ENVIRONMENTAL IMPACT ASSESSMENT

LIGHTHOUSE POINT
ELEUTHERA, THE BAHAMAS

PREPARED FOR

DCL ISLAND DEVELOPMENT, LTD.

MARCH 2021

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EXECUTIVE SUMMARY

This Environmental Impact Assessment (EIA) pertains to the development of a cruise port and entertainment destination at Lighthouse Point, Eleuthera, The Bahamas for Magical Cruise Company Limited, a wholly owned subsidiary of the Walt Disney Company. DCL Island Development, Ltd., is a company incorporated under the Laws of the Commonwealth of The Bahamas, having its Registered Office in the City of Nassau (herein known as 'the Developer').

An EIA identifies potential environmental risks and impacts based on site investigations and review of literature and recommends measures for avoiding, minimizing, or mitigating those potential impacts through best management practices (BMPs). As a planning tool, the outcome of these site investigations directly influences land use design to avoid, minimize, and mitigate impacts to the extent possible.

The Project to be situated on Lighthouse Point will include the following: development of a pier, berth, service ramp, and marina; dining and beverage facilities; merchandise and retail facilities; spa facilities; aquatics and recreational facilities; beach expansion, enhancements, and improvements; themed buildings and elements, recreational areas, and structures; maintenance and utility plants and facilities; and employee dining, housing, and recreation facilities.

The cruise port will be capable of berthing one cruise ship with a draft up to 27.3 feet, which requires 35 feet of water depth (at lowest low), providing seven feet of clearance between the keel and sea floor. The open trestle pier is about 2,348 ft in length. The location and position of the cruise ship pier eliminates the need for offshore dredging. The small-vessel marina will accommodate approximately 25 vessels up to a maximum size of 35 feet and has been designed such that no dredging will be required. A rock protection structure is needed for wave attenuation on the south and west sides of the small-vessel marina.

Site Description

The Project is to be located at the property known as Lighthouse Point (LHP) in South Eleuthera, Eleuthera, The Bahamas. Lighthouse Point is located 75 miles southeast of Nassau, New Providence, and 11 miles west of Little San Salvador. The Project site is a total of 919 acres comprising 758 acres of lands purchased by Disney, and Crown Lands that include Big Pond, White Pond, and multiple land parcels (Figure 2-3). Approximately 193 acres of the privately owned lands, including the southern tip encompassing the actual lighthouse building structures, will form the Disney Donated Public Lands. Development will be limited to 16 percent or less – up to 152 acres of the purchased property. The balance of the site, about 413 acres, will remain undisturbed. Donated and remaining undisturbed lands total 606 acres, or 80 percent of the Disney purchased lands utilized for Project development. Total developed areas, including built infrastructure and hardscape, will comprise less than 16 percent of the total land purchased.

Project Need, Site Alternatives, and Description

Disney Cruise Line will add three new cruise ships to its fleet, in 2022, 2024, and 2025, with each ship capable of having up to 4,000 passengers. With seven cruise ships and total passenger berths in excess of 25,000 by 2025, the Developer intends to increase the number of ships' calls at the Port of Nassau and/or Freeport, and Castaway Cay (Abaco), with operation of Lighthouse Point anticipated to commence in 2024. The estimated number of calls at Lighthouse Point by calendar year is as follows: 2024 = 138, 2025 = 186 and the remaining years are estimated at 238 calls. The ship sizes will range between 84,000 tons carrying 2,800 passengers and 130,000 tons carrying 3,800 passengers. The estimated weekly volume of passengers ranges from 11,400 to 26,600.

The Developer explored several alternative locations prior to purchasing the Lighthouse Point property. These locations included Egg Island, Eleuthera; Morgan's Bluff, Andros; West End, Grand Bahama; and various parcels within the Berry Islands. These alternative site locations were rejected due to the potential for significant environmental impacts or operational constraints for cruise ships and other factors. The Lighthouse Point property met Developer needs with the least environmental impact, while providing access to deep water. A commitment to an open trestle pier/berth design allows access to deep water and eliminates the need for dredging, which is generally associated with a greater environmental impact.

In addition, once the site at LHP was selected several iterations of the site plan were developed to reduce impacts within the Project boundaries. In keeping with the environmental due diligence for the Project, The Developer incorporated modifications to the original plan to further reduce impacts to the seafloor by shrinking the footprint of the marine scope deck by roughly 78,000 square feet as well as relocating the employee housing and back of house facilities to the east side of the property. The employee housing and back of house shift helped to alleviate further environmental impacts to the north side of the property found during geotechnical preclearance surveys: low lying rock walls, archaeological finds, Lignum vitae and Mahogany trees.

During the course of the Project planning, the Developer had continuous conversations with many residents of Eleuthera and representatives of environmental organizations that have also affected the design plans. These topics included no-dredge solutions to berthing, the need to provide economic opportunities for Bahamians, the continued need for a public road, as well as other locally important inputs.

Biodiversity

Development of the cruise port and associated amenities will result in some unavoidable loss of habitat (marine and upland) and create potential for secondary impacts. The Developer has taken proactive measures to document baseline site conditions, to carefully manage development and operational activities, and to mitigate impacts through site design, ongoing monitoring, and educational programs. Based on the results of site investigations and species encountered, construction and operation of the Project is not expected to result in any loss of terrestrial or marine biodiversity, although conscientious efforts will be made to remove and/or control invasive non-native species that are listed in The Bahamas National Invasive Species Strategy.

Botanical and Avian Assessment

Botanical and avian surveys took place to capture seasonal variations in wintering, breeding season and migratory bird activities. Field investigations have occurred over a 36-month period and were performed in October, November and December 2017, November and December 2018, January, April, June, October and November 2019, and January, February, June, July and October 2020. Information relative to all the plant surveys is included in the appropriate summary tables and appendices found in this document.

Botanical

In terms of vegetation community classification, the site contains 11 vegetation types including Dry Broadleaf Evergreen Formation Forest, Sand Strand, Sand, Herbaceous and Shrub-Dominated Dunes, *Casuarina* Dominated Dunes, *Conocarpus erectus*, Herbaceous Wetland, Mixed Mangrove, Exposed Rock, Human Altered (roads), and four open-water ponds: Big Pond, White Pond, Shad Pond, and Northwest Pond, two of which (i.e., Big Pond and White Pond) are Crown Lands.

The site is dominated by dry broadleaf evergreen forest, covering approximately 48.2 percent of the property, followed by sand strand at 27.2 percent coverage, with other land classifications at less than 5 percent. Nearly 200 species of vascular plants were observed during the field investigations.

Protected Tree & Invasive Species

Four species listed on the Protected Tree Order (Conservation and Preservation of the Physical Landscape Act) were observed during field investigations including *Guapira discolor* (narrow-leaved blolly), *Guaiacum sanctum* (lignum vitae), *Swietenia mahagoni* (mahogany) and *Lysiloma sabicu* (horseflesh). Four other species encountered on the site are listed under the International Union for Conservation of Nature (IUCN) Endangered/Vulnerable or CITES Appendix II, including *Guaiacum officinale* (Lignum vitae), *Zanthoxylum flavum* (Yellowwood), *Encylcia altissima* (Tall Orchid), and *Opuntia stricta* (prickly pear cactus). A majority of these species are found within the dry broadleaf evergreen formation.

Two invasive plant species were encountered on site: *Casuarina equisetifolia* (Australian Pine) and *Scaevola taccada* (White Inkberry), with each being recommended in the National Invasive Species Strategy for control. The *Casuarina* is abundant along the east coastline.

Terrestrial Impacts Summary

The Developer is committed to a development footprint of less than 16 percent. Impacts pertain primarily to the unavoidable loss of vegetation for guest amenity structures, back-of-house (BOH) operations, and road corridors. With the exception of *Casuarina* dominated dunes and the shrub and herbaceous dominated dune vegetation communities, at least 85 percent of the nine remaining vegetative communities will be left in their present natural state. There are no anticipated adverse long-term impacts to the onsite ponds designated as Crown Land.

Sustainable design practices are reflected in the limited Project footprint, Disney Donated Public Lands, and areas of extensive undisturbed vegetation. Preclearance surveys will be performed prior development activities to identify and avoid protected trees where feasible. Beach areas along the shoreline will be improved by shaping the upland/above water areas, including removal of *Casuarina* species and other non-native invasive vegetation that has become established in the dune community. Minimal below-water sand placement or impacts to the bottom are planned. No shoreline stabilization structures (groins, jetties, etc.) are anticipated.

Avian

The avian survey identified 100 bird species during observations made at various times between November 2018 and October 2020. Areas of highest use varied by species. Wading birds were most frequently observed in the salt ponds, with White Pond attracting the highest numbers and species diversity. Gulls and terns were observed along the shore and in several of the salt ponds. The Dry Broadleaf Evergreen Forest is the most abundant vegetative community on the property, providing habitat for permanent resident species, migrants, and winter residents.

Of note is the sighting of one banded piping plover in a small flock (i.e., mostly six to eight individuals) of piping plovers observed on repeated occasions at Bottle Bay Beach and the rocky shoreline at the east end of Bottle Bay Beach. These small migratory shorebirds, which are known to have a high level of winter-time site fidelity, are protected pursuant to the Wild Birds Protection Act, the Endangered Species Act in the United States and by international treaties. Additional site work to determine the spatial distribution and habits of these birds will be undertaken as one component of the Environmental Management Plan, with the goal being to maintain a wintering population of this species on the site.

Marine Assessment

Marine resources adjacent to Lighthouse Point were investigated to identify and map the range of benthic habitats, existing coastal processes, and characterize the diversity and condition of flora and fauna in December 2018, April 2019, November 2019 and October

2020. Surveys were conducted using the Atlantic and Gulf Rapid Reef Assessment (AGRRA) method in November 2019 to characterize benthic cover, stony coral condition and fish populations. Additional underwater surveys were conducted within the proposed Project footprint, to quantify potential impacts to marine habitats and species. Analyses were done to estimate the amount of habitat impacted, as well as the amount of stony corals and other notable species to be affected within the proposed development area.

Marine Resources

Marine resources adjacent to Lighthouse Point included 11 benthic habitat types: hardbottom (five subtypes), submerged aquatic vegetation (SAV), scattered coral mounds, sand, patch reefs, fore reefs and offshore coral wall. These ecosystems were examined for condition, biomass and ecosystem services (e.g., fisheries, land protection, etc.). More than 33 species of marine flora, 33 stony coral species, 13 soft coral species, and 26 sponge species were observed. Fish biomass was found to be typical of each habitat and consisted of 74 species of fish, including commercially important grouper and snapper. In addition, more than 60 other marine species including green sea turtles and hawksbill turtles were observed. Site investigations noted the presence of what appeared to be suitable nesting habitat for sea turtles, but no evidence of any nesting was observed.

Based on AGRRA indicator thresholds developed by the Healthy Reefs Initiative (www.healthyreefs.org), which ranks habitats on a scale from "Critical" to "Very Good," the overall condition of surveyed reefs is considered average with a median score of "Fair". Reefs do not occur within the marine facilities footprint. Hardbottom habitats comprise 68 percent of the impacted area within the footprint. These habitats are in good condition but scored low on the benthic index when compared to reefs in Eleuthera and The Bahamas; a lower index score is considered typical for this type of habitat within The Bahamas. Within these hardbottom habitats, the overall combined live planar area for soft/stony coral and barrel sponges was calculated to be 0.0152 acres, which represents 0.3 percent of the directly impacted areas. The other two habitats found within the footprint, sand and submerged aquatic vegetation, were also found to be in good condition.

Marine Impacts

To minimize impacts on benthic habitats, the Project has intentionally avoided an open channel/landside berth design, which would have involved dredging and significantly greater impacts on marine resources. Instead, the cruise ship pier, berth and marina will be constructed as pile-supported structures and floating docks, which reduces the direct loss of habitat and potential secondary effects. With the proposed design, direct impacts will be limited to construction and placement of pier piles and the protective revetment for the small-vessel marina.

The area of marine resources directly affected by development will be up to 5.04 acres. Impacts associated with shading underneath the dock and pier structures have been included in the impact habitat area calculations, so the actual displacement of habitat is less. Marine habitats and associated fauna that will be affected include 3.41 acres of hardbottom, 1.46 acres of sand habitat, 0.16 acres of scattered coral mound habitat, and 0.01 acres of submerged aquatic vegetation. The estimated combined amount of live surface area (stony corals, barrel sponges and gorgonians) that will be impacted within the marine development footprint was estimated to be 0.0152 acres (661.1 ft^2/614,190 cm^2). Including a 75-ft secondary impact buffer, construction could potentially affect up to 0.145 acres of stony coral, soft coral and barrel sponges. Of the stony corals, only 3.1 percent (0.002 acres) are considered endangered and 23 percent (0.014 acres) are considered important reef-building corals. Other sensitive coral reef habitats (e.g., patch reefs, fore reefs and the offshore coral wall) are well outside of the Project area by more than 500 to 1,000 feet and will not be directly impacted.

The Developer has implemented a more detailed analysis of corals within the directly impacted hardbottom footprint of the marine facilities to better understand potential impacts, avoidance and minimization strategies and conservation opportunities. Based on final Project plans, The Developer will develop a relocation plan to move corals of listed species (i.e., species designated by the IUCN as Endangered, Critically Endangered and/or Threatened) and adult reef-building coral colonies ≥10 cm (3.9 inches) in diameter that are good candidates for relocation, to similar, matched habitat in the Lighthouse Point vicinity. The Developer will also be implementing an in-water AGRRA coral reef monitoring program, as well as a rehabilitation program in coordination with the Perry Institute's Reef Rescue Network Program.

BMPs specific to coastal development will be implemented to minimize potential impacts to nearshore patch reefs and notable inshore hardbottom habitats during development and operation. Details of these BMPs are provided in Section 7, Proposed Mitigation Measures, will be further expanded within the Environmental Management Plan (EMP). The EMP will include topics such as best management practices to minimize guest impacts to nearshore sensitive areas; feasibility of incorporating ecological design into pier and marina breakwater construction to allow uninterrupted fish migration and sediment transport; long-term monitoring program to guide adaptive management, and a coral nursery and rehabilitation program. Some barrel sponges will be moved as an exploratory/experimental commitment, as the techniques have not been proven for long-term success.

Marine Mammals

Construction noise has the potential to impact local marine fauna, particularly marine mammals that are present in the surrounding waters. Construction in the marine environment will be likely be limited to pile techniques because dredging is not planned. Developer will monitor and attempt to mitigate construction noise as much as practically possible.

Climate Change

The Developer has considered climate change as it relates to Lighthouse Point and the Project is not expected to have a material impact on climate change. The Developer intends to employ design and building techniques that will enable the Project to withstand any impacts due to climate change. The Developer has committed to achieving net zero greenhouse gas emissions by 2030, as part of broader environmental goals of The Walt Disney Company. Sustainability planning has been part of the project at Lighthouse Point from the beginning, which will enable efficient design of the built environment and the use of renewable energy. The Developer is committed to a minimum of 30 percent of its initial operation electrical needs to be produced by solar.

Offshore and Bathymetric Analysis

Jacobs Engineering was engaged by the Developer to prepare an engineering analysis relative to the design and accommodation of the open trestle pier to the cruise ship specifications. The following conclusions were obtained based on the analyses results.

Sediment transport will not be significantly interrupted along the shoreline by any pier structures or planned beach structures. Ample use of flushing thru-ways will allow for sand and benthic species to pass unimpeded. The small vessel marina has been located in an area that does not have any natural significant long-term sand accumulation that would be affected by the proposed development. As such, no significant erosion or accretion of sand or sediments will occur from the development of the pier or beach areas.

The cruise vessels will access the site from deep water offshore to the east coast of Eleuthera and pass between Little San Salvador (Half Moon Cay) and Lighthouse Point. A sub-surface feature referred to the as 'the bridge' extends between the tip of South Eleuthera and Little San Salvador. The depth of the bridge is no shallower than 80 feet which is well below the draft of the cruise ships at 27 feet. Several cruise operators and other vessels traverse this area to access two existing privately owned cruise destinations, Princess Cays, Eleuthera and Half Moon Cay.

Socio-Economic Influences

Employment and Contributions to GDP

Oxford Economics provided an analysis of economic impacts associated with the Project over a 25-year timeline being the four years of development 2019-2022 and operation from 2023-2043. The Project is conservatively expected to provide an $805.1 million increase in Bahamian gross domestic product (GDP) and a $357.5 million increase in Bahamian Government revenues, significantly exceeding concessions.

Through its Heads of Agreement with the Government of The Bahamas, Disney has committed to creating economic opportunities for Bahamians, particularly in Eleuthera, and to strengthening the local community. Disney's commitments include:

- Investing $250 to $400 million to create a destination in Eleuthera. This level of investment reflects Disney's commitment to the environment and sustainable building practices.
- Creating at least 120 construction jobs with an overall ratio of 80 percent Bahamians over the life of construction.
- Creating at least 150 well-paying operations jobs with benefits in a range of disciplines and with opportunities for advancement. The current average wage at Castaway Cay is $600-700 per week. With guests expected to be in port 3 to 5 days

per week year-round and the need to complete a variety of projects on non-port days, the roles will provide much-needed employment stability.

- Developing training and professional development programs to maximize opportunities for Bahamians.
- Providing space for Bahamian vendors for the sale of authentic, high-quality Bahamian retail goods, services, souvenirs, arts and crafts and more.
- Providing priority to Bahamian-owned and -operated tour operators.
- Providing opportunities for Bahamian entertainers.
- Purchasing some Bahamian agricultural and seafood products.

Disney has already made progress toward these initiatives. For example:

- Disney has toured construction sites and met with contractors across Eleuthera, engaged with the Bahamian Contractors Association, Society of Engineers and other industry organizations and hosted multiple information sessions in Eleuthera and Nassau to maximize opportunities for Bahamian contractors, and this work will continue.
- Disney has held information sessions and met with hundreds of potential employees, vendors, tour operators and others over the past year to further build relationships and maximize opportunities for Eleuthera and the greater Bahamas and will continue to do so. Contracting for opportunities that will be available when the site is operational generally begins 12 to 18 months prior to the start of onsite operations. Hiring is expected to begin in 2023.
- The design for Lighthouse Point will be inspired by the natural environment and rooted in the culture of Eleuthera and The Bahamas more broadly. Disney Cruise Line is working with the local creative community, led by master artists Kevin Cooper and Antonius Roberts, to achieve this.
- In addition to its ongoing community engagement in The Bahamas, Disney has begun supporting the community in Eleuthera, providing funding for holiday events, cultural activities, an after-school program, college visits to Florida by high school students from Eleuthera and more. Disney has also announced scholarships for four female cadets at LJM Maritime Academy, sponsored and participated in Culinary Week at the University of The Bahamas and made significant contributions to Hurricane Dorian relief and recovery efforts, including a $1 million donation to non-

profit organizations and more than $500,000 in supplies for impacted communities and direct assistance to Disney's Bahamian employees.

- Disney has entered into an agreement with the Access Accelerator Small Business Development Centre and the Eleuthera Chamber of Commerce, providing more than $1 million (over three years) to fund a new Eleuthera Business Center and provide business development advisory services, business communication training, customer service training, business mentorship and other programming designed to prepare startups and small businesses for participation in development projects underway on Eleuthera, including Lighthouse Point.
- Disney is committed to working with the Government of The Bahamas, the local community and educational institutions to develop training and professional development programs for residents of Eleuthera and the greater Bahamas interested in working at Lighthouse Point. Disney has met with the Ministry of Labour, University of The Bahamas, National Training Agency, Bahamas Technical and Vocational Institute and others to begin developing important relationships.

Public Access and Cultural Resources

The Developer will provide all citizens and residents of The Bahamas with full access to the property for non-commercial purposes, while working with the Government to ensure appropriate safety and port security. Approximately 190 acres of upland and the southernmost point of the property comprising approximately three acres (total of 193 acres) will form the Disney Donated Public Lands. The Developer will construct a roadway through the Disney Donated Public Lands, a parking lot, and beach amenities including restrooms.

Present land use at the site is undeveloped, save for intermittent recreational use. Access to the site is via a deteriorating roadway, which requires a high clearance vehicle to traverse. This north-south oriented roadway terminates at Lighthouse Bay Beach and provides access to the lighthouse. In addition to the Lighthouse, several historic and previously occupied structures were identified in the vicinity the property's northern boundary. Historical aerial imagery indicates pockets of past human disturbance likely for agricultural purposes.

A Historic Resource Survey of Lighthouse Point was completed by Colin Brooker in February 2019 and January 2020. Nine ruins and several ancillary features have been identified onsite predominantly in the northern area of the property in the vicinity of Old

Bannerman Town. All cultural resources onsite will be assessed in coordination with the Antiquities, Monuments, and Museums Corporation (AMMC) for their potential eligibility for inclusion on The Bahamas National Register of Historic Resources. With the relocation of the back-of-house, there are no anticipated impacts to these historic structures and there are no plans to ever develop where any ruins or historic structures are located.

Utilities

Pending final negotiations with Government, all water and wastewater infrastructure will be constructed onsite. Potable water will be obtained through reverse osmosis (RO) capable of producing up to 130,000 gallons of water per day. No impacts to existing to freshwater resources will occur during the R/O process. A wastewater treatment plant will be constructed onsite. Electricity will be produced onsite using solar arrays and generators with fuel stored onsite. Renewable energy sources are anticipated to generate at least 30 percent of total site energy needs. The feasibility of technologies to provide higher levels of renewable energy to as much as 70 percent are being evaluated for use by the Project.

Food waste will be incinerated or returned to the ship for appropriate disposal. All landscape clippings will be mulched and recycled for landscape use or incinerated onsite. Solid wastes generated both during and after development will be collected, processed for volume and disposed of in an appropriate manner, pending discussion with Government of The Bahamas and local authorities. Some solid waste will be incinerated onsite or returned to the ship for appropriate disposal. Waste transported by the ship includes metals and plastics. All utilities will meet the regulations of The Bahamas.

Data Gaps and Uncertainties

Access to the site interior was limited due to dense vegetation and limited cleared corridors for surveying. To minimize disturbance during site biological investigations, mechanical clearing of vegetation was avoided. Therefore, cultural resources, protected trees, and/or other sensitive features may be discovered during site investigations prior to and during development. Any and all mechanical activity onsite will adhere to protocols that address the potential for discovery of artefacts, preservation of the environment, and/or other notable finds.

Baseline data captured in this report represent observations at a given time and date. Natural forces and seasonality may affect reproduction of similar observations. Avian surveys are ongoing in an effort to document use by non-resident populations, including neo-tropical migrants.

Mitigation

Detailed mitigation measures are found within this report under Section 7, Proposed Mitigation Measures. Despite the limited Project footprint and BMPs to avoid and minimize impacts, the Project will result in some unavoidable impacts to marine habitat and terrestrial vegetative communities. To mitigate this loss the following mitigation measures are proposed.

- **Open Trestle Pier Design.** Because the pier will be an open trestle design with no impermeable walls or revetments, direct impacts to the bottom will be reduced to the footprint of the piles supporting the pier structure. No dredging or infilling will occur.
- **Twenty Percent Land Development.** Up to 152 acres will be utilized for Project development, and at least 606 acres will remain undisturbed.
- **Disney Donated Public Lands.** Approximately 193 acres of the privately owned lands will form the Disney Donated Public Lands. At the request of the Government of The Bahamas, the Developer will construct a roadway through the Disney Donated Public Lands; construct a parking lot and beach amenities including restrooms; and provide environmentally sensitive access to the southernmost point of the property.
- **Public Access.** The Developer will facilitate access to Lighthouse Point and the public areas throughout the Project site subject to port security regulations. For public safety, site access will be restricted to varying degrees throughout the development process.
- **Renewable Energy.** The Developer shall ensure that at least 30 percent of the energy demand of the Project shall be from renewable energy sources. Solar arrays will produce renewable power. The feasibility of technologies to provide higher levels of renewable energy to as much as 70 percent are being evaluated for use by the Project.

- **Marine Resources.** To mitigate for unavoidable impacts to marine resources in the proposed ship berthing area, trestle area, marina, and service ramp, the following initiatives will be implemented.
    - **Corals.** Disney will develop a relocation plan to move corals of listed species (i.e., species designated by the IUCN as Endangered, Critically Endangered and/or Threatened) and adult reef-building coral colonies ≥10 cm (3.9 inches) in diameter that are good candidates for relocation to similar, matched habitat in the Lighthouse Point vicinity. Coral transplants off Castaway Cay have yielded a 90 percent success rate over the past 13 years in a philanthropic and "dedicated" coral conservation program. Disney will also investigate the feasibility of a conch and coral propagation center to help replenish the area's natural resources. A comprehensive coral reef monitoring program will be implemented before, during, and after development to inform best management activities.
    - **Fish.** Bonefish migration will be studied and techniques to encourage uninterrupted fish migration will be employed.
    - **Barrel Sponges.** Barrel sponges will be moved as an exploratory/ experimental commitment as the techniques have not been proven for long-term success.
    - **Sea Turtles.** While no evidence of sea turtle nesting has been observed to date, sea turtle nest monitoring will be performed along the east-facing beach, Lighthouse Bay Beach, and Bottle Bay Beach prior to, during, and following development; and when in operation during nesting season.
    - **Marine Mammals.** To the extent practicable, the Developer will compress the duration of time required for development of the marine facilities to minimize potential noise impacts. The Developer will also work with a marine mammal acoustical expert that is familiar with construction to develop an adaptive approach to minimize the impacts on marine mammals. BMPs for noise quality will be employed, including visual monitoring and scaled noise intensity to allow mammals to avoid or move away from the area. To the extent practicable, the Developer will compress the duration of time required for development of the marine facilities to minimize potential noise impacts.

- **Environmental Management Plan.** The Developer will perform monitoring to determine the spatial use of birds with an adaptive management strategy into the Environmental Management Plan.
- **Education.** On-island interpretative signage and environmental education programs for employees and visitors will be implemented to address reef-friendly sun protection measures and other environmental conservation messages.

Recommendations

Recommended BMPs for the Project at Lighthouse Point, Eleuthera, will be contained within the subsequent Environmental Management Plan. The following focus areas will be included.

- **Marine Infrastructure.** The cruise port and marina will use BMPs to limit impacts. A detailed summary of BMPs to be implemented during development and operations will be provided in the EMP. Topics will include water quality controls including turbidity reduction, storm water discharge and prevention, and spill prevention and control.
- **Beach Management Program.** A comprehensive beach management program will be established to provide information, environmental management, and appropriate safety for the guests. Comprehensive cleanup of the existing beach will be conducted during development. Beach maintenance will be conducted on Developer-owned properties during the operational phase.
- **Marine Resource Management Plan**. A comprehensive management and monitoring plan will be developed to limit Project impacts to nearshore patch reefs and notable inshore hardbottom habitats. Topics will include best management practices to minimize guest impacts to nearshore sensitive areas; feasibility of incorporating ecological design into pier and marina breakwater construction for fish migration; long-term monitoring program to guide adaptive management, and a coral nursery and rehabilitation program.
- **Limited Clearing Footprint.** Clearing for all required areas will be limited to the immediate area necessary for development and development amenities. Adjacent area clearing will be restricted to thinning underbrush and selective removal of toxic and invasive plants.
- **Sediment and Erosion Controls**. BMPs including site-specific controls and turbidity management measures will be followed to minimize impacts to water quality in the

pier and berth areas; a turbidity management plan will be part of the EMP. BMPs will be employed during land clearing activities to limit impacts and reduce the potential for sediment transport during storm events, with a focus on avoiding impacts to subsurface voids, ponds, wetlands, and the marine environment.

- **Materials Storage and Fuel Storage**. Materials storage will be kept away from sensitive environmental features. Fuel storage and refueling will adhere to BMPs, including raised storage with either 110 percent containment mechanism or double walled tanks in the event of spill.
- **Planting with Native Tree Species.** Removal of invasive species, considered a threat to small island nations, will slow the proliferation of unwanted plant species that threaten local biodiversity. It is recommended that the Developer perform routine removal of seedlings and/or saplings to prevent recolonization. A landscaping program that uses a palette of native trees and shrubs will encourage visits by native fauna.

Conclusion

Lighthouse Point, Eleuthera, is a total of 919 acres comprised of 758 acres of lands purchased by Disney, and Crown Lands that include Big Pond, White Pond, and multiple land parcels (Figure 2-3). The property culminates at a dramatic limestone outcrop extending into the Atlantic Ocean. The proposed development, a cruise port and entertainment destination, situated on 758 acres of privately owned lands will result in a change of land use from mostly undeveloped to partially developed for commercial and recreational purposes. The Developer, Magical Cruise Company Limited, is committed to a development footprint of less than 16 percent, with an emphasis on avoidance and minimization of impacts; and sustainable design, building, and management practices that will conserve natural resources, while allowing limited use of the land. A detailed breakout of the land use is provided below.

Lighthouse Point Distribution of Land

919 acres	Project Site and internal Crown Lands
161 acres	Crown Lands and 13 acres less outparcel retained by seller on the northeast corner
758 acres	Lands bought by Disney
193 acres	Lands to be donated
413 acres	Lands to remain undeveloped
152 acres	Lands to be developed for cruise port

The Project's critical element, the cruise port and ancillary facilities, have been sited based on extensive marine and coastal engineering investigations to meet ship berthing requirements with respect to identified sensitive marine and upland resources within the area of influence. The cruise ship pier, berthing area and service ramp will be constructed as pile-supported structures to minimize impacts to benthic habitat and nearshore currents.

Elements of the marine facilities will have varying degrees of impact for up to 5.04 acres of marine habitat, which may include 3.41 acres of hardbottom, 1.46 acres of sand habitat, 0.16 acres of scattered coral mound habitat, and 0.01 acres of submerged aquatic vegetation. The estimated combined amount of live surface area (stony corals, barrel sponges and gorgonians) that will be impacted within the marine development footprint was estimated to be 0.0152 acres (661.1 ft^2/614,190 cm^2). Coral reefs in the vicinity, but more than 1,000 feet east of the marine facilities, are considered to be in fair condition, based on the comparison of AGRRA ecological indicators to other sites reported in The Bahamas.

Upland design reflects a minimum of 85 percent preservation of the biodiverse dry broadleaf evergreen formation and no long-term adverse impacts on the existing salt ponds. South Eleuthera and the greater Bahamian economy will benefit from direct and indirect employment opportunities during development and operation of the Project.

Development of the cruise port and associated amenities will result in some unavoidable loss of habitat (marine and upland) and create potential for secondary impacts. The Developer has taken proactive measures to document baseline site conditions, to carefully manage development and operational activities, and to mitigate impacts through site design, ongoing monitoring, and educational programs. Based on the results of site investigations and species encountered, construction and operation of the Project is not expected to result in any loss of terrestrial or marine biodiversity, although conscientious efforts will be made to remove and/or control invasive non-native species that are listed in The Bahamas National Invasive Species Strategy.

Disney is developing this Project with the same approach that has enabled it to earn worldwide recognition and a reputation for its long-term commitment to the environment and sustainable practices.

Contributing Consultants

- Applied Technology Management (ATM), Florida, USA
- Waypoint Consulting Ltd. Nassau, The Bahamas
- Design Elements, Ltd. Nassau, The Bahamas
- Jacobs Engineering
- Brooker & Architectural Design Consultants, Charleston, SC, USA
- Oxford Economics
- Perigee Environmental Inc., Florida, USA

1.0 INTRODUCTION AND OBJECTIVES

1.1 OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT

This report provides an Environmental Impact Assessment (EIA) for a proposed development at Lighthouse Point, located in South Eleuthera. Up to 152 acres will be utilized for Project development, and at least 606 acres will remain undisturbed. The majority of the existing terrestrial vegetative communities and the four salt ponds that exist on the property will be left undisturbed. The Developer will also be applying for a submerged land lease for the planned marina and ship berthing area. The report is formatted in accordance with the General Outline for an Environmental Impact Assessment of Resort Developments provided by The Department of Environmental Planning and Protection (DEPP) and has been developed after a site visit and meetings with DEPP staff where environmental issues were discussed. All the items listed in the approved Terms of Reference have been addressed within this document.

1.2 SCOPE OF THE ENVIRONMENTAL IMPACT ASSESSMENT

In general, this effort has included detailed evaluations of the Project site itself and the various alternative plans considered during the planning process. The report summarizes the potential physical and environmental impacts and benefits attributable to the chosen plan components.

1.3 PROJECT DEVELOPER AND OPERATORS

DCL Island Development, Ltd., the Developer, is a company incorporated under the laws of the Commonwealth of The Bahamas and having its Registered Office in the City of Nassau. DCL Island Development, Ltd. was incorporated on the 6th day of September 1995.

2.0 PROJECT BACKGROUND

2.1 LOCATION AND BOUNDARIES

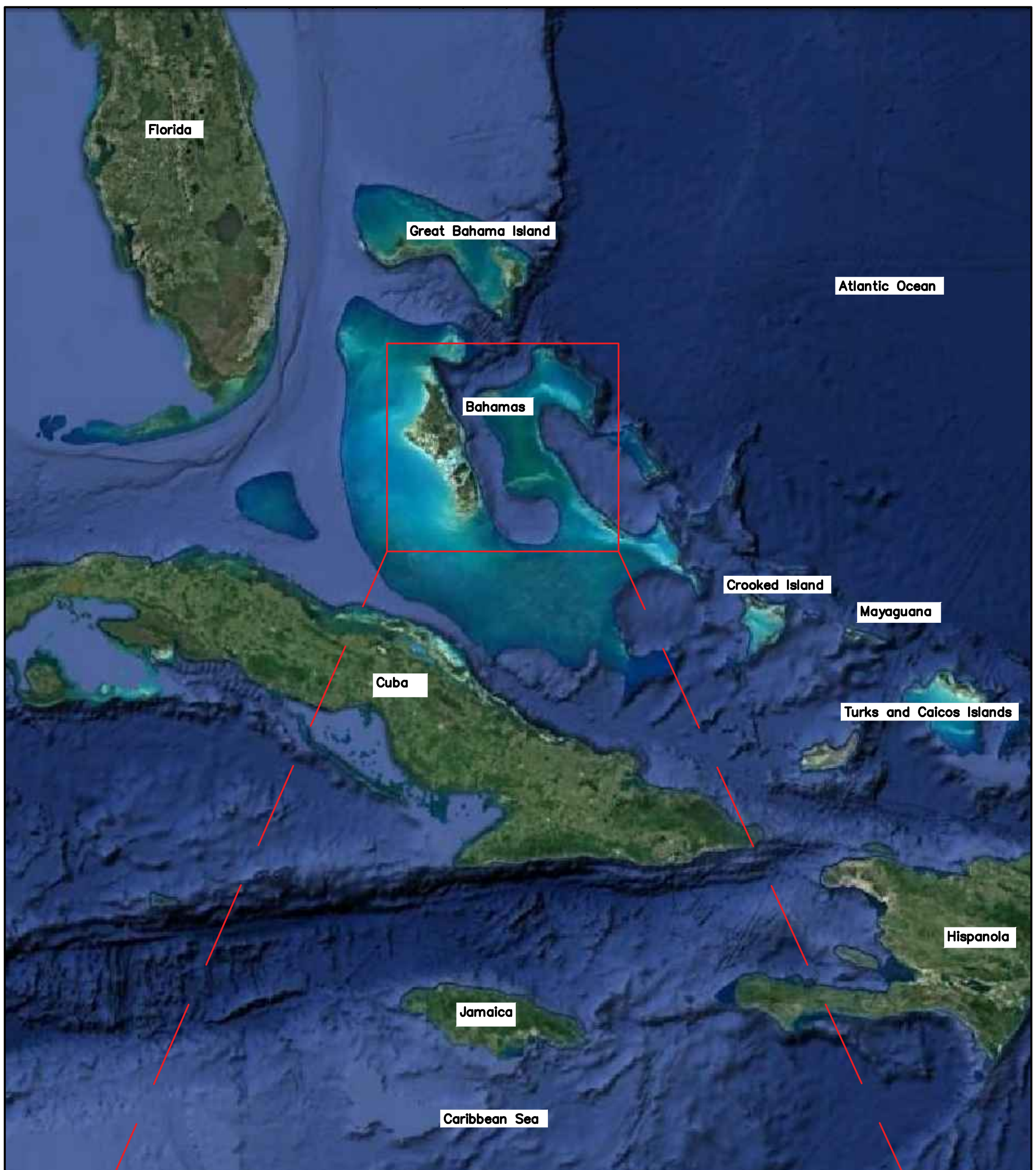
Lighthouse Point is located at the south end of Eleuthera Island and approximately 75 nautical miles southeast of Nassau, The Bahamas. Figure 2-1 shows the location of Lighthouse Point in relation to the Islands of The Bahamas. Figure 2-2 shows Lighthouse Point in relation to the Island of Eleuthera.

The site boundaries of the Lighthouse Point development extend from the most southern tip of the Island (Lighthouse Point proper) north approximately 8,000 feet (ft) including both the eastern and western shorelines. The Project site is a total of 919 acres comprising 758 acres of lands purchased by Disney, and Crown Lands that include Big Pond, White Pond, and multiple land parcels (Figure 2-3). Approximately 193 acres of the privately owned lands, including the southern tip encompassing the actual lighthouse building structures, will form the Disney Donated Public Lands. Upon the execution of the land swap agreement that is currently being reviewed by the BIA and AG offices, the lands will be transferred to the Government of The Bahamas; see Section 5.9 of the March 7, 2019 Heads of Agreement (HOA). Development will be limited to 16 percent or less – up to 152 acres of the purchased property. The balance of the site, about 413 acres, will remain undisturbed. Donated and remaining undisturbed lands total 606 acres, or 80 percent of the Disney purchased lands utilized for Project development based on the current site plan. The pier extending to the berthing area will be connected to the western shoreline of Project site. Figure 2-3 shows the approximate boundaries of the Project site. A full size copy of the survey has been submitted to DEPP under a separate cover.

2.2 PURPOSE AND NEED

The purpose of this EIA is to document existing environmental site conditions and assess impacts at Lighthouse Point, Eleuthera associated with the development of a cruise port destination for Magical Cruise Company Limited, a wholly owned subsidiary of the Walt Disney Company, which currently operates four cruise ships. All the ships are registered with The Bahamas Maritime Authority (such entity being hereinafter called “Disney Cruise Line” (DCL).

REGIONAL MAP



N.T.S.

BAHAMAS ISLANDS

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SITE LOCATION MAP

FIGURE 2-1
GENERAL LOCATION MAP
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 9, 2019

ATM

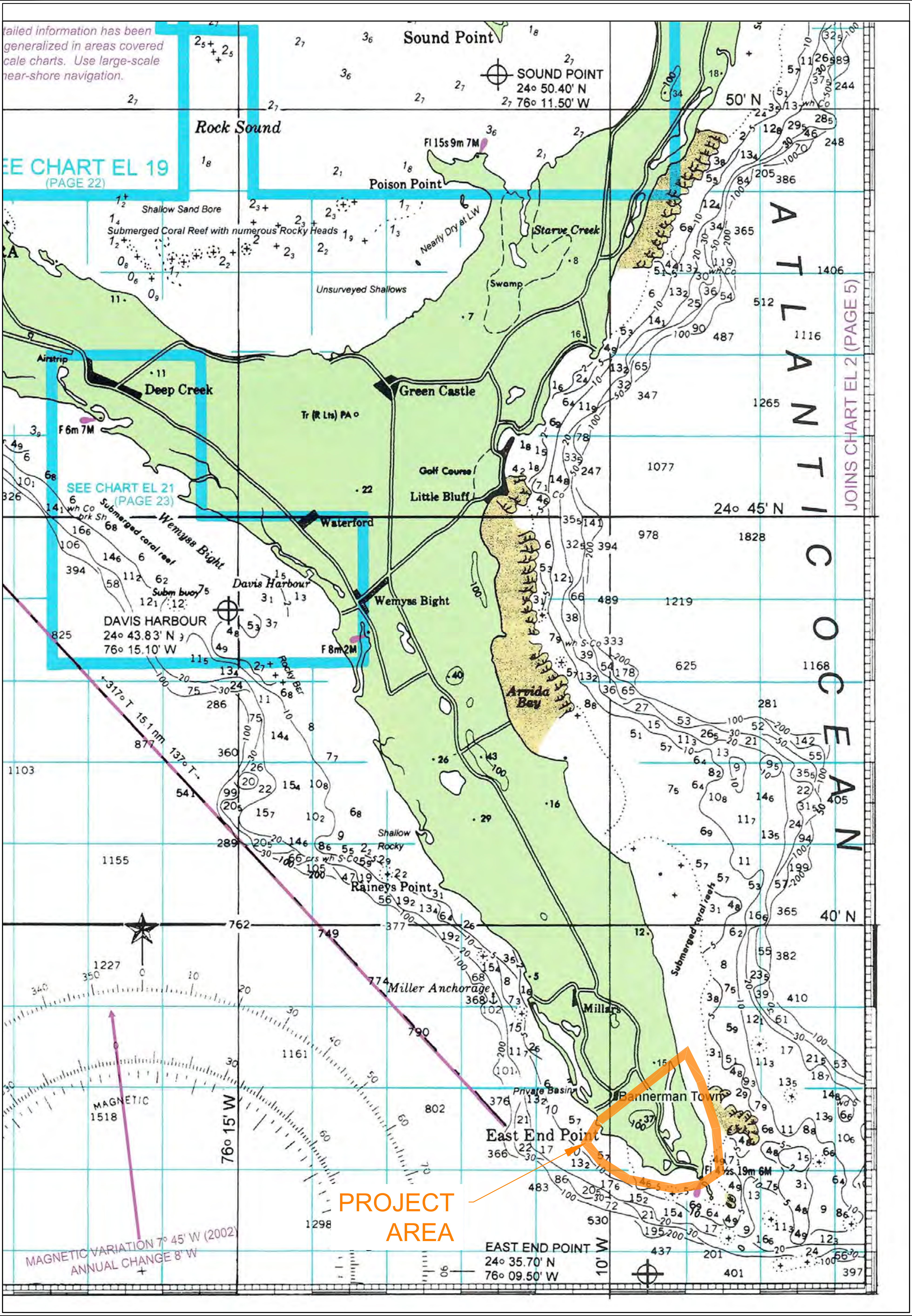

FIGURE 2-2
NAUTICAL CHART OF SOUTH ELEUTHERA
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 9, 2019

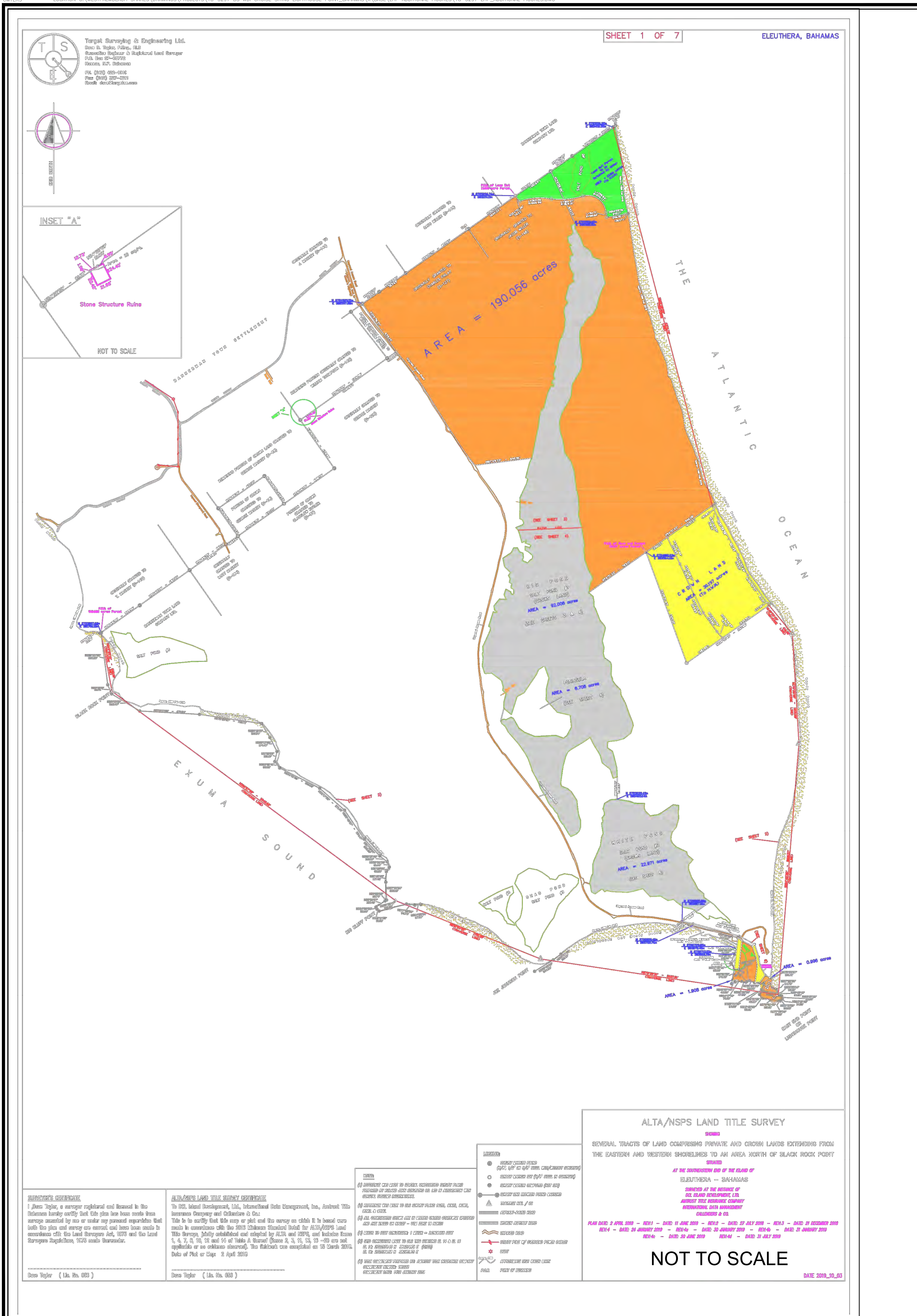

FIGURE 2-3
SITE BOUNDARIES / SURVEY
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 9, 2019

ATM

The EIA identifies potential environmental risks and impacts based on the results of site investigations and recommends measures for avoiding and minimizing potential impacts through best management practices (BMPs) recommended in the subsequent Environmental Management Plan (EMP) and mitigating for unavoidable impacts.

Importantly, an EIA is used for planning purposes to consider Project features and impacts prior to development.

This EIA was prepared in accordance with the EIA guidelines of DEPP and the Terms of Reference (TOR) that were approved on February 9, 2019.

2.3 AREA OF INFLUENCE

The area of influence for Lighthouse Point includes:

- Direct impacts to Lighthouse Point, South Eleuthera and the submerged lands adjacent to where a ship berthing area, a service ramp, and a small vessel marina will be located, and areas on the upland where clearing will take place and structures are proposed to be built; and
- Secondary and indirect impacts to areas outside of the direct footprint of the developed areas from increased human activity and development operations.

Upland onsite influences include land clearing associated with the development and long-term operation of roadways, island amenities, infrastructure, beaches, and the landfall of the trestle that will provide access to the cruise ship berthing area. Marine influence areas include barren sands, corals, hardbottom, and submerged aquatic vegetation communities impacted by the development associated with the cruise ship berthing area, trestle and a small-vessel marina expected to accommodate a maximum vessel size up to 35-foot boats, and potential secondary impacts of the development on adjacent marine resources. Placement of a rock protection structure to protect the small vessel marina will also have direct and indirect impacts on marine habitats but will also create new habitat areas. This EIA lists all proposed Project components and details their potential environmental impacts.

2.4 SITE ALTERNATIVES

Prior to selecting Lighthouse Point for the new Project site, the Developer researched several areas in The Bahamas within the cruising range of the vessels anticipated to use the new Project. Considerations were given to cruising distance from home port, cruising distance from the Port of Nassau, navigation depth requirements, minimization and avoidance of any dredging and development impacts, avoidance of areas of cultural resources, minimization of adverse sociological impacts and overall minimization of environmental impacts and other factors.

During the approximately five-year search for a suitable location, all potential sites were carefully analyzed for fatal flaw characteristics and thoroughly evaluated for the requirements above. Several sites were investigated in great detail and were rejected based on preliminary findings. This included:

- Egg Island near northern Eleuthera, which was rejected due to the potential for higher than acceptable impacts to coral and benthic habitats;
- Morgan's Bluff in Andros, which was rejected due to the requirement for extensive dredging and the presence of blue holes and the freshwater lens at a relatively shallow depth;
- West End on Grand Bahama, which was rejected due to land ownership issues and potential interference between a cruise ship and the active runway;
- Various vacant parcels within the Berry Islands, which were rejected due to excessively shallow depths on the west side prohibiting easy access and high wind and wave exposure on the east side;
- Additional areas on the southern end of Abaco that were rejected due to low elevations and potential for flooding;
- The Developer also considered a no new action alternative such as expanding Castaway Cay to handle additional vessels should no acceptable new sites be located.

As part of the site selection process, The Developer conducted a comprehensive site analysis for the Lighthouse Point site and determined that this site provided the most desirable elements for the cruise ship destination, while having the least environmental impacts.

Once Lighthouse Point was selected, several pier, trestle and berth location options were evaluated. An open channel/land side berth design was initially considered, then rejected due to the required extent of dredging and associated environmental impacts. Initial findings indicated that some dredging would be required to achieve the necessary depths for cruise ship operations.

Upon completion of additional site studies and bathymetric surveys, it was determined that the Project could be completed with a no dredging alternative. The pier option described herein has been arrived at a result of input and consideration from a variety of disciplines. Most significantly, the site and adjusted layout's access to deep water eliminates the need for dredging and/or offshore anchoring and tendering. Additionally, the property's large size allows the Project to be designed, constructed and operated in a manner that avoids impacts to the majority of the property. This provides a stark contrast with the site plan of a prior, Government of The Bahamas-approved project at Lighthouse Point (Appendix J).

2.5 SIZE AND SCOPE

The Project site is a total of 919 acres comprising 758 acres of lands purchased by Disney, and Crown Lands that include Big Pond, White Pond, and multiple land parcels (Figure 2-3). Approximately 193 acres of the privately owned lands, including the southern tip encompassing the actual lighthouse building structures, will form the Disney Donated Public Lands. Up to 152 acres will be utilized for Project development, and at least 606 acres will remain undisturbed. Donated and remaining undisturbed lands total 606 acres, or 80 percent of the Disney purchased lands utilized for Project development based on the current site plan.

2.5.1 RESIDENT/GUEST CAPACITY AND STAFFING

At least 150 permanent jobs will be created during the operation of the Project. While the company plans to first focus its recruitment efforts in Eleuthera, the planned residential housing has the ability to host 50 to 150 permanent staff. Of those staff, many will be employed to conduct routine maintenance, guest service, Project management, and other normal day-to-day operations. It is anticipated that local Bahamian employees will live off site in the various communities of South Eleuthera. A contingent of employees will also be housed onsite to include emergency staff and site managers and other employees working on a temporary basis.

2.5.1.1 During Construction

During construction, at least 120 Bahamians will be employed, and an 80 percent Bahamian work force will be maintained in accordance with the approved Heads of Agreement (Appendix I).

2.5.1.2 Build-Out

The Project will be built in a single phase with the early efforts to include improving access to the site and establishing basic infrastructure such as water and wastewater treatment, electrical supply and other amenities to house the work staff. Construction materials will be brought to the site via overland truck and small barges which will be off-loaded in a central laydown area to be located on the property. The current estimate of the size of the laydown area is 5 to 10 acres. This area will be wholly contained within the ultimate development footprint, which may include the solar panel area or other back-of-house (BOH) areas.

During the operational phase of the Project, at least 150 well-paying jobs with benefits will be created in a range of disciplines and with opportunities for training and advancement. Once open, the destination will allow opportunities for Bahamian vendors for souvenir sales, entertainers and port excursion adventures, among other opportunities.

