	0.002	0	-	0	0
3/19/2020	16:57:19	0.002	0	-	0	0
3/19/2020	16:58:19	0.002	0	-	0	0
3/19/2020	16:59:19	0.002	0	-	0	0
3/19/2020	17:00:19	0.002	0	-	0	0
3/19/2020	17:01:19	0.002	0	-	0	0
3/19/2020	17:02:19	0.002	0	-	0	0
3/19/2020	17:03:19	0.002	0	-	0	0
3/19/2020	17:04:19	0.003	0	-	0	0
3/19/2020	17:05:00	-	0	-	0	0
3/19/2020	17:06:00	-	0	-	0	0
3/19/2020	17:07:00	-	0	-	0	0
3/19/2020	17:08:00	-	0	-	0	0
3/19/2020	17:09:00	-	0	-	0	0
3/19/2020	17:10:00	-	0	-	0	0
3/19/2020	17:11:00	-	0	-	0	0
3/19/2020	17:12:00	-	0	-	0	0
3/19/2020	17:13:00	-	0	-	0	0
3/19/2020	17:14:00	-	0	-	0	0
3/19/2020	17:15:00	-	0	-	0	0
3/19/2020	17:16:00	-	0	-	0	0
3/19/2020	17:17:00	-	0	-	0	0
3/19/2020	17:18:00	-	0	-	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			G-AM-02			
Device		DustTrak II 8530	ppbRAE 3000(PGM-7340)			
Date	Time	Mass Conc. Total (mg/m³)	VOC Min (ppb)	VOC Avg (ppb)	VOC Max (ppb)	VOC Real (ppb)
3/19/2020	17:19:00	-	0	-	0	0
3/19/2020	17:20:00	-	0	-	0	0
3/19/2020	17:21:00	-	0	-	0	0
3/19/2020	17:22:00	-	0	-	0	0
3/19/2020	17:23:00	-	0	-	0	0
3/19/2020	17:24:00	-	0	-	0	0
3/19/2020	17:25:00	-	0	-	0	0
3/19/2020	17:26:00	-	0	-	0	0
3/19/2020	17:27:00	-	0	-	0	0
3/19/2020	17:28:00	-	0	-	0	0
3/19/2020	17:29:00	-	0	-	0	0
3/19/2020	17:30:00	-	0	-	0	0
3/19/2020	17:31:00	-	0	-	0	0
3/19/2020	17:32:00	-	0	-	0	0
3/19/2020	17:33:00	-	0	-	0	0
3/19/2020	17:34:00	-	0	-	0	0
3/19/2020	17:35:00	-	0	-	0	0
3/19/2020	17:36:00	-	0	-	0	0
3/19/2020	17:37:00	-	0	-	0	0
3/19/2020	17:38:00	-	0	-	0	0
3/19/2020	17:39:00	-	0	-	0	0
3/19/2020	17:40:00	-	0	-	0	0
3/19/2020	17:41:00	-	0	-	0	0
3/19/2020	17:42:00	-	0	-	0	0
3/19/2020	17:43:00	-	0	-	0	0
3/19/2020	17:44:00	-	0	-	0	0
3/19/2020	17:45:00	-	0	-	0	0
3/19/2020	17:46:00	-	0	-	0	0
3/19/2020	17:47:00	-	0	-	0	0
3/19/2020	17:48:00	-	0	-	0	0
3/19/2020	17:49:00	-	0	-	0	0
3/19/2020	17:50:00	-	0	-	0	0
3/19/2020	17:51:00	-	0	-	0	0
3/19/2020	17:52:00	-	0	-	0	0
3/19/2020	17:53:00	-	0	-	0	0
3/19/2020	17:54:00	-	0	-	0	0
3/19/2020	17:55:00	-	0	-	0	0
3/19/2020	17:56:00	-	0	-	0	0
3/19/2020	17:57:00	-	0	-	0	0
3/19/2020	17:58:00	-	0	-	0	0
3/19/2020	17:59:00	-	0	-	0	0
3/19/2020	18:00:00	-	0	-	0	0
3/19/2020	18:01:00	-	0	-	0	0
3/19/2020	18:02:00	-	0	-	0	0

Table 10 - Continous Air Monitoring Results
Greenfield Property
Clifton Pier, New Providence, The Bahamas

Air Monitoring Location			**G-AM-02**			
Device		**DustTrak II 8530**	**ppbRAE 3000(PGM-7340)**			
Date	**Time**	**Mass Conc. Total (mg/m^3)**	**VOC Min (ppb)**	**VOC Avg (ppb)**	**VOC Max (ppb)**	**VOC Real (ppb)**
3/19/2020	18:03:00	-	0	-	0	0
3/19/2020	18:04:00	-	0	-	0	0
3/19/2020	18:05:00	-	0	-	0	0
3/19/2020	18:06:00	-	0	-	0	0
3/19/2020	18:07:00	-	0	-	0	0
3/19/2020	18:08:00	-	0	-	0	0
3/19/2020	18:09:00	-	0	-	0	0
3/19/2020	18:10:00	-	0	-	0	0
3/19/2020	18:11:00	-	0	-	0	0
3/19/2020	18:12:00	-	0	-	0	0
3/19/2020	18:13:00	-	0	-	0	0
3/19/2020	18:14:00	-	0	-	0	0

