



**JSS CONSULTING**  
Environmental Consulting Services

**Prepared by:**  
JSS Consulting

**Prepared for:**  
SLV Holdings Ltd.

**Re:**  
Sunsets Estates and Marina Development  
Environmental Impact Assessment  
October 3<sup>rd</sup>, 2023

## **EXECUTIVE SUMMARY**

SLV Holdings Ltd. (the Developer) proposes to develop the Sunset Estates and Marina at Governor's Harbour, Eleuthera (the Project). The site is approximately one hundred and thirty-seven point sixty-five (137.65) acres in size and is currently undeveloped.

The Project is currently located in one of five parcels of land at the northern end of the settlement of Governor's Harbour on the island of Eleuthera, The Bahamas (25°12'1.65"N, 76°14'27.73"W). The Developer proposes to establish a residential subdivision within 30.63 acres of the 137.65-acre parcel. A 40-ft wide road reservation to provide access throughout the subdivision is expected to total an area of approximately 1.53 acres. Additionally, the proposed marina footprint is approximately 1.6 acres.

The objective of the Environmental Impact Assessment (EIA) is to provide an accurate assessment of the potential environmental impacts of the proposed development. For the purposes of this EIA, the assessment of the Project in Governor's Harbour environment is inclusive of biological, physical, and socio-economic resources, as well as the processes that have the potential to be directly and/or indirectly impacted by the proposed Project.

## Table of Contents

Executive summary .....	2
1.0 Introduction .....	9
1.1 Authorization .....	9
1.2 Purpose and Objective of the EIA .....	9
1.3 Scope of The Project .....	10
2.0 Project Location and Description .....	10
2.1 Geographic Description of Eleuthera, The Bahamas .....	10
2.1.1 Project Location.....	10
2.1.2 Climate and Weather .....	11
2.2 Project Description .....	11
2.2.1 Proposed Development.....	11
3.0 Alternatives to The Project Development .....	16
3.1 Alternative Size and Design.....	16
3.2 “No Action” Alternative .....	16
4.0 Environmental Laws, Regulations and Requirements of The Bahamas.....	17
4.1 National Environmental Codes and Regulations Applicable to The Bahamas ...	17
4.2 National Environmental Policies in The Bahamas.....	20
4.3 International Conventions and Agreements.....	21
4.4 Government Departments .....	22
5.0 Environmental Baseline .....	24
5.1 Physical Environment.....	24
5.1.1 Hydrogeological and Hydrodynamic Studies.....	24
5.2 Biological/Natural Environment.....	26
5.2.1 Terrestrial Environment Assessment.....	26
5.2.2 Methodology .....	26
5.2.3 Observations/Findings.....	26
5.2.4 Avian Survey .....	32
5.2.5 Methodology .....	32
5.2.6 Observations/Findings.....	33
5.2.7 Fauna Survey .....	35

5.2.8	Methodology .....	35
5.2.9	Observations/Findings.....	36
5.3	Geology .....	36
5.3.1	Topography .....	36
5.3.2	Caves and Blue Holes.....	37
5.3.3	Marine Benthic Assessment.....	37
5.3.4	Methodology .....	38
5.3.5	Observations/Findings.....	39
5.3.6	Commercially Important, Endemic and Endangered Species .....	47
5.3.7	Discussion .....	48
5.4	Species of Economic Importance.....	49
5.4.1	Terrestrial.....	49
5.4.2	Marine .....	49
5.5	Human Influence.....	50
5.6	Habitat Utilization and Food Sources for Native Fauna .....	50
5.7	Aesthetics .....	51
5.7.1	Protected Areas .....	51
5.8	Cultural Resources .....	53
5.8.1	Historical Overview .....	53
5.8.2	Historical, Archaeological and Paleontological Resources .....	54
5.8.3	Tourist and Recreational Areas.....	56
5.9	Transportation .....	56
5.9.1	Air Transport.....	56
5.9.2	Land Transport.....	57
5.9.3	Sea Transport.....	57
5.10	Socioeconomic Aspects.....	57
5.10.1	Land Use and Land Acquisition.....	57
5.10.2	Zoning Aspects.....	58
5.10.3	Population .....	58
5.10.4	Economy of The Bahamas .....	58
5.10.5	Labour Regulations.....	59

6.0	Environmental Impact Analysis .....	59
6.1	Land Use Impact.....	61
6.2	Aesthetics Impact .....	62
6.3	Impacts to the Physical Environment.....	62
6.3.1	Erosion and Sediment Impact.....	62
6.3.2	Beach Impact .....	62
6.3.3	Hydrological Impact .....	64
6.3.4	Air Quality Impacts .....	64
6.3.5	Water Quality Impact .....	65
6.3.6	Noise Impacts.....	65
6.4	Biological Impacts .....	65
6.4.1	Habitat Loss and Degradation Impact .....	65
6.4.2	Coastal Carrying Capacity.....	66
6.4.3	Impacts on Special Ecological Features and Biodiversity.....	67
6.4.4	Terrestrial Resources Impact.....	67
6.4.5	Marine Resources Impact.....	68
6.5	Fire, Flood, and Hurricane Risk.....	68
6.6	Solid and Hazardous Waste Impact.....	68
6.7	Energy Impacts.....	69
6.8	Water and Wastewater Impact .....	69
6.9	Socio-Economic Impact.....	70
6.9.1	Traffic Impacts .....	70
6.9.2	Safety for Workers.....	71
6.9.3	Land Use Impacts.....	71
6.9.4	Impact on Communities .....	71
6.9.5	Economic Impact.....	72
6.10	Cultural Impacts .....	72
6.10.1	Archaeological, Historic and Paleontological Resources .....	72
6.10.2	Community Service.....	73
6.10.3	Recreational.....	73
6.10.4	Marine Transportation.....	73

7.0	Summary Table of Environmental Impacts .....	75
8.0	Recommendations and Mitigation Strategies .....	76
8.1	Methodology .....	76
8.2	Biological Resource Impacts and Mitigation.....	76
8.2.1	Invasive Species Management.....	77
8.2.2	Poisonous and Harmful Plants .....	79
8.3	Physical Impacts .....	79
8.3.1	Water Quality Impacts and Mitigation .....	79
8.3.2	Flooding Impacts and Mitigation.....	80
8.3.3	Solid Waste Impacts and Mitigation.....	81
8.3.4	Hazardous Waste Management and Mitigation.....	81
8.3.5	Noise and Light Impacts and Mitigation .....	82
8.3.6	Air Pollution Impacts and Mitigation.....	82
8.3.7	Marine Ecosystem Impacts and Mitigation.....	82
8.3.8	Sewage and Waste Refuge Impacts and Mitigation.....	83
8.4	Traffic Control.....	84
9.0	Environmental Management.....	84
10.0	Environmental Management Plan.....	85
10.1	Draft Environmental Management Plan (EMP) Terms of Reference (TOR) ..	85
10.2	Construction Management Plans .....	85
10.2.1	Water Quality Control Plan.....	85
10.2.2	Solid Waste Management Plan .....	89
10.2.3	Flood Control Plan .....	93
10.2.4	Noise and Light Control Plan .....	94
10.2.5	Dust and Air Pollution Management Plan.....	95
10.2.6	Traffic Management Plan .....	95
10.2.7	Sewage Management Plan .....	97
10.2.8	Landscaping Plan.....	98
10.2.9	Vegetative Management Plan .....	98
10.2.10	Wildlife Management Plan.....	99
11.0	Emergency Response Plans .....	100

11.1	Fuel Spill Prevention Plan.....	100
11.2	Health and Safety Plan .....	100
11.3	Fire Response Plan .....	101
11.4	Hurricane Preparedness Plan .....	102
11.5	Hazardous Waste Plan .....	104
12.0	Public Consultation .....	106
	Conclusion.....	107
	References .....	109
	Appendix A: Environmental Monitoring Documents.....	112
	Appendix A-1: Incident Report Form .....	112
	Appendix A-2: Hazardous Waste Report Form.....	113
	Appendix A-3: Environmental Monitoring Checklist.....	114
	Appendix A-4: Monthly Environmental Report Template .....	120
	Appendix A-5: Nonconformance Report Template .....	121
	Appendix A-6: Turbidity Report Form.....	122
	Appendix B: Fuel Spill Prevention Plan .....	123
	Appendix B-1: Spill Report Form .....	129

## List of Figures

<b>Figure 1:</b>	Sunset Estates Marina Development Location Map.....	10
<b>Figure 2:</b>	Sunset Estates and Marina Conceptual Plan. ....	14
<b>Figure 3:</b>	Sunset Estates & Marine Subdivision Plan .....	15
<b>Figure 4:</b>	Marine and Commercial Village Layout.....	16
<b>Figure 5:</b>	Bathymetry Survey of Propose Site Area by Sea Diversifies Inc. 2005. ....	25
<b>Figure 6:</b>	Sunset Estates Subdivision Project Site Vegetation Map. ....	28
<b>Figure 7:</b>	Landside Topographic Survey of Project Site.....	37
<b>Figure 8:</b>	Map of the assessed area. ....	38
<b>Figure 9:</b>	Benthic Habitat Map.....	43
<b>Figure 10:</b>	Snapper and Grouper landings in The Bahamas over the period 1970-2014 in tons. ....	50
<b>Figure 11:</b>	Protected Areas Located on Eleuthera Island. ....	52
<b>Figure 12:</b>	The Leon Levy Native Plant Preserve is shown in green and is ~2 miles from the subdivision.....	53
<b>Figure 13:</b>	Rocky Substrate observed on site. ....	55

<b>Figure 14:</b> Old rock formations observed on site.....	55
<b>Figure 15: (A)</b> Cylindrical glass bottle fragment with green tint (c.1870-1910), <b>(B)</b> Case type olive green bottle fragment (c.1870-1900). .....	56
<b>Figure 16:</b> Map of the Roads in Proximity to the Marina and Subdivision of the Project Site. ....	57
<b>Figure 17:</b> Beach Locations in Proximity to the Project Site. ....	63
<b>Figure 18:</b> Rocky Shore Coastline Impacted by the Marina. ....	64
<b>Figure 19:</b> Example of Hazardous Waste PPE. ....	92

## List of Tables

<b>Table 1:</b> National Environmental Laws in The Bahamas. ....	17
<b>Table 2:</b> List of relevant National Policies in The Bahamas. ....	20
<b>Table 3:</b> Vascular plant species recorded on the Sunset Estates Subdivision Project site. ....	29
<b>Table 4:</b> Invasive species recorded on the proposed Sunset Estates Subdivision Project site, Queen’s Highway, Eleuthera, The Bahamas. ....	30
<b>Table 5:</b> Protected Species recorded on the proposed Sunset Estates Subdivision Project site, Queen’s Highway, Eleuthera, The Bahamas. ....	32
<b>Table 6:</b> Avifauna observed on the proposed Sunset Estates Subdivision Project site, Queen’s Highway, Eleuthera, The Bahamas.....	33
<b>Table 7:</b> Non-Avian Fauna observed on the proposed Sunset Estates Subdivision Project site, Queen’s Highway, Eleuthera, The Bahamas. ....	36
<b>Table 8:</b> Fish species observed during the assessment. ....	44
<b>Table 9:</b> Coral species observed during the assessment. ....	45
<b>Table 10:</b> Additional fauna and epifauna species observed during the assessment. ....	45
<b>Table 11:</b> Flora species observed during the assessment. ....	46
<b>Table 12:</b> CITES and IUCN status for species observed during the assessment. ....	47
<b>Table 13:</b> Species observed that are Commercially Important, Ecologically Important, Endangered and/or Protected in The Bahamas.....	47
<b>Table 14:</b> Protected Areas located on Eleuthera as Provided by the Bahamas Protected Areas Fund Website. ....	51
<b>Table 15:</b> Wild Bird Reserves Managed by the Ministry of Environmental and Natural Resources. ....	52
<b>Table 16:</b> Environmental aspects under consideration for the Impact Analysis.....	59
<b>Table 17:</b> Impact Significance Summary Table Key. ....	61
<b>Table 18:</b> Summary of Environmental Impacts.....	75
<b>Table 19:</b> Handling procedure for various waste on The Project site.....	91



## 1.0 Introduction

### 1.1 Authorization

This Environmental Impact Assessment (EIA) has been prepared by JSS Consulting LTD. on behalf of the SLV Holdings Ltd. for the proposed Sunset Estates and Marina Development, hereafter referred to as “The Project”. The Project is intended to conform to the standards, legislation and regulations of the Bahamian Government, the Department of Environmental Planning and Protection (DEPP) and relative international communities.

### 1.2 Purpose and Objective of the EIA

The purpose of the EIA is to assess and document existing conditions of The Project area and the potential impacts associated with the proposed project. It provides recommendations to avoid, negate and minimize or mitigate potential impacts during construction or operational phases of The Project. This report will address factors that influence the development of The Project in this location including:

- Site Conditions.
- Development Designs.
- Existing Marine Resources.
- Description of Impacts and Mitigations Measures.
- Environmental Management Plan.
- Socio-Economic Analysis.
- Conclusions of the overall impacts from construction of the proposed project.

Specific objectives of the EIA include:

- Prevent harm, damage and loss to personnel, the environment and community assets.
- Reduce the impact to surrounding marine benthic types and wildlife,
- Prevention and mitigation of noise, dust and vibration impacts.
- Protection of groundwater resources.
- Minimize waste production and ensure correct waste management on site.
- Adhering to all environmental laws and regulations.
- Actively promote an environmentally responsible approach to The Project activities amongst the entire workforce.
- Involve and commit The Project Management as well as each employee to The Project.
- Maintain health and safety standards on site.
- Ensure Subcontractors/Suppliers/Visitors apply the same or equivalent environmental practices as those defined by Employer and Contractor.
- Document the existing biological environment of the site.

### 1.3 Scope of The Project

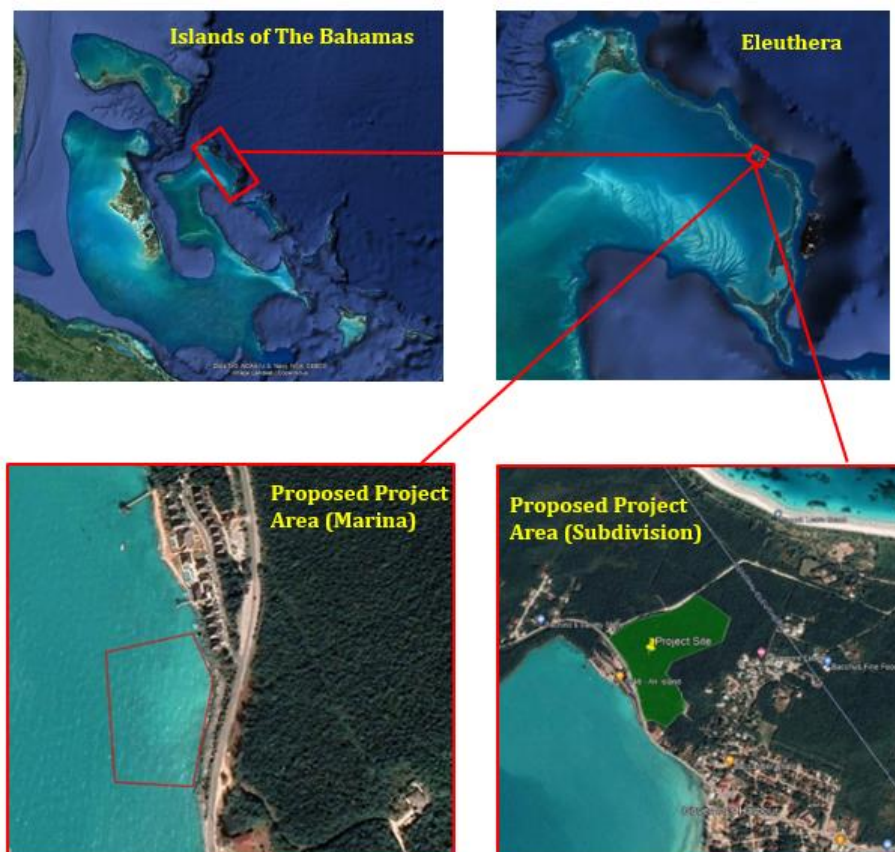
The Project consists of the development of a marina, a residential subdivision/commercial village, public/green spaces, and parking facilities. The Project will require pile driving for the development of the marina and land clearing to allow for development of the parking, recreational/public spaces and commercial spaces. The Project also includes a minor road realignment to improve site lines and aide in pedestrian safety. The primary scope of works for The Project is as follows:

## 2.0 Project Location and Description

### 2.1 Geographic Description of Eleuthera, The Bahamas

#### 2.1.1 Project Location

Sunset Estates and Marina Development is located in Governor's Harbour, Eleuthera (See Figure 1). Eleuthera is 110 miles long and approximately 380 miles from Florida, USA. The site is located in the central district of Eleuthera within the Governor's Harbour settlement. The site is approximately one hundred and thirty-seven point sixty-five (137.65) acres in size, undeveloped, and composed of a coastal marine ecosystem.



**Figure 1:** Sunset Estates Marina Development Location Map

### 2.1.2 Climate and Weather

The climate of The Bahamas consists of a tropical maritime wet and dry climate, with occasional winter gust of modified polar air. As a result, Eleuthera does not receive frost, sleet, snow, or extreme temperatures. In the month of August, Eleuthera has recorded temperatures ranging from an average high of 90° F (32° C) to an average low of 77° F (25° C). In January, the average high temperature is 79° F (26° C), and the average low is 65° F (18° C).

Humidity is high all year long in Eleuthera, usually maintaining around 80% humidity in the summer. Precipitation is highest from May through October. The average annual rainfall is about 44 inches (1,120 mm), occurring mostly during the summer. The high precipitation values can be attributed to extreme storm events, such as hurricanes and tropical storms. Easterly winds prevail most of the year in The Bahamas, shifting to a more southeasterly direction in the summer and to a northeasterly direction in the winter.

## 2.2 Project Description

### 2.2.1 Proposed Development

The Developer proposes to develop a Subdivision/Community Village area known as Sunset Estates along with a full-service Marina located on Queen's Highway in Governor's Harbour, Eleuthera. The proposed development will consist of forty-nine (49) single family lots, parking facilities, eight (8) commercial buildings that will contain a restaurant, marina amenities, and office spaces. The project will also include a recreational/public space area that will consist of a number of retail and commercial spaces that can be accessed by both locals of the Governor's Harbour community and tourists that visit the island.

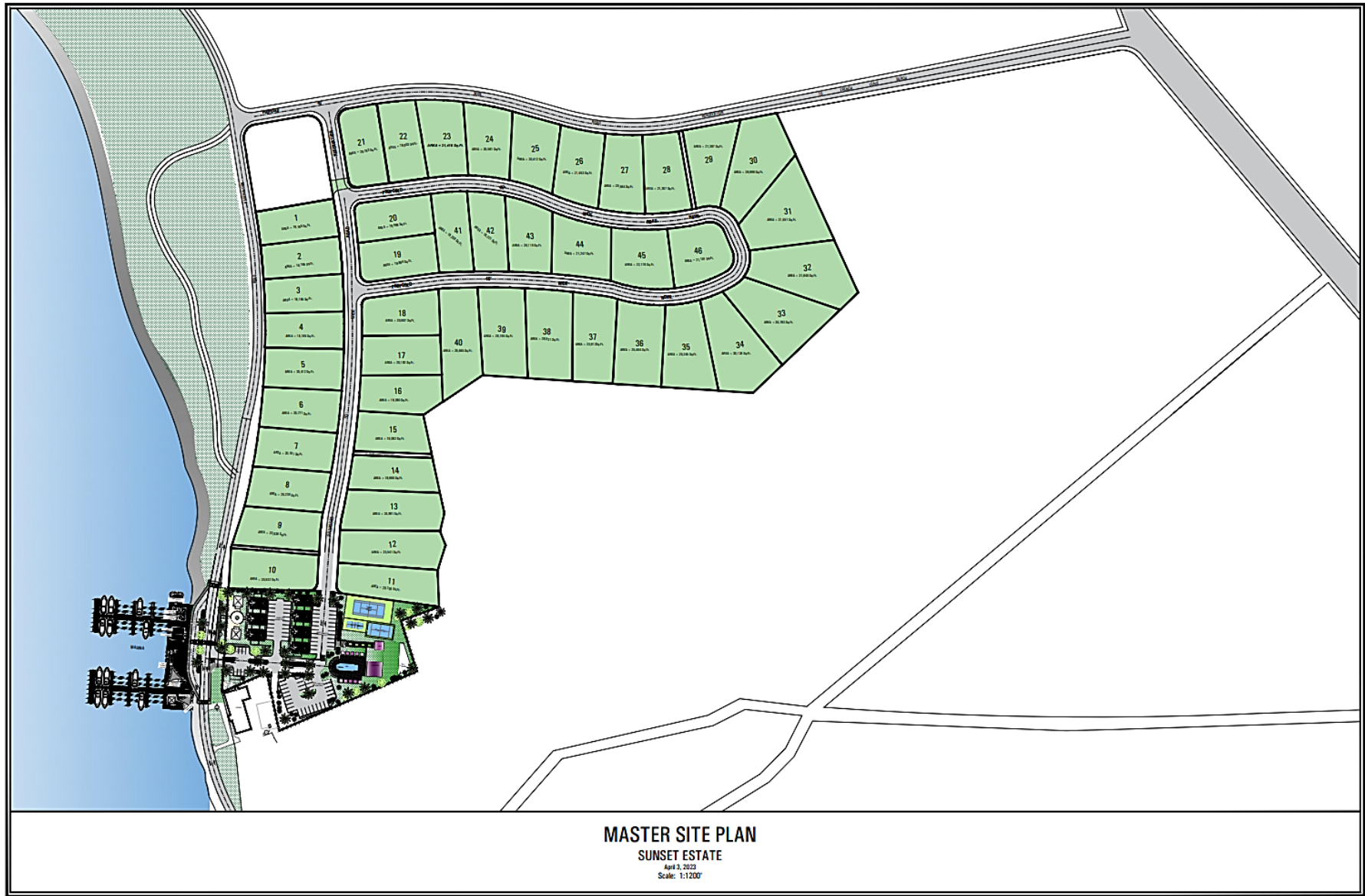
The Project will be developed in two phases. Both phases will be rolled out simultaneously. Phase 1 will be the Marina and Residential Subdivision Development and Phase 2 will be the Commercial Village development. The Commercial Village also includes the Open Space. The primary scope of works for The Project is as follows:

#### **Construction of a Multi-Use Residential and Commercial Space including amenities such as:**

- **Sunset Estates Subdivision (30.63 acres)- See Figure 2 for Layout Design**
  - 49 Single Family Residential Lots (14,000-30,000 sq. ft)
  - A Utility Easement

- **Marina (1.6 acres)- See Figure 4 for Layout Design**
  - 32 boat slips (supporting vessels up to 45ft in length overall)
  - Two (2) 900 sf dockside buildings
    - Refreshment and snack bar,
    - Marina Fuel,
    - Charter/Rental Shop,
    - Sundries,
    - Administration/Dockmaster Building.
  - Parking lot.
  
- **Two (2) Underground Fuel Storage Tanks**
  - Fuel tank (1) 10,000 gallons carrying capacity for gas
  - Fuel tank (2) 10,000 gallons carrying capacity for diesel
  
- **Recreational/Public Space (2.859 acres)**
  - A Retail Center,
  - Commercial Center,
  - Residential Condominium Units,
  - Other Recreational facilities such as a:
    - Kids' playground,
    - Pool,
    - Paddle court, and
    - Gym

See Figure 2 for the conceptual plan of the proposed project site.



**Figure 2: Sunset Estates and Marina Conceptual Plan.**



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 Freeport, C.B. Bahamas

**SURVEYOR'S CERTIFICATE**

I, Randy White, a surveyor registered and licensed in the Bahamas, hereby certify that the information provided on this plan is true and correct, and was obtained from a survey executed by me, or under my personal supervision.

Randy White (P. 062)



**PLAN**

SHOWING  
 A PROPOSED SUBDIVISION KNOWN AS "SUNSET ESTATES" BEING A PART OF "FRENCH LEAVE DEVELOPMENT."

SITUATE  
 EAST OF QUEEN'S HIGHWAY AND SOUTH OF A PROPOSED 40' WIDE ROAD RESERVATION BEING PORTION OF THE "FRANK LLOYD ESTATE" ON

**ELEUTHERA ISLAND**  
 IN THE COMMONWEALTH OF THE BAHAMAS  
 PREPARED AT THE INSTANCE OF  
**BEARFOOT LUXURY BAHAMAS**

Line #	Length	Direction
L1	10.03'	N25°41'31" E
L2	54.88'	N15°30'58" E
L3	8.06'	N68°50'59" E
L4	10.30'	N168°24'50" E
L5	45.52'	N61°34'20" E
L6	38.85'	N33°32'51" E
L7	54.77'	N15°52'27" E

Curve #	Length	Radius	Delta
C1	54.99'	35.03'	089°56'43"
C2	10.40'	2062.68'	000°17'20"
C3	40.77'	201.43'	011°35'47"
C4	30.74'	20.00'	088°03'20"
C5	29.92'	20.00'	085°42'59"
C6	40.77'	201.43'	011°35'47"
C7	10.05'	2242.48'	000°15'24"
C8	30.12'	18.30'	094°18'07"
C9	32.67'	19.98'	063°41'23"
C10	31.54'	20.00'	092°21'53"
C11	38.33'	25.00'	087°50'30"
C12	39.15'	25.00'	089°43'43"
C13	32.17'	20.00'	092°09'30"
C14	10.14'	802.53'	000°43'26"
C15	10.36'	602.64'	000°59'05"
C16	10.00'	602.64'	000°57'04"
C17	15.61'	602.64'	001°29'02"
C18	45.61'	80.00'	032°39'48"
C19	64.88'	80.00'	048°28'05"
C20	15.57'	80.00'	011°09'00"
C21	69.62'	80.00'	049°51'31"
C22	32.69'	80.00'	023°24'41"
C23	33.86'	373.30'	005°11'49"
C24	60.39'	373.30'	009°16'07"
C25	59.33'	373.30'	009°06'21"
C26	29.17'	391.67'	004°15'59"
C27	15.90'	391.67'	002°19'33"
C28	57.43'	40.00'	082°16'05"

**NOTES & LEGEND**

Reference was made to  
**FRENCH LEAVE MARINA SUBDIVISION PLAN**

DRAWN BY : Tatyana Ferguson  
 DATE : November 30, 2022  
 Job No. : 2022297  
 Plan No. : 2022297A-3

**Figure 3: Sunset Estates & Marine Subdivision Plan**



**MASTER PLAN - LEGEND/ KEY NOTES**

1 EXISTING (TO REMAIN SAME)	7 PDL 4' X 6'	13 FISH CLEANING STATION	19 BUILDING A 2000 SQ FT	23 BUILDING E 2000 SQ FT	25 BUILDING G 2000 SQ FT	28 POOL	34 PADEL TENNIS
2 MARINA FUEL	8 ICE CREAM 450 SQ FT.	14 TRASH COLLECTION SERVICE AREA	20 BUILDING B 2000 SQ FT	24 BUILDING F 2000 SQ FT	26 BUILDING H 2000 SQ FT	29 POOL DECK	35 PICKLE BALL
3 CONCH SHACK	9 SANDRIES 450 SQ FT.	15 6' WIDE SIDEWALK	21 BUILDING C 2000 SQ FT	27 PARKING TOTAL 40 SPACES	27 BUILDING I 2000 SQ FT	30 CLUB HOUSE - 2000 SQ FT.	36 LIMESTONE WALL 6' MAX CUT
4 BEACH BAR	10 ADMIN & RESTROOMS 450 SQ FT.	16 COFFEE SHOP/ BAKERY/DEL 1000 SQ FT.	22 BUILDING D 2000 SQ FT	28 BUILDING J 2000 SQ FT	28 BUILDING K 2000 SQ FT	31 KID'S PLAYGROUND	37 COMBO CUT LIMESTONE & RETAINING WALL 4' TO 6' MAX HEIGHT
5 SUNDOWNERS COCKTAILS	11 BOAT/ DIVE & KAYAK 450 SQ FT.	17 PIZZA OVEN W/ OUTSIDE GRILL	23 BUILDING E 2000 SQ FT	29 BUILDING L 2000 SQ FT	29 BUILDING M 2000 SQ FT	32 CYM 1500 SQ FT.	38 RETAINING WALL 4' MAX HEIGHT
6 SEATING AREA	12 WATERSPORTS DOCK	18 PEDESTRIAN CROSSING	24 BUILDING F 2000 SQ FT	30 BUILDING N 2000 SQ FT	30 BUILDING O 2000 SQ FT	33 PLUNGE POOL - 12' X 24'	39 20' WIDE ROAD RESERVATION INTO SUNSET ESTATES

*Sunset Estates*  
at Governor's Harbour

**SUNSET ESTATES & MARINA**



**Figure 4: Marine and Commercial Village Layout**

### *2.2.1.1 Proposed Utilities and Infrastructure*

Major project utility components will be located in a utility easement within the residential zone of Sunset Estates.