3.0 PROJECT DESCRIPTION AND ALTERNATIVES

3.1 PROJECT DESCRIPTION

3.1.1 SITE PLANS AND DESCRIPTIONS

The Developer has proposed to transform the parcel referred to herein as Lighthouse Point, an uninhabited parcel of land, into a cruise port to be visited by the residents and citizens of The Bahamas and cruise passengers for daily excursions. There will be up to 4,000 passengers on the ship, with a support staff of at least 150 persons on the property. The berthing facility is designed for a single cruise ship. The ship uses bow thrusters and therefore requires no tug assistance. The berth will be an open-pile trestle extending from the shore to a sufficient depth that no dredging will be required (Figure 3-1). The planned development will include items such as the following:

- Cruise ship berthing area
- Small vessel service and excursion marina
- Service Ramp
- Food and beverage locations and retail shops
- Outdoor entertainment and recreation areas
- Vehicular roadways and pedestrian walkways
- Beach swimming areas
- Day-use cabanas along the beaches
- Snorkeling areas and water activities area
- Back-of-House (BOH)
    - Staff Housing
    - Pump House
    - Administration and Maintenance Buildings
    - Electrical Building
    - Sanitation Building
    - Power Generator
    - Solar Power Generation Arrays
    - Diesel Tank
    - Gasoline Tank
    - Reverse Osmosis (RO) Units
    - Wastewater Treatment Plant (WWTP)

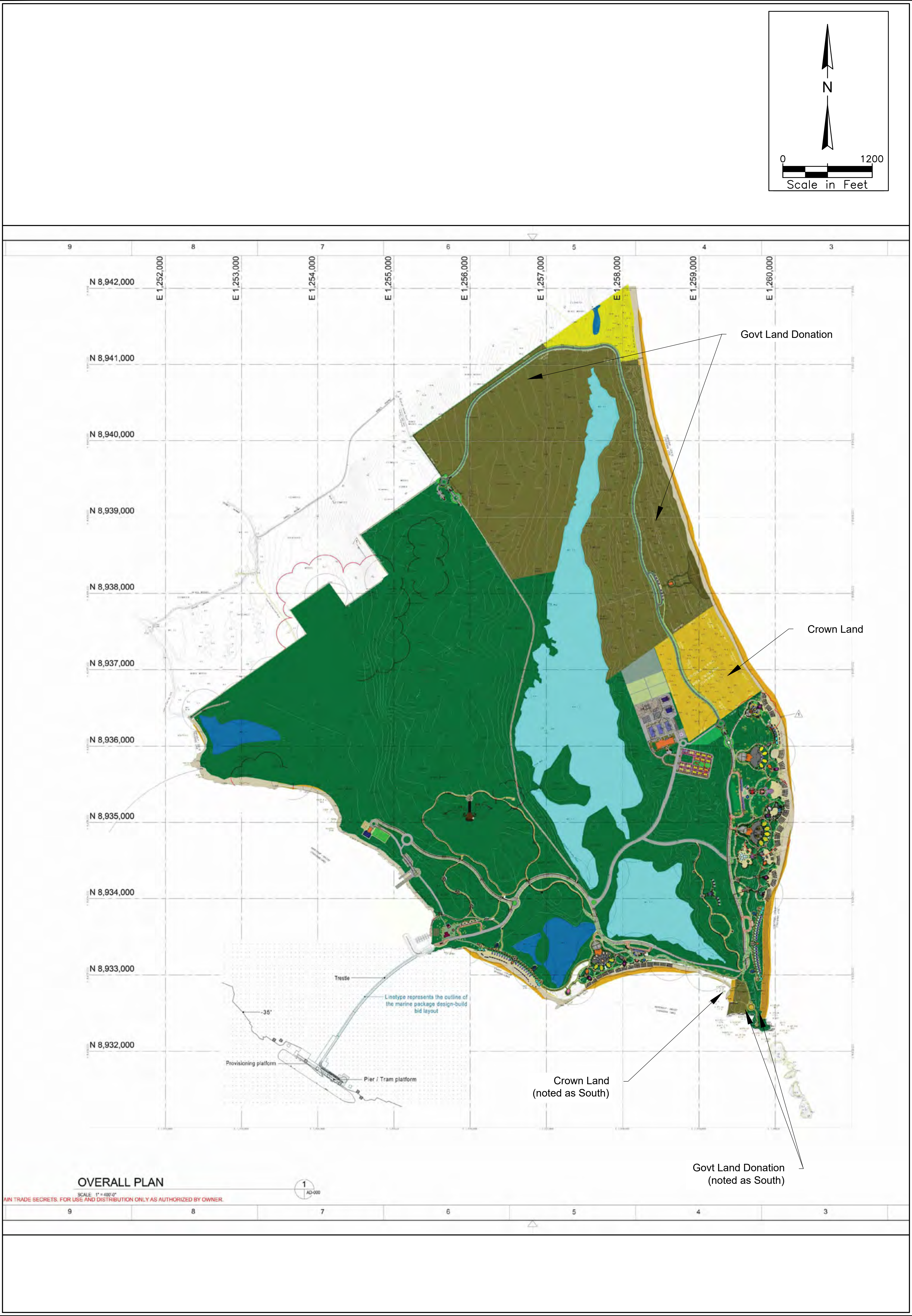

FIGURE 3-1
1:1200 OVERVIEW WITH ILLUSTRATIVE CONCEPT PLAN OVERLAY
LIGHTHOUSE POINT, BAHAMAS
NOVEMBER 10, 2020

ATM

- Potable Water Tank
- Re-Use Water Tank
- Incinerator
- Cellular Communications Tower

Sediment transport will not be significantly interrupted along the shoreline by any pier structures or planned beach structures. Ample use of flushing thru-ways will allow for sand fish, and benthic species to pass unimpeded. The small vessel marina has been located in an area that does not have any natural significant long-term sand accumulation that would be affected by the proposed development. As such, no significant erosion or accretion of sand or sediments will occur from the development of the pier or beach areas.

3.1.1.1 Berthing Area

The berthing facility will be designed for a single cruise ship (Figure 3-2). The ship uses bow and stern thrusters and, therefore, requires no tugs.

The cruise ships that will use the site have a draft of up to 27.3 ft and require up to 35 ft of water depth (at lowest low) which provides up to seven feet of clearance between keel and ocean bottom. The trestle pier is designed to extend to the natural depth contour of a minimum of 35 feet, and therefore, no dredged channels or berthing areas are proposed. The vessel will typically be berthed with its bow pointing in the departure direction (i.e., southeast) so it can leave quickly if an emergency situation should arise. Pier-side cruise ship utilities will be limited to lighting, limited power and potable water to supplement the ship's on board systems, fuel bunkering connections, mooring arrangements, and embarkation/debarkation structures. In order to meet international security requirements, access will be controlled to the ship for passengers and ship employees only.

Refer to Sections 6.2.1.4.7 and 6.2.1.4.8 for discussion of potential thruster impacts and Figure 6-2 Marine Benthic Impacts - Areas of Impacts. While at berth, the vessel will cycle approximately 5,000 cubic meters/hour of water through its internal system for cooling of chillers and other ship operations. The water is not mixed with any other systems or waste streams but will return the water approximately 5 degrees Fahrenheit (°F) warmer from intake to discharge. The berth is located in deep, unconfined water with measured currents upward of 1.5 knots, either in the flood or ebb stage.

CMYERS LOCATION G:\WESTPALMBEACH SHARES\DRAWINGS\PROJECTS\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\18-3297 BS WDI_FIG 3-2 FIG 4-23.DWG

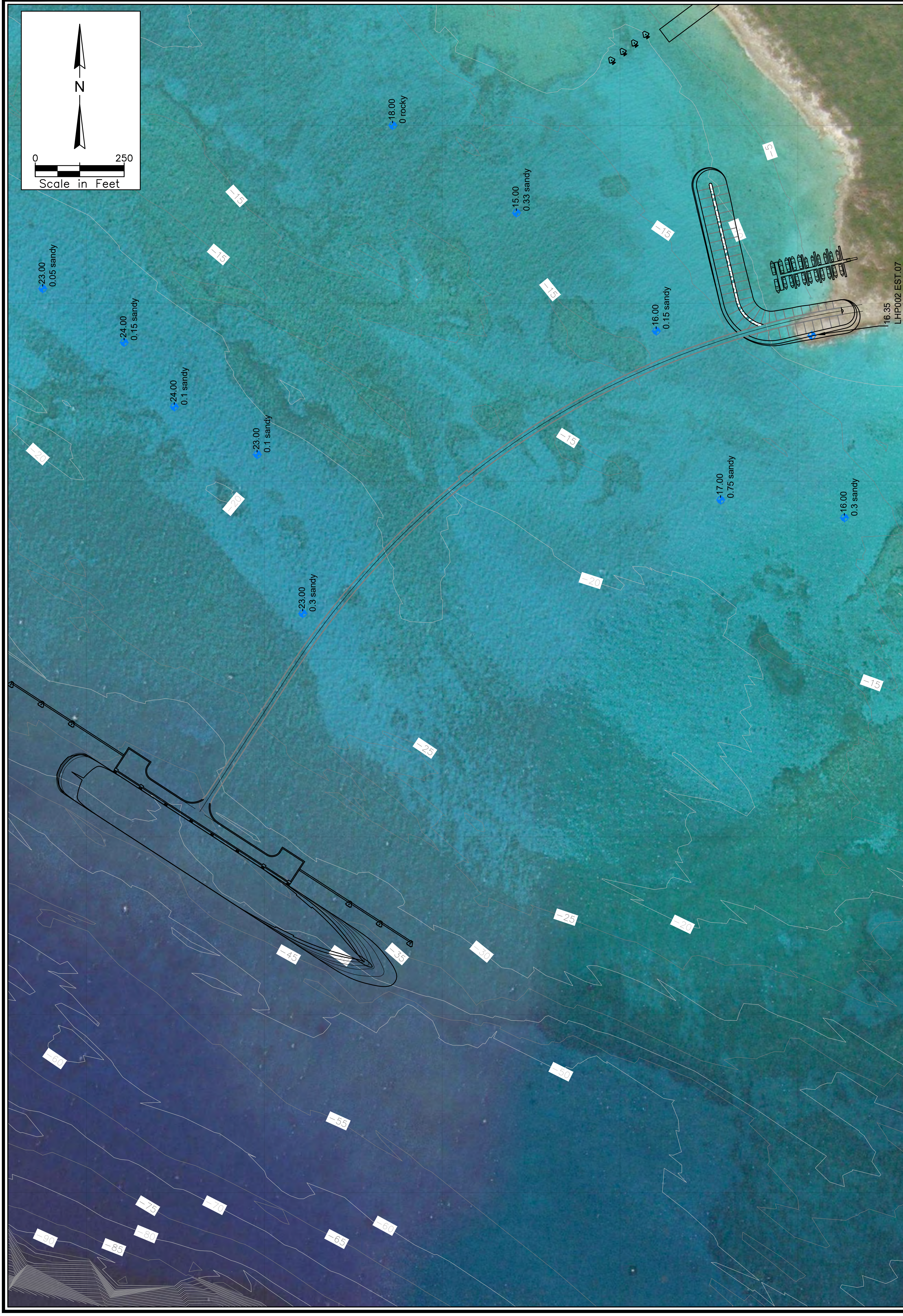

FIGURE 3-2
1:250 PIER WITH CONTOURS & LABELS
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 9, 2019

ATM

The water discharged from the vessel will mix rapidly with surrounding waters and no net, local increase in water temperature will occur. While not modeled specifically for this EIA, the dissipation of the warmer waters within the surrounding cooler waters will occur rapidly and continuously and is not anticipated to be an impact to surrounding HSCMS and Scattered Coral Mounds/Relict Spur and Groove Structures (SCM) communities

It is expected that one engine will run continuously to provide power to the ship while alongside. Propulsion engines are not used continuously.

3.1.1.2 Beaches

The conceptual beach enhancements are based on locally observed conditions, discussions with local persons working with the field crew during the EIA site investigations and engineering analyses. The beach/swimming areas will be located where natural sand beaches currently occur on the south, southwest and along the southeast coast (north of the actual point). All these areas are relatively stable sand beach areas that naturally hold and accrete sand. To increase the beach usage area, guest beach areas will be expanded landward, and new sand will be placed on the upland where needed. Coastal stabilization structures will be limited to upland areas only above the mean high water line to contain the beach areas and minimize erosion. See guest beach areas on Figure 3-1, the Lighthouse Point Illustrative Concept Plan. Beach expansion is planned landward of the foredune. Depth of sand and other details will be site-specific pending completion of the design process. A beach plan overlay with typical conditions is shown in Figure 3-3.

By using this method, minimal, if any, sand filling of the water areas will be required, invasive non-native *Casuarina* trees will be removed, and any potential impacts to seagrasses or other benthic habitats will be non-existent or minimal. Structures such as rock revetments and groins will not be constructed below the mean high water line. In some locations, existing rock directly beneath the sand along the beach in the upland areas will be excavated and replaced with sand to ensure it is not exposed in bathing areas.

No access will be provided to the small cays that are present nearshore to the south of the tip of Lighthouse Point.

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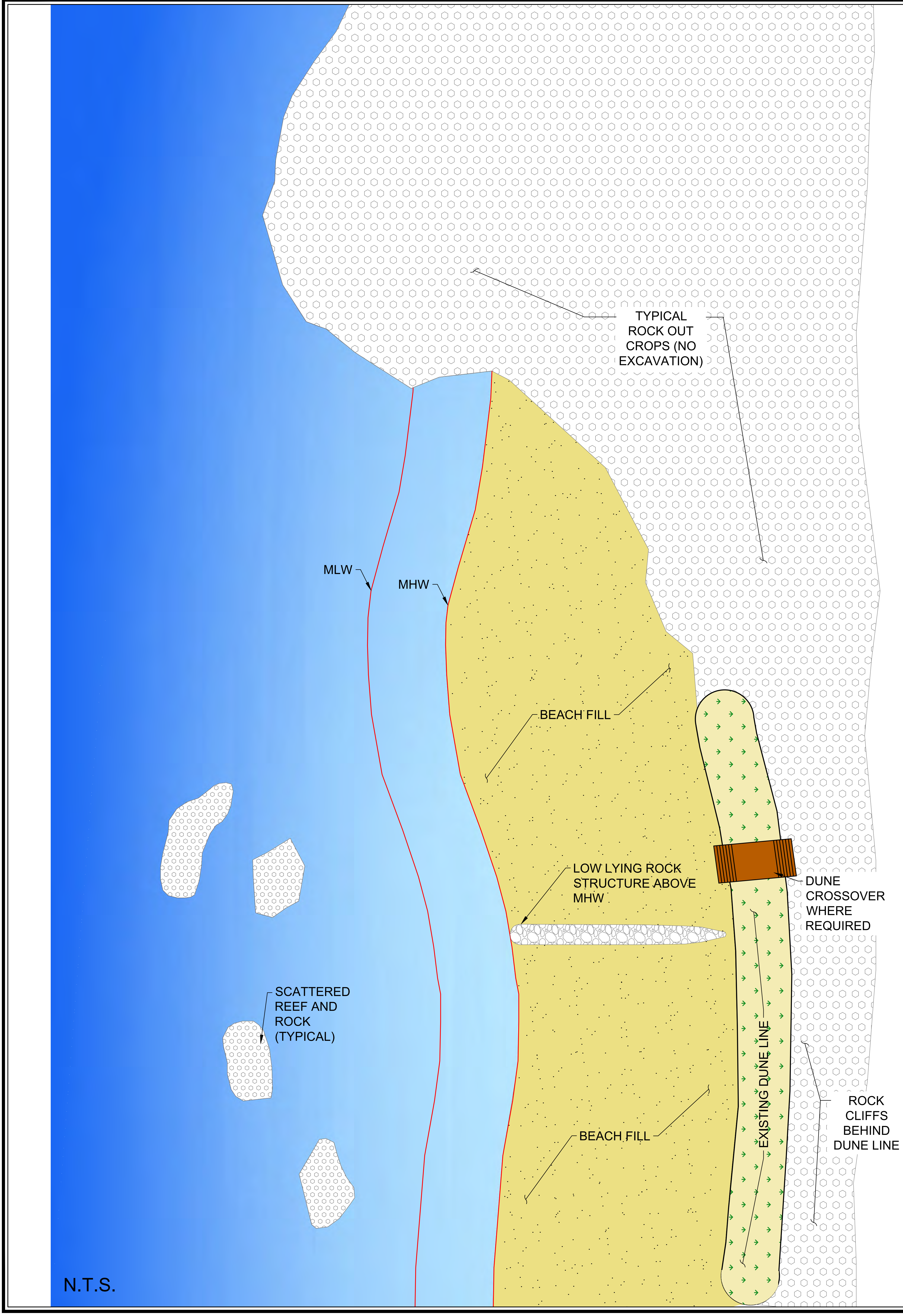

FIGURE 3-3
CONCEPT BEACH PLANS - PLAN VIEW
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 30, 2020

ATM

Based on the conceptual site plan, there is approximately 10,000 total linear feet of sandy beach areas at the site, including the east and west sides. Existing and enhanced beach areas will be between 100 and 200 feet wide, depending on the area. This provides approximately 1,500,000 square feet of beach area. Based on guidelines from the U.S. Army Corps of Engineers (USACE) Engineering and Design Manual No. 1110-1-400 Recreation Facility and Customer Service Standards, the recommended area for each individual is 50 square feet of sand/upland area. The recommendations also use a turnover rate of three persons per day per area, as not all beachgoers stay at the beach the entire day. Based on these figures, the beaches at Lighthouse Point have an approximate capacity of well over 20,000 guests daily, which significantly exceeds the capacity of the passengers on the ship. The ship sizes will range between carrying 2,800 and 3,800 passengers, and not all passengers visit the beach. Those that do may not stay the entire day. The beach will also be accessible for local residents per the approved HOA documents.

The coastal stabilization structures will consist of low-lying native rock and materials, including vegetation and temporary sand fencing installed during storm events. The intent of the structures is to contain sand during times of extreme water levels from hurricanes and reduce wind-borne migration of sand. The structures will also delineate beach areas to keep guests out of non-swimming and protected areas. The structures will not inhibit sea turtles or other natural uses of the coastal areas. The Project will adhere to guidelines established by USACE and the State of Florida for beach nourishment activities. Examples of such structures are shown in Figure 3-4 and will be expanded further upon design in the EMP. All beach work will be considered an expansion of the existing beach.

Detailed information about habitat loss and faunal impacts associated with beach expansion are described in Section 6.1 in accordance with each habitat type.

Beach expansion is planned to occur landward of the foredune and placement of sand is planned at or above the mean high water Line. Created dunes and sensitive areas on the foredune will have crossovers or boardwalks to prevent disturbance. Management and maintenance of the beach areas will be included with the Environmental Management Plan (EMP). Information including examples of the expansion areas are shown and will be expanded further upon design in the EMP.

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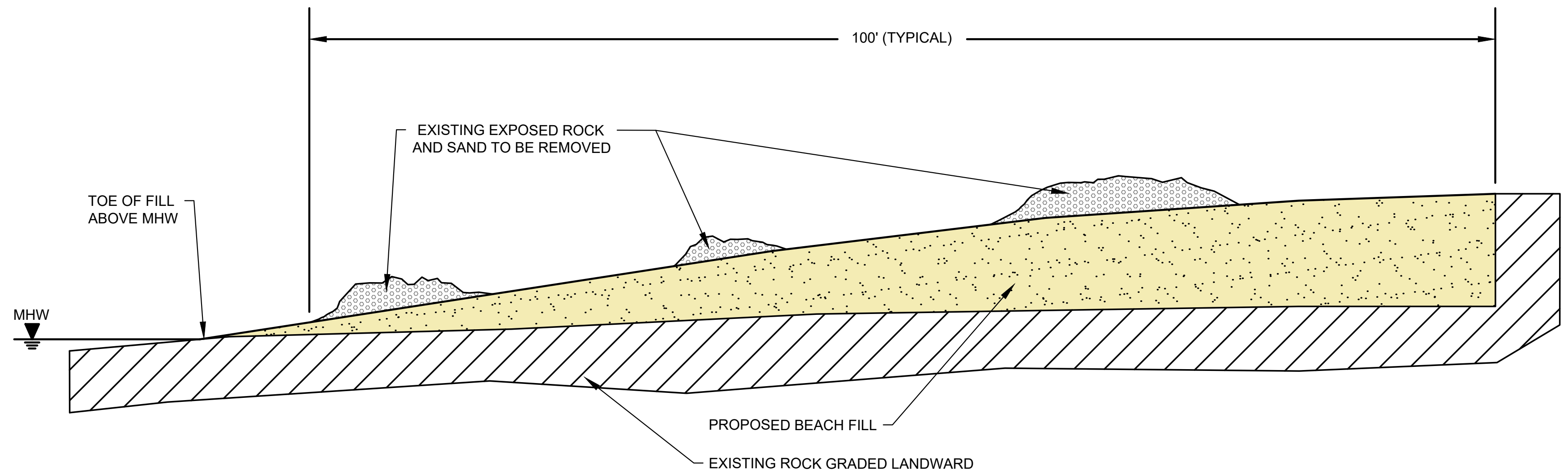

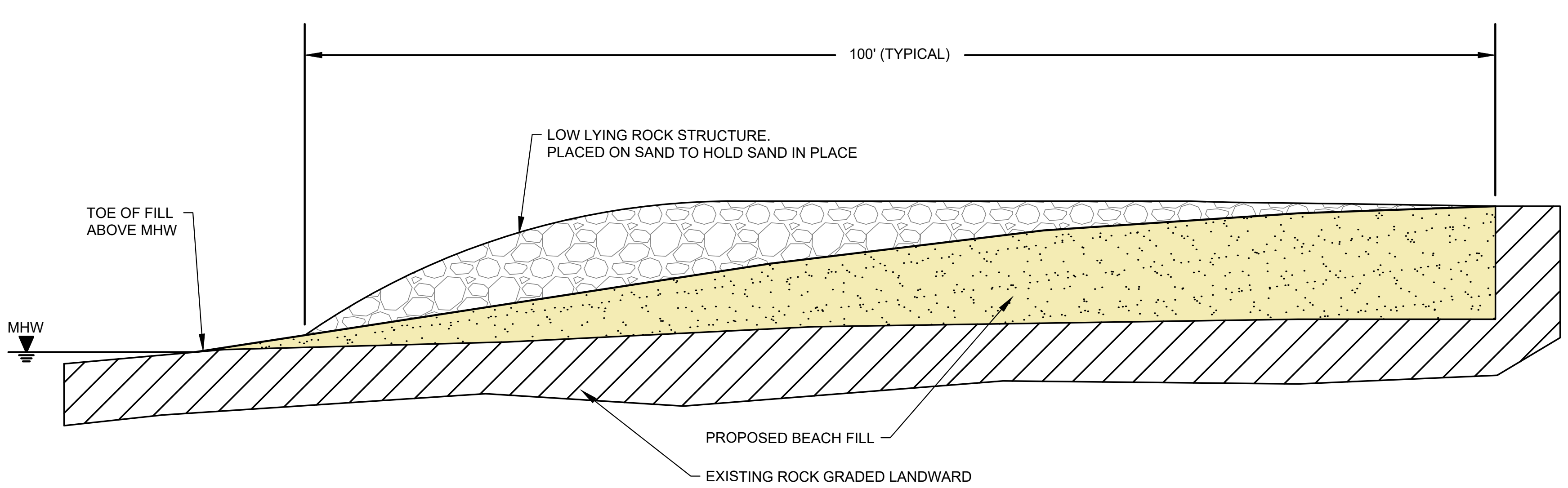

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FIGURE 3-4
CONCEPT BEACH PLANS - PROFILE VIEW
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 30, 2020

ATM

Sand used to expand/enhance beach areas will be locally sourced from an approved and licensed contractor and approved for the site using matching color and gradation indexes and other guidelines established by the State of Florida Beaches and Shores. All sand will be placed above the mean high water line. The anticipated quantity of sand required for the beach expansion is 30,000 cubic yards.

Guest beach areas are shown in the Figure 3-1, Lighthouse Point Illustrative Concept Plan. Additional areas with potential for excavation of rock will be available upon completion of geotechnical studies and site design. Areas where subsurface rock is encountered in the proposed expansion areas will be noted and provided to DEPP and the reporting plan will be outlined in the EMP. Only rock above the mean high water (MHW) line will be excavated and only on as-needed basis.

The depth and extent of areas to be excavated will be limited, and details are pending geotechnical findings and final design. Impacts and changes to the environment because of land development, including excavation of rock above MHW and the addition of sand over these limited areas are described in Section 6.1 in accordance with each habitat type.

3.1.2 DREDGE AND FILL REQUIREMENTS

3.1.2.1 Navigation Channels/Basins

Construction of the open-trestle pier will support the Project objective of no dredging. The pier will extend approximately 2,348 ft offshore to water of 35 ft depth, which is sufficient depth for the ship berth. The berth will be parallel to shore such that no ship channel or dredging will be required.

3.1.2.2 Beach Construction/Structures

Several of the existing beach areas will be enhanced to facilitate beach use. The coastal areas will require upland nourishment to create larger areas. Widened beaches will be created primarily by removing invasive *Casuarina* trees from existing back-dune areas and adding clean sand on the landward side of the existing beaches. Any groins or shoreline stabilization structures constructed for swim areas and beaches will be above the mean high water line. No structures are planned below the mean high water line.

The groins or shoreline stabilization structures may consist of native rock, sand fencing and vegetation placed to prevent cross sediment transport during storms and wind borne erosion. The structures will be designed to keep sand contained in high use areas and only in areas exhibiting above normal erosion rates. They may also be used as guest barriers to prevent access into restricted areas.

3.1.2.3 Construction Phasing Schedule

Once the EIA and other necessary approvals are issued, site development will begin on both the upland and pier facilities. Construction is scheduled to commence in mid-2020, and duration is expected to be 34 months.

3.1.2.4 Materials Source

Materials for the development will be brought to the site either via over-road vehicles or by using barges that will access the site at the service ramp. Materials will be from local sources, including other parts of Eleuthera, Nassau and surrounding islands, based on availability. Materials will be sourced from the USA as well. Sand for beach creation and fill will come from other off-site licensed borrow areas that have not yet been identified.

3.1.3 INFRASTRUCTURE DESCRIPTIONS

Lighthouse Point will require BOH areas to provide support to other areas within the Project. This will include water and wastewater services, power generation, garbage sorting and collection, recycling processing and storage, fuel storage, maintenance and repair areas, staff housing, and kitchens/dining areas. The primary BOH will be in the eastern portion of the site and will have limited access for employees only. Other smaller BOH areas may be located near developed guest areas, but will be limited to primary functions for that particular guest area such as garbage collection, storage, etc.

3.1.3.1 Potable Water Supply, Treatment, and Distribution

Currently, there is no developed potable water supply at Lighthouse Point. An RO water treatment plant onsite will produce potable water from salt water. The RO plant will produce pure water of a quality that meets requirements for domestic use. Technologies to optimize energy used for producing and distributing water will be evaluated for feasibility. Additional uses of water produced by the RO plant include landscape irrigation as necessary to supplement reuse water from the WWTP. The feasibility of capture and use of rainwater for irrigation and flushing will be evaluated. Estimated water produced will be 130,000 gallons daily to handle an estimated need of 120,000 gallons daily for normal operations.

There are no geotechnical reports available at this time due to geotechnical work interruption from government orders related to COVID-19. Figure 3-5 is based on Figure C-1, "Water Resources of the Bahamas", from a December 2004 report by USACE, "Water Resources Assessment of the Bahamas".

RO intake and discharge will be designed and operated to ensure no significant adverse impact to freshwater resources. Water intake will be from a deep groundwater well that is expected to be located in or near the Administrative Area (Figure 3-1). Brine discharge will be via injection deep well planned in or near the Administrative area where the RO system will be located.

3.1.3.2 RO Intake/Discharge

The RO water treatment facility will include supply wells or ocean water intakes, pre-treatment and post-treatment systems, membrane cleaning system, RO skids with cartridge filters and pumps, and disposal systems. Brine that is a by-product of the RO system will be discharged through groundwater injection or offshore, pending final Project design. As stated above, RO intake and discharge will be designed and operated to ensure no significant adverse impact to freshwater resources.

3.1.3.3 Wastewater Collection, Treatment, and Disposal

Currently, no public wastewater treatment facility is located or available in proximity to Lighthouse Point. Wastewater generated on Lighthouse Point will be collected via a central sewer system and pumped to an activated sludge WWTP. The operational model indicates the need for a 60,000 gallon per day package plant. The WWTP will be constructed in accordance with standard design and permitting requirements to provide treated water consistent with public access reuse requirements and used for irrigation and flushing. The potential for energy recovery from wastewater treatment processes will be explored.

Treated wastewater will be used after treatment and disinfection for irrigation of landscape and horticulture. Landscaping will consist of local flora, which will reduce the need for irrigation. Irrigation pipes used for reclaimed water will be clearly designated as such.

CMYERS LOCATION G:\WESTPALMBEACH SHARES\DRAWINGS\PROJECTS\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\LANDSIDE\WDI FIG 3-1.DWG

LIGHTHOUSE POINT RESOURCES
SOURCE: WATER RESOURCES ASESSMENT OF THE BAHAMAS, USACE, DECEMBER 2004.

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Scale in Feet

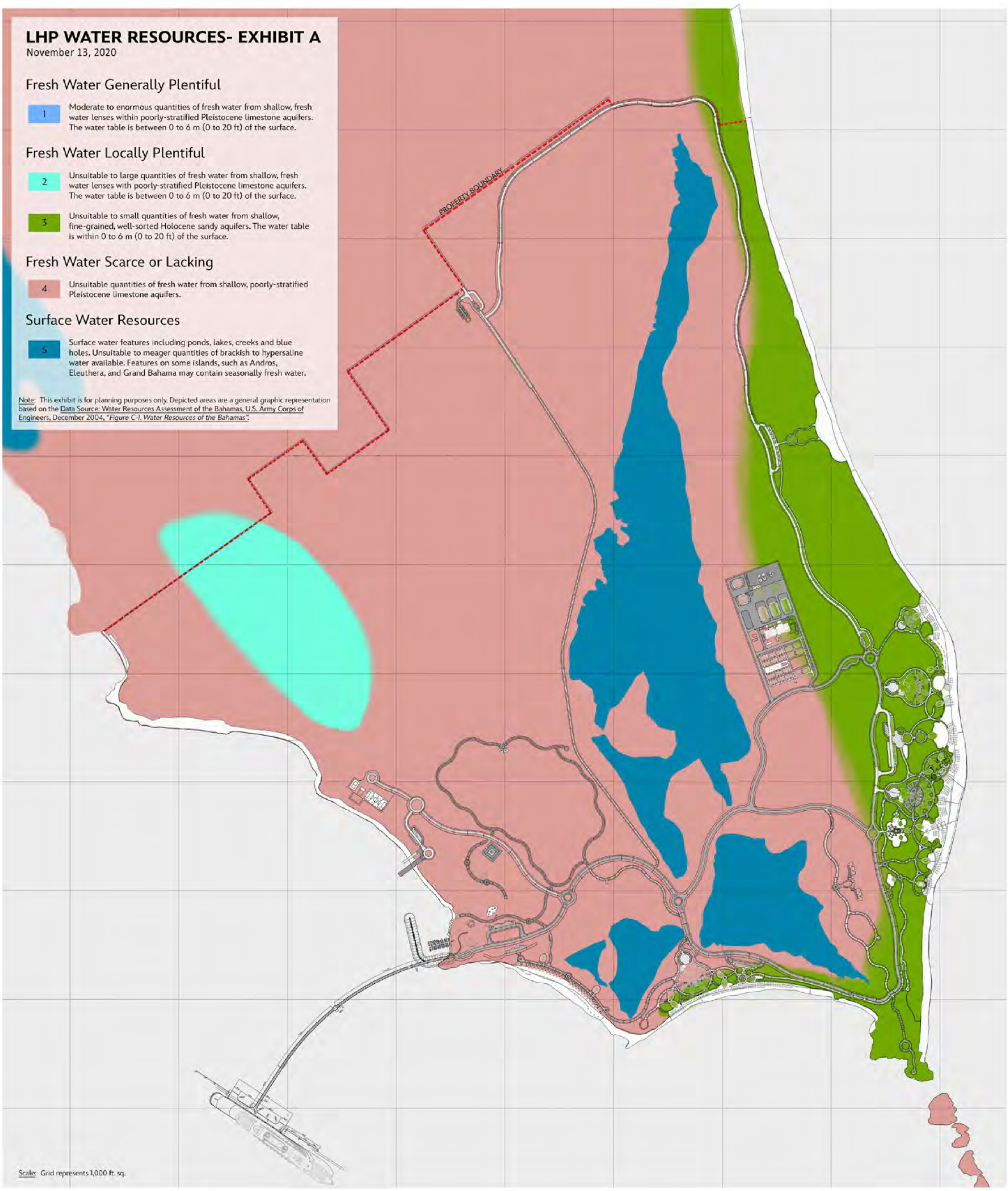

FIGURE 3-5
LIGHTHOUSE POINT RESOURCES
LIGHTHOUSE POINT, BAHAMAS
NOVEMBER 17, 2020

ATM

The proposed system type under consideration given the intent for grey water irrigation and energy recovery is an extended aeration wastewater treatment process. This is an activated sludge process that uses microorganisms to feed on contaminates in the wastewater. In the extended aeration, aerobic microorganisms are grown to metabolize organic matter and produce inorganic end products such as carbon dioxide, ammonia and water.

3.1.3.4 Electric Power

Electrical service is not currently provided to the Lighthouse Point property. Because Lighthouse Point has to be self-sufficient for energy, all buildings and equipment will be designed with high efficiency in mind. To best leverage efficiencies, the development will follow an integrated approach to design of energy, water, transport, and waste infrastructure.

In terms of energy supply, a minimum of 30 percent will come from renewable sources. In line with company commitment towards low-carbon energy, the potential for use of higher levels of renewable energy will be evaluated. Electricity will be generated by generators using fuel stored onsite, and solar arrays. All systems requiring power will have redundant generation capacity to assure uninterrupted operation. It is anticipated that approximately 3.5 megawatts (MW) per day will be produced. Only portions of the site will require electricity, and all distribution wiring will be underground.

The initial energy plan is to have a 1.2-MW solar system with battery to meet the HOA requirement that stipulates 30 percent of the power generated will be from renewable resource. Further augmentation of solar capacity is being assessed and will depend, in part, on balancing land development impacts. Castaway Cay, for example, will soon utilize 70 percent renewable energy sources.

Generator fuel will be diesel that is in line with the 0.1 percent sulfur marine diesel fuel that is used on Castaway Cay. Renewable diesel will be explored once local supply can meet site demand.

As noted in Section 4.12 of the HOA, the Developer shall make best efforts to incorporate into the construction of the Project the use of environmentally friendly technology and green building practices designed to reduce water usage, increase energy efficiencies in light and any cooling systems and increase efficiencies within its physical plant. The Developer shall seek to incorporate in any new buildings and outdoor amenities (e.g. outdoor lighting), efficient energy saving technologies and reduce solid and liquid waste streams, reduce energy usage and increase the efficiency of cooling systems.

It has been determined that the site is suitable for the placement of below-ground electrical utilities. DCL is solely responsible for the provision of all power onsite and the maintenance of associated utilities.

3.1.3.5 <u>Communications</u>

Cell phone service is limited in the vicinity of Lighthouse Point. To enhance communications both locally and regionally, a cellular communications tower will be constructed onsite. In addition, onsite communications will be by very high frequency (VHF) radio on dedicated channels. The constructed cell tower will be incorporated into the general communication grid on the island.

3.1.3.6 <u>Solid Waste Generation and Disposal</u>

Presently, there are no solid waste facilities at Lighthouse Point. Solid wastes generated during and after development will be incinerated onsite, processed for volume reduction and returned to the ship, or otherwise disposed in an appropriate manner in consultation with Government of The Bahamas and local authorities.

DCL's guiding principle is to implement waste reduction strategies while striving toward zero waste. Waste will continue to be sorted by stream for treatment: Recyclables, Reusables, Dry (Non-Hazardous) Waste, Hazardous Waste and Food Waste. Food waste generated by guests visiting the island is brought back to the ship for treatment. The volume of food waste is estimated at 4,000 lb per visit. Hazardous waste is very low and disposed of properly based on laws and United States guidelines.

Recyclables, such as cans, glass, scrap metal, cardboard, are estimated at just over two tons of items each month and will also be brought back to the ship and recycled in the United States. The island and ship have already removed many one-time use items. Hot drink cups, condiments, plastic lids, plastic straws, one-time use shopping bags and plastic utensils are some of the items that are no longer part of waste stream, while other practices are being explored to support waste reduction strategies as DCL strives toward a zero waste goal.

Non-hazardous waste that cannot be recycled or reused, such as metal scraps, building materials, lumber, rubber material, will be incinerated. The incinerator will be located in the BOH area as shown on the plan. Specific information regarding the incinerator will be provided as the design advances. The waste stream will be a closed system, intended only for use at the site. The incinerator will be operated and maintained in accordance with the manufacturer's specifications to ensure optimum performance. Qualitative capacities will be determined through the Project design process. It will either meet U.S. EPA in Table 1 to Subpart EEEE of CFR Part 60 or current IMO regulations, MEPC 224(66). Waste-to-energy technology is currently being tested as a possible alternative. All other requirements of the Government of The Bahamas will be met regarding air quality control and monitoring.

Incinerator ash will be safely and securely stored onsite, then shipped to United States for landfilling as dry waste. The ash will be contained in metal cans or transferred to larger ash bags on a pallet but will never be left outside for exposure to the environment. The incinerator ash is tested yearly, and compliance is maintained in accordance with Toxic Characteristic Leaching Procedures (TCLP) requirements.

3.1.3.7 Fuel Storage

Fuel for generators, vessels, vehicles and other ancillary equipment will be stored onsite in a dedicated fuel farm area. All storage systems will be above ground, with sufficient overfill protection and leak detection. A spill control and containment plan (SCCP) will be developed to address any potential accidental spills or discharges.

Diesel and gasoline will be used to fuel heavy construction equipment, marine craft, and small motor vehicles. Current operating plans include storing both diesel (estimated 47,000 gallons) and gasoline (estimated 10,000 gallons) in the Administrative area, with limited supplies at the marina location. The marina will have its own separate fuel storage system near the marina. The ships will not be fueled at this site. A Fuel Storage and Spill plan will be part of the EMP.

3.1.3.8 Stormwater Management

Stormwater runoff from roads and other impervious surfaces within Lighthouse Point will be handled with standard accepted BMPs. Runoff from these areas will be directed away from the existing ponds and handled in a manner that will provide sedimentation and water quality management. More specific details regarding stormwater management will be provided in the EMP.

3.1.4 TRAFFIC AND TRANSPORTATION

3.1.4.1 Air Transportation

Three airports presently serve Eleuthera: North Eleuthera International Airport (ELH), Governor's Harbor International Airport (GHB) and Rock Sound International Airport (RSD). All the guests to the site will arrive on the cruise ship, and no significant increase in air traffic is expected.

In the event that an emergency requires an air extraction, a dedicated location for helicopter landings will be designated near the emergency services building located within the BOH area.

3.1.4.2 Vehicle Transportation

Staff ingress and egress to the site will be primarily via Queen's Highway and other existing public access roads. Currently, the Project site is undeveloped, with no paved roadways. New roads in the interior of the site will be 20 ft wide with an additional 10-foot-wide utility easement on one side of the road or the other. The road will be constructed with a chip seal roadbed.

Within the site, the primary mode of transportation for staff and guests will be various modes of motorized transport, and some staff will use utility vehicles. Visitors will be transported by trams from the trestle landfall to onsite visitor use and recreation areas. Some standard-sized trucks and utility vehicles will be located on the site in association with the marina, and other support facilities. All vehicles will utilize the roads that the Developer will construct to provide access to various areas of the site.

3.1.4.3 Boat and Vessel Traffic

All DCL current and future fleet vessels are expected to berth at the site. Current projections are for an average of five to seven ship calls per week. The cruise vessels will access the site from deep water offshore the east coast of Eleuthera and passing between Little San Salvador and Lighthouse Point using existing cruise ship and other vessel pathways.

A sub-surface feature locally referred to as “the Bridge” extends between the tip of south Eleuthera and Little San Salvador. The depth to the top of the Bridge has been charted to be no shallower than 80 ft of depth, which is well below the draft of the cruise ships operating in the area (27-ft draft). Currently, vessels from three other cruise lines operate in the general area accessing areas along the coast to the northwest of the subject property. Figure 3-6 shows the vessel ingress to and egress from the site.

Local boat traffic will remain uninterrupted, with the exception of the trestle pier and small-vessel marina. Nearshore access north and south of the pier will remain open. Vessel operations for the Project will include crew boats, small supply vessels and recreational boating for uses including SCUBA, snorkeling, fishing and other sightseeing excursions and other activities to be operated by vendors, with a preference for Bahamian operators.

Conservation education and BMPs will be part of the operational plan for vendors. The location of these vendor vessels is the Marina and Service Ramp (Figure 3-1, Lighthouse Point Illustrated Concept Plan).

The number of guests traveling on DCL ships will range from 11,400 to 26,600 per week, depending on the season. The guests will be contained in designated areas within the Project site and not allowed access to sensitive areas or allowed to roam freely from paths and guest areas. DCL has extensive experience in managing guest flows and control.

CMYERS LOCATION G:\WESTPALMBEACH SHARES\DRAWINGS\PROJECTS\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT BAHAMAS_USFT.DWG

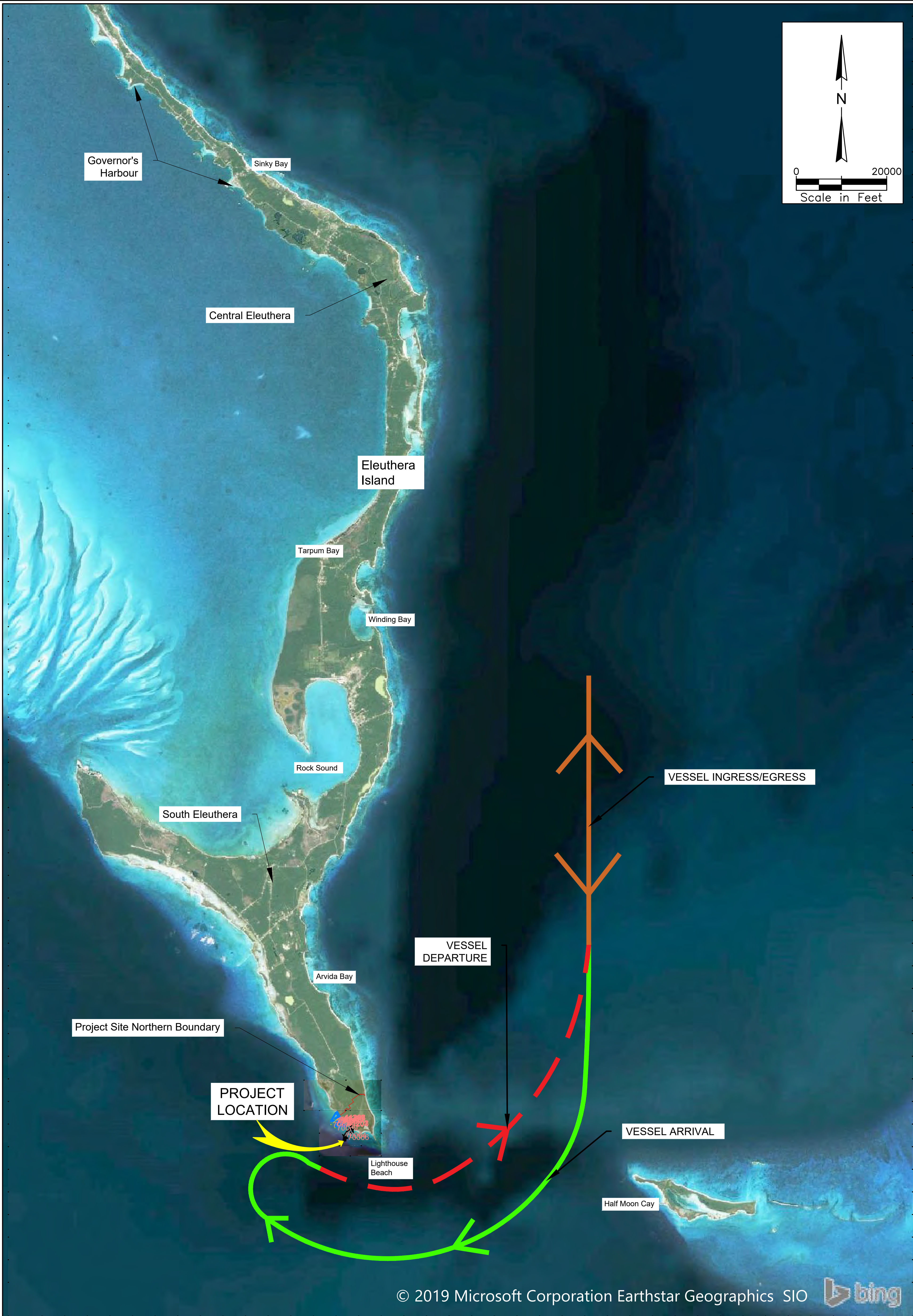

FIGURE 3-6
VESSEL INGRESS AND EGRESS
LIGHTHOUSE POINT, BAHAMAS
NOVEMBER 17, 2020

ATM

The small vessel marina will be used to house DCL operational watercraft and will encompass the ability to provide fuel (gas and diesel) and conduct minor repairs. The marina will also be used by third-party tour operators for guest shore excursions, such as snorkeling and fishing tours. Per the HOA "The developer shall provide the opportunity, in exchange for certain arms-length considerations and other terms and conditions to be negotiated between the Developer and such persons, for Bahamian owners and operators of charter deep seas fishing boasts, parasailing boats, jet skis, banana boat rides, water-skiing, bone fishing boats, sightseeing boasts or tour boats about Eleuthera or other neighboring islands."

Further to this, "Such excursion operators referenced in Paragraph 3.5 above (of HOA) shall be selected by the Developer, and the particular number of such excursion operators shall be determined by the Developer giving priority to Bahamians in the first instance and using good faith endeavours to maximize the hiring of Bahamian excursion operators, taking into account, among other factors, experience operation excursions, guest demand therefor, guest satisfaction experiences, safety and available space."

Currently, all ships utilize low sulfur fuel, and no on-ship incineration will be conducted in port. While at berth, the ship will operate some of its engine capacity to provide power for the ship's needs. The combustion products are exhausted through the stack, typically located at highest point of the ship. The stack height may range from 150 feet to 190 feet or more. Considering the time the vessel is at berth in a 24-hour day, and exhaust discharge height and open-air conditions, it is reasonable to conclude that there will be no adverse effects on the local air quality due to ship activity while at berth. DCL's internal policy is to keep visible emissions below 20 percent opacity while in port, except for initial startup and shut down of engines.

3.1.4.4 Pedestrian and Bicycle Traffic

Consistent with the Master Plan, approximately four to six miles of 8- to 24-ft-wide guest and service paths are proposed. These paths will include paving, drainage, and other design details necessary to construct them in accordance with the standards and specifications of the Ministry of Works and Utilities and BMPs.

3.2 ALTERNATIVES FOR BERTH LOCATION

Alternative ship berth locations within the Project site were evaluated during the EIA and site planning process. The eastern portions of the site were rejected early in the process due to wind and wave exposure, depth restrictions, distance to deeper navigable water, and the presence of nearshore environmentally sensitive habitats. Anchoring offshore, with tendering passengers to the site was also rejected due to safety concerns and the limited anchoring areas available that would not impact environmentally sensitive offshore habitats.

The deployment of marine current sensors revealed that, due to the predominant currents, existing natural water depths and presence of sensitive habitat areas, the somewhat protected area near the southwest end of Lighthouse Point was chosen as the location for the ship berthing area. This area allowed for maximum natural protection from winds and storm surge from the east and northeast. It also allowed for the shortest distance to deeper water, eliminating the need for dredging and thereby minimizing potential impacts to ecologically sensitive benthic resources.

Within the primary pier location area, a northern and southern berth location were evaluated. Both areas were fully mapped and surveyed to determine the most appropriate location. Both areas were similar in potential impacts and depths and required distance from shore to deep water. The primary factors in the final decision to use the southern location were the north’s close proximity to adjacent landowners and their ocean view, and the southern location’s close proximity to guest beach areas.

During the design process and Value Engineering, modifications to the pier and trestle design were made to narrow the structures and further reduce impacts to the seabed and surrounding benthic communities.

4.0 BASELINE SITE CHARACTERISTICS

4.1 PHYSICAL FEATURES

4.1.1 GEOGRAPHIC SETTING

Lighthouse Point is located on the very southern tip of Eleuthera, 75 miles southeast of Nassau and 11 miles west of Little San Salvador. The entire east side of Eleuthera is bordered by the open waters of the Atlantic Ocean. Lighthouse Point faces the Exuma Sound on its west-facing shore. The Project site is bordered by water on three of its sides, and by upland property along its northern boundary. The site is approximately 1.3 miles at its widest point. Figure 4-1 is an aerial photograph of the site.

4.1.2 CURRENT/HISTORICAL LAND USES

The extreme southern tip of the Lighthouse Point encompasses the actual lighthouse and lighthouse keeper's building. The remaining portion of the Project site is nearly 100 percent undeveloped land, with an existing unimproved roadway, some existing trails, and observation areas. Other uses of the site include as a day stopover for boaters and other visitors and occasional harvesting of land crabs by residents of nearby communities, overnight camps, and unauthorized dune buggy and other tours to the site. Commercial and recreational fisherman utilize the areas offshore. There are no permanent occupied buildings on the site.

A Historic Resource Survey of Lighthouse Point was completed by Colin Brooker in February 2019 and January 2020. Additionally, on February 12, 2020, Dr. Grace Turner, Senior Archaeologist and Research Officer – National Museum of The Bahamas/ Antiquities, Monuments, and Museums Corporation (AMMC), and Gammell Deal, Senior Project Officer at DEPP performed a site visit to review discovered cultural resources. Historic resource reports are provided in Appendix G.

Nine historic structures have been identified onsite, predominantly in the northern area of the property in the vicinity of Old Bannerman Town.

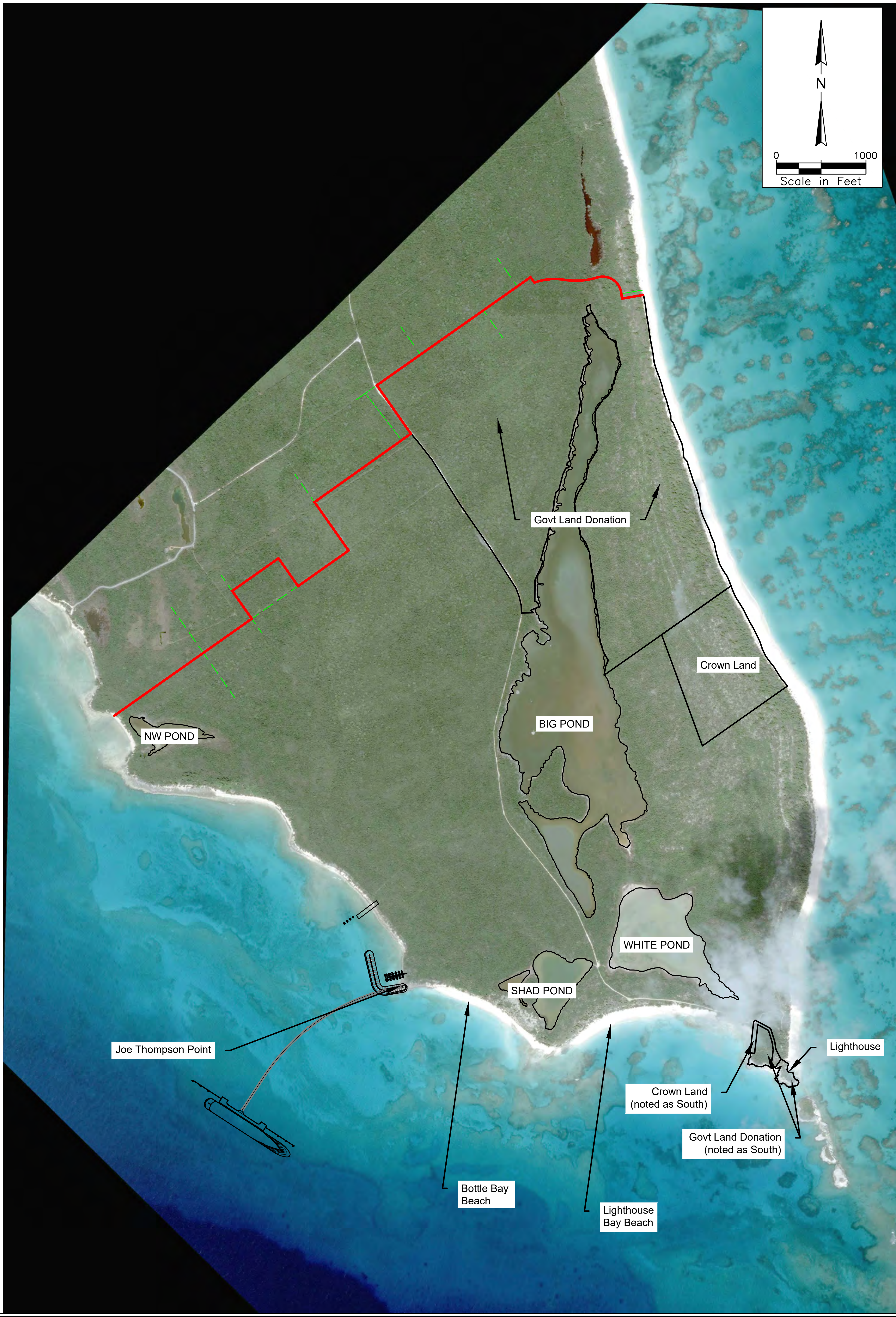

FIGURE 4-1
1:1000 AERIAL PHOTO OF PROJECT SITE. DATE OF PHOTO:4-5-2016
SOURCE: APOLLO MAPPING.
OCTOBER 9, 2019

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Additionally, several segments of rock walls that are believed to date to the mid-nineteenth century were encountered on the property. Stonewall segments north and east of the pier location are believed to be evidence of the Jack Millar Farmstead, though attempts by Brooker to document this site were limited due to dense vegetation.