FIGURES

Legend

- Air Monitoring
- Surficial Soil Sample
- Shallow Soil Boring
- Deep Soil Boring
- Proposed Pipeline

N

0 120 Feet

Greenfield Sample Locations
BPL LNG Project

Nassau, The Bahamas

Geosyntec consultants

Blue Bell, PA | April 2020

Figure 1

P:\GIS\GISprojects\PH0229 Shell BPL\Projects\Greenfield_Sample_Locations_20200410.mxd 4/10/2020 3:46:12 PM

APPENDIX A

Soil Boring Logs

Geosyntec consultants

BORING NUMBER G-DB-01

CLIENT Shell

PROJECT NAME Shell Greenfield Property

PROJECT NUMBER PH0249

PROJECT LOCATION Nassau, The Bahamas

DATE STARTED 3/19/20 **COMPLETED** 3/19/20

GROUND ELEVATION

DRILLING CONTRACTOR Sentinel

NORTHING

DRILLING METHOD Auger

EASTING

LOGGED BY RC **CHECKED BY** JA

HOLE SIZE 6 inches

DEPTH (ft)	REC. (Dr/Rec) (in)	U.S.C.S CODE	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	SAMPLES	COMMENTS (odor, staining, etc)
0.0		SP		(SP) Light brown fine to medium grained SAND, dry.	27.52	G-DB-01(0-1)	
2.5					1.412		
5.0		SP		5.0 (SP) Light brown/white medium to coarse grained SAND, dry.			
7.5					1.439		
10.0							

NOTES Water level gauged at 24.10. Sampled water at 17.53

(Continued Next Page)

CLIENT Shell **PROJECT NAME** Shell Greenfield Property
PROJECT NUMBER PH0249 **PROJECT LOCATION** Nassau, The Bahamas

DEPTH (ft)	REC. (Dr/Rec) (in)	U.S.C.S CODE	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	SAMPLES	COMMENTS (odor, staining, etc)
10.0		SP		(SP) Light brown/white medium to coarse grained SAND, dry. *(continued)*			
12.5					2.202	G-DB-01(10-15)	
15.0							
17.5					1.718		
20.0							

NOTES Water level gauged at 24.10. Sampled water at 17.53

(Continued Next Page)

Geosyntec consultants

BORING NUMBER G-DB-01

CLIENT Shell

PROJECT NAME Shell Greenfield Property

PROJECT NUMBER PH0249

PROJECT LOCATION Nassau, The Bahamas

DEPTH (ft)	REC. (Dr/Rec) (in)	U.S.C.S CODE	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	SAMPLES	COMMENTS (odor, staining, etc)
22.5		SP		(SP) Light brown/white medium to coarse grained SAND, dry. *(continued)*			
25.0		SP		25.0 (SP) White medium to coarse SAND, wet. EOB at 30 ft.			
27.5					2.372	G-DB-01(25-30)	
30.0				30.0			

Bottom of borehole at 30 feet

32.5

NOTES Water level gauged at 24.10. Sampled water at 17.53

Geosyntec consultants

BORING NUMBER G-SB-01

CLIENT	Shell	**PROJECT NAME**	Shell Greenfield Property
PROJECT NUMBER	PH0249	**PROJECT LOCATION**	Nassau, The Bahamas
DATE STARTED	3/19/20 **COMPLETED** 3/19/20	**GROUND ELEVATION**	
DRILLING CONTRACTOR	Sentinel	**NORTHING**	
DRILLING METHOD	Auger	**EASTING**	
LOGGED BY	RC **CHECKED BY** JA		
HOLE SIZE	6 inches		

DEPTH (ft)	REC. (Dr/Rec) (in)	U.S.C.S CODE	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	SAMPLES	COMMENTS (odor, staining, etc)
0.0		SP		(SP) White/light fine medium grained SAND, dry. EOB at 6ft.	9.532	G-SB-01(0-1)	
					1.606		
2.5					2.304		
					2.183		
					2.732		
5.0					3.322	G-SB-01(5-6)	
				6.0			
				Bottom of borehole at 6 feet			
7.5							
10.0							

NOTES

ENVIRONMENTAL BH - 2 - XY IN HEADER - GEOSYNTECNJ_STD.GDT - 4/11/20 09:23 - C:\USERS\LOCALADMIN\DESKTOP\BPL MARCH 2020 SOIL BORINGS2.GPJ

BORING NUMBER G-SB-02

Geosyntec consultants

CLIENT Shell

PROJECT NAME Shell Greenfield Property

PROJECT NUMBER PH0249

PROJECT LOCATION Nassau, The Bahamas

DATE STARTED 3/19/20 **COMPLETED** 3/19/20

GROUND ELEVATION

DRILLING CONTRACTOR Sentinel

NORTHING

DRILLING METHOD Auger

EASTING

LOGGED BY RC **CHECKED BY** JA

HOLE SIZE 6 inches

DEPTH (ft)	REC. (Dr/Rec) (in)	U.S.C.S CODE	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	SAMPLES	COMMENTS (odor, staining, etc)
0.0		SP		(SP) Light brown fine to medium grained SAND, dry. EOB at 6 ft.	6.241	G-SB-02(0-1)	
					4.543		
2.5					5.275	G-SB-02(2-3)	
					4.52		
5.0					3.625		
				6.0	1.945		
7.5				Bottom of borehole at 6 feet			
10.0							