### *2.2.1.2 Electricity*

The electrical power for the site will be provided by the Bahamas Power and Light (BPL). Solar panels will also be used as an alternate power source for the development during the operational phase and will be located on the rooftops of buildings. Detailed construction plans for the solar panels and accompanying electrical distribution system will be prepared and submitted to the BPL for review prior to commencement of construction activities.

### *2.2.1.3 Water and Sewage*

Water and Sewage services will be provided by The Bahamas Water and Sewerage Corporation (WSC). Potable Water Infrastructure throughout the proposed project facilities will be connected to the WSC network. Potable water will be provided through this network and will follow standards set by WSC and the Department of Environmental Health Services (DEHS). The system will utilize a series of pumps to pressurize the distribution lines, supplying water to individual buildings, and any fire hydrants present. The water lines will be laid out in a loop configuration with backflow prevention controls and will be located approximately three feet (3ft.) underground.

During the construction phase Portable Toilets will be used on site. These portable toilets should be kept away from any open water body, be serviced at as needed according to activity by a licensed contractor and secured to prevent them from tipping over.

During the operational phase an onsite sewage treatment facility will be developed to treat all wastewater generated, including facilities to collect and transport sewage. Sewage will be collected and treated according to standards provided by DEHS and WSC.

All potable water and sewage construction plans will be prepared and submitted to WSC for review and approval prior to commencement of construction activities.

### *2.2.1.4 Roadways and Storm Drainage*

Roadways are proposed to provide access to all lots and buildings throughout the site. The roadways will be for vehicle use. All roads will allow for proper drainage and the water generated should flow into the drainage system.

Stormwater from the roads and buildings will be collected in drainage swales and/or basins and conveyed to stormwater retention areas or deep well injection drainage wells throughout the site. The retention area should allow for a fast rate of flow and be large enough to prevent overflow. The drainage design includes a series of drainage basins that



will collect water from the surface of the parking lot and roadways. Water collected from drainage basins will be directed to a 150 ft to 180 ft deep disposal well. The drainage system should be able to handle any the flood water from rainfall and any weather changes.

Special care should be taken to ensure that roadway drainage and stormwater discharge does not enter the open water surrounding the site. The increase of water into this sensitive environment can introduce chemicals such as fuel and oil, increase turbidity and lower dissolved oxygen. This can negatively impact the wildlife inhabiting this ecosystem.

### **3.0 Alternatives to The Project Development**

#### **3.1 Alternative Size and Design**

The Project was previously proposed/designed to incorporate a breakwater to reduce wave energy during the winter months. However, after further consideration it was determined that of constructing a breakwater at the proposed depth of the marina and distance from shoreline was not feasible and the size of breakwater required would provide significant adverse impacts to the marine environment and community. Additionally, the final marina design became significantly smaller to only accommodate thirty-two (32) boat slips. The final marina design also included increased deck heights that are proposed to be significantly above mean sea level to ensure the docking facility will be more resilient to high wave action. The project will also include designs of lower sections within the marina to provide more accessibility to individuals utilizing the space. To further ensure that the marina remained resilient during adverse weather events, it was recommended that these lower sections should be incorporated with a FRP grated deck to reduce effects of pressure and erosion on the underside of the deck caused by high wave actions. Boats permanently moored within the marina will be required to be on boatlifts and remain above high tide levels.

#### **3.2 “No Action” Alternative**

The “No Action” alternative would be to let The Project site remain in its present condition. This alternative will preserve the natural state of The Project areas; however, local communities would not be provided with access to amenities that The Project would provide such as retail spaces, a marina and a restaurant. Additionally, the positive economic impact being gained through employment and infrastructure investment, would be lost. This development will enhance the business district of Central Eleuthera to meet demand of a growing community.

## 4.0 Environmental Laws, Regulations and Requirements of The Bahamas

The Owner and Contractor will be required to utilize accepted regulatory standards as a minimum to protect the environment, the health and safety of all personnel (Contractor, Subcontractors and third parties) working on The Project, and any others who may be affected by The Project activities.

### 4.1 National Environmental Codes and Regulations Applicable to The Bahamas

Construction of The Project must comply with a range of national legislation, regulations, strategies and policies in order to provide for the management of environmental effects. There are seventeen (17) Legislations that are relevant and applicable to the management of the physical and natural environment of the proposed Project as outlined in Table 1.

**Table 1:** National Environmental Laws in The Bahamas.

Act Title	Year Enacted	Comments
Water & Sewerage Corporation Act	1976	Provides regulatory framework for the management of water resources in The Bahamas
Environmental Health Services Act	1987	Provides the framework for environmental regulations that will ensure compliance for The Project. The Act authorized the DEHS to develop regulations that prevent and control air pollution, soil contamination and preserve water quality.
Wild Animals Protection Act	1968	Prohibits the taking, capturing or hunting of any animal without a permit.
Wild Birds Protection Act	1952	Prohibits the taking, capturing or hunting of any animal without a permit. Protects birds and eggs during closed season.
Plants Protection Act	1916	Relates to plant disease and controls importation of plants to prevent outbreaks of exotic disease and establishment of unwanted species.

Conservation and Protection of the Physical Landscape of The Bahamas Act	1997	Protects physical landscape from environmental degradation, flooding and removal of hills; regulates filling of wetlands, drainage basins or ponds; prohibits digging or removing sand from beaches and sand dunes; prevents harvesting or removing protected trees. In order to perform activities that may affect the physical landscape of The Bahamas, permits must be obtained for these activities. The Department of Physical Planning issues the permits and enforces the regulations.
Planning and Subdivision Act	2010	This Act provides for:  A land use planning-based development control system led by policy, land use designations and zoning Prevention of indiscriminate division and development of land Promotion of sustainable development in a healthy natural environment Maintenance and improvement of the quality of the physical and natural environment Protection and conservation of the natural and cultural heritage of The Bahamas Planning for the development and maintenance of safe and viable communities
The Forestry Act	2010	Protects wetlands, water reserves, endemic flora and fauna and protected trees. It establishes a legal framework for the long-term sustainable management of forests, a governmental forestry agency and a permanent forest estate. It requires a license for timber cutting and other activities in the Forest Reserves. The Act mandates that a National Forest Plan be developed every five years to govern management activities, such as harvesting and reforestation measures, prescriptions for fire prevention, wildfire suppression and prescribed burning and soil and water conservation.
The Merchant Shipping (Oil Pollution) Act	1976	The Act provides for the proper registration of ships, the control, regulation and orderly development of merchant shipping in The Bahamas, proper qualification of seamen and regulation of employment conditions for seamen. These provisions Advocate ship safety and competency which prevent shipping accidents that can be detrimental to the marine environment as well in human casualties.

The Private Roads and Subdivision Act	1961	This Act enables the Department of Physical Planning to regulate road construction and subdivision development.
Disaster Preparedness Response Act	2006	This Act provides for a more effective organization of the mitigation of, preparedness for, response to and recovery from emergencies and disasters
The Ministry of the Environment Act	2019	This Act establishes the Ministry of the Environment to oversee the integrity of the environment of The Bahamas, to make the minister responsible therefore a corporation sole, to establish the environmental administration fund and the environmental trust fund and for matters connected thereto.
The Environmental Protection (control of plastic pollution) Act	2019	This Act prohibits single use plastic food ware and non-biodegradable and biodegradable single use plastic bags.  Prohibit the release of balloons; regulate the use of compostable single use plastic bags and for connected matters.
The Environmental Planning and Protection Bill	2019	The Act provides for the prevention or control of pollution, the regulation of activities and the administration, conservation and sustainable use of the environment and for connected purposes. The Bill has been enacted by the Parliament of The Bahamas and if sent to the Gazette during the time of this project the legislation will be enforced.
Environmental Impact Assessment Regulations,	2020	To provide procedures for a Certificate of Environmental Clearance (CEC). The Regulations provide procedures for the review proposed projects inclusive of monitoring and compliance requirements. The Regulations dictate the requirements for a Certificate of Environmental Compliance (CEC).
Health and Safety at Work Act	2002	This Act makes provisions relating to health and safety at work and for connected purposes. It details the general duties of employers and employees at work.

Emergency Powers (COVID-19) Regulations	2020	This is a national response to the global threat of COVID-19.
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## 4.2 National Environmental Policies in The Bahamas

**Table 2:** List of relevant National Policies in The Bahamas.

<b>Relevant National</b>	<b>Subject</b>	<b>Summary</b>
National Policy for the Adaptation to Climate Change 2005	Climate change assessment for the immediate and project adaptation techniques for The Bahamas	The National Policy for the Adaptation to Climate Change outlines a national framework to meet the goals and objectives of the United Nations Framework Convention on Climate Change (UNFCCC). The Bahamas is committed to reduce greenhouse gases and address climate change impacts.
National Invasive Species Strategy for The Bahamas, 2013	Identifies and recommends a management framework for the control and eradication of invasive species.	The National Invasive Species Strategy for The Bahamas originally published in 2003, was updated in 2013 as part of the Global Environment Facility funded project, Mitigating the Threats of Invasive Alien Species in the Insular Caribbean (MITIASIC). It sets forth a management framework for the control and eradication of invasive species.

National Biodiversity Strategy and Action Plan, 1999	A plan to maintain biodiversity through sustainable development for a small island developing nation.	The Bahamas Government is committed to conserve biodiversity and to pursue sustainable development. This document highlights the role of biodiversity in the Bahamian social and environmental context and recommends measures to ensure its compatibility with future development.
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### 4.3 International Conventions and Agreements

**Stockholm Convention on Persistent Organic Pollutants** – “As set out in Article 1, the objective of the Stockholm Convention is to protect human health and the environment from persistent organic pollutants.”

**Commission on Sustainable Development** – “The United Nations Commission on Sustainable Development (CSD) was established by the UN General Assembly in December 1992 to ensure effective follow-up of United Nations Conference on Environment and Development (UNCED), also known as the Earth Summit”

**Kyoto Protocol** – The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change, which commits its Parties by setting internationally binding emission reduction targets. The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005.

**Basel Convention on the Control of Transboundary Movement of Hazardous Wastes** – “The Basel Convention is a global agreement between countries to protect human health and the environment against the adverse effects of hazardous wastes.”

**Ramsar Convention on Wetlands** – “the intergovernmental treaty that provides the framework for the conservation and wise use of wetlands and their resources. The Convention was adopted in the Iranian city of Ramsar in 1971 and came into force in 1975.”

**Minamata Convention** - “The Minamata Convention on Mercury is a global treaty to protect human health and the environment from the adverse effects of mercury. The Convention draws attention to a global and ubiquitous metal that, while naturally occurring, has broad uses in everyday objects and is released to the atmosphere, soil, and water from a variety of sources. Major highlights of the Minamata Convention include a

ban on new mercury mines, the phase-out of existing ones, the phase out and phase down of mercury use in a number of products and processes, control measures on emissions to air and on releases to land and water, and the regulation of the informal sector of artisanal and small-scale gold mining. The Convention also addresses interim storage of mercury and its disposal once it becomes waste, sites contaminated by mercury as well as health issues.”

#### 4.4 Government Departments

Government departments that will be involved with aspects of approval and permitting of this project include:

##### **Office of the Prime Minister**

Office of the Prime Minister coordinates ministries, government, and parliamentary business. Specific related departments and agencies are listed below.

##### **Department of Lands and Surveys**

This department is responsible for planning, mapping, and monitoring of crown land (i.e., where beaches begin and end, high water marks, etc.).

##### **National Emergency Management Agency (NEMA)**

NEMA aims to reduce life and property loss in the event of a natural disaster.

##### **Antiquities Monuments and Museum Corporation (AMMC)**

The mission of AMMC is “to protect, preserve, and promote the Historic Cultural Resources of The Bahamas, and to be the number one conservation Agency in the world. We will do this while protecting our environment, encouraging research and archaeology, and by protecting, preserving, and promoting our Historical Sites.”

##### **Ministry of Agriculture, Marine Resources and Family Island Affairs**

The Ministry of Agriculture Marine Resources and Local Government is responsible for the implementation, monitoring and evaluation of policies related to agricultural lands and marine resources. The Ministry serves as the Management and Scientific Authority for the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in The Bahamas.

##### **Department of Environmental Planning and Protection (DEPP)**

The Department of Environmental Planning and Protection (DEPP) will review and approve the EIA and Environmental Management Plan (EMP) for The Project. Monthly environmental reports will be submitted to DEPP.

### **The Port Department**

The Port Department will be responsible for granting approval of the location of The Project as well as many permits required to operate a marina.

### **Ministry of Public Works**

The Ministry of Public Works will authorize and provide permits for activities and maintain physical infrastructure in the country.

### **Department of Physical Planning**

The Department of Physical Planning will authorize and provide permits for activities such as excavation, filling, roadworks, and all construction activities.

### **Department of Marine Resources (DMR)**

DMR is primarily responsible for the administration, management, and development of fisheries in The Bahamas. The department was created to administer, manage, and develop the fisheries sector as stipulated by the Fisheries Resources (Jurisdiction and Conservation) Act. The department is also tasked with enforcement of Fisheries Regulations, Marine Mammal Regulations and the Seafood Processing and Inspection Regulations.

### **Ministry of Public Works and Utilities**

The Ministry of Public Works maintains the physical infrastructure and natural environment of The Bahamas by providing quality services to its client agencies.

### **Department of Public Works**

The Department of Public Works maintains public infrastructure inclusive of government buildings, roads, docks, bridges, and cemeteries.

### **Department of Physical Planning**

The Department of Physical Planning manages town, physical, country and land use planning, zoning, private roads and subdivisions for New Providence and the Family Islands.

### **Water and Sewerage Corporation**

The Water and Sewerage Corporation is entrusted with managing, maintaining, distributing, and developing the water resources of The Bahamas.

### **Ministry of Environment and Natural Resources**

The Ministry of Environment and Natural Resources serves to protect, conserve, and manage the environment of The Bahamas. This ministry focuses on environmental



control, solid waste management, public sanitation, and the beautification of public areas such as parks and beaches.

### **Department of Environmental Health Services (DEHS)**

DEHS manages the disposal of all wastes and management of environmental pollution (on land or in water). This department also promotes planning and approves various measures designed to ensure wise use of the environment.

### **Forestry Unit**

The Forestry Unit's mandate is "to develop the forest resources of The Bahamas to their maximum potential by applying sound, scientific and sustained yield forest management principles and concepts."

### **Bahamas National Trust (BNT)**

The mission of the BNT is "Conserving and protecting the natural resources of The Bahamas, through stewardship and education, for present and future generations."

### **Ministry of Labour**

The Ministry of Labour oversees and regulates labour relations within The Bahamas.

### **Department of Labour**

**The Mission of the Department of Labour** promotes good industrial relations between employer and employee, while promoting a high level of employment.

## **5.0 Environmental Baseline**

### **5.1 Physical Environment**

#### **5.1.1 Hydrogeological and Hydrodynamic Studies**

A Bathymetric Survey was undertaken during the period of August 31<sup>st</sup> to September 1<sup>st</sup>, 2005, by Sea Diversified Inc. An Odom HT100 Digital Fathometer was used to indicate the general geophysical conditions of the water body during that period.

The shoreline increases in depth from the shoreline from 4 feet to 12 feet. The depth at the location of the dock was between the 6ft and 7 ft contour and the depth of the proposed marina location is between the 4ft and 12 ft contour at the time of the survey. The Bathymetric Survey is shown in the following figure below.

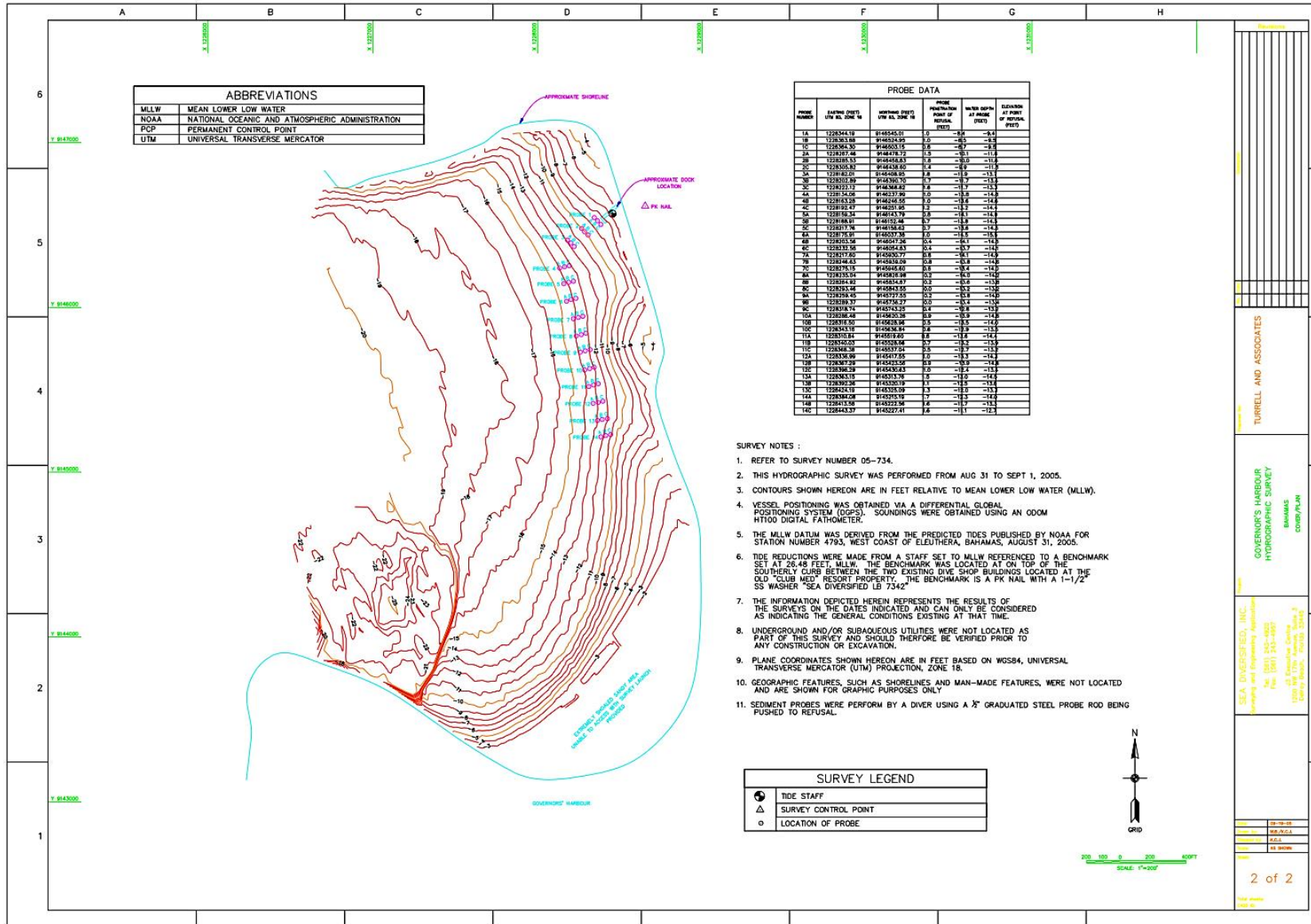


Figure 5: Bathymetry Survey of Propose Site Area by Sea Diversifies Inc. 2005.

## 5.2 Biological/Natural Environment

### 5.2.1 Terrestrial Environment Assessment

Field studies were conducted on the 7<sup>th</sup> and 8<sup>th</sup> of July 2022. The purpose of the study was to map vegetation types, determine floristic diversity, identify wildlife inhabiting the area, identify the presence and abundance of invasive species and conduct a protected species survey in the areas of proposed works.

### 5.2.2 Methodology

Vegetation types were mapped and verified by walking along the interior and the perimeter of the site using existing roadways, footpaths, and surveyor transects. Vegetation Type taxonomy was based on Areces et al. (1999). Vascular plant species occurring in each vegetation type were recorded and used to compile a floral list (See Table 3). Plant taxonomy was based on Correll and Correll (1982). The presence, location, and abundance of vascular species listed under the National Invasive Species Strategy for The Bahamas (2013), and the Protected Trees Order (2021) were noted when encountered. The primary objective of protected species potential estimations is to estimate the total protected species potential across the site as per DEPP regulations.

To assess the relative abundance of protected species recorded, nine vegetation plots, randomly placed throughout the property. Each plot was 66ft<sup>2</sup> x 66ft<sup>2</sup> and covered an area of 4356ft<sup>2</sup> or 0.1 acres. All protected plants observed in each plot were recorded. The average number of each protected species within the nine (9) plots was calculated and multiplied by 10 to determine the number of protected plants in one acre. This number was then multiplied by the total acreage of the site to determine the density of each protected species across the project site.

### 5.2.3 Observations/Findings

#### 5.2.3.1 Habitat Description

The terrestrial portion of the site spans approximately 33.80 acres and contains one (1) major terrestrial ecosystem, Interior Upland. There are two (2) vegetation classes on the site, Dry Broadleaf Evergreen Formation-Forest and Human Altered Environment. The Human Altered Environment spans the northern and southern edges of the property site and most likely was encourage by previous disturbances. This may have been done to clear the area where powerlines were fixed for safety reasons. Notwithstanding, these disturbances with the inundation of non-native and invasive species such as *Leucaena leucocephala* (Jumbey) indicates that the vegetation growth can be describe as secondary growth.

##### 5.2.3.1.1 Interior Upland

There are two (2) Interior Upland vegetation classes present on the site, Dry Broadleaf Evergreen Formation-Forest and Human Altered Environment.

### **Dry Broadleaf Evergreen Formation-Forest**

Dry Broadleaf Evergreen Formations are interior upland vegetation types that consist of broadleaf deciduous plants on sandy and/or limestone substrate. These formations are classified by the height of trees and the presence of a well-defined canopy. A Dry Broadleaf Evergreen Formation-Forest is present throughout the interior of the site except in the disturbed areas. It consists of a 20-25ft dense canopy, dominated by Gumbo Limbo (*Bursera simaruba*), Small leaved Blolly (*Guapira discolor*), Quicksilver Bush (*Thouinia discolor*), Silver Palm (*Coccothrinax argentata*), Buccaneer Palm (*Pseudophoenix sargentii*), Dildo Cactus (*Pilocereus polygonus*), and Horseflesh Mahogany (*Lysiloma sabicu*). The DBEF-Forest represents 33.26 acres (98%) of the terrestrial portion of the site.



**Photo 1:** Dry Broadleaf Evergreen Formation-Forest in the interior of the site.

### **Human Altered Environment**

Human-altered environments are defined as areas in which the natural habitat has been altered or degraded by human activities. These areas consist of mainly pioneer and invasive species. A Human Altered Environment is present in the disturbed areas throughout the site i.e., transect lines and land clearing. This vegetation class is nestled within the old-growth Dry Broadleaf Evergreen Formation-Forest and on both the northern and southern perimeters of the site. The Human Altered Environment was 0.54 (2%) acres of the terrestrial portion of the site.



5.2.3.2 *Vegetation Map*



**Figure 6:** Sunset Estates Subdivision Project Site Vegetation Map.

### 5.2.3.3 Vascular Plant Diversity

Species diversity and richness on the site are in line with what is expected of a site that consists of one (1) terrestrial ecosystem, two (2) vegetation classes, and evidence of previous disturbances. A total of thirty-five (35) species were recorded on the site, including six (6) protected species and six (6) invasive species (See Table 3). \* Denotes protected species observed on the site.

**Table 3:** Vascular plant species recorded on the Sunset Estates Subdivision Project site.

**Table 3 Key:** DBEF = Dry Broadleaf Evergreen Formation-Forest, HAE = Human-Altered Environment

Botanical Name	Common Name	Location	
		DBEF	HAE
1. <i>Bidens alba</i>	Shepherd Needle	✓	
2. <i>Boussieria succulenta</i>	Strongback	✓	
3. <i>Bursera simaruba</i> *	Gum Elemi	✓	
4. <i>Casuarina equisetifolia</i>	Australian Pine		✓
5. <i>Cassytha filiformis</i>	Love Vine	✓	
6. <i>Chiococca alba</i>	Snowberry	✓	
7. <i>Cocos nucifera</i>	Coconut Palm		✓
8. <i>Coccoloba diversifolia</i>	Pigeon Plum	✓	
9. <i>Coccoloba uvifera</i>	Seagrape	✓	
10. <i>Coccothrinax argentata</i> *	Silver Top Palm	✓	
11. <i>Delonix regia</i>	Royal Poinciana		✓
12. <i>Dracaena cyanthiodes</i>	Snake Plant		✓
13. <i>Erythroxylum areolatum</i>	False Cocaine	✓	
14. <i>Eugenia axillaris</i>	White Stopper	✓	
15. <i>Exothea paniculata</i>	Butterbough	✓	
16. <i>Guapira discolor</i> *	Small Leaved Blolly	✓	
17. <i>Guapira obtusata</i>	Big Leaf Blolly	✓	
18. <i>Guettarda scabra</i>	Rough Velvet Seed	✓	
19. <i>Gymnanthes lucidus</i>	Crabwood	✓	
20. <i>Ipomoea indica</i>	Morning Glory		✓
21. <i>Jasminum fluminense</i>	Azores Jasmine		✓

22. <i>Leucaena leucocephala</i>	Jumbey		✓
23. <i>Lysiloma sabicu*</i>	Horseflesh Mahogany	✓	
24. <i>Manilkara zapota</i>	Sapodilla		✓
25. <i>Metopium toxiferum</i>	Poisonwood	✓	
26. <i>Ocotea coriacea</i>	Lancewood	✓	
27. <i>Pilocereus polygonus</i>	Dildo Cactus	✓	
28. <i>Pithecellobium keyense</i>	Ram's Horn	✓	
29. <i>Pseudophoenix sargentii*</i>	Buccaneer Palm	✓	
30. <i>Psychotria ligustrifolia</i>	Smooth Wild Coffee	✓	
31. <i>Schefflera actinophylla</i>	Umbrella Tree		✓
32. <i>Sideroxylon foetidissimum</i>	Mastic	✓	
33. <i>Sideroxylon salicifolium</i>	Willow Busic	✓	
34. <i>Terminalia catappa</i>	West Indian Almond		✓
35. <i>Thouinia discolor*</i>	Quicksilver Bush	✓	

#### 5.2.3.4 Invasive Species

Six (6) Invasive species were observed on the site. These species are outlined below along with their occurrences, abundance on the site, and recommendations for control (See Table 4).