4.1.3 METEOROLOGY AND CLIMATIC CONDITIONS

The destructive nature of hurricanes and tropical storms can result in significant damage to upland development and facilities from storm surge, waves and wind. Hurricane Frances in 2004 is a good example of this. Table 4-1 lists the number of tropical storms and hurricanes that passed within 100 miles of the Project area over the past 30 seasons (from 1987 through 2017) (Figure 4-2), as reported by the U.S. National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center. NOAA's data indicate that Lighthouse Point, on average, is brushed or hit by a hurricane once every 2.85 years and is directly hit once in every 9.57 years.

Table 4-1. Number of Occurrences of Tropical Storms and Hurricanes in the Vicinity of Lighthouse Point (1987-2017)

Category	Number of Occurrences
1	4
2	3
3	3
4	0
5	1
Tropical Storms	7
Total	18

Source: NOAA, 2018

Recent storms of record are Hurricanes Andrew, Floyd, Frances, and Irene (which occurred in 2011), Joaquin in 2015 and Hurricane Mathew in 2016. The passage of Hurricane Andrew in 1992 resulted in 170 mph winds and a 23-ft storm surge, with significant physical impacts on Lighthouse Point. In 1999, Hurricane Floyd impacted the area with 155 mph winds and a reported storm surge of approximately 20 ft. In 2004, a slow-moving Hurricane Frances hit Eleuthera with 115 mph winds. Other storms of significant winds and surges have frequently impacted the area as well, as noted by local observations from nearby island residents and fishermen.

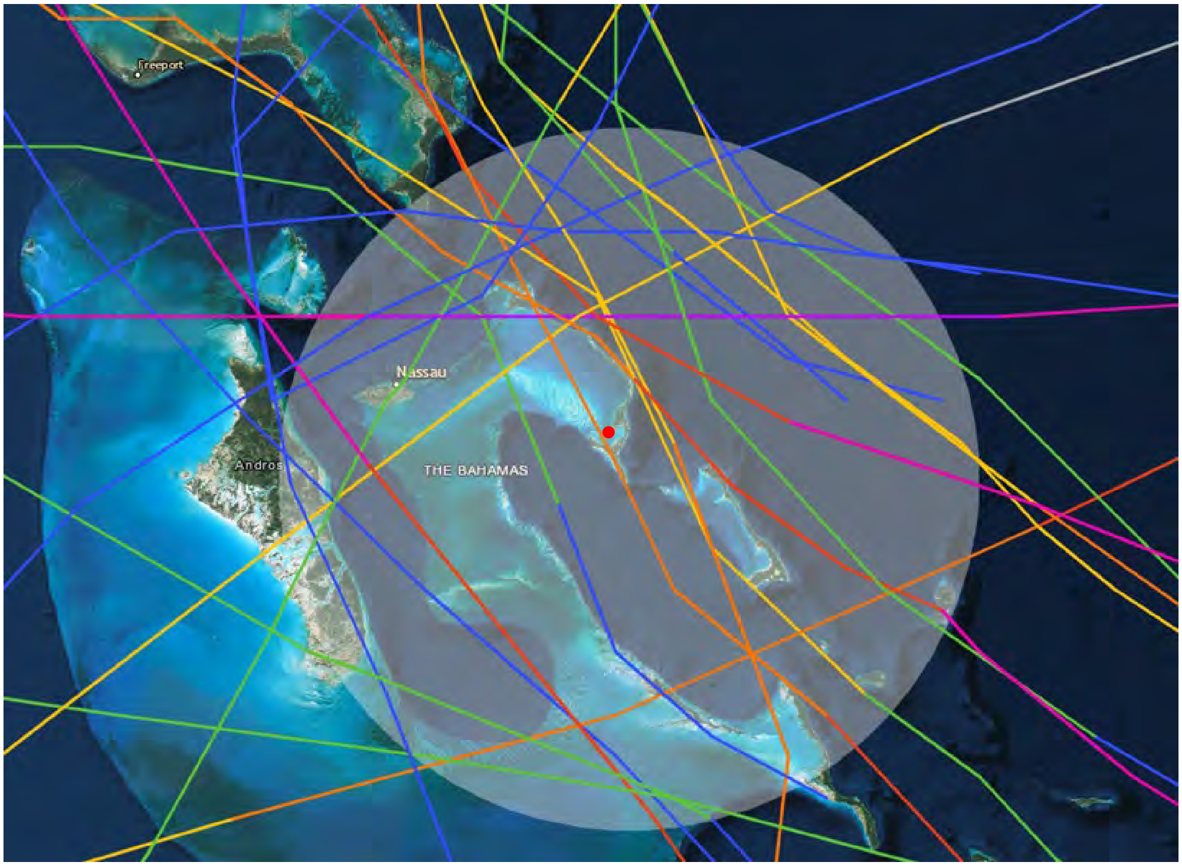


Figure 4-2. Storm Tracks for All Known Hurricanes that Passed within 100 Nautical Miles of Lighthouse Point between 1987 and 2017

Historical meteorology for Lighthouse Pont is based on data collected for Eleuthera, summarized in the Weather-Atlas. Figures 4-3 through 4-7 present meteorological statistics for temperature, precipitation, sunshine and average sea temperature. Additional statistics are presented in Table 4-2, which is based on information from the Nassau International Airport.

Temperature

The monthly mean temperature ranges from 18 degrees Celsius (°C) to 31°C. The average daily minimums range from 18°C to 24°C, while the maximums range from 25°C to 31°C. The data reflect the temperate climate of The Bahamas, with a comparatively low degree of fluctuation in air temperature.

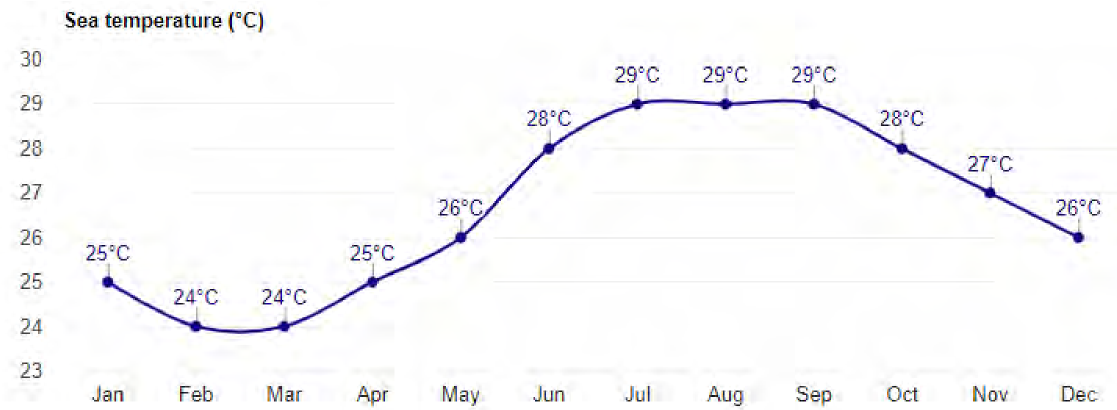


Figure 4-3. Average Sea Temperature in Eleuthera, The Bahamas

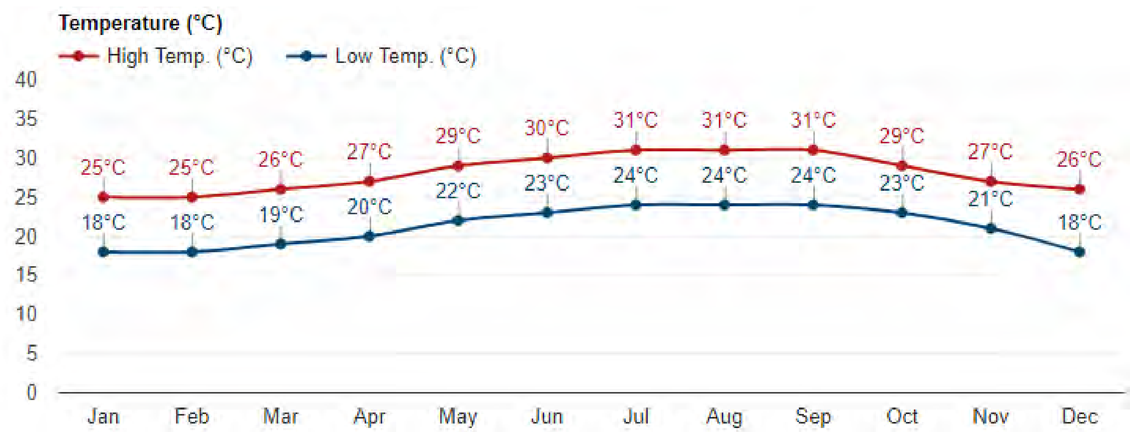


Figure 4-4. Average Temperature in Eleuthera, The Bahamas

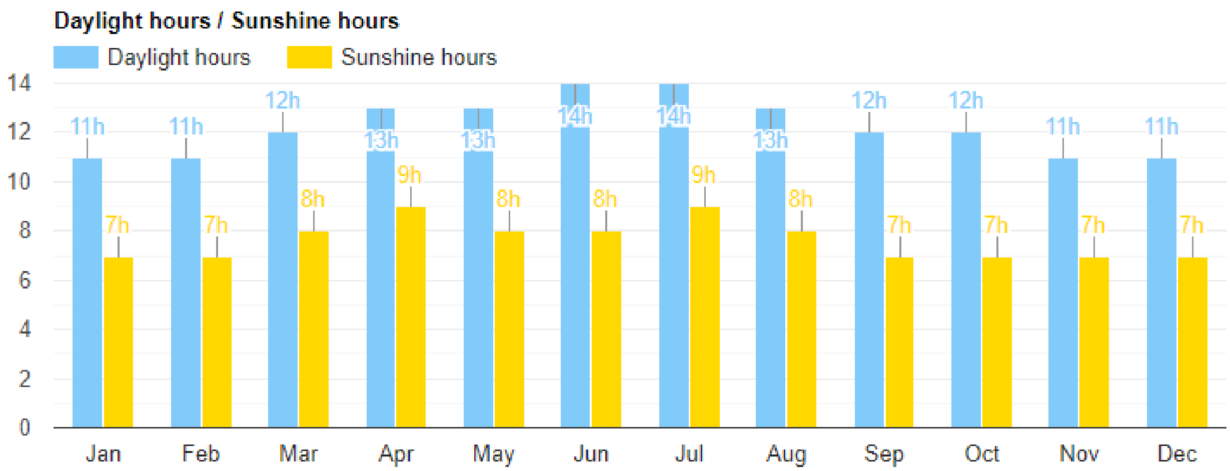


Figure 4-5. Average Daylight/Average Sunshine in Eleuthera, The Bahamas

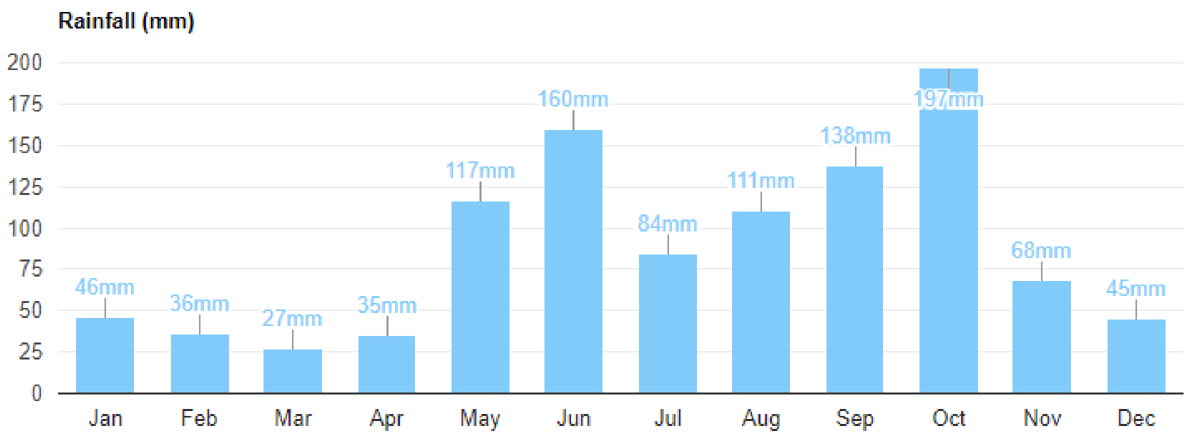


Figure 4-6. Average Rainfall in Eleuthera, The Bahamas

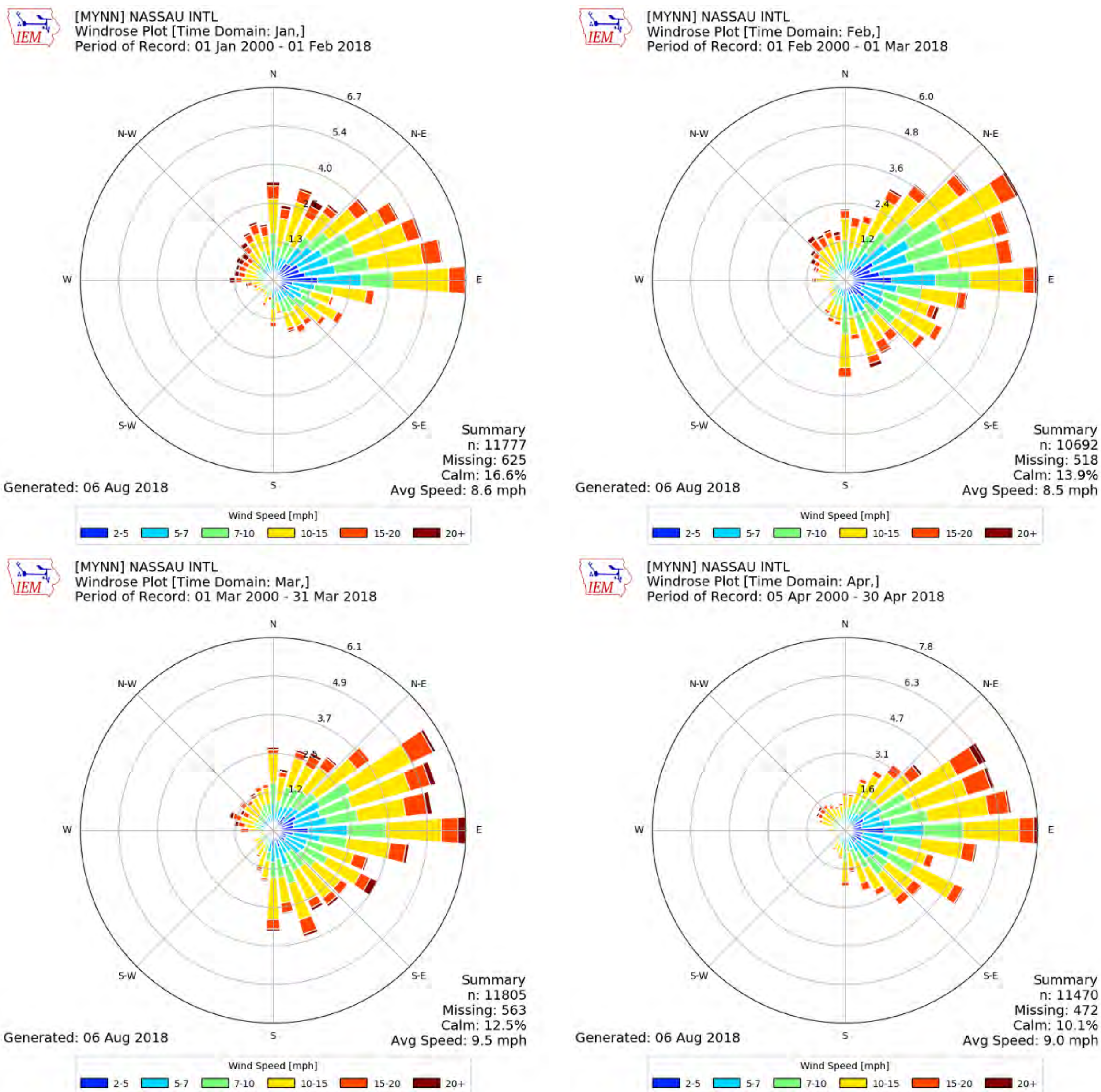


Figure 4-7. Monthly Wind Roses – Nassau International Airport

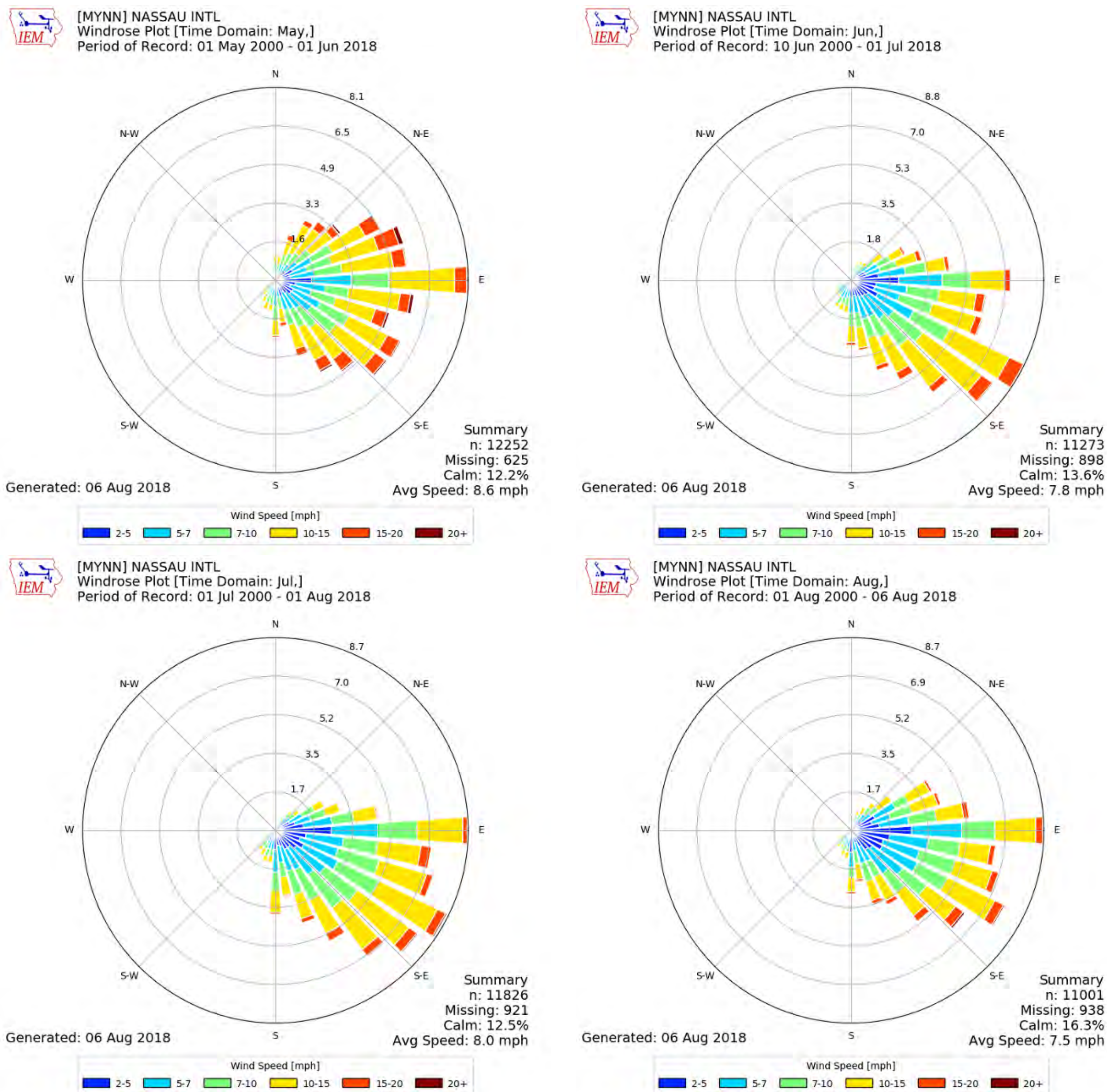


Figure 4-7. Monthly Wind Roses – Nassau International Airport

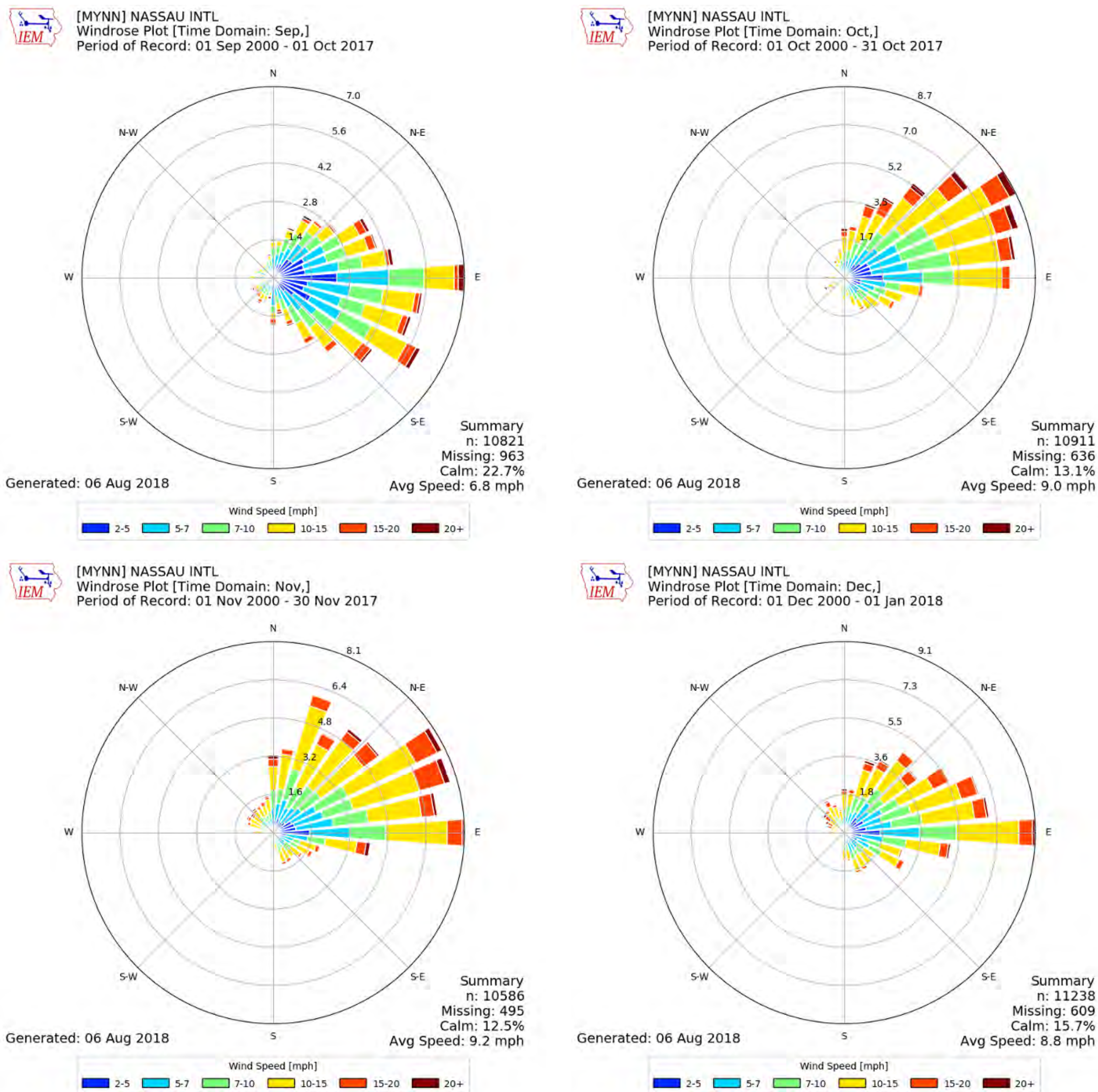


Figure 4-7. Monthly Wind Roses – Nassau International Airport

Table 4-2. Nassau Airport Meteorological Statistics

		Month											
Statistics	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature													
Monthly Mean***	°F	70.7	70.9	72.6	74.9	77.8	80.6	82.1	82.5	81.5	79.1	75.2	72.1
Mean Daily Maximum	°F	77.3	77.5	79.7	81.8	84.6	87.3	89.1	89.3	88.4	85.4	81.8	78.7
Mean Daily Minimum	°F	62.1	62.5	63.8	66.2	69.8	73.3	74.7	74.8	74.4	71.9	68.0	63.8
Hourly Means													
07h	°F	65.9	66.2	68.1	71.2	75.9	79.4	80.6	80.2	78.5	75.7	71.4	67.5
13h	°F	75.2	75.4	77.5	79.5	82.1	84.6	86.6	86.7	85.6	83.2	79.8	76.6
Highest Maximum	°F	86.4	88.7	87.8	91.2	92.3	93.2	93.4	95.0	93.2	91.8	90.0	86.7
Lowest Minimum	°F	41.4	45.8	44.6	48.6	55.5	59.0	64.2	64.4	59.5	56.0*	51.0*	41.5
Mean Dew Point	°F	62.6	62.6	63.5	64.9	69.6	73.5	74.6	75.0	74.7	71.8	67.6	64.0
Rainfall													
Rainfall Monthly Total	Inches	1.86	1.59	1.57	2.12	4.58	9.17	6.21	8.50	6.75	6.91	2.23	2.04
Maximum Rainfall/Day	Inches	4.62	3.47	3.48	11.23	3.48	6.55	4.08	6.23	5.31	8.07	2.68	4.64
Number of Days		8	6	6	5	10	15	17	18	17	16	9	8
Other Statistics													
Pressure	mmHg	19.6	19.3	20.2	21.1	24.5	28.1	29.0	29.5	29.2	26.4	23.1	20.6
Mean R. H.	%	78	78	76	74	77	79	77	79	81	80	78	78
Mean Wind Speeds	mph	8.0	8.6	8.9	8.3	7.9	7.2	7.1	6.9	6.2	7.4	8.1	7.8
Sunshine Mean Daily	Hours	7.1	7.6	8.3	9.2	8.7	7.7	8.8	8.6	7.1	7.2	7.4	6.9

*Occurred outside the 30-year means 1961-1990.
**Highest/lowest temperature on record: 95.4°F High; 41.4°F Low.
***Period of record: 1874 to 1987.

Precipitation

Table 4-2 provides monthly rainfall statistics for Eleuthera. The data indicate that the highest rainfall occurs during the summer months, as well as October, which has the highest rainfall, with an average of 197 millimeters (mm). The driest month is March with an average of 27 mm. The winter months have the lowest rainfall, while the summer months have the highest rainfall.

Winds

Table 4-2 presents the average monthly wind speeds, and Figure 4-7 presents monthly average wind roses for Nassau airport, which has the most comprehensive information on winds and barometric pressure for The Bahamas. The mean wind speeds do not appear to vary significantly on a monthly basis. Average monthly wind speeds range from 6.2 miles per hour (mph) (September) to 8.9 mph (March) (Table 4-2). The highest average winds are observed generally during the fall and winter months (Table 4-2). The prevailing winds at the site generally occur from the easterly trade winds. The wind direction is predominantly from the east. There is a slight variation to the east-northeast in the fall and winter months, and a more significant variation during the summer months, when more winds are from the southeast (Figure 4-7). From January to March, there are occasional strong winds from the northwest.

4.1.4 BANK GEOLOGY/GEOMORPHOLOGY

Regional Geology

As is the case of islands throughout The Bahamas, Lighthouse Point is the result of shallow water deposited carbonate sediments building on the stable, but aseismically subsiding Great Bahama Bank. The shallow strata at Lighthouse Point are anticipated to correlate with the Pliocene/Pleistocene age Lucayan Formation, that is comprised of a laterally discontinuous sequence of fossil coral and carbonate deposits (Ewbank Preece Limited, 1996). The carbonate/evaporitic sequences of The Bahamas are geologically young and have generally not been deformed, folded or faulted through regional tectonic forces; however, relatively small-scale growth faults are commonly present in outcrop exposures such as the sea cliffs at Clifton, New Providence.

Site Geology

The carbonate rock sequences (limestones) expected to be present within the Project site stratigraphy include fossilized coral and bryozoan reefs containing a matrix of reef detritus (reef deposits), lithified oolitic sequences (some deposited under tidal flat conditions and others as eolian dune/ridge deposits), and calcite-cemented shell hash. In addition, it is likely that evaporitic sequences and/or lagoon deposits are present within the stratigraphy.

The geotechnical work completed to date has been limited due to COVID-19 restrictions and has not provided any new information that would result in changes to the information above. Any new information will be provided as it becomes available.

Seismology

Inasmuch as the Great Bahama Bank is located on the North American Plate and more than 700 miles from the North American-Caribbean Plate boundary, it is usually thought of as being aseismic. The closest potential large-scale seismic source is most likely the North Hispaniola fault, located offshore of northern Dominican Republic, some 750 miles southeast of New Providence (Dixon et al., 1998) and the Septentrional fault, which is exposed within the Cordillera Septentrional of Hispaniola (Prentice et al., 1998). The Septentrional fault zone (SFZ) continues to the west of Hispaniola as a transform boundary comprised of a complex of left-lateral faults extending across the Caribbean Sea and into Central America. To the east of Hispaniola, the plate boundary is located within a transition zone between a subduction zone and a transform zone. The primary geologic structures associated with the transform zone to the east of Hispaniola and offshore of northern Puerto Rico are the North and South Puerto Rico Slope faults (Prentice et al., 1998).

Paleoseismology studies conducted by the U.S. Geological Survey (USGS) and cooperating universities indicated that the most recent earthquake that ruptured ground surface along the SFZ in the northern Dominican Republic occurred about 800 years ago. These studies were based on identifying and analyzing paleoliquefaction structures in shallow Holocene age alluvial deposits in the western and eastern Cibao Valley. In general, an earthquake of magnitude 5.5 to 6.0 is considered to be the threshold at which soils will undergo liquefaction. Under soil liquefaction conditions, soils become quick and lose their load-bearing capacity.

Analysis of global positioning system (GPS) measurements collected during 1986, 1994, and 1995 at various stations in the Dominican Republic, Puerto Rico, Cuba and Grand Turk Island provided an estimate of the velocity of the Caribbean Plate relative to the North American Plate. The data analyses indicated a relative motion of the Caribbean Plate toward the east at 21 ± 1 millimeter per year (mm/yr). The data were combined with elastic strain models to provide estimates of slip rates for major left lateral strike-slip faults on Hispaniola and environs. Slip along the North Hispaniola fault (offshore of the north coast of

Hispaniola) was calculated to be 4 ±3 mm/yr and 8 ±3 mm/yr for the Septentrional fault, located onshore in northern Dominican Republic (Dixon et al., 1998). The authors concluded that the relatively high plate motion and the slip rates on the major left lateral strike-slip faults, strain accumulation, and historic seismicity may indicate an increased risk of moderate or larger earthquake occurrence in the northern Caribbean basin than prior estimates had predicted (Dixon et al., 1998). These data notwithstanding, seismic concerns relative to the Bahama Archipelago in general, and the Project site specifically, are minimal.

Geomorphology

The dominant geomorphology of Lighthouse Point is karst landscape, typified by solutional features such as erosional vugs, caves and shafts, dissolution holes, dolines and solutionally enlarged joints and fractures within the surface and subsurface limestone rock. The stability of the shoreline is and will continue to be a function of eustatic sea level rise, carbonate sediment supply and asymmetrical subsidence of the larger carbonate platform.

Lighthouse Point and the surrounding cays are the emergent portion of the larger Great Bahama Bank carbonate platform. The interior of the larger carbonate platform is shallow and dissected by fringe reef, patch reef, intertidal shoals, and emergent island landforms. The emergent landform known as Lighthouse Point is the southerly portion of Eleuthera, a long, narrow island composed of carbonate sand and a series of weathered limestone ridges. These topographic high, ridge features were formed by the solidification and partial solidification of carbonate sand dunes over the past 500,000 years periods of lower sea level. The carbonate sand was provided by the original and persistent coral reef and ooid shoal complexes that that characterize the margins of the Great Bahama carbonate platform.

Soils

Soils on Lighthouse Point are dominantly composed of windblown and hydraulically deposited calcareous sand, silt and clay. These soils range from lagoonal, intertidal, supratidal and upland deposits with moderate to low organic content. The upland soil is a very thin veneer over the underlying calcareous limestone. The upland soil has undergone only minor soil genesis and generally is not considered as significant. The humus content of the upland soil is minimal, and the shallow soil horizons lack significant trace elements and basic nutritional compounds (nitrogen, phosphorus and potassium) that would sustain traditional agriculture without considerable anthropogenic assistance.

Caves and Blue Holes

No caves, significant solutions shafts, or blue holes were observed during analyses of aerial photographs of the site or encountered during landside assessments, nor have any been reported by individual locals working with the EIA Project team familiar with Lighthouse Point. There are isolated areas of sub-surface voids located throughout the property. The largest void observed was approximately eight feet below existing grade and extended no more than six feet horizontally.

Offshore Subsurface Conditions

Subsurface conditions beneath the dominant benthic habitats are mostly a thin veneer of sand over hardbottom. During the course of the fieldwork, several probes were made in sandy bottom areas (Figure 4-8). The average thickness of the sand veneer over rock was less than six inches.

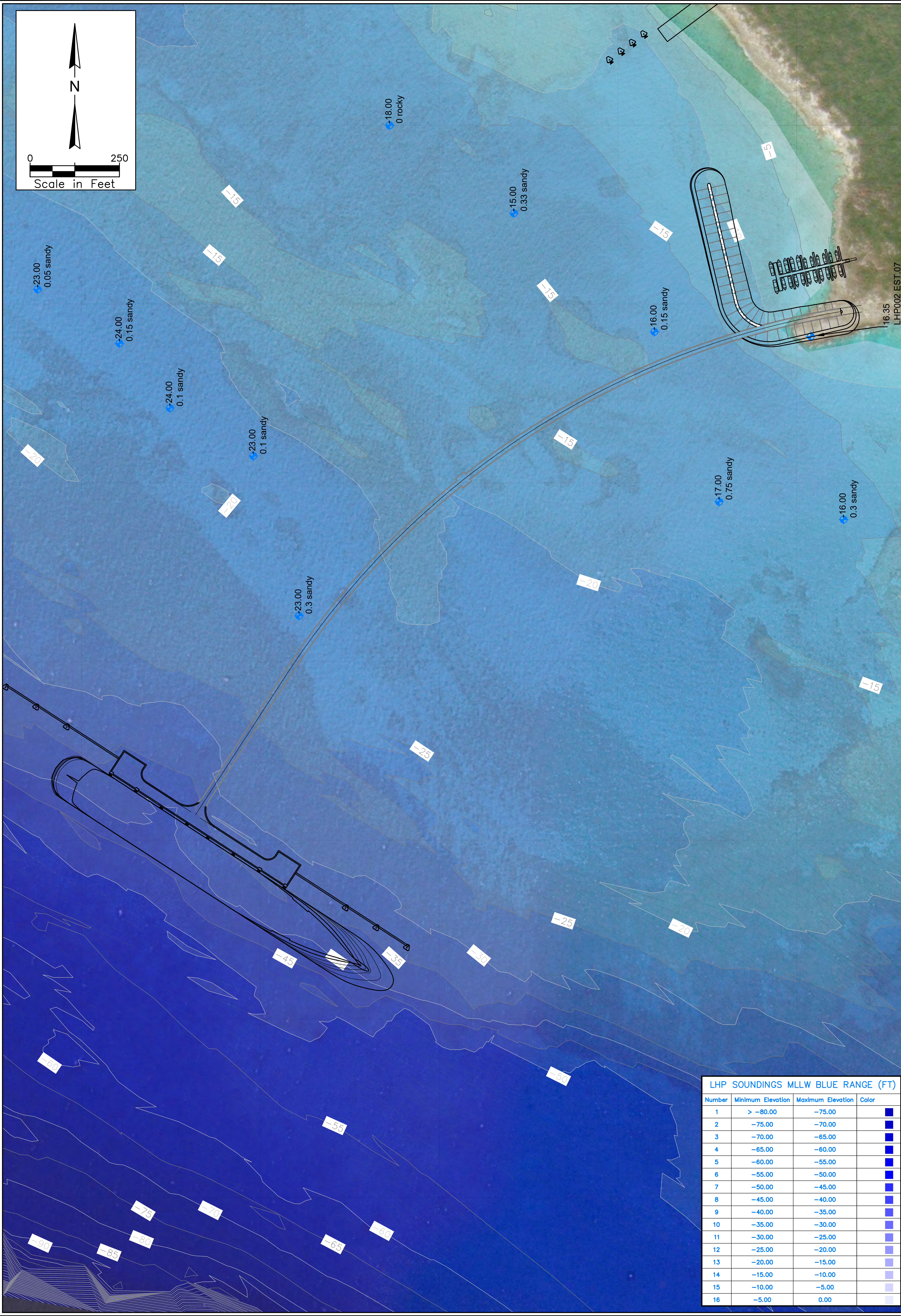
Upland Topography

A site topographic map is provided in Figure 4-9 with data collected in 2000. The site varies topographically along its length, with some areas of high relief along the outer edges. The island has ground elevations ranging from 5 to 120 ft above water, with the highest elevation in an area near the center of the site, west of Big Pond. High (to approximately 30 ft), steep ridges along the east shoreline run along the coast, which is a common feature in southern Eleuthera.

4.1.5 HYDROGEOLOGY/HYDROGEOLOGY

4.1.5.1 Surface Water Resources and Existing Drainage Patterns

Hydrogeologic resources are not estimated to be significant at Lighthouse Point, although several saline ponds are located on the site. A thorough assessment of the hydrogeologic conditions will be developed as part of the civil engineering infrastructure detailed design. For purposes of the proposed development, it is unlikely that freshwater resources are of a magnitude and degree of reliability that they could be adequate to serve the proposed development. Therefore, a RO plant will be constructed on the island to provide potable water for the development.



LHP SOUNDINGS MLLW BLUE RANGE (FT)

Number	Minimum Elevation	Maximum Elevation	Color
1	> −80.00	−75.00	
2	−75.00	−70.00	
3	−70.00	−65.00	
4	−65.00	−60.00	
5	−60.00	−55.00	
6	−55.00	−50.00	
7	−50.00	−45.00	
8	−45.00	−40.00	
9	−40.00	−35.00	
10	−35.00	−30.00	
11	−30.00	−25.00	
12	−25.00	−20.00	
13	−20.00	−15.00	
14	−15.00	−10.00	
15	−10.00	−5.00	
16	−5.00	0.00	

FIGURE 4-8
1:250 PIER WITH CONTOURS, LABELS & BLUE ELEVATION RANGE
LIGHTHOUSE POINT, BAHAMAS
NOVEMBER 11, 2019

ATM

NOTES:

1. Topographic Survey Data Provided by Southern Resource Mapping, Inc. Dated December 13, 2005.
2. Topographic Contour Interval is 2ft.
3. Base Map Source: ATM 04-05-2016.

FIGURE 4-9
1:1000 OVERVIEW WITH TOPOGRAPHY
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 9, 2019

ATM

Ecological investigations of Lighthouse Point conducted during 2017, 2018 and 2019 revealed four distinct surface water areas present within the boundary of the Project site: Big Pond, White Pond, Shad Pond and a previously un-named pond situated near the northwest boundary of the property hereafter referred to as Northwest Pond. The locations of these ponds are identified on Figure 4-1. Big Pond and White Pond are Crown Lands. Table 4-3 identifies the approximate size of each pond and the estimated size of each pond's contributory watershed/drainage basin.

Table 4-3. Surface Waters, Their Sizes and Estimated Drainage Basins

Pond	Size (Acres)	Estimated Drainage Basin (Acres)[1]
Big Pond	84.0	165
White Pond	19.8	20
Shad Pond	8.3	10
Northwest Pond	3.5	10

[1] Drainage basin sizes estimated based on 2000 topography and observations of field conditions, rounded to the nearest ± 5 acres.

Detailed descriptions of these ponds are provided in Section 4.2 (Biological Features). Other than various wetland vegetation, including buttonwoods (*Conocarpus erectus*), red mangroves (*Rhizophora mangle*), white mangroves (*Laguncularia racemosa*), black mangroves (*Avicennia germinans*) and herbaceous vegetation that was intermittently present in narrow bands around the shoreline of these ponds, no wetlands, blue holes or other areas of surface water or saturated soil conditions were observed on the site.

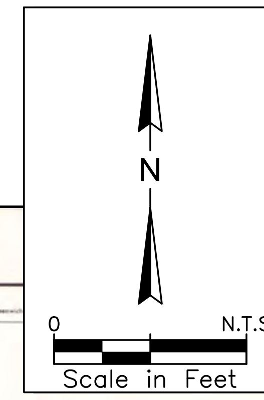
Drainage and other roadway design criteria will meet or exceed industry standards and requirements of the Government of The Bahamas. Design plans will include improvements to existing conditions that include uncontrolled drainage and siltation that flow into White Pond and Shad Pond from an existing unimproved road.

4.1.5.2 **Ground Water Resources**

The Land Resources Eleuthera with accompanying maps identifies the Generalized Freshwater Lens for South Eleuthera in map 4G, 1970. The 1970 map from The Directorate of Overseas Surveys is attached as Figure 4-10. The map, while not clearly legible due to reproducible quality problems, indicates a freshwater lens to a depth of 10 ft at the northwestern corner of the property extending north into Old Bannerman Town.

CMYERS LOCATION G:\WESTPALMBEACH SHARES\DRAWINGS\PROJECTS\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\LANDSIDE\WDI FIG 3-1.DWG

GENERALISED MAP SHOWING THICKNESS OF FRESHWATER LENSES ON ELEUTHERA.
PREPARED BY THE DIRECTORATE OF OVERSEAS SURVEYS, 1970.



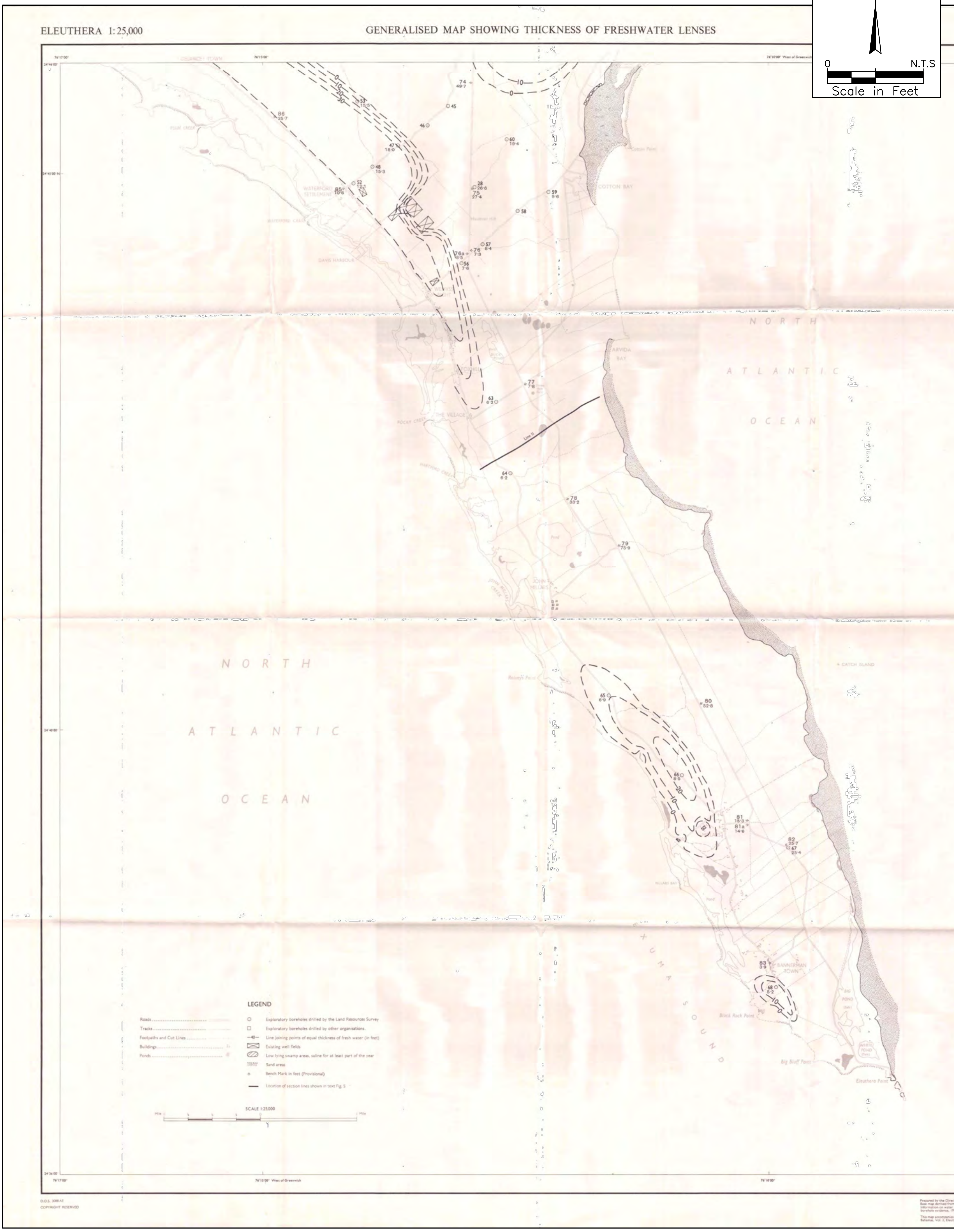


FIGURE 4-10
GENERALISED MAP SHOWING THICKNESS OF FRESHWATER LENSES.
LIGHTHOUSE POINT, BAHAMAS
NOVEMBER 16, 2020

ATM

Although no known fresh groundwater resources are known to exist onsite, geotechnical investigations will include a review of potential freshwater sources in this area. Big Pond, White Pond, Shad Pond and Northwest Pond are hypersaline with seasonal variations in salinity due to rainfall. Details on the ponds are found in Section 4.2.1.2.

In The Bahamas, groundwater comprises the fresh, brackish, saline and hypersaline waters found in the near and deep subsurface and in the lakes and ponds that intercept the surface. Surface water with no salinity is uncommon in The Bahamas and therefore, freshwater lakes, rivers, and creeks are non-existent. Freshwater resources in The Bahamas originate from rainfall only and accumulate in Ghyben-Hertzberg lenses. The Ghyben-Hertzberg lens consists of three lateral zones: 1) freshwater where chloride ranges from 90 to 400 ppm; 2) a transition zone (brackish), approximately 1 to 2 m thick where chlorides increase rapidly from 400 to 1200 ppm; and 3) a saline zone where chlorides rise above 1200 ppm. Freshwater is less dense than saltwater, thus sits above the saline zone separated by a thin mixing layer of brackish water.

On average, the freshwater lens occurs at a depth of two to five feet below the surface. Ninety percent of freshwater lens resources in The Bahamas are within five feet of the surface. Given the proximity of fresh water to the surface and the high porosity of limestone, over-extraction and contamination may lead to depletion, saltwater intrusion, and/or contamination, impairing the fragile layer of freshwater over salt.

Threats to groundwater resources:

- **Saltwater Intrusion** – Saltwater intrusion to groundwater may occur due to 1) storm surge generated by tropical disturbances; 2) sea level rise due to climate change; and/or 3) over-pumping/extraction of freshwater aquifers.
- **Development/Building Features –** Canals and boat basins have the potential to disturb sub-surface freshwater lenses by allowing the sea to connect at the inland surface.
- **Climate Change –** Based on the IPCC 5th Assessment Report and the Coupled Model Intercomparison Project 5 (CMIP5); climate change will alter existing rainfall patterns in The Bahamas. Climatology data suggest that The Bahamas region will incur a three percent (3 percent) decrease in monthly rainfall averages with an

increase of intensity of rainfall events between October and February. Overall, total rainfall is expected to decrease placing additional pressure on freshwater resources.

- **Contamination –** Groundwater is susceptible to contamination from untreated sewage, industrial wastes, and leaking fuels.

The geotechnical investigations completed to date have not provided any new information. Only hand augers were used for landside boreholes in the Administration area as part of conservation strategies for cultural resources (limited use of mechanical equipment) and protected trees. Use of hand augers and shallow rock have generally precluded reaching depths that might be sufficient to meet the water table.

If a freshwater lens is encountered during construction, additional investigations will be conducted to ensure that there are no impacts to the source. Additional actions will be taken to preserve the source if one is encountered, including monitoring wells and/or casing wells. There is no intent by the Project to utilize any freshwater lens on the property to supply water to Lighthouse Point. The well for the proposed RO system will be sealed or encased to ensure no connection to other water resources will be created.

A freshwater pond area (refer to Section 4.2.1.1.3, Figure 4-20) is off the site to the north, and as such there are no freshwater resources known to exist on the Project site.

Project design and operational best practices will help to avoid impacts to groundwater resources. The Environmental Management Plan will further address protection of groundwater resources.

4.1.5.3 Ambient Water Quality

Observed ocean water clarity and visibility within the vicinity of Lighthouse Point and South Eleuthera is generally excellent. There are no known local sources of discharge or runoff in the area, and the overall water quality is presumed to be good. The presence of deep water immediately off both coasts ensures that the tidal prism is at a maximum, meaning no stagnation of water occurs. Underwater visibility typically ranges from 60 to 100 ft suggesting that little or no sedimentation is present in the water column during calm conditions.

Water quality including salinity, temperature and presence of observed flora and fauna in the ponds is typical of isolated salt ponds that have no direct surface tidal connection to the sea. Hypersaline conditions exist in all four ponds and are so extreme that aquatic life is minimal or non-existent in some ponds. Other than salinity, detailed analyses of water quality in the salt ponds were determined to not be necessary, as no development is planned in the ponds, no recreational activities that involve contact with pond water are proposed, and surface water run-off will be directed away from the ponds or treated in accordance with BMPs before being discharged to the ponds.