NOTES

BORING NUMBER P-SB-04

Geosyntec consultants

engineers | scientists | innovators

CLIENT Shell

PROJECT NAME Shell Greenfield Property

PROJECT NUMBER PH0249

PROJECT LOCATION Nassau, The Bahamas

DATE STARTED 3/19/20 **COMPLETED** 3/19/20

GROUND ELEVATION

DRILLING CONTRACTOR Sentinel

NORTHING

DRILLING METHOD Auger

EASTING

LOGGED BY RC **CHECKED BY** JA

HOLE SIZE 6 inches

DEPTH (ft)	REC. (Dr/Rec) (in)	U.S.C.S CODE	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	SAMPLES	COMMENTS (odor, staining, etc)
0.0		SP		(SP) Brown fine to medium grained SAND, dry. Refusal at 2 ft.	6.13	P-SB-04(0-1)	
					1.029	P-SB-04(1-2)	
			2.0				
	Refusal at 2.0 feet.						
2.5							
5.0							
7.5							
10.0							

NOTES

ENVIRONMENTAL BH - 2 - XY IN HEADER - GEOSYNTECNJ_STD.GDT - 4/11/20 09:23 - C:\USERS\LOCALADMIN\DESKTOP\BPL MARCH 2020 SOIL BORINGS2.GPJ

Geosyntec consultants

engineers | scientists | innovators

BORING NUMBER P-SB-05

CLIENT Shell
PROJECT NAME Shell Greenfield Property
PROJECT NUMBER PH0249
PROJECT LOCATION Nassau, The Bahamas
DATE STARTED 3/19/20
COMPLETED 3/19/20
GROUND ELEVATION
DRILLING CONTRACTOR Sentinel
NORTHING
DRILLING METHOD Auger
EASTING
LOGGED BY RC
CHECKED BY JA
HOLE SIZE 6 inches

DEPTH (ft)	REC. (Dr/Rec) (in)	U.S.C.S CODE	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	SAMPLES	COMMENTS (odor, staining, etc)
0.0		SP		(SP) Brown fine to medium SAND and trace gravel, dry. Refusal at 5 ft.	14.41	P-SB-05(0-1)	
					5.221		
2.5					4.424		
					5.33		
5.0				5.0	8.621	P-SB-05(4-5)	

Refusal at 5.0 feet.

7.5

10.0

NOTES

ENVIRONMENTAL BH - 2 - XY IN HEADER - GEOSYNTECNJ_STD.GDT - 4/11/20 09:23 - C:\USERS\LOCALADMIN\DESKTOP\BPL MARCH 2020 SOIL BORINGS2.GPJ

Appendix 7: Personnel involved in EBA

Stacey Helena Moultrie

Proposed Position:	Consultant
Date of Birth:	1 September 1971
Nationality:	Bahamian
Certifications and Membership in Professional Societies:	GHG Inventory Expert, UNFCCC Roster of Experts Chartered Institution of Water and Environmental Management (CIWEM), United Kingdom Chartered Scientist, Science Council, United Kingdom Member, American Planning Association (APA) Lifetime Member, Delta Epsilon Iota Academic Honor Society

Education

2016	University of Florida (USA), Master of Urban Planning – Sustainability
1998	Dalhousie University (Canada), Master of Marine Management
1995	University of the West Indies (Mona Campus, Jamaica), B.Sc. (*Upper Second Class Honours*) Zoology – Marine Science & Fisheries

Certificates

2020	IDB INDES (USA), Behavioral Economics for Better Public Policies
2020	SCRUMstudy (USA), Scrum Master Certified (SMC) in Project Management
2020	SCRUMstudy (USA), Scrum Fundamentals Certified (SFC) in Project Management
2020	GHG Management Institute (USA), Proficiency Certificate in UNFCCC Online IPCC Guidelines
2007	Conservation Strategy Fund, Stanford University (USA), Economic Tools for Conservation

Countries of Work Experience

The Bahamas

Regional projects involving Antigua and Barbuda, Bahamas, Barbados, Belize, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Saint Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, and Venezuela.

Languages

	Speaking	*Reading*	*Writing*
English	Excellent	Excellent	Excellent

Key Qualifications

Mrs. Moultrie is an environmental planner. Her employment history in the environmental arena spans more than 25 years, including 18 months with the Department of Environmental Health Services and 7 years with the BEST Commission. Her experience involves work in project management, international negotiations, tourism, development of environmental education materials, environmental policy development, project proposal development for international funding, assessing environmental impacts of development projects, and environmental management and planning. Her role at the BEST Commission included advising the Government of The Bahamas on the environmental impacts of large private development projects, Government-led development projects, and policy decisions. She negotiated on behalf of the Bahamas Government in the following fora – Convention on Biological Diversity, Cartagena Protocol on Biosafety, Stockholm Convention on Persistent Organic Pollutants, United Nations Framework Convention on Climate Change, Rotterdam Convention on Prior Informed Consent and United Nations Convention on Desertification and Drought. She also provided policy guidance to the Ministry of Foreign Affairs on the Law of the Sea Convention and its various protocols.