**Table 4:** Invasive species recorded on the proposed Sunset Estates Subdivision Project site, Queen's Highway, Eleuthera, The Bahamas.

Species	Occurrence and Abundance	Recommendations*
<i>Casuarina equisetifolia</i> , Australian Pine	A few mature trees and saplings within the Human Altered Environment on the site.	Control
<i>Delonix regia</i> , Poinciana	A few mature trees and saplings within the Human Altered Environment on the site.	Control
<i>Ipomoea indica</i> , Morning Glory	A large cluster of vines transitioning from the HAE into the DBEF on the	Control

	western perimeter of the site.	
<i>Jasminum Fluminense</i> , Azores Jasmine	A large cluster of vines within the HAE along the perimeter of the site.	Control
<i>Leucaena leucocephala</i> , Jumbey	Clusters were found throughout the HAE on the southern perimeter of the site.	Control
<i>Schefflera actinophylla</i> , Umbrella Tree	One (1) tree, approximately 15ft tall within the HAE on the northern perimeter of the site.	Control



**Photo 2:** Snake Plant (*Dracaena cyanthioides*) located in the Human Altered Environment on the southern perimeter of the site.

#### 5.2.3.5 Protected Species Survey

The Forestry Act Declaration of Protected Trees Order 2021 lists one hundred and twenty-seven (127) vascular plant species as protected. Eighty-six (86) species are listed as Endemic, Endangered, or Threatened and forty-one (41) are listed as Cultural or Historical and Economic. Endemic species are species that are native and restricted to the archipelago, island groupings, or specific islands. Cultural or historical species are species



that are of historical or cultural importance such as species utilized for boat building and straw work. Six (6) species listed on the Forestry Act Declaration of Protected Trees Order 2021 were recorded at the site (See Table 5). One (1) species, *Thouinia discolor* (Quicksilver Bush) is listed under the subsection of Endemic or Endangered or Threatened Species (Schedule 1) in the Act. Additionally, five (5) of the six (6) species, *Bursera simarouba* (Gum Elemi), *Coccothrinax argentata* (Silver Top Palm), *Guapira discolor* (Small-leaved Blolly), *Lysiloma sabicu* (Horseflesh Mahogany), and *Pseudophoenix sargentii* (Buccaneer Palm) are listed under the subsection Cultural or Historical and Economic in the Act.

**Table 5:** Protected Species recorded on the proposed Sunset Estates Subdivision Project site, Queen’s Highway, Eleuthera, The Bahamas.

#	Species Recorded		Abundance
	Botanical Name	Common Name	
1	<i>Bursera simarouba</i>	Gum Elemi	4018
2	<i>Coccothrinax argentata</i>	Silver Top Palm	1636
3	<i>Guapira discolor</i>	Small Leaved Blolly	1138
4	<i>Lysiloma sabicu</i>	Horseflesh Mahogany	71
5	<i>Pseudophoenix sargentii</i>	Buccaneer Palm	462
6	<i>Thouinia discolor</i>	Quicksilver Bush	71

#### 5.2.4 Avian Survey

An avian survey was conducted to identify the presence, abundance, and habitat utilization of avian species within the boundaries of the site.

#### 5.2.5 Methodology

Field studies were conducted in July 2022 between the hours of 7:00 AM and 9:00 AM. The avifauna of the area was assessed and recorded by walking along the interior wetland and through the site within the interior, an established transect, and an access road. Species numbers were recorded as Single (1), Few (2-10), and Many (11-100). Species recorded were compiled for final abundance estimates. Status is based on the International Union for Conservation of Nature (IUCN).

## 5.2.6 Observations/Findings

### 5.2.6.1 Species Diversity

A total of ten (10) species were recorded during the investigation (See Table 6).

**Table 6:** Avifauna observed on the proposed Sunset Estates Subdivision Project site, Queen’s Highway, Eleuthera, The Bahamas.

#### TABLE KEY:

#### Range

**PRB** = Permanent Resident Breeding

**SRB** = Summer Resident Breeding

**SRN** = Summer Resident Non- Breeding

**e** = endemic subspecies

#### Status

**LC** = Least Concern (Conservation-IUCN)

**IUCN** = International Union of Conservation of Nature

Scientific Name	Common Name	Master Observation	Range/ Conservation Status
<i>Coereba flaveola bahamensis</i>	Bananaquit	Many	PRB/e/LC
<i>Crotophaga ani</i>	Smooth-billed Ani	Few	PRB/LC
<i>Melopyrrha violacea</i>	Greater Antillean Bull-Finch	Few	PRB/LC
<i>Coccyzus merlini bahamensis</i>	Great Lizard Cuckoo	Few	PRB/e/LC
<i>Coccyzus minor</i>	Mangrove Cuckoo	Single	PRB/e/LC
<i>Patagioenas leucocephala</i>	White-crowned Pigeon	Few	PRB/LC
<i>Pelecanus occidentalis</i>	Brown Pelican	Few	PRB/LC
<i>Thalasseus maximus</i>	Royal Tern	Few	SRB/LC

<i>Thalasseus sandvicensis</i>	Sandwich Tern	Single	SRB/LC
<i>Vireo crassirostris crassirostris</i>	Thick-billed Vireo	Few	PRB/e/LC



**Photo 3:** Great-Lizard Cuckoo (*Coccyzus merlini bahamensis*) observed on site.

#### 5.2.6.1.1 Range

The range of a species is the geographic areas where the birds can be consistently found e.g., migrant birds have seasonal ranges while restricted range species remain on the same island or in the same region year-round.

#### 5.2.6.1.2 Permanent Resident Breeding

Permanent Resident breeding (PRB) species refers to the resident species that live and breed year-round throughout the Bahama Islands. There were nine (9) PRB species (approximately 90%) of the species recorded during the survey.

#### 5.2.6.1.3 Unique Avian Taxa

The Sunset Estates site contained three PRB subspecies that are unique to The Lucayan Archipelago. These subspecies include, *Coereba flaveola bahamensis* (Bananaquit), *Coccyzus merlini bahamensis* (Great-Lizard Cuckoo), and *Vireo crassirostris crassirostris* (Thick-billed Vireo) are recorded on the site are endemic subspecies found in the Lucayan Archipelago. Summer Resident Breeding

Summer Resident Breeding (SRB) species refers to the summer migrants to the Bahama Islands from North America that breed. None of the species recorded above were SRB. Approximately 20% of the species recorded were SRB species.

#### 5.2.6.1.4 Summer Resident Non-Breeding

Summer Resident Non-breeding (SRN) species refers to the winter migrants to the Bahama Islands from North America. None of the species recorded above were SRN.

### 5.2.6.2 Conservation Status

#### 5.2.6.2.1 Protected Species

All the species observed during the site assessment are protected under the Wild Birds Protection Act Chapter 249 (Statute Law of The Bahamas).

#### 5.2.6.2.2 Endangered Species

None of the species recorded are classed as endangered.

### 5.2.6.3 Habitat Utilization

Seven of the 10 species recorded within the site were land birds, that utilize Dry Broadleaf Evergreen Formation and the Human Altered Environment. Several Shorebirds and sea birds perch and forage along the waters around the western coastline within the site area. Brown Pelicans and several species of Terns and Laughing Gulls were observed frequenting the damaged dock near the proposed site. The vegetation, characteristic of an in-tact dry broadleaf evergreen formation, provides nectivorous, granivorous, and omnivorous birds with plentiful food from the flowers, fruits, and arthropods on the site. Plants such as Poisonwood (*Metopium toxiferum*), Pigeon Plum (*Coccoloba diversifolia*), and Gum Elemi (*Bursera simaruba*) provide important nutrients to the Avi-fauna, especially to White Crowned Pigeons who are known to Favor the fruit of Poisonwood trees when nurturing their young chicks.

## 5.2.7 Fauna Survey

A non-avian survey was conducted to identify the presence and diversity of other fauna species within the boundaries of the site.

## 5.2.8 Methodology

Non-avian surveys were conducted as a part of the Terrestrial Resource Survey (TRS) and to record other fauna diversity at the site. Walking transects were done throughout the site and all species observed were recorded.

## 5.2.9 Observations/Findings

### 5.2.9.1 Species Diversity

Several species of non-avian fauna were observed on and around the site including two vertebrates and several arthropods (see table 7).

**Table 7:** Non-Avian Fauna observed on the proposed Sunset Estates Subdivision Project site, Queen’s Highway, Eleuthera, The Bahamas.

Common Name	Scientific Name
American Grasshopper	<i>Schistocerca americana</i>
Bahama Brown Anole	<i>Anolis sagrei ordinatus</i>
Cuban Whiptail	<i>Pholidoscelis auberi</i>
European Honeybee	<i>Apis mellifera</i>
Gulf Fritillary	<i>Agraulis vanillae</i>
Longtail Skipper	<i>Urbanus proteus domingo</i>
Mexican Paper Wasp	<i>Mischocyttarus cubensis</i>
Peanut Snail	<i>Cerion sp</i>

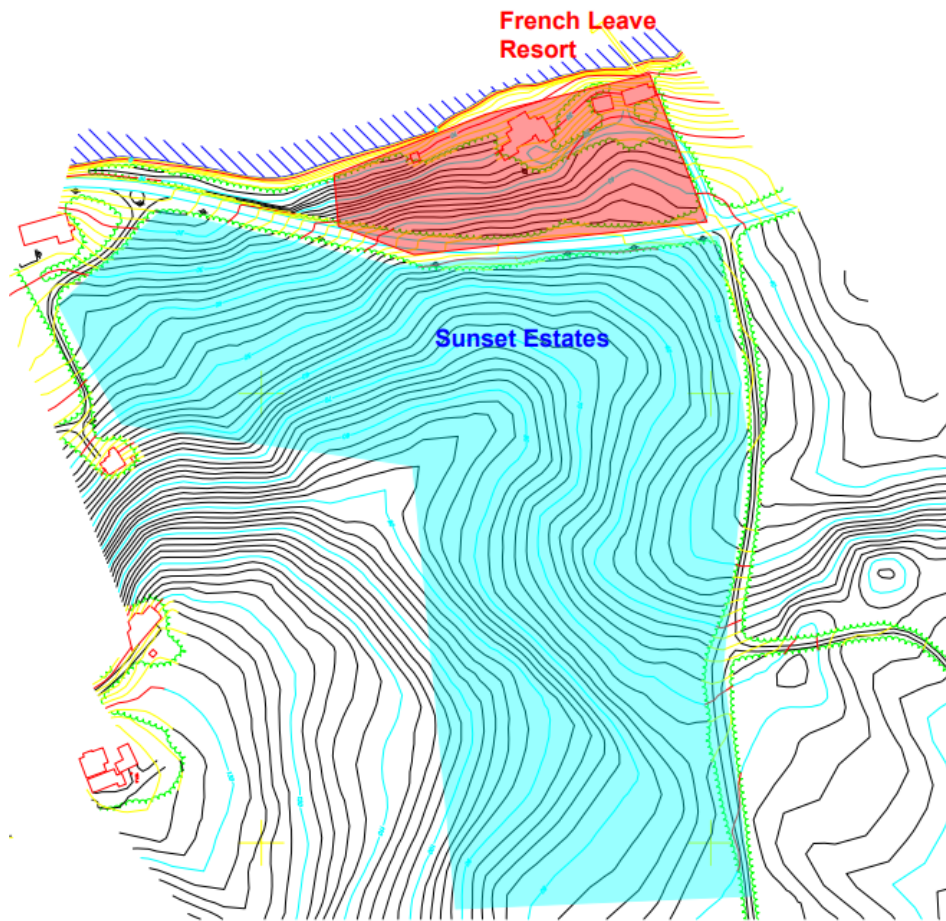
## 5.3 Geology

The Bahama Islands were formed through cycles of sediment deposition and exposure of this platform, coinciding with the Ice Ages and fluctuations of sea level. The main island of Eleuthera, like many other islands along the eastern edges of the Bahama Banks, has a rolling landscape of high ridges and low rock lands, with wetlands occupying areas falling below sea level in the rock lands.

### 5.3.1 Topography

Some rolling undulating elevations can be observed with steep slopes throughout the site. The lowest elevation being approximately 18ft above sea level as observed in the south-western most segment of the site on Lot 12, and the highest elevation being

approximately 106ft as observed in the east segment of the site, specifically in the southern limit of Lot 37. Site Topographic Survey is shown in Figure 7.



**Figure 7:** Landside Topographic Survey of Project Site.

### 5.3.2 Caves and Blue Holes

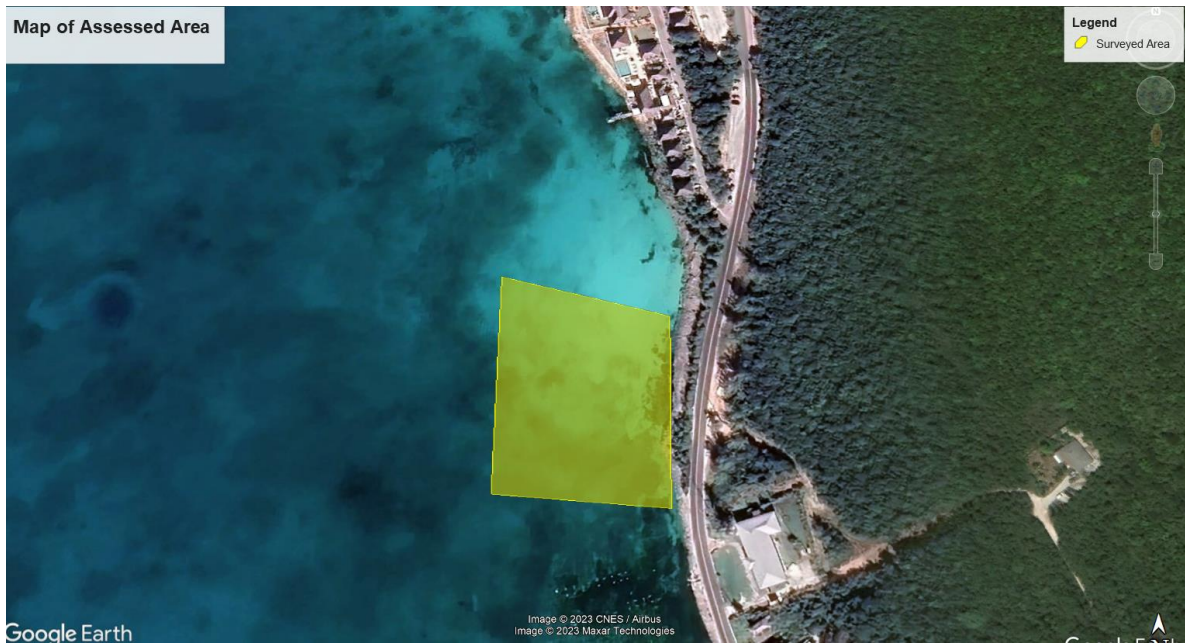
Although small karst formations were observed in the site, no caves or blue holes were seen.

### 5.3.3 Marine Benthic Assessment

A marine assessment was conducted on July 17th and 21st, 2022 to assess the coastal ecosystem of the proposed project site. The purpose of the assessment was to characterize the benthic composition of The Project area, identify flora and fauna



abundance and diversity, assess corals for bleaching and/or diseases and assess the health of seagrass beds.



**Figure 8:** Map of the assessed area.

#### 5.3.4 Methodology

A three (3) person team conducted the assessment. Divers assessed the benthic composition of The Project site using snorkel gear. Digital photographs of the representative and/or notable conditions were recorded.

##### 5.3.4.1 Coastal Assessment

Coastal areas were assessed using the transect method. Four (4) perpendicular transects to the shoreline were done in the area. Transects were approximately one-hundred feet (100 ft) from the shoreline and approximately one-hundred feet (100ft) apart. Divers also swam parallel along the shore between perpendicular transects to assess the change in habitat structure. Spot Checks were completed around the assessed areas to confirm benthic habitat type.

Areas with coral colonies and seagrass beds in the assessed area were noted. Coral health was visually observed during the assessment for the presence of diseases such as Stony Coral Tissue Loss Disease (SCTLD), and coral bleaching. Representation photos were taken.

Benthic habitats were classified as hardbottom, sandy bottom, and seagrass cover. A list of the dominant stony corals, seagrass, fish and other marine life observed within the surveyed area are included in the Species List in Section 5.3.5.4. General observations were also made for the surveyed area.

### 5.3.5 Observations/Findings

#### 5.3.5.1 *General Observations*

The weather conditions during this assessment were clear and sunny. Low tide was observed during the assessment. Water depth was measured to be between eight to ten feet (8ft- 10ft). Based on a range of one to ten (1-10), with one (1) being zero visibility and ten (10) being transparent, visibility throughout the proposed site was nine (9).

#### 5.3.5.2 *Benthic Description*

The following section provides descriptions of the benthic habitat observed throughout the proposed project area. Due to the similarity in benthic habitat along transects, the habitats encountered are separated into three (3) generalized categories:

- Algal-Dominated Hardbottom
- Sandy bottom
- Seagrass

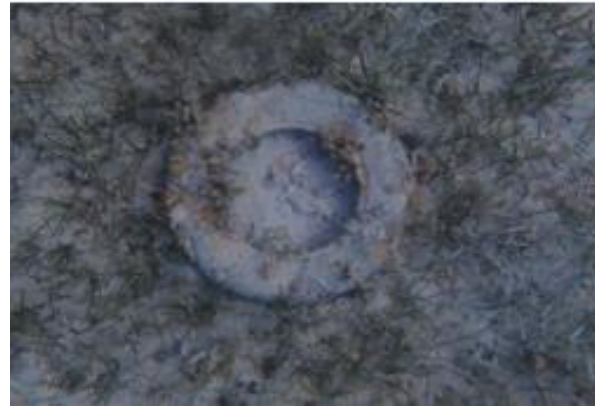
The proposed project area was observed to transition from an algal-dominated hardbottom inshore to sandybottom with patches of macroalgae and then to Seagrass. Seagrass was observed on the north-western end of the assessed area further offshore. Sandy bottom was observed mainly in the centre of the assessed area, further offshore. Hardbottom habitats were observed inshore along the coastline and the south-eastern end of site (See Figure 9).

Overall, the benthic habitats appear to be healthy and consist of typical flora and fauna populations for the area. There was some human-related debris (such as bottles and tires) observed during the assessment which was to be expected due to the proximity to houses and roadways. There was no evidence of degraded water quality.





**Photo 4:** Glass bottle in sandybottom habitat.



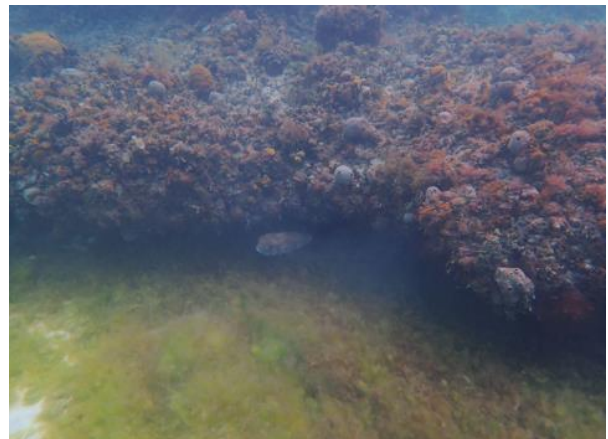
**Photo 5:** Debris along the benthic environment.

#### 5.3.5.2.1 Algal-Dominated Hard Bottom

The benthic habitat inshore and offshore on the southeast side of the assessed area was observed to be hard bottom dominated by algae. This area had low rugosity and was intermixed with patches of sand. Several macroalgae species were observed within this area such as Green Algae (*Halimeda spp.*), Scroll Algae (*Padina jamaicensis*), and Bubble Algae (*Valonia ventricosa*). This benthic habitat made up approximately fifteen percent (15%) of the assessed area.



**Photo 6:** Algal-dominated hardbottom benthic habitat.



**Photo 7:** Algal-dominated hardbottom along the coastline.

Majority of the fish species were observed in this benthic habitat. Some of the species observed include, Blue Tang (*Acanthurus coeruleus*), Mahogany Snapper (*Lutjanus analis*), Porcupine Fish (*Diodon hystrix*), and Pork Fish (*Anisotremus virginicus*).

Coral species observed in this habitat include Massive Starlet Coral (*Siderastrea siderea*), Finger Coral (*Porities porities*), and Rose Coral (*Manicina areolata*). All coral species observed were small (less than 10 cm) in size.

#### 5.3.5.2.2 Sandy Bottom

Sandy bottom was present in the central part of the assessed area, in patches amidst the seagrass beds and in patches admits the hard bottom habitat on the southeastern side of the surveyed area. Dominant macroalgae observed in this habitat usually included Green Algae (*Halimeda spp.*). Sparse seagrass was also observed amongst the sandy bottom, with the predominant seagrass species being Turtle Grass (*Thalassia testudinum*).

The predominant epifauna observed throughout the assessment was the Upside-Down Jellyfish (*Cassiopea xamachana*) and Banded Sea Star (*Luidia alternata*). This benthic habitat made up approximately thirty-five percent (35%) of the assessed area.



**Photo 8:** Banded Sea Star (*Luidia alternata*) on the sandy bottom of the assessed area.



**Photo 9:** Green Algae (*Halimeda spp.*) growing on sandy bottom of the assessed area.

#### 5.3.5.2.3 Seagrass Beds

Dense seagrass beds were observed offshore on the northwest side of the assessed area. The areas are consisted of dense Turtle grass (*Thalassia testudinum*), with sparse Manatee grass (*Syringodium filiforme*), moderate algae and moderate sponge species. Turtle Grass (*Thalassia testudinum*) was determined to be the predominant seagrass species observed during the assessment.



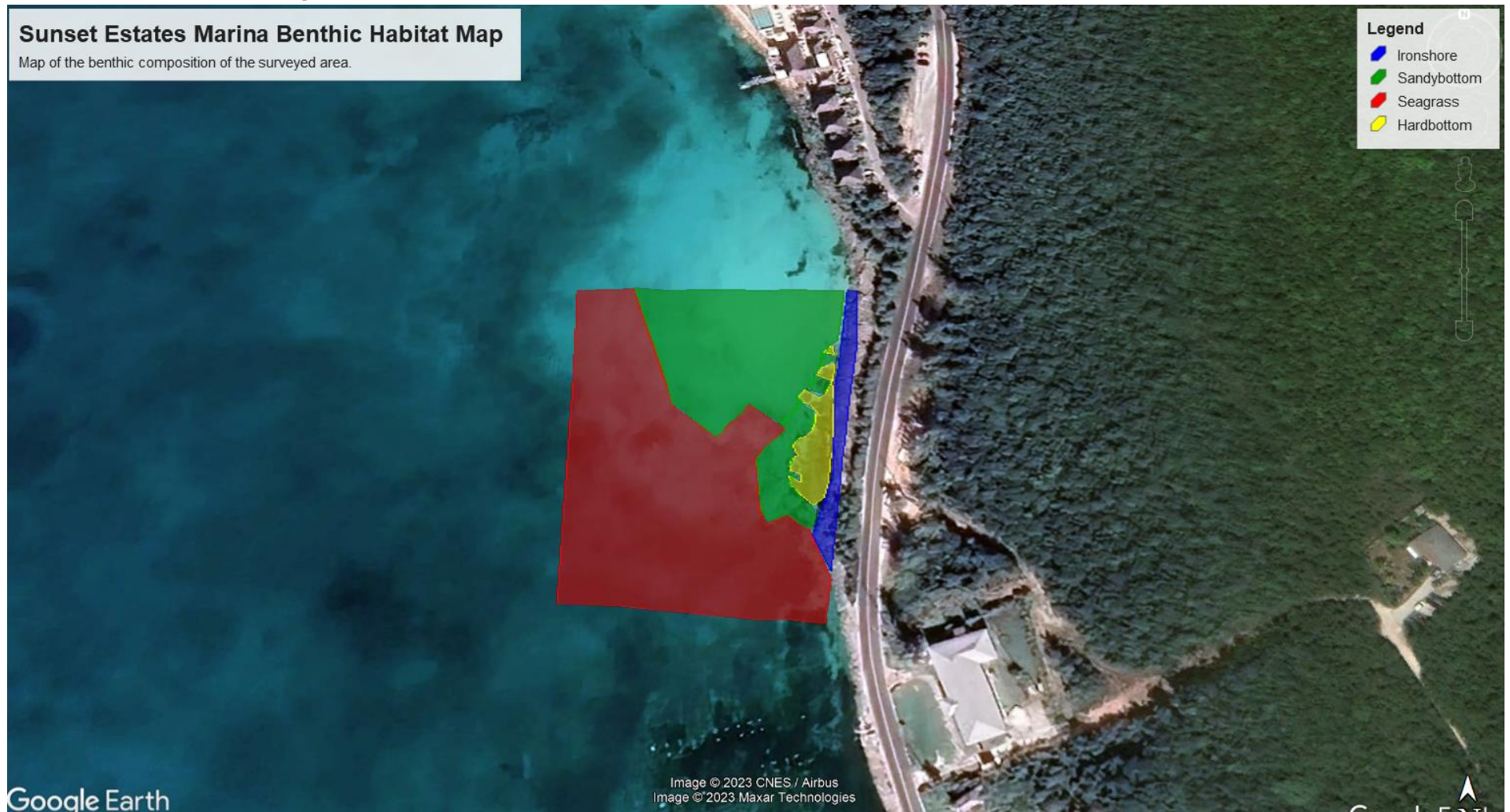
**Photo 10:** Dense Turtle Grass (*Thalassia testudinum*)

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Dominant sponge observed in the seagrass included Stinker Sponge (*Ircinia felix*) and Thin Rope Sponge (*Clathria juniperina*). Dominate algae observed throughout the habitat include Pinecone Algae (*Rhizocephalus phoenix*) and Three Leaf Finger Algae (*Halimeda incrassata*). This benthic habitat made up approximately fifty percent (50%) of the assessed area.