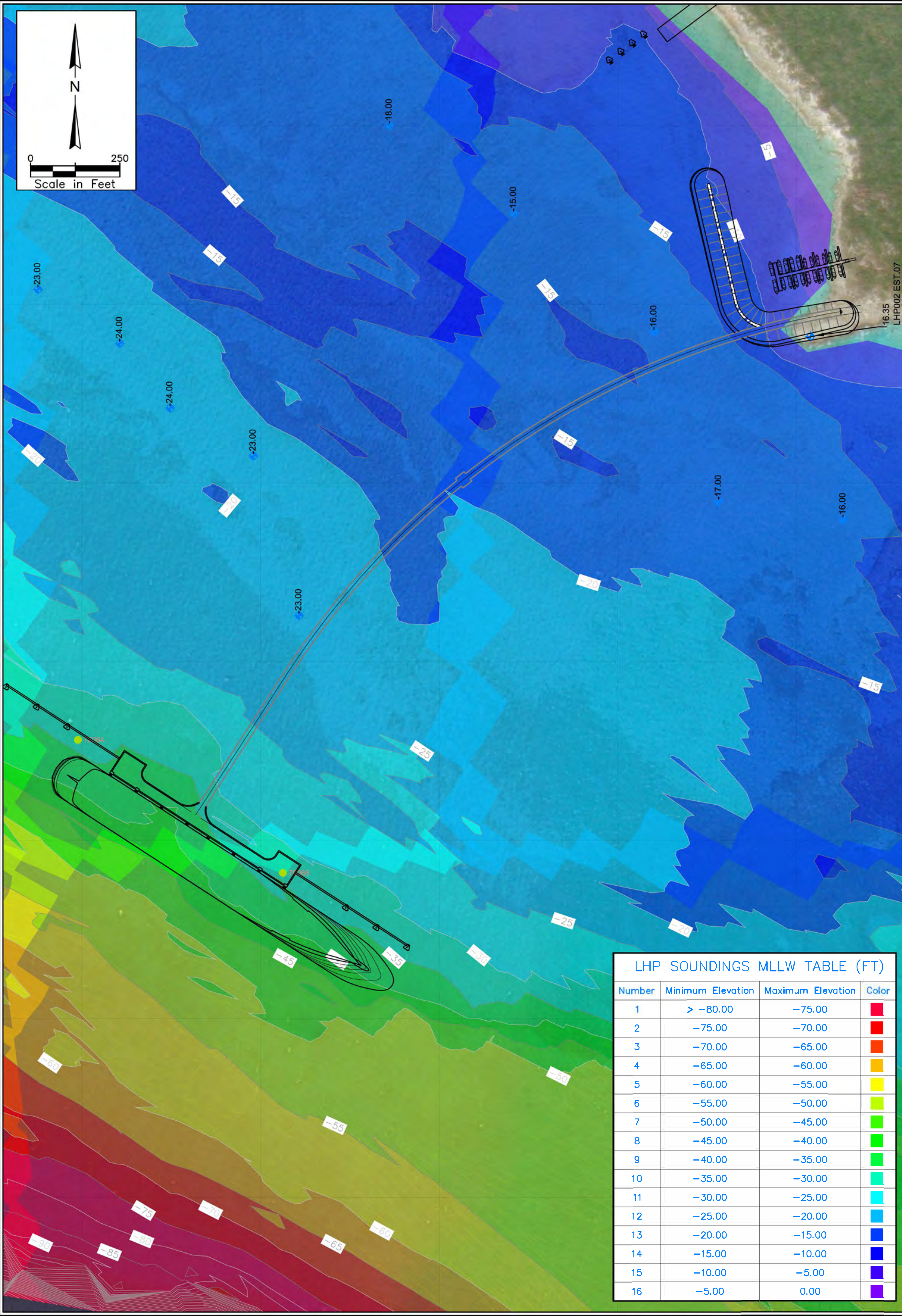
4.1.6 BATHYMETRY

Regional bathymetry is presented in Appendix A and summarized in Figures 4-8 and 4-11. Detailed bathymetric surveys were conducted in the nearshore and surrounding areas of Lighthouse Point specifically for the proposed Project. Lighthouse Point is surrounded by the open Atlantic Ocean to the east and Exuma Sound to the west. Nearshore waters are shallow and generally less than 15 ft within a 0.5-mile radius of the Point. On the east side of the Point, the depths remain fairly constant, and a fringe reef protects the Point from large breaking swells. The reef is awash during normal sea conditions and breaking waves can often be seen on the horizon. The west side of the Point is relatively protected most of the time, unless there are strong southwest or westerly winds. Depths gradually increase moving offshore and then drop off significantly about 0.75 mile from land, going deeper than 1,000 ft. A deep pass exists between the tip of Lighthouse Point and Little San Salvador directly to the east, with depths approaching 650 ft. Large cruise ships and other vessels regularly travel between Lighthouse Point and Little San Salvador. These bathymetric features and local meteorology are the primary factors influencing water levels and currents and are the reason this location was selected for cruise ship operations.

4.1.7 SHORELINE AND COASTAL PROCESSES

ATM has completed oceanographic data collection efforts at the proposed Project site. This section summarizes the data, including tidal datum information and general wave and current characteristics.

CMYERS LOCATION M:\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT BAHAMAS_USFT.DWG



LHP SOUNDINGS MLLW TABLE (FT)			
Number	Minimum Elevation	Maximum Elevation	Color
1	> −80.00	−75.00	
2	−75.00	−70.00	
3	−70.00	−65.00	
4	−65.00	−60.00	
5	−60.00	−55.00	
6	−55.00	−50.00	
7	−50.00	−45.00	
8	−45.00	−40.00	
9	−40.00	−35.00	
10	−35.00	−30.00	
11	−30.00	−25.00	
12	−25.00	−20.00	
13	−20.00	−15.00	
14	−15.00	−10.00	
15	−10.00	−5.00	
16	−5.00	0.00	

FIGURE 4-11
1:250 PIER WITH CONTOURS & FULL COLOR ELEVATION RANGE
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 11, 2019

4.1.8 PROJECT SITE TIDAL DATUMS

Because no permanent tide station was found to exist near the Project site, a tidal study was conducted at the site to determine water level datums that were subsequently used as a basis for vertical elevation reference of various Project elements.

Primary and secondary gauges were deployed at the site and surveyed into the Project site survey datum via the Coastal Systems survey disk benchmark (refer to survey in Appendix A). Gauges were corrected for atmospheric pressure variations via barometric data collected from the site. Gauges were deployed for approximately six months (November 2017 through April 2019) over a 2-year period to cover typical lunar tide cycles.

Measured tidal data were compared to NOAA tidal prediction stations in the nearby region. NOAA tidal prediction station TEC4625 – "Eleuthera Island, west coast," correlated very well with the measured data (https://tidesandcurrents.noaa.gov/noaatidepredictions.html?id=TEC4625). A year-long NOAA tidal prediction signal at the location was used to determine the recommended tidal datums (Table 4-4). Year-long signals account for seasonal variations in water levels that month-long observations cannot rectify.

Table 4-4. Project Site Tidal Datums

Tide	MLLW Datum (ft)	CS-Disk Datum (ft)
MAX	3.7	-12.7
MHHW	2.9	-13.5
MHW	2.7	-13.7
MTL	1.4	-15.0
MLW	0.1	-16.3
MLLW	0.0	-16.4
MIN	-0.8	-17.2

Based on continuous ATM tide study data.
Correlated with NOAA Tide Prediction Station Eleuthera, West Coast, The Bahamas (TEC4625)

<u>Sea Level Rise (SLR) and Resiliency</u>

A 50-year projected sea level rise (SLR) scenario should be included in the design water levels to match a typical 50-year project design life. United States Army Corps of Engineers (USACE) and National Oceanographic and Atmospheric Administration (NOAA) intermediate projections indicate a 50-year SLR of approximately 1.0 ft relative to 2017 levels for the region. The 2014 Bahamian National Communication Report on Climate

Change (UNFCCC, 2014) indicates similar SLR projections specific to Settlement Point, Grand Bahama and other locations throughout The Bahamas.

Throughout the Project development, the effects of SLR will be incorporated into the building and pier design. Resiliency and long-term climatic change predictions dictate that floor elevations and living areas will be situated and constructed in a manner to withstand natural events well beyond the projected lifetime of the Project.

The recent events of Hurricane Dorian in Marsh Harbour and Grand Bahama have reinforced the requirement that all building structures must be designed and constructed to withstand extreme storm events. This includes appropriate placement of all structures above extreme water levels, added protection for wind and debris impacts, and using the most up to date building codes for The Bahamas and other appropriate standards.

All onsite structures will be located at or above elevation 12 ft MSL. The design criteria for all onsite buildings per the American Society of Civil Engineers codes (ASCE) is Exposure D, Risk Category II that will meet a wind speed of 175 mph or The Bahamian Code, whichever is higher. The Admin/Crew Pavilion that serves as an onsite “Hurricane Shelter” is designed to be Exposure D, Risk Category III that will meet a wind speed of 186 mph. Coastal landscape plantings will be native or regionally appropriate for use in stabilizing native dunes and shorelines.

Wave and Current Observations

Wave data and current velocities were collected in shallow and deep locations using two bottom-mounted acoustic Doppler current profiler (ADCP) instruments. The locations of the instruments were approved by the appropriate agencies within the Government of The Bahamas. ADCP deployment took place during the same time as the tide gage deployment (November 2017 – April 2019) to capture wave and current behavior at the proposed Project site. In general, significant wave heights (Hs) recorded during the deployment were relatively small (0.10 to 0.95 m), with periods ranging between approximately 2 to 15 seconds. Waves are typically out of the south-southeast direction, and the deep ADCP location showed wave heights slightly larger than the shallow location. Figures 4-12 to 4-17 present time series summaries of the recorded wave properties, as well as wave roses at the shallow and deep locations.

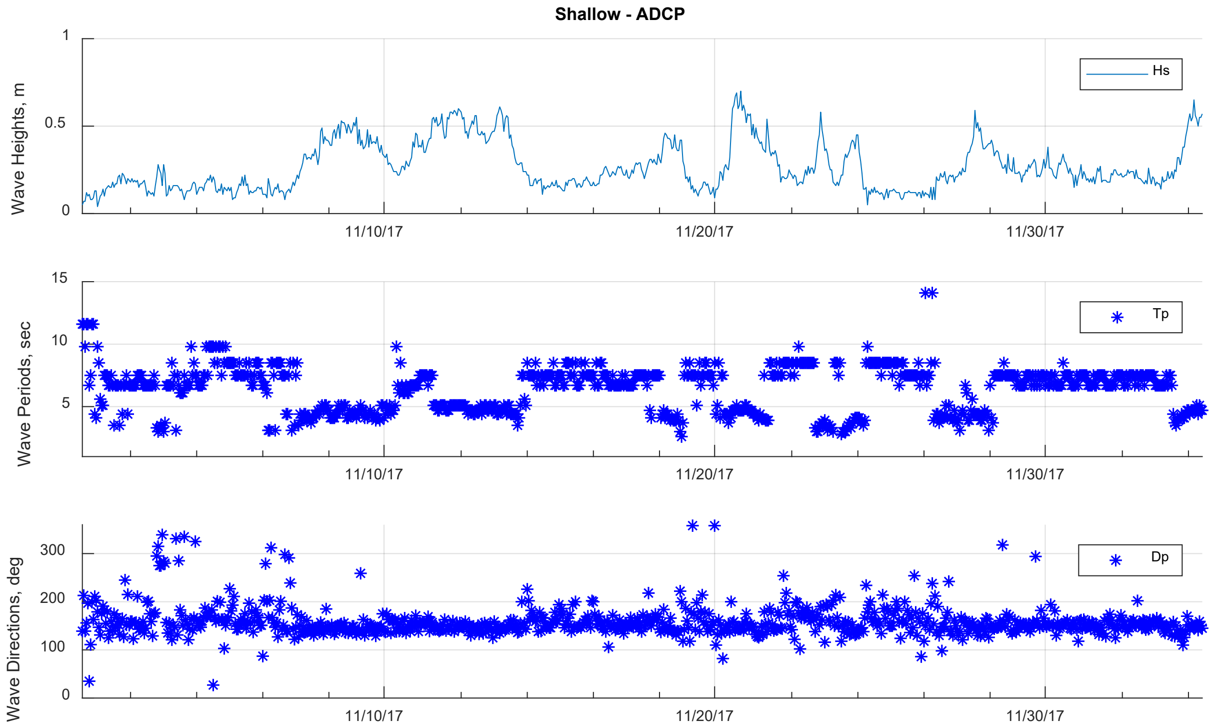


Figure 4-12. Time Series Summaries of the Recorded Wave Properties in Shallow Water

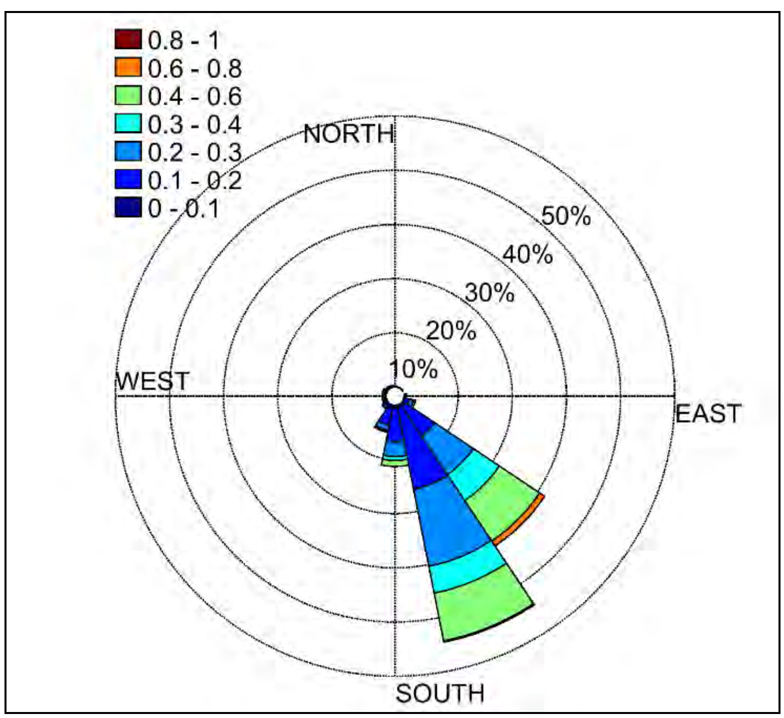


Figure 4-13. Shallow Location ADCP Wave Heights (m)

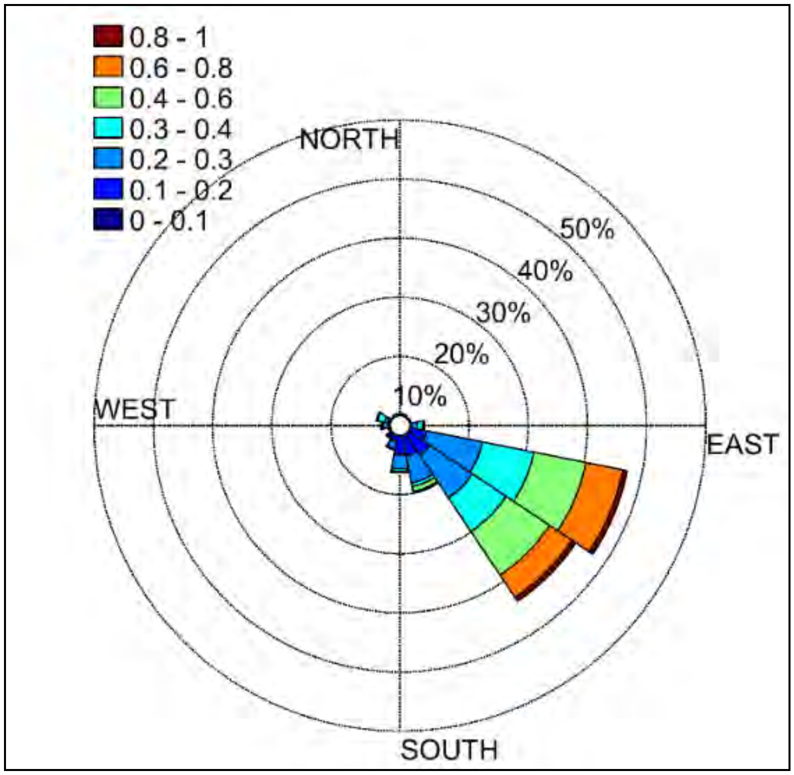


Figure 4-14. Deep Location ADCP Wave Heights (m)

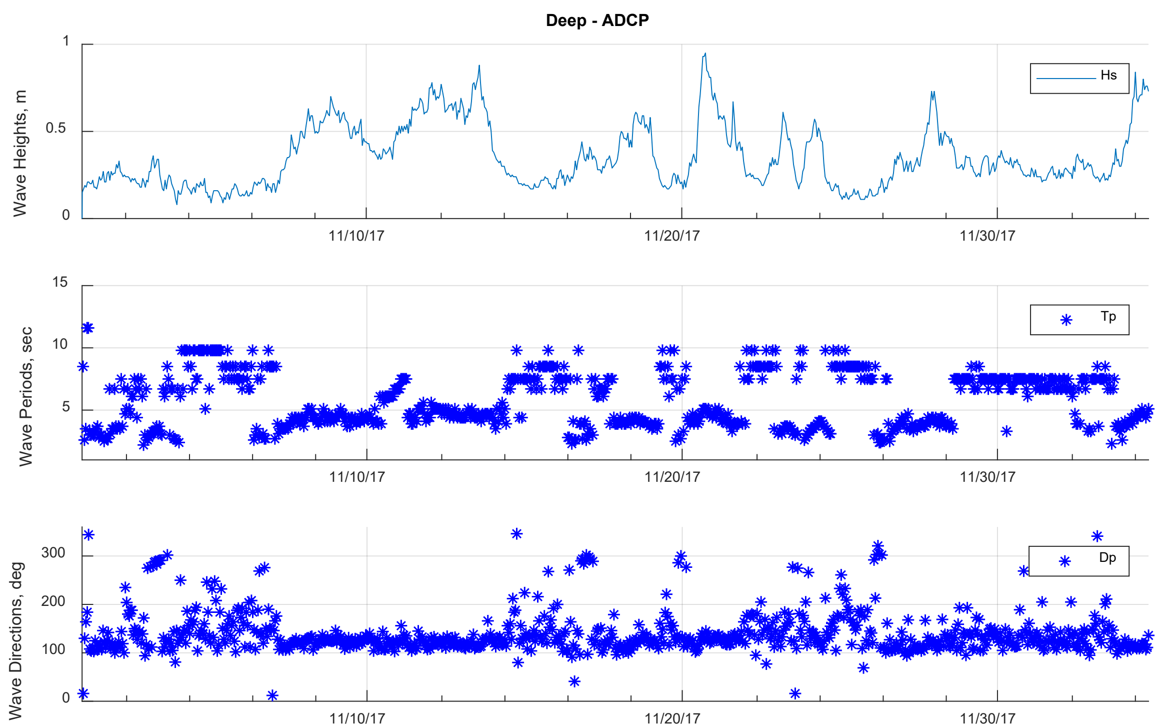


Figure 4-15. Time Series Summaries of the Recorded Wave Properties in Deep Water

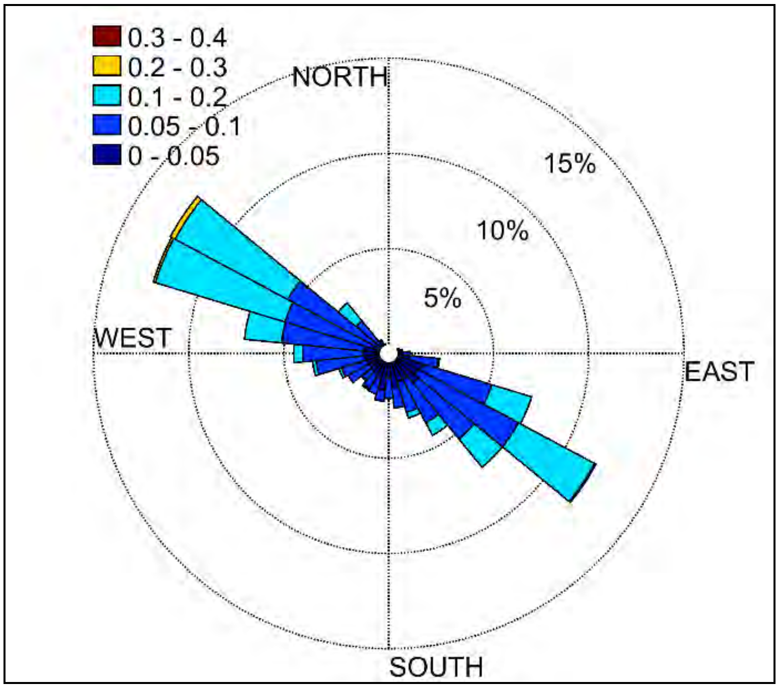


Figure 4-16. Shallow Location ADCP Currents (Depth Averaged) (m/s)

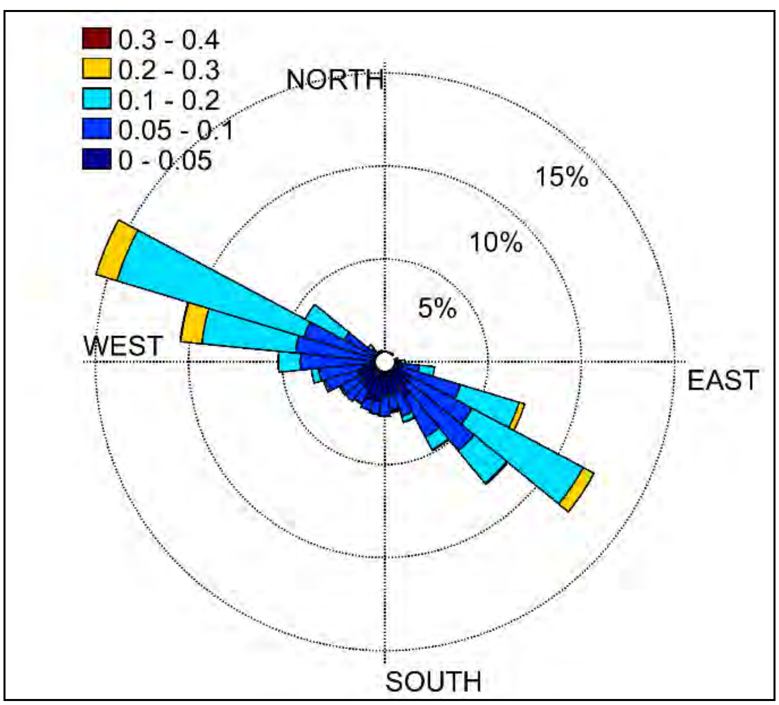


Figure 4-17. Deep Location ADCP Currents (Depth Averaged) (m/s)

Measured currents at the site are relatively mild and appear to be predominantly tidally driven. In general, stronger currents were observed at the deep location, with maximum velocities (averaged over depth) of 0.22 m/s and 0.33 m/s recorded at the shallow and deep ADCP locations, respectively. Depth-averaged current roses for the two locations are presented in Figures 4-14 and 4-17. Currents at both ADCP locations typically flow west-northwesterly and east-southeasterly. East-southeasterly currents were most commonly observed with rising tides, and west-northwesterly currents were most commonly observed with falling tides. However, some short periods of reversals (less than three days) were observed when it appeared that wind or other regional currents dominated over tidal influences.

4.1.8.1 Shoreline Erosion/Accretion Trends

4.1.8.1.1. Shoreline Distribution

The shoreline features of Lighthouse Point are a combination of mostly rock on the northwest coast, then transitioning to a sandy bottom over shallow rock for the remainder of the shoreline around the Point and along the east coast. Probes conducted during fieldwork could not be advanced more than a few inches through sand before solid rock was encountered. The rocky portions of the shoreline generally have approximately four to six feet of relief above MHW. Areas of mixed sand, rock, coral and submerged aquatic vegetation were found in the water adjacent to the rocky shoreline.

Beaches along the eastern coast are naturally sand dominated, with intermittent rock and coral outcrops. The sand appears to typically accrete and erode naturally, dependent on seasonal winds and tides. Storm conditions such as hurricanes may cause short-term shoreline changes prior to settling back to a state of equilibrium.

The southwest beach areas are mostly less disturbed from open ocean storms and tides. However, the shoreline on the west-facing coast tends to be steeper and narrower during higher tides and have exposed rock during mid and low tides.

The Lighthouse Point beach environment is highly dynamic. Beach expansion is planned to occur primarily landward of the foredune. Excavation of rock will be limited to specific areas beneath existing sand and minimized to the extent possible for beach expansion. No excavation of rock slopes or cliffs will occur. Placement of sand will be at or above the mean high water line. The design intent is to minimize impacts to the beach environment, and these site improvements are not expected to adversely affect beach stability.

4.1.8.1.2. Existing Coastal Processes

Limited knowledge exists about the coastal processes for Lighthouse Point. Baseline information is founded mostly on historical aerial photographs and verbal conversations with local residents familiar with the area. The sandy beaches appear to have an inherently stable sandy shoreline. Comparison of historical aerial photographs and surveys indicate that the shoreline has not changed significantly over recorded time. Post-storm shorelines may have short-term erosional conditions, but they appear to return to a stable shoreline seasonally. The presence of shore-parallel secondary and tertiary dunes extending south-to-north along the east part of the site suggest a long-term pattern of sand accretion in this area.

4.2 BIOLOGICAL FEATURES

4.2.1 TERRESTRIAL ECOLOGY (INCLUDING LAKES/PONDS)

To prepare for the field assessment, a literature search was conducted. This involved querying the databases used by the Government of The Bahamas for information pertinent to the site, including lists of flora and fauna that are designated for protection pursuant to the Conservation and Protection of the Physical Landscape of The Bahamas Act and their associated list of "Protected Trees." The literature search also included querying species lists maintained by international conservation organizations to which The Bahamas are a signatory. These include the Convention on International Trade of Threatened and Endangered Species (CITES), to which the Government of The Bahamas joined on June 6, 1979 and the International Union for the Conservation of Nature (IUCN), to which The Bahamas National Trust is a non-governmental organization member.

Members of the team also met with staff from The Bahamas National Trust (BNT) and the Cape Eleuthera Institute (CEI), a marine research and educational facility based at Cape Eleuthera in South Eleuthera, to discuss the proposed Project and seek reference materials on topics relevant to the site and/or Project. Consultations with Perry Institute for Marine Science also occurred.

Section 13 of this document provides a comprehensive list of contributors.

Field investigations were performed at the site during visits in October, November, and December 2017, November and December 2018, January, April, June, October and November 2019 and January, February, June, July and October 2020. Continued site investigations are planned.

Vegetative community types, as well as other land cover and land uses were characterized. Observations were made regarding the presence of birds and other animal species. The fall, winter and spring bird surveys were ideal for understanding the use of the property by wintering species of neotropical migratory birds, and helpful in understanding the use of the property by birds during migration. These were augmented with summer bird surveys, which provided insight into use of the property by summertime nesting species. Additional surveys are planned at other times of the year to gain further insight into avian diversity, abundance and seasonal variation. Faunal surveys included periods of typical high bird activity, including morning hours and late afternoon and during various times of the tidal cycle for reconnaissance of shorebirds. Observations of floral communities included documentation of the presence of protected plants. Field records were kept of observations of flora and fauna.

The field methodology consisted of visual inspections around the perimeter of the site, along existing roads, footpaths, at various locations around each of the four open-water ponds, and during bush-whacking forays through the forested coppice, shrub-dominated dunes and sand strand communities. During the non-breeding season, some avian surveys included the use of play-back calls of notable species (i.e., great lizard cuckoo, Kirtland's warbler, clapper rail and black rail) along transects that are to be monitored on a regular basis prior to construction, during construction and during long-term operation of the facility. The protocol for these surveys involves recording of observations (visual and audible) along fixed transects and point counts at select locations along these transects. Records were kept of all species seen and heard in four time blocks of 2.5 minutes each. Within each time block, the relative distance of each individual bird from the point count location was recorded as occurring within 0-25 m, 25-50 m, >50 m, or as a flyover. These surveys were conducted by experienced birders, who applied professional wisdom to not count the same individual twice and only record new individuals seen or heard in subsequent time blocks. After this 7.5 minutes of passive listening and observation, calls of the four notable species identified above were played for 15 seconds each, with 15 seconds of silence between each species (2-minute total) and then listening for 30 seconds.

The field reconnaissance was guided by high-resolution color aerial photography flown April 5, 2016 (Figure 4-1). Ecological investigations focused primarily on areas that were identified by the Developer as locations where development is proposed. The location of the vegetation assessment transects is shown on Figure 4-18.

At variably spaced intervals along these transects, 9-ft x 9-ft vegetation assessment plots were analyzed for species diversity, numbers of trees and shrubs and percent cover of groundcover species, vines and epiphytes. Observations of flora and fauna also took place along additional pedestrian transects that extended through portions of the property where no development is proposed.

The presence of fauna inside and in the vicinity of each vegetative plot and along the transects between plots was recorded and, where appropriate, GPS coordinates were also recorded at edges of transition zones and/or at other notable locations.

In addition, on several occasions, the entire approximately 3.7 miles of the site's shoreline was inspected by foot and/or by boat. Kayaks were used to access Big Pond on several occasions. A hand-held optical refractometer was used to determine instantaneous salinity values in the salt ponds, and Van Essen CDT-Diver multi-parameter data loggers were deployed for varying lengths of time to obtain hydrologic and water quality data salinity in all four salt ponds.

In some remote and difficult-to-access areas, a drone was deployed to photographically document conditions in accordance with all Government of The Bahamas approvals.

Vegetation was identified to species whenever possible. A list of the plant species observed is included as Appendix B. Vegetative community classifications generally follow *Flora of the Bahama Archipelago* (Correll and Correll, 1982), and *A Guide to Caribbean Vegetation Types: Preliminary Classification Systems and Descriptions* (Areces-Mallea, et al., 1999), with modifications to more explicitly describe mangrove and other communities encountered on the site.

FIGURE 4-18
1:1000 LANDSIDE TRANSECTS WITH CONCEPTUAL PLAN OVERLAY
LIGHTHOUSE POINT, BAHAMAS
NOVEMBER 11, 2020

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Plant nomenclature generally follows Correll and Correll (1982) and/or *Flowers of The Bahamas and the Turks and Caicos Islands* (Wood, 2003), with occasional updates to phylogeny and nomenclature as systematics have improved subsequent to those publications.

During the vegetative community assessments and habitat mapping, observations of terrestrial animals were also recorded. Most often these observations were of birds, including passerines and wading birds, which were identified by sight and/or call. The presence of various mollusks, crabs, snails, and reptiles were also recorded. A list of animals observed and identified on the site is included in Appendix B.

Additionally, the qualitative condition of each vegetation analysis plot was evaluated based on the following categories and descriptions:

Excellent: Natural floral and faunal communities are intact; have little or no adverse impacts from non-native species; possess primarily natural hydrological conditions; and are free of adverse human-related (e.g., debris, previous development) and/or natural (e.g., hurricane, wildfire) impacts. Species designated as Endangered, Endemic and/or Protected are present in sustainable populations.

Good: Natural floral and faunal communities are present, but communities are not meeting optimal conditions due to adverse impacts from hydrological, human-related or natural causes. Species designated as Endangered, Endemic and/or Protected may be present, but long-term population sustainability is not certain.

Fair: Natural floral and faunal communities are substantially impaired as a result of hydrological, human-related or natural causes. Species designated as Endangered, Endemic and/or Protected are absent or minimally present, and their long-term population sustainability is tenuous.

Poor: Native floral and faunal communities are absent or minimally present due to previous hydrological, human-related or natural impacts. Species designated as Endangered, Endemic and/or Protected are not present or are not present in sustainable populations.

4.2.1.1 Habitat/Land Cover Mapping & Characterization

Based on these field inspections, boundaries for each cover type were delineated to produce a comprehensive vegetative community map for the site (Figure 4-19).

The 11 vegetative communities that were identified on the site are identified and quantified in Table 4-5 and described individually thereafter.

Table 4-5. Vegetative Community Acreages within Assessment Area[1]

Vegetative Community	Size (Acres)	Percent of Assessment Area
Dry Broadleaf Evergreen Forest	471.9	48.2
Sand Strand	265.3	27.1
Sand[2]	40.5	4.1
Herbaceous and Shrub-dominated Dunes	24.7	2.5
Casuarina-dominated Dunes	22.1	2.3
Conocarpus	16.4	1.7
Exposed Rock	11.1	1.1
Mixed Mangroves	5.4	0.6
Roads	2.9	0.3
Herbaceous Wetland	2.1	0.2
Ponds		
Big Pond[3]	84.0	11.8
White Pond[3]	19.8	
Shad Pond	8.3	
Northwest Pond	3.5	
Totals:	978.0[1]	100

[1] Sizes may not coincide with previously-identified property acreages due to inclusion of sandy beaches, ponds and Crown Lands.
[2] Areas of Sand are included in this table, even though they are located waterward of the boundary of the purchased parcel, due to their potential of being impacted by the proposed Project.
[3] Big Pond and White Pond are Crown lands but are included in Table 4-5 because they are situated within the property boundary.

4.2.1.1.1. Dry Broadleaf Evergreen Forest

The 471.9 acres of this habitat make it by far the largest individual vegetative community on the property, approximately 48 percent of the site. This community, referred to locally as "Coppice," and coastal coppice when it occurs near the shore, is also the most abundant vegetative community in The Bahamas.

CMYERS LOCATION G:\WESTPALMBEACH SHARES\DRAWINGS\PROJECTS\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\LANDSIDE\18-3297_RESOURCE MAP_BS WDI CRUISE SITING LHP_BAHAMAS_USFT.DWG

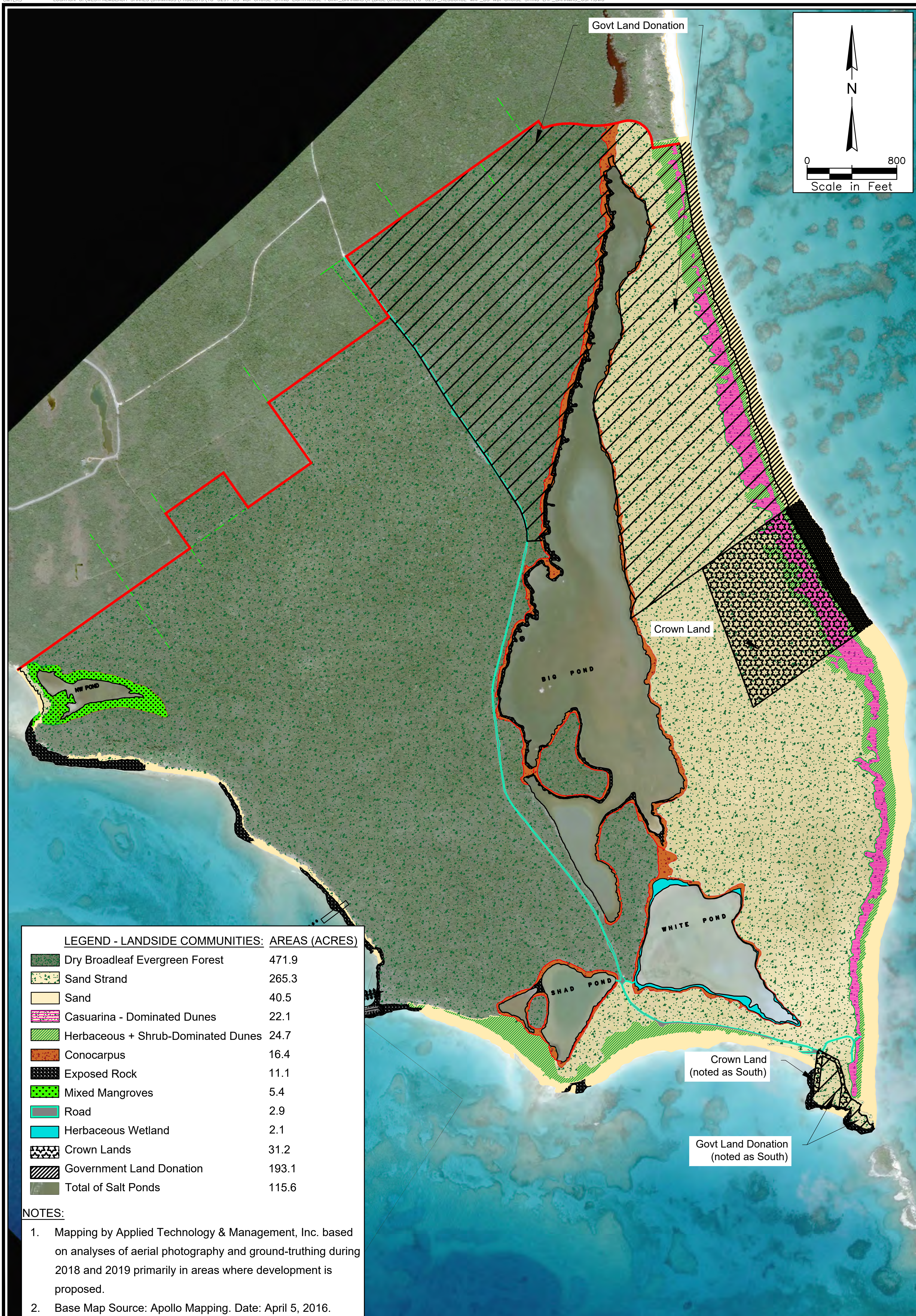

FIGURE 4-19
1:800 OVERVIEW - VEGETATIVE COMMUNITIES
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 9, 2019

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On the subject property, this community consisted of a highly diverse, enclosed-canopy forest. Abundant tree species included poisonwood (*Metopium toxiferum*), five fingers (*Tabebuia bahamensis*), gum elemi (*Bursera simaruba*), wild tamarind (*Lysiloma latisiliquum*), chink bush (also known as pigeon berry) (*Bourreria succulenta*) and lignum vitae (*Guaiacum sanctum*). East of Big Pond, where this community transitions to Sand Strand, additional trees include silver top palm (*Coccothrinax argentata*), darling plum (*Reynosia septentrionalis*), and yellowwood (Zanthozylum flavum). Canopy height varied from about 7 ft (near open, exposed areas) to maximums of approximately 15 to 20 ft (Photo 4-1). Understory shrubs included narrow-leaved blolly (*Guapira discolor*), boxwood (*Schaefferia frutescens*), Abraham-bush (*Phyllanthus epiphyllanthus*) and others. Epiphytes included air plants (*Tillandsia utriculata and T. recurvata*) and orchids (*Encyclia altissima*). Vines were intermittently abundant, with prickly saw-brier (*Smilax havanensis*) often restricting progress through the mostly dense forest. Rock substrate was intermittently exposed.

Photo 4-1. Example of Closed-Canopy Dry Broadleaf Evergreen Forest

Fauna observed in this community consisted of land crabs, reptiles (*Anolis* lizards), spiders and birds, including permanent resident bird species (e.g., bananaquits, Bahama mockingbirds, thick-billed vireos, greater Antillean bullfinch, white-crowned pigeons) and wintering migrants (e.g., gray catbirds) and neotropical migrants, primarily warblers, that pass through the area during southerly or northerly migration. One notable species observed was the great lizard cuckoo, a permanent breeding resident that is only known to have populations in The Bahamas on Andros, New Providence and Eleuthera. A population of this species also exists in Cuba, but The Bahamas population is recognized as a sub-species – *Saurothera merlini bahamensis*.

Another notable bird species that was observed on the site during the ecological investigations and is worthy of discussion is Kirtland's Warbler (*Setophaga kirtlandii*) a migratory species that nests in the northern United States and is well-documented to spend much of the non-breeding season in The Bahamas, including Eleuthera. This species was designated as Endangered on March 11, 1967. After development and adoption of a Recovery Plan by the U.S. Fish and Wildlife Service in 1985, a variety of activities have been undertaken to reverse the decline of this species. Based on the success of these initiatives, on April 12, 2018, the USFWS proposed to remove Kirtland's warblers from the list of endangered and threatened wildlife, due to its recovery.

Research on this species, including successful mist-net captures of individuals of this species on Eleuthera, has revealed its preference for early successional vegetative communities, including shrub-height coppice. In its proposal to delist Kirtland's warbler, the USFWS states: "Most Kirtland's warblers appear to winter more commonly in early successional habitat that has recently been or are currently being used by people (e.g., abandoned after clearing, grazed by goats), where disturbance has set back plant succession" (USFWS, 2018, Wunderle et al. 2010). It is within this type of disturbed habitat along the existing access road where Kirtland's warblers were sighted during October and November 2019. The tall, densely vegetated coppice that constitutes the majority of the subject property suggests that while the incidental presence of Kirtland's warblers on the property is not out of the question, in its present condition, the property is unlikely to provide habitat that is critical to this species during its fall-through-spring presence on Eleuthera. The proposed Project could actually improve habitat for this species by reducing vegetation density within the dense coppice and creating the early successional and disturbed areas that this species appears to prefer during its annual stay in The Bahamas.

Non-native flora and fauna observed in the Dry Broadleaf Evergreen Forest included small numbers of Australian pine trees, Asiatic scaevola and one feral cat.

Qualitative Ranking of the Dry Broadleaf Evergreen Forest

While there is certainly some variation in the quality of different areas within the 471 acres of Dry Broadleaf Evergreen Forest, in overall terms, this community was ranked as being in Excellent condition. Evidence of adverse impacts from natural and human-related events was minimal, although several low rock walls are present and a north-south oriented un-paved road bisects the property, separating it into east and west tracts. Comparatively few invasive exotics were present, natural hydrology appeared intact and notable species, including lignum vitae [both *Guaiacum sanctum* (common) and *Guaiacum officinale* (occasional)], were mature, common, and present in sustainable quantities.

4.2.1.1.2. Sand Strand

Situated in a shore-parallel band on the east side of the property, sand strand (Photo 4-2) composed 265.3 acres (27.1 percent) of the property. The terrain is a rolling dune landscape characterized by loose, unconsolidated sandy soils. The heights of primary, secondary and tertiary dunes increase in elevation as the distance from shore increases, and some showed evidence of lithification. No fully lithified karst formations (i.e., banana holes, dissolution holes or caves) and inter-dunal swales were observed.

Floral diversity and physical structure appeared to be strongly influenced by the combination of elevation and proximity to the shore; plant heights and diversity were lower closest to the shore and on the top of dune crests, where they were intermittently exposed to high winds and salt spray. Plant heights and diversity were higher as the distance from shore increased and where plants were more sheltered from winds and salt spray.

Photo 4-2. Sand Strand on the East Side of the Property

Common trees included silver thatch palms (*Coccothrinax argentata*), yellowwood (*Zanthoxylum flavum*), seven-year apple (*Casasia clusiifolia*) and blackbead (*Pithecellobium keyense*). Within this overall category, some areas demonstrated specific plant assemblages, including the *Coccothrinax argentata-Reynosia septrionalis* assemblage described by Mark Daniels in his floristic study that included properties on South Eleuthera, Little San Salvador and Cat Island (Daniels, 2016).

Shrubs/understory species included darling plum (*Reynosia septrionalis*), sage (*Lantana involucrata*), pearlberry (*Vallesia antillana*), black torch (*Erithalis fruticosa*), granny-bush (*Croton linearis*), horsebush (*Gundlachia corymbosa*), canker-berry (*Solanum bahamense*), coast sophora (*Sophora tomentosa*) and others. A notable plant in this community was narrow-leaved blolly (*Guapira discolor*) a protected tree species. This species was found to be widespread in both the Sand Strand and Dry Broadleaf Evergreen Forest communities, where it was observed in all stages of growth (i.e., seedlings, saplings, understory shrubs and mature trees). Groundcover and vine species were highly variable – present in some areas, but non-existent in others.

A notable geologic feature in the sand strand community was a north-south oriented rocky bluff (Photo 4-3) that dropped nearly vertically 20 to 30 ft in height on the east side of the property. This feature was most pronounced near the southern tip of the island and decreased in height further to the north.


Photo 4-3. North-South Oriented Rocky Bluff

Fauna observed in the sand strand include migratory warblers (e.g., prairie warblers, palm warblers), year-round resident breeding birds (e.g., bananaquits, Bahama woodstar hummingbirds, and western spindalis), land crabs, and seagrape snails.

Qualitative Ranking of the Sand Strand Community

This community was ranked as being in Excellent condition. Evidence of adverse impacts from natural and human-related events was minimal. Comparatively few invasive exotics were present, natural hydrology appeared intact and notable species and plant assemblages appeared to be a heathy mix of seedlings, shrubs and mature vegetation.

4.2.1.1.3. Sand

The next most abundant community type was sand. Broad sandy beaches were primarily present all along the east shore of the property, with two smaller 'pocket beaches' present at the south end of the property. Collectively, these areas totaled approximately 40.5 acres, (4.1 percent of the assessment area).

The east beach was wide and long (Photo 4-4). Occasionally, rock outcrops that were landward extensions of the nearshore underwater marine ecosystem protruded onto the otherwise sandy beaches. Ghost crabs (*Ocypode quadrata*) were observed near their burrows in the sand, and shorebirds, including ruddy turnstones (*Arenaria interpres*) were occasionally observed foraging near the water's edge and/or in wave-deposited wrack higher on the beach.

Photo 4-4. East Beach

Although no evidence of sea turtle's nests was observed, surveys were not performed frequently during the sea turtle nesting season. To date, inquiries regarding documentation of turtle nesting have not revealed any known nesting on the subject property, but the presence of broad, gently sloping, deep sands adjacent to significant nearshore marine resources suggest this area may be suitable for nesting by one or more species of sea turtles. Further monitoring will be performed by Disney staff who have extensive experience with sea turtle stewardship. If turtles are determined to nest on the resident beaches, Disney will apply protocols used in its current sea turtle monitoring program at Vero Beach, Florida.

Lighthouse Bay Beach is an approximately 0.4-mile-long stretch of sandy beach that extends from the Lighthouse area on the east to Joe Thompson Point on the west. Although most of this area was found to be sand-covered, rock was exposed near the water line in the east portion of this bay. As with the east beaches, no evidence of sea turtle nesting was observed, but the habitat appeared to be potentially suitable for this use.

Further to the west, a sandy stretch of beach extended approximately 0.3 miles from Joe Thompson Point on the east to Big Bluff Point on the west. This area is referred to as “Bottle Bay” by local residents. As with the east beaches and Lighthouse Bay Beach, no evidence of sea turtle nesting as observed, but the habitat in this area also appeared to be potentially suitable for this use. Short stretches of barren sand were occasionally encountered further north along the western shoreline, but for the most part, sand was present only in a thin veneer overlaying a rock undersurface.

Laughing gulls (*Larus atricilla*) and royal terns (*Thalasseus maximus*) were occasionally seen along the shore and were observed at rest near the water’s edge.
One series of notable sightings was the presence of a small flock (mostly three to eight individuals of piping plovers (*Charadrius melodus*) that were observed on repeated occasions, mostly on Bottle Bay Beach. This small migratory shorebird is protected under the Endangered Species Act in the United States and international treaties. One individual that was banded (Photo 4-5) has been confirmed to be part of a population that nests in the Magdalen Islands north of Prince Edward Island and the Cape Breton peninsula in eastern Quebec.


Photo 4-5. Banded Piping Plover

According to the biologist who oversees the piping plover program for Quebec's *Environment and Climate Change Canada*, (F. Schaffer, pers. comm. 2019) the uniquely banded piping plover observed at Lighthouse Point is the product of only 19 known piping plover nests in Quebec, the far northern end of this species' nesting range. Piping plovers have a high level of winter-time site fidelity, a somewhat unusual trait for many species of migratory birds. Piping plovers were observed in the same general area of the site during separate site visits in October and December 2017, November and December 2018, and January, October and November 2019. The location where the piping plovers were most often encountered is shown on Figure 4-20, which also shows other notable landside features. The Developer will incorporate a piping plover conservation program into the EMP. A portion of the point on Bottle Bay where these plovers have been consistently observed will be protected with buffers to prevent disturbance.

The only non-native faunal species observed on the sandy beaches were domestic dogs, which were only occasionally observed. When observed, none were on leashes, but were in the vicinity of visitors. Unleashed dogs have the potential to threaten birds and other native wildlife and introduce biological contamination through defecation and urination. Domestic pets will be excluded from private lands within the Project.

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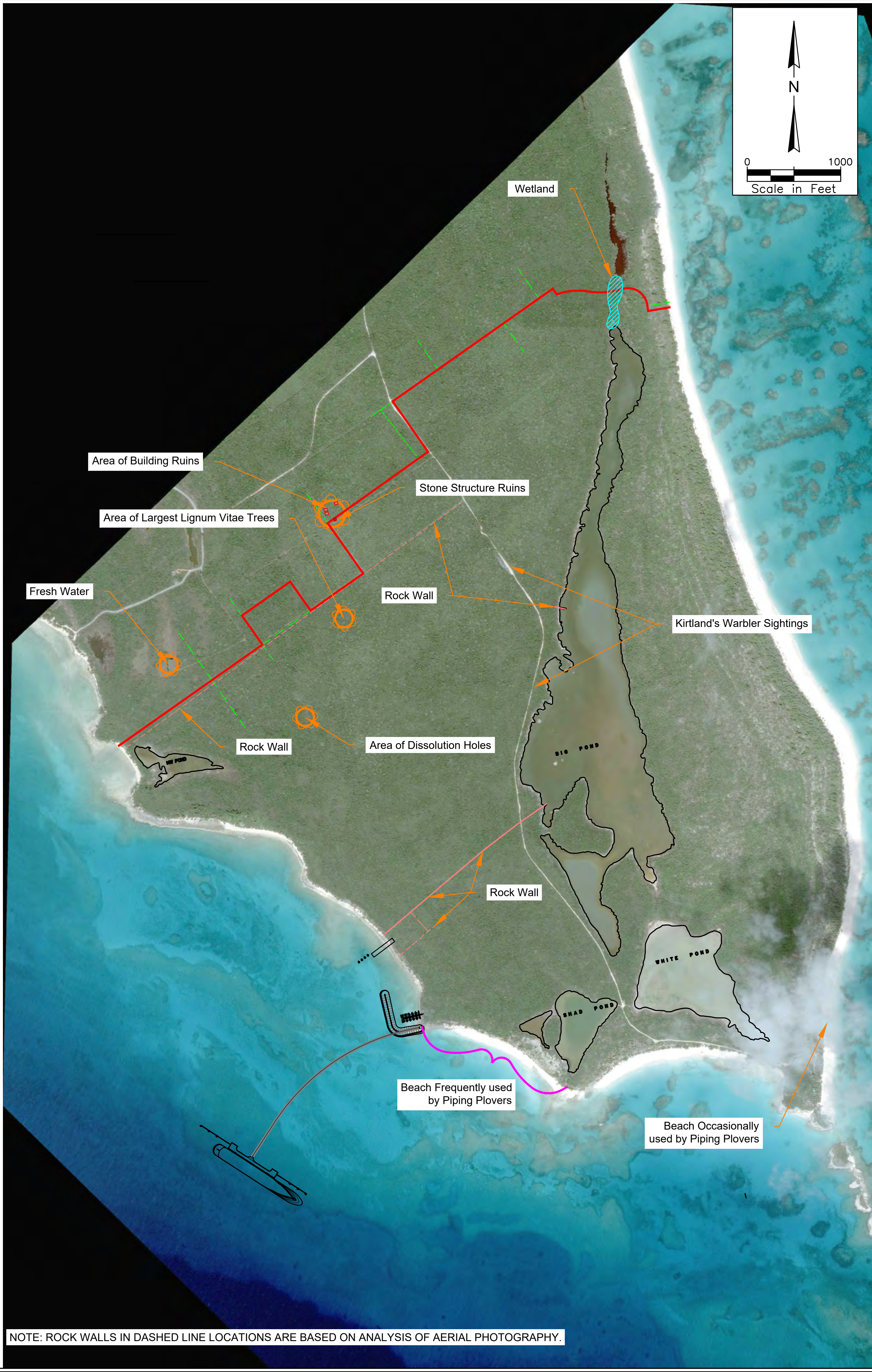

FIGURE 4-20
NOTABLE LANDSIDE FEATURES
LIGHTHOUSE POINT, BAHAMAS
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Qualitative Ranking of the Sandy Beaches

This community was ranked as being in Excellent condition. Evidence of adverse impacts from natural and human-related events was minimal. No invasive exotics were present, natural hydrology appeared intact and notable species were repeatedly observed. Areas of moderate erosion were occasionally present (Photo 4-6), but review of historic aerial photography indicates that the longest stretch of beach appeared to have a long history of accretional conditions.

Photo 4-6. Area of Moderate Erosion

To date, site visits have revealed only minimal to moderate amounts of sargassum that have been deposited along beaches and shoreline at the site. It is notable, however, that the volume of this wind-blown and current-moved seaweed has increased significantly in recent months on the windward side of many islands in The Bahamas and the Caribbean, to such an extent that it is causing severe disruption of beach activities at many resorts and waterfront properties.

4.2.1.1.4. Herbaceous and Shrub-Dominated Dunes

Situated slightly landward, but abutting the sandy beaches, herbaceous and shrub-dominated dunes (Photo 4-7) were mapped near the east-facing beaches, and on the south, adjacent to Lighthouse Bay Beach and Bottle Bay. Collectively, this community totaled 24.7 acres, approximately 2.5 percent of the area assessed.

Photo 4-7. Herbaceous and Shrub-Dominated Dunes

Trees were absent or minimally present in these areas. Herbaceous species included sea oats (*Uniola paniculata*) and beach elder (*Iva imbricata*). Shrubs, which were mostly less than four feet in height, included inkberry (*Scaevola plumieri*), sea lavender (*Heliotropium gnaphalodes*) and beach creeper (*Ernodea littorialis*). Vines included beach morning-glory (*Ipomoea pes-caprae*) and beach bean (*Canavalia rosea*).

Fauna was comparatively infrequent in this zone, but included seagrape snails, and Bahama woodstar hummingbirds, which were observed feeding on beach creeper flowers.

Qualitative Ranking of the Herbaceous and Shrub-Dominated Dunes

This community was ranked as being in Excellent condition. Evidence of adverse impacts from natural and human-related events was minimal. Comparatively few invasive exotics were present, although *Scaevola taccada* was intermittently present. Wave-induced erosion was observed along a part of this community near the east end of Bottle Bay Beach, but this community is primarily vegetated with pioneer-plants, so some adjustment of the line of the edge-of-vegetation on an annual basis is normal.

4.2.1.1.5. *Casuarina*-Dominated Dunes

A long, narrow band of this community extended in a mostly continuous band along the east coast, between the herbaceous and shrub-dominated dunes to the east and the Sand Strand to the west. It totaled 22.1 acres, approximately 2.3 percent of the area assessed. *Casuarina equisetifolia* (Australian pine) trees are highly invasive and were present in sufficient quantities and cover (Photo 4-8) that they were having noticeably adverse impacts on native vegetative communities.