Born and raised in The Bahamas with considerable work experience in the environmental sector, Mrs. Moultrie is well versed in the regulatory and policy aspects of natural resource management.

Employment Record

From 2007	**To Present**
Employer	SEV Consulting Group (Nassau, The Bahamas)
Position Held and	Environmental Planner
Description of Duties	Mrs. Moultrie is responsible for business development, project management, staff management, and client service delivery in the areas of environmental policy, planning and management as well as EIA and EMP development, coordination of internationally funded projects and development of environmental education, awareness and training materials.

From 2019	**To Present**
Employer	The Islands Laboratory, University College London (London, United Kingdom)
Position Held and	Researcher
Description of Duties	Mrs. Moultrie is a researcher with the Islands Laboratory which focuses on innovative solutions to tackle climate change and assess scenarios for disaster risk reduction and resilience for islands globally. Her research focuses on sustainability indicators, resilience, resource nexus and energy reform.

From 2000	**To 2007**
Employer	Bahamas Environment, Science and Technology (BEST) Commission (Nassau, The Bahamas)
Position Held and	Senior Environmental Officer
Description of Duties	Mrs. Moultrie was responsible for project management, staff management and advice to the Government of The Bahamas in the areas of biodiversity conservation, environmental impacts from development, mitigation for development activities, policy development, international negotiations, drafting environmental legislation, developing national strategies for environmental issues (included development of National Environmental Policy and National Environmental Management and Action Plan) and securing international funding for environmental projects. She was also responsible for management of environmental aspects of development of the islands of New Providence, Exuma, Eleuthera, Abaco, Long Island and Paradise Island.

Work Experience in Environmental Planning and Management

Degree of Integrated Water Resources Management Implementation (SDG 6) in The Bahamas – The Bahamas, October 2020 – November 2020 (National Consultant)
Funded by the Economic Commission for Latin America and the Caribbean (ECLAC), the project involved an analysis of institutional arrangements for integrated water resources management (IWRM) in The Bahamas and the country's progress in implementation of SDG 6 of the 2030 Agenda. Mrs. Moultrie served as the national consultant for The Bahamas. The consultancy also involved analysis of the effectiveness of national cross-sector coordination mechanisms, identification of gaps, the identification of successful mechanisms and development of lessons learned or identification of success factors that could be replicated in other countries. Tasks included consultation with several Government and non-Government agencies, including the Water and Sewerage Corporation (WSC). The final deliverable was a national report submitted to ECLAC to form a part of the Caribbean regional report.

Department of Environmental Planning and Protection, Preparation of the Third National Communication (TNC) and First Biennial Update Report (BUR1), September 2020 – Present (National Consultant, joint consultancy with the Islands Laboratory at University College London)
Funded by the Global Environment Facility (GEF) and the Bahamas Government, the project will involve development of the TNC and BUR1 reports to the UNFCCC Secretariat. SEV in cooperation with UCL Islands Laboratory will develop chapters on National Circumstances, Integration of Climate Change into National Development Priorities, Education, Training and Public Awareness, Information and Networking, and Capacity-Building. The work will entail data collection, data analysis, stakeholder consultations and training workshops on policy development and climate change integration into development planning.

Bahamas Power and Light, Environmental Impact Assessment and Environmental Management Plan – New Providence, The Bahamas, March 2020 – Present (Consultant)

Project involves construction of a power plant in New Providence. Mrs. Moultrie is responsible for development of an EIA and EMP for the project inclusive of coordinating all field teams, data collection, preparation of reports and liaising with BEST Commission and other Government agencies as necessary prior to construction works commencing.

Central Bank of The Bahamas, Environmental Impact Assessment and Environmental Management Plan – New Providence, The Bahamas, February 2020 – May 2021 (Consultant)
Project involved demolition of several buildings in New Providence. Mrs. Moultrie was responsible for development of an EIA and EMP for the project inclusive of coordinating all field teams, data collection, preparation of reports and liaising with BEST Commission and other Government agencies as necessary prior to construction works commencing. She also served as Lead Environmental Monitor for the project through completion of demolition activities.

Nassau Cruise Port, Environmental Management Plan and Environmental Monitoring – New Providence, The Bahamas, January 2020 – Present (Consultant)
Project involves construction of cruise port facilities in New Providence. Mrs. Moultrie is responsible for development of an EMP for the project inclusive of development of detailed mitigation measures, a hurricane preparedness plan and an environmental, health and safety training manual for construction staff. She is also Lead Environmental Monitor on the project responsible for managing on-site monitors and liaising with DEPP.

Bill Simmons Construction, Environmental Monitor – New Providence, The Bahamas, December 2018 – June 2019 (Consultant)
Project involved provision of potable water infrastructure and road reinstatement for western New Providence. Mrs. Moultrie was responsible for development of environmental checklist and biweekly environmental inspections to ensure compliance with Ministry of Works and Water and Sewerage Corporation standards. She also provided environmental, health and safety training for all construction staff prior to construction works commencing.