### 5.3.5.3 Benthic Habitat Map



**Figure 9:** Benthic Habitat Map.

### 5.3.5.4 Coastal Species List

Roving diver visual fish surveys were conducted using a modified Atlantic and Gulf Rapid Reef Assessment (AGRRA) Protocol to form the species list. Fish, coral and other fauna and epifauna observed were identified and given a frequency rating (based on occurrence) of Single (1 individual), Few (2-10 individuals), Many (11-100 individuals), or Abundant (More than 100 individuals).

**Table 8-11 Key:** Habitat Type (AL = Algae, SG = Seagrass, HB = Hard Bottom, SD = Sand)

#### 5.3.5.4.1 Fauna Species

##### 5.3.5.4.1.1 Fish Species

Seven (7) fish species were seen existing in coastal areas or the near crevices of the hard bottom habitat of the proposed site area.

**Table 8:** Fish species observed during the assessment.

Common Name	Scientific Name	Habitat	Quantity
Blue Tang	<i>Acanthurus coeruleus</i>	AL	Single
Lane Snapper	<i>Lutjanus synagris</i>	SD	Single
Mahogany Snapper	<i>Lutjanus analis</i>	AL	Single
Porcupine Fish	<i>Diodon hystrix</i>	AL	Single
Pork Fish	<i>Anisotremus virginicus.</i>	AL	Few
Tomate	<i>Haemulon aurolineatum</i>	AL	Many
White Margate	<i>Haemulon album</i>	AL	Single



**Photo 11:** Porcupine Fish (*Diodon hystrix*).

#### 5.3.5.4.1.2 Coral Species

Seven (7) coral species were mostly observed in the hard bottom benthic habitat during the assessment.

**Table 9:** Coral species observed during the assessment.

Common Name	Scientific Name	Habitat	Quantity
Mustard Hill Coral	<i>Porites astreoides</i>	HB	Few
Boulder Star Coral	<i>Orbicella franksi</i>	HB	Single
Branching Fire Coral	<i>Millepora alcicornis</i>	HB	Few
Lesser Starlet Coral	<i>Siderastrea radians</i>	HB	Few
Rose Coral	<i>Manicina areolata</i>	SG	Few
Finger Coral	<i>Porites porites</i>	SG, HB	Few
Massive Starlet Coral	<i>Siderastrea siderea</i>	HB	Single



**Photo 12:** Finger Coral (*Porites porites*).



**Photo 13:** Boulder Star Coral (*Orbicella franksi*).

#### 5.3.5.4.1.3 Other Fauna and Epifauna Species

Majority of the epifauna species were found either on the sea floor or on rocks that sat on the seafloor. Nine (9) additional fauna and epifauna species were observed.

**Table 10:** Additional fauna and epifauna species observed during the assessment.

Common Name	Scientific Name	Habitat	Quantity
Banded Sea Star	<i>Luidia alternata</i>	SD	Few
Christmas Tree Worm	<i>Spirobranchus giganteus</i>	HB	Few
Giant Anemone	<i>Condylactis gigantea</i>	HB	Few



Split Crown Feather Duster	<i>Anamobaea oerstedii</i>	SG	Few
Stinker Sponge	<i>Ircinia felix</i>	SG	Few
Thin Rope Sponge	<i>Clathria juniperina</i>	SG	Few
Two Spined Sea Star	<i>Astropecten duplicatus</i>	SD	Few
Upside Down Jellyfish	<i>Cassiopea frondosa</i>	AL	Few
Yellow Spotted Stingray	<i>Urobatis jamaicensis</i>	SG	Single



**Photo 14:** Giant Anemone (*Condylactis gigantea*).



**Photo 15:** Yellow Spotted Stingray (*Urobatis jamaicensis*).

#### 5.3.5.4.2 Flora Species

Seven (7) Flora species were found throughout the survey site.

**Table 11:** Flora species observed during the assessment.

Common Name	Scientific Name	Habitat
Scroll Algae	<i>Padina jamaicensis</i>	HB
Turtle Grass	<i>Thalassia testudinum</i>	SG
Manatee Grass	<i>Syringodium filiforme</i>	SG
Green Algae	<i>Halimeda spp.</i>	SG, SD
Pinecone Algae	<i>Rhipocephalus phoenix</i>	SG
Three Finger Leaf Algae	<i>Halimeda incrassata</i>	SG
Bubble Algae	<i>Valonia ventricosa</i>	HB

### 5.3.6 Commercially Important, Endemic and Endangered Species

There were two (2) marine species observed during this assessment that are listed on the Convention on International Trade of Endangered Species (CITES) list and/or the International Union for Conservation of Nature (IUCN) Red List (see Table 12).

The CITES listing group species in appendices I, II and III. Two (2) species observed during the assessment were listed within CITES Appendix II. CITES Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival.

The IUCN Red List Categories and Criteria classify species at high risk of global extinction. It divides species into nine categories: Not Evaluated, Data Deficient, Least Concern, Near Threatened, Vulnerable, Endangered, Critically Endangered, Extinct in the Wild and Extinct.

**Table 12:** CITES and IUCN status for species observed during the assessment.

Scientific Name	Common Name	CITES Listing	ICUN Listing
<i>Scleractinia spp.</i>	Stony Corals	Appendix II	Not Listed
<i>Siderastrea sidereal</i>	Massive Starlet Coral	Appendix II	Critically Endangered

There are some species of fauna and flora observed during the assessment that are important to the economy of The Bahamas and are important key stone species for the reef and seabed ecosystems. Other species are protected under The Bahamas Fisheries Resources (Jurisdiction and Conservation) Act 1977 (highlighting amendments 2006, 2010, 2011) and Fisheries Act 2020. Table 13 below outlines these key species.

All Stony Coral species are listed on the IUCN Red List as ‘Least Concern’ and are protected under the Fisheries Resources (Jurisdiction and Conservation) Regulations. Turtle Grass (*Thalassia testudinum*), Shoal Grass (*Halodule wrightii*) and Manatee Grass (*Syringodium filiforme*) are protected under the Declaration of Protected Trees Order, 2021.

**Table 13:** Species observed that are Commercially Important, Ecologically Important, Endangered and/or Protected in The Bahamas.

**Table key:** **CI** = Commercially Important, **ES** = Endangered Species, **PS** = Protected Species, **EI** = Ecologically Important

Scientific Name	Common Name	Status
<i>Scleractinia spp.</i>	All Coral Species	PS/EI
<i>Thalassia testudinum</i>	Turtle Grass	EI/PS

<i>Syringodium filiforme</i>	Manatee Grass	EI/PS
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### 5.3.7 Discussion

The assessed area consisted of a coastal marine ecosystem off of Queen’s Highway, Eleuthera. The proposed development will include construction of a 32-slip marina, construction of a subdivision/commercial village area and commercial centre with parking spaces, development of a public/green space, retail spaces, restaurant and bar, office space, and recreational/public spaces.

The descriptions of benthic habitat observed are a fair representation of the vegetation cover and biodiversity on the site. While it is likely that additional species would be recorded with further field studies this is not likely to impact the results of this study for the purposes it is intended.

The benthic habitat is mostly composed of a sandy bottom substrate and seagrass beds. In addition to this, areas of hardbottom substrate were observed along the coastline and the southeastern section of the assessed area. These hardbottom areas were observed to have the most fauna activity.

It should be noted that the proposed site has been previously impacted which is evident by seabed/trash observed on the seafloor. Marine activities have been in existence in the Governor’s Harbour basin for a long period of time including the French Leave Resort Marine (previously Club Med Marina), the Public/Government Hippe Dock, Government Freight Dock, numerous sail/power boats anchored in the harbour on a regular basis.

#### **Fish Diversity**

Fish diversity was considered to be moderate and abundance was observed to be relatively low throughout The Project area. Fish activity was observed to be most abundant in areas where hardbottom substrates were located or closer inshore. This was to be expected at the ridges and crevices provide a habitat and feeding ground for fish species. There were no fish observed during the assessment that are considered commercially important or endangered.

#### **Seagrass Beds**

Seagrass beds were observed to be further offshore and were dominated by dense Turtle Grass (*Thalassia testudinum*) with sparse amounts of Manatee Grass (*Syringodium filiforme*). Turtle grass (*Thalassia testudinum*), and Manatee Grass (*Syringodium filiforme*) are now listed on the updated 2021 Bahamas Protected Tree Order. The seagrass beds observed throughout The Project area appear to be healthy and contain flora and fauna typically seen in seagrass beds.

#### **Coral**

Coral abundance and diversity was observed to be low during the assessment. Corals within The Project area was located near hardbottom substrates or closer in shore. All corals that were observed in this area were considered to be in good condition. No bleaching or signs of Stony Coral Tissue Loss Disease (SCTLD) were observed during this assessment. Hard corals observed were dominantly less than 10 cm wide. Due to the coral size relocation is not recommended.

Overall, the benthic habitats for the assessed areas appeared healthy and consisted of the typical flora and fauna populations. Water quality parameters were also observed to be within the normal range.

## 5.4 Species of Economic Importance

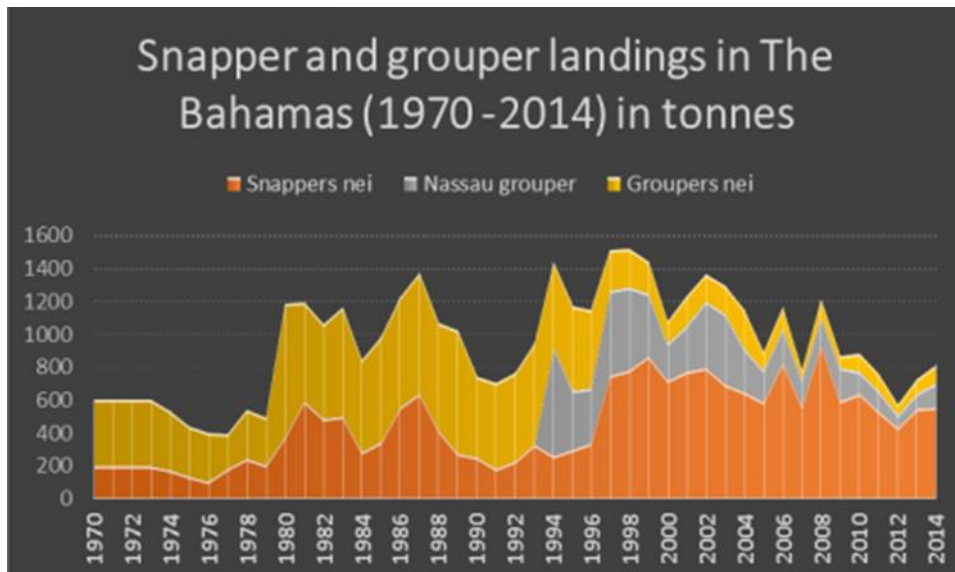
### 5.4.1 Terrestrial

The Narrow Leaf Blolly is a known food source for birds (i.e., White Crowned Pigeon). Its red fruit attracts native and migrant birds which contribute to biodiversity. The Thatch Palm the Sabal Palm can be used for thatching huts. The Gum Elemi is used medicinally to treat circulatory problems as well as teas. It is also used as an ornamental.

### 5.4.2 Marine

Seagrass is a vital ecosystem which provides food, habitat, and nursery areas for various marine organisms and is considered a marine biodiversity feature of significance for The Bahamas.

Economically, fisheries products contribute an estimated 1% to The Bahamas' Gross Domestic Product (GDP). In 1986, the total export value of Snappers and Groupers were an estimated \$3,852,540. It was noted that over the years, trends in fisheries export decreased in both weight (lbs.) and value. Scaled fish export quantity and value in 2016 were an estimated 62,725lbs. at \$145,653.43. Future export quantity and value in 2021 were an estimated 28,670lbs. at \$25,600. Thus, illustrating possible prohibiting factors such as increase fisheries regulations and/or environmental changes.



**Figure 10:** Snapper and Grouper landings in The Bahamas over the period 1970-2014 in tons.

### 5.5 Human Influence

Various debris items (i.e., tire, glass and plastic bottles) were observed during the marine survey. Which indicated anthropogenic influence on the area of interest. Additionally, of fishing cage was found. This shows that people use this site as a fishing ground which would affect the fish population of the area. Waste management is discussed in section 10.

### 5.6 Habitat Utilization and Food Sources for Native Fauna

Several Shorebirds and sea birds perch and forage along the waters around the western coastline within the site area. Brown Pelicans and several species of Terns and Laughing Gulls were observed frequenting the damaged dock near the proposed site. The vegetation, characteristic of an in-tact dry broadleaf evergreen formation, provides nectivorous, granivorous, and omnivorous birds with plentiful food from the flowers, fruits, and arthropods on the site. Plants such as Poisonwood (*Metopium toxiferum*), Pigeon Plum (*Coccoloba diversifolia*), and Gum Elemi (*Bursera simaruba*) provide important nutrients to the Avi-fauna, especially to White Crowned Pigeons who are known to favour the fruit of Poisonwood trees when nurturing their young chicks.

The marine habitat primarily consists of seagrass and sandy bottom ecosystems. The seagrass species found is predominantly Turtle Seagrass (*Thalassia testudinum*). There are also areas dominated by sandy bottom and algae. Seagrass is used in the marine ecosystem as a shelter, nursery, and a source of food.

## 5.7 Aesthetics

Aesthetically, the site is in good condition and exhibits a Dry Broadleaf Evergreen Formation of great ecological value in a town that is conveniently located at the heart of Eleuthera and is the prime center for development. Governor’s Harbour has fragments of native forests spread across the town, and there is no contest that the proximity to human development has increased the introduction of invasive species into these forest formations and has changed the structure of these habitats. Aesthetics of the surrounding area such as the likes of the French Leave Resort and the Leon Levy Native Plant Preserve demonstrate the culmination of urban development and forestry management which suits the proposed development for the Project site.

### 5.7.1 Protected Areas

There are nine (9) protected areas and five (5) Wild Bird Preserves located on Eleuthera Island. The following tables provide the names and sizes of the areas. Table 14 shows the list of Protected Areas and Figure 11 shows the location of the protected areas. The Leon Levy Native Plant Preserve (LLNPP), managed by the Bahamas National Trust (BNT), is nearest the project site and is located ~2.14 miles from the site as shown in Figure 12. This national park features native and endemic plants from across the Bahamian archipelago. The LLNPP website provides detailed information about the national park. National Parks are established under the Bahamas National Trust Act, Amendment Bill, 2010, “The Bahamas National Trust shall from time to time advise the Government of The Bahamas in matters concerned with the areas to be or become Trust property and the policy to be pursued for the preservation thereof and the means of enforcing the same.” Wild Bird Reserves are established under the Wild Birds Protection Act Chapter 249, “An Act to make provision for the protection of wild birds.”

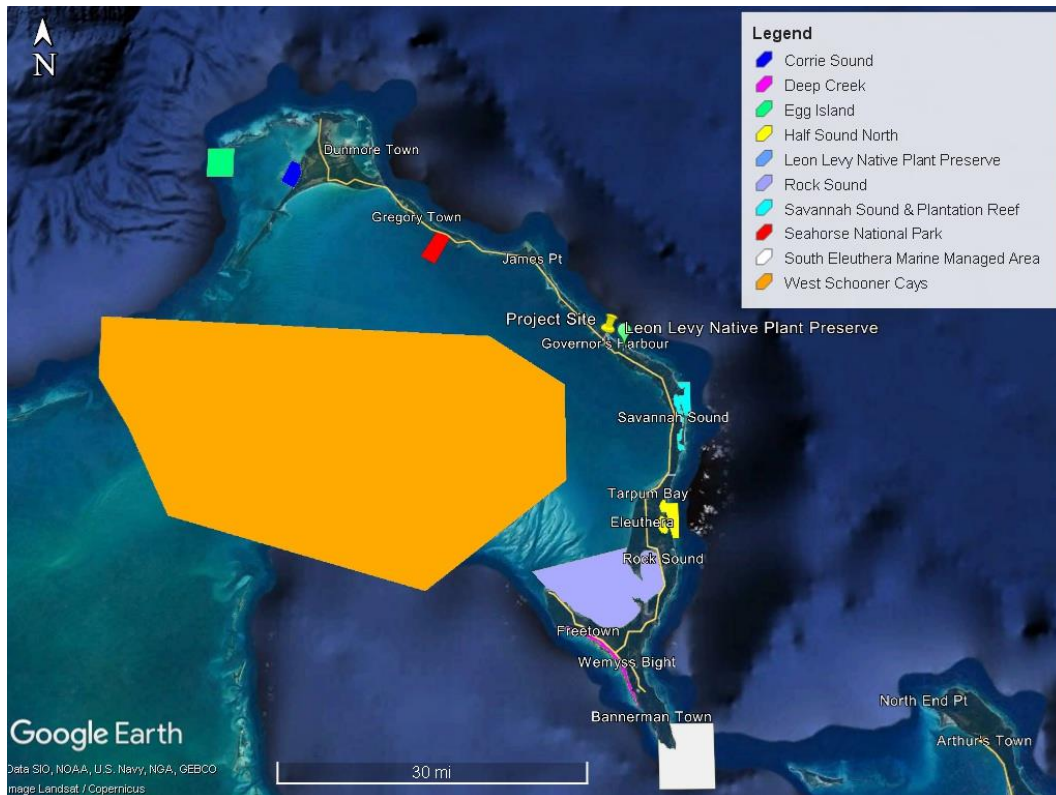
**Table 14:** Protected Areas located on Eleuthera as Provided by the Bahamas Protected Areas Fund Website.

Name of Protected Area	Size (Acres)	Management Authority
Leon Levy Native Plant Preserve	25	BNT
West Schooner Cays	614,953	Unassigned
Egg Island	5,570	Unassigned
Seahorse National Park	3,211	Unassigned
Savannah Sound & Plantation Reef	3,468	Unassigned
Deep Creek	2,059	Unassigned
Half Sound North & South	3,573	Unassigned
Lighthouse Point Marine Area	18,876	Unassigned
Corrie Sound	2,511	Unassigned



**Table 15:** Wild Bird Reserves Managed by the Ministry of Environmental and Natural Resources.

Name of Wild Bird Preserve	Size
Bottle Cay	10
Cedar Cay	5
Finley Cay	12
Water Cay	7
Wood Cay	15



**Figure 11:** Protected Areas Located on Eleuthera Island.



**Figure 12:** The Leon Levy Native Plant Preserve is shown in green and is ~2 miles from the subdivision.

## 5.8 Cultural Resources

### 5.8.1 Historical Overview

The island of Eleuthera is known to be the first island that was colonized and permanently settled in The Bahamas. Governor's Harbour is the capital of Eleuthera and The Bahamas. It was originally named Colebrooke Town. Governor's Harbour was also an important settlement for the growing and processing of pineapples. Commercial exports of pineapples in The Bahamas began in 1844, with the island of Eleuthera being the top producing cultivator. The first pineapple canning factory was established in Governor's Harbour in 1857 and was located where the current abandoned Levy Medical Clinic now stands. Heaps of stones seen in various areas about the site suggest that land clearing activities were conducted for pineapple cultivation. Thorough research into the site at the Department of Lands and Surveys indicates that the site was indeed utilized for pineapple cultivation by at least two independent pineapple farmers. A 1927 Survey Map of Land Grants shows that the property was once granted to Kersey Sturup and Captain Edward Miller. The Dry Broadleaf Evergreen Formation which characterized the entire site consists of mature-growth indigenous trees, which suggests that the property has not undergone major land clearing activities with heavy equipment such as a bulldozer or other advanced machinery in over 100 years.

The US Navy Experimental Facility, an old navy base, is found in the settlement of Governor's Harbour, south of the airport. It was built in 1951 but was officially commissioned in 1957. The facility was built by Western Electric and used Sound surveillance technology to track soviet submarines in the Atlantic. In 1957, the Eleuthera Auxiliary Air Force Base (AAFB) began operations and was tasked with monitoring rockets and guiding long range missiles by the Air Force. US Army Engineers built the Governor's Harbour airstrip to accommodate large supply planes coming to the island.

French Leave Resort, located to the east of the site was originally a 100-acre private residence purchased by Ruth Fahnestock de Marigny in 1937. It was later sold to Roland T Symonette and then to actor Craig Kelly in 1950 who turned it into a resort. A fire destroyed the original resort, and the property was later taken over by Club Med, who ran the resort from 1976-1999. It later became a part of the Mariott Autograph collection group.

### 5.8.2 Historical, Archaeological and Paleontological Resources

A Historical, Archaeological and Paleontological Resource Survey of the Project site was conducted by Dr. Grace Turner, Chief Archaeologist and Research Officer at the Antiquities, Monuments and Museum Corporation (AMMC), accompanied by two Assistant Archaeologists and Scott Johnson, Environmental Scientist at Bron Ltd., between February 16<sup>th</sup> and 17<sup>th</sup>, 2023. The AMMC Historical Resource Report is provided in Appendix D.

Several rock piles have been observed on the site (See Figure 14), indicating deliberate placement to clear land areas and expose the topsoil layer for farming activities. The rock piles were not found to originate as a part of a man-made, dry-stone wall. Very few historical resources were found during the site visit. Two shards of cultural material were observed on the site. These materials were collected, analysed, and found to be late 19<sup>th</sup> century glass bottle fragments (See Figure 15). The limited cultural material recovered from the site coupled with the loosely arranged rock piles suggest that the site was not used as a dwelling area but as a work area and was likely utilized last in the early 20<sup>th</sup> century.

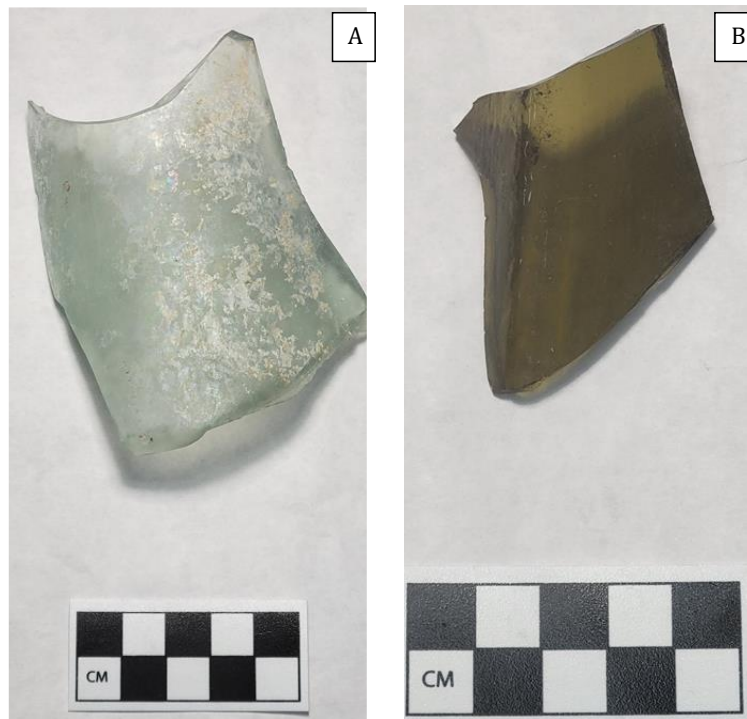




**Figure 13:** Rocky Substrate observed on site.



**Figure 14:** Old rock formations observed on site.



**Figure 15: (A)** Cylindrical glass bottle fragment with green tint (c.1870-1910), **(B)** Case type olive green bottle fragment (c.1870-1900).

### 5.8.3 Tourist and Recreational Areas

The Project site is found with the town of Governor's Harbor in Eleuthera. There are several lodging places for tourists to stay within the area such as French Leave Resort, Squire Estate, Governor's Estate, Fond Memories, among other places. There are also several restaurants for locals and tourists to enjoy in town such as 1648-An Island Restaurant, Buccaneer Club, Da Perk, The Fish Fry and a few other restaurants and bars. There is a popular beach is that is used recreationally named the French Leave Beach.

## 5.9 Transportation

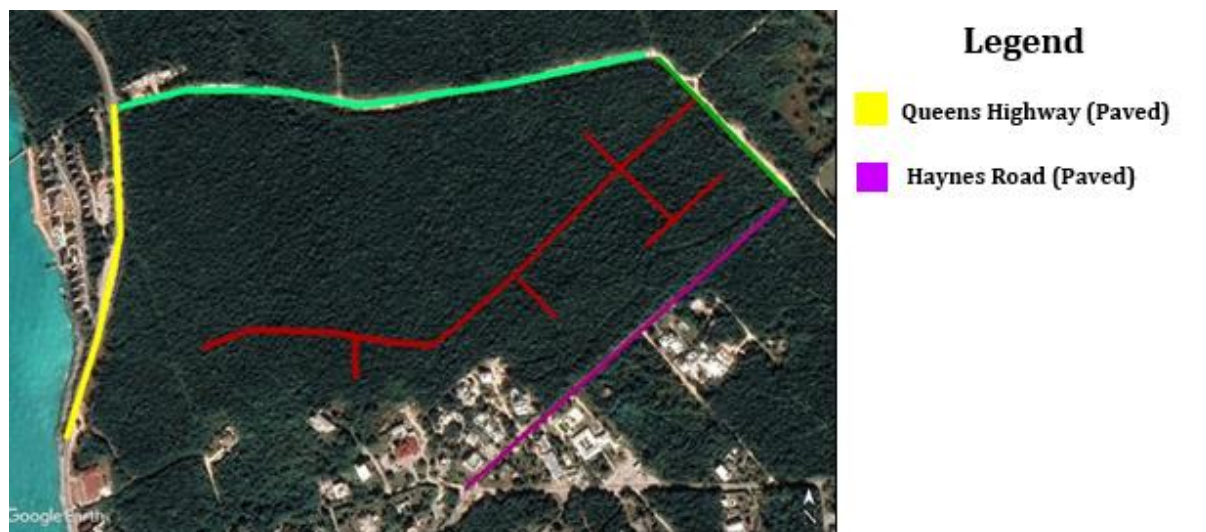
### 5.9.1 Air Transport

There are three main airports on Eleuthera. The nearest airport to the project site is the Governor's Harbour Airport (MYEM), about 8 miles northwest of the property. The second is the Rock Sound International Airport (RSD) which is ~ 27 miles southeast of the site. A dysfunctional Ferry Dock near Rocky Point, and the private and public docks located in the settlement of Sandy Point. The third is North Eleuthera International Airport which is ~40 miles north of Governors Harbour.



### 5.9.2 Land Transport

The Queens Highway serves as the major thoroughfare across the island of Eleuthera and is one of five access points to the proposed subdivision. It runs north to south along the western boundary of the proposed subdivision. Queen's Highway is between the proposed marina and the subdivision. Haynes Avenue southeast of the proposed subdivision. Both roads are paved. The remaining three access roads are unpaved. The following figure shows the location of the roads.



**Figure 16:** Map of the Roads in Proximity to the Marina and Subdivision of the Project Site.

### 5.9.3 Sea Transport

A Ferry Terminal is located at the Governor's Harbour Ferry Dock, approximately 1 kilometer away from the proposed site, which is used for public and commercial sea transportation to and from various ports. Roughly half a kilometer northwest of the proposed project is the French Leave Marina, the only existing marina in that area presently. The fixed mega yacht slip can accommodate two (2) Super Yachts up to 160ft in length, and 5 additional yachts. Therefore, private vessels can also utilize sea transportation routes surrounding the project site.