Photo 4-8. Australian Pine (*Casuarina equisetifolia*)

In some areas, numerous *Casuarina* trees were toppled like giant piles of pick-up-sticks. Although a definitive cause for this situation is not known, *Casuarina* trees are infamous for their shallow root systems and inability to withstand heavy winds. It is likely that the toppled trees are a result of high, storm-associated winds.

Few wildlife species were observed in the *Casuarina*-dominated dunes.

Qualitative Ranking of the *Casuarina*-Dominated Dunes

This community was ranked as being Poor in quality, condition and value. Non-native, invasive vegetation was dominant. Native faunal species were absent or minimally present.

4.2.1.1.6. Conocarpus

Buttonwood (*Conocarpus erectus*) is a hardy, salt-tolerant plant that is highly tolerant of variable substrate and hydrologic regimes. Mature individuals were found on the site in a low-growing life form in the salt-spray zone on nearly barren rock in the ironshore zone, and in heights of 30 ft or more in areas of thick saline or fresh-water soils and on exposed rock. Its silver form is particularly aesthetically appealing and is occasionally used as a landscape plant in urban yards. On the subject site, it occupies a unique niche as the dominant plant in the narrow, rocky, transition zone between the shoreline of salt ponds and the adjoining uplands (Photo 4-9). Although the width of this zone was typically less than 30 ft, because the cumulative shoreline of the four salt ponds on the property totals over five miles, approximately 16.4 acres (1.7 percent of the area assessed) consists of this *Conocarpus*-dominated vegetative community.

Many of the *Conocarpus* trees were not in good condition. Many were dead, and although some were in seed, few seedlings were noticed. It is likely that highly variable soil salinity and hydrological regimes along the pond edges intermittently subjects this species to nearly lethal stresses.

Few animals were seen in this area, as although wetland shores are often teeming with aquatic life, hyper-salinity in all the ponds provided relatively inhospitable conditions for most aquatic organisms.

Photo 4-9. Buttonwood (*Conocarpus erectus*) Trees along the Pond Edge

Qualitative Ranking of the *Conocarpus* Community

This community was ranked as being Poor in quality and function. Although non-native, invasive vegetation was absent or minimally present, plant diversity was exceedingly low, some trees were dead, and many appeared to be in poor health and birds and other wildlife were mostly absent. One attribute is this community's long-term potential to respond favorably to sea level rise, as it provides a wider transition zone than other vegetative communities.

4.2.1.1.7. Exposed Rock.

Approximately 11.1 acres (1.1 percent) of the area assessed were exposed rock areas where vegetation was absent or minimally present. Most of these 11 acres were shoreline zones also known as Coastal Rock, where native, sharp-spiked ironshore (Photo 4-10) met the sea. Barren close to the water line, sandfly bush (*Rhachicallis americana*), mosquitobush (*Strumpfia maritima*) and sea ox-eye (*Borrichia frutescens*) became increasingly abundant toward the upper reaches of this community.


Photo 4-10. Coastal Rock with Native, Sharp-Spiked Ironshore

Exposed rock in the form of slabs of plate rock were the norm in areas where exposed rock was present along portions of the shores of the salt ponds.

Few birds and comparatively little wildlife were seen in these areas. Chitons, beaded periwinkles and nerites were frequently common, and a pair of oystercatchers (*Haematopus palliatus*) was occasionally observed in the coastal rock along the west shore. The exposed rock along the salt pond edges appeared less desirable, although fiddler crabs (*Uca minax*) would take refuge under these rocks and picked-clean crab shells gave away the intermittent presence of yellow-crowned night herons (*Nyctanassa violacea*). Antillean nighthawks (*Chordeiles gundlachii*) are known to nest in this habitat, and one nest of this species was located on the southwest part of the property during the July 2019 bird survey. Additionally, gull-billed terns (*Gelochelidon nilotica*) and black-necked stilts (*Himantopus mexicanus*) were observed nesting in areas of exposed rock in some of the salt ponds.

Qualitative Ranking of the Exposed Rock Zone

This community was ranked as being Good in quality and function. Non-native, invasive species were absent, faunal diversity and abundance appeared normal, and this geologic feature appeared to provide valuable protection from storm surge and shoreline erosion and could prove to be beneficial in consideration of possible effects of sea level rise.

4.2.1.1.8. Roads

One unpaved, deeply rutted road (Photo 4-11) was found to extend in a generally north-to-south alignment through the middle of the property. Varying in width from 9 to 15 ft, this road totaled approximately 2.9 acres, 0.3 percent of the area assessed. As it approached Lighthouse Bay Beach, the road curved eastward toward an area that is used for vehicle parking near the base of the trail up-slope toward the lighthouse. A sandy extension passable only to four-wheel drive vehicles appeared to allow some visitors to drive over the bluff toward the beach north of the lighthouse, an area apparently occasionally used for camping.

Photo 4-11. Deeply Rutted Road Through Center of the Site

Rainwater runoff was observed carrying sediment from the road into Shad Pond.
While the assessments were underway, the road was comparatively infrequently used, often by only several vehicles each day. The road is apparently used more frequently during "ship days", when passengers from nearby Princess Cays rent off-road vehicles for dusty motorcades through the bush to Lighthouse Point (Photo 4-12).

Photo 4-12. Existing Road Use by Tourists Creating Dusty Motorcades

The road also provides seasonal access to residents of South Eleuthera who access the property to harvest land crabs and shoreside fishing areas.

Bird and wildlife use of the roads was minimal, although common ground-doves (*Columba passerina*) were occasionally observed foraging for seeds along the edges of the road. Due to the poor condition of the road, vehicles necessarily must travel at low speeds, which minimizes direct adverse impacts on wildlife, although one deceased snake was encountered on the road during a wildlife survey in 2019.

Qualitative Ranking of the Roads

The single road was in poor condition – heavily rutted, and a potential danger for all vehicles except high-clearance four-wheel drives. It was also ranked as being Poor for quality and function as bird and wildlife habitat, with simultaneously its biggest attribute and biggest impact being that it provides access to Lighthouse Point and fragments the dense dry broadleaf evergreen forest and sand strand communities through which it traverses. Non-native, invasive vegetation (e.g., *Casuarina, Dactylctenium aegyptium*) was minimally present along the road.

4.2.1.1.9. Herbaceous Wetland

Two types of wetlands were found to be present on the property; herbaceous wetlands, and forested wetlands (see Section 4.2.1.1.10). The herbaceous wetland consisted of a very narrow fringe of seashore salt grass (*Distichlis spicata*) (Photo 4-13) that was found to be present along much of the periphery of White Pond, which unlike the other salt ponds on the property, had a soft, sandy shoreline substrate, instead of a rocky shore. Collectively, this narrow band of herbaceous wetland totaled approximately 2.1 acres, 0.2 percent of the area assessed.

Photo 4-13. Narrow Fringe of Seashore Salt Grass (*Distichlis spicata*)

Armies of fiddler crabs were seen in this area, which in turn attracted wading birds, including reddish egrets (*Egretta rufescens*), green herons (*Butorides virescens*) and black-bellied plovers (*Pluvialis squatarola*).

Qualitative Ranking of the Herbaceous Wetland

The lack of invasive species, intact hydrologic condition and good wildlife habitat earned this area an Excellent ranking for quality and function. The gently sloping shoreline appeared to provide excellent resiliency for the apparently highly variable water level experienced in White Pond.

4.2.1.1.10. Mixed Mangroves

A narrow band of buttonwoods, red mangroves, black mangroves and white mangroves was found to be present along much of the shore of Northwest Pond. The trees (Photo 4-14) were mature and appeared to provide protection to this pond from the nearby sea. This single polygon of this habitat was approximately 5.4 acre in size, constituting less approximately 0.6 percent of the area assessed.

Photo 4-14. Narrow Band of Mixed Mangroves along the Western Edge of Northwest Pond

Due to its small size, few birds or other wildlife were observed in the mixed mangrove community, although a belted kingfisher (*Ceryle alcyon*), a non-breeding, winter resident was observed perching atop the mangroves.

Qualitative Ranking of the Mixed Mangroves

This vegetative community was ranked Excellent for quality and function. Mangroves appeared healthy, provided good bird and wildlife habitat, had an intact hydrologic regime and comparatively little non-native, invasive vegetation. Some *Scaevola taccada* was present as an understory shrub between Northwest Pond and the sea.

4.2.1.2 <u>Salt Ponds</u>

Four salt ponds were found to be present within the property boundary (Figure 4-19). As noted on Table 4-5, they varied in size from approximately 3.5 acres (Northwest Pond) to 84.0 acres (Big Pond). Salt ponds throughout The Bahamas and Caribbean are notable features. They provide unique habitats for select flora and fauna and often provide the only suitable areas for nesting of black-necked stilts and other bird species. Often modifications are proposed, through which naturally occurring extremes of salinity and temperature are moderated in order to effectuate transitions to more marine systems, with goals of increasing value to fishes, and reducing odor and/or bothersome insects. No dredging, creation of swimming areas or inland marinas are proposed at the site and the Developer's decision has been to preserve the ponds in their existing condition. Nonetheless, research papers were obtained and reviewed regarding previous studies at the Lighthouse Point salt ponds [e.g., Dupraz and Visscher (2005), Boush et al. (2014)]. Additionally, because Big Pond and White Pond are Crown Lands and little land alteration is proposed within the drainage basins of these ponds, expensive and detailed water chemistry analyses were determined to not be necessary. The four salt ponds are described separately hereafter.

4.2.1.2.1. Big Pond

At 84.0 acres in size and with an estimated drainage basin of approximately 165 acres, Big Pond is a noteworthy feature of the subject property (Figure 4-21 and Photo 4-15). Approximately 1.4 miles in length, it is approximately 0.26 miles wide at its widest point.

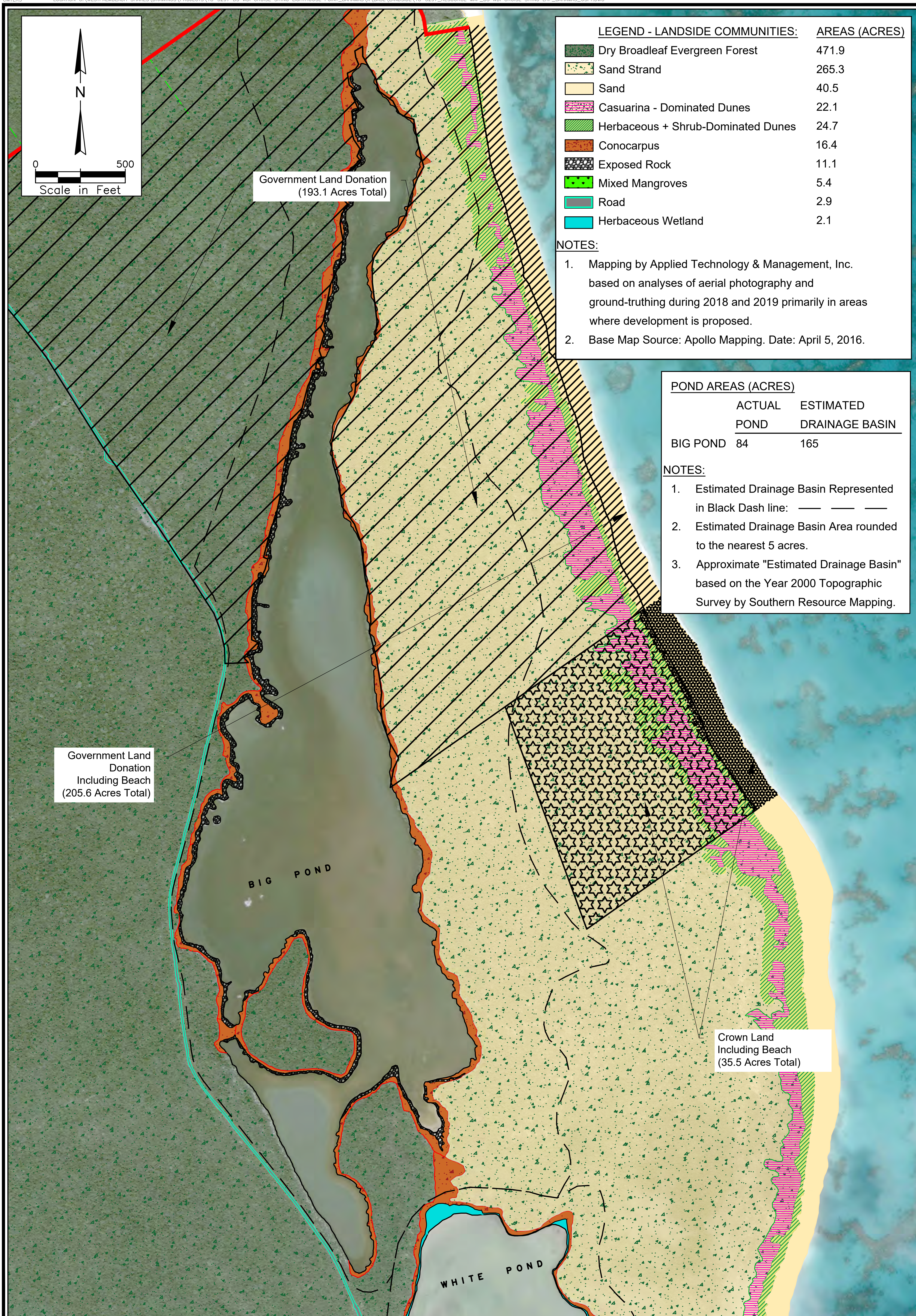

FIGURE 4-21
1:500 BIG POND
LIGHTHOUSE POINT, BAHAMAS
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Photo 4-15. Big Pond, View Looking East from West Shoreline

The submerged lands of white pond are Crown Lands, but a 6.4-acre peninsula that juts eastward into Big Pond from its southwestern side is part of the privately owned tract. Much of its shoreline was found to be fringed with *Conocarpus erectus* that had become established in an exposed rock substrate This pond, which was investigated by kayak on three occasions, was mostly very shallow, less than two feet in depth.

Two rock walls extend from the uplands into the edge of Big Pond on its western side. One of these walls (Photo 4-16), on the southwest side appeared to be part of a longer wall that extended through the dry broadleaf evergreen forest to near the west (i.e., Exuma Sound) shore. A cultural examination of this feature concluded that it may have been for containment of livestock. A shorter segment of rock wall was present extending into Big Pond on its northwest shore. The degree to which this wall extends through the dry broadleaf evergreen forest is not known. No evidence of a previous salt-harvesting operation was evident in Big Pond.

Photo 4-16. Rock Wall Extending into Big Pond

In spite of an extensively sinuous west shoreline, which would typically be expected to provide good foraging habitat for shorebirds, comparatively few shorebirds and wading birds were observed in this pond. Two black-bellied plovers, a northern waterthrush (*Parkesia noveboracensis*) greater and lesser yellowlegs (*Tringa* melanoleuca and *Tringa flavipes*, respectively) were the only birds observed during several dry-season visits to this pond. Nests of black-necked stilts was observed along the shore of Big Pond during spring 2019 and summer 2020. During bird surveys conducted in July 2019 and June 2020, gull-billed terns appeared to be nesting on a small rocky islet in Big Pond. Additionally, mangrove cuckoos were heard in the shrubs along the shore, and one un-occupied bird nest (possible gray kingbird) was found in a *Conocarpus erectus* tree whose branches extended out over the water. A maximum count of 64 laughing gulls was documented at Big Pond in June 2020, but no nesting of this species was observed.

No fish of any size were observed in Big Pond and no fiddler crabs were observed in this pond or along its periphery. Salinity values varied from 88 to 158 parts per thousand (ppt). This hyper-salinity (ocean water is approximately 35 ppt) and the lack of significant numbers of wading birds suggests that this pond, while aesthetically attractive, appeared to provide comparatively little habitat for aquatic organisms, at least during the dry season, although brine shrimp were observed.

The sediments were primarily reddish bacterial mats and wind-blown foam was present along much of the leeward (west) shoreline. Field observations of conditions in Big Pond are consistent with the descriptions of microbial mats in hypersaline ponds that were reported by Dupraz and Visscher (2005) which included ponds on Eleuthera. Their interest and analyses of the role of microbes in the formation of stromatolites and microbial mats was based on the knowledge that stromatolitic structures are among the earliest macroscopic evidence for life on Earth. They found that the dominant bacteria included *Microcoleus*, *Phormidium*, *Entophysalis* and *Gloeocapsa*, and that the water column contained cyanobacterial pigments which restrict light penetration. The presence of these compounds, in combination with elevated salinities likely explain the lack of seagrasses and other submerged aquatic vegetation which would otherwise be expected to be present in shallow saline ponds. Due to this comparative dearth of faunal and floral life, Big Pond was ranked poor for environmental quality and function, even though its hydrologic regime appeared intact and invasive non-native vegetation was mostly absent.

4.2.1.2.2. White Pond

Located in the southeast part of the property, White Pond was found to be approximately 19.8 acres in size and its watershed/drainage basin was estimated to be approximately 20 acres (Figure 4-22 and Photo 4-17). White Pond was found to have no direct surface connection to the sea. Sediments were exceedingly soft. Instantaneous salinity values varied from 28 to 74 ppt.

A data logger installed near the southeast shore of White Pond collected near-surface conductivity (salinity), temperature, and pressure (water level) values during the oceanographic data collection period of December 2018 through February 2019. Analysis of the resulting data suggests that water levels and salinity are mostly affected by rainfall events and rainy/dry season conditions. Minor salinity fluctuations on daily intervals were observed during several extended periods and are likely due to temperature/sunlight and similar variations.

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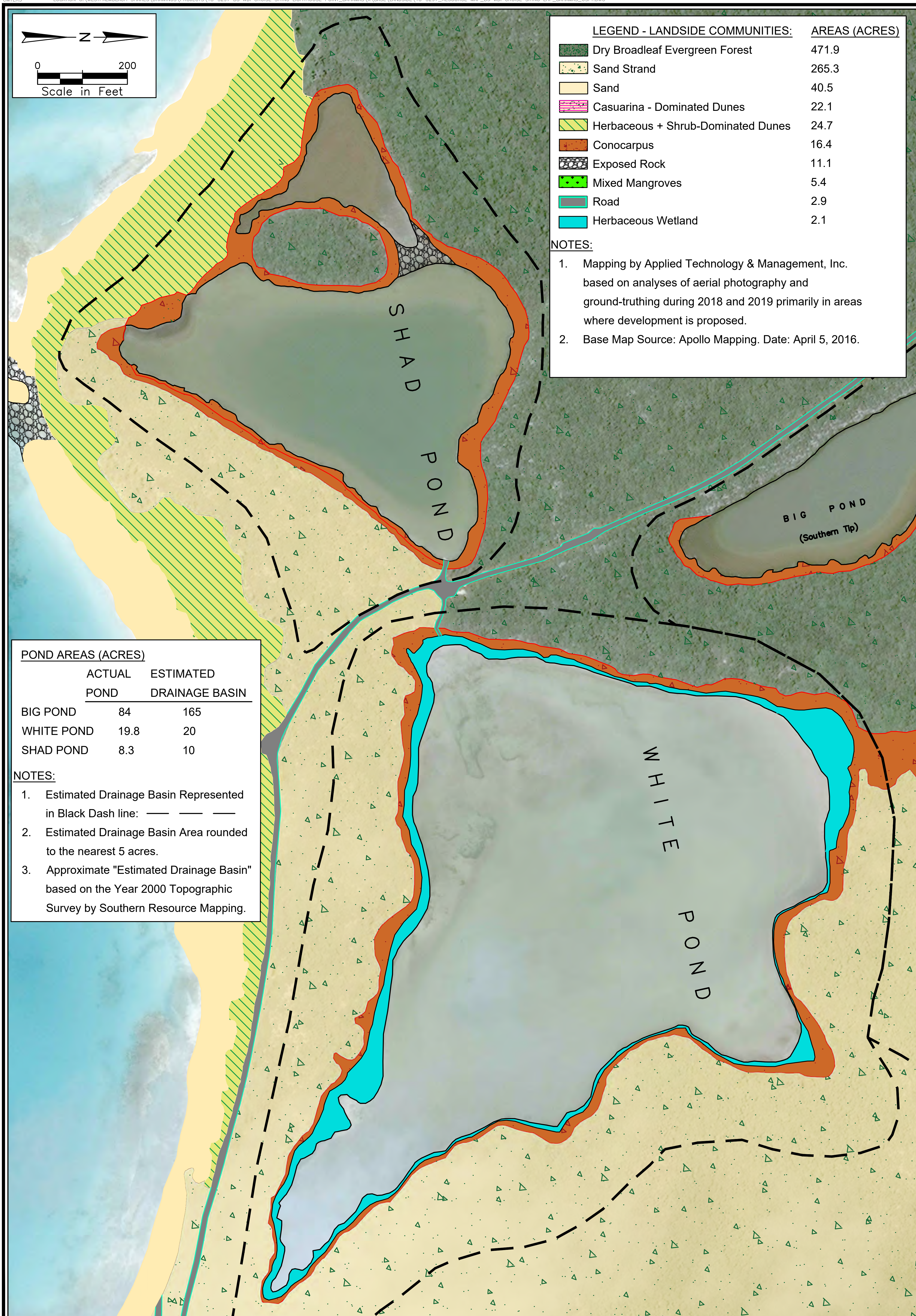

POND AREAS (ACRES)

	ACTUAL POND	ESTIMATED DRAINAGE BASIN
BIG POND	84	165
WHITE POND	19.8	20
SHAD POND	8.3	10

NOTES:

1. Estimated Drainage Basin Represented in Black Dash line: —— —— ——
2. Estimated Drainage Basin Area rounded to the nearest 5 acres.
3. Approximate "Estimated Drainage Basin" based on the Year 2000 Topographic Survey by Southern Resource Mapping.

FIGURE 4-22
1:200 SHAD POND AND WHITE POND
LIGHTHOUSE POINT, BAHAMAS
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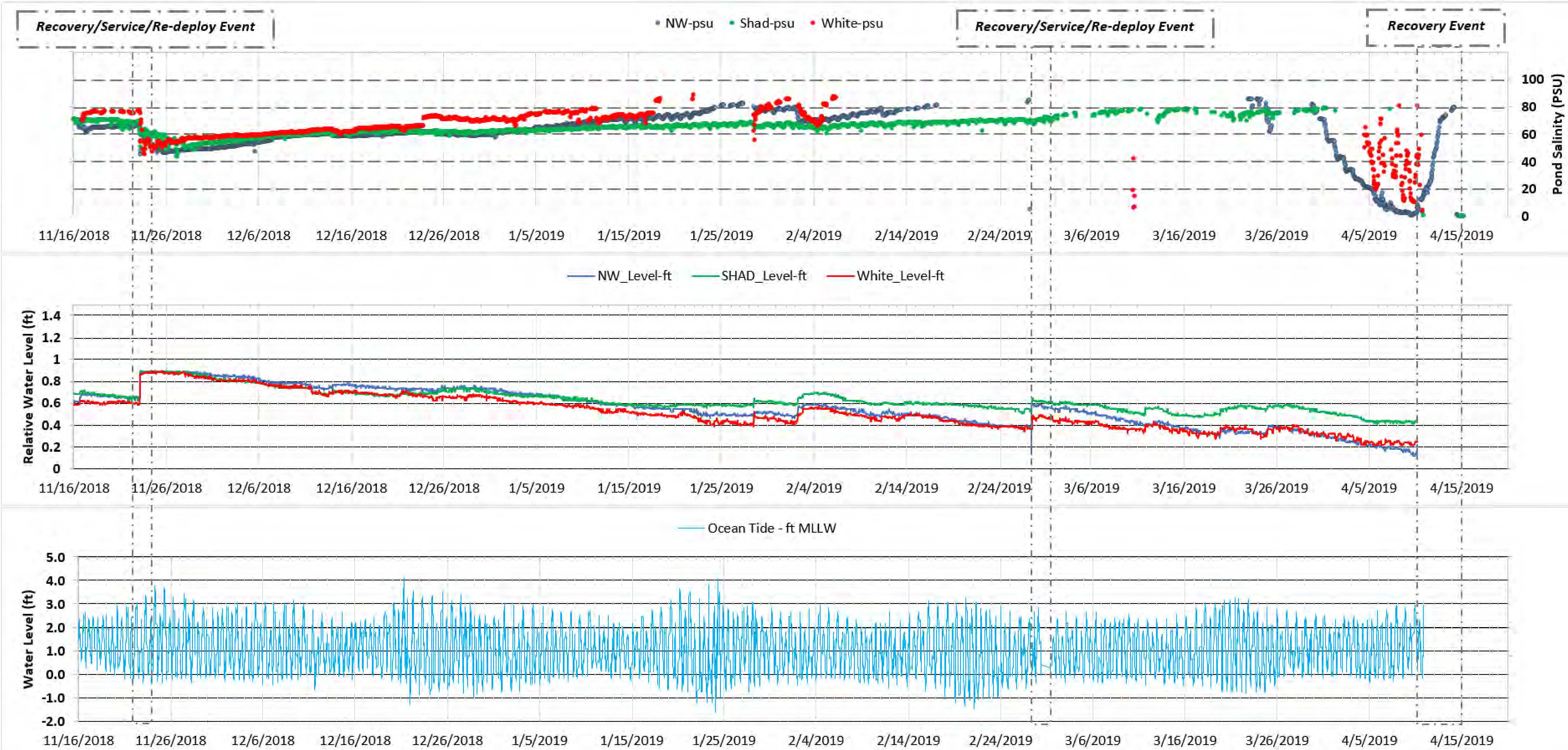
Photo 4-17. White Pond

A comparison of the pond water level fluctuations and nearby measured ocean tides do not indicate any significant hydraulic connection or influence of ocean tides on pond water levels. The graphs on the following page illustrate all the collected ponds salinity and water level data, along with the ocean tide signal. However, there may be subtle sub-surface capillary effects due to ocean tides. Additionally, extreme storm events can cause storm surge and wave overwash that may impact the ponds, including near the southeast terminus of White Pond.

Small fish (species not identified) were observed in White Pond, and small mollusks and bivalves were noted along the shore, as were large numbers of fiddler crabs and patches of wigeon grass (*Ruppia maritima*).

Bird presence in White Pond was seasonally variable, both in species diversity and abundance. Small numbers (typically less than five individuals) of reddish egrets (white phase), tri-colored herons, black-bellied plovers, green herons, willets and ruddy turnstones were observed during several avian surveys conducted from October through April.



Lighthouse Point Ponds Data Logger Observations and Ocean Tides: (Upper) Salinity, (Middle) Relative Water Level Fluctuations, and (Lower) Ocean Tide Signal.

Waterfowl observed in this pond included white-cheeked pintails (*Anas bahamensis*), which were observed on one occasion (October 2019), and blue-winged teal (*Spatula discors*), which were observed during November 2019. Summer-time breeding species observed along the periphery of White Pond included Wilson's plovers (*Charadrius wilsonii*), black-necked stilts, least terns (*Sternula antillarum*) and gull-billed terns.

An existing pathway was found to provide visitor access from the road to the west shore of White Pond, and an educational sign (Photo 4-18) featuring birds of the salt ponds was present near this access point.

Photo 4-18. Educational Signage at White Pond (Mistakenly labeled as Big Pond)

No evidence was observed that suggested that White Pond had ever been used for salt-harvesting.

White Pond was ranked Good for environmental value and function.

4.2.1.2.3. Shad Pond

Located approximately 300 ft west of the west shore of White Pond, Shad Pond was found to extend further to the west (Figure 4-22 and Photo 4-19). Separated naturally into a larger east basin and a smaller west basin, collectively, these ponds were approximately 8.3 acres in size and had an estimated drainage/watershed basin of approximately 10 acres. As with White Pond, sediments were exceedingly soft. Instantaneous salinity values ranged from 49 to 92 ppt. A data logger installed near the southeast shore of Shad Pond collected water level, salinity and conductivity from near the surface for the period from December 2018 through February 2019. As with White Pond, analysis of the resulting data indicated that water levels and salinity are mostly affected by rainy season/dry season conditions, although there may be a subtle sub-surface capillary effect of tides.

Photo 4-19. Shad Pond

The southwest portion of Shad Pond is less than 300 ft from the sea, and topographic and physical indicators suggest that intermittently, the sea may wash over into Shad Pond during extreme sea (e.g., hurricane) conditions.

Sawgrass (*Cladium jamaicensis*) was encountered along the southwest shore of Shad Pond – the only place on the subject property where it was observed.

In spite of its name, no fish of any size were observed in Shad Pond.

The sediments in Shad Pond were found to be composed mostly of bacterial mats similar to those observed in Big Pond, although not as strongly lithified. Water beetles (Dytiscidae), genus and species unknown) were occasionally observed.

Birds were occasionally observed foraging in Shad Pond, although numbers were always fewer than 10 individuals. Lesser yellowlegs, white-cheeked pintails and Wilson's plovers were the only bird species observed in Shad Pond. Mollusks were present along the shoreline.

Shad Pond was ranked Good for environmental value and function.

4.2.1.2.4. Northwest Pond

Situated in the far northwest corner of the property, Northwest Pond was found to be approximately 3.5 acres in size, separated into east and west basins and was estimated to have a contributing watershed/drainage basin of approximately 10 acres (Figure 4-23 and Photo 4-20).

Photo 4-20. Northwest Pond

CMYERS LOCATION G:\WESTPALMBEACH SHARES\DRAWINGS\PROJECTS\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\LANDSIDE\18-3297_RESOURCE MAP_BS WDI CRUISE SITING LHP_BAHAMAS_USFT.DWG

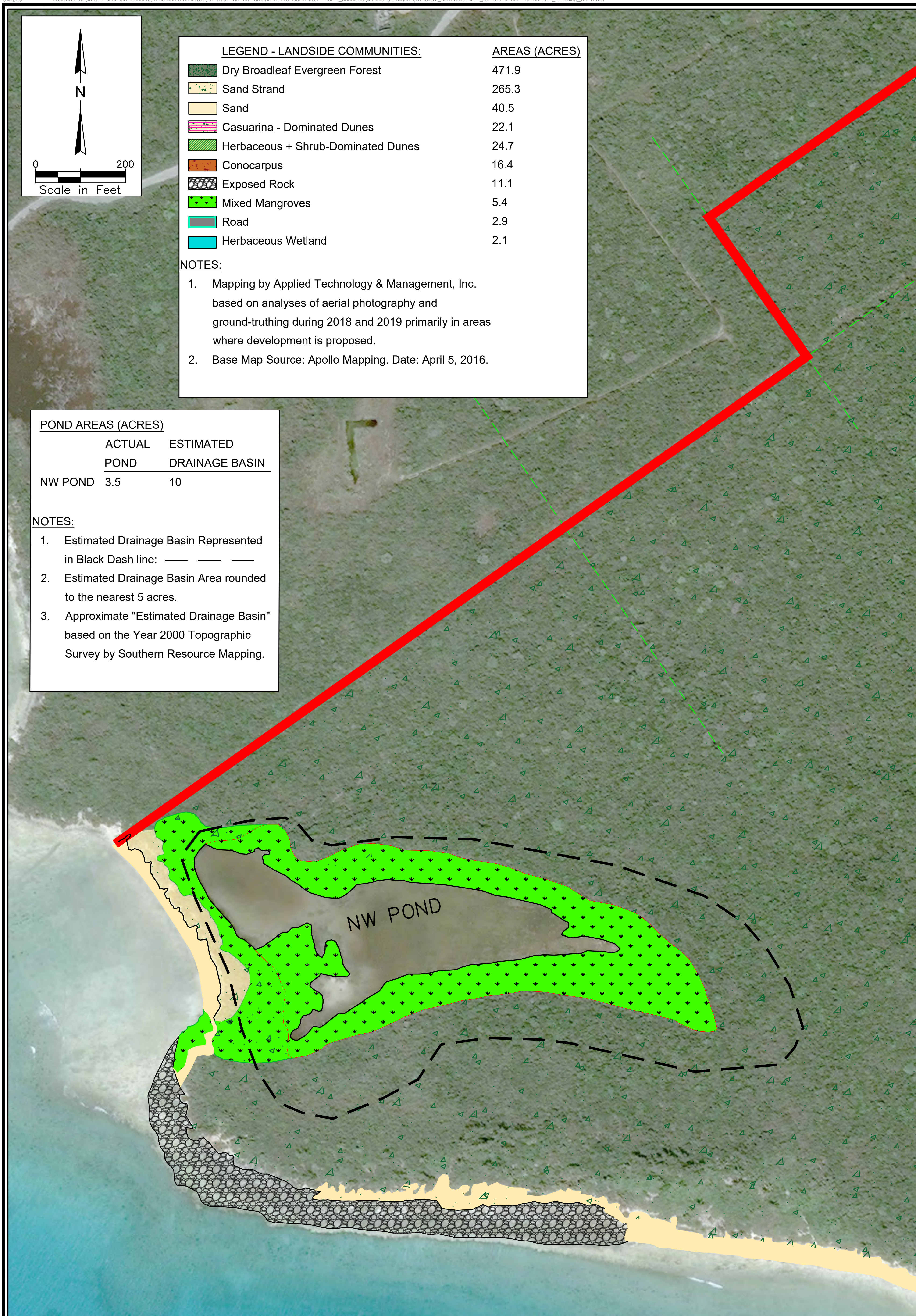


FIGURE 4-23
1:200 NW POND
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 9, 2019

ATM

Sediments were exceedingly soft and appeared to be primarily bacteriological in origin. Instantaneous salinity values ranged from 10 to 122 ppt. A data logger installed near the midpoint on the south side of Northwest Pond collected water level, salinity and conductivity from near the surface for the period from December 2018 through February 2019. As with White Pond and Shad Pond, analysis of the resulting data indicated that water levels and salinity were mostly affected by rainy season/dry season conditions, although there may be a subtle sub-surface capillary effect of tides.

The west edge of Northwest Pond is less than 100 ft from the sea, and topographic and physical indicators suggest that intermittently, the sea may wash over into Northwest Pond.

Birds observed in and near Northwest Pond included year-round breeding residents, including white-cheeked pintails, a yellow-crowned night-heron (*Nyctanassa violacea*), clapper rails (*Rallus longirostris coryi*), migratory species, including lesser yellowlegs and a kingfisher, and summer-time nesters, including black-necked stilts and Wilson's plovers. A gathering of 36 white-cheeked pintails observed during the January 2020 bird survey is notable. Water birds observed in Northwest Pond included lesser scaup (*Aythya affinis*), double-crested cormorants (*Phalacrocorax auritus*), least grebe (*Tachybaptus dominicus*) and blue-winged teal.

Small fish, species not identified (possibly *Cyprinodon* sp.) were observed in Northwest Pond. Hundreds of these fish were found dead or in poor condition in a mass mortality event along the north shore of Northwest Pond during the June 2019 avian survey, at which time the surface salinity was measured at 122 ppt – the highest recorded in this pond.

The perimeter of Northwest Pond was the only pond on the property where red mangroves were encountered.

Northwest Pond was ranked Good for environmental value and function.

4.2.1.3 <u>Floral Diversity</u>

In order to be able to accurately predict the impacts of the Project on vegetation, data on the presence and abundance of trees, shrubs, groundcovers, vines, epiphytes were collected on the plants growing in 158 9 ft x 9 ft (2.7 m x 2.7 m) plots along 31 strategically located vegetation monitoring transects (Figure 4-18).

Of the more than 185 species of plants that were observed on the site, 134 species were present in these plots. Plant presence and abundance varied from abundant and widespread species (e.g., blolly (*Guapira discolor*) which was present in 45 plots, to very uncommon, and spatially restricted species [e.g., wild tomato (*Rivina humilis*)], which was only present in a single plot. Several species [e.g., horseflesh (*Lysiloma sabicu*)] were not present in any of the plots. Table 4-6 identifies the species identified and the locations of their presence. Samples of unidentified species were collected for subsequent identification.

4.2.1.4 <u>Faunal Diversity and Abundance</u>

Birds, as described in the vegetative community descriptions and in Section 4.2.1.4.1., giant land crabs (*Cardisoma guanhumi*), black-back land crabs (*Gecarcinus lateralis*) and land hermit crabs (*Coenobita clypeaster*) were the most often encountered land animals.

Mammals were infrequently observed, but included feral cats (*Felis catus*), observed in the dry broadleaf evergreen forest and dogs (*Canus lupus familiaris*), which were seen on the east-facing beach, unrestrained, but in the company of human visitors.

Reptiles encountered included Bahamas brown racers (*Cubophis vudii*) an endemic species, *Anolis* lizards, curly-tailed lizards (*Leiocephalus carinatus virescens*), and blue-tailed whiptails (*Pholidoscelis auberi*) (also endemic).

Amphibians encountered were limited to a single species, a frog, preliminarily identified as a non-native Cuban tree frog (*Osteopilus septrionalis*), which was observed in the cistern near the lighthouse.

Insects encountered included several species of butterflies and moths, including the Bahamas swallowtail (*Heraclides andreamon bonhotei)*, the colorful faithful beauty (*Composia fidelissima*), and the large black witch moth (*Ascalapha odorata*).

Spiders included golden orbs (*Nephila clavipes*), silver argiopes (*Argiope argentata)* and black widows (*Latrodectus mactans*).

Table 4-6. Plants Present in 125 Vegetation Monitoring Plots (Page 1 of 12)

Scientific Name	Common Name	Plot 1-1	1-2	1-3	1-4	1-5	2-1	2-2	2-3	2-4	2-5	3-1	3-2	3-3	3-4	4-1	4-2	4-3	4-4	4-5	5-1	5-2	5-3	5-4	5-5	6-1	6-2	6-3	6-4	6-5	7-1	7-2	7-3	8-1	8-2	8-3	8-4	8-5	8-6	8-7	8-8	8-9	8-10	8-11	8-12	9-1	9-2	9-3	9-4	9-5	10-1	10-2	10-3	10-4
Agave bahamana	Century Plant		1%																																																			
Agave sisalana	Century Plant																																																					
Alvaradoa amorphoides	Alvaradoa																																																					
Ambrosia hispida	Sweet Bay, Bay tansy, Soap-bush																	1%																																			< 1%	
Amyris elemifera	Torchwood																																																					
Andropogon glomerulatus	Bushy Beard Grass, Bluestem																																																					
Antirhea myrtifolia	False Myrtle																							3																														
Auerodendron northropianum																																																							
Avicennia germinans	Black Mangrove																																																						
Baccharis dioica	Broom-bush, Vahl's Baccharis			1	1																																																	
Borreria sp.																																																							
Borrichia arborescens	Lavender, Sea Marigold																																																					
Borrichia frutescens	Sea Ox-eye, Bay Marigold					2																																																
Bourreria succulenta	Strong-back		3												3					1									1/0																									
Bursera frenningae	Boar Gum-elemi																																							1														
Bursera simaruba	Gum-elemi, Gumbo Limbo																													1																								
Caesalpinia bahamensis																																																						
Caesalpinea bonduc	Gray Nicker																																																					
Caesalpinia major	Large Yellow Nicker			5%						< 1%																																												
Caesalpinia sp.																																																						
Cakile lanceolata	Southern Sea Rocket																																																					
Calyptranthes pallens	Spice-wood																																																					
Canavalia rosea	Bay Bean, Beach Bean											5%	40%	< 1%			< 1%																																					
Capraria biflora	Goat Weed, Stow-weed																																																					
Casasia clusiifolia	Seven-year Apple			0/2	0/1				1		2													0/1	2/0												3	5	1	0/1				2/0				1/0				0/2	0/2	2
Cassia chapmanii	Stinking pea, Bahamas Senna																																																					
Cassytha filiformis	Woe-vine, Love Vine		5%			< 1%		< 1%		< 1%					< 1%						1	2%				1%		< 1%																						< 1%			< 1%	
Casuarina equisetifolia	Beefwood, Australian Pine	1				1	1																			1	0/1					2			1												1					1		1/0
Catesbaea foliosa																																																						
Catesbaea parviflora	Catesbeae																																																					
Cenchrus spinifex	Southern Burgrass						< 1%	< 1%													< 1%																																	
Centrosema virginianum	Butterfly Pea, Wild Pea																																																					
Cephalocereus millspaughii	Old Man Cactus																																																					
Chamaecrista lineata	Narrowpod Sensitive Pea													8				6	1											1			1																	8				
Chamaesyce sp.	Spurge																																																					
Chiococca alba	Snowberry, Snakeroot																																																					
Chromolaena (fka Eupatorium) lucayanum	Bitter Bush, Tonka Bean, Jack-in-the-bush																																																					
Chrysobalanus icaco	Coco Plum																																																					
Cissus intermedia	Bull-vine																																																					
Cladium jamaicensis	Sawgrass																																																					
Coccoloba diversifolia	Pigeon-plum																																																					
Coccoloba krugii	Crabwood, Bow-pigeon, wild grape																																																					
Coccoloba northropiae																																																						
Coccoloba uvifera	Seagrape																																																					
Coccothrinax argentata	Silver Thatch, Silver Top		1/1	2	1/8		< 1%	0/2	0/2	2/1	1/1		0/2	1/1	2/0/<1%		0/1/1%	1/1	1/5	0/5	0/1	1/3	1/4	0/15	2/5/5%		0/6	1/2	0/12/1%	1/0/1%		1/1/<1%	0/1		2	1/2/1%	3/4			0/7	1/1	3/1	0/2	1/0	3/0		1/6/1%	0/1	0/18	1/5/<1%		0/1	0/2	0/2
Cocos nucifera	Coconut Palm								1																									1																				
Conocarpus erectus	Buttonwood																																																					
Conocarpus erectus v. sericea	Silver Buttonwood																																																					
Consolea (Opuntia) nashii	Cactus Tree, Nash's Prickly Pear																																																					
Conyza canadensis	Smooth Horseweed																																																					
Crossopetalum rhacoma	Maiden Berry, Mating Berry																																																					
Croton eluteria	Sweetwood, Cascarilla																																																					
Croton linearis	Granny-bush, Bay Wormwood		2	< 1%																									1	1								1				1	1							2				
Croton lucidus	Fire Bush																																																					
Cryptostegia grandiflora	Rubber Vine																																																					
Cynanchum bahamense																					< 1%		1%					2%										5%																< 1%
Cynanchum sp undetermined																																															1%	< 1%						
Cyperus spp.	Limestone Turf Sedge																																																					
Cyperus planifolius	Coast Cyperus		1%					< 1%						< 1%			< 1%	< 1%					10%	< 1%			40%	15%				1%	20%			< 1%	< 1%	< 1%									1%	30%	< 1%			1%	20%	
Dactyloctenium aegyptium	Crowfoot Grass																																																					
Desmanthus virgatus	Virgate Mimosa																																																					
Diospyros crassinervis	Feather-bed																																																					
Distichlis spicata	Seashore Saltgrass																																																					
Drypetes diversifolia	White wood, Milkbark																																																					
Echites umbellata	Devil's Potato									< 1%																						5%							< 1%	1%	1%									< 1%				
Eleusine indica	Goosegrass					1 %		< 1%													5%									1%			1%																					
Encyclia altissima	Tall Orchid																																					< 1%																
Encyclia sp. Undetermined	Orchid																																																					
Erithalis fruticosa	Black Torch, Candlewood			1	< 1%				1		1				1		< 1%								1/0													1			0/1	1/0											1	
Ernodea littoralis	Golden Creeper, Cough Bush							15										1%						3%				5%									10%	5%															20%	
Erythroxylum areolatum	Swamp Redwood, Paperleaf																																																					
Erythroxylum rotundifolium	Rat-wood																																																					
Eugenia axillaris	White Stopper																																																					
Eugenia confusa	Red-berry Stopper																																																					
Eugenia foetida	Spanish Stopper, White Wattle																																																					
Eugenia rhombea	Red Stopper																																																					
Eupatorium odoratum	Bitter Bush, Tonka Bean							1																																														
Euphorbia cayensis	Spurge		1														23					2		2									3			< 1%																		
Euphorbia mesembrianthemifolia	Coast spurge, Seaside spurge																																																					
Evolvulus squamosus	Broom Bush																																																					
Exostema caribaeum	Princewood, Jesuit Bark, Fustic																																																					
Ficus citrifolia	Short-leaved Wild Fig																																																					
Fimbrystylis ferruginea	Rusty Sedge																																																					
Galactia rudolphoides	Red Milk Pea																																																					
Galactia sp un-determined																																																						
Grimmeodendron eglandulosum	Poison Bush																																																					
Guaiacum officinale	Lignum vitae																																																					
Guaiacum sanctum	Lignum vitae																																																					
Guapira discolor	Blolly																	1						2/1					2/0												1/0				1/0									
Guettarda elliptica	Smooth Velvet Seed			2					1																																													

Table 4-6. Plants Present in 125 Vegetation Monitoring Plots (Page 2 of 12)

Scientific Name	Common Name	Plot 1-1	1-2	1-3	1-4	1-5	2-1	2-2	2-3	2-4	2-5	3-1	3-2	3-3	3-4	4-1	4-2	4-3	4-4	4-5	5-1	5-2	5-3	5-4	5-5	6-1	6-2	6-3	6-4	6-5	7-1	7-2	7-3	8-1	8-2	8-3	8-4	8-5	8-6	8-7	8-8	8-9	8-10	8-11	8-12	9-1	9-2	9-3	9-4	9-5	10-1	10-2	10-3	10-4
Guettarda scabra	Rough Velvet Berry																																																					
Gundlachia corymbosa	Horse Bush		4			1		1						4				1	1				< 1%	1				1									< 1%						1							5				
Gymnanthes lucida	Crabwood														2																																							
Helicteres jamaicensis	Cow-bush, Blind Eye Bush																																																					
Helicteres semitriloba	Wild Salve																																																					
Heliotropium curassavicum	Seaside Heliotrope																																																					
Heliotropium gnaphalodes	Wild Bay, Sea Lavender															1										1						5																			44			
Heliotroium nanum	White Pusley																																																					
Hymenocallis arenicola	Dune Spider Lily		2%					6	22								6	33																														43				4		
Hypelate trifoliata	White Ironwood																																																					
Ipomoea (stolonifera) imperati	Morning Glory																																																					
Ipomoea alba	Moon-vine														< 1%					5%												2%																						
Ipomoea microdactyla	Wild Potato																																																					
Ipomoea pes-caprae	Bay Hops, Bay Winders																																																					
Ipomoea triloba	Littlebell																																																					
Iresine flavens	Coastal Iresine																																																					
Iva imbricata	Beach Iva											5%																			5%																							
Jacquemontia havanensis	Jacquemontia		< 1%	< 1%	< 5%																						1%						1%					10%			10%									< 1%				
Jacquinia keyensis	Joe-wood, Ironwood								1																																		1/0	2/0									1/0	
Koanophyllon villosum	Jackmada, Bitter Sage																																																					
Krugiodendron ferreum	Strong Back																																																					
Laguncularia racemosa	White Mangrove																																																					
Lantana bahamensis	Black Sage																																																					
Lantana balsamifera	Inaugua Sagebrush																																																					
Lantana demutata																																																						
Lantana involucrata	Sage Cop, Wild Sage		1	1										1	4/ <1%			1	2			1						4				1			1			5										3		1			5	
Lasiacis divaricata	Wild Cane																																																					
Leucaena luecocephala	Jumbie Bean, Jumbay (Cow Bush in TCI)																																																					
Lysiloma latisiliquum	Wild Tamarind																																																					
Lysiloma sabicu	Horseflesh																																																					
Malpighia polytricha	Touch-me-not, Wild Cherry																																																					
Manilkara bahamensis	Wild Dilly									2/1																																												
Manilkara zapota																																																						
Melochia tomentosa	Velvety Melochia																																																					
Metopium toxiferum	Poisonwood																																																					
Mosiera fka Psidium - longipes	Bahama Stopper																																																					
Myrcianthes fragrans	Pale Stopper																																		2%																			
Myrica cerifera	Bay-berry, Wax-berry																																																					
Myriopus volubilis	Soldier-bush																		10%								5%									< 1%			30%				30%		0/1								< 1%	
Ocotea coriacea	Black Torch																																																					
Oplonia spinosa	Prickly Bush																																																					
Opuntia stricta	Prickly Pear Cactus																																																						
ORCHIDACEAE - Genus & Species undetermined	Un-identified																																																					
Panicum amarulum	Sea-beach Grass																																																					
Paspalum blodgettii	Coral Paspalum																																																					
Passiflora cupraea	Devil's Pumpkin														< 1%																																							
Passiflora suberosa	Juniper-berry, Small Passion-flower																																																					
Pentalinon luteum	Wild Unction																																																					
Pera bumelifolia	Bullwood																																																					
Phyllanthus epiphyllanthus	Abraham-bush, Hardhead																																																					
Piscidia piscipula	Fish Poison, Jamaican Dogwood																																																					
Pithecellobium keyense	Blackbead							4			2/1		2						1						1/0/1%			2/7/1%		0/1						1/0				2/2			0/2		0/2									< 1%
Pluchea symphytifolia	Bushy Fleabane																																																					
Plumbago scandens	Doctor-bush, White Plumbago																																			1	1		1										1					
Plumeria obtusa	White Frangipani								2																																													
POACEAE (GRAMMINEAE) Undetermined tall grass	Un-identified Tall Grass													< 1%					85%			< 1%						1%		1%																		1%		< 1%		10%		
POACEAE (GRAMMINEAE) Undetermined grass #2	Un-identified Grass																																																					
Pseudophoenix sargentii	Hog Palm, Buccaneer Palm																																																					
Randia aculeata	Box briar																																																					
Reynosia septentrionalis	Darling Plum		1	2	3														0/1					0/4	1/0/1%				0/1	2/2/1%									1/0	0/2			0/11											1/1/1%
Rhachicallis americana	Hog-bush, Sandfly-bush					23																																																
Rhynchospora floridensis	White-top, White-headed Rush																																																					
Rhizophora mangle	Red Mangrove																																																					
Rivina humilis	Wild tomato, Pigeon-berry																																																					
Rochefortia spinosa																																																						
Ruppia maritima	Widgeon Grass																																																					
Sabal palmetto	Pond-top, Pond Thatch																																																					
Salicornia ambigua	Woody Glasswort																																																					
Salmea petrobioides	Shanks, Bushy Salmea		4																																																			
Sansevieria hyacinthoides	African Bowstring Hemp																																																					
Scaevola plumieri	Inkberry, Black-soap	1										15				13															50%																1				3			
Scaevola taccada	Ornamental Candlewood																					5																																
Schaefferia frutescens	Boxwood																																																					
Scleria lithosperma	Slender Nut-rush																																																					
Sesuvium portulacastrum	Pondweed, Sea purslane																																																					
Sida acuta	Wire-weed																																																					
Sida ciliaris	Fringed Sida																																																					
Sideroxylon salicifolia	Wild Cassada								2																																													
Smilax havanensis	Prickly Saw-brier														< 5%																																							
Solanum bahamense	Canker Berry, Bahamas Nightshade																	1									3	2								1			1								1					3		
Sophora tomentosa	Coast Sophora, Necklace pod																																																					
Spermacoce tenuoir																																																						
Spigelia anthelmia	Pink																																																					
Sporobolus domingensis	Domingan Dropseed																																																					
Sporobolus virginicus	Seashore Rush-grass	2%																																																				
Stachytarpheta fruticosa	Bahama Vervain, Blue Rat Tail																																																					
Stachytarphaeta jamaicensis	Blue Flower, Jamaica Vervain																																																					
Strumpfia maritima	Mosquito Bush, Candle Torch																																																					
Stylosanthes hamata	Sweet Weed, Pencil Flower																																																					
Suriana maritima	Bay Cedar																				1					1/4																												
Swietenia mahagani	Mahogany																																																					

Table 4-6. Plants Present in 125 Vegetation Monitoring Plots (Page 3 of 12)