Shell Bahamas LNG Project, Environmental Permitting and Environmental Impact Assessment – New Providence, The Bahamas, December 2018 – May 2021 (Consultant)
Project involved development of an LNG pipeline and power plant by Shell in cooperation with Bahamas Power and Light (BPL). Mrs. Moultrie was responsible for providing guidance on environmental, health and safety legislation, regulations and standards the project will need to adhere to as well as assisting with liaising with the Department of Environmental Planning and Protection (DEPP). Mrs. Moultrie's responsibilities also involved field work and chapter creation for developing an EIA for the project.

By The Ocean Development, Environmental Impact Assessment – Eleuthera, The Bahamas, April 2018 – December 2018 (Team Leader)
Project involved development of an EIA hotel and luxury home development with an organic farm component. Preparing the EIA involved terrestrial and hydrological surveys to assess the impacts of the development. The EIA also recommends mitigation measures to be undertaken to eliminate or minimize negative environmental impacts. Mrs. Moultrie was responsible for preparing of the EIA, coordinating the

team of consultants, and liaising with Government agencies during the EIA review to obtain no-objection for the development to proceed.

Caribbean Community Climate Change Centre, Capacity Building of National Designated Authority (NDA) and Preparation of Country Strategic Framework – The Bahamas, February 2018 – December 2018 (National Consultant, team member with Acclimatise)
Funded by the Green Climate Fund (GCF), Caribbean Community Climate Change Centre (CCCCC) and the Bahamas Government, the project sought to strengthen the capacities of the Ministry of Environment and Housing as the National Designated Authority for the GCF, develop operational guidelines for engagement of the NDA with the GCF, and prepare a Country Strategic Framework for The Bahamas (including a portfolio of climate change projects). Mrs. Moultrie is responsible for stakeholder engagement and assisting with development of project reports and the Country Strategic Framework along with communication materials about the GCF.

Caribbean Development Bank, Water Supply Improvement Project – The Bahamas, December 2016 – April 2018 (Socio-Environmental and Climate Specialist)
Funded by the Caribbean Development Bank (CDB) and the Bahamas Government, the project sought to improve existing and develop new infrastructure for water supply on six islands in The Bahamas. Mrs. Moultrie was responsible for developing ESMPs for five of the islands and monitoring compliance with the ESMPs during construction. A key component of the project was ensuring infrastructure is resilient to climate change.

Inter-American Development Bank, Environmental and Social Analysis and Management Plan – The Bahamas, July 2016 – September 2016 (Socio-Environmental and Climate Specialist)
Funded by the Inter-American Development Bank (IDB) and the Bahamas Government, the Skills for Current and Future Jobs in The Bahamas project involved finding a location for the Department of Labour. Mrs. Moultrie was responsible for advising on the environmental and social impacts of three scenarios – repair of Clarence A. Bain building, demolition of the building and construction of a new building at the same site, and rental of space in an existing building. She developed an Environmental and Social Analysis (ESA) of related demolition, construction and operation activities for the various scenarios. She also developed an Environmental and Social Management Plan (ESMP) to guide demolition, construction and operation, depending on the scenario selected.

Inter-American Development Bank, Feasibility Studies for a Climate Risk-resilient Coastal Zone Management Investment Program in The Bahamas – Preparation of a National ICZM Policy Framework, February 2016 – October 2016 (SEV Team Leader)
Funded by the Inter-American Development Bank, the project sought to prepare a national integrated coastal zone management (ICZM) policy framework for The Bahamas, support the Government of The Bahamas in communicating with the public on relevant issues and enhance knowledge and capacities in innovative aspects of ICZM for the Government and other key stakeholders. SEV Consulting Group, along with Caribbean Coastal Services, was selected to support the project through development of technical briefs on thematic areas including policy, governance and planning, environment and climate change adaptation as well as develop a draft ICZM National Policy Framework. Mrs. Moultrie was responsible for ensuring all SEV team members completed their tasks in a timely manner and served as liaison with other consulting

teams on the project as well as Government and IDB staff. She led all tasks related to policy development, including drafting of the ICZM Policy Framework and participation as a presenter in the training workshop, and assisted with other tasks.

Cotton Bay Development Golf Course, Eleuthera – Environmental Impact Assessment Addendum and Environmental Management Plan, July 2015 – September 2016 (Project Lead)
Project involved development of an EIA Addendum for the golf course component under Phase 2. Preparing the Addendum involved terrestrial and hydrological surveys to assess the impacts of the golf course construction. The Addendum also recommends mitigation measures to be undertaken to eliminate or minimize negative environmental impacts. Subsequent to the approval of the EIA Addendum, an EMP was developed to guide construction and operation.

Inter-American Development Bank, Ecosystem-based Development for Andros Island, The Bahamas – Outreach and Capacity-Building, July 2015 – March 2017 (Team Leader)
Funded by the Inter-American Development Bank and Office of the Prime Minister, the project sought to complete an analysis of ecosystem services and future development scenarios as well as development of a master plan for the island of Andros. SEV was selected to support the project through development of outreach and capacity building activities including development of a communications strategy, facilitation of public consultations, assessment of technical capacity of decision-making agencies and delivery of a training workshop on several topics including ecosystem services and economic valuation. Mrs. Moultrie was responsible for ensuring all team members completed their tasks in a timely manner and served as liaison with other consulting teams on the project as well as the IDB staff. She led the tasks on stakeholder consultations and training workshop.