## 5.10 Socioeconomic Aspects

### 5.10.1 Land Use and Land Acquisition

The Project site private property owned by Governor's Harbour Resort and Marina Ltd., who has authorized SLV Holdings Ltd. (the Developer) to develop the Project at the site. Land acquisition is not required before works can commence.



### 5.10.2 Zoning Aspects

The project area currently has no zoning.

### 5.10.3 Population

The 2022 National Census indicates the total population of The Bahamas has three hundred and ninety-nine thousand, three hundred and fourteen (399,314) people. During the 2010 census, the Southern Eleuthera constituency's population was estimated at 4,955 people with 1,647 households in that community. The population was evenly distributed between males and females with the population of males being 2,425 and the females being 2,530. Eleuthera is approximately one-hundred and ten (110) miles long and the project site is located within the Central/Southern constituency of the island.

### 5.10.4 Economy of The Bahamas

Tourism, the number one (1) industry, contributes sixty percent (60%) of the GDP. The Financial services sector, including private and commercial banking institutions, is the second major industry.

However, The Bahamas has experienced two major events in the past five (5) years that has caused a slight downturn in economic growth. These two events were Hurricane Dorian in 2019 and the COVID-19 Pandemic in 2020.

Hurricane Dorian was one of the biggest hurricanes to hit The Bahamas and caused an estimated amount of \$3.4 billion dollars in damages (IDB 2020). According to the IDB The Bahamas experienced a sharp decrease in GDP growth rate because of Hurricane Dorian, with the islands that suffered the most, such as Abaco and Grand Bahamas experiencing significant decreases in economic activity.

The COVID- 19 Pandemic not only impacted the Bahamian economy but disrupted the world's economic order and global public health. With the implementation of social distancing measures to curb the spread of the virus, global economic activity decreased and tourism dependent sectors which depend on the movement of people were basically shut down. Due to the Bahamian economy heavily relying on Tourism, the COVID19 Pandemic caused a steep decline in GDP and economic activity in the country between 2020 and 2021. The IDB estimates that the COVID- 19 Pandemic caused The Bahamas \$9.5 billion due to tens of thousands of job losses and impacts to the country's tourism sector (IDB 2022)

Despite the downturn in the Bahamian economy due to the COVID- 19 pandemic and the impacts of Hurricane Dorian, the Bahamian domestic economy registered a growth of 13.7% in 2021 (Central Bank 2021 annual report).

The Project is anticipated to positively impact the Bahamian economy during construction or operational phases. The marina, industrial and commercial development would result in small direct economic impact on the overall economy.

#### 5.10.5 Labour Regulations

The current Employment Act of Bahamas provides the specific provisions on labour dispute, wage, employment contract, labour insurance benefits, work hours, holidays, employment of non-local residents and arbitration of trade unions. There is an anticipated impact associated with engagement of non-Bahamian or non-local workers on The Project site.

This will be mitigated by the adherence to established ratios of local to non-Bahamian workers as stated in legislation. Compliance with this regulation is important during the development of The Project. Work halts due to workers dissatisfaction can be managed by adherence to agreed payment schedules and other items in the compensation package.

## 6.0 Environmental Impact Analysis

The impact analysis is a critical component of the EIA process as it evaluates the potential impacts resulting from the interaction between project related activities and the surrounding environment during construction and operations phases of the Project. Impacts are described as changes brought about to the surrounding environment as a result of project-related activities. The surrounding environment for this EIA is inclusive of the physical, biological, and socioeconomic environment within the Project’s area of influence. Environmental aspects considered in this analysis are listed below.

**Table 16:** Environmental aspects under consideration for the Impact Analysis.

Environmental Aspects	
<b>Physical</b>	Erosion
	Air Quality
	Noise Quality
	Hydrogeology
<b>Coastal Processes</b>	Hydrology / Hydrodynamic
	Turbidity / Sedimentation

	Beach
<b>Biological</b>	Nearshore / Coastal Habitats
	Marine Habitats
	Terrestrial Habitat
	Terrestrial Fauna
	Marine Megafauna
<b>Socioeconomics</b>	Neighboring Communities
	Relocation
	Boat Traffic
	Economics
<b>Cultural</b>	Archaeological, Historic & Paleontological Resources
	Fishing

Project related activities during construction and operations have the potential to impact the surrounding environment, and the nature of these impacts can be Negative or Positive and Direct or Indirect. Negative impacts are activities which result in an adverse change or degradation from the environmental baseline, while positive impacts result in a beneficial change or improvement to the environmental aspect under consideration. Direct impacts result from the direct interaction between Project related activities and the surrounding environment, while indirect impacts consequences of the Project implementation on the surrounding environment on a larger time and distance scale. Additionally, other parameters such as Significance, Duration, and Intensity are used in determining the scale of environmental impact.

Significance in this assessment is a determination of the degree of importance assigned to an environmental impact resulting from project related activities. An impact's significance is evaluated in terms of its magnitude and likelihood. Magnitude is a function of the impact's extent, whether restricted on site to the immediate project area, locally within a 10-mile radius, regionally to include the island of Eleuthera and the Central Bahamas and Nationally to include the extent of the Bahamian Archipelago. The likelihood of an impact is a rating which evaluates the likely potential for an impact to occur, with typical rating categories being unlikely to occur, Likely to occur under most conditions, and definitely will occur.

The duration of the impact relates to the temporal scale which is required for changes in the host environment to return to baseline conditions or undetectable levels. Temporary impacts persist for a short duration and occur occasionally and/or intermittently. Short Term Impacts are expected to persist for the duration of the project activities related to

the construction phase of the Project. Long Term impacts extend beyond the duration of the construction period and exist throughout the life of the Project. Permanent impacts persist far beyond the life of the Project and are irreversible changes to the host environment due to project related activities.

The intensity of an impact can be considered as Negligible, Low, Medium, or High. A Negligible impact is one which has no detectable change on the host environment. A low intensity impact does not affect the host environment in such a manner as altering natural flows and processes. Medium intensity impacts alter the natural flows and process of the host environment while allowing the flows and process to retain their natural functions. High intensity impacts alter natural flows and processes to the extent where natural functions are totally inhibited for a temporary or permanent period.

Cumulative impacts are the compounding effects of Project related activities when combined with past, current, or future actions or activities related to this or another Project in the nearby environment. Cumulative impacts represent the interaction of impacting factors originating from different sources with the same host environment. The result is typically an exacerbation of the impact on the environmental aspect and is considered in this assessment.

**Table 17:** Impact Significance Summary Table Key.

<b>SIGNIFICANCE</b>			
<b>MAGNITUDE</b>			<b>LIKELIHOOD</b>
<b>Extent</b>	<b>Duration</b>	<b>Intensity</b>	
On Site (O)	Temporary (T)	Negligible (N)	Unlikely (U)
Local (L)	Short-Term (ST)	Low (LW)	Likely (LK)
Regional (R)	Long-Term (LT)	Medium (M)	Definite (D)
National (N)	Permanent (P)	High (H)	

## 6.1 Land Use Impact

The immediate footprint of the site is currently undeveloped and is utilized by native flora and fauna. The site is located east of French Leave Resort, a luxury tropical resort offering scenic landscaping, modern infrastructures, and ocean experiences. This aligns with the intended land use for the proposed project which will offer luxury residence lots in a subdivision, a commercial village with rental villas and a full-service marina to invite more maritime activities and tourist attractions for Governor’s Harbour. The site lies south of a service yard and is located near residential communities which will benefit from the community features proposed by the project. It is expected that the land use impact will be minimal.

## 6.2 Aesthetics Impact

The design element of the Project during the operation phase will add attractive, modern infrastructure while maintaining the distinctive local architectural style within the Governor's Harbour community. Temporary negative impact to the aesthetics of the local environment will, however, be expected for a temporary period during the construction phase of the Project. The Developer intends to incorporate green spaces to mirror natural ecosystem function by utilizing the native flora for landscaping purposes. The Developer also proposes to provide recreational amenities that fit within the parameters of sustainable urban development. Improvement to the overall aesthetics of the coastline is expected for a long-term period. The abandoned dock impacted by previous hurricanes just south of the proposed project will be overshadowed with the full-service and aesthetically pleasing operational marina. It is therefore very likely that aesthetics will be positively impacted by the Project.

## 6.3 Impacts to the Physical Environment

### 6.3.1 Erosion and Sediment Impact

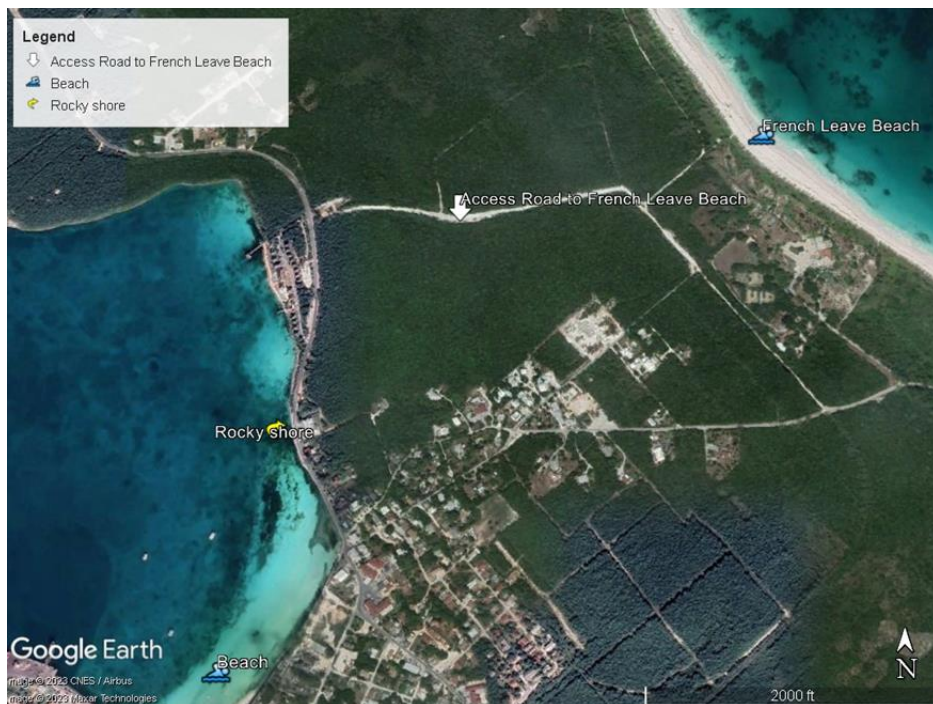
The Project is expected to have minor excavation activity in the upland area for developing roadways and establishing building foundations, and land clearing and site grading activities to accommodate the project design. This will have a high impact on erosion and sediment as some of the vegetative features in the affected areas that act as a sponge for run-off and rain catchment will now be removed. The topsoil layer and karst formations in certain areas will be altered or removed to facilitate building foundations and construction of the pool and buildings, and will therefore have a high, long-term impact on erosion on the site. The topsoil layer observed was limited and since it is historically known that pineapple cultivation was a common practice in this area, it can be deduced that soil erosion is already present on the site and thus the overall impact of the Project will have low significant on the impact of erosion in the upland area. There is no proposed excavation or land clearing activities expected for the development of the marina, therefore sediment impact is expected to be minimal in the marine habitat. Mitigation methods will however be considered such that sedimentation may be likely to occur.

### 6.3.2 Beach Impact

The beach east of the site, commonly referred to as French Leave Beach, is a sandy beach which may be negatively impacted by the Project. The road north of the subdivision currently functions as an access road to the beach as shown in Figure 17; the public frequents this beach. This road will be maintained during operation. Once the Subdivision and Marina are complete, more people will be concentrated in this area, which will

increase the anthropogenic impact on the beach. As mentioned previously, the beach is currently readily accessible to the Eleuthera community which means the additional anthropogenic impact will have a minor to moderate long-term impact on the site. These can include increased litter on the beach and in the marine environment and destruction of the dune habitat. This impact is ranked yellow in the summary impact table as a result.

The Beach coastline along the western boundary of the site is rocky shore, but southwest of the marina site is a sandy beach as shown in Figure 17. The marina construction will not negatively impact the sandy beach. The rocky shore will be directly negatively impacted by the marina as shown in Figure 18. It is not anticipated that the marina design will result in erosion of the rocky shore.



**Figure 17:** Beach Locations in Proximity to the Project Site.





**Figure 18:** Rocky Shore Coastline Impacted by the Marina.

### 6.3.3 Hydrological Impact

Negligible hydrologic impacts are anticipated in the area due to the Project. The marina will be constructed using wooden piles, which do not interrupt the tidal flow. Excavation near the coastline is not required to achieve the proposed design. As a result, groundwater will not be impacted by the construction of the marina.

### 6.3.4 Air Quality Impacts

Air Quality will be temporarily impacted during construction. During land clearing, site grading and excavation where there will be dust that is dispersed within the air. This Project is directly adjacent to a private resort and surrounded by a residential community. The dust and dirt can affect the surrounding community on particularly windy days during construction. There will also be emissions from machinery on site that can pollute the air if they are not properly maintained. There will need to be mitigation measures in place to ensure that dust is not dispersed to the surrounding communities. Once construction has been completed air quality impact will likely be minimal. A description of the dust suppression activities will be provided in the Environmental Management Plan.

### 6.3.5 Water Quality Impact

The construction of the marina will impact the water quality. The building of the docks and buildings will cause a stir in sediment, creating a turbid environment. However, since local coastline excavation and seabed dredging is not required for the proposed marina, the turbidity is expected to be minor and limited to the temporary pile installation phase. The boats docked at the marina during operations may lead to general pollution within the immediate and surrounding footprint of the water body and can cause fuel spillage if they are not maintained properly.

The Governor's Harbor basin currently experiences high marine activities due to the presence of the French Leave Resort Marina (previously Club Med Marina), the Public/Government Hippe Dock, Government Freight Dock, numerous sail/power boats anchored in the harbour. This high activity has a potential to create a high turbid environment within the basin.

### 6.3.6 Noise Impacts

Noise quality will be temporarily negatively impacted during construction. The Project site is in a residential area where no noise comes from construction and commercial businesses, so there will be a spike in noise levels during construction. During construction hours machinery and the actions of excavation and land clearing will raise noise levels. This will also affect wildlife in the area, such as birds forced to relocate if they are unwilling to withstand the sound.

## 6.4 Biological Impacts

### 6.4.1 Habitat Loss and Degradation Impact

The proposed project is expected to have a negative impact on habitat loss and degradation due to the removal of coppice forest habitat during land clearing, shading of seagrass, and removal of rocky shore during the marina construction. Removing these habitats will lead to an environmental phenomenon known as habitat fragmentation. Habitat fragmentation is the process during which a large expanse of habitat is transformed into smaller patches of total area isolated from each other by a matrix of habitat unlike the original habitat.

Approximately 33 acres of coppice forest habitat will be impacted from the site. Vegetation removal through land clearing will be expected for the development of the roadway which will comprise 3 acres, the commercial village will comprise 2.8 acres and the land clearing required to facilitate the construction on the Subdivision Lots will follow the guidelines of the Department of Town Planning regulations. To reduce this negative impact, land clearing will not take place at one time, and landscaping will take place during construction where feasible. The predominant habitat impacted in the marine

environment is sand with approximately 0.83 acres within the area of influence. Seagrass is the second largest habitat that will be impacted at 0.47 acres.

Sea birds that frequently perch and forage on the dilapidated “hippie dock” may be displaced with development of the new marina and sudden increase in human traffic, but they may return if high human traffic doesn’t deter their utilization of the dock. Though the avian species count was low during the survey period, the data does not reflect migratory species that may utilize the forest habitat and coastal area. Some species of birds are sensitive to anthropogenic disturbance, such as the Great Lizard Cuckoo which was observed on the site, and the Project can lead to local extirpation of sensitive species.

Habitat fragmentation in the terrestrial habitat can impose the ‘edge effect’ on the healthy forest habitats observed during the environmental surveys. Disturbances in the forest structure will alter resource availability for forest species and increase the potential for introduction of invasive species in cleared areas. Animals such as Corn snakes, Green Iguanas, and Cane Toads have been introduced and are spreading rapidly across The Bahamas. Their prolific breeding behaviour along with their strong competitive nature can seriously affect local biodiversity.

The removal of this habitat will also directly impact populations of coppice forest species in these areas. Mitigation against removal of forest habitats can include the intentional preservation of habitat corridors throughout the property, use of native trees in landscaping, and the transplanting of rare, endemic, and protected species where feasible.

The Project intends to enhance the road north of the site leading to the French Leave Beach to provide easier access to the public beach. The three major impacts to the French Leave Beach that may occur as a result of increased human traffic are higher pollution levels, loss of habitat and marine life and accelerated rates of coastal erosion. The Developer is not including project activities on the French Leave Beach and the increase in population due to the project is expected to be minimal in percentage to the size of the Governor’s Harbour community, therefore, these impacts are expected to be minimal. As a result, mitigation efforts will be focused on erecting signs at the marina and commercial area to indicate uses of appropriate waste disposal methods such as marine grade trash cans so that boaters, residents, and guests are aware of and encouraged to conduct best practices.

#### 6.4.2 Coastal Carrying Capacity

It is anticipated that the 49 lots within the Subdivision will house approximately 5 persons per household or ~245 persons. The French Leave Beach is found in Governor’s Harbour, with a local population of about 701 persons and a total of 2,363 persons 1

across the communities of Central Eleuthera. The 1-mile-long beach has an estimated sand bank area of 82, 076.34 m<sup>2</sup>, which can hold a total number of 13,061, 2- meter diameter circles (representing individual persons) with 2-meter gaps between each circle (representing 2-meters between each person). In an extremely rare case that all inhabitants of Governor's Harbour, including the anticipated residents of the Sunset Estates Subdivision at project completion and full occupancy – 946 persons total), were to occupy the beach all at once, that would encompass ~7% of the beach's full carrying Capacity.

While the definition of 'Coastal Carrying Capacity' remains conceptually ambiguous and understudied within The Bahamas and with coastal projects around the world, for the purpose of this EIA the calculation was derived by entering the population size (701 persons), rate of increase of population for The Bahamas (13.6% or 0.136), and the total change in population (~946 persons with anticipated additional residents from the Sunset Estates project at completion). The Carrying Capacity, defined as the ability of a system to support an activity or feature at a given time, was calculated to be 206.24. It is reported that the beach is not overused or oversaturated with beach goers. The Development will be phased and is not expected to create overcapacity issues for the French Leave Beach as none of the project activities are intended to occur on the beach.

#### 6.4.3 Impacts on Special Ecological Features and Biodiversity

The vegetation in these habitats serve as feeding and breeding grounds for terrestrial organisms including the near threatened White Crowned Pigeon and the Great Lizard Cuckoo, as well as other rare, endemic, or protected species of Bahamian birds. Removal of nesting habitats during breeding season can have population level impacts for bird species utilizing the forested habitats. Utilizing native coastal and coppice species in the landscape will assist in increasing the biodiversity of the site after construction.

The marina creation will have little impact on the marine ecological features since remnants of a hurricane impacted, abandoned dock is presently located just south of where the marina development is proposed. The only construction activities required for developing the marina will be pile driving using wooden piles which will not interrupt tidal flow and have little impact on intertidal species and slow-moving marine creatures.

#### 6.4.4 Terrestrial Resources Impact

The 33.80-acre property is presently undeveloped, and while there is some presence of invasive floral species and species diversity is not abundant due to development and forest fragmentation in the surrounding town, it is a relatively undisturbed Dry Broadleaf Evergreen Coppice formation with ecosystem significance to native flora and fauna species. The impact on the terrestrial environment will be severe and will lead to a loss

of both important flora and faunal species. Development of this area will also affect the Great-lizard Cuckoo population at the site, especially if the clearing of land takes place during the birds breeding season (May-September). Minimal to no negative impacts are expected on the shorebird population. Due to the absence of a sandy shoreline at the site of the proposed marina, visits from shorebirds are minimal.

#### 6.4.5 Marine Resources Impact

There will be negative impacts to the marine environment because of the marina construction. Most of the marine habitat was observed to be seagrass beds. Seagrass is a protected species and has ecological importance to marine organisms. Seagrass beds are nursery grounds, for marine life including species of commercial importance, a feeding ground and general area of shelter. Where seagrass is not directly affected by the marina, the surrounding seagrass can be affected from the turbidity of the construction. An increase in turbidity for a long period of time can cloud the water and/or blanket the seagrass preventing seagrass from efficiently photosynthesize and potentially cause them to wither.

Effects caused by turbidity is not expected to be significant as the Governor's Harbour basin currently has high marine activity due to the nearby docks and marinas. Due to the basin already experiencing increased turbidity during movement of boats, impacts to biodiversity due to increased turbidity during construction activities are expected to be low. Marine biodiversity in the lagoon is adapted to increased turbidity.

#### 6.5 Fire, Flood, and Hurricane Risk

The fragmentation of terrestrial habitats, introduction of electrical and motorized equipment, flammable materials and anthropogenic activity will increase the chances of fire on the proposed development site. The existing coppice forest can be susceptible to fires and the spreading of fires. Wildfires within a residential community will temporarily lower air quality and can have moderate to severe long-term impacts on coppice forest habitats. Establishment of fire boundaries around both properties and implementation of a strict fire emergency protocol will reduce the risks of fire to the surrounding environments within this Pineland area.

Hurricane activity is anticipated annually throughout The Bahamas due to its geographical location. The Atlantic hurricane season is observed from June 1st – November 30th. Commonly associated risks of storm/hurricane activities include intense wind speeds, storm surges, heavy rainfall, and associated flooding.

#### 6.6 Solid and Hazardous Waste Impact

Waste generated during construction and operation can negatively impact the site, adjacent areas, and the Eleuthera landfill by increasing the volume of waste on the island.



Negative impacts can include reduced air quality and contributing to pollution on the island and in the marine environment. Increased pollution in the terrestrial and marine environment will decrease the habitat quality for avifauna and marine species which were observed on site. Increased pollution in the marine environment will decrease water quality which can negatively impact marine resources beyond the marina boundary as ocean currents transport the debris. During weather events, the solid waste can be transported beyond the Project site, which will negatively impact the environment adjacent to the Project. Solid waste is comprised of household waste, construction debris, and waste from streets. Hazardous waste is defined as waste that meets the characteristics of a hazardous waste. A characteristic of hazardous waste is a property when present in waste, indicates that this waste product poses a sufficient threat to merit regulation as hazardous. EPA established four hazardous waste characteristics: ignitability, corrosivity, reactivity and toxicity:

1. Ignitability – Wastes that are hazardous due to the ignitability characteristic include liquids with flash points below 60 °C, non-liquids that cause fire through specific conditions, ignitable compressed gases, and oxidizers.
2. Corrosivity – Wastes that are hazardous due to the corrosivity characteristic include aqueous wastes with a pH of less than or equal to 2, a pH greater than or equal to 12.5 or based on the liquids ability to corrode steel.
3. Reactivity – Wastes that are hazardous due to the reactivity characteristic may be unstable under normal conditions, may react with water, may give off toxic gases and may be capable of detonation or explosion under normal conditions or when heated.
4. Toxicity – Wastes that are hazardous due to the toxicity characteristic are harmful when ingested or absorbed. Toxic wastes present a concern as they may be able to leach from waste and pollute groundwater.

## 6.7 Energy Impacts

The increase in energy demand may have a negative impact on the local Bahamas Power and Light (BPL) infrastructure because the Project will be connected to the BPL infrastructure.

## 6.8 Water and Wastewater Impact

The increase in potable water demand may have a negative impact on the local Water and Sewerage Corporation (WSC) infrastructure because the Project will source its potable water from WSC. The site drainage and sewerage systems will not be connected to the WSC infrastructure and will otherwise utilize septic tanks and localized soak away systems for each residential lot, and a deep injection well for wastewater disposal for the

commercial area, and deep disposal wells to dispose stormwater. Wastewater or liquid waste is waterborne solids, and liquids discharged into sewers that includes dissolved and suspended organic solids, which are “putrescible” or biologically decomposable. It is 99.9% water and the remaining 0.1% can include nutrients, fats and oils, microorganisms, and other inorganic compounds. This will be generated during construction and operation of the Project. Impacts of improper wastewater management include water pollution which can negatively impact wildlife, decreasing biodiversity. Wastewater will be managed by incorporating a wastewater treatment system, which will be described in the EMP.

## 6.9 Socio-Economic Impact

The project includes the Project of a marina, subdivision and other facilities and associated buildings such as dive shops, restaurant and bar, and administrative buildings that will aid economic development of the local community by providing additional recreational activities that will bring the community closer together and provide new experiences for tourists and locals alike. These features will also help to provide employment opportunities and will increase the technical capacity for the local workforce and thus will be expected to have a positive socio-economic impact.

### 6.9.1 Traffic Impacts

The proposed project site is located on Queen’s Highway, Governor’s Harbour, Eleuthera. There is only one entry and exit point and there will be an increase in traffic on the main thoroughfare, The Queen’s Highway. There is a potential for increased vehicular and pedestrian traffic during both during the construction and operational phase of The Project. The increase in vehicular traffic, movement of heavy machinery and change in traffic patterns due to road closures (if necessary) can cause impacts to the safety of road users (vehicular and pedestrian) and cause discomfort to the community due to increased noise, and increased emissions.

To assist with road and pedestrian safety during the operational phase the developer proposes a minor realignment of the Queen’s Highway. Road realignment activities can also cause impacts to the safety of road users (vehicular and pedestrian) and cause discomfort to the community.

To mitigate the traffic impacts, the following strategies should be employed:

- Notice should be given to the community of the commencement of work and possible traffic inconveniences.
- Signage will need to be placed at the site entrance/exit and the main thoroughfare.
- Heavy machinery should have a banksman to assist in manoeuvring on and off site.

- Flagmen should be placed strategically at the site's entrance, exit, and onto the main thoroughfares to direct activities.

### 6.9.2 Safety for Workers

The Safety of workers on site is a high priority for The Project. The aim is to ensure that the contractor, subcontractors, their staff, and all visitors know and follow all rules and regulations of the site to prevent and limit any accidents and incidents from occurring. All workers on site should have induction training which outlines the health, safety and environmental rules and regulations for the site. Mandatory use of PPE such as helmets, safety harnesses, masks, gloves, life vests and boots should be worn by workers at all times. All personnel on site should be familiar with material handling procedures, emergency response plans and safety procedures. First Aid kits and First Aid responders should be identified and present on site.

### 6.9.3 Land Use Impacts

The Project will require modification/removal of the natural coastal ecosystem. Construction activities are not expected to affect the hydrogeological and hydrodynamic mechanisms in the surrounding marine ecosystem. To mitigate against loss of the natural environment, construction activities will be limited to the footprint of works.

During construction, human-related debris in the area will be removed and cleaned up. This will improve the remaining coastal environment and improve the aesthetics of the area.

The visual and aesthetic impacts will be limited considering the design of the buildings and the inclusion of a green/public space.

### 6.9.4 Impact on Communities

The project is expected to have a positive impact on the community as additional amenities will be added to the community, such as a restaurant, retail spaces, office space, and a marina fuel station.