Scientific Name	Common Name	Plot 1-1	1-2	1-3	1-4	1-5	2-1	2-2	2-3	2-4	2-5	3-1	3-2	3-3	3-4	4-1	4-2	4-3	4-4	4-5	5-1	5-2	5-3	5-4	5-5	6-1	6-2	6-3	6-4	6-5	7-1	7-2	7-3	8-1	8-2	8-3	8-4	8-5	8-6	8-7	8-8	8-9	8-10	8-11	8-12	9-1	9-2	9-3	9-4	9-5	10-1	10-2	10-3	10-4
Tabebuia bahamensis	White Cedar, Five Fingers																																																				
Tamarindicus indica	Tamarind																																																				
Thouinia discolor	Nakedwood, Quicksilver																																																				
Tillandsia recurvata	Thread-leaved Wild Pine																																																				
Tillandsia utriculata	Swollen Wild Pine																																																				
Tournefortia gnaphalodes	Bay Lavender																																																				
Triopteris jamaicensis	Cough Vine																																																				
Turnera diffusa																																																					
Turnera ulmifolia	Buttercups, Yellow Alder								6			1		8					< 1%	1		1								1	1		3	1	1											1					2	
Uniola paniculata	Sea Oats	30%					70%	< 1%				65%				20%	35%	10%			< 1%	60%	30%			30%	30%				30%			50%		< 1%										30%					25%			
Uniola virgata	Spike-grass													50%																																									
Vachellia choriophylla	Cinnecord																																																				
Vallesia antillana	Pearl Berry													8							15%																																			1/ <1%
Varronia bahamensis	Cocobey								1																			3									1											1	1					2
Varronia brittonii																																																					
Waltheria indica	Sleepy Morning																																																				
Wedelia bahamensis	Rong Bush																																																				
Zanthoxylum coriaceum	Hercules' Club																																																				
Zanthoxylum fagara	Wild lime, Satin-wood																																																				
Zanthoxylum flavum	Yellow-wood, Satin-wood									1/1											1				0/1															1	1		1/0	1/0											
Zapoteca formosa	White Calliandra																																																				
Ziziphus taylorii																																																					
Undetermined vine																																																					
Undetermined vine # 2																																																					
Undetermined - alternate leaf shrub																																																					

Legend and Notes
plot size = 9' x 9' (~ 2.7 m x 2.7 m)
Trees = < 7' (2.1 m)
Shrubs = 1-7' (0.3 m - 2.1 m)
Groundcovers = < 1'; % groundcover shown
For species that can grow to tree size, #/# = # tree size / # shrub size
% Groundcover provided when individual was < 1' tall, regardless of height when mature
Green shading = Species identified as protected by the Government of the Bahamas and/or international treaties
Pink shading = Species identified in Bahamas National Invasive Species Strategy
For species which have had name changes since they were designated as protected or invasive, the following apply
Gymnanthes lucida (Crabwood) formerly known as Ateramnus lucidus
Consolea nashii (Cactus Tree, Nash's Prickly Pear) was formerly known as Opuntia nashii
Pentalinon luteum (Wild Unction) formerly known as Urechites lutea
Scaevola taccada (Ornamental Candlewood, Inkberry) also known as Scaevola taccada
Tournefortia gnaphalodes (bay lavender) also known as Mallotonia gnaphalodes and Argusia gnaphalodes
Vachellia choriophylla (cinnecord) formerly known as Acacia choriophylla
Varronia bahamensis (Cocobey) formerly known as Cordia bahamensis
Occurrence Categories:
Abundant = Present in more than 15% of the 158 plots
Common = Present in 5-15% of the 158 plots
Occasional = present in 1-5% of the 158 plots
Uncommon = Observed on the property, but was present in none or one of the plots

Table 4-6. Plants Present in 125 Vegetation Monitoring Plots (Page 4 of 12)

Scientific Name	Common Name	10-5	10-6	11-1	11-2	11-3	11-4	11-5	11-6	12-1	12-2	12-3	13-1	13-3	13-5	13-7	13-9	13-11	13-13	13-15	13-17	13-18	13-19	13-20	13-21	13-22	13-23	15-1	15-3	15-5	15-7	17-1	17-3	17-5	17-7	19-1	19-3	19-5	20-1	20-2	20-3	20-5	20-7	20-8	20-9	20-10	20-11	20-12	20-13	20-14	20-15
Agave bahamana	Century Plant																																																		
Agave sisalana	Century Plant																																																		
Alvaradoa amorphoides	Alvaradoa																																					1/0													0/1
Ambrosia hispida	Sweet Bay, Bay tansy, Soap-bush																																																		
Amyris elemifera	Torchwood																								0/1		0/1						0/2		0/1										2/3	0/1	4/82	0/6	2/3	0/13	2/0
Andropogon glomerulatus	Bushy Beard Grass, Bluestem																																																		
Antirhea myrtifolia	False Myrtle																																																		
Auerodendron northropianum																																																			
Avicennia germinans	Black Mangrove																																							0/1											
Baccharis dioica	Broom-bush, Vahl's Baccharis																																																		
Borreria sp.																																																			
Borrichia arborescens	Lavender, Sea Marigold																																																		
Borrichia frutescens	Sea Ox-eye, Bay Marigold												1	19														3																							
Bourreria succulenta	Strong-back														0/2			2/2	7		2/2		1/0				1/0		2/0		2/0		1/0					1/0	4/0		2/0		1/0								
Bursera frenningae	Boar Gum-elemi															2					1/0	1/0		1/0		1/0	0/1		1/0	1/0			3/0				1/2					1/0									
Bursera simaruba	Gum-elemi, Gumbo Limbo																			2																		1/1	0/4				1/0					1/0	0/2	1/0	1/0
Caesalpinia bahamensis																																																			
Caesalpinea bonduc	Gray Nicker																																																		
Caesalpinia major	Large Yellow Nicker																																																		
Caesalpinia sp.												5%																															1/0								
Cakile lanceolata	Southern Sea Rocket																																																		
Calyptranthes pallens	Spice-wood																																						1/1		1/10	1/0									
Canavalia rosea	Bay Bean, Beach Bean																																																		
Capraria biflora	Goat Weed, Stow-weed																																																		
Casasia clusiifolia	Seven-year Apple				0/1		1										1				1/1																														
Cassia chapmanii	Stinking pea, Bahamas Senna																																																		
Cassytha filiformis	Woe-vine, Love Vine									1%	2%																																								
Casuarina equisetifolia	Beefwood, Australian Pine				1/0	1	32			1/1																																									
Catesbaea foliosa																																																			
Catesbaea parviflora	Catesbeae																																																		
Cenchrus spinifex	Southern Burgrass									5%																																									
Centrosema virginianum	Butterfly Pea, Wild Pea																																																		
Cephalocereus millspaughii	Old Man Cactus																																																		
Chamaecrista lineata	Narrowpod Sensitive Pea		16																																																
Chamaesyce sp.	Spurge																																																		
Chiococca alba	Snowberry, Snakeroot																																					1	1		1				1		1/0		2	1	
Chromolaena (fka Eupatorium) lucayanum	Bitter Bush, Tonka Bean, Jack-in-the-bush																																																		
Chrysobalanus icaco	Coco Plum																																																		
Cissus intermedia	Bull-vine																																																		
Cladium jamaicensis	Sawgrass																																																		
Coccoloba diversifolia	Pigeon-plum																									1/0								1/0								1/0		1/2				2/0		1/1	
Coccoloba krugii	Crabwood, Bow-pigeon, wild grape																					1/0																													
Coccoloba northropiae																																																			
Coccoloba uvifera	Seagrape																																																		
Coccothrinax argentata	Silver Thatch, Silver Top	1/3	0/5			2/2	2/2	1/6/< 1%	0/2		3	1/0/1%				0/1		0/1		1/1	1/1	0/1		0/0/< 1%							1/4						0/3		< 1%				0/1			0/1	0/1				0/0/<1%
Cocos nucifera	Coconut Palm																																																		
Conocarpus erectus	Buttonwood												0/1/5%															0/8/1%												1/1											
Conocarpus erectus v. sericea	Silver Buttonwood																																																		
Consolea (Opuntia) nashii	Cactus Tree, Nash's Prickly Pear																																																		
Conyza canadensis	Smooth Horseweed																																																		
Crossopetalum rhacoma	Maiden Berry, Mating Berry																																																		
Croton eluteria	Sweetwood, Cascarilla															1					0/5						4/ 1%		6																						
Croton linearis	Granny-bush, Bay Wormwood		1																	1													3/0																		
Croton lucidus	Fire Bush																								21	0/2			22				47	67	82							0/3									
Cryptostegia grandiflora	Rubber Vine																																																		
Cynanchum bahamense		2%																											< 1%	< 1%									< 1%												
Cynanchum sp undetermined																																																			
Cyperus spp.	Limestone Turf Sedge																																																		
Cyperus planifolius	Coast Cyperus	1%	< 1%					< 1%	< 1%																																										
Dactyloctenium aegyptium	Crowfoot Grass																																																		
Desmanthus virgatus	Virgate Mimosa																																																		
Diospyros crassinervis	Feather-bed																1																																		
Distichlis spicata	Seashore Saltgrass												< 1%																																						
Drypetes diversifolia	White wood, Milkbark																																																		
Echites umbellata	Devil's Potato	< 1%				1%										< 1%			< 1%						< 1%					< 1%																					
Eleusine indica	Goosegrass							< 1%																																											
Encyclia altissima	Tall Orchid																																																		
Encyclia sp. Undetermined	Orchid																																																		
Erithalis fruticosa	Black Torch, Candlewood				0/1										0/4	0/3	3/2	0/2		0/1	1/0	3/0		2/0	3/0	3/0	2/0		0/3	2/4							2/13				1/0										
Ernodea littoralis	Golden Creeper, Cough Bush	30%																																																	
Erythroxylum areolatum	Swamp Redwood, Paperleaf																																																		
Erythroxylum rotundifolium	Rat-wood																									0/1									1/0																1/0
Eugenia axillaris	White Stopper																										1/0																0/1	6/4	1/1	2/2			1/0		
Eugenia confusa	Red-berry Stopper															4																					1/1						2/1				0/3			0/4	
Eugenia foetida	Spanish Stopper, White Wattle																																																	1/7	3/0
Eugenia rhombea	Red Stopper																																																		1/0
Eupatorium odoratum	Bitter Bush, Tonka Bean																																																		
Euphorbia cayensis	Spurge							7	48/1%	1	16																																								
Euphorbia mesembrianthemifolia	Coast spurge, Seaside spurge																																																		
Evolvulus squamosus	Broom Bush																																																		
Exostema caribaeum	Princewood, Jesuit Bark, Fustic																																																		
Ficus citrifolia	Short-leaved Wild Fig																																																		
Fimbrystylis ferruginea	Rusty Sedge																																																		
Galactia rudolphoides	Red Milk Pea																																																		
Galactia sp un-determined																							< 1%		< 1%													< 1%												< 1%	
Grimmeodendron eglandulosum	Poison Bush																																																		
Guaiacum officinale	Lignum vitae																																																		
Guaiacum sanctum	Lignum vitae																														1/0										1/1<1%	2/0		1/4	2/6	0/3	3/1	3/0	1/19	1/3	1/2
Guapira discolor	Blolly															3/0	6/0	1/2		11/1	2/7	1/0	1/1	2/0	3/2	5/2	0/1		0/1	1/0	2/0				1/1		1/0	5/7					6/0		2/0	2/0	0/1	1/0	2/0		3/2
Guettarda elliptica	Smooth Velvet Seed																	1/2			4/2														1/0								0/1		1/0						2/2

Table 4-6. Plants Present in 125 Vegetation Monitoring Plots (Page 5 of 12)

Scientific Name	Common Name	10-5	10-6	11-1	11-2	11-3	11-4	11-5	11-6	12-1	12-2	12-3	13-1	13-3	13-5	13-7	13-9	13-11	13-13	13-15	13-17	13-18	13-19	13-20	13-21	13-22	13-23	15-1	15-3	15-5	15-7	17-1	17-3	17-5	17-7	19-1	19-3	19-5	20-1	20-2	20-3	20-5	20-7	20-8	20-9	20-10	20-11	20-12	20-13	20-14	20-15
Guettarda scabra	Rough Velvet Berry																																																		
Gundlachia corymbosa	Horse Bush	2	3								32																																								
Gymnanthes lucida	Crabwood															0/5			8/6/< 1%	1/0			0/1	4/0					0/6				0/4		2/3		0/1						1/5	0/5	1/13	3/2	0/1	0/4			
Helicteres jamaicensis	Cow-bush, Blind Eye Bush																																		1/0																
Helicteres semitriloba	Wild Salve																						0/2																												
Heliotropium curassavicum	Seaside Heliotrope																																																		
Heliotropium gnaphalodes	Wild Bay, Sea Lavender																																																		
Heliotroium nanum	White Pusley																																																		
Hymenocallis arenicola	Dune Spider Lily										4																																								
Hypelate trifoliata	White Ironwood																																																		
Ipomoea (stolonifera) imperati	Morning Glory																																																		
Ipomoea alba	Moon-vine				< 1%																																														
Ipomoea microdactyla	Wild Potato																																																		
Ipomoea pes-caprae	Bay Hops, Bay Winders																																																		
Ipomoea triloba	Littlebell																																																		
Iresine flavens	Coastal Iresine		1																																																
Iva imbricata	Beach Iva			30%																																															
Jacquemontia havanensis	Jacquemontia																																																		
Jacquinia keyensis	Joe-wood, Ironwood																												1/0																						
Koanophyllon villosum	Jackmada, Bitter Sage																																																		
Krugiodendron ferreum	Strong Back																																				0/5							1/0	1/6	0/3	1/9	2/0	2/0		
Laguncularia racemosa	White Mangrove																																																		
Lantana bahamensis	Black Sage																													3																					
Lantana balsamifera	Inaugua Sagebrush																																																		
Lantana demutata																																																			
Lantana involucrata	Sage Cop, Wild Sage		2					2	2																																										
Lasiacis divaricata	Wild Cane																									2%											1 %													< 1%	
Leucaena luecocephala	Jumbie Bean, Jumbay (Cow Bush in TCI)																																				0/1	2/15	2/0										2/1	2/0	1/1
Lysiloma latisiliquum	Wild Tamarind																						3/0										1/0					1/1													
Lysiloma sabicu	Horseflesh																																																		
Malpighia polytricha	Touch-me-not, Wild Cherry																						1				1																								
Manilkara bahamensis	Wild Dilly																																																		
Manilkara zapota																																																			
Melochia tomentosa	Velvety Melochia																																																		
Metopium toxiferum	Poisonwood																																																		1/0
Mosiera fka Psidium - longipes	Bahama Stopper																																																		
Myrcianthes fragrans	Pale Stopper																													2												4/1			2/18						
Myrica cerifera	Bay-berry, Wax-berry																																																		
Myriopus volubilis	Soldier-bush						< 1%																															< 1%												1	< 1%
Ocotea coriacea	Black Torch																																																		
Oplonia spinosa	Prickly Bush															3	3				3	0/2	1		2/2%	2%			4	4			1										1								
Opuntia stricta	Prickly Pear Cactus																																																		
ORCHIDACEAE - Genus & Species undetermined	Un-identified																																																		
Panicum amarulum	Sea-beach Grass			< 1%	1%																																														
Paspalum blodgettii	Coral Paspalum																																																		
Passiflora cupraea	Devil's Pumpkin																							< 1%			< 1%																								
Passiflora suberosa	Juniper-berry, Small Passion-flower																																																		
Pentalinon luteum	Wild Unction																																																		
Pera bumelifolia	Bullwood																																																		
Phyllanthus epiphyllanthus	Abraham-bush, Hardhead																										1																1			0/1					
Piscidia piscipula	Fish Poison, Jamaican Dogwood																		1												1/2												0/1								
Pithecellobium keyense	Blackbead											0/2			0/3	0/1		0/1		7/2			0/2	1/0		0/2	0/1								0/2		6/15	3/0			1/1	5/2		2/0		3/1	0/6	3/5	1/0	1/2	2/3
Pluchea symphytifolia	Bushy Fleabane																																																		
Plumbago scandens	Doctor-bush, White Plumbago																																																		
Plumeria obtusa	White Frangipani																																		1/0																
POACEAE (GRAMMINEAE) Undetermined tall grass	Un-identified Tall Grass					5%																																													
POACEAE (GRAMMINEAE) Undetermined grass #2	Un-identified Grass																					< 1%																													
Pseudophoenix sargentii	Hog Palm, Buccaneer Palm																																																		
Randia aculeata	Box briar																		0/4	0/1		0/1	0/4	0/2		0/6	1/0		0/1	1/4	2/0		0/3	0/2	0/4		0/8	2/8	1		1/1		1/2			0/1			0/2		0/4
Reynosia septentrionalis	Darling Plum					0/1												2/0	1/0		1/0	2/0		1/1	0/1	2/2			1/0				1/1	4/0	0/2		1/0		1/0			2/1		0/1		0/1			1/1		
Rhachicallis americana	Hog-bush, Sandfly-bush												16	24														21																							
Rhynchospora floridensis	White-top, White-headed Rush																																																		
Rhizophora mangle	Red Mangrove																																							2/1											
Rivina humilis	Wild tomato, Pigeon-berry																																																		
Rochefortia spinosa																																																			
Ruppia maritima	Widgeon Grass																																																		
Sabal palmetto	Pond-top, Pond Thatch																																																		
Salicornia ambigua	Woody Glasswort																																																		
Salmea petrobioides	Shanks, Bushy Salmea																																																		
Sansevieria hyacinthoides	African Bowstring Hemp																																																		
Scaevola plumieri	Inkberry, Black-soap			4																																															
Scaevola taccada	Ornamental Candlewood																																																		
Schaefferia frutescens	Boxwood																																																	0/1	0/1
Scleria lithosperma	Slender Nut-rush																																																		< 1%
Sesuvium portulacastrum	Pondweed, Sea purslane																																																		
Sida acuta	Wire-weed																																																		
Sida ciliaris	Fringed Sida																																																		
Sideroxylon salicifolia	Wild Cassada																																																		
Smilax havanensis	Prickly Saw-brier														< 1%		< 1%					< 1%	< 1%	< 1%	2%	< 1%	2%						1%	< 1%	< 1%				< 1%		< 1%		< 1%		< 1%						
Solanum bahamense	Canker Berry, Bahamas Nightshade				2																																														
Sophora tomentosa	Coast Sophora, Necklace pod																																																		
Spermacoce tenuoir																																																			
Spigelia anthelmia	Pink																																																		
Sporobolus domingensis	Domingan Dropseed																																																		
Sporobolus virginicus	Seashore Rush-grass			< 1%						1%	< 1%																																								
Stachytarpheta fruticosa	Bahama Vervain, Blue Rat Tail																																																		
Stachytarphaeta jamaicensis	Blue Flower, Jamaica Vervain																																																		
Strumpfia maritima	Mosquito Bush, Candle Torch																																																		
Stylosanthes hamata	Sweet Weed, Pencil Flower																																																		
Suriana maritima	Bay Cedar				8					1																																									
Swietenia mahagani	Mahogany																																																		

Table 4-6. Plants Present in 125 Vegetation Monitoring Plots (Page 6 of 12)

Scientific Name	Common Name	10-5	10-6	11-1	11-2	11-3	11-4	11-5	11-6	12-1	12-2	12-3	13-1	13-3	13-5	13-7	13-9	13-11	13-13	13-15	13-17	13-18	13-19	13-20	13-21	13-22
Tabebuia bahamensis	White Cedar, Five Fingers														0/1			0/1				1/0	1/0		4/0	1/0
Tamarindicus indica	Tamarind																									
Thouinia discolor	Nakedwood, Quicksilver																							6/2		
Tillandsia recurvata	Thread-leaved Wild Pine																									
Tillandsia utriculata	Swollen Wild Pine																< 1%					4		< 1%	< 1%	1%
Tournefortia gnaphalodes	Bay Lavender																									
Triopteris jamaicensis	Cough Vine																									
Turnera diffusa																										
Turnera ulmifolia	Buttercups, Yellow Alder				1							7														
Uniola paniculata	Sea Oats			10%						1%																
Uniola virgata	Spike-grass																									
Vachellia choriophylla	Cinnecord																				1/0		3/0		1	
Vallesia antillana	Pearl Berry																									
Varronia bahamensis	Cocobey				1%		1																			
Varronia brittonii																										
Waltheria indica	Sleepy Morning																									
Wedelia bahamensis	Rong Bush																					1				
Zanthoxylum coriaceum	Hercules' Club																									
Zanthoxylum fagara	Wild lime, Satin-wood																									
Zanthoxylum flavum	Yellow-wood, Satin-wood		1/0																			1/0				
Zapoteca formosa	White Calliandra																									
Ziziphus taylorii																										
Undetermined vine		< 1%																								
Undetermined vine # 2																	1%									
Undetermined - alternate leaf shrub																										

Scientific Name	Common Name	13-23	15-1	15-3	15-5	15-7	17-1	17-3	17-5	17-7	19-1	19-3	19-5	20-1	20-2	20-3	20-5	20-7	20-8	20-9	20-10	20-11	20-12	20-13	20-14	20-15
Tabebuia bahamensis	White Cedar, Five Fingers	1/1						1/1		1/0			1/1							3/0						1/0
Tamarindicus indica	Tamarind																									
Thouinia discolor	Nakedwood, Quicksilver			1/1					0/1									1/0								
Tillandsia recurvata	Thread-leaved Wild Pine																									
Tillandsia utriculata	Swollen Wild Pine	1		< 1%					1%							< 1%	< 1%									
Tournefortia gnaphalodes	Bay Lavender																									
Triopteris jamaicensis	Cough Vine																									
Turnera diffusa					3																					
Turnera ulmifolia	Buttercups, Yellow Alder																									
Uniola paniculata	Sea Oats																									
Uniola virgata	Spike-grass																									
Vachellia choriophylla	Cinnecord							0/1				0/1				1/0			0/1						1/0	0/1
Vallesia antillana	Pearl Berry								1					5											1	
Varronia bahamensis	Cocobey																									
Varronia brittonii																										
Waltheria indica	Sleepy Morning																									
Wedelia bahamensis	Rong Bush																									
Zanthoxylum coriaceum	Hercules' Club																									
Zanthoxylum fagara	Wild lime, Satin-wood												2/1	1/0							1/0			1/3	3/0	0/1
Zanthoxylum flavum	Yellow-wood, Satin-wood					1/0																				
Zapoteca formosa	White Calliandra																									
Ziziphus taylorii																										
Undetermined vine																										
Undetermined vine # 2																										
Undetermined - alternate leaf shrub																						1/2		1/0		

Legend and Notes
plot size = 9' x 9' (~ 2.7 m x 2.7 m)
Trees = < 7' (2.1 m)
Shrubs = 1-7' (0.3 m - 2.1 m)
Groundcovers = < 1'; % groundcover shown
For species that can grow to tree size, #/# = # tree size / # shrub size
% Groundcover provided when individual was < 1' tall, regardless of height when mature
Green shading = Species identified as protected by the Government of the Bahamas and/or international treaties
Pink shading = Species identified in Bahamas National Invasive Species Strategy
For species which have had name changes since they were designated as protected or invasive, the following apply
Gymnanthes lucida (Crabwood) formerly known as Ateramnus lucidus
Consolea nashii (Cactus Tree, Nash's Prickly Pear) was formerly known as Opuntia nashii
Pentalinon luteum (Wild Unction) formerly known as Urechites lutea
Scaevola taccada (Ornamental Candlewood, Inkberry) also known as Scaevola taccada
Tournefortia gnaphalodes (bay lavender) also known as Mallotonia gnaphalodes and Argusia gnaphalodes
Vachellia choriophylla (cinnecord) formerly known as Acacia choriophylla
Varronia bahamensis (Cocobey) formerly known as Cordia bahamensis
Occurrence Categories:
Abundant = Present in more than 15% of the 158 plots
Common = Present in 5-15% of the 158 plots
Occasional = present in 1-5% of the 158 plots
Uncommon = Observed on the property, but was present in none or one of the 158 plots

Table 4-6. Plants Present in 125 Vegetation Monitoring Plots (Page 7 of 12)

Scientific Name	Common Name	20-16	20-17	20-18	20-19	20-20	21-1	21-2	21-3	21-4	21-5	21-6	21-7	21-8	21-9	21-10	22-1	22-2	23-1	23-2	24-1	24-2	25-1	25-2	25-3	28-1	28-2	28-3	29-1	29-2	29-3	29-4	29-5	29-6	BOH1-1	BHO1-2	BOH1-3	BOH1-4	BOH1-5	BOH2-1	BOH2-2	BOH2-3	BOH2-4
													0/1																														
Agave bahamana	Century Plant					0/1																																					
Agave sisalana	Century Plant																															0/2	0/1										
Alvaradoa amorphoides	Alvaradoa	0/1			1/1	0/1	1/0	0/1			1/1																0/3						0/1	0/1									
Ambrosia hispida	Sweet Bay, Bay tansy, Soap-bush														1%																												
Amyris elemifera	Torchwood		1/0						0/2		0/2	2/2																5/3															
Andropogon glomerulatus	Bushy Beard Grass, Bluestem																																										
Antirhea myrtifolia	False Myrtle																																										
Auerodendron northropianum																																											
Avicennia germinans	Black Mangrove																																										
Baccharis dioica	Broom-bush, Vahl's Baccharis																																										
Borreria sp.																																											
Borrichia arborescens	Lavender, Sea Marigold																																										
Borrichia frutescens	Sea Ox-eye, Bay Marigold																												2														
Bourreria succulenta	Strong-back		2/0				2/0	0/1			4/1																				0/1		1/0				2/0			0/1	0/1		
Bursera frenningae	Boar Gum-elemi																																									1/0	
Bursera simaruba	Gum-elemi, Gumbo Limbo	2/0	1/0		4/1	1/1	1/0	1/0	1/0		1/0	1/3		2/0													1/0					2/2											
Caesalpinia bahamensis																																											
Caesalpinea bonduc	Gray Nicker																																						0/5				
Caesalpinia major	Large Yellow Nicker																																										
Caesalpinia sp.																		3/1%																									
Cakile lanceolata	Southern Sea Rocket																																										
Calyptranthes pallens	Spice-wood																																0/1/<1%										
Canavalia rosea	Bay Bean, Beach Bean																1%																										
Capraria biflora	Goat Weed, Stow-weed																													1													
Casasia clusiifolia	Seven-year Apple													1/0						0/2					1/0								0/1									0/1	
Cassia chapmanii	Stinking pea, Bahamas Senna																																										
Cassytha filiformis	Woe-vine, Love Vine														1%	1%	1%	2%		< 1%	< 1%	< 1%																					
Casuarina equisetifolia	Beefwood, Australian Pine												2/0						0/1																								
Catesbaea foliosa																																											
Catesbaea parviflora	Catesbeae																																										
Cenchrus spinifex	Southern Burgrass																5%		1%		< 1%																						
Centrosema virginianum	Butterfly Pea, Wild Pea																																	< 1%									
Cephalocereus millspaughii	Old Man Cactus																																										
Chamaecrista lineata	Narrowpod Sensitive Pea														0/16			1	1																								
Chamaesyce sp.	Spurge																																										
Chiococca alba	Snowberry, Snakeroot		1							0/1	0/1	0/1														5%							0/2										
Chromolaena (fka Eupatorium) lucayanum	Bitter Bush, Tonka Bean, Jack-in-the-bush												0/1																														
Chrysobalanus icaco	Coco Plum																					1																					
Cissus intermedia	Bull-vine																																										
Cladium jamaicensis	Sawgrass																																										
Coccoloba diversifolia	Pigeon-plum	4/2/< 1%		10/12/<1%		0/1																				4/1		0/1					0/1	2/0									
Coccoloba krugii	Crabwood, Bow-pigeon, wild grape																														1/0	1/0											
Coccoloba northropiae					1/0				1/0																																		
Coccoloba uvifera	Seagrape																												0/2														
Coccothrinax argentata	Silver Thatch, Silver Top										0/3	0/1		1/2	1/6/1%	0/1		0/2		0/2		0/5			1/8	0/1								0/1	2/1	2/0	0/1		1/0	1/0	3/1	0/2	2/0
Cocos nucifera	Coconut Palm													1/0						1/0																							
Conocarpus erectus	Buttonwood												2/5																0/2														
Conocarpus erectus v. sericea	Silver Buttonwood																																										
Consolea (Opuntia) nashii	Cactus Tree, Nash's Prickly Pear																																										
Conyza canadensis	Smooth Horseweed																																										
Crossopetalum rhacoma	Maiden Berry, Mating Berry																																										
Croton eluteria	Sweetwood, Cascarilla																																										
Croton linearis	Granny-bush, Bay Wormwood														0/1			4						5												0/1					0/2		
Croton lucidus	Fire Bush							0/21																																			
Cryptostegia grandiflora	Rubber Vine																																										
Cynanchum bahamense																1%																											
Cynanchum sp undetermined																																											
Cyperus spp.	Limestone Turf Sedge																																										
Cyperus planifolius	Coast Cyperus														1%	5%																					5%		5%				
Dactyloctenium aegyptium	Crowfoot Grass																																										
Desmanthus virgatus	Virgate Mimosa																																										
Diospyros crassinervis	Feather-bed																																										
Distichlis spicata	Seashore Saltgrass																																										
Drypetes diversifolia	White wood, Milkbark							2/6																																			
Echites umbellata	Devil's Potato					< 1%																																					
Eleusine indica	Goosegrass																	2%																									
Encyclia altissima	Tall Orchid					cluster																																					
Encyclia sp. Undetermined	Orchid								75																																		
Erithalis fruticosa	Black Torch, Candlewood							0/1			1/0	2/0															1/0				1/3		1/0				0/2						0/1
Ernodea littoralis	Golden Creeper, Cough Bush															0/6					1	8		1																			
Erythroxylum areolatum	Swamp Redwood, Paperleaf																										0/1																
Erythroxylum rotundifolium	Rat-wood									0/1																																	
Eugenia axillaris	White Stopper																																										
Eugenia confusa	Red-berry Stopper			0/1			1/0		4/7		0/1															0/15		2/0					1/2	1/0									
Eugenia foetida	Spanish Stopper, White Wattle	1/22			1/4	3/14	12/4				1/0	0/2																															
Eugenia rhombea	Red Stopper				0/1					1/9																																	
Eupatorium odoratum	Bitter Bush, Tonka Bean																																										
Euphorbia cayensis	Spurge														0/13			35		6		3																					
Euphorbia mesembrianthemifolia	Coast spurge, Seaside spurge																																										
Evolvulus squamosus	Broom Bush																																0/1										
Exostema caribaeum	Princewood, Jesuit Bark, Fustic																																										
Ficus citrifolia	Short-leaved Wild Fig																																										
Fimbrystylis ferruginea	Rusty Sedge																																										
Galactia rudolphoides	Red Milk Pea																																										
Galactia sp un-determined					< 1%																									< 1%													
Grimmeodendron eglandulosum	Poison Bush																																										
Guaiacum officinale	Lignum vitae																																										
Guaiacum sanctum	Lignum vitae	0/2/<1%	2/3		6/0		0/3	0/1	1/12/<1%	3/5	1/2																	3/4															
Guapira discolor	Blolly		1/0			3/10	6/3		1/0		1/3	3/1	1/0											0/1	1/0	1/0	3/4	1/2			6/1	2/4	1/0	2/2						0/1			
Guettarda elliptica	Smooth Velvet Seed								1/0																							0/1											

Table 4-6. Plants Present in 125 Vegetation Monitoring Plots (Page 8 of 12)

Scientific Name	Common Name	20-16	20-17	20-18	20-19	20-20	21-1	21-2	21-3	21-4	21-5	21-6	21-7	21-8	21-9	21-10	22-1	22-2	23-1	23-2	24-1	24-2	25-1	25-2	25-3	28-1	28-2	28-3	29-1	29-2	29-3	29-4	29-5	29-6	BOH1-1	BHO1-2	BOH1-3	BOH1-4	BOH1-5	BOH2-1	BOH2-2	BOH2-3	BOH2-4
													0/1																														
Guettarda scabra	Rough Velvet Berry																																										
Gundlachia corymbosa	Horse Bush												20		0/1				1	4	10	5													0/4	0/4							
Gymnanthes lucida	Crabwood						0/1		0/7																		0/3					1/0		8/3									
Helicteres jamaicensis	Cow-bush, Blind Eye Bush																																										
Helicteres semitriloba	Wild Salve																																										
Heliotropium curassavicum	Seaside Heliotrope																																										
Heliotropium gnaphalodes	Wild Bay, Sea Lavender																																										
Heliotroium nanum	White Pusley																																										
Hymenocallis arenicola	Dune Spider Lily															11		42		26				20	2																		
Hypelate trifoliata	White Ironwood																																										
Ipomoea (stolonifera) imperati	Morning Glory														1%																												
Ipomoea alba	Moon-vine																																										
Ipomoea microdactyla	Wild Potato																																										
Ipomoea pes-caprae	Bay Hops, Bay Winders																			1%																							
Ipomoea triloba	Littlebell																																										
Iresine flavens	Coastal Iresine																																										
Iva imbricata	Beach Iva																30%						10%																				
Jacquemontia havanensis	Jacquemontia																			1%							< 1%						< 1%				15%			5%			
Jacquinia keyensis	Joe-wood, Ironwood										0/1																														0/1		
Koanophyllon villosum	Jackmada, Bitter Sage																																										
Krugiodendron ferreum	Strong Back								1/3	0/1	0/1																0/1																
Laguncularia racemosa	White Mangrove																																										
Lantana bahamensis	Black Sage																																										
Lantana balsamifera	Inaugua Sagebrush																																										
Lantana demutata																																											
Lantana involucrata	Sage Cop, Wild Sage													0/1		0/2		0/1																									
Lasiacis divaricata	Wild Cane	< 1%			< 1%	< 1%			<1%			1%														< 1%						< 1%											
Leucaena luecocephala	Jumbie Bean, Jumbay (Cow Bush in TCI)						1/0	1/0																		2/1	2/9			9/15				2/0									
Lysiloma latisiliquum	Wild Tamarind	1/0										1/0																				1/0											
Lysiloma sabicu	Horseflesh																																										
Malpighia polytricha	Touch-me-not, Wild Cherry																																										
Manilkara bahamensis	Wild Dilly																																										
Manilkara zapota																																											
Melochia tomentosa	Velvety Melochia																																										
Metopium toxiferum	Poisonwood			1/0																																			1/0				
Mosiera fka Psidium - longipes	Bahama Stopper																														0/1												
Myrcianthes fragrans	Pale Stopper								1/0		0/3																																
Myrica cerifera	Bay-berry, Wax-berry																																										
Myriopus volubilis	Soldier-bush	< 1%																						3																			
Ocotea coriacea	Black Torch																																										
Oplonia spinosa	Prickly Bush																																										
Opuntia stricta	Prickly Pear Cactus				1																									1													
ORCHIDACEAE - Genus & Species undetermined	Un-identified																																										
Panicum amarulum	Sea-beach Grass																																										
Paspalum blodgettii	Coral Paspalum																																										
Passiflora cupraea	Devil's Pumpkin																								< 1%																		
Passiflora suberosa	Juniper-berry, Small Passion-flower																																	< 1%									
Pentalinon luteum	Wild Unction																																			5%							
Pera bumelifolia	Bullwood		0/4																																								
Phyllanthus epiphyllanthus	Abraham-bush, Hardhead				7/0																										0/6		0/6										
Piscidia piscipula	Fish Poison, Jamaican Dogwood							0/1																																			
Pithecellobium keyense	Blackbead	0/1			2/6	0/3	10/2/<1%		6/24		2/2	0/3	0/5			0/2									1/3	1/1	2/8	2/4			1/6/<1%	1/0/<1%	0/13	2/4									
Pluchea symphytifolia	Bushy Fleabane																																										
Plumbago scandens	Doctor-bush, White Plumbago																																										
Plumeria obtusa	White Frangipani	0/2																														0/6	3/2										
POACEAE (GRAMMINEAE) Undetermined tall grass	Un-identified Tall Grass																																										
POACEAE (GRAMMINEAE) Undetermined grass #2	Un-identified Grass														1%														< 1%				< 1%										
Pseudophoenix sargentii	Hog Palm, Buccaneer Palm																																										
Randia aculeata	Box briar	0/2		0/2		0/3		0/2	0/5			0/2														1/1	0/5	0/2			0/7		0/5	0/2									
Reynosia septentrionalis	Darling Plum			0/1	1/0	3/5	2/0	0/1			1/0	0/1		1/8												1/0		0/1			1/0	1/0	1/2						1/0	0/2		0/3	1/0
Rhachicallis americana	Hog-bush, Sandfly-bush																												0/6														
Rhynchospora floridensis	White-top, White-headed Rush																																										
Rhizophora mangle	Red Mangrove																																										
Rivina humilis	Wild tomato, Pigeon-berry																													3													
Rochefortia spinosa																																											
Ruppia maritima	Widgeon Grass																																										
Sabal palmetto	Pond-top, Pond Thatch												0/1																														
Salicornia ambigua	Woody Glasswort																																										
Salmea petrobioides	Shanks, Bushy Salmea																					1																					
Sansevieria hyacinthoides	African Bowstring Hemp																																										
Scaevola plumieri	Inkberry, Black-soap																26		14		29		1																				
Scaevola taccada	Ornamental Candlewood																																										
Schaefferia frutescens	Boxwood		2/1																								0/1																
Scleria lithosperma	Slender Nut-rush										< 1%	< 1%																				5%											
Sesuvium portulacastrum	Pondweed, Sea purslane																																										
Sida acuta	Wire-weed																																										
Sida ciliaris	Fringed Sida																																										
Sideroxylon salicifolia	Wild Cassada																																										
Smilax havanensis	Prickly Saw-brier									< 1%	< 1%	< 1%																		< 1%													
Solanum bahamense	Canker Berry, Bahamas Nightshade																							1																			
Sophora tomentosa	Coast Sophora, Necklace pod																																										
Spermacoce tenuoir																																											
Spigelia anthelmia	Pink																																										
Sporobolus domingensis	Domingan Dropseed																																										
Sporobolus virginicus	Seashore Rush-grass																																										
Stachytarpheta fruticosa	Bahama Vervain, Blue Rat Tail																																										
Stachytarphaeta jamaicensis	Blue Flower, Jamaica Vervain																																										
Strumpfia maritima	Mosquito Bush, Candle Torch																																										
Stylosanthes hamata	Sweet Weed, Pencil Flower																																										
Suriana maritima	Bay Cedar																		20										0/3														
Swietenia mahagani	Mahogany																																										

Table 4-6. Plants Present in 125 Vegetation Monitoring Plots (Page 9 of 12)

Scientific Name	Common Name	20-16	20-17	20-18	20-19	20-20	21-1	21-2	21-3	21-4	21-5	21-6	21-7	21-8	21-9	21-10	22-1	22-2	23-1	23-2	24-1	24-2	25-1	25-2	25-3
													0/1												
Tabebuia bahamensis	White Cedar, Five Fingers				3/7		0/1		1/0	1/0															
Tamarindicus indica	Tamarind																								
Thouinia discolor	Nakedwood, Quicksilver							0/1																	
Tillandsia recurvata	Thread-leaved Wild Pine																								
Tillandsia utriculata	Swollen Wild Pine	< 1%			< 1%	< 1%																			
Tournefortia gnaphalodes	Bay Lavender																								
Triopteris jamaicensis	Cough Vine																								
Turnera diffusa																									
Turnera ulmifolia	Buttercups, Yellow Alder													0/7	0/3	0/3		1						6	
Uniola paniculata	Sea Oats														5%		5%	10%	1%		Ck pic	1%	10%		
Uniola virgata	Spike-grass																								
Vachellia choriophylla	Cinnecord								1/0	0/1	0/1	2/2												1	0/1
Vallesia antillana	Pearl Berry											0/1	0/1	0/1											
Varronia bahamensis	Cocobey														0/1	0/6									
Varronia brittonii																									
Waltheria indica	Sleepy Morning																								
Wedelia bahamensis	Rong Bush																								
Zanthoxylum coriaceum	Hercules' Club																								
Zanthoxylum fagara	Wild lime, Satin-wood			1/0			1/0			1/2															
Zanthoxylum flavum	Yellow-wood, Satin-wood											1/0													
Zapoteca formosa	White Calliandra																								
Ziziphus taylorii																									
Undetermined vine																									
Undetermined vine # 2																									
Undetermined - alternate leaf shrub																									

Scientific Name	28-1	28-2	28-3	29-1	29-2	29-3	29-4	29-5	29-6	BOH1-1	BHO1-2	BOH1-3	BOH1-4	BOH1-5	BOH2-1	BOH2-2	BOH2-3	BOH2-4
Tabebuia bahamensis						0/2												
Tamarindicus indica			1/0															
Thouinia discolor																		
Tillandsia recurvata																		
Tillandsia utriculata							< 1%	1	< 1%									
Tournefortia gnaphalodes																		
Triopteris jamaicensis																		
Turnera diffusa																		
Turnera ulmifolia																		
Uniola paniculata																		
Uniola virgata																		
Vachellia choriophylla							1/0/<1%	1/0	1/0									
Vallesia antillana																		
Varronia bahamensis		1/0																
Varronia brittonii																		
Waltheria indica																		
Wedelia bahamensis																		
Zanthoxylum coriaceum																		
Zanthoxylum fagara	1/1																	
Zanthoxylum flavum		1/0			1/0						1/0			1/0				
Zapoteca formosa																		
Ziziphus taylorii																		
Undetermined vine																		
Undetermined vine # 2																		
Undetermined - alternate leaf shrub																		

Legend and Notes
plot size = 9' x 9' (~ 2.7 m x 2.7 m)
Trees = < 7' (2.1 m)
Shrubs = 1-7' (0.3 m - 2.1 m)
Groundcovers = < 1'; % groundcover shown
For species that can grow to tree size, #/# = # tree size / # shrub size
% Groundcover provided when individual was < 1' tall, regardless of height when mature
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Scaevola taccada (Ornamental Candlewood, Inkberry) also known as Scaevola taccada
Tournefortia gnaphalodes (bay lavender) also known as Mallotonia gnaphalodes and Argusia gnaphalodes
Vachellia choriophylla (cinnecord) formerly known as Acacia choriophylla
Varronia bahamensis (Cocobey) formerly known as Cordia bahamensis
Occurrence Categories:
Abundant = Present in more than 15% of the 158 plots
Common = Present in 5-15% of the 158 plots
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Uncommon = Observed on the property, but was present in none or one of the plots

Table 4-6. Plants Present in 125 Vegetation Monitoring Plots (Page 10 of 12)

Scientific Name	Common Name	BOH2-5	BOH3-1	BOH3-2	BOH3-3	BOH3-4	BOH3-5	BOH4-1	BOH4-2	BOH4-3	BOH5-1	BOH5-2	BOH5-3	BOH6-1	BOH6-2	BOH6-3	BOH7-1	BOH7-2	BOH7-3	BOH8-1	BOH8-2	BOH8-3	BOH9-1	BOH9-2	BOH9-3	# Occurrences	Frequency
Agave bahamana	Century Plant																									2	Occasional
Agave sisalana	Century Plant																									2	Occasional
Alvaradoa amorphoides	Alvaradoa																									11	Common
Ambrosia hispida	Sweet Bay, Bay tansy, Soap-bush																									3	Occasional
Amyris elemifera	Torchwood																									16	Common
Andropogon glomerulatus	Bushy Beard Grass, Bluestem																									0	Uncommon
Antirhea myrtifolia	False Myrtle			0/3																						2	Occasional
Auerodendron northropianum																										0	Uncommon
Avicennia germinans	Black Mangrove																									1	Uncommon
Baccharis dioica	Broom-bush, Vahl's Baccharis																									2	Occasional
Borreria sp.																										0	Uncommon
Borrichia arborescens	Lavender, Sea Marigold																									0	Uncommon
Borrichia frutescens	Sea Ox-eye, Bay Marigold																									5	Occasional
Bourreria succulenta	Strong-back					2/0																			1/0	28	Abundant
Bursera frenningae	Boar Gum-elemi												0/1													14	Common
Bursera simaruba	Gum-elemi, Gumbo Limbo																									21	Common
Caesalpinia bahamensis													0/1				1/0									2	Occasional
Caesalpinea bonduc	Gray Nicker	0/5	0/1		0/1		0/1					0/3			0/1				0/1					0/1		9	Common
Caesalpinia major	Large Yellow Nicker																									2	Occasional
Caesalpinia sp.																										3	Occasional
Cakile lanceolata	Southern Sea Rocket																									0	Uncommon
Calyptranthes pallens	Spice-wood																									4	Occasional
Canavalia rosea	Bay Bean, Beach Bean																									5	Occasional
Capraria biflora	Goat Weed, Stow-weed																									1	Occasional
Casasia clusiifolia	Seven-year Apple			1/0		2/1											0/1		0/1							28	Abundant
Cassia chapmanii	Stinking pea, Bahamas Senna																									0	Uncommon
Cassytha filiformis	Woe-vine, Love Vine																									20	Common
Casuarina equisetifolia	Beefwood, Australian Pine																									16	Common
Catesbaea foliosa																										0	Uncommon
Catesbaea parviflora	Catesbeae																									0	Uncommon
Cenchrus spinifex	Southern Burgrass																									7	Occasional
Centrosema virginianum	Butterfly Pea, Wild Pea																									1	Uncommon
Cephalocereus millspaughii	Old Man Cactus																									0	Uncommon
Chamaecrista lineata	Narrowpod Sensitive Pea																									10	Common
Chamaesyce sp.	Spurge																									0	Uncommon
Chiococca alba	Snowberry, Snakeroot																									13	Common
Chromolaena (fka Eupatorium) lucayanum	Bitter Bush, Tonka Bean, Jack-in-the-bush																									1	Uncommon
Chrysobalanus icaco	Coco Plum																									1	Uncommon
Cissus intermedia	Bull-vine																									0	Uncommon
Cladium jamaicensis	Sawgrass																									0	Uncommon
Coccoloba diversifolia	Pigeon-plum																									13	Common
Coccoloba krugii	Crabwood, Bow-pigeon, wild grape																									3	Occasional
Coccoloba northropiae																										2	Occasional
Coccoloba uvifera	Seagrape																									1	Uncommon
Coccothrinax argentata	Silver Thatch, Silver Top	0/2	3/1		1/1			0/1		1/0		0/2	0/5			1/3	0/1	0/2	2/2	2/2		0/2	2/3	1/4	1/4	74	Abundant
Cocos nucifera	Coconut Palm																									4	Occasional
Conocarpus erectus	Buttonwood																									5	Occasional
Conocarpus erectus v. sericea	Silver Buttonwood																									0	Uncommon
Consolea (Opuntia) nashii	Cactus Tree, Nash's Prickly Pear																									0	Uncommon
Conyza canadensis	Smooth Horseweed																									0	Uncommon
Crossopetalum rhacoma	Maiden Berry, Mating Berry																									0	Uncommon
Croton eluteria	Sweetwood, Cascarilla																									4	Occasional
Croton linearis	Granny-bush, Bay Wormwood							0/3								0/2										17	Common
Croton lucidus	Fire Bush																									8	Occasional
Cryptostegia grandiflora	Rubber Vine																									0	Uncommon
Cynanchum bahamense																										10	Common
Cynanchum sp undetermined																										2	Occasional
Cyperus spp.	Limestone Turf Sedge																									0	Uncommon
Cyperus planifolius	Coast Cyperus	5%	5%									5%	5%		5%			5%								33	Abundant
Dactyloctenium aegyptium	Crowfoot Grass													5%												0	Uncommon
Desmanthus virgatus	Virgate Mimosa																									0	Uncommon
Diospyros crassinervis	Feather-bed																									1	Uncommon
Distichlis spicata	Seashore Saltgrass																									1	Uncommon
Drypetes diversifolia	White wood, Milkbark																									1	Uncommon
Echites umbellata	Devil's Potato																									13	Common
Eleusine indica	Goosegrass																									7	Occasional
Encyclia altissima	Tall Orchid																									2	Occasional
Encyclia sp. Undetermined	Orchid																									1	Uncommon
Erithalis fruticosa	Black Torch, Candlewood						0/5	0/3	0/1		0/3	0/1	0/1	0/2	0/1						0/4	0/2				45	Abundant
Ernodea littoralis	Golden Creeper, Cough Bush																						0/2			12	Common
Erythroxylum areolatum	Swamp Redwood, Paperleaf																									1	Uncommon
Erythroxylum rotundifolium	Rat-wood																									4	Occasional
Eugenia axillaris	White Stopper																									6	Occasional
Eugenia confusa	Red-berry Stopper																									13	Common
Eugenia foetida	Spanish Stopper, White Wattle																									8	Occasional
Eugenia rhombea	Red Stopper																									3	Occasional
Eupatorium odoratum	Bitter Bush, Tonka Bean																									1	Uncommon
Euphorbia cayensis	Spurge																									14	Common
Euphorbia mesembrianthemifolia	Coast spurge, Seaside spurge																	5%					0/2			2	Occasional
Evolvulus squamosus	Broom Bush																									1	Uncommon
Exostema caribaeum	Princewood, Jesuit Bark, Fustic																									0	Uncommon
Ficus citrifolia	Short-leaved Wild Fig																									0	Uncommon
Fimbrystylis ferruginea	Rusty Sedge																									0	Uncommon
Galactia rudolphoides	Red Milk Pea																									0	Uncommon
Galactia sp un-determined																										6	Occasional
Grimmeodendron eglandulosum	Poison Bush																									0	Uncommon
Guaiacum officinale	Lignum vitae																									0	Uncommon
Guaiacum sanctum	Lignum vitae																									20	Common
Guapira discolor	Blolly				1/0			2/1			1/0				1/0			1/0	1/0				1/0	1/0		54	Abundant
Guettarda elliptica	Smooth Velvet Seed																									10	Common

Table 4-6. Plants Present in 125 Vegetation Monitoring Plots (Page 11 of 12)

Scientific Name	Common Name	BOH2-5	BOH3-1	BOH3-2	BOH3-3	BOH3-4	BOH3-5	BOH4-1	BOH4-2	BOH4-3	BOH5-1	BOH5-2	BOH5-3	BOH6-1	BOH6-2	BOH6-3	BOH7-1	BOH7-2	BOH7-3	BOH8-1	BOH8-2	BOH8-3	BOH9-1	BOH9-2	BOH9-3	# Occurrences	Frequency
Guettarda scabra	Rough Velvet Berry																									0	Uncommon
Gundlachia corymbosa	Horse Bush		0/1				0/6		0/5	1/0						0/1					0/3					29	Abundant
Gymnanthes lucida	Crabwood																									20	Common
Helicteres jamaicensis	Cow-bush, Blind Eye Bush																									1	Uncommon
Helicteres semitriloba	Wild Salve																									1	Uncommon
Heliotropium curassavicum	Seaside Heliotrope																									0	Uncommon
Heliotropium gnaphalodes	Wild Bay, Sea Lavender																									4	Occasional
Heliotroium nanum	White Pusley																									0	Uncommon
Hymenocallis arenicola	Dune Spider Lily																									13	Common
Hypelate trifoliata	White Ironwood																									0	Uncommon
Ipomoea (stolonifera) imperati	Morning Glory																									1	Uncommon
Ipomoea alba	Moon-vine																									4	Occasional
Ipomoea microdactyla	Wild Potato																									0	Uncommon
Ipomoea pes-caprae	Bay Hops, Bay Winders																									1	Uncommon
Ipomoea triloba	Littlebell																									0	Uncommon
Iresine flavens	Coastal Iresine													15%												2	Occasional
Iva imbricata	Beach Iva																									5	Occasional
Jacquemontia havanensis	Jacquemontia			10%					10%			30%					5%	5%								18	Common
Jacquinia keyensis	Joe-wood, Ironwood			1/0				1/0		1/0							1/0									11	Occasional
Koanophyllon villosum	Jackmada, Bitter Sage																									0	Uncommon
Krugiodendron ferreum	Strong Back																									11	Common
Laguncularia racemosa	White Mangrove																									0	Uncommon
Lantana bahamensis	Black Sage																									1	Uncommon
Lantana balsamifera	Inaugua Sagebrush		0/1											0/1												2	Occasional
Lantana demutata																										0	Uncommon
Lantana involucrata	Sage Cop, Wild Sage						0/4																			21	Common
Lasiacis divaricata	Wild Cane																									10	Occasional
Leucaena luecocephala	Jumbie Bean, Jumbay (Cow Bush in TCI)																									12	Common
Lysiloma latisiliquum	Wild Tamarind																									12	Common
Lysiloma sabicu	Horseflesh																									0	Uncommon
Malpighia polytricha	Touch-me-not, Wild Cherry																									2	Occasional
Manilkara bahamensis	Wild Dilly																									1	Uncommon
Manilkara zapota																										0	Uncommon
Melochia tomentosa	Velvety Melochia																									0	Uncommon
Metopium toxiferum	Poisonwood	1/0								1/0																5	Occasional
Mosiera fka Psidium - longipes	Bahama Stopper																									1	Uncommon
Myrcianthes fragrans	Pale Stopper																									6	Occasional
Myrica cerifera	Bay-berry, Wax-berry														0/1											1	Uncommon
Myriopus volubilis	Soldier-bush																									13	Common
Ocotea coriacea	Black Torch																									0	Uncommon
Oplonia spinosa	Prickly Bush																									11	Common
Opuntia stricta	Prickly Pear Cactus																									2	Occasional
ORCHIDACEAE - Genus & Species undetermined	Un-identified																									0	Uncommon
Panicum amarulum	Sea-beach Grass																									2	Occasional
Paspalum blodgettii	Coral Paspalum																									0	Uncommon
Passiflora cupraea	Devil's Pumpkin																									4	Occasional
Passiflora suberosa	Juniper-berry, Small Passion-flower																									1	Occasional
Pentalinon luteum	Wild Unction			5%				5%																		3	Occasional
Pera bumelifolia	Bullwood																									1	Uncommon
Phyllanthus epiphyllanthus	Abraham-bush, Hardhead	0/1														0/1			0/1			0/5				10	Occasional
Piscidia piscipula	Fish Poison, Jamaican Dogwood																									4	Occasional
Pithecellobium keyense	Blackbead																									49	Abundant
Pluchea symphytifolia	Bushy Fleabane																									0	Uncommon
Plumbago scandens	Doctor-bush, White Plumbago																									4	Occasional
Plumeria obtusa	White Frangipani																									5	Occasional
POACEAE (GRAMMINEAE) Undetermined tall grass	Un-identified Tall Grass																									9	Occasional
POACEAE (GRAMMINEAE) Undetermined grass #2	Un-identified Grass																									4	Occasional
Pseudophoenix sargentii	Hog Palm, Buccaneer Palm																									0	Uncommon
Randia aculeata	Box briar							0/1		0/1									0/1						0/3	37	Abundant
Reynosia septentrionalis	Darling Plum	3/0	0/1							0/3		0/2	0/4	1/4	1/0		2/0						0/1		2/4	57	Abundant
Rhachicallis americana	Hog-bush, Sandfly-bush																									5	Occasional
Rhynchospora floridensis	White-top, White-headed Rush																									0	Uncommon
Rhizophora mangle	Red Mangrove																									1	Uncommon
Rivina humilis	Wild tomato, Pigeon-berry																									1	Uncommon
Rochefortia spinosa																										0	Uncommon
Ruppia maritima	Widgeon Grass																									0	Uncommon
Sabal palmetto	Pond-top, Pond Thatch																									1	Uncommon
Salicornia ambigua	Woody Glasswort																									1	Uncommon
Salmea petrobioides	Shanks, Bushy Salmea																									1	Uncommon
Sansevieria hyacinthoides	African Bowstring Hemp																									0	Uncommon
Scaevola plumieri	Inkberry, Black-soap																									11	Common
Scaevola taccada	Ornamental Candlewood																									1	Uncommon
Schaefferia frutescens	Boxwood																									4	Occasional
Scleria lithosperma	Slender Nut-rush																									4	Occasional
Sesuvium portulacastrum	Pondweed, Sea purslane																									0	Uncommon
Sida acuta	Wire-weed																									0	Uncommon
Sida ciliaris	Fringed Sida																									0	Uncommon
Sideroxylon salicifolia	Wild Cassada																									1	Uncommon
Smilax havanensis	Prickly Saw-brier																									19	Common
Solanum bahamense	Canker Berry, Bahamas Nightshade																									9	Common
Sophora tomentosa	Coast Sophora, Necklace pod																				0/1					1	Uncommon
Spermacoce tenuoir																										0	Uncommon
Spigelia anthelmia	Pink																									0	Uncommon
Sporobolus domingensis	Domingan Dropseed																									0	Uncommon
Sporobolus virginicus	Seashore Rush-grass																									4	Occasional
Stachytarpheta fruticosa	Bahama Vervain, Blue Rat Tail																									0	Uncommon
Stachytarphaeta jamaicensis	Blue Flower, Jamaica Vervain																									0	Uncommon
Strumpfia maritima	Mosquito Bush, Candle Torch																									0	Uncommon
Stylosanthes hamata	Sweet Weed, Pencil Flower																									0	Uncommon
Suriana maritima	Bay Cedar																									6	Occasional
Swietenia mahagani	Mahogany																									0	Uncommon

Table 4-6. Plants Present in 125 Vegetation Monitoring Plots (Page 12 of 12)

Scientific Name	Common Name	BOH2-5	BOH3-1	BOH3-2	BOH3-3	BOH3-4	BOH3-5	BOH4-1	BOH4-2	BOH4-3	BOH5-1	BOH5-2	BOH5-3	BOH6-1	BOH6-2	BOH6-3	BOH7-1	BOH7-2	BOH7-3	BOH8-1	BOH8-2	BOH8-3	BOH9-1	BOH9-2	BOH9-3	# Occurrences	Frequency
Tabebuia bahamensis	White Cedar, Five Fingers																									17	Common
Tamarindicus indica	Tamarind																									1	Uncommon
Thouinia discolor	Nakedwood, Quicksilver																									5	Occasional
Tillandsia recurvata	Thread-leaved Wild Pine																									0	Uncommon
Tillandsia utriculata	Swollen Wild Pine																									15	Common
Tournefortia gnaphalodes	Bay Lavender																									0	Uncommon
Triopteris jamaicensis	Cough Vine																									0	Uncommon
Turnera diffusa																										1	Uncommon
Turnera ulmifolia	Buttercups, Yellow Alder																									20	Common
Uniola paniculata	Sea Oats																									24	Abundant
Uniola virgata	Spike-grass																									1	Uncommon
Vachellia choriophylla	Cinnecord												0/1													18	Common
Vallesia antillana	Pearl Berry																									8	Occasional
Varronia bahamensis	Cocobey								0/1		0/4										0/3					14	Common
Varronia brittonii																										0	Uncommon
Waltheria indica	Sleepy Morning																									0	Uncommon
Wedelia bahamensis	Rong Bush																									1	Uncommon
Zanthoxylum coriaceum	Hercules' Club																									0	Uncommon
Zanthoxylum fagara	Wild lime, Satin-wood																									10	Common
Zanthoxylum flavum	Yellow-wood, Satin-wood				1/0							2/0			1/0	0/1				2/0	2/0	1/0				21	Common
Zapoteca formosa	White Calliandra																									0	Uncommon
Ziziphus taylorii																										0	Uncommon
Undetermined vine																										1	Uncommon
Undetermined vine # 2																										1	Uncommon
Undetermined - alternate leaf shrub																										2	Uncommon

Legend and Notes
plot size = 9' x 9' (~ 2.7 m x 2.7 m)
Trees = < 7' (2.1 m)
Shrubs = 1-7' (0.3 m - 2.1 m)
Groundcovers = < 1'; % groundcover shown
For species that can grow to tree size, #/# = # tree size / # shrub size
% Groundcover provided when individual was < 1' tall, regardless of height when mature
Green shading = Species identified as protected by the Government of the Bahamas and/or international treaties
Pink shading = Species identified in Bahamas National Invasive Species Strategy
For species which have had name changes since they were designated as protected or invasive, the following apply
Gymnanthes lucida (Crabwood) formerly known as Ateramnus lucidus
Consolea nashii (Cactus Tree, Nash's Prickly Pear) was formerly known as Opuntia nashii
Pentalinon luteum (Wild Unction) formerly known as Urechites lutea
Scaevola taccada (Ornamental Candlewood, Inkberry) also known as Scaevola taccada
Tournefortia gnaphalodes (bay lavender) also known as Mallotonia gnaphalodes and Argusia gnaphalodes
Vachellia choriophylla (cinnecord) formerly known as Acacia choriophylla
Varronia bahamensis (Cocobey) formerly known as Cordia bahamensis
Occurrence Categories:
Abundant = Present in more than 15% of the 158 plots
Common = Present in 5-15% of the 158 plots
Occasional = present in 1-5% of the 158 plots
Uncommon = Observed on the property, but was present in none or one of the plots

A native cockroach, thought to be an endemic (Currie et al. 2019) with a limited distribution only in the central Bahamas, and which was only encountered one time, is believed to be *Eurycotis bahamensis*. Other insects included cicadas (*Diceroprocta bonhotei*), West Indian termites (*Nasutitermes costalis*), with their characteristically large mounds, and American bird grasshoppers (*Schistocerca americana*).