Publications

- Wells-Moultrie, S. (2020). Assessing sustainability in small island developing states: A comparative analysis of sustainability assessment tools and their applicability to small island developing states. Chapter 10. In *Tourism Development, Governance and Sustainability in The Bahamas*. Abingdon, Oxon; New York, N.Y: Routledge.
- Silver, J.M. et al. (2019). Advancing Coastal Risk Reduction Science and Implementation by Accounting for Climate, Ecosystems, and People. In *Frontiers in Marine Science*, 6(556).
- Arkema, K. et al. (2019). Integrating fisheries management into sustainable development planning. In *Ecology and Society*, 24(2):1.
- Wells-Moultrie, S. (2016). *Assessing Sustainability in Small Island Developing States" A comparative analysis of sustainability assessment tools and their applicability to Small Island Developing States*. Gainesville: University of Florida.
- Moultrie, Stacey. (2013). *Bahamas Invasive Species Field Guide: Identification of Plant and Animal Invasives.* Nassau: Department of Marine Resources.
- Moultrie, Stacey. (2013). *The Bahamas National Invasive Species Strategy 2013.* Nassau: Department of Marine Resources.
- Sherman, K., Dahlgren, C., Moultrie, S., and Arnett, F. (2013). *Building a Sustainable National Marine Protected Area Network: Controlling Lionfish Populations in Marine Protected Areas*. PSBP Conference Paper.
- Moultrie, Stacey. (2012). *Everyman's Guide to Protected Areas.* Nassau: HD Wells.

- Moultrie, Stacey. (2012). *Master Plan for The Bahamas National Protected Area System*. Nassau: The Nature Conservancy.
- The Nature Conservancy (2010). *Land and Sea Use Plan for the island of Andros.* Nassau: The Nature Conservancy.
- The Nature Conservancy (2009). *Master Plan Summary for The Bahamas National Protected Area System*. Nassau: The Nature Conservancy.
- Moultrie, S. (2009). *Sustainable Financing for Protected Areas*. In The Bahamas Investor, Nassau, The Bahamas.
- The BEST Commission. (2007). *National Environmental Policy* and *National Environmental Management and Action Plan.* Nassau, The Bahamas: The BEST Commission.
- Wells-Moultrie, Stacey. (2006). *The Evolution of Environmental Management in The Bahamas - 1994-2005.* In The Bahamas Journal of Science, Nassau, The Bahamas.
- The BEST Commission. (2003). *National Invasive Species Strategy for The Bahamas*, Nassau: The BEST Commission.
- The BEST Commission. (2002). *Bahamas Environmental Handbook.* Nassau, The Bahamas: Media Enterprises.
- Wells, Stacey. (1998). *A Marine Environmental Policy Proposal for The Bahamas*, Halifax, Canada: Dalhousie University.

JOHN A. BOWLEG, PE C.Eng, C.Env, C.Sci (Hydrology)

Chartered Water and Environmental Manager

M.CIWEM, M.ASCE, M.BSE

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PO Box EE-17345, Nassau, The Bahamas
Mobile #'s: (242) 557-2775

855 W. Commercial Blvd, #103
Fort Lauderdale, Florida 33309
Email: JBowleg@AEESconsultants.com

EXPERIENCE:

6/05 – Present **CONSULTING PROFESSIONAL CIVIL-ENVIRONMENTAL ENGINEER | HYDROLOGIST | ANALYST**
ADARIE Engineering & Environmental Services [AEES]. AEES Consulting Group, LLC
Fort Lauderdale, Florida USA | Atlanta, Georgia USA.
Project management for civil engineering works, environmental monitoring, hydrological design, reverse osmosis, renewable energy, waste, and wetland projects. Construction site inspections, prepare final reports, and expert witness in defense of environmental matters. Independent environmental laboratory data review for clients. International project works for land development, water & natural resources management, climate change | disaster risk reduction & mitigation mechanisms, and the scaling of resilient water-energy technologies. Ocean Thermal Energy Conversion (OTEC) research | development.

- ***American Institute of Hydrology [AIH] – Member***
- ***American Society of Civil Engineers [ASCE] | Environmental & Water Resources Institute [EWRI] – Member***
- ***Greenhouse Gas Management Institute [GHGMI] Inventory Courses (2022)***
- ***Ocean Thermal Energy Association [OTEA] – Member (2020 – Present)***
- ***United Nations [UN] Department of Safety and Security [BSAFE] Certification (2021 - Present)***
- ***UN Food & Agricultural Organization [FAO] Forest & Water Nexus – Intro (21Nov2021)***
- ***UN Development Programme [UNDP] | UN Environment Programme [UNEP] Consultancies (2021 -Present)***
- ***UNESCO-IHP, EcoHydrology Working Group for Latin America & Caribbean – Head (2021 - Present)***
- ***UNESCO-IHP Latin America & Caribbean (LAC) – Consultant (2020 – Present)***

7/99 – Present **WATER RESOURCES CONSULTANT | SR. HYDROLOGIST [Groundwater Management | WaSH].**
Water & Sewerage Corp. [W&SC] – Water Resources Management Unit [WRMU]. Nassau, The Bahamas.
Water & Environmental Manager with responsibility for the assessment & monitoring of the groundwater resources, thru the Engineering & Planning Department of WSC. Provide guidance on the development / management of the groundwater resources & coastal zone. Involved in matters concerning groundwater abstraction, reverse osmosis processes, wastewater effluent disposal, and Water Sanitation & Hygiene [WaSH]. In accordance with a key international environmental convention, served as Chairman of the National Wetlands Committee [Ramsar Convention] to implement the countries goals/policy regarding wetlands. Additional international duties for water | hydrology | environment are:

- ***Global Water Partnership – Caribbean [GWP-C], Bahamas Water Resources Representative (2000 – Present)***
- ***International Water Association [IWA] Specialist Group – Caribbean Representative (2013 – Present)***
- ***Ramsar Convention on Wetlands – Caribbean Representative (2003 – 2008), Vice-Chairman of Standing Committee (2005– 2008), & Member of the Management Working Group (2009 – 2012)***
- ***UNESCO-IHP, Hydrological Representative for the Bahamas | Caribbean (Aug 2007 – Present)***
- ***Water Resources Government Representative to the Organization of American States [OAS] (2002 – Present), & Inter-American Water Resources Network [IWRN] Board Member (2009 - 2012)***
- ***World Meteorological Organization [WMO] – Hydrological Advisor for the Bahamas (2004 – Present)***

4/99 – 7/99 **CONTRACT CIVIL | ENVIRONMENTAL ENGINEER. George V. Cox & Co. Nassau, NP, The Bahamas.**
<u>**Family Island Infrastructure Study - Great Exuma, Little Exuma | Exuma Cays, & Cat Island, The Bahamas.**</u>
Collection of data for the physical condition of government facilities. Project site data integrated into a Global Information Systems (GIS) Project. Facilities consist of Docks, Airports, Buildings, Bridges, Roads, and Utilities. Hazardous substances and potential environmental impacts also identified.

6/98 – 3/99 **PROJECT ENGINEER | CONSTRUCTION MANAGER. Willmer Engineering, Inc. Atlanta, Georgia, USA.**
Project management of landfill closure, asphalt testing at airports, and asbestos surveys | abatement monitoring. Construction Quality Control | Assurance (CQC | CQA) services for the testing & inspection of fill density | compaction, asphalt & concrete pavements, building footings, and structures. Conduct construction site inspections, and prepare final CQA Certification Reports for landfill projects.

9/97 – 6/98 **CONTRACT CIVIL | DESIGN ENGINEER. EMCON Environmental Services. Duluth, Georgia, USA.**
Designs of solid waste landfills & transfer facilities, site development, and hydrological analysis. Environmental Phase I & II Surveys, Corrective Acton Plan (CAP) analysis, site closure, and remediation for Environmental Projects. CQA, site inspections, and CQC for landfill projects.

8/96 – 9/97 **CIVIL ENGINEER | TECHNICAL SPECIALIST. GZA GeoEnvironmental, Inc. Gwinnett, Georgia, USA.**
Solid waste landfill | transfer facility design, site development, drainage studies, & environmental site assessments. Engineering | hydrological design calculations using AutoCAD, and EaglePoint Software.

12/93 – 7/96 **ENVIRONMENTAL ANALYST. Analytical Services Inc. [ASI]. Norcross, Georgia, USA.**
Extraction methodologies | organic analysis for analytical methods following the US Environmental Protection Agency (EPA) Solid Waste Regulations (SW-846). Performed the review and report of clientele results for sample extracts following EPA-8270, 625, 525 methods | regulatory guidelines, including all required QA/QC Protocols for US Army Corp Of Engineers Project Sites. [ASI - Norcross, GA Environmental | Lab is presently PACE Analytical]

PUBLICATIONS | RESEARCH:

Climate Change, Water Resources, & Renewable Energy in The Bahamas, 2022, DOI: 10.13140/RG.2.2.22283.98084

Water-Energy Nexus: Case Study on Climate Change and Water Resources, in The Bahamas. {Use of the reverse geothermal conditions, towards adaptation measures - OTEC | SDC/SWAC | SWRO} – September 2017 | December 2020 | Ongoing Research Activities (Bowleg, 2017, DOI: 10.13140/RG.2.2.28981.91369)

Water Resources - Challenges for Groundwater Management & Climate Change in the Caribbean | Commonwealth of The Bahamas, North Andros and Grand Bahama Storm Surge Data (UNESCO International Science School - Havana Cuba, Bowleg, 2018, DOI: 10.13140/RG.2.2.22690.45765)

UNESCO Ecohydrology, Ecosystem Change & Management Response on Tropical Island Systems: Case Study of Great Exuma linking Land Use Change, Coastal Wetlands and Marine Fisheries (Exuma Bahamas, Sealey | Bowleg, 2015)

UNESCO Graphic Publication (CRC Press), Climate Change Effects on Groundwater – Chapter 5, Effects of storm surges on groundwater resources, North Andros Island, Bahamas (Bowleg | Allen, 2011)

UNEP 1st Expert Workshop on Vulnerability of Coastal Aquifers in the Insular Caribbean, Impact to North Andros Water Resources, due to storm surge – presentation of data, following Hurricane Frances (Havana City Cuba, Bowleg, 2004)