Public Consultation with relevant stakeholders should occur before the commencement of The Project to ensure that all views, values, interests, issues, and concerns about the proposed development are raised, heard, and is incorporate into decisions making process.

Daily monitoring of The Project will be done by an Environmental Management Team that tracks all environmental inspections and potential hazards. They will ensure that

environmental measures are implemented prior to commencement of works and enforce all hold points and have the authority to stop works because of environmental issues.

## 6.9.5 Economic Impact

### 6.9.5.1 Capital Investment

The complete development of the Sunset Estates and Marina Development will require significant capital investment. It is estimated that approximately \$20 million USD is to be invested in The Project. The Project will be developed in two phases. Both phases will be rolled out simultaneously. Phase 1 will be the Marina and Residential Subdivision Development and Phase 2 will be the Commercial Village development. Phase 1 is estimated to cost approximately \$5 million dollars to complete. Of this \$5 million dollars, \$3 million dollars will be used in the marina construction and 2 million dollars will be used in construction of the residential community's infrastructure. Phase 2 is estimated to cost \$15 million dollars to complete. This will incur a positive impact on the overall economy.

### 6.9.5.2 Job Generation

Development of The Project will create new job positions for Bahamians both during the construction and operational phases. The Project is also estimated to have a significant positive impact on the Bahamian economy. These impacts include:

1. Bahamian contractors being hired during the operational and construction phase.
2. Equipment and materials needed during the construction phase to be purchased throughout The Bahamas where feasible.
3. Entrepreneurial opportunities being generated by the commercial spaces and retail shops being developed on the property.

The approximate number of workers scheduled to work during the construction and operational phase of The Project is still being discussed. It is expected that approximately fifty percent (50%) of The Project cost will go directly into the Bahamian economy in the form of purchasing of goods, services and labour. It is anticipated that eighty percent (80%) of The Project workforce will be Bahamian.

## 6.10 Cultural Impacts

### 6.10.1 Archaeological, Historic and Paleontological Resources

There were few known or observed archaeological, historic, or religious resource indicators identified onsite. These include several scattered rock piles and 2 pieces of late 19<sup>th</sup>-century glass bottles that were recovered. Due to such limited findings and the Developer's intentions to not encourage clear cutting of the entire site, but instead have

localized land clearing and excavation activities for road development, creating building foundations and facilitating the project design, it is determined that the Project will have minimal impact on Archaeological, historic, and paleontological resources. It is recommended that the Antiquities, Monuments and Museums Corporation (AMMC) of The Bahamas be notified immediately if additional cultural resources are discovered during construction or operation.

#### 6.10.2 Community Service

The current community structure of Governor's Harbour is divided by a small local Bahamian populous and a community of foreign national retirees with minimal interaction except for the weekly community event at the Fish Fry. The public green spaces, parking areas and community amenities such as the pool, restaurant, bar, shops, etc., proposed in the project design aims to attract members of the broader community to utilize these features and build stronger social connections. The proposed project will therefore have a positive impact on the community.

#### 6.10.3 Recreational

The Project's full-service marina will enhance the capacity for maritime related recreational activities and promote access to private vessel owners who would wish to dock their boats and engage in other activities within the community. Other marine related activities such as fishing, snorkelling, and diving may also be increased. Additionally, the proposed development of a pool, pool house, restaurant and bar, public parking and charter shop will have a positive impact on recreational activities in the area. A future development associated with the project will be enhancements made to the access road to the French Leave Beach which will improve public access to the beach. The proposed development will therefore have a positive impact on recreational activities for the community and guests visiting Governor's Harbour and Eleuthera at large.

#### 6.10.4 Marine Transportation

There will be no dredging activities for the Project of the marina, and due to sufficient distance between the proposed project site, the French Leave Marina, and the Governor's Harbour Ferry Dock, marina transportation will be minimally impacted during the construction phases. During the operations phase, marine transportation will be positively impacted by the proposed development due to the presence of an additional port for more private charters and vessel owners to dock their vessels. Additionally, the Project of the marina includes a fuel dock available to all boaters within the vicinity. This will positively impact the local fishermen and recreational boaters since there is no other marine fuel dock within Governor's Harbour.



The proposed Marina will houseboat vessels of up to 45 feet in length. There is also a transient day slip that can accommodate vessels of up to 70 feet in length. There will be two underground storage tanks: one will be 10,000 gallons diesel and the second will be 10,000 gallons gasoline.

## 7.0 Summary Table of Environmental Impacts

**Table 18:** Summary of Environmental Impacts.

		Negligible / Not Applicable (White)	Minor (Yellow)	Orange (Moderate)	Severe (Red)	Beneficial (Green)						
		ENVIRONMENTAL ASPECTS										
PROJECT COMPONENT	IMPACTING FACTOR	PHYSICAL				COASTAL PROCESSES			BIOLOGICAL			
		Erosion	Air Quality	Noise Quality	Groundwater Resources	Hydrology	Turbidity	Beach	Terrestrial Habitats	Marine Habitats	Marine Resources	
Buildings include the Harbormaster Office, Restaurant, Dive Shop. Marina includes the slip and fuel dock												
Marina	Pile Installation											
	Excavation (Underground Fuel Storage Tanks)											
Parking Lot	Excavation (Drainage Installation)											
	Site Grading & Finishing											
Buildings	Land Clearing & Site Grading											
	Solid Waste											
	Liquid & Hazardous Waste											
	Surface Runoff											
	Noise (Heavy Equipment)											
	Emissions (Vehicles & Heavy Equipment)											
	Landscaping											
<b>ACCIDENTAL</b>												
	Fuel, Oil, Hydraulic Fluid spills											
	Sewerage Spills											

## 8.0 Recommendations and Mitigation Strategies

### 8.1 Methodology

Once the Project impacts were determined, best management practices and mitigation strategies were developed based on desktop research and the technical team's experience with similar projects. The following table and sections summarize the proposed mitigation strategies for the Project. The Environmental Management Plan (EMP) will further detail each strategy.

### 8.2 Biological Resource Impacts and Mitigation

The use of environmental windows, turbidity curtains as needed, and preclearance surveys are proposed mitigation measures for the Project. Environmental windows are periods of time known to be less active in a certain area for a species. Installing turbidity curtains as needed prior to the start of marina construction can help reduce the amount of turbidity and sedimentation in the immediate marine environment and prevent sediment transport along the coast. The location of the turbidity curtains will be determined in consultation with the relevant project contractors and a proposed location will be identified in the EMP.

Seagrass, a common food source for green turtles, is a protected species. Removing this habitat will reduce the food source for the turtles. Impact on the seabed is expected to be 0.47-acres. The Developer will collaborate with the Forestry Unit and the Department of Marine Resources (DMR) to determine suitable mitigation for the impacted species. The mitigation will be outlined in the EMP.

Species like the Great-lizard Cuckoo a species with a very limited global range (found only on Eleuthera, Andros and Cuba) and birds considered to be of high concern by the US Fish and Wildlife Service such as the White-crowned Pigeon and the Prairie Warbler were observed in or near the Project site. Preclearance surveys will be conducted to reduce the impact of these species and their nests. Signage will be erected on site to caution the public about the Bahama Cuckoo habitat nearby, as a biological corridor will be incorporated in the landscaping plan.

Gum elemi (*Bursera simaruba*) and Silver Thatch Palm (*Coccothrinax argentata*) were the identified protected plants that may be impacted by the road construction. These will be relocated to other areas on the property if they cannot be avoided during the land clearing activity. The number of each species will be documented in a protected tree survey and the requested information will be included in a report to DEPP. The information will also be used to construct the permit application which will be submitted to the Forestry Unit. To avoid impacting protected species, preclearance surveys will be conducted by the

Environmental Monitor and the heavy equipment clearing the access road area will be guided by the Monitor.

The indication of human disturbance was reflected in the successional assemblage of plants in which invasive species such as the notable *Casuarina equisetifolia* (Australian Pine) and *Jasminum Fluminense* (Azores Jasmine), and edible, non-native plant species such as the *Manilkara zapota* (Sapodilla) were observed on the property. All invasive species will be cleared using a backhoe and considered for mulching and incorporation into the site pathways.

### **Pre-clearance Survey Method**

The Environmental Monitor will conduct the pre-clearance survey prior to the land clearing activity. Prior to mobilization to the site, the staff will be trained by the Environmental Manager to identify protected species that were identified during the Environmental Baseline Study surveys. Staff will be notified that a flagged tree is considered protected, and it should not be impacted during the day-to-day activities. Staff will also be notified that if a flagged plant is impacted, the Environmental Manager should be notified immediately. Every effort will be made to avoid protected plants with a Diameter at Breast Height (DBH) of over 8 inches.

Protected plants were identified during the environmental surveys. An on-site orientation will be conducted to show the staff the location of the flagged trees within the area of impact.

The Environmental Manager will use the latest site plans in CAD to generate coordinates and positions to layout the road. If protected species are identified within the area of impact during access road layout, alternative positions will be evaluated to exclude protected species from the area of impact.

Visible nests will be avoided. In the event this is not possible, the nests will be relocated in a similar habitat / tree out of the immediate area of interest for land clearing.

Difficult terrain will be evaluated during access road layout and may be avoided in the final layout design.

#### **8.2.1 Invasive Species Management**

The indication of human disturbance was reflected in the successional assemblage of plants in which invasive species such as the notable *Dracanea cyanthoides* (Snake Plant), *Leucaena leucocephala* (Jumbey), and *Delonix regia* (Poinciana), *Casuarina equisetifolia* (Australian Pine) and *Jasminum Fluminense* (Azores Jasmine), and edible, non-native plant species such as the *Manilkara zapota* (Sapodilla) were observed on the property.

All invasive species will be cleared using a backhoe. Invasive species will be replaced with native species during landscaping of the site. Once building foundations are installed and the site is landscaped, the invasive species will not have the opportunity to reestablish. Casuarina plants will be considered for mulching and incorporation into the site pathways.

- *Dracaena marginata* (Snake Plant) - Snake plants are clumping, evergreen perennials with long, sword-shaped leaves. They reproduce primarily through rhizome division and stem cuttings. Manual removal by digging out the clumps, ensuring complete removal of the rhizomes. Once building foundations are installed and the site is landscaped, the invasive species will not have the opportunity to reestablish.
- *Leucaena leucocephala* (Jumbey) - Jumbey is a fast-growing shrub or small tree with compound leaves and white or pale-yellow flowers. It reproduces through both seeds and vegetative propagation. Mechanical methods like cutting, mowing, or mulching can be effective, but follow-up treatments may be necessary. To avoid spreading seeds during cutting and ensure proper disposal of plant material.
- *Delonix regia* (Poinciana) - Poinciana is a large, spreading tree with fern-like leaves and showy red or orange flowers. It reproduces through seeds, which are contained in long, woody pods. Mechanical removal of seedlings and saplings will be conducted during land clearing, ensuring the removal of the entire root system.
- *Casuarina equisetifolia* (Australian Pine) - Australian Pine is a tall evergreen tree with slender, needle-like branchlets resembling pine needles. It reproduces through wind dispersed seeds. Mechanical methods like cutting or chain sawing will be used, as necessary.
- *Jasminum luminense* (Azores Jasmine): Azores Jasmine is a woody vine with dark green leaves and fragrant white flowers. It reproduces through seeds and vegetative propagation from stem fragments. Heavy equipment will be used during land clearing, which will include removing these plants.
- *Manilkara zapota* (Sapodilla) -Sapodilla is a large evergreen tree with glossy leaves and edible fruit. It reproduces through seeds, which are contained within the fruit. Mechanical removal by cutting down the tree and ensuring the complete removal of the stump and root system. As the site is landscaped, the tree will not have the opportunity to establish on site.

Mechanical removal, also known as physical removal, refers to the use of physical methods and tools to physically eliminate or reduce the presence of invasive species. It involves the manual or mechanical manipulation of plants or plant parts to remove them from the target area. Mechanical removal methods will be employed to prevent the use of chemical herbicides on site. Some examples of mechanical removal which will be considered are as follows.



- **Cutting** - This method involves cutting down the invasive plants at or near the ground level. Tools such as shears, loppers, or handheld saws can be used to sever the stems or branches.
- **Mowing**- Mowing is typically employed for invasive grasses or plants that can tolerate repeated cutting. Lawn mowers or specialized brush mowers can be used to reduce the height of the vegetation. This is more suited to during operations.
- **Excavation:** Excavation is employed when invasive species have deep or extensive root systems. It involves using heavy machinery, such as excavators or backhoes, to physically remove the entire plant, including the roots and associated soil.

Invasive species will be cut into smaller pieces on site and placed in a skip on site. The skip will be transported to the local landfill on Eleuthera.

### 8.2.2 Poisonous and Harmful Plants

*Metopium toxiferum* (Poisonwood) should be removed or marked to protect residents. When removing or marking these plants, precede with caution. The sap of *Metopium toxiferum* (Poisonwood) trees is extremely abrasive to the skin. If removed, allow it to decay, or dispose of at a landfill. Do not incinerate.

## 8.3 Physical Impacts

### 8.3.1 Water Quality Impacts and Mitigation

There will be no dredging or land reclamation activities in the marine habitat therefore impacts such as turbidity are expected to be minimal. Control measures to reduce turbidity in the marine environment is extremely important as suspended sediments that cause turbidity can block light to aquatic plants such as seagrass, smother aquatic organisms, and carry contaminants and pollutants and pathogens, such as lead and bacteria. Mitigating any potential harmful effects to the open water quality is extremely important for the scope of construction. Implementing the following measures will assist with preservation of site:

- Installation of Type II turbidity curtains.
- Monitoring of curtains to ensure they are effective.
- Turbidity reading documentation– Turbidity reading should not exceed 29NTU. If threshold is met or exceeded, works should immediately halt until levels return to acceptable.
- Effective sediment control measures.

Mitigating against groundwater and open water contamination due to leaching of fuel/oil, or hazardous waste are extremely important for the scope of construction. To help mitigate these concerns identifying the main source of potential releases during the

construction phase is important. There is to be no storage of large quantities of fuel or hazardous wastes on site. Construction heavy equipment vehicles being used on and around the site should be given special attention. No hazardous substances will be allowed to escape into the open water at the work site. The following measure will assist in preventing water contamination (See Appendix B: Spill Prevention Plan for more details).

- Use biodegradable (non-mineral) drilling fluids and hydraulic oils when working over water
- Spill Kits will be placed on all operating machinery, boats and barges.
- All vehicles, boats and equipment used on-site must be well maintained.
- Idling must be kept to a minimum. Any equipment not in use for extended periods of time must be switched off.
- Fuel should not be stored on site.
- Equipment shall be inspected, and repaired, if necessary, by the contractor prior to mobilizing to site.
- Maintenance laydown will be located away from open water bodies

Should a concern with water quality arise, work will stop and the Environmental Manager (EM) be contacted. The EM retains the right and responsibility to suspend site work and to require the Contractor to take corrective action if water quality parameters are not in compliance with allowable levels. Work may be suspended until adequate corrective measures have been implemented to the satisfaction of the Owner.

### 8.3.2 Flooding Impacts and Mitigation

During the operational phase of The Project, there will be an increased risk of flooding due to the increase in impervious surfaces for buildings, roads, roofs and gutters, which can result in an increase in the amount of water entering the proposed drainage system. To help mitigate the effects of flooding several measures can be implemented:

- The development of an adequate drainage system that can handle flood water from rainfall or the weather changes.
- The construction of drainage retention ponds or swales designed to collect and drain water at a fast rate.
- Buildings should also be elevated to reduce the risk of flooding in the event of extreme weather and flooding conditions.

Flooding impacts are not expected to occur during the construction phase of The Project.

### 8.3.3 Solid Waste Impacts and Mitigation

Domestic and construction waste should be placed in waste bins provided on site. Bins should have lids (if available), be secured on site and should be emptied on a least a weekly basis or as needed by a licensed contractor.

During both the construction and operational phases, a commercial waste management company will be hired to remove solid waste from the site. Waste removal will occur a minimum of once a week or as frequently as needed. All waste generated from The Project should be sorted before being disposed of at the local landfill facility. The Project should employ waste reduction and recycling practices to reduce, re-use where possible and recycle where feasible.

### 8.3.4 Hazardous Waste Management and Mitigation

There is the potential for hazardous waste impacts associated with the construction and operational phases. All hazardous materials brought on site should be accompanied by material safety data sheets (MSDS). These sheets detail proper handling, storage and disposal techniques for use of hazardous materials as well as proper treatment if persons are exposed to the materials. All MSDS should be accessible to staff who will be in contact with or using the hazardous materials, so they understand how to safely use them.

There is the potential for hazardous waste impacts associated with the construction and operational phases. To help mitigate the effects of hazardous waste several measures can be implemented:

- All equipment and hazardous material (such as used absorbent pads) will be stored in designated waste bins/locations to reduce the risk of spills and pollution events in the environment.
- Temporary storage facilities will be inspected at least once a day by appropriate staff to check for leaky containers.
- During construction, temporary hazardous waste storage facilities at The Project site will have disposal containers that are covered, made of inflammable material, sealed to prevent leaking, and positioned on an impervious surface as far from any water as possible.
- Secondary containment for all disposal containers should be 110 per cent of the maximum volume of the container.
- Appropriate spill containment and clean-up equipment will be easily accessible near hazardous waste storage facilities.
- Disposal of all hazardous waste utilized or generated during construction will occur offsite by a licensed contractor at a licensed facility as per DEHS requirements.

### 8.3.5 Noise and Light Impacts and Mitigation

Noise and light disturbances due to construction activities need to be managed to reduce impacts to the surrounding communities and wildlife. Contractors and site employees should be trained to be aware of and identify any sources of noise or light disturbances on site and how to minimize disturbances where possible.

#### **Noise**

To help combat excessive noise during construction, operations should be restricted to daylight hours between 0700 hrs. and 1900 hrs. Any reason to work outside these hours to speed up the progress of works, local communities will be given advance notice and specific requests will be reasonably accommodated.

Special care should be taken during pile driving and retaining wall construction activities as they can affect nearby residents and business communities. Pile driving should be limited to daylight hours. Any complaints by the community should be brought to the attention of the Project Manager (PM) and EM immediately.

#### **Light**

Lighting of the construction site will be required if construction is to occur when there is not enough daylight available. To control excess lighting and glare in the community the Contractor should strategically place lights away from residential areas, tilt lights downwards, and use a shield to restrict the glare of lights.

### 8.3.6 Air Pollution Impacts and Mitigation

Construction activities such as earthworks have the potential to cause dust to accumulate regularly on site in work areas. Dust can cause eye irritation, respiratory issues and cause other hazards to human health. The surrounding environment will also be affected as dust can coat surrounding leaves and vegetation. To reduce the impact of dust on site, the following activities should be implemented:

- Water is to be used as a dust retardant as needed.
- Screening and fencing should be used to reduce wind, improve aesthetics, and mark the limit of works.
- The use of Proper Protective Equipment including dust masks and eyewear/safety glasses.
- Dump trucks moving loose material are to be covered with tarpaulins.

### 8.3.7 Marine Ecosystem Impacts and Mitigation

Activities that will result in impacts to the marine environment pile driving during the construction phase of the project. Pile driving is expected to have direct but short-term

impacts on the marine environment. Direct impacts are impacts that occur throughout the duration of the activity while indirect impacts are impacts that are subsequent changes given the direct impact. Permanent impacts are those that may result in a physical loss or degradation of an ecosystem.

### **Pile Driving**

Pile driving of the marina dock pile is expected to have minimal impact in the natural environment.

### **Mitigation Measures**

Overall marine species diversity was moderate and abundance was low. Coral abundance and diversity was observed to be low with seven (7) coral species being observed mainly on the hard bottom substrate. Corals observed in this area were small (less than 10cm). Other fauna and epifauna species diversity and abundance were observed to be moderate for the area with fourteen (14) species being recorded around the site.

Emphasis will be placed on observing the presence and management of all wildlife on site and the identified epifauna populations. Prior to pile driving activities, the area will be assessed to ensure that there are no epifauna present within the footprint. Any identified epifauna will be removed from the area and relocated to a similar habitat.

Turbidity will be controlled during all in water activities by use of turbidity curtains and active turbidity monitoring (See Water Quality Control Plan in Section 10.2.1 for more details). Turbidity curtains will be monitored for any mobile species that may have entered the area and will be given access to escape the curtains. It is recommended that all in water activities cease if marine mammals are observed in the area (see Wildlife Management Plan in section 10.2.10 for more details).

### **8.3.8 Sewage and Waste Refuge Impacts and Mitigation**

Leaching of human waste into the environment introduces contaminants such as nutrients (nitrogen and phosphorus); organic matter, pathogens (including bacteria, viruses and protozoa), heavy metals (including mercury, cadmium, lead, chromium, copper) and many other toxic chemicals into the environment. The improper disposal or treatment of human waste can result in a breeding ground for diseases, lead to eutrophication events and lead to oxygen depletion in coastal environments. To prevent leaching of wastewater into the groundwater or open water bodies, any portable toilet(s) that are on-site during the construction phase should be secured to avoid vandalism and prevent tipping in windy conditions. Toilets must be located more than one hundred and



fifty feet (150ft) from any open water source. Portable toilets should be serviced at least twice a week by a licensed commercial sanitation company.

During the operational phase of The Project, an onsite wastewater treatment facility will be constructed. The wastewater treatment facility will be constructed and operated in accordance with rules and regulation set out by WSC and DEHS. Gray water from the treatment facility will be reused in irrigation during landscaping.

#### 8.4 Traffic Control

The Project is expected to increase traffic volumes in the Governor's Harbour area. During construction vehicle traffic will increase as construction workers and heavy equipment are mobilized to site. During the operation of the marina and retail spaces vehicle and pedestrian traffic will increase as the Project attracts customers.

The increased pedestrian and vehicle traffic volumes will be managed in the following ways.

- An adequate buffer between the Subdivision boundary along the Queen's Highway will be maintained and landscaped with native plants.
- Traffic calming measures will be incorporated near the marina entrance and parking lot to reduce traffic speed in this area.
- The streets within the subdivision will be designed to discourage excessive speeds, and Lots will have adequate vehicular and pedestrian access.
- Minor realignment to the Queen's Highway within the vicinity of the site to improve pedestrian and motorists' line of sight while crossing or driving on the and to help minimize potential traffic and pedestrian hazards.

## 9.0 Environmental Management

Once the Project impacts were determined, best management practices and mitigation strategies were developed based on desktop research and the technical team's experience with similar projects. The following sections summarize the proposed mitigation strategies for the Project that will be included in the Environmental Management Plan (EMP).

The Environmental Manager reports to the Project Manager and oversees the Environmental Monitor. The Environmental Manager will liaise with the Project Manager and submit Environmental Reports to DEPP. The Environmental Monitor and Manager will have an environmental or related relevant background.

## 10.0 Environmental Management Plan

The Environmental Management Plan (EMP) is a written document that provides a guideline for the practices to use to avoid potential environmental impacts. It details the mitigation measures to minimize/eliminate potential negative environmental impacts of the proposed project; and to ensure The Project utilizes best management practices for all activities and project components.

### 10.1 Draft Environmental Management Plan (EMP) Terms of Reference (TOR)

I. Executive Summary

II. Introduction

III. Project Description

- Sunset Estates Subdivision & Open Space
- Marina

IV. Relevant Environmental Regulatory Bodies

V. Environmental Management Organization

VI. Environmental Impacts Summary Table

VII. Management Plans and Mitigation Strategies

- Sunset Estates Subdivision & Open Space
- Marina

VIII. Emergency, Health, and Safety Plan

IX. Public Consultation

X. Monitoring and Reporting

XI. Conclusion

### 10.2 Construction Management Plans

#### 10.2.1 Water Quality Control Plan

Construction activities have the great potential to negatively impact open water bodies and the various access ways to ground water sources. Protecting groundwater, open water and other environmentally sensitive areas is of great importance during construction of The Project and requires a group effort of every person working and/or visiting the construction site. Control methods laid out in this sediment control plans should be adhered to diligently by the Contractor and all subcontractors throughout the entire project.

The goal of this plan is to ensure that the groundwater and open water are free from the risk of nonpoint source pollutants and to limit the turbidity caused by construction activities.

The main construction activities that may potentially decrease water quality are earthworks and dewatering for utility installation. Some of the mitigation measures include defining the site boundaries using measures such as silt fencing and implementing dust control measures such as watering the construction site.

All employees including subcontractors should be trained and given instructions on their role in this control plan.

### **Site Preparation**

Prior to any works or implementation of water quality control measures, examination of the existing project site and surrounding area should be documented. This will identify any noticeable drainage patterns, and any potential problems that may arise due to slope differences on site.

Site boundaries should be defined, clearly marked and communicated to heavy equipment operators to ensure that the site will have stable access points and that areas are mapped out for adequate staging of materials as well as containment areas.

### **Control Measures**

The following control measures will be implemented to help mitigate the potential hazard due to sediment during construction. Daily monitoring should be done to ensure that the controls mentioned below are implemented and effective.

#### **Base/Land Formation and Deposit of Material on Site:**

- Speed limits will be designated on site for all moving equipment and strictly enforced.
- Materials should only be stored within the designated storage areas.
- Materials should be safely secured at the end of each day.
- Water truck will be used if necessary to prevent dust.
- Sheet pilings should be inspected to ensure material is contained in the area.
- Stockpile material should be secured during extreme weather events.

#### **Utility Installation:**

- Trenches used for utility installation should be always appropriate size.
- Back fill trenches as soon as work scope is completed.

#### **General Erosion control and construction impact minimization techniques will include:**

- Inspect and maintain water quality control measures.

- No hazardous substances will be allowed to escape into open water at the work site.

If deemed necessary, water quality testing maybe conducted. The EM retains the right and responsibility to suspend site work and to require the Contractor to take corrective action if water quality parameters are not in compliance with allowable levels. Work may be suspended until adequate corrective measures have been implemented to the satisfaction of the Owner.

#### *10.2.1.1 Turbidity Control Plan*

Turbidity control measures include the installation of a turbidity curtain as needed during the pile installation stage of the marina construction. The EMP will include the turbidity monitoring schedule during the proposed 3-week period and associated reporting protocols. An appropriate site would be selected for the stockpile of excavated upland material. Excavation activity is not proposed for the marina development, only for the upland area. All excavated material will be incorporated into the construction of the site.

Turbidity is a major impact during marine construction. All efforts should be made to keep turbidity at a minimum. Control measures to reduce turbidity in the marine environment is extremely important as suspended sediments that cause turbidity can block light to aquatic plants such as seagrass, smother aquatic organisms, and carry contaminants and pollutants and pathogens, such as lead and bacteria.

To minimize impairment of water quality during pile driving activities and dock installation, the following mitigation measures will be implemented:

- Sediment control methodologies will be employed around active pile driving to contain suspended solids within the construction area.
- Sedimentation control equipment (Type II Turbidity Curtains) will be maintained during marina construction activities.
- Turbidity levels will be monitored on a daily basis during active marine works. If turbidity exceeds 29 NTU above natural levels, activities will be stopped until sediments have settled before activities can commence again.
- Adequate freeboard should be maintained on barges to reduce the likelihood of decks being washed by wave action.
- Spill kits will be kept on the barge for absorbing any fuel/chemical spill.
- All chemical spills caused by maintenance work on the barge will be cleaned up immediately, properly and safely.