Terrestrial snails included peanut snails (*Cerion* sp.) and colorful seagrape snails (*Hemitrochus* sp.), which were intermittently abundant.

A list of all animal species identified on the site is included in Appendix B.

4.2.1.4.1. Summary of Bird Observations

To date, observations of bird sightings on the property have been recorded during October, November, and December 2017; November and December 2018; January, April, June, October, November, and December 2019; and January, February, June, July and October 2020. One hundred bird species, which include permanent resident breeding species, migrants and ocean-going species have been observed during these site visits (Table 4-7). Bird surveys were performed by members of the EIA team, which included widely-respected Bahamian bird expert Predensa Moore. Discussions regarding birds also took place with representatives from The Bahamas National Trust (BNT) and the Cape Eleuthera Institute (CEI). Table 4-7 identifies the species observed and pertinent comments (species are listed in accordance with the 2019 List of North American Birds by the American Ornithological Society.

Table 4-7. Bird Species Observed at Lighthouse Point and in the Vicinity

Scientific Name	Common Name	Abundance	Comments
Anas bahamensis	White-cheeked Pintail	Occasional	Year-round resident; only observed in salt ponds
Aythya affinis	Lesser Scaup	Uncommon	Fall, winter & spring resident and transient on Eleuthera, rarely observed on site
Anas discors	Blue-winged Teal	Uncommon	Fall, winter & spring resident and transient on Eleuthera, rarely observed on site
Tachybaptus domincus	Least Grebe	Uncommon	Year-round resident in Bahamas, status at LHP undetermined

Table 4-7. Bird Species Observed at Lighthouse Point and in the Vicinity

Scientific Name	Common Name	Abundance	Comments
Columba leucocephala	White-crowned Pigeon	Uncommon	Year-round resident; likely nests on small offshore islands
Columba passerine	Common Ground-dove	Common	Year-round resident; likely nests on the property
Geotrygon chrysie	Key West Quail Dove	Uncommon	Only saw on adjoining tract to the north, but may visit the property
Zenaida asiatica	White-winged Dove	Uncommon	Year-round breeding resident in central Bahamas; nesting not confirmed on the property
Zenaida aurita	Zenaida Dove	Occasional	Year-round resident; likely nests on the property
Crotophaga ani	Smooth-billed Ani	Occasional	Year-round resident; nesting not confirmed on property on the word document
Coccyzus minor	Mangrove Cuckoo	Uncommon	Reportedly a permanent resident in The Bahamas, but only observed on the site during the summer-time nesting season.
Coccyzus americanus	Yellow-billed Cuckoo	Uncommon	Transient, only observed during fall migration
Saurothera merlini bahamensis	Great Lizard Cuckoo	Uncommon	Year-round resident; likely nests on the property
Chordeiles gundlachii	Antillean Nighthawk	Occasional	Summer resident; observed nesting on west shoreline coastal rocks
Calliphlox evelynae	Bahama Woodstar	Uncommon	Year-round resident; nests from previous years observed on the property
Rallus longirostris coryi	Clapper Rail	Uncommon	Uncommon. Only heard near NW Pond, potentially nests along pond edge
Fulica americana	American Coot	Uncommon	Only observed in NW Pond
Himantopus mexicanus	Black-necked Stilt	Common	Summer-time resident, nesting confirmed on perimeter of salt ponds
Haematopus palliatus	American Oystercatcher	Occasional	Year-round resident; observed on rocky shores; Adults with one immature observed along the west shoreline during June 2019
Pluvialis squatarola	Black-bellied Plover	Occasional	Winter resident; nests in northern latitudes
Charadrius vociferous	Killdeer	Uncommon	Year-round resident on Eleuthera, limited habitat on subject property
Charadrius semipalmatus	Semi-palmated Plover	Uncommon	Migrant, was only observed during migration
Charadrius melodus	Piping Plover	Occasional	Endangered; winter resident; non-breeding; Banded individual tracked to Quebec

Table 4-7. Bird Species Observed at Lighthouse Point and in the Vicinity

Scientific Name	Common Name	Abundance	Comments
Charadrius wilsonia	Wilson's Plover	Occasional	Summer-time resident, nests along perimeter of salt ponds and possibly on beaches
Arenaria interpres	Ruddy Turnstone	Common	Winter resident on beaches; One individual had been banded in New Jersey
Calidris alba	Sanderling	Uncommon	Fall-winter-spring resident on sandy beaches; nests in the Arctic
Calidris minutilla	Least Sandpiper	Uncommon	Fall-winter-spring resident near wetlands & shores; nests in Arctic
Tringa solitaria	Solitary Sandpiper	Uncommon	Fall-spring resident near wetlands & shores; nests across N Canada
Limnodromus griseus	Short-billed Dowitcher	Occasional	Winter resident; only observed in White Pond
Tringa flavipes	Lesser Yellowlegs	Occasional	Winter resident; observed only in White and Shad Ponds
Tringa semipalmata	Willet	Occasional	Possible year-round resident; but only had a few sightings
Tringa melanoleuca	Greater Yellowlegs	Occasional	Winter resident; observed in White and Shad Ponds
Larus atricilla	Laughing Gull	Common	Year-round resident, but not likely to nest on the property
Anous stolidus [1]	Brown Noddy	Uncommon	Oceanic species; present in summer. Observed over water west of site. Unlikely visitor to the property
Onychoprion fuscatus [1]	Sooty Tern	Uncommon	Documented to nest on nearby cays in 2007 and observed nesting there during June 2019
Onychoprion anaethetus [1]	Bridled Tern	Uncommon	Oceanic species; present in summer. Observed over water west of site. Observed nesting on nearshore cays in 2019, but unlikely visitor to the property
Sternula antillarum [1]	Least Tern	Uncommon	Summer-time resident, possibly nests on the property
Gelochelidon nilotica	Gull-Billed Tern	Uncommon	Only observed in Big Pond and White Pond
Sterna dougallii	Roseate Tern	Uncommon	Summertime breeding resident; only observed on nearshore cays
Thalasseus maximum	Royal Tern	Occasional	Routinely observed on and near shore
Phaethon lepturus [1]	White-tailed Tropicbird	Uncommon	Observed aerially in June 2019. Unlikely to visit the property.
Calonectris diomedea [1]	Cory's Shearwater	Uncommon	Oceanic species; present in summer. Observed over water west of site. Unlikely visitor to the property

Table 4-7. Bird Species Observed at Lighthouse Point and in the Vicinity

Scientific Name	Common Name	Abundance	Comments
Ardenna gravis [1]	Great Shearwater	Uncommon	Oceanic species; present in summer. Observed over water west of site. Unlikely visitor to the property
Puffinus lherminieri [1]	Audubon's Shearwater	Uncommon	Oceanic species; present in summer. Observed over water west of site. Unlikely visitor to the property
Fregata magnificens [1]	Magnificent Frigatebird	Uncommon	Oceanic species, year-round presence, but not likely to nest on the property
Phalacrocorax auritus	Double-crested Cormorant	Uncommon	Open-water areas; only observed in Northwest Pond
Ardea herodias	Great Blue Heron	Uncommon	Shorelines & wetlands; could nest on the property, but infrequently observed
Ardea alba	Great Egret	Occasional	Only saw on adjoining tract to the north, but may visit the property
Egretta caerulea	Little Blue Heron	Occasional	Year-round breeding resident in The Bahamas. Only observed in White Pond, breeding not confirmed
Egretta tricolor	Tri-colored Heron	Occasional	Year-round resident; occasionally observed in White Pond and Northwest Pond
Egretta rufescens	Reddish Egret	Common	Year-round resident; often observed in White Pond
Bubulcus ibis	Cattle Egret	Occasional	Year-round resident; few sightings
Egretta thula	Snowy Egret	Occasional	Year-round resident on Eleuthera, infrequently observed on the site
Butorides virescens	Green Heron	Occasional	Year-round resident; occasionally observed in White Pond and Northwest Pond
Nyctanassa violacea	Yellow-crowned Night-heron	Common	Year-round resident; likely nests on the property
Pandion haliaetus	Osprey	Uncommon	Year-round resident; observed near shorelines, nests nearby
Athene cunicularia	Burrowing Owl	Uncommon	Year-round breeding resident; minimal suitable habitat on site
Ceryle alcyon	Belted Kingfisher	Uncommon	Fall, winter & spring non-breeding resident; only observed near Northwest Pond
Sphyrapicus varius	Yellow-bellied Sapsucker	Uncommon	Winter resident; only observed near in palm tree near Shad Pond, but characteristic feeding holes seen in trees at various locations on the property
Falco sparverius	American Kestrel	Uncommon	Year-round breeding resident in The Bahamas, nesting not confirmed on the subject property

Table 4-7. Bird Species Observed at Lighthouse Point and in the Vicinity

Scientific Name	Common Name	Abundance	Comments
Falco columbarius	Merlin	Uncommon	Fall, winter & spring non-breeding resident; mostly seen in vicinity of existing road
Falco peregrinus	Peregrine Falcon	Uncommon	Fall & spring migrant, present in winter, nests in northerly latitudes
Myiarchus sagrae	La Sagra's Flycatcher	Uncommon	Summer-time resident, likely nests on the property
Tyrannus dominicensis	Gray Kingbird	Common	Summer resident, typically Apr-Oct. Likely nests on the property
Contopus virens	Eastern Wood Pewee	Uncommon	Uncommon fall migrants, nests in northerly latitudes
Contopus caribaeus bahamensis	Cuban Pewee	Uncommon	Potential year-round resident, but only encountered during the summer
Vireo crassirostris	Thick-billed Vireo	Common	Year-round resident; likely nests on the property
Vireo philadelphicus	Philadelphia Vireo	Uncommon	Passage migrant; nests across Canada; winters in Central & S America
Vireo olivaceus	Red-eyed Vireo	Uncommon	Fall and spring migrant
Vireo altiloquus	Black-whiskered Vireo	Uncommon	Summer breeding resident, although nesting not confirmed on the property
Dumetella carolinensis	Gray Catbird	Common	Fall, winter & spring resident; frequently heard
Mimus gundlachii	Bahama Mockingbird	Occasional	Year-round resident; likely nests on the property
Mimus polyglottos	Northern Mockingbird	Occasional	Permanent resident on Eleuthera, but only observed on the property during the summer
Melospiza lincolnii	Lincoln's Sparrow	Uncommon	Transient, observed during migration
Spindalis zena	Western Spindalis	Occasional	Year-round resident; likely nests on the property
Seiurus aurocapilla	Ovenbird	Uncommon	Fall, winter & spring non-breeding resident
Helmintheros vermivorum	*Worm-eating Warbler*	Uncommon	Uncommon fall, winter & spring resident and transient migrant
Seiurus noveboracensis	Northern Waterthrush	Uncommon	Fall, winter & spring resident; nests in northerly latitudes; only 1 sighting, near Big Pond
Mniotilta varia	Black and White Warbler	Uncommon	Fall, winter & spring resident; nests in northerly latitudes
Limnothlypis swainsonii	Swainson's Warbler	Uncommon	Transient migrant, possible winter resident
Leiothlypis peregrina	Tennessee Warbler	Uncommon	Fall, winter & spring non-breeding resident

Table 4-7. Bird Species Observed at Lighthouse Point and in the Vicinity

Scientific Name	Common Name	Abundance	Comments
Geothlypis rostrata	Bahama Yellowthroat	Uncommon	Nesting on the property possible, but not confirmed
Setophaga ruticilla	American Redstart	Uncommon	Winter resident; nests in northerly latitudes, only 1 sighting
Setophaga kirtlandii	Kirtland's Warbler	Uncommon	Fall, winter & spring resident, nests in northerly latitudes
Geothlypis trichas	Eastern Yellowthroat	Uncommon	Fall, winter & spring resident
Setophaga tigrina	Cape May Warbler	Uncommon	Fall, winter & spring resident, nests in northerly latitudes
Setophaga americana	Northern Parula	Uncommon	Fall, winter & spring resident, nests in northerly latitudes
Dendroica magnolia	Magnolia Warbler	Uncommon	Fall, winter & spring resident; nests in northerly latitudes, only 1 sighting
Setophaga caerulescens	Black-throated Blue Warbler	Uncommon	Fall, winter & spring resident, nests in northerly latitudes
Setophaga palmarum	Palm Warbler	Common	Fall, winter & spring resident; nests in northerly latitudes
Setophaga pinus	Pine Warbler	Uncommon	Fall, winter & spring non-breeding resident
Setophaga coronata	Yellow-rumped Warbler	Uncommon	Fall, winter & spring non-breeding resident and transient migrant
Setophaga dominica	Yellow-throated Warbler	Uncommon	Fall, winter & spring resident, nests in northerly latitudes
Setophaga virens	Black-throated Green Warbler	Uncommon	Fall, winter & spring resident, nests in northerly latitudes
Setophaga discolor	Prairie Warbler	Occasional	Fall, winter & spring resident; nests in northerly latitudes
Hirundo rustica	Barn Swallow	Occasional	Transient, observed during migration
Coerba flaveola	Bananaquit	Abundant	Year-round resident; nests of previous years observed on the property
Passerina cyanea	Indigo Bunting	Uncommon	Fall, winter & spring resident, nests in northerly latitudes
Tiaris bicolor	Black-faced Grassquit	Common	Year-round resident; likely nests on the property
Loxigilla violacea violacea	Greater Antillean Bullfinch	Occasional	Year-round resident; likely nests on the property

[1] Species observed aerially over open water and in the vicinity of the cays immediately south of the subject property

Future avian surveys, including those conducted during implementation of the EMP, are likely to provide a more thorough understanding of avian life on the property.

All species of birds observed on the property and in the vicinity of the property are designated for protection by the Government of The Bahamas.

4.2.1.5 Protected Species

Protected species of trees observed onsite are identified on Table 4-8. Other plant species that are protected by the Government of The Bahamas and/or international treaties may be present on the property but were not encountered or identified during field assessments.

Table 4-8. Protected Plants

Common Name	Scientific Name	Designation(s)	Abundance	Comments
Lignum vitae	*Guaiacum officinale*	IUCN- Near Threatened CITES Appendix II	Uncommon	Dry Broadleaf Evergreen Forest
Lignum vitae	*Guaiacum sanctum*	Bahamas – Protected IUCN- Near Threatened CITES Appendix II	Intermittently common	Dry Broadleaf Evergreen Forest
Red Cedar	*Juniperus bermudiana*	Bahamas – Protected IUCN- Critically Endangered	Rare, if present	Reported to be on the property, but not observed during ecological investigations
Blolly	*Guapira discolor*	Bahamas – Protected	Common	Dry Broadleaf Evergreen Forest
Mahogany	*Swietenia mahagoni*	Bahamas – Protected IUCN – Endangered CITES – Appendix II	Occasional	Dry Broadleaf Evergreen Forest
Horseflesh	*Lysiloma sabicu*	Bahamas – Protected	Occasional	Dry Broadleaf Evergreen Forest
Yellowwood	*Zanthoxylum flavum*	IUCN – Vulnerable	Common	Sand Strand
Tall Orchid	*Encyclia altissima*	CITES – Appendix II	Occasional	Dry Broadleaf Evergreen Forest
Prickly pear cactus	*Opuntia stricta*	CITES – Appendix II	Occasional	Dry Broadleaf Evergreen Forest

Because of the interruption of geotechnical work due to government orders related to COVID-19, additional plant survey work has not been completed. Two additional tree species (i.e., Holy Lignum vitae (*Guaiacum officinale*), and mahogany (*Sweitenia mahagoni*) and several species designated as endemics were observed on the property, but not within the area impacted by the proposed Project. Protected tree species are listed in Sections 4.2.1, Table 4-6, Table 4-8, 4.2.15, and Section 7.6. Additional protected tree data will be collected by a qualified individual as COVID-19 restrictions allow enhanced baseline and impacts data analysis. A protected tree survey will be performed to obtain a permit from the Forestry Unit to harvest protected trees prior to initiating land clearing. Individuals of other protected tree species may be encountered during future site investigations.

4.2.1.6 Invasive Species

Only two of the plant species and two animal species identified in The Bahamas National Invasive Species Strategy (NISS) were encountered during the field assessments. These species, their designation and their overall abundance and spatial distribution on the property are identified on Table 4-9.

Table 4-9. Invasive Species Observed during the Landside Assessment

Common Name(s)	Scientific Name	NISS Designation	General Abundance on the Property	Spatial Distribution on the Property
Plants				
Australian Pine	*Casuarina equisetifolia*	Control	Intermittently dominant	Mostly adjacent to east beach
White Inkberry, Asian Scaevola Beach Naupaka	*Scaevola taccada*	Eradication	Uncommon	Mostly adjacent to East Beach
Animals				
Domestic Dog	*Canus lupus familiaris*	Control	Uncommon	Observed un-leashed on beaches
Feral Cat	*Felis catus*	Control	Uncommon	Observed along road

Several other species that are not native to The Bahamas but are not listed in the NISS were observed during field investigations on the site (Table 4-10).

The absence of these species in the NISS may either be because their degree of invasiveness has not been analyzed by the Government of The Bahamas or that they have been evaluated and were determined to not be posing a significant enough threat to native ecosystems to warrant their designation as needing eradication or control.

Table 4-10. Invasive Species Not Listed in the NISS but Observed during the Landside Assessment

Common Name	Scientific Name	General Abundance on the Property	Spatial Distribution on the Property
Plants			
Century Plant	*Agave sisalana*	Uncommon	Scattered – Mostly near previously-disturbed areas
Coconut	*Cocos nucifera*	Common	Near edge of vegetation along sandy shores
Smooth Horseweed	*Conyza canadensis*	Uncommon	Only observed off property near NW property corner
Rubber Vine[1]	*Cryptostegia grandiflora*	Uncommon	Disturbed sandy areas
Crowfoot Grass	*Dactylctenium aegyptium*	Common	Disturbed sandy areas
Indian Goosegrass	*Eleusine indica*	Occasional	Scattered – Mostly near previously-disturbed areas
African Bowstring Hemp	*Sansevieria hyacinthoides*	Uncommon	Only near previously-inhabited areas near NW property boundary
Tamarind	*Tamarindus indica*	Occasional	Scattered – Mostly near previously-disturbed areas
Animals			
European Honeybee	*Apis mellifera*	Occasional	Scattered, mostly in dry broadleaf evergreen forest
Cuban Treefrog	*Osteopilus septrionalis*	Uncommon	Only observed in cistern below lighthouse. Not collected to verify species identification
Marine Species			
Red Lionfish	*Pterois volitans*	Uncommon	Reefs & hardbottom with relief

[1] Not observed within the Project boundary by members of the Project team but reported by E. Freid.

4.2.2 MARINE RESOURCES

The marine resource investigation consisted of acquiring and analyzing high-resolution aerial photography and historical high resolution satellite imagery in Google Earth, a literature search, discussion of marine issues with representatives from entities with knowledge of the marine environment [e.g., the Cape Eleuthera Institute (CEI), The Bahamas National Trust (BNT), and the Perry Institute for Marine Science (PIMS)], and subsequent underwater visual inspections of marine areas in the vicinity of the Project. The following investigations were conducted.

- **Broad Scale Ground-Truthing Surveys:** Snorkeling investigations at broadly spaced intervals around the periphery of the area where analyses of aerial photography or satellite imagery indicated varied benthic conditions. Over 100 spot check points of the benthos were conducted, primarily along the southern portion of the Project area (Figure 4-24).

- **Benthic Habitat Characterizations**: Investigations by SCUBA and/or snorkeling were conducted on the principal hardbottom benthic habitats of the southern Project area across which development is being considered; These included eight randomly selected sites (two each for the four principal hardbottom types and one site strategically chosen on the adjacent Patch Reef habitat that is outside of the proposed construction area). At each site, a team of trained, scientific divers certified by the Atlantic and Gulf Rapid Reef Assessment (AGRRA) conducted surveys to characterize the benthic cover, stony coral condition, and fish life utilizing the internationally recognized AGRRA methodology (see www.agrra.org) In October 2020, a total of 26 fixed marine habitat plots (10m x 10m) were established within and outside (including control sites) of the proposed direct and secondary marine impact areas of the LHP Project. High resolution video was collected of the benthos within each plot to provide a record of the pre-development condition of all the principal habitats as part of the adaptive monitoring and management framework for the LHP Project (Figure 4-24).

- **Detailed Investigations within the Proposed Construction Footprint**: Investigations by SCUBA and/or snorkeling were undertaken in areas within the proposed construction footprint where direct impacts are anticipated to occur. Two types of surveys were conducted: A) Broad-based benthic characterizations along 600-foot long transects placed parallel to the proposed structures; and B) Detailed quantitative counts of benthic organisms along 10 m (~33 feet) long transects placed parallel to the centerline of the proposed structures.

For benthic habitat characterizations, a team of experienced marine scientists completed diver tows and SCUBA or snorkel-assisted investigations along underwater transects that extended through areas being considered for installation of infrastructure (i.e., open trestle pier and berth, small-vessel marina and service ramp). Benthic conditions were assessed along four 600-ft transects (from the centerline of the proposed berthing area) and eight 400-ft transects (from the centerline of the proposed trestle) (Figure 4-25).

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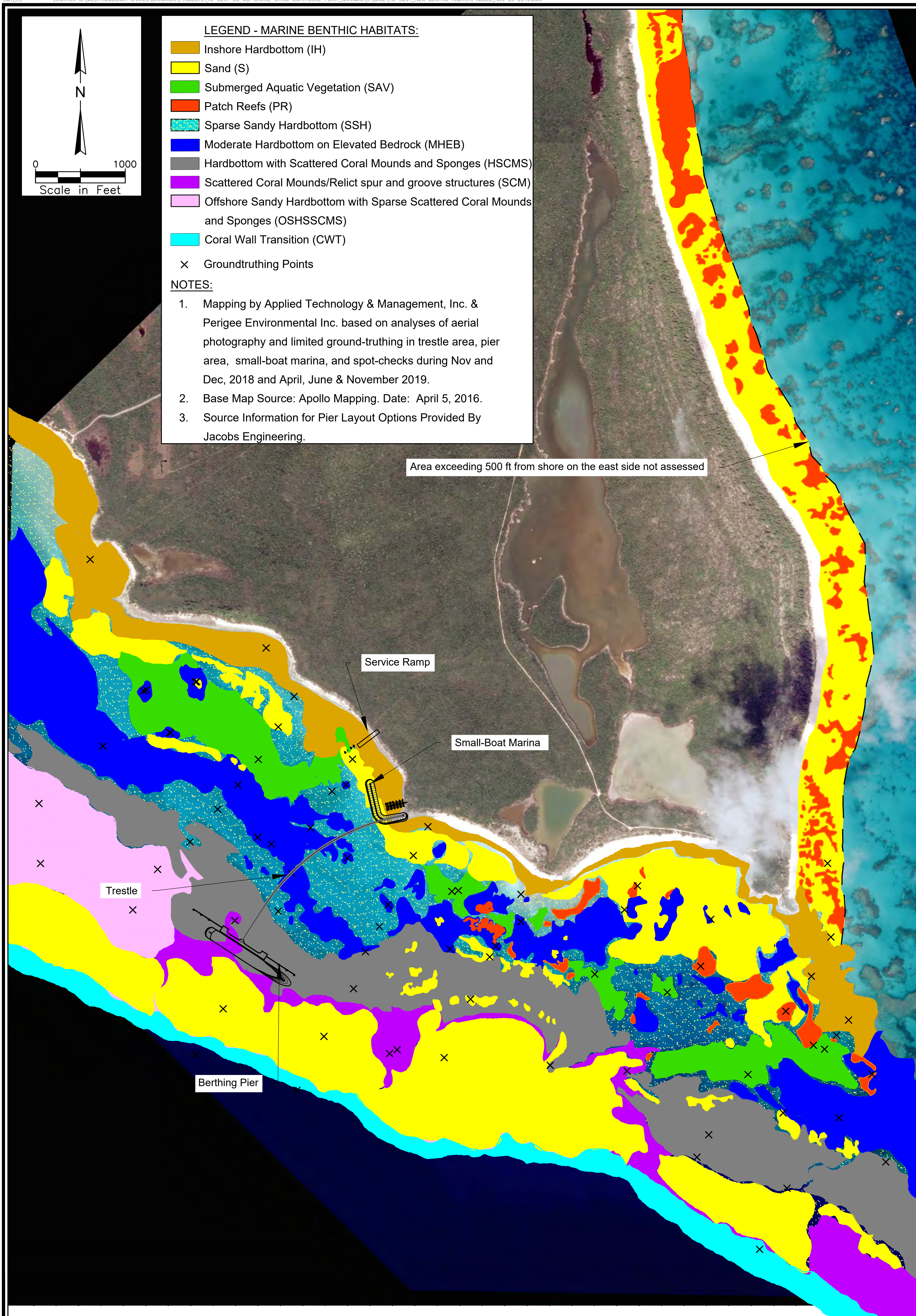

FIGURE 4-24
1:1000 MARINE BENTHIC HABITAT MAP
LIGHTHOUSE POINT, BAHAMAS
NOVEMBER 18, 2020

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CMYERS LOCATION G:\WESTPALMBEACH SHARES\DRAWINGS\PROJECTS\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\18-3297 BS WDI_FIG 3-2 FIG 4-23.DWG

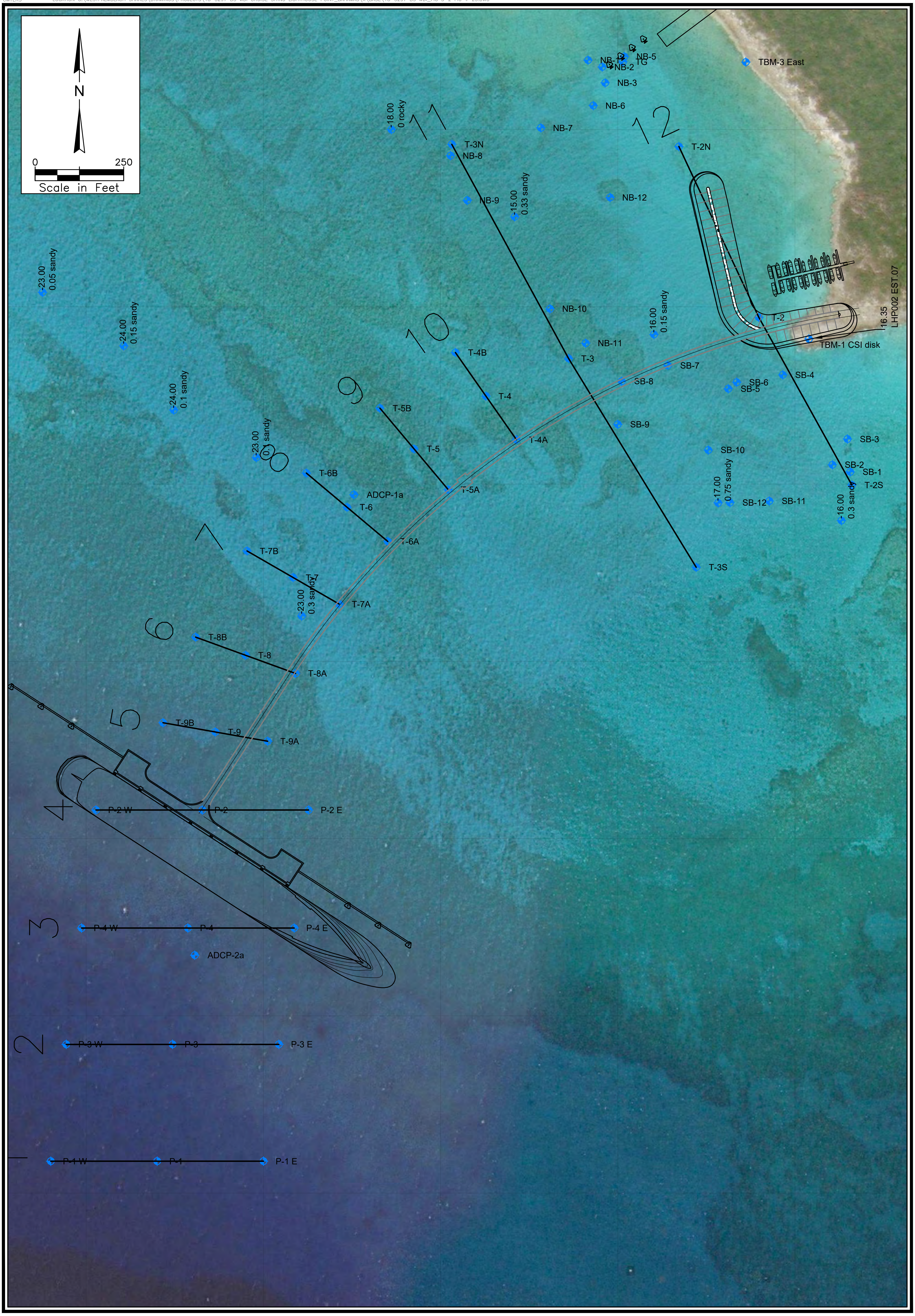

FIGURE 4-25
MARINE TRANSECTS OF PIER AREA
LIGHTHOUSE POINT, BAHAMAS
NOVEMBER 18, 2020

Data on habitat type, dominant species and notable species were recorded at plots spaced every 50 ft along the transects at which time photographs were also taken. The locations of additional underwater evaluation transects are shown on Figure 4-26.

The detailed quantitative counts of benthic stony corals and sponges were made along weighted benthic transects that were 10 meters in length. A total of 165 benthic transects were situated within the construction footprint of the trestle (86 transects); ship berthing pier (42 transects); small vessel marina (21 transects); and the service ramp (16 transects). Each 10-m long transect was laid on the bottom within 30' or 60' of the centerline of each of the development infrastructure depending on the proposed design width. For each transect, a 1-m x 1-m PVC quadrat was utilized to aid counting and measuring all stony coral colonies greater than four cm in diameter with colony boundaries of at least 50 percent or more within the quadrat. In addition, octocorals (gorgonians, sea rods, sea plumes) and barrel sponges (*Xestospongia muta*) were also counted on a subset of the transects to provide abundance estimates for selected sessile invertebrates.

Downward facing video was collected along the entire centerline of the trestle, pier, and service ramp and for the outer perimeter of the boat basin. All data were recorded on underwater paper and entered into a database. Spatial planar coverage of stony corals and barrel sponges within the impact areas was calculated using their maximum measured diameter by the formula:

$$\text{Colony Area (CA)} = \pi * (0.5L * 0.5W)$$

Where L = maximum diameter (cm) and W=width perpendicular to diameter.
For stony corals, the area of Live Coral Tissue Area (LCTA) was estimated from Colony Area factoring in any observed partial mortality as follows:

$$\mathrm{LCTA} = \mathrm{CA} \times \sum NDC + TM + OM\,/100$$

Where CA = Colony Area; NDC= % Newly Dead Coral, TM = % Transitional Coral Mortality, OM = % Old Coral Mortality.

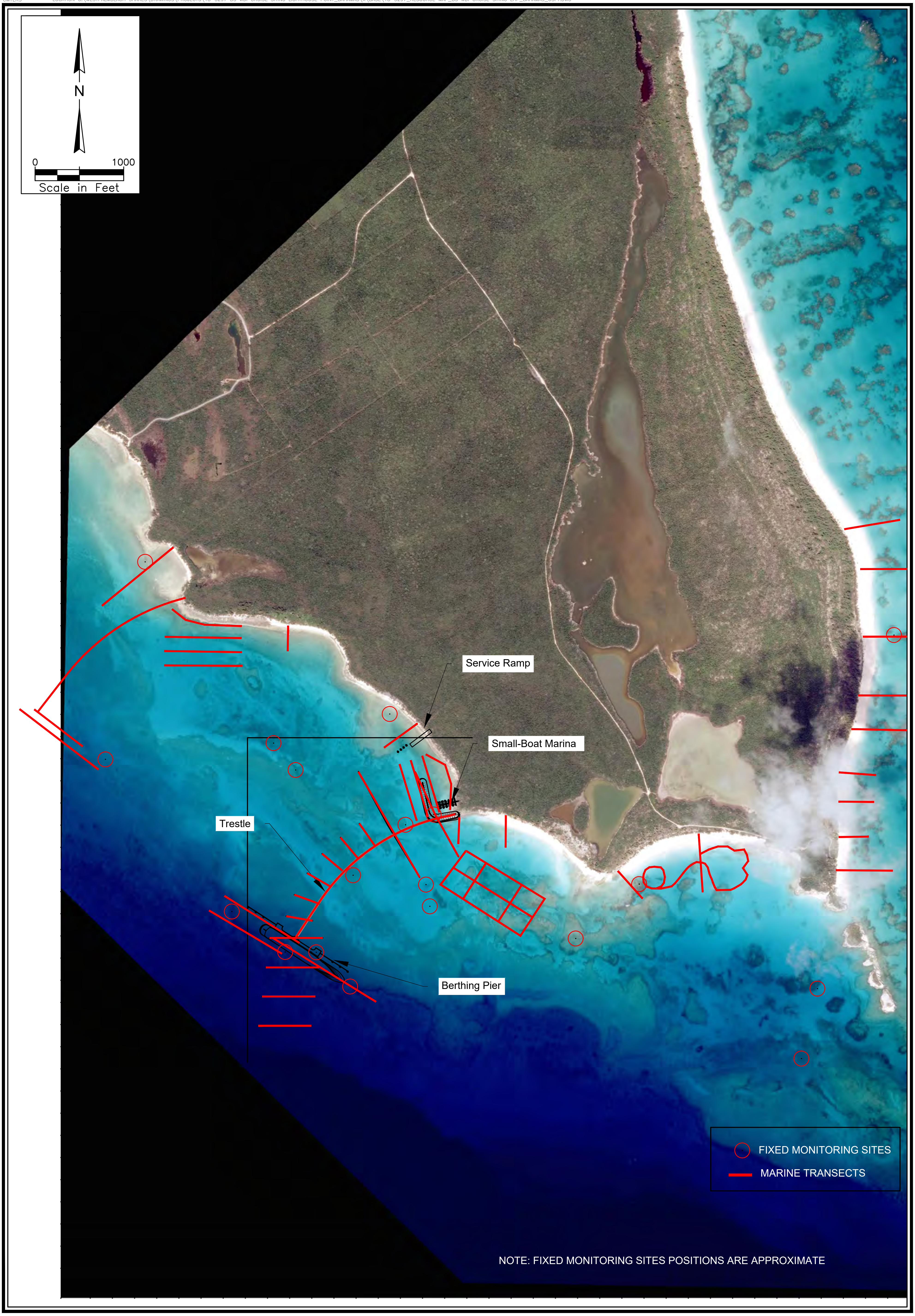

FIGURE 4-26
1:1000 MARINE TRANSECTS AND FIXED MONITORING SITES
LIGHTHOUSE POINT, BAHAMAS
NOVEMBER 18, 2020

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Additionally, to initially assist the planning team in determining suitable locations to allow swimming, snorkeling, and other water-based recreational pursuits, nearshore areas adjacent to portions of the west, south and east shorelines were also investigated. After beach use areas were selected as a result of these investigations, these observations also served to assist in identifying potential impacts to marine resources and development of measures to minimize adverse impacts and mitigate for unavoidable impacts. The results of these investigations are described in the following sub-sections.

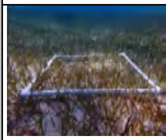
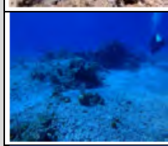
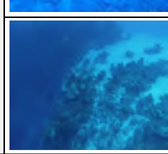
4.2.2.1 Benthic Cover Mapping & Characterization

Benthic communities were separated into the 11 major categories identified and described in the summary table (Table 4-11), with locations shown in Figures 4-27 and 4-28. Along the east-facing beaches, only the nearshore areas within 500 feet of shore were examined and mapped even though notable resources extend well offshore.

More attention was spent on the south and southwest facing areas where most of the Project infrastructure developments are proposed. Here the habitat types were more numerous because of differences in wave exposure, bedrock morphology, and sand availability going from inshore to offshore and from east to west. The more recognizable and distinctive benthic habitats found on the shelf are sand, submerged aquatic vegetation, patch reefs, and hardbottom communities often referred to as gorgonian plains. Hardbottom habitats are the most extensive habitat type and displayed small, yet important differences in their morphology, benthic community composition, and ecosystem services and were thus subdivided into five subtypes going from inshore to offshore (Hardbottom subtypes 1-5).

Of the 11 habitats, Inshore Hardbottom (IH) and Patch Reefs (PR) support the greatest ecosystem functions and biodiversity. The outer limits of the habitat characterization extended to the shelf break at a depth of over one hundred feet and to the northwest beyond the northern limits of the Project. Detailed characterizations were concentrated on the nearshore areas and offshore habitat types that were closest to the proposed infrastructure.

Table 4-11. Summary of Lighthouse Point Marine Habitats

Summary of Lighthouse Point Marine Habitats			
Within project area	Soft bottom		**Sand (S):** Sand habitat, mostly barren, but some with sparse macroalgae or seagrass. Mid-shelf areas have thin veneer of sand (<5 cm thick) with pockets of deeper sand (>3 m). Found mainly in nearshore and mid-shelf areas on the east and the south side of island in 0-6 m of water. A deeper sand zone (18-30 m), stabilized by macroalgae, occurs offshore on the south side. Stony coral cover was 0%.
			**Submerged Aquatic Vegetation (SAV):** Seagrass beds dominated by turtle grass, mixed with sparse manatee grass and shoal grass. Patch sizes vary, ranging 1-10 hectares, with sparse to dense seagrass densities. Located in 2-8 m of water along the south and southeast areas of the project, but inshore patches also occur along the east side beaches. Stony coral cover was <1%.
	Hardbottom		**Hardbottom Subtype 1- Inshore Hardbottom (IH):** Shallow rocky hardbottom area at land-sea interface comprised of submerged bed rock often covered by a veneer of sand and sparse corals (starlet, rose, and maze coral) and macroalgae (*Sargassum*). Abundant crustose coralline algae, fire coral, and sea urchins occur on hardbottom near rocky promontories. Found in 0-3 m water, along south and western facing shore and rarely along the eastern beach-dominated shoreline. Stony coral cover was 0-2%.
			**Hardbottom Subtype 2 - Sparse Sandy Hardbottom (SSH):** Smooth, flat hardbottom areas covered with thin mobile layers of sand with sparse algae, octocorals, sponges and stony corals. Shifting sand often smothers corals and sponges. Located in 2-8 m water along the south and northwest coasts of the project area, with increasing extent from southeast to northwest. Stony coral cover was low (<1%).
			**Hardbottom Subtype 3- Moderate Hardbottom on Elevated Bedrock (MHEB):** Higher relief bedrock areas with karst features (e.g., holes, cracks, cavities) colonized by algae, gorgonians, sea rods and stony corals. This hardbottom occurs in 2-8 m water, mainly along the south and southwest coasts of the project area. Stony coral cover was 1-2%.
			**Hardbottom Subtype 4- Hardbottom with Scattered Coral Mounds and Sponges (HSCMS):** A band of hardbottom extending parallel to the shoreline along a break in the shelf slope in 8-15 m water depth. Fairly strong (0.2 m/sec) currents prevail. Generally flat, with abundant sponges, octocorals, and scattered, mostly dead, coral mounds. These are found along the southwest portion of the project area increasing in extent to the northwest. Stony coral cover was 2-3%.
Outside project area			**Hardbottom Subtype 5 - Offshore Hardbottom with Sparse Scattered Coral Mounds and Sponges (OSHSSCMS):** Offshore low relief, sandy hardbottom with sparse sponges and octocorals and only occasional outcroppings (patches) of mostly dead relict coral mounds (~1-3 m in diameter). Similar to hardbottom subtypes 3 and 4, but lower relief and fewer corals or sponges. These occur in 8-18 m mostly to the north and west of the proposed project. Stony coral cover was <1%.
	Reef		**Patch Reefs (PR):** Isolated or winding high relief reef outcrops surrounded by sand. Structures are built by numerous massive (star) and branching (elkhorn) corals often rising to sea level and covered with gorgonians. Patch reefs are found in 1-6 m water along the entire east-facing shoreline and some in the southeast areas of the project. Stony coral cover averaged 10%.
			**Fore Reefs (FR):** Extensive stony coral growth is found along the east facing shelf of Eleuthera occurring along mid-shelf to offshore shelf slopes (8 to 15 m water depth). Reefs have high structural relief (up to 5 meters) and are dominated by massive stony corals (star corals), abundant gorgonians, and some sponges. Located outside of the direct impact area of the project. Stony coral cover was ~10%.
Within project			**Scattered Coral Mounds/relict spur and groove structures (SCM):** Offshore, deeper carbonate reef structures oriented perpendicular to the dominant wave direction. Mostly dead, relict spur and groove features with moderate relief (up to 3 m) dominated by large sponges and octocorals, and sparse small stony corals. These mounds are found along the south and southwest coast at the base of the mid-shelf slope break in 14-16 m of water. Stony coral cover was 2-3%.
Outside project			**Coral Wall Transition (CWT):** Narrow coral reef outcropping at the outer shelf break, dominated by large star corals and platy corals. Corals occur at the outcrop edge in deep water (30 m), then wall drops to depths greater than 80 m. These are located near the southside of the island and continue along the northwest Eleuthera shelf edge. Stony coral cover ranged 10-15%.

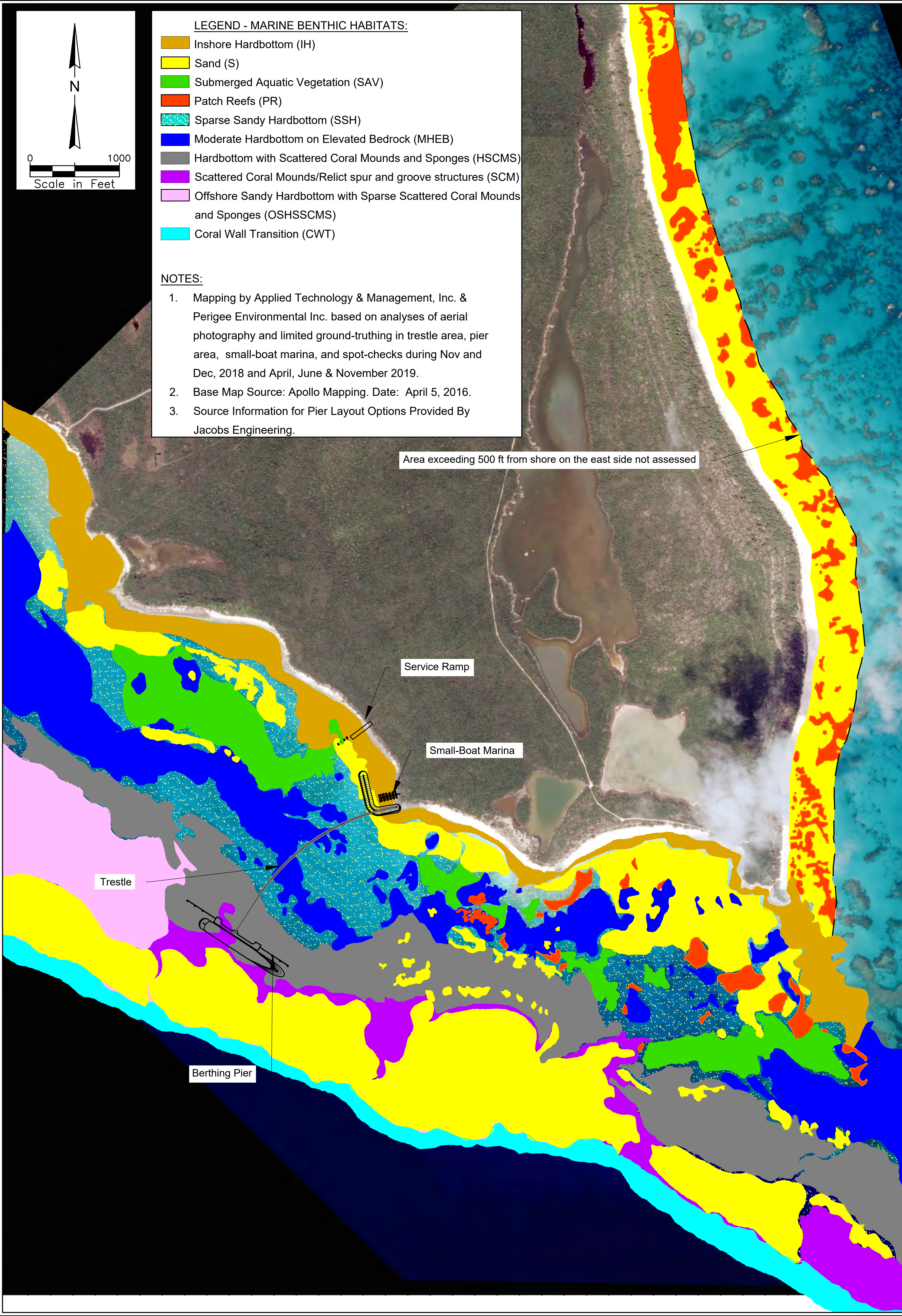


FIGURE 4-27
1:1000 MARINE BENTHIC HABITATS OVERVIEW
LIGHTHOUSE POINT, BAHAMAS
NOVEMBER 18, 2020

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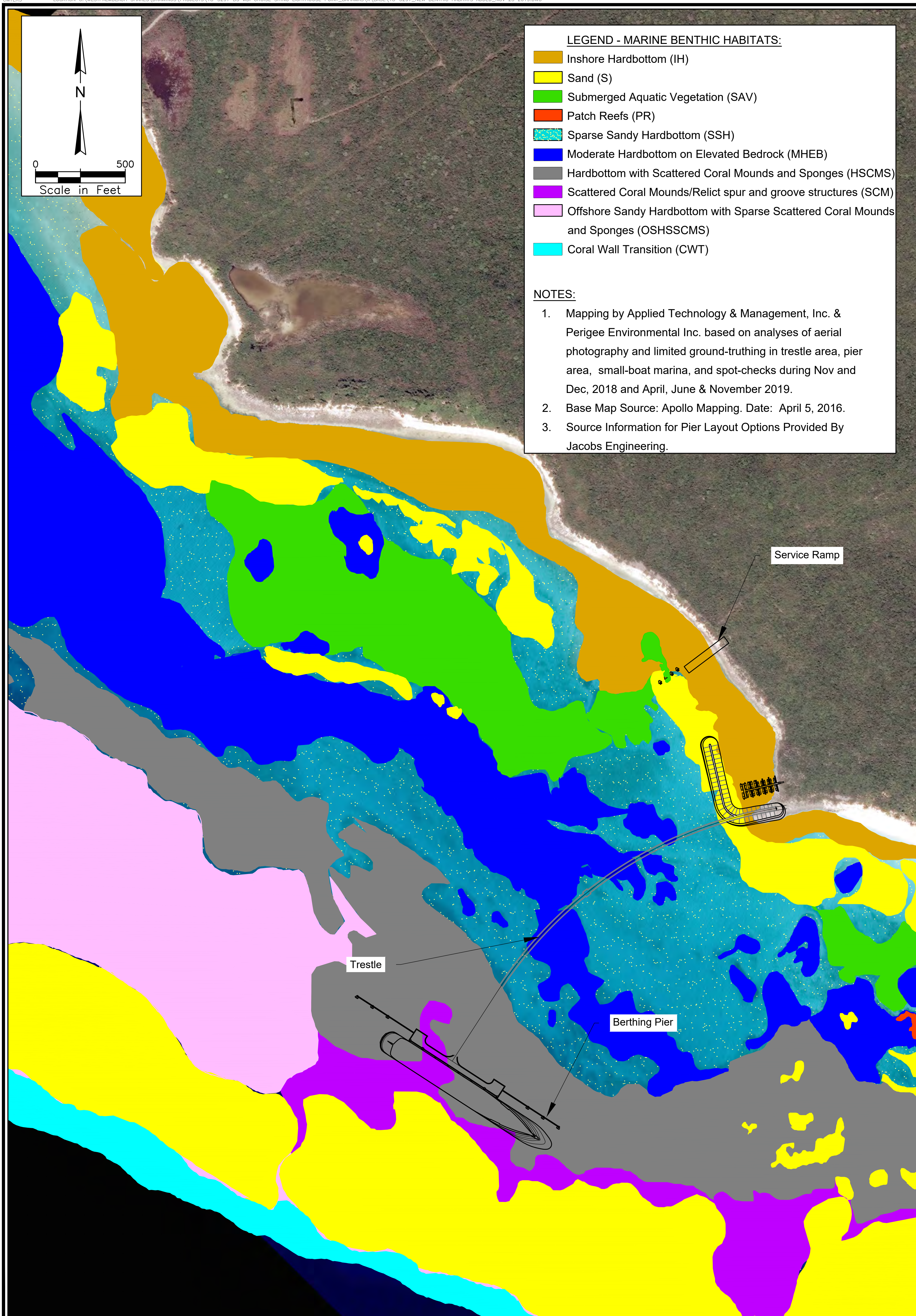

FIGURE 4-28
1:500 MARINE BENTHIC HABITATS. WESTERN SIDE OF ISLAND
LIGHTHOUSE POINT, BAHAMAS
NOVEMBER 18, 2020

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Habitat characterization surveys of the benthos and fish were primarily focused on habitats with hardbottom or reef that would be influenced in the area of the proposed development. Sand (S), Dense Submerged Aquatic Vegetation (SAV), and the Hardbottom with Sparse Scattered Coral Mounds and Sponges (OSHSSCMS) found primarily north of the proposed development were not subject to detailed benthic or fish surveys, nor was the Coral Wall Transition (CWT) and east-facing mixed fore reef (FR), which occur outside the primary Project area. Hardbottom habitat along the south and west shelf areas of the Lighthouse Point (LHP) area were extensive and varied. These coral communities were found on limestone rock often covered by a thin layer of sand and were typically dominated by gorgonians, algae, sponges, and non-reef building stony coral species. The lower diversity and abundance of stony corals associated with hardbottom habitats prevents substantial carbonate accretion. Hardbottom habitats have lower overall productivity than high-relief coral reef habitats and their limestone substrates are often thousands or hundreds of thousands of years old. The hardbottom habitats in the LHP area are thought to be resting primarily on the Pleistocene-aged oolitic aeolianite that underlies much of Eleuthera.

A species list of flora and fauna observed during marine assessments at the site is provided in Appendix C.

The following habitat descriptions are organized by habitats located inshore to offshore within the Project area. Other habitats outside the Project area are described at the end.

1. Hardbottom Subtype 1 – Inshore Hardbottom (IH)

Inshore Hardbottom is found along shorelines in shallow water that experiences breaking waves much of the time, which results in a distinctly different benthic community compared to other hardbottom habitats further offshore. IH occurs along the south and western facing shorelines but not along the east-facing sandy beaches, which lack shallow limestone bedrock. Abundant shifting sand from beaches creates fairly turbid dynamic conditions for sessile invertebrates and potential burial following large storm events. On the south and west coasts of the Project site, IH is most diverse and complex around the rocky headlands or points along the shoreline and can extend up to 300 feet from shore in places. Sand is more prevalent in coves between the rocky headlands with decreasing amounts along the coast to the northwest. Water depths typically range from 0.5-3 m (1-9 ft) with an average of 1 m (3 ft). Structural vertical relief, averaging 15 cm (6 inches) mainly comes from karst features (e.g., holes, cavities, cracks) enhanced by urchin erosion. Breaking waves across the inshore hardbottom communities give rise to abundant crustose coralline algae – primarily *Negoniolithon strictum* and *Hydrolithon farinosum* – that can locally cover up to 50 percent of the substrate particularly around rocky shoreline points (Photo 4-21).

Photo 4-21. Inshore Hardbottom with Abundant Crustose Coralline Algae (*Neogoniolithon strictum* and *Hydrolithon farinosum*), Blade Fire Coral (*Millepora complanata*) and Sea Urchins (*Diadema antillarum* and *Echinometra lucunter*)

The design intent is that the inshore hardbottom area associated with the marina will not require any dredging or shoreline modification. If this changes, it will be addressed as a supplement to the EIA for review and approval by DEPP.

Total live stony coral cover in this benthic community was generally less than 1 percent and limited to a few species that include rose coral (*Manicina areolata*), knobby brain coral (*Pseudodiploria clivosa*) along with the more commonly ubiquitous starlet corals (*Siderastrea siderea* and *Siderastrea radians*) and mustard hill coral (*Porites astreoides*).

Fire coral (*Millepora complanata*) also occurred on the more elevated, higher relief areas where there is less sand movement.

Macroalgal species included wave tolerant Sargassums (*Sargassum platycarpum* and *S. pteropleuron*) which reached heights of one foot or more. Numerous red fleshy macroalgae species occurred in these inshore areas (Photo 4-22), often colonizing recently exposed flat rocky areas, including *Liagora dendroidea, Chondria* spp, *Acanthophora spicifica, Digenea simplex* and *Padina* spp. Green fleshy macroalgae were also common including several *Halimeda* species, *Rhipocephalus phoenix*, and *Udotea* species, which were intermixed with occasional seagrass within the more sheltered coves.

Photo 4-22. Inshore Hardbottom (A6) with Abundant Brown Macroalgae (*Sargassum* spp.)

Sessile invertebrates included large flat sponges (*Cliona caribbaea*), and smaller sponges such as (*Erylus formosus*). Few, if any, octocorals were found in this nearshore habitat, presumably due to intermittently high wave energy and resulting naturally-occurring elevated turbidity. Motile invertebrates occurred in large numbers around exposed bedrock including the long-spined black urchin (*Diadema antillarum)* and the red rock urchin (*Echinometra lucunter*), with measured average densities of 0.02 and 1.17 individuals per meter square, respectively. The shallow protected nature of the inshore hardbottom habitat allows it to serve as a nursery ground for many fish and invertebrates. Helmet conch (*Cassis tuberosa)* and queen conch (*Strombus gigas*) also occurred in small quantities based on the presence of empty shells, although no live juveniles were encountered during surveys, suggesting the area does not serve as a significant nursery at this time.

These inshore habitats contained overall low numbers of fish (average total fish density of 23 per 100 m^2), when compared to other hardbottom or reef habitats and areas. Dominant fish included small wrasses such as yellow heads (*Halichoeres garnoti*) and slippery dicks (*Halichoeres bivittus*), juvenile blue tang (*Acanthurus coeruleus*) and ocean surgeon (*Acanthurus tractus*). Several species of parrotfishes [e.g., striped – *Scarus iseri*, redband-*Sparisoma aurofrenatum*)] and grunts (French – *Haemulon flavolineatum*) also utilize this habitat.

Moderate evidence of human-derived trash and debris were encountered in this habitat.

2. Sand (S)

Sand habitat consisted of extensive areas of coarse, unconsolidated sand (~>5 inches or more deep). Areas of mostly barren sand (Photo 4-23) were identified in polygons of varying sizes mostly in nearshore areas on the east, south and west regions of the assessment area. An area of offshore sand was also mapped on the outer shelf on the west side in water depths ranging from 60 feet (18 m) out to the shelf coral wall at 100 ft (~30 m).

Substrate probe results suggest that inshore areas were sand accumulations of varying depths overlaying the bedrock substrate. In most areas, substrate probes indicated that only a thin veneer of sand was present (often less than two inches (5 cm) in thickness), but isolated pockets of deeper sand did occur. One sand-infilled karst sinkhole was probed and found to have in excess of five feet of sand (limit of probe length). The offshore sand beds were also found to be thicker than five feet (1.5 m) where it was probed. Because the substrate mapping was primarily performed through analysis of aerial photography, some zones mapped as sand may include areas with sparse SAV.

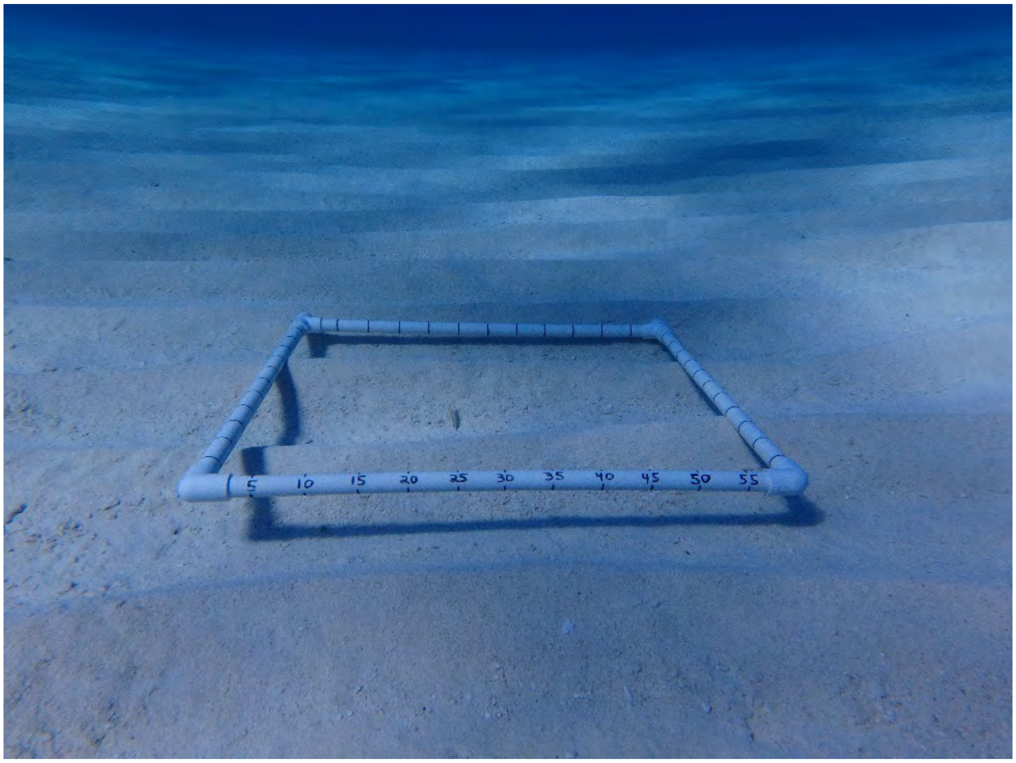


Photo 4-23. Barren Sand (S)

Some movement of sand likely occurs in near-shore areas as a result of waves and currents and the passing of hurricanes and other storms. SAV, which included both seagrasses and macroalgae, may become established on barren sand or underlying rock, and then intermittently exposed or buried due to shifting sands. Offshore sand bodies that were below the wave base appeared to be more stable and likely do not shift. They were further stabilized by sparse green macroalgae (e.g., *Udotea, Rhipocephalus, Penicillus, Halimeda*) and cyanobacterial films.

Areas of barren sand typically had few fish and other marine organisms compared to hardbottom habitats or reefs, but can be important habitat for some species, including sand dollars (*Leodia sexiesperforata*), which were encountered in the nearshore areas off the east beach, bivalves, including sunrise tellins (*Tellina radiata*), mantis shrimp (Squillidae) and some species of fish, including rays, razorfish and tilefish. Low relief mounds in the offshore sand bodies also indicated the likely presence of burrowing invertebrates, such as *callianassid* shrimp.

No evidence of dredging, prop dredging, propeller scars, debris or other human-related or natural impacts were observed in the sand-bottom areas that were inspected.

3. Dense Submerged Aquatic Vegetation (SAV)

Dense beds of SAV were identified on high-resolution aerial photographs and spot-checked during the marine investigations. The most significant seagrass beds occurred primarily on the south-facing and southwest-facing portions of the Project area in moderately protected areas of the shelf within 150 to 250 yards of shore in water depths of 12 to 25 feet. Some of these SAV areas were dominated by moderate densities of primarily turtle grass (*Thalassia testudinum*) (Photo 4-24).

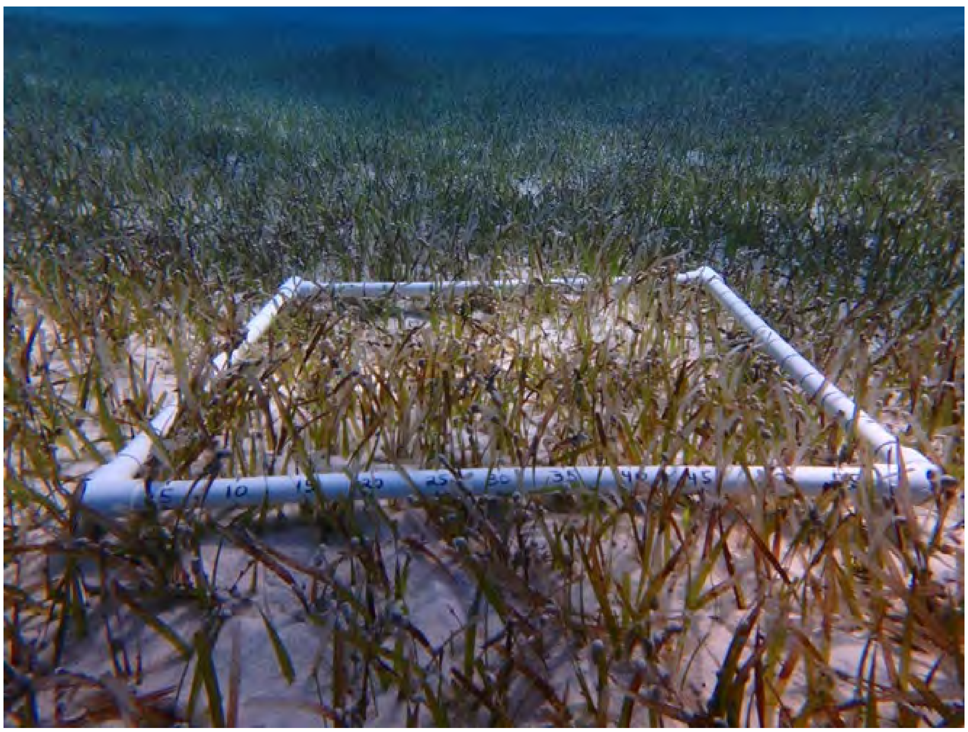


Photo 4-24. Dense Submerged Aquatic Vegetation

The sizes of SAV patches was variable, ranging from 2-25 acres (1-10 hectares). *Thalassia* blades were typically narrow and short, showing evidence of grazing thought to be from juvenile green turtles, some of which were observed in the area. Blades did not display unnaturally high levels of cyanobacterial coatings, epi-benthic growth or diseases.

Manatee grass (*Syringodium filiforme*) and/or shoal grass (*Halodule wrightii*) were also found in low and patchy amounts on the east, south and west sides of the assessment area particularly in near-shore waters, and sometimes interspersed with turtle grass (*Thalassia*). In some areas, seagrasses were intermixed with several types of macroalgae including brown algae (Phaeophyta), red algae (Rhodophyta) and green algae (Chlorophyta). Common species included *Acetabularia calicus*, *Penicillus* spp., *Batophora oerstedii*, *Halimeda* spp, *Laurencia*, *Rhipocephalus phoenix*, and *Sargassum* spp. In some SAV areas, seagrasses were absent, and fleshy and/or calcareous macroalgae were present in varying abundances.

Seagrasses and SAV are well-documented for the ecological functions and services they provide, including habitat for marine life, including fish and shellfish that are important recreationally and economically. In addition to providing lifetime habitat for some species, they are also important nursery areas for juvenile fishes, including reef species that move to seagrass beds as they mature. Rooted SAV also helps to stabilize sandy sediments, thereby protecting shorelines from wind-induced and/or wave-induced erosion and they sequester carbon.

No evidence of dredging, prop dredging, propeller scars, debris or other human-related or natural impacts were observed in the SAV beds that were inspected.

4. Patch Reefs (PR)

Patch reefs are stony coral dominated high relief structures that are some of the most diverse and productive habitats. Patch reefs were observed outside of the development footprint. Patch reefs can be isolated and/or coalesced reef structures elevated above the surrounding sea floor and often are independent of a larger reef system. Built on the remains of dead coral skeletons that accumulate over time, they are distinctly different than the more extensive hardbottom coral habitats of the south and west coast areas of the LHP site. Patch reef habitat contains abundant large reef-building corals (e.g., *Acropora* and *Orbicella*), which allow for vertical growth above the bedrock and have the ability to keep up with rising sea levels over time. They occur in abundance along the nearshore areas off the east facing beaches rising 10 to 20 feet off the flat sandy bottom with overall structural relief in excess of 40 inches (100 cm) (Photo 4-25). Along the south and west facing areas of the Site, they were found to occur in a more limited distribution mainly between Bottle Bay

Beach and Lighthouse Bay Beach and west of the small rocky islets that extend toward the south from the lighthouse. Patch reef habitat was not observed along much of the west coast of Eleuthera, only appearing again about five miles north of the LHP site, where the shelf edge turns to the west and is a popular dive and snorkel location for tour excursions. During the assessment of marine resources in the LHP area, the team surveyed one of the inshore patch reefs (E1) with the AGRRA methodology (see Appendix D for location map).

Photo 4-25. Patch Reef Habitat in Shallow Water (1 to 2 m) near Lighthouse Beach with Abundant Mustard Hill Coral (*Porites astreoides*), Blade Fire Coral (*Millepora complanata*) and Crustose Coralline Algae

Patch reef habitat can extend close to the shore in places where it may be nearly exposed at low tides. Along the east side and within Lighthouse Bay Beach, seasonal changes in the position of the adjacent beach appears to have caused shifting sand and exposed these innermost patch reefs to high levels of suspended sediment, particularly during periods of onshore winds and waves. Massive colonies of elkhorn coral (*Acropora palmata)* several feet in diameter were found upturned and dead in these inshore areas likely due to the wave energy periodically experienced in these areas. Shifting sands apparently limit the establishment and long-term survival of corals and sponges particularly on lower relief patches close to shore. Coral growth was best developed around the seaward edges of patch reefs, where waves break over them and amounts of resuspended beach sediment are reduced. Floral and faunal diversity increased substantially with the distance from shore, up to about 100 feet (~30.5 m) after which it became more variable.

Colonies of elkhorn coral, staghorn coral (*A. cervicornis*) and fused staghorn coral (*A. prolifera*) were observed on several of the patch reefs off both the east and south facing shorelines (Figure 4-29). Both live and dead elkhorn coral provide important structural habitat for other organisms and reduce wave energy. Several of the large patch reefs along the SE portion of the south facing shelf were dominated by large framework *Orbicella* corals (*O. faveolata, O. annularis*) and tended to be in deeper water depths of up to 20 feet (~6.1 m) (Photo 4-26). Blade fire coral (*Millepora complanata*), mustard hill coral (*Porites astreoides*) and brain coral (*Pseudodiploria strigosa)* were also abundant on all patch reef habitat. Numerous sea fans (*Gorgonia flabellum, Gorgonia ventalina*) along with other octocorals and occasional encrusting/burrowing sponges (*Cliona caribbaea*) were common.

Photo 4-26. Patch Reef Habitat in Deeper Water (3 to 6 m) South of Lighthouse Point Dominated by Mountainous Star Coral (*Orbicella faveolata*)

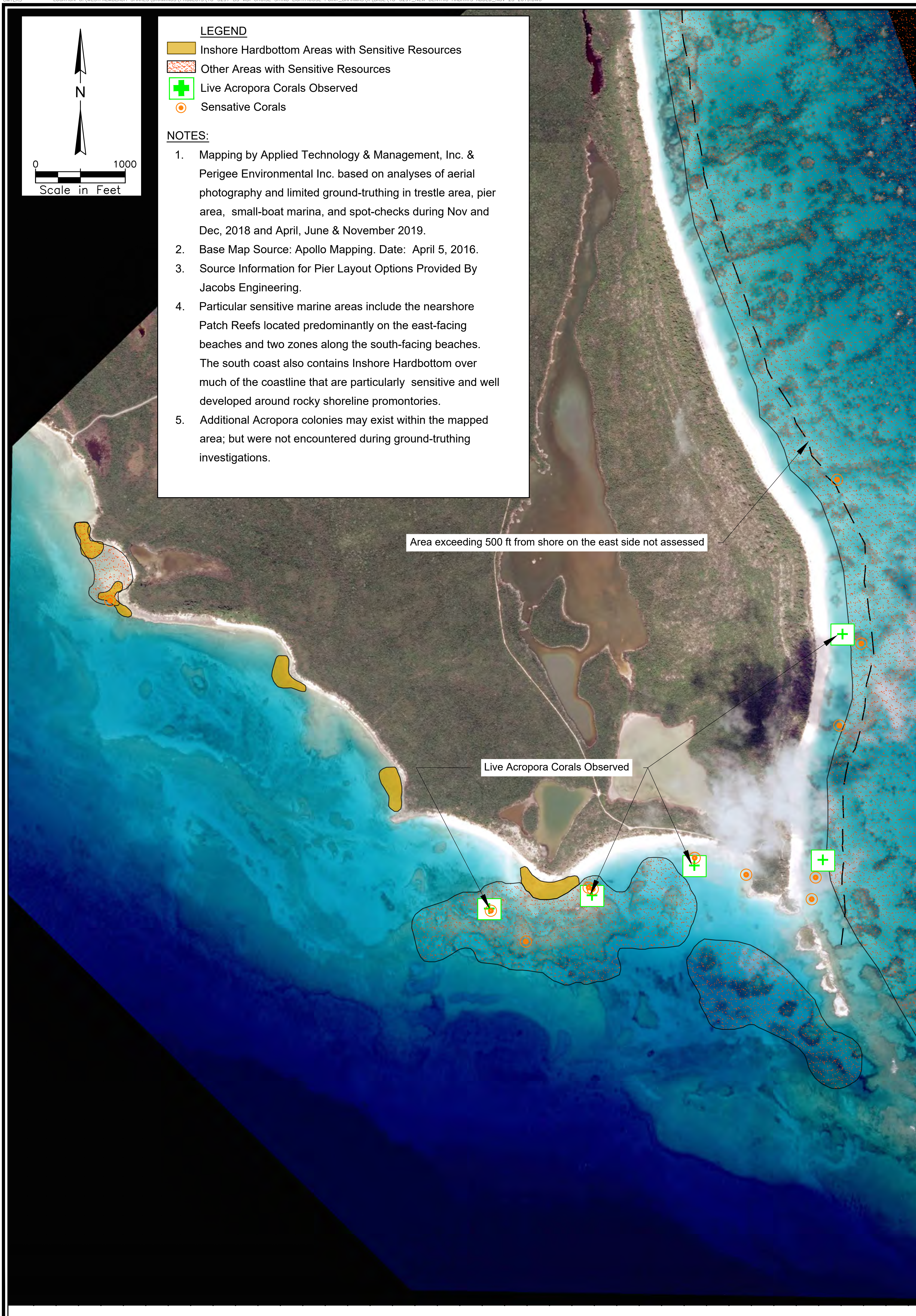


FIGURE 4-29
1:1000 NOTABLE MARINE FEATURES
LIGHTHOUSE POINT, BAHAMAS
NOVEMBER 11, 2020

ATM

Live stony coral cover was highly variable, averaging about 10 percent, with more live coral growth around the seaward edges and less on the landward sides. Macroalgae were commonly present ranging in abundance from 10 percent to greater than 30 percent. Some of the more common fleshy macroalgal species observed included blistered saucer leaf (*Turbinaria turbinata*), fluffy ruffle algae (*Lobophora variegata*), scroll algae (*Padina jamaicensis*) and several species of y-branched algae (*Dictyota* spp.). Dead coral surfaces were covered with turf algae and crustose coralline algae, which facilitate coral recruitment.

At Lighthouse Point, marine life was the most abundant associated with patch reefs. Fish were abundant in these patches. Spiny lobster (*Panulirus argus*), long-spined urchins and other invertebrates were observed utilizing the numerous internal cavities within the coral framework. Parrotfish species were abundant and included stoplight (*Sparisoma viride*), princess (*Scarus taeniopterus*), rainbow (*Scarus guacamaia*), queen (*Scarus vetula*), redtail (*Sparisoma chrysopterum)* along with smaller species such as striped (*Scarus iseri*). Other herbivorous fish included large schools of adult blue tangs (*Acanthurus coeruleus*) mixed with doctorfish (*Acanthurus chirugus*) and ocean surgeonfish (*Acanthurus tractus*). Commercially important snapper, grunts, and groupers were also abundant on these patch reefs, and were more numerous than in any of the other benthic habitats present at LHP. Snapper species observed included large schools of mahogany (*Lutjanus mahogoni*), lane (*Lutjanus synagris*), gray (*Lutjanus griseus*), and schoolmaster (*Lutjanus apodos*). Grouper species observed included large black (*Mycteroperca bonaci*), tiger (*Mycteroperca tigris*), yellowfin (*Mycteoperca venenosa*), Nassau (*Epinephelus striatus*), graysby (*Cephalopholis cruentata*), coney (*Cephalopholis fulva*) and red hind (*Epinephelus guttatus*). Overall fish density based on AGRRA methodology for Site E1, which is thought to be representative of this type of habitat, averaged 58.7 fish per 100 m^2 with an average biomass of 15,234 grams per 100 m^2. These were the highest observed across the LHP site and are similar to other coral reefs in Eleuthera and The Bahamas based on comparisons of other sites included in the AGRRA database.

These patch reef habitats had evidence of fishing lines, nets and plastic entangled on the reef structure, particularly on the east side. Fiberglass and wood debris from wrecked boats were found on both the south and east patch reef areas. Patch reefs displayed minimal levels of coral bleaching and appeared to provide numerous essential ecosystem services at LHP, including three-dimensional structural habitat, shelter for a higher abundance of marine life, essential fish habitat for commercial fisheries species including lobster, snapper and grouper, wave reduction and higher coastal protection. Additionally, they have high natural beauty, which is important for tourism and recreation. On the east-facing shorelines, patch reef habitats contribute to the pink sands that have made these beaches world-renowned. Due to their comparatively easy accessibility, nearshore patch reefs appear to be natural attractants for snorkelers and SCUBA divers, particularly on calm days when the water is clear and marine life easily visible. Best management practices can be adopted to prevent damage to these features (see Section 7, Proposed Mitigation Measures, and the EMP, when it is completed).

5. Hardbottom Subtype 2 – Sparse Sandy Hardbottom (SSH) – (Sparse Corals)

Sparse Sandy Hardbottom habitats were mapped in low-relief hardbottom areas that were covered with thin layers of sand and algae, with sparse octocorals, sponges and stony corals. Much of the shelf area in water depths of 7-25 feet (~2-8 m) along the south and west regions of the LHP assessment area have been characterized as Sparse Sandy Hardbottom. Photo 4-27 is representative of this marine community. The underlying substrate was oolitic bedrock, which was generally flat with very low relief [averaging 5 inches (13 cm)] and often covered by a veneer of sand up to one inch (~3 cm) thick. Relief was mainly associated with small scale bedrock karst features, but several areas had unattached dead coral mounds that were likely broken off from adjacent, higher-relief coral reef habitats and transported during large storms. The thin veneer of sand over the hardbottom, has apparently washed back and forth across the substrate during storms and has likely inhibited the establishment and long-term survival of most corals and other sessile invertebrates.

Substrate cover was mostly turf algal sand mats (>95 percent) intermixed with sandy mats of fleshy green macroalgae (e.g., *Microdictyon spp., Cladophora spp.*). In some transitional areas with enough sand, there were also occurrences of calcareous green macroalgae (e.g., *Halimeda spp., Penicillus spp., Rhipocephalus phoenix*) and occasionally, some sparse seagrass cover. Overall, stony coral cover in this community was the lowest encountered on non-sand substrates (~<1 percent).

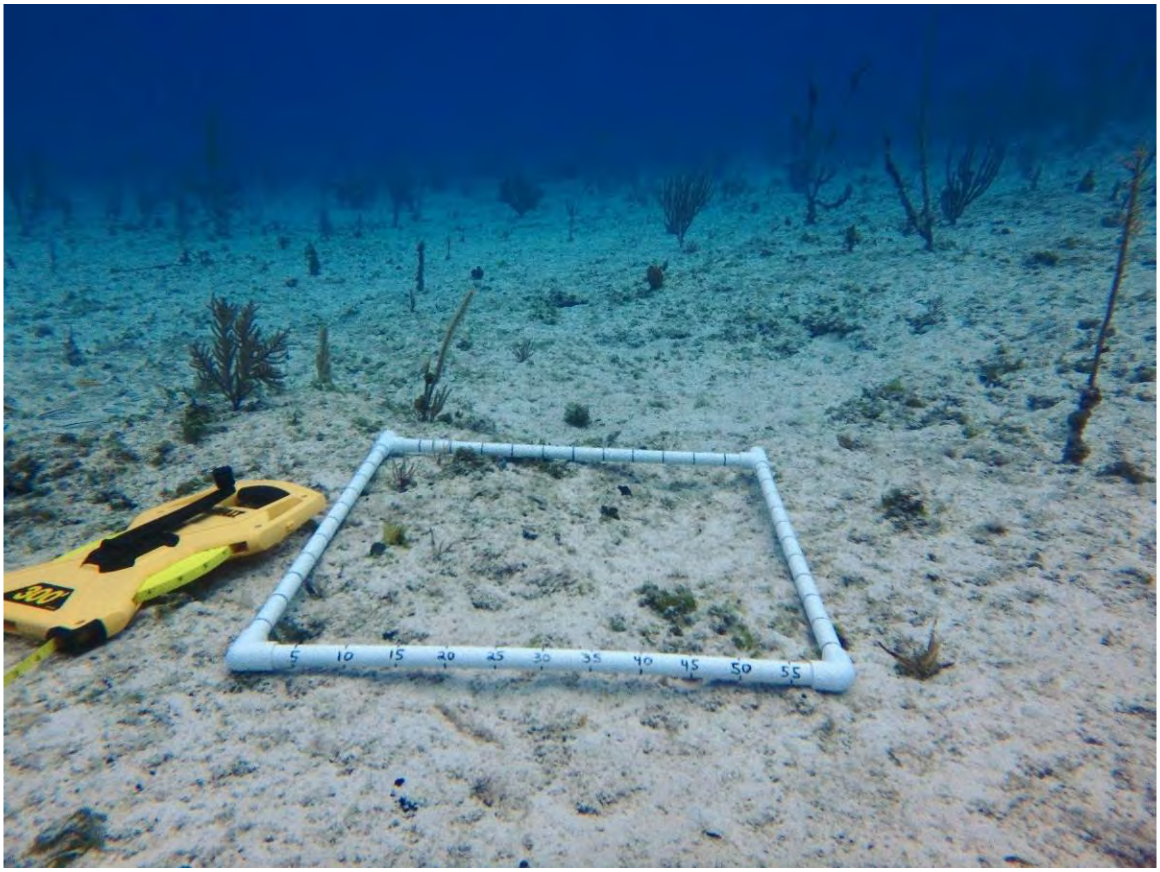


Photo 4-27. Sparse Sandy Hardbottom (SSH) (Sparse Corals)

Where the bedrock had apparently been exposed for longer durations, sparse coral communities have become established. Most corals found here were high-recruiting, fast growing and low-relief species such as star (*Siderastrea siderea, S. radians*), lettuce (*Agaricia agaricites*), mustard hill (*Porites astreoides*), and finger (*Porites porites*) corals, along with occasional colonies of elliptical star (*Dichocoenia stokesii)* and brain (*Pseudodiploria strigosa*) corals. Octocorals were scattered throughout at low abundances and included sea rods (*Eunicea* sp.), sea fans (*Gorgonia ventalina*), sea whips (*Pterogorgia citrina*), and sea plumes (*Pseudopterogorgia* spp.). Many of the larger specimens were dead, with their branches colonized by encrusting fire coral (*Millepora alcicornis*). Sponges were not abundant but were present in low numbers.

Sparse sandy hardbottom areas provide little three-dimensional structural relief but are habitat for queen conch (*Strombus gigas*). Habitat characterization surveys using AGRRA and diver tows across areas representative of this community did not encounter queen conch, cushion sea stars (*Oreaster reticulatus*), or other motile invertebrates of significance (e.g., sea cucumbers, lobsters, long-spined urchins). Fish abundances were also very low, with densities averaging about 15 fish per 100 m^2, and biomasses averaging 853 grams per 100 m^2. The most common fish species observed were small wrasses including yellowhead (*Halichoeres garnoti*), slippery dick (*H. bivittatus*), and bluehead (*Thalassoma bifasciatum*), along with occasional blue tangs (*Acanthus caeruleus*) and ocean surgeons (*Acanthurus bahianus*). Solitary individuals of white grunts (*Haemulon plumierii*) and saucereye porgie (*Calamus calamus*) were seen along with yellowtail snapper (*Ocyurus chrysurus*) and great barracuda (*Sphyraena barracuda*). No grouper or lobster were observed in this habitat type, which is not surprising given the lack of any sizeable structure for them to hide.

The ecosystem services provided by SSH are lower for fisheries and coastal protection than most of the other benthic communities.

No evidence of human-related damage (e.g., anchoring, dredging, trash/debris) were encountered in this habitat.

6. Hardbottom Subtype 3 – Moderate Hardbottom on Elevated Bedrock (MHEB)

Moderate Hardbottom on Elevated Bedrock habitat is found principally along the south coast shelf in water depths ranging from 8 to 25 feet (2.5-8 m). It differs from Sparse Sandy Hardbottom (SSH) in that it has greater structural relief and higher abundance of flora and fauna. This habitat is characterized as being places where the oolitic bedrock rises up several feet (~0.5 m) or more above the surrounding lower relief areas. The elevated nature of these areas reduces the harmful impacts caused by shifting sands to colonizing invertebrates allowing for more abundant and larger growth but not in sufficient enough quantities to build coral framework as found in Patch Reefs (PR). These bedrock areas featured moderately low relief averaging 18 inches (44 cm). They may also display karst features and substantial fracturing presumably caused by massive ocean waves breaking up the bedrock during large storm events (Photo 4-28). Considerable quantities of these fractured slabs are piled up along the rocky shorelines NW of the headland between Lighthouse Bay Beach and Bottle Bay Beach, suggesting that massive waves can affect this portion of the shelf.

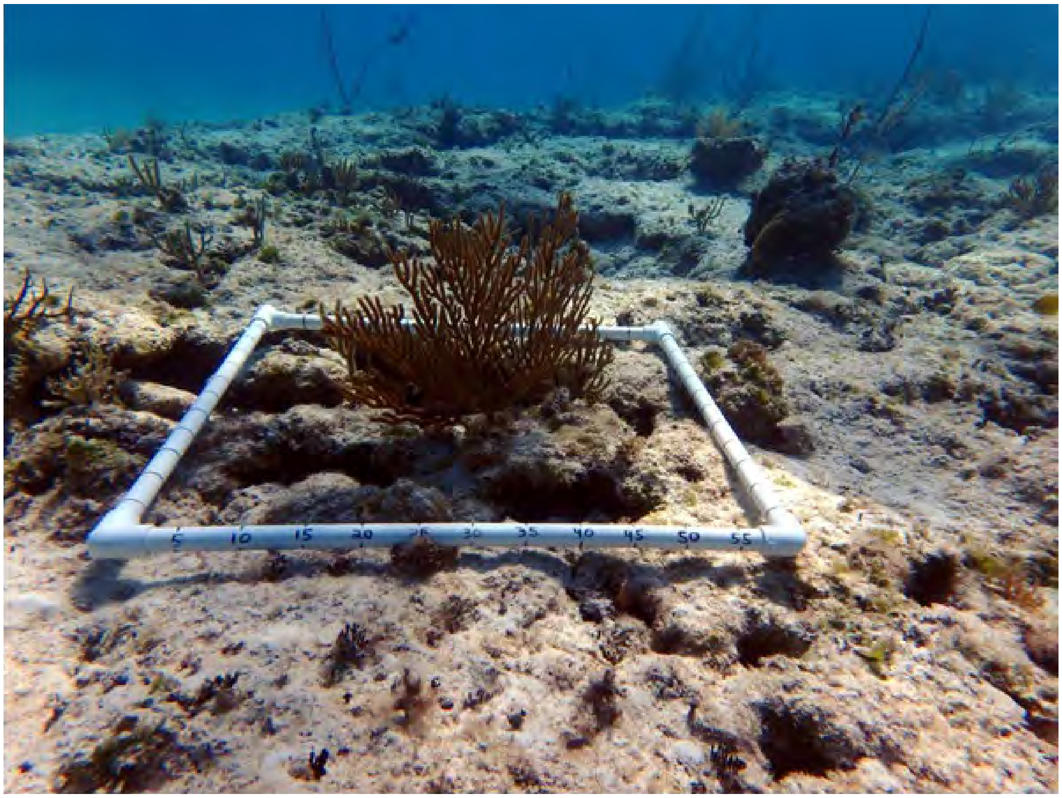


Photo 4-28. Moderate Hardbottom on Elevated Bedrock (MHEB)

Underlying bedrock topography is responsible for much of the variability in size and relief of this habitat. In large part, these habitats were similar to the previously-described SSH but floral and faunal diversity, size and abundance were all higher, although lower than hardbottom habitats that were encountered further offshore and nearshore patch reefs.

Benthic cover on MHEB habitat was also dominated by a turf algal sediment (~>80 percent) intermixed with green macroalgal sediment mats (*Microdictyon*, *Cladophora* spp), as well as *Halimeda* and *Dictyota* spp., which collectively average about 15 percent cover. Live stony coral cover averaged less than 1 percent of the benthos and included star (*Siderastrea siderea)*, lettuce (*Agaricia agaricites*), mustard hill (*Porites astreoides*), finger (*Porites porites*), elliptical star (*Dichocoenia stokesii)* and brain (*Pseudodiploria strigosa*) corals. Small-sized colonies of *Orbicella faveolata* and *Montastraea cavernosa* were present. Many of these larger framework building species displayed partial mortality around their bases, and in some cases, tops which divided the remaining live tissue into isolated patches. Causes of partial mortality are likely related to sediment stress and macroagal overgrowth. Octocorals were scattered throughout at moderate abundances and reached fairly large sizes. These included sea rods (*Eunicea* sp.), sea fans (*Gorgonia ventalina*), sea whips (*Pterogorgia citrina*), and sea plumes (*Pseudopterogorgia* spp.) that collectively covered about 25 percent of the bottom. Sponges (mostly clionids) were also present in low abundances covering less than 1 percent.

Fish diversity and abundance was higher than seen on SSH, IH, S, or SAV habitats but also highly variable and greatest in places with bedrock ledges and fractures. Total fish density averaged across two of the MHEP sites averaged 34 fish per 100 m^2 and biomass of 3,096 grams per 100 m^2. Schools of grunts around relief features were common, and included blue striped (*Haemulon sciurus)*, French (*H. flavolineatum*), and white (*H. plumierii*). Snapper were dominated by gray (*Lutjanus griseus*), schoolmaster (*L. apodus*) and occasionally mutton (*L. analis*). Groupers included graysby (*Cephalopholis cruentata*), red hind (*Epinephelus guttatus*) and a few juvenile Nassau (*E. striatus*) and tiger (*Mycteroperca. Tigris*) grouper. Herbivorous fish were low in abundance with a variety of species of parrotfish and surgeonfish observed. Several ornamental fish including gray angelfish *(Pomacanthus arcuatus),* queen angelfish (*Holacanthus ciliaris*) and several species of butterflyfish (*Chaetodon* spp.). Invasive lionfish (*Pterois* spp.) were also observed utilizing overhanging bedrock structure.

These MHEB habitat types appeared to be playing an important role as essential fish habitat for some high-valued commercial fish (e.g., snappers, grunts) and as nursery habitat for several species of grouper, parrotfish, and surgeonfish. They are particularly important given the absence of patch reef habitat over much of the northwestern portion of the LHP shelf area. These elevated areas also protect inshore beaches by breaking waves and causing increased drag as they cross over them. Their value as underwater snorkeling or diving attractions is considered fairly low compared to the patch reefs on the east side of the property or deeper fore reef and hardbottom habitats.

Minimal evidence of human-related damage (e.g., anchoring, dredging, trash/debris) were encountered in this habitat.

7. Hardbottom Subtype 4 – Hardbottom with Scattered Coral Mounds and Sponges (HSCMS)

Hardbottom Subtype 4 – Hardbottom with Scattered Coral Mounds and Sponges (HSCMS) – was found along the south facing portions of the LHP Site offshore between depths of 25 feet (8 m) and 45 feet (16 m) oriented parallel to the shore. The stronger tidal currents measured in this outer portion of the shelf were about 50 percent higher (~0.3 m/s) than measured further inshore (~0.2 m/s), which is thought to contribute to a change in the benthic community composition to include large sponges and abundant gorgonians. Coral mounds were mostly relict dead skeletal structures that ranged in size from 2-4 feet (~0.5-1 m) in diameter and averaged 28 inches (71 cm) vertical relief above the pavement. There were few living stony corals associated with these relict mounds today. Live stony coral cover ranged from 2-3 percent and was dominated (~>85 percent) by fast recruiting, short-lived species of the massive starlet (*Siderastrea siderea*), mustard hill (*Porites astreoides*), finger (*Porites porites*) and lettuce (*Agaricia agaricites)*. Occasionally, reef-building corals were present, including great star coral (*Montastraea cavernosa*), brain corals (e.g., *Diplora labyrinthiformis, Pseudodiploria strigosa*), and mountainous star coral (*Orbicella faveolata*). Most of these colonies were small [~<10 inches (25 cm)] in size, with larger colonies partially dead and fragmented. Other stony corals observed included the elliptical star (*Dichocoenia stokesii*), maze (*Meandrina meandrites*), and the sinuous cactus (*Isophylla sinuosa*). The relative absence of abundant live reef building corals seen today suggests that much of the structural relief associated with the coral mounds represents relict coral growth from an earlier period of significant reef development.

Sponges covered approximately 1 to 2 percent of the benthos and were a distinctive and common component of this habitat (Photo 4-29). They varied in size from comparatively small branchlet sponges (*Aplysina insularis*) less than 6 inches (~15 cm) in size to giant barrel sponges, some of which were 3 to 4.5 ft (1 to 1.5 m) in diameter. Giant barrel sponges have been referred to as the "Redwoods of the Reef" (McMurray et al. 2008) because of their comparatively large size and long life span. Other sponges present in this community included blackball sponge (*Ircinia strobilina*) and black bell sponge (*I. campana*), loggerhead sponge (*Spheciospongia vesparium*), green finger sponge (*Iotrochota birotulata*), lavender rope sponge (*Niphates erecta*) and vase sponges, including *Niphates digitalis* and *Mycale laxissima*.

Photo 4-29. Hardbottom with Scattered Coral Mounds and Sponges (HSCMS)

Octocorals were also quite common, reaching heights of 3 to 5 ft (1-2 m), including sea rods (*Eunicea mammosa, Plexaura flexuosa, Pseudoplexaura* sp,), sea plumes (*Pseudopterogorgia* sp.) and sea whips (*Pterogorgia citrina, Pterogorgia guadalupensis*).

Turf algae with sediment dominated the benthos (~60 percent) with smaller amounts of sparse turf (~6 percent) occurring on the upward surfaces and edges of the coral mounds. Fleshy macroalgae composed about 24 percent of the substrate mainly with y-branched algae (*Dictyota* spp.), net algae (*Microdictyon marinum)* and Sargassum *(S. hystrix)*. Lower abundances of green calcareous algae *(e.g., Halimeda* spp. ~2 percent) and crustose coralline algae (~3 percent) were associated with upward facing surfaces on coral mounds. Populations of echinoderms, including long-spined urchins (*Diadema antillarum*), cnidarians, including pink-tipped anenomes (*Condylactis gigantea*), annelids, including social feather dusters (*Bispira brunnea*) and Christmas tree worms (*Spirobranchus giganteus*) were also present. A number of spiny lobsters were observed utilizing the coral mounds and a single large live queen conch (*Strombus gigas*) was also seen in this habitat – the only one encountered during the surveys.

Fish densities estimated from AGRRA surveys were moderately low, with an average of 21 fish per 100 m^2 and total fish biomass of ~ 2544 grams per 100 m^2. Commonly encountered species were small groups of adult parrotfish including stoplight (*Sparisoma viride*), queen (*S, vetula*), yellowtail (*S. rubripinne)*, striped (*Scarus iseri*) and redband (*S. aurofrentum*). Other common herbivores included large mature blue tangs (*Acanthus caeruleus*), doctorfish (*Acanthurus chirugus*) and ocean surgeons (*Acanthurus bahianus*). Wrasses were also common including puddingwife (*Halichoeres radiatus*), hogfish (*Lachnolaimus maximus*), yellowhead (*Halichoeres garnoti*), slippery dick (*H*. *bivittatus*), and bluehead (*Thalassoma bifasciatum*). Snappers observed included yellowtail (*Ocyurus chrysurus*), while groupers were mainly coney (*Cephalopholis fulva*), Nassau grouper (*Epinephelus striatus*), and red hinds (*E. guttatus*). Other species seen were saucereye porgie (*Calamus calamus*), blue chromis (*Chromis cyanea*), great barracuda (*Sphyraena barracuda*), squirrelfish (*Holocentrus adscensionis*) and queen triggerfish (*Balistes vetula*). Several lionfish were also observed on some of the coral mounds.

The ecosystem services contributed by this habitat are probably most significant as essential fish habitat for commercially important, mature species. More Nassau grouper were observed here than in any of the other habitats surveyed, but grouper abundance was still moderately low compared to patch reefs and other coral reefs in Eleuthera and The Bahamas.

No evidence of human-related damage (e.g., anchoring, dredging, trash/debris) were encountered in this habitat.

8. Scattered Coral Mounds/Relict Spur and Groove Structures (SCM)

Scattered Coral Mounds/Relict Spur and Groove Structures (SCM) were found in deeper water (~45-60 feet/14-18 m) than the previously described communities. This habitat occurred along a transitional shelf break area similar to the base of the forereef zone found along east-facing shelf areas of The Bahamas. In several places, a pronounced 10 foot vertical “step” of 10 feet (3 m) occurred that likely represents a paleo-shoreline feature. Relict spur and groove features are also evident towards the base of the slope where large mounds extending perpendicular to the shelf edge reach 2 to 10 ft above the largely flat, barren sandy hardbottom substrate. These coral-dominated outcrops had higher biodiversity (e.g., corals, fish, sponges, macroalgae) with large-sized colonies of stony corals, octocorals and sponges present (Photo 4-30). The coral mound outcrop contained similar species composition and abundance to the coral mounds found in the adjacent HSCMS but with greater size and relief. Detailed surveys were not conducted for this habitat type as it was beyond the depth and area where the proposed Project activities would have direct impacts.

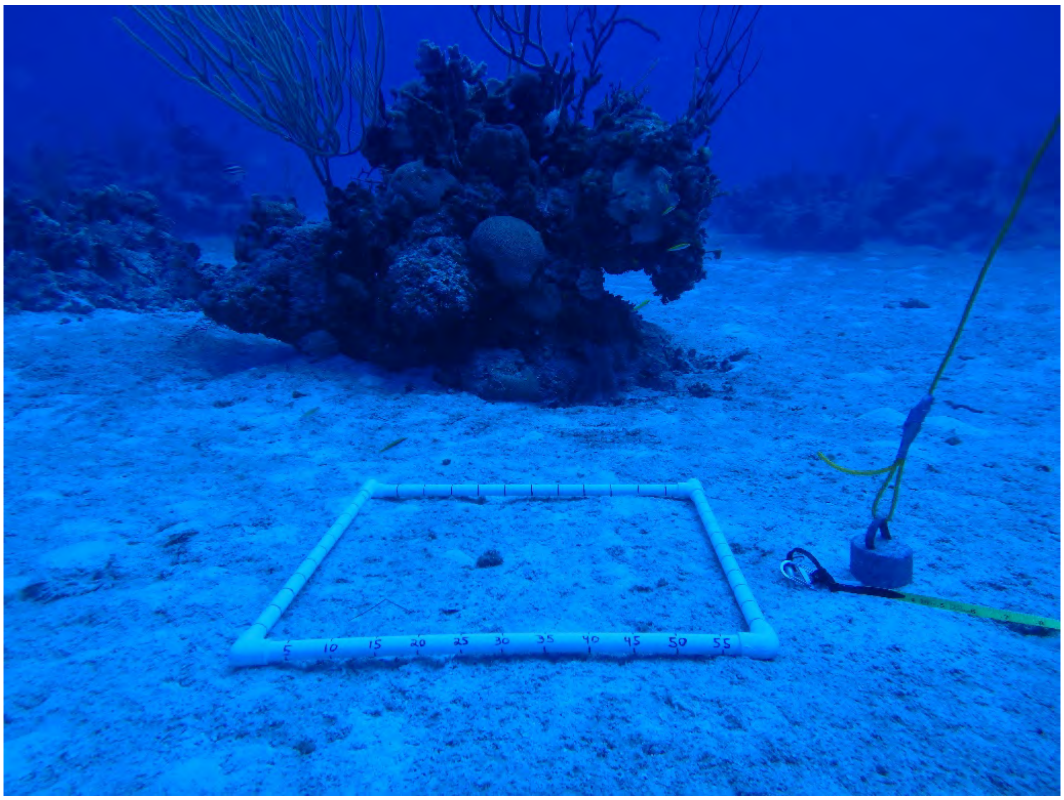


Photo 4-30. Scattered Coral Mounds/Relict Spur and Groove Structures (SCM)

No evidence of human-related damage (e.g., anchoring, dredging, trash/debris) were encountered in this habitat.

Several other distinct habitat types were observed during ground-truthing for the benthic habitat map. These were well outside of the proposed development area but are described here as they are linked functionally to the other habitat types. Detailed characterization surveys were not conducted on these habitats but a brief description of each is given in the following paragraphs.

9. Hardbottom Subtype 5 – Offshore Sandy Hardbottom with Sparse Scattered Coral Mounds and Sponges (OSHSSCMS)

Found on the southwest and west facing portions of the outer LHP shelf, Hardbottom Subtype 5 – Offshore Sandy Hardbottom with Sparse Scattered Coral Mounds and Sponges