Mobil Oil Corporation, 'Biological Activated Carbon for Removal of Gasoline Contaminants in Groundwater', Determination of Isotherm(s) associated with the Competitive Adsorption of Benzene, Toluene, Ethylbenzene, & O-Xylene using Calgon Filtrasorb-400 Granular Activated Carbon (Howard University School of Engineering, Washington DC, 1993)

PROFESSIONAL REGISTRATIONS | AFFILIATIONS:

American Society of Civil Engineers [ASCE], Member (#296012)
Bahamas Professional Engineers Board [PEB] Registration for Civil & Environmental (#10129)
The Bahamas Society of Engineers [BSE], Member (#0131)
The Chartered Institution of Water and Environmental Management [CIWEM], Member (#27901)
UK Chartered Engineer (C. Eng.) Register – (Registration #542642)
UK Chartered Environmentalist (C.Env.) Register – (Registration #3505)
UK Chartered Scientist (C.Sci.) Register – (Registration #WEM/105/000293)

EDUCATION:

IHE DELFT INSTITUTE FOR WATER EDUCATION | Groundwater Hydrology Studies | Certificate – Short Course [2015]
UNV. OF COLORADO BOULDER – UCAR Comet | Hydrometeorology Analysis | Certificate – International Course [2008]
MASHAV – SHEFAYIM, ISRAEL – CINADCO | Water Resources Management | Certificate – International Course [2000]
HOWARD UNV. | Mobil Oil Removal of Gasoline Contaminants in Groundwater | Senior-Graduate Research [1993]
HOWARD UNIVERSITY | School of Civil / Environmental Engineering | Bachelor of Science (BSc) [1988 – 1993]

Mayer G. Murphy

EDUCATION

Bachelor of Environmental Studies Sept 2019-May 2023 University of Prince Edward Island, Charlottetown, PE

- Within a 4th year course, conducted an environmental impact assessment for aquaculture farms in PEI resulting in helping improve wastewater practices; identified sustainable alternatives to disposing of aquaculture waste and sustainable transportation, the project concluded with a proposed policy agreement
- Researched and presented a variety of papers and presentations using Microsoft Word, Excel, PowerPoint, and Access
- Adaptability skills further developed by having to adjusted to online learning during the COVID-19 pandemic

WORK EXPERIENCE

SEV Consulting Group
June 2023 – Present
Position: Environmental Technician

Ms. Murphy is responsible for field data collection on terrestrial and marine species as well as assisting with preparation of EIAs and EMPs. She also works as an environmental monitor for projects under construction as per monitoring requirements of each project's EMP. Her projects portfolio at SEV includes:
2023-2024 FOCOL Environmental Overview (RBC requirement) – Field assessments and report preparation
2023 RUBiS Abaco – Environmental Monitor
2023 -2024 Windsor Lakes housing development – Environmental Monitor
2023 – Present Royal Caribbean Island Club – Public consultation and Environmental Monitor
2024 High Cay development – Field data collection for EIA; EIA and EMP preparation
2024 NAD ODALS project – Field data collection for EBA; EBA and EMP preparation

VOLUNTEER WORK EXPERIENCE

Internship (Sept 2021-Present)
Hunter-Clyde Watershed Group, Charlottetown, PE

- Developed listening and interpersonal skills through weekly check-ins where feedback was given to help support and further develop learning skills and knowledge during internship with the Hunter Clyde Watershed Group
- Assigned and conducted field research on Brook Trout to determine if there were any size differences; results were then added to the website
- Work both independently and as part of a group while assisting with field work such as planting trees, checking water quality and redd surveying of Brook Trout; learned and conducted test water quality

Intern, Boat Registration Department (Jul – Aug 2021 Bahamas Port Department)

- Sorted boat registration records into spreadsheets using Microsoft Access; assisted with answering phone calls
- Conducted a research project to identify ways boats could be better equipped to handle hurricanes

CERTIFICATIONS

PADI Open Water and Advanced Open Water Diver	2023
Valid Standards of Training, Certification and Watchkeeping for Seafarers	2019
Valid Emergency First Aid and CPR Training	2019

David Dean

Position Title and No.	Ornithologist
Name of Expert:	David Dean
Country of Citizenship/Residence	The Bahamas

EDUCATION

2014	CV Bethel Senior High School – High School Diploma
2011	CH Reeves Junior High School – BJC Certificate

EMPLOYMENT RECORD

Period	Employing organisation and title/position. Contact information for references	Country	Summary of activities performed relevant to the Assignment
2021 - Present	SEV Consulting Group *Ornithologist* S. Helena Moultrie hmoultrie@sevconsulting.com	The Bahamas	Successfully completed bird surveys for following development projects - Adelaide Pines, Exuma Yacht Club, Bel Air Hotel & Residences, and East Grand Bahama school Complex.
2020 - 2021	Science and Perspective *Field Assistant for bird surveys* Dr. Ancilleno Davis ancilleno@scienceandperspective.com	The Bahamas	Mr. Dean worked as a field assistant to Dr. Davis completing bird surveys for various projects across The Bahamas, including bird surveys for BPL Station D Power Plant project and Shell LNG storage facility project.
2019-2020	Ardastra Gardens and Zoos Park Attendant	The Bahamas	Mr. Dean worked with animals at Ardastra including various bird species.

Language Skills

- English (Speaking, Reading, Writing); Very Good