#### 10.2.1.1.1 Containment

Turbidity curtains will be installed for containment. The type of turbidity curtains used must meet specifications for conditions experienced on site. Specifically, Type II curtains will be installed for the duration of the activities. The turbidity curtains will be installed to the manufacturer's specification. Anchors have been provided with the curtain assemblages, but additional concrete blocks will be used to anchor curtain corners to ensure stability. Monitoring will be conducted to ensure effective containment. Special care should be taken when placing curtains as the area has active boating traffic.

#### 10.2.1.1.2 Curtain Maintenance

Curtains are to be inspected prior to and during daily works for the following:

- Noticeable areas where the curtain is not successfully securing the containment area.
- Sufficient turbidity control performance.
- Anchors that have become dislodged or loose. Depending on load, installation, and weather events, repositioning or re-tensioning anchors may be periodically required.
- Curtain skirt bases that have become buried in sediment or debris. To function properly, the turbidity curtain should be approximately one foot (1 ft) above the bottom.
- Marine growth or accumulated debris on connectors and buoys will be cleaned if necessary.
- Damage or tears to the turbidity curtain itself.
- Signs that the weather is changing. Turbidity Curtain should not be left out during extreme weather conditions or hurricanes.

#### 10.2.1.1.3 Turbidity Monitoring

During construction, necessary mitigation measures will be implemented around The Project site to reduce turbidity. The baseline turbidity reading will be taken closer to The Project commencement. The construction activities are not expected to exceed 29NTU which is a holding point for activities. Daily environmental management and monitoring will be conducted by JSS Consulting. Turbidity monitoring will be conducted during activities to ensure that turbidity does not exceed 29NTUs (see Appendix A-6 for Turbidity Report Form). Turbidity monitoring should be conducted upstream (500m from work area) and downstream (500m from work area) or at any visible turbidity plume area. Turbidity reading should be conducted daily, at the start, during and after all marine activities.

Although turbidity is not expected to reach or exceed the 29 NTU mark, all in-water activities will be measured. Monitoring should also be done at any signs of turbidity,

regardless of activity. The first effort will be to limit the amount of turbidity generated due to the activity as much as possible. Contractor will monitor weather conditions to ensure that work cease during unfavourable weather conditions.

The EMP will also include the turbidity monitoring schedule during the proposed 3-week period and associated reporting protocols. Any incidents will be reported to the DEPP within 24 hours using the incident report form in Appendix A-1.

#### *10.2.1.2 Erosion Control Plan*

Erosion control will be necessary during land clearing and construction once the lots have been cleared for development. To prevent soil erosion, the lots will not be cleared simultaneously to reduce the surface area of exposed topsoil. Because the site is adjacent to Queen's Highway erosion control such as silt fences will be installed to prevent sediment from impacting oncoming traffic during construction. An example of the type of silt fence is shown in the following figure. Silt fences will be inspected daily by the Environmental Monitor or the Site Manager to identify breaks or tears. Breaks or tears will be repaired immediately. Additional measures include covering bare soil with mulch as soon as possible to reduce sediment transport once the topsoil is exposed during land clearing and avoiding construction activities during periods of strong wind and heavy rain.

Additionally, an appropriate site would be selected for the stockpile of excavated upland material. Excavation activity is not proposed for the marina development, only for the upland area. All excavated material will be incorporated into the construction of the site.

#### *10.2.2 Solid Waste Management Plan*

The purpose of the waste management plan is to clearly define the controls that will be used to manage all waste generated on The Project site. Implementing this plan will help to ensure protection for human and environmental health and protect open water supply which is of great concern on this project site.

This plan will detail the management process for the various waste streams associated with the construction phase and operational phase. The goal is to ensure that the site employs waste reduction and recycling practices to reduce, re-use where possible and recycle where feasible. The plan requires cooperation of all employees and visitors on site. Details of this plan will be communicated to all persons entering the site.

Waste Materials should be classified into waste streams and considered for reuse or recycling before being removed and disposed of at the landfill. Communication with the



public is important to reduce the construction debris going into dumpsite as materials such as scrap wood, concrete and glass etc., can be repurposed.

### **Site Preparation**

During the initial stages of the site prior to construction, designated locations for storage of materials should be laid out. All material, if possible, should be stored in an area free from obstruction and with means to cover the material from the elements and to reduce any potential runoff pollution.

### **Types of Waste**

The construction phase will create a wide range of waste some more harmful to the environment than others. It's important that all subcontractors are aware of the different types of waste and disposal methods on site. Some examples of the waste generated due to construction are:

- Non-Hazardous Waste – Wood, Glass, Plastic, Paper, Food etc.
- Hazardous Waste – Adhesive, Aerosol Cans, Paint and Paint Thinners, Solvents, Concrete, Lightbulbs, Batteries, etc.

### **Waste Management Controls**

Efforts to control any risks associated with the waste should start at the site to ensure protection for human and environmental health. This will be of huge benefit when transporting and managing the types of waste created.

### **Storage Collection and Disposal**

Waste bins should be strategically positioned around the site and designated for different waste generated. This will ensure that waste material that can be recycled remains clean and will reduce the need for sorting. Each bin should be numbered to help with identifying each bin's purpose and monitored to ensure compliance from subcontractors.

Contractors and subcontractors are responsible for collecting and disposal of the waste generated from their work activities. They should be made aware of the disposal policies and procedures on site as well as location of bins for appropriate waste material. Once containers are full, they should be handled based on their contents and transported to the stockyard via barge then to the DEHS landfill via dump truck to prevent overfilling and returned to location. Bins should be checked for any leaks or damages before being utilized again.

The following practices and procedures will be applied:

- Ensure that an adequate number of appropriate waste containers are available on site.
- All spill clean-up material (i.e., used sorbent pads) will be stored in lined containment drums and disposed of at an approved facility.
- Designate a safe area for temporary waste storage with adequate containment, that is secure and protected from weather until waste bin removal and disposal can be arranged.
- Remove all waste materials from the site as soon as possible.
- Any portable toilet(s) that are on-site should be secured to avoid being knocked over by heavy winds and vandalism. They must be adequately maintained on a regular basis by a licensed contractor. Toilets must be located more than 150ft from the edge of the open water.
- If potentially contaminated soils or waters are encountered during the work, the Contractor will contact the EM immediately. Contaminated soils or waters must be assessed by a qualified environmental consultant and disposed of off-site at a regulated facility.

The Construction phase will create a lot of debris that will then be directed to the dumpsite/landfill. This will include general waste, construction debris, as well as hazardous waste. Reducing the debris deposited into the landfill is of high priority. Table 19 below will show proposed handling procedures for the various waste.

**Table 19:** Handling procedure for various waste on The Project site.

Material	Waste Form	End of life Option	Handling Procedure
Clean Wood scrap	Solid	Recycled	Reused on site.
Concrete	Solid	Recycled	Crushed and used as fill.
Scrap Metal	Solid	Recycled	Responsibility of subcontractor. Stored in separate area covered until disposed.
Other wastes (Human generated, office generated)		Landfill	Stored in appropriate containers until disposed of in landfill.

### **Residual waste**

Waste that cannot be disposed of by usual means (e.g., old tires or contaminated waste). Unused Equipment, spare parts or discarded parts should be identified, dated, logged, and stored away in a safe location away from the public. The future need for these materials should be assessed and if not necessary for future work, arrangements for removal from site.

## **Hazardous Waste**

All work must be completed in a manner that ensures water quality standards are maintained. Hazardous materials such as concrete, paint, solvents and other chemicals may be high in pH and are considered harmful; therefore, there shall be no contact with open water through spillage, hosing off surfaces, rain, cleaning of tools or concrete washout. Hazardous materials will be kept in a covered storage location to prevent the potential for mixing with water and substances being released into the environment. A concrete and equipment washing site will be bunded, lined to contain any concrete and chemicals. All accepted washing locations must be cleaned up prior to demobilization. Any excess material shall be removed upon project completion, transported via barge to the stockyard and transported to be disposed of.



**Figure 19:** Example of Hazardous Waste PPE.

Any waste that falls into the category of hazardous should be collected immediately after being generated and stored safely in a designated area until removal and disposal is arranged. That area should be free from obstruction, structural defects, and only used to store hazardous waste. Appropriate signage should also be used to depict hazards in the area as well as a no smoking sign. All hazardous liquid waste should be in approved containers and stored on spill containment pallets. This area should be monitored, and access limited.

For all waste that will be referenced as e-waste ex. electronic devices, careful consideration will be given to prevent any potential toxic materials from being released

into any nearby bodies of water, soil and air. E-waste is hazardous and should also be stored in the hazardous waste area until disposal methods are arranged.

See the Hazardous Waste Management Plan (Section 11.5) for more details.

### **Site Inspections**

Weekly routine inspections by the contractor should occur to assist with the management of waste on site. It's important to track and plan, if possible, for the creation of construction debris. This can help mitigate any potential fire hazards or environmental risks on the site. Monitoring of the bins and the hazardous waste disposal area should be given special attention.

### **10.2.3 Flood Control Plan**

With the changes to the environment due to construction, the natural flow of water will be affected. The goal of this flood control plan is to introduce measures to reduce the risk of flooding on site during construction and operation phases. The flood control plan will show proposed flood control measures to be used and the accompanied execution plan for the listed control measures.

Flooding during the construction phase of The Project is not expected to occur, however, there is an increased risk of flooding during the operational phase of The Project. The activities that have the potential for storm water runoff as well as direct runoff from precipitation during operation. Extreme weather events such as hurricanes also pose a risk of flooding during the operational phase.

### **OPERATIONAL PHASE:**

#### **Runoff from direct precipitation**

The drainage system is to be designed to collect and dispose of water due to direct precipitation, thus waters that would have naturally been filtered in this area will not runoff or be redirected into the retained natural drainage areas as a result of The Project. Specific control measures to be used include:

#### **Porous Pavement Material**

This can be used in the parking lot and any other paved areas. Rainwater and stormwater will drain through this material into the ground beneath it reducing runoff and flooding.

#### **Grading**

The site will be graded away from the existing bodies of water and the main road to contain water from direct precipitation within the site.

### Drainage Basin

The drainage design includes a series of drainage basins that will collect water from the surface of the parking lot. A maintenance program will be implemented to ensure that the drainage basins are kept free from debris and function as intended.

### Drainage/Retention Pond

An efficient drainage system for flood water from rainfall and severe weather events but also from overflow of any surrounding bodies of water. This will collect and drain water at a fast rate.

### Deep Disposal Well

Water collected from drainage basins will be directed to a deep disposal well. Water and Sewerage Corporation requirements call for 150 to 180 ft well with 40ft PVC pipe and concrete casing.

#### 10.2.4 Noise and Light Control Plan

Noise and light disturbances due to construction activities need to be managed to reduce impacts to the surrounding areas and wildlife. Contractors should be aware of and identify any sources of noise or light disturbances and train all on-site workers to be aware of noise or light issues and how to minimize disturbances where possible. The level of noise, light and dust from construction plant operation shall be periodically assessed by the Contractor and the Owner in relation to the significance of potential disturbance.

### **Noise**

The Contractor will maintain equipment in good order so as to minimize extraneous noise. The general rule shall be that construction operations shall be restricted to daylight hours between 0700 hrs. and 1900 hrs. Where there is a reason to work outside these hours to speed up the progress of works, advance notice will be given and specific requests will be reasonably accommodated. Any complaints concerning noise shall be reported to the Owner and steps taken wherever possible to conform to local wishes, for instance in relation to the specific timing of activities.

To manage noise impacts during construction hours, contractors shall utilize accepted noise control techniques, such as:

- Maintaining equipment in good working order.
- Implement the use of best available control technologies to reduce noise such as mufflers and silencers.
- Implement a speed limit to slow vehicles and limit noise generation
- Turn off idling equipment when not in use.

### **Light:**

If construction is to occur during hours when enough daylight is not available, and lighting of the work area is required, the Contractor is expected to manage excess lighting and glare by:

- Strategic placement of lights away from residential areas,
- Tilting lights downwards, and
- Using shielding to restrict the glare of lights.

### **10.2.5 Dust and Air Pollution Management Plan**

Dust control is detailed in the Water Quality Plan. Minimization techniques to be implemented include:

- Spray dredge material and other surfaces as necessary with water to reduce dust generation.
- Materials should only be stored and secured within the designated storage areas.

### **Air-borne pollution**

The minimization of air-borne pollution is a key component for the environmental management of the site. Construction phase air quality impacts shall be minimized or avoided by incorporation of air quality control measures. The installation and application of air quality controls during the construction phase shall be in accordance with the following principles:

- All equipment used and all facilities erected on site are to be designed and operated to control the excessive emission of dust, fumes and any other air impurity into the atmosphere;
- Contractor/subcontractors will maintain all construction equipment to reduce exhaust emissions;
- The Engineer will visually monitor levels of dust deposition and air quality, the effectiveness of dust emission controls and the construction site and the impacts of any nuisance on adjoining properties.

### **10.2.6 Traffic Management Plan**

Development of The Project will result in an increase in commercial traffic and boating traffic to and from The Project site. This traffic management plan objectives are to minimize the impact on the public road system/ maritime traffic and establish protocols for vehicle and pedestrian movement within the site boundary. The Contractor is responsible for the execution of this plan.

The Project is expected to increase traffic volumes in the Governor's Harbour area. During construction vehicle traffic will increase as construction workers and heavy equipment



are mobilized to site. During the operation of the marina and retail spaces vehicle and pedestrian traffic will increase as the Project attracts customers.

The increased pedestrian and vehicle traffic volumes will be managed in the following ways.

- An adequate buffer between the Subdivision boundary along the Queen's Highway will be maintained and landscaped with native plants.
- Traffic calming measures will be incorporated near the marina entrance and parking lot to reduce traffic speed in this area.
- The streets within the subdivision will be designed to discourage excessive speeds, and Lots will have adequate vehicular and pedestrian access.
- Minor realignment to the Queen's Highway within the vicinity of the site to improve pedestrian and motorists' line of sight while crossing or driving on the and to help minimize potential traffic and pedestrian hazards.

Project activities have the potential to negatively affect boating traffic due to movement of the barge and tugboat to and from The Project site. The increase in movement of heavy machinery can cause impacts to the safety of other boaters in the area and cause discomfort to the community.

To prevent any boating accidents during construction the following strategies should be employed:

- The transportation of the waste and other materials should be in a safe manner considering boating regulations.
- The Port Department should be made aware of all movement of the barge.
- All crane and excavator barges are to be kept within the marina construction area.
- All navigational hazard lights should be checked daily.
- Ensure goal posts and warning signs have been erected in appropriate areas prior to commencement of works.

Due to The Project site being relatively small, there is no need for pedestrian-only routes and vehicle-only routes. Workers should remain vigilant around moving vehicles and when walking throughout the site. All heavy moving equipment should have a flagman or banksman to help prevent accidents and injuries on site.

General traffic management on the site will include:

- Designated haul routes for commercial vehicles;
- Maintenance of low speeds for driving on site;
- Only authorized personnel should operate heavy construction machinery;
- Traffic control/signage on site and on the road directly in front of the project site during times of heavy commercial vehicle and/or heavy equipment traffic to prevent accidents with private vehicles;

- Wheel wash or vehicle wash down are near/at site exit;
- Regular cleaning of roads (if necessary);
- Securing the site (e.g., fencing) to prevent pedestrians from traversing the site and to protect adjacent vegetation from damage;
- Ensuring all workers wear high visibility vests so that drivers of commercial vehicles and heavy equipment can see them; and
- Training all workers in traffic hazards on site in an effort to avoid injury and loss of life.

Once construction commences, the public will be advised of instances of inconvenience or disturbance, such as changes to traffic routes and times of excessive noise. Signage will also be utilized on and near the site to advise of traffic diversions and active construction areas. At least one sign needs to include information about the onsite contractor inclusive of a telephone number and email address for contacting them. Contact information will also be provided for DEHS, DEPP and Ministry of Works.

#### 10.2.7 Sewage Management Plan

The purpose of the Sewage and Refuse Disposal plan is to clearly define the controls that will be used to manage waste generated on The Project site. Implementing this plan will help to ensure protection for human and environmental health and protect groundwater supply which is of great concern on this project site. The improper disposal or treatment of human waste can result in a breeding ground for diseases. The plan requires cooperation of all employees and visitors on site. Details of this plan will be communicated to all persons entering the site.

#### **Site Preparation**

During the initial stages of the site, prior to construction, designated locations for waste management materials should be laid out. The area should be free from obstruction, in an area that is covered to prevent runoff and away from water bodies and buildings.

#### **Construction Phase**

During the construction phase, portable potties will be distributed throughout the site and will require weekly maintenance. Portable toilets should be at least 150 feet from open water bodies and tied down to prevent them from being knocked over during weather events. Units will be serviced twice per week or as needed by a licensed commercial company.

#### **Operational Phase**

A wastewater treatment system will be used during the operational phase and will be maintained and disposed of by a licensed commercial company as directed by DEHS and

WSC regulations. Any wastewater storage unit should be located at least six feet (6 ft.) away from all buildings and away from the water edge.

There will be no drainage of sewage or wastewater to the oceans, or any water bodies on or near The Project site at any time.

#### 10.2.8 Landscaping Plan

Landscaping can have adverse impacts on various ecosystems through the introduction of invasive species, which are one of the leading threats to native species. Invasive species spread quickly and can displace native species, prevent plant growth and create monocultures. Invasive species also lead to the reduction of plant biodiversity. Choosing species native to The Bahamas and the island will mitigate the introduction of invasive species. If flora must be imported, no prohibited species will be included in the landscaping. Guidelines will be followed when importing plants, all shipments must include permits and the phytosanitary certificate of species origin from the Department of Agriculture and are privy to inspections.

#### 10.2.9 Vegetative Management Plan

Vegetation loss will be unavoidable due to land clearing activities necessary for development. The Contractor and Owner should ensure that vegetation removal is kept to a minimum and only within the direct footprint of works. Clearing of the above ground trees and foliage and grubbing of tree roots is required to prepare the site for development. This process requires heavy machinery and adherence to Best Management Practices (BMPs) for sediment and erosion control, prevention of pollution to groundwater resources, and protection of sensitive of environmental features, namely the mangroves and Lake which abuts the project. The following BMPS should be followed during construction:

- Protection of Sensitive Environmental Features.
- Fencing shall be placed along sensitive environmental features such as wetlands and protected tree species to protect from encroachment, illegal dumping, and damage from machinery.
- There will be no burning of materials on site.
- The construction team will receive training on protected tree species and the importance of wetland habitat and mangroves.
- A walkover survey shall be performed prior to the commencement of works. Protected trees, if any, in the work site shall be removed only upon receipt of a Permit to Harvest a Protect Tree as permitted by the Forestry Unit.
- Heavy machinery will undergo routine maintenance to prevent leaks, spills, and/or other mechanical failure which may cause environmental harm.

#### 10.2.10 Wildlife Management Plan

During construction, wildlife may be encountered during marine work. Wildlife may include marine mammals (e.g., dolphins and manatees), marine turtles, and sharks. These procedures outline what steps should be taken by construction staff should they encounter any wildlife on site. It is important to note that the safest course of action when encountering wildlife is to do nothing and simply wait for the animal to move away. Most animals are not aggressive unless they feel threatened. It is also important to note that some wildlife species are protected under law in The Bahamas, and intentional harming of these animals can lead to fines and prosecution (See Section 4.0 for Environmental Laws Regulations and Standards for The Bahamas).

Prior to pile driving activities, the area will be assessed to ensure that there are no epifauna present within the footprint. Any identified epifauna will be removed from the area and relocated to a similar habitat.

- **Feeding** – No animals should be fed under any circumstances. Providing animals with human food (e.g., chips, candy) can harm them. Food should not be left out in the open around the site where it might attract animals.
- **Entanglement** – Entanglement is a particular risk for marine animals (e.g., dolphins, manatees, marine turtles and sharks). If an animal becomes entangled in construction equipment in the marine environment, it is critical to free the animal as quickly as possible. In the event of such an incident, the HSSE Manager or Environmental Management Personnel should be notified immediately so they can quickly contact the Department of Marine Resources for assistance. Some marine wildlife, such as dolphins, manatees and marine turtles, need to be able to surface periodically so that they can breathe and will drown if trapped underwater.
- **Fishing** – No fishing will be allowed on site.
- **Injury or death** – If wildlife is injured on site or is killed on site, whether it is self-inflicted or by accident, the HSSE Manager or Environmental Management Personnel should be contacted immediately so they can quickly contact the relevant agency for assistance in treating the injured animal and document the incident.
- **Human injury from wildlife encounter** – If a staff member or subcontractor is injured on site because of an encounter with wildlife, immediate first aid treatment should be given as some scratches and bites can result in infection or disease transmission. Seek further medical treatment is necessary.

## 11.0 Emergency Response Plans

### 11.1 Fuel Spill Prevention Plan

The Spill Response Plan was developed for the use of all contractors and sub-contractors, to prevent and control any spillage associated with The Project in accordance with Environmental, Health and Safety regulations. The Fuel Spill Prevention Plan is located in Appendix B.

### 11.2 Health and Safety Plan

The Site Engineer (SE) will be designated as the site Health and Safety Officer (HSO) and the Foreman as acting Health and Safety Officer in SE absence. Basic first aid training of these persons will be required. There shall always be a fully equipped first aid box at all work sites and a list of local emergency telephone numbers in case of accident (See Appendix D: Emergency Response Plan). Minor and major accidents shall be recorded (See Appendix A-1: Incident Report Form).

All construction personnel involved in the work will observe the following basic working rules, amongst others:

- Relevant Personnel Protective Equipment (PPE) will be issued and used prior to the commencement of the work;
- PPE shall be worn at all times on site with exception of the dedicated safe area(s) and welfare facilities;
- Proper training and induction in the various roles for the type of activity will be performed;
- Experienced and active supervision will be in place at all work times.

The contractor shall ensure that all staff, including subcontractors, undergo safety training and inductions. These training events will educate workers on the best practices for working (to include but not limited to):

- With hazardous materials.
- Working near water.
- With heavy equipment.
- Emergency Procedures.
- Confined spaces.
- Excavation and safe digging practices.
- Lifting operation and lifting equipment.
- Plant, vehicle and equipment – checking procedures.
- Site / road/boating traffic rules and requirements.
- Site security arrangements.
- Vehicles – safe driving practices and checklists.

During construction, workers will be trained in proper tool operation and safety, handling of materials, driver safety and knowledge of first aid and safety response. New

hires will complete the course for “All Employees” and any other appropriate segments of training required for their specific duty assignments within 30 days of starting work. The “All Employee” training course will include the following elements:

- Spill prevention, response, and reporting procedures
- Discussion of good housekeeping practices
- COVID-19 awareness and prevention
- Site Orientation & Personal Protective Equipment (PPE) Requirements
- Proper use of PPE
- Identification of the Pollution Prevention and Spill Response Team members and their respective responsibilities
- Emergency Exits and Procedures; and
- Environmental Requirements.

### 11.3 Fire Response Plan

Emergencies associated with The Project may include fires and explosions due to accidents or machine malfunctions. Project personnel will be trained in fire/explosion prevention and response. The “All Employee” training course will include the following elements:

- No burning or smoking will be allowed on the Project construction site.
- Fire extinguishers will always be accessible at designated muster stations on site.
- No burning, welding, or other source of ignition shall be applied to any enclosed tank or vessel, even if there are some openings, until it has first been determined that no possibility of explosion exists and authority for the work is obtained from the foreman or Supervisor.
- Employees should be aware of the locations of fire extinguishers that have been provided throughout the project and know- how to use them. A five-pound ABC rated fire extinguisher must be readily available while welding, burning, cutting, or using flammable gases or liquids. Smoking is not permitted around gasoline or other flammable liquids or gases.
- Equipment must be turned off before refueling.
- Gasoline must be stored and transported only in approved safety containers and gasoline must not be used for cleaning purposes. Compressed gas cylinders must be kept secured, upright, capped and separated when not in use. Empty gas cylinders should be marked and returned to the storage area for pickup.
- Compressed gas cylinders must be kept secured, upright, capped and separated when not in use. Empty gas cylinders should be marked and returned to the storage area for pickup.



## 11.4 Hurricane Preparedness Plan

The Hurricane Preparedness Plan serves the purpose of a guideline for contactors before, during and after the hurricane, while providing background information, it is detailed to ensure minimum damage and shutdown time. Hurricane season runs from June 1 to November 30 each year.

The following notifications determines the actions to be implemented:

- Hurricane/Tropical Storm watches mean that a hurricane or tropical storm is possible in the specified area.
- Hurricane/Tropical Storm warnings mean that a hurricane or tropical storm is expect to reach the area, typically within 24 hours.

The Project Manager (PM) will stay tuned to weather alerts via radio, TV or social media and evacuate as soon as local authorities give the word. Before storm season the PM needs to learn the community's, emergency plans and the location of nearby shelters so employees have a safe place to go if they cannot leave the island.

The contractor is required to prepare before a severe weather event. The PM and Health and Safety Officer (HSO) will ensure all equipment are secure and cover incomplete structures before a storm.

Some or all the following hurricane preparation materials and equipment be made available if required:

- Concrete Anchors
- Duct Tape
- Garbage Bags
- Generators
- Ground Anchors
- Fuel
- Misc. Hardware and Fasteners
- Netting
- Plastic Sheeting
- Plywood
- Pumps
- Rope
- Sandbags
- Shoring and Bracing
- Water
- Wire

There are to be hard copies of contact lists, plans and other important documents kept in a safe place. These documents should include:

- Emergency contact information for all employees.
- List of hurricane preparation materials, equipment, and their sources.

- The Ministry of Social Services and Urban Development Department of Social Services Islands of The Bahamas 2023 Official Hurricane Shelters Document include:
  - Church of Nazarene – Palmetto Point, Eleuthera
  - The Salvation Army- Palmetto Point, Eleuthera
  - Wesley Methodist Church Hall – Palmetto Point, Eleuthera
  - Emily G Petty Primary School – Governor’s Harbour, Eleuthera
  - George E. Johnson Memorial Centre – Hatchet Bay, Eleuthera
  - Bahamas Methodist Habitat – James Cistern
- Procedures to follow in the event of exposed electrical wires, hazardous material leaks or structural damage.

The PM and Site Engineer (SE) are to monitor the weather closely once a Tropical Storm Watch is issued. Both local and international weather services should be monitored for accurate information and provide updates to staff.

Once the National Weather Service issues a Hurricane Watch, it is time to secure structures and equipment on the job site for the storm by implementing the following actions:

- Use rope, sandbags, ground anchors and other items to weigh down materials that could easily fly away.
- Cover materials with plastic sheeting, netting, or garbage bags to prevent water damage.
- Stack loose materials together and secure them with rope or duct tape to keep them from dispersing.
- Complete work on partially completed structures to minimize damage if time allows.

After a Hurricane Warning is announced the following actions should be implemented:

- Loose materials or expensive equipment should be moved or secured.
- Construction dumpsters should be picked up or covered with tarp.
- Remove or tie down portable bathrooms.
- Remove hazardous chemicals to prevent them from being released into the environment.
- Remove materials, tools or equipment that can be damaged by rising water.
- Move heavy equipment and machinery to a garage or other covered structure.
- Tear down and store light-weight fence screens and job site signage.
- Move any portable electronics, job site plans and other important documents from the construction trailer to a safe location offsite.
- Turn off power to the site and make sure fuel is available for power generators.
- Board up door and window openings.
- Tarp or board up any other large openings.
- Place sandbags around the perimeter of structures as reinforcement.
- There will be no staff left on site during hurricane events.

Once the all clear has been given after a storm the PM and SE may return to the site to assess damages and determine cleanup efforts. Upon returning to site the following steps are to be taken:

- Be careful when walking in standing water, which may contain sharp or jagged objects.
- Use caution when entering the building because structural elements may be weakened.
- Rent a dumpster to safely dispose of materials that were damaged by the storm.
- Plan to remove water. During a hurricane, water will inevitably flood your work site. Removing it is important for the safety of your property and neighboring structures. Standing water can soften the ground, compromising structural stability.
- Place pumps in excavations or basements before the storm hits.
- Have dehumidifiers and fans available to dry out the space.
- Discharge water to the storm water system or into the deep wells.

The construction hurricane plan should be communicated to staff prior to the start of hurricane season and a briefing held by the PM once it is determined that severe weather is eminent. Hurricane preparedness is essential for a safe construction site.

The weather will be monitored by the PM and SE on a regular basis to determine site conditions. During heavy rain events site works will be stopped and commenced once weather conditions remain favorable. This includes the presence of lightening within five (5) miles of the site.

### 11.5 Hazardous Waste Plan

This plan outlines best management practices for handling hazardous materials that may be found or generated on site. Protection of ground water, open water and any other sensitive environments is of most importance.

All hazardous materials brought to The Project site should be accompanied by material safety data sheets (MSDS). These sheets detail proper handling, storage and disposal techniques for use of hazardous materials as well as proper treatment if persons are exposed to the materials. All MSDS should be accessible to staff who will be in contact with or using the hazardous materials, so they understand how to safely use them.

#### **Good Housekeeping**

- Only necessary material required to do the job will be stored on site.
- All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
- Products will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.

- Whenever possible, all of a product will be used before disposing of the container.
- Manufacturers' recommendations for proper use and disposal will be followed.
- The Site Superintendent will inspect the site daily to ensure proper use and disposal of materials onsite.

### **Hazardous Products**

The guidelines below should be followed when handling hazardous material:

- Products will be kept in original containers unless they are not resealable.
- All hazardous material will be stored with the original labels and material safety data sheets for important product information.
- The manufacturer or local recommended methods will be followed if surplus product must be disposed of.
- All containers for chemicals and lubricants used on site shall be stored in trays of steel or other approved materials of appropriate volume to reduce the chance of a spill.
- All hazardous products should be disposed of by a licensed contractor. A receipt should be produced and attached to the hazardous waste reporting form (Appendix A-2).

### **Concrete Washout.**

Concrete trucks and equipment used during concrete works (like concrete bucket or tremie and tremie pipe) will be required to wash out or discharge surplus concrete or drum wash water into a wash out pit. The construction and maintenance of the pit overseen by the Site Superintendent. The wash out pit should be enclosed and lined and will be designated in an area that does not receive significant runoff and does not drain directly into a storm water network. Upon the completion of The Project, this area will be cleared of the concrete and the site restored. All accepted washing locations must be cleaned up prior to demobilization. Any excess material shall be removed upon project completion and disposed of at the DEHS landfill.

### **Petroleum Products.**

All vehicles will be monitored for leaks before being brought on site and receive regular preventive maintenance to reduce the chances of leakage. Petroleum products will be stored in tightly sealed containers which are clearly labeled.

### **Paints, thinners, solvents etc.**

All containers will be tightly sealed and stored when not required for use. Excess paint and other chemicals will not be discharged to the storm sewer system, the sea, the ground or any natural water body, but will be properly disposed of according to manufacturer's instructions or local regulations. The contents of used chemicals will be transferred to a sealable plastic bin if the can cannot be resealed to avoid spills.

### **Emergency Contact**

If there is a major Spill of hazardous materials, call the following agencies:

- Fire Department (should fire be possible) 911
- Department of Environmental Health Services 322-8037 or 322-2295
- Department of Environmental Planning and Protection 322-4546

## **12.0 Public Consultation**

Public Consultation with relevant stakeholders is important in helping decision makers to understand the views, values, interests, issues, and concerns about the proposed development and to incorporate them into decisions. SLV Holdings Ltd should hold a public consultation on the EIA for the Sunset Estates and Marine Development to present the purpose of The Project, the objective of The Project, the scope of works, findings of the baseline data, monitoring programme and outline the possible impacts and mitigation of works. The meeting should be in a public location during a designated time and include stakeholders such as tourist, surrounding businesses, water sport operators, local residents, relevant Government Agencies, Non-Governmental Agencies, and any other groups that has a stake in The Project.

Once the logistics of the meeting are determined, the general public should be made aware of when and where the meeting is occurring. Adds should be placed in media sources such as the newspaper, on television, on the radio and on social media platforms at least 14 days in advance.

During the meeting minutes should be taken and a form and/or email should be provided where stakeholders can submit their comments, questions and concerns about The Project. The Project should incorporate the answers to these comments and concerns in the final draft of the EIA.

## CONCLUSION

Sunset Estates and Marina Development currently consists of an undeveloped terrestrial ecosystem that is bordered by a coastal marine ecosystem with three (3) types of benthic habitats observed. The Project benthic habitat consisted mostly of seagrass beds and a sandybottom substrate. Overall marine species diversity was moderate and abundance was low. Coral abundance and diversity was observed to be low with seven (7) coral species being observed mainly on the hard bottom substrate. Corals observed in this area were small (less than 10cm). Other fauna and epifauna species diversity and abundance were observed to be moderate for the area with seven (7) species being recorded around the site. The benthic habitats for the assessed areas appeared healthy and consists of the typical flora and fauna populations.

The overall goal of The Project is to create a positive impact on the Bahamian economy through the generation of job opportunities for locals, the creation of entrepreneurial opportunities, sourcing project material locally within the community where practical and through capital investment. Job opportunities would be generated through the construction and operational phases. During the construction phase Bahamian contractors will be hired to develop the properties and during the operational phase, Bahamians would be hired to work at the retail shops, office spaces, restaurant and other commercial spaces. The local community would also benefit from the creation of a marina, a recreational/public space, and commercial zone. The community would have a place to dock their boats and also enjoy recreational and leisure activities.

Throughout construction, environmental mitigation plans and environmental best-practices should be utilized to reduce impacts to the marine environment. Although impacts are inevitable throughout the construction phase, seagrass beds, sandy bottom habitats, and hard-bottom communities should be considered and protected. Measures should be taken to limit impacts to marine flora and fauna as well as protected and native terrestrial flora and fauna. The proposed mitigation strategies include water quality measures during pile driving; wildlife management; noise, light and air pollution measures; measures to prevent flooding due increase in rainfall; solid waste management and Sewage and waste refuge measure.

In addition to this, The Developer is committed to minimizing the adverse environmental impact of the Project activities, while maximizing the environmental and social benefits of the proposed development through mitigation measures such as:

1. The Developer proposes to realign Queens Highway to improve the safety of pedestrians and motorists using the Highway such as traffic lights, pedestrian crosswalk, speed bumps or speed-control textured road surfaces.



2. To further mitigate the Project impact on native vegetation, the Developer proposes to landscape along the Highway and the coast near the marina with native salt tolerant plants.
3. The proposed marina amenities and commercial village will be accessible for public use.
4. The Developer propose to relocate the entrance to the existing abandoned clinic to the commercial village to improve safe access should the clinic come back into operations.

Given the scale of The Project and its socio-economic benefits, impacts due to construction activities are expected to be low. If The Project were to proceed as planned and all recommendations and measures outlined are adhered to, The Project will have positive impacts on the surrounding local communities and minimize negative impacts to the environment.

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# Appendix A: Environmental Monitoring Documents

## Appendix A-1: Incident Report Form


		<h1>Incident Report Form</h1>	
<b>Date of Incident:</b>		<b>Time of Incident:</b>	
<b>Type of Incident</b> (mark 'X' next to appropriate option below)			
Chemical Spill	Excessive air emission	Sediment	Health & Safety
Sanitary Spill	Vegetation Damage	Flood	Excessive Noise
Excessive Odor	Waste Management	Fire	Fauna Injury
<p>Details of Incident:</p>          			
<p>Response to Incident:</p>          			
<p>Measures to prevent reoccurrence:</p>          			
<b>Name:</b>		<b>Position:</b>	
<b>Signature:</b>		<b>Date:</b>	

Appendix A-2: Hazardous Waste Report Form

<b>Hazardous Waste Report Form</b>	
<b>Date of Incident:</b>	<b>Time of Incident:</b>
<b>Reporting's Party Name:</b>	
<b>Position:</b>	
<b>Address/Island:</b>	
<b>Phone:</b>	
<b>Description of Hazardous Material (including name and any unique formulas identifiers (UFI's for the containers):</b>	
<b>Weight or volume of material disposed of:</b>	
<b>Location where material was collected:</b>	
<b>Location where material was disposed of:</b>	
<b>Summary of disposal methods:</b>	
<b>Name of Licensed Contractor:</b>	<b>Position of Licensed Contractor:</b>
<b>Signature of Licensed Contractor:</b>	<b>Date of Disposal:</b>



## Appendix A-3: Environmental Monitoring Checklist

 <b>Environmental Monitoring Checklist</b>				
Site description:		Location:		Weather Conditions:
		GPS Coordinates:		
1	Site Safety and Health	YES	NO	Comments/ Prescribed Corrective Actions
a	Is personal protective equipment used appropriately?			
b	Are there proper safety requirements for work sites near water?			
c	Are there proper safety requirements for works at heights?			
d	Are open pits secured with caution tapes and or cones?			
e	Is there adequate fresh drinking water available?			
2	Waste Management			
a	Are appropriate waste storage containers being used and properly labelled?			
b	Are litter bins conveniently placed throughout the site?			
c	Is waste collection needed?			
d	Is hazardous waste separated in laydown area?			

e	Are there solid waste ticket receipts for landfill disposal of onsite waste?			
<b>3</b>	<b>Air Quality Management</b>			
a	Are speed restrictions of 15mph adhered to?			
b	Are equipment properly maintained to reduce emissions?			
c	Are dust suppression mechanisms implemented?			
<b>4</b>	<b>Material Storage</b>	<b>YES</b>	<b>NO</b>	<b>Comments/ Prescribed Corrective Actions</b>
a	Are material in storage area secured to prevent airborne debris?			
b	Are fill stockpiles located more than 100 feet from open water?			
c	Is silt fencing installed around the perimeter of fill stockpiles?			
<b>5</b>	<b>Groundwater Management</b>			
a	Is refuelling on concrete apron or lined fuel pad in case of spillage?			
b	Are fuel and oil storage on concrete apron or lined containment pad in case of spillage?			
c	Are fuel and oil storage containers free from leaks or signs of corrosion?			
d	Is there adequate secondary containment for fuel and oil storage units?			

e	Are secondary containment covered to prevent ingress of rainwater?			
f	Are mobile machine repairs and maintenance on concrete apron or lined containment pad in case of spillage?			
g	Are all mobile machinery in use free from engine lubrication and oil leaks?			
	Is spill response equipment on site and easily accessible?			
h	Is cement storage on concrete apron or lined containment pad?			
i	Is concrete washout established and appropriate with liner installed?			
j	Are there any excavations with exposed groundwater?			
k	Is fuel and oil storage a minimum of 100 feet from any excavations with exposed groundwater?			
l	Is refuelling operations a minimum of 100 feet from any excavations with exposed groundwater?			
6	Portable Potties/Restroom facilities	YES	NO	Comments/ Prescribed Corrective Actions
a	Are facilities conveniently located?			

b	Are units clean and stocked with supplies?			
c	Are there proper disposal bins for feminine sanitary waste?			
d	Are the units on concrete apron or lined containment pad in case of spillage?			
e	Are units a minimum of 100 feet from any excavations with exposed groundwater?			
f	Are units a minimum of 100 feet from waterbody?			
<b>7</b>	<b>Protection of Waterbodies &amp; Sediment Control</b>			
a	Is silt fencing adequately placed, properly installed and maintained?			
b	Are turbidity curtains adequately placed, properly installed and maintained?			
c	Is there any turbidity observed outside turbidity curtain containment area?			
d	Is there any oil or grease observed?			
e	Are there poor water quality indicators, i.e., algae growth, dead marine life?			
f	Is fuel and oil storage, a minimum of 100 feet from waterbody?			
g	Is refuelling operations a minimum of 100 feet from waterbody?			

h	Is there any plastic or other solid waste in water?			
i	Is marine organism spotter in place prior to marine work?			
8	<b>Vegetation</b>	<b>YES</b>	<b>NO</b>	<b>Comments/ Prescribed Corrective Actions</b>
a	Has protected trees been maintained or relocated?			
b	Are invasive species removed?			
c	Is native vegetation used in landscaping?			
d	Is there build-up of dust on vegetation?			
9	<b>Noise</b>			
a	Is there excessive noise on site?			
<b>Inspected by:</b>			<b>Signature:</b>	
<b>Date:</b>				
I, the Contractor's Representative, have read, understood, and affirm to the conditions and remarks cited by the above Environmental Manager.				
<b>Name:</b>			<b>Signature:</b>	

**Date:**



## Appendix A-4: Monthly Environmental Report Template

### **MONTHLY ENVIRONMENTAL REPORT TEMPLATE**

#### ○ **1.0 OVERVIEW**

*Indicate report period and construction activities during period.*

#### ○ **2.0 SITE INSPECTION**

*Summarize observations made during site inspections for each monitoring parameter indicated on the site inspection sheet. Include site inspection sheets for the period as an appendix to this report.*

#### ○ **3.0 REPORTS & COMMUNICATION**

*Provide details on reports submitted during this period including NCR, Incident Report, Fuel Spill Report, Turbidity and Grievance Monitoring Reports. Attach copies of reports as an appendix to this report.*

*Summarize communication with relevant agencies including Department of Environmental Planning & Protection, Department of Environmental Health, Department of Marine Resources and Incidents logged into the BESTPROTECT242 APP.*

#### ○ **4.0 MEETINGS**

*Record any meeting during this period where environmental management matters were discussed including construction progress meetings, meetings with the contractor to address specific environmental matters and meetings with government officials. Minutes of meeting should be included as an appendix to this report.*


#### ○ **5.0 TRAINING**

*Provide details on all training exercises conducted during this period including site inductions and toolbox talks. Register of individuals undergoing training should be included as an appendix to this report.*


#### **6.0 STAKEHOLDER ENGAGEMENT**

*All stakeholder engagement activities during the period should be included and the update stakeholder engagement log attached as an appendix to this report.*

## Appendix A-5: Nonconformance Report Template

 <h1 style="display: inline;">Nonconformance Report Form</h1>			
<b>SECTION 1: COMPLETED BY THE ENVIRONMENTAL MANAGER</b>			
<b>NCR No.</b>		<b>Specific:</b>	
<b>Contractor:</b>		<input type="checkbox"/> Site Safety <input type="checkbox"/> Groundwater Management <input type="checkbox"/> Sediment Control <input type="checkbox"/> Vegetation <input type="checkbox"/> Marine Environment <input type="checkbox"/> Waste Management <input type="checkbox"/> Air Quality <input type="checkbox"/> Other	
<b>Activity:</b>			
<b>Non-Compliance:</b> <input type="checkbox"/> Environment <input type="checkbox"/> Health & Safety			
<b>Details:</b>			
Details of Nonconformance observation (attach photos on separate page)			
Recorded by:			
Signature:		Date:	
<b>SECTION 2: COMPLETED BY THE CONTRACTOR</b> (returned to Environmental Manager)			
Contractor's response, intended method and date of repair			
<b>SECTION 3: CLOSE OUT</b>			
Correction Completed and Report Closed Out:			
Environmental Manager		Date:	
Contractor's Representative		Date:	

## Appendix A-6: Turbidity Report Form

 <h1 style="text-align: center;">Turbidity Report Form</h1>							
<b>Project:</b>							
<b>Date:</b>				<b>Recorder:</b>			
Sample 1							
NTU Reading:						Time	
GPS Coordinates:		Latitude				Longitude	
Weather Condition							
Clear	Y/N	Partly Cloudy	Y/N	Cloudy	Y/N	Rain	Y/N
Tide	High Time:					Low Time:	
Wind Speed (mph):				Direction			
Project Activity:							
Sample 2							
NTU Reading:						Time	
GPS Coordinates:		Latitude				Longitude	
Weather Condition							
Clear	Y/N	Partly Cloudy	Y/N	Cloudy	Y/N	Rain	Y/N
Tide	High Time:					Low Time:	
Wind Speed (mph):				Direction			
Project Activity:							
Sample 3							
NTU Reading:						Time	
GPS Coordinates:		Latitude				Longitude	
Weather Condition							
Clear	Y/N	Partly Cloudy	Y/N	Cloudy	Y/N	Rain	Y/N
Tide	High Time:					Low Time:	
Wind Speed (mph):				Direction			
Project Activity:							
<b>Environmental Manager Name:</b>							
<b>Environmental Manager Signature:</b>							

## Appendix B: Fuel Spill Prevention Plan

The following Spill Prevention and Response measures will be implemented to prevent or mitigate escalation in the event of a possible spill.

### **SPILL PREVENTION MEASURES**

The following proactive measures will be adopted to prevent the likelihood of spill event:

- The Health and Safety Officer (HSO) will provide training to Construction Staff and contractors regarding proper methods for transporting, transferring, and handling substances that have the potential impact to human health or the environment.
- Preventative program including inspection and maintenance schedules to confirm and maintain the mechanical integrity and operability of equipment.
- Implementation of Standard Operation Procedures (SOPs) for handling materials including refueling vehicles, the use of diesel/oil absorption blankets, the use of diesel tanks, the use and handling of processing chemicals, and managing secondary containment areas.
- Fuel will be purchased locally and immediately transferred to vehicles on site using a fuel pump. No fuel will be stored on site.
- Provision of secondary containment, drip trays or other overflow and drip containment measures, for hazardous materials containers at connection points or other possible overflow points. Identification and provision of all equipment necessary to handle, transfer or transport materials properly.
- Use of transfer equipment that is compatible with and suitable for the characteristics of the materials transferred and designed to ensure safe transfer.
- Use of dripless hose connections for vehicle tank and fixed connections with storage tanks.
- Review of all potential pollutants' characteristics prior to introduction to site and establishment of proper storage, handling and transportation procedures and spill risk analysis.
- Material Safety Data Sheets (MSDS) for all contaminants on-site will be readily available. These will include human health effects of chemicals handled and will be included in the required chemical environmental and safety training for all employees handling or otherwise exposed to the contaminants. All appropriate personal protective equipment, handling and response procedures will also be identified in the MSDS or otherwise recommended by the suppliers/manufacturers and will be followed by The Project staff.
- Bulk transfers of chemicals during delivery will be observed by workers to identify preliminary hazards.
- SOPs will be adhered to for chemical transportation, unloading, transfer, storage if required, and handling. Use and disposal shall be developed, kept current, effectively implemented.

### **SPILL CONTROL AND COUNTERMEASURES**

The following spill control and countermeasures will be followed in the event of a spill incident:

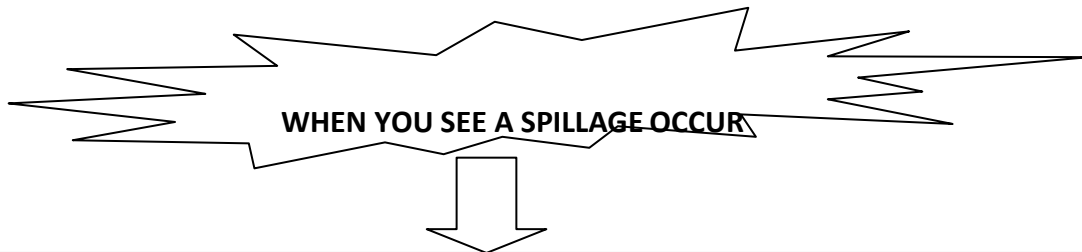
- Maintenance of updated emergency contact information list at all spill response kit's locations.
- Maintenance of spill route maps (perceived overland flow path [flow gradient] and likely contamination point [i.e., surface water features, potable boreholes etc.] of a given contaminant substance) at potential spill locations.
- Document availability of all spill response equipment that can handle a large spill (See Appendix B-1: Spill Report Form).
- Document availability of specific personal, protective equipment, and the necessary training needed to respond to different potential spills.
- Maintenance of spill response kits on all Project fuel and lubrication sites and vehicles.
- Maintenance of spill response guidelines at all spill response kit locations.
- Maintenance of an updated table of all contaminants on-site and recommended spill response procedures.
- Development, implementation, and regular training and testing of a facility-wide Spill Response Plan.
- First-aid trained workers on site.
- All spills will be reported to appropriate management workers.

### **SPILL RESPONSE PROCEDURE & COMMUNICATIONS**

The Spill Response Procedure describes what to do when you see a spillage occur.

The Project Manager (PM) is responsible for notifying the Environmental Manager (EM) immediately on the discovery or notification of a spill, that Emergency arrangements are made, and communication lines are established with relevant agencies and authorities.

The PM is to ensure that employees on The Project are aware of the emergency telephone numbers, addresses, and response procedures. Furthermore, the PM ensures, either via the local agent or direct, that Department of Environmental Planning and Protection (DEPP) and the local authorities are made aware of the existence of The Project. ALL spills are to be reported to DEPP.



- 1) Check
  - a. type of spillage (fluid / solid)
  - b. estimate quantity
  - c. spillage continues (If Yes, Take action to stop it/If No proceed)
  - d. source of spillage
  - e. danger of explosion (If Yes, ask for assistance /If No proceed)
  - f. danger of fire (if Yes, ask for assistance /if No proceed)
- 2) Ask for assistance
  - a. when possible, start spillage recovery
- 3) Inform Project Manager, Project Environmental Manager

Superintendent/Foreman  
 Minor spillage: can be treated with available spillage recovery set  
 Major spillage: assistance is required

**MINOR SPILLAGE**  
 Superintendent or Foreman:  
 1. To stop and / or take over

Superintendent or Foreman:  
 Log on daily report

- a. type of spillage
- b. estimated quantity
- c. reason of recovery
- d. cause of spillage
- e. measures (to be) taken to avoid reoccurrence

1. Inform Project Manager within **24hrs.**  
**(Should be address immediately and remediation within 12hrs)**

**MAJOR SPILLAGE**  
 Superintendent or Foreman:

1. Check Location-**immediately**
  - a. Ensure safety
2. Check Spillage-**immediately**
  - a. type of spillage
  - b. estimated quantity
3. Instruct workers-**immediately**
  - a. To stop and / or take over activities
  - b. To start spillage recovery
4. Inform Project manager, Environmental Manager **Within 1 hr.**
5. Tactic Meeting with key workers

Project Manager or Project Environmental Manager:

1. **Immediately** determine what kind of assistance is required
2. Inform ENGINEER **within 1hr of notification**
3. ENGINEER to inform Employer **within 1 hr. of notification**
4. Request assistance from 3rd Parties **within 1 hr.**
5. Inform DEHS & DEPP-**verbally in 1hr, written within**



## **EMERGENCY RESPONSE EQUIPMENT**

In the unlikely eventuality there is a spill, on the site there will be Environmental Emergency Response kits. These spill kits will consist of the following listed materials (or similar):

- Absorption pads (43 x 48 cm)
- Absorption rolls (96 cm x 40 m)
- Spill drum for contaminated materials
- Absorption socks (7.6 cm x 1.2 m)
- Sack of absorption grit
- Plastic foil

Once an eventual spill has been cleaned-up all contaminated materials will be packed in plastic sacks and / or foil and placed in the disposal drum. This drum will be transported to an eventual waste recycling / treatment facility or to a location approved by the DEHS.

## **EMERGENCY PREPAREDNESS**

The Contractor should anticipate and prepare in general for the following scenarios:

- Serious personal injury/fatality.
- Road traffic accident.
- Fire or explosion.
- Spillage of fuel or hazardous substance.
- Severe weather conditions (Hurricanes, Tropical Storms, Tornadoes).
- Evacuation of work site; and
- Damage to Third Party Property.

Priority for action of each scenario is as follows:

1. Saving lives and people safety.
2. Avoid or limiting environmental damage.
3. Control of situation.
4. Establishing site safety; and
5. Salvage and repair.

## **SPILL REPORTING PROTOCOL**

**Step 1:** All workers on the work site and assigned to The Project will be responsible for implementation with the PM and EM providing coordination of efforts. A report will be generated by the Contractor and disseminated to relevant parties including DEPP.

### **Emergency Contacts:**

Project Manager

TBD

Environmental Manager

Janeen Bullard

357-9262

Director of DEPP

Rhianna Neely-Murphy,

322-4546

Department of Environmental Health Services

Anthony Ryan

557-0379

**Step 2:** When contact is made with the above individuals, report the following information (See Appendix B-1: Spill Report Form):

- Location of Spill.
- Source of Spill.
- Time of Spill.
- Volume of Spill.
- Potential Hazard of Spill.
- Has the spill been contained?
- Has the spill material reached a body of water?
- Responsible party's name, address, telephone, official to contact, etc.
- Weather conditions at the spill site.


**Step 3:** If the spill report is not made by the PM, the reporter will communicate the above information to him/her as soon as possible. From that point forward, the Project Engineer will coordinate all further activities in response to spill control.

### **SPILL CONTAINMENT AND CLEANUP**

Upon discovering a spill, every effort will be made to contain the spill and stop it at its source (when this can be done without danger to the health and safety of those involved). Containment may involve blocking storm water drains, building berms/dikes, deploying booms/absorbent materials and other barriers to prevent the spread of the pollutant, and other measures to minimize health and environmental damage.

Clean-up and removal of spill material and spill contaminated materials will be undertaken after consultation with appropriate governmental agencies to determine the best method(s) for removal. The Contractor will contract with (or consult) a private company to conduct any clean-up. Disposal of the pollutant and/or pollutant contaminated material will be in a manner and location as approved by the DEHS.

## Appendix B-1: Spill Report Form

		<h1>Spill Report Form</h1>	
Reporting Party's Name			
Address/City/State			
Phone:			
<b>Responsible Party's Name:</b>			
Address/City/State			
Phone:			
Date of Spill		Time of Spill:	
Location:		Product spilled:	
Estimated Quantity		Discharge stopped or contained?	Y/N
Source or cause of Spill:			
Action Take:			
Injuries/fatalities/evacuation			
Environmental Damage:			
List of equipment used:			
Disposal site/facility for used absorbent			
Spill Notifications			
Organization	Phone Number	Time Contacted	Case Number
Fire Department			
Spill Response Contractor			
Department of Environmental Planning and Protection			
Department of Health Services			
Preventative actions taken			
<p><b>**Note: Please attach a map of spill location</b></p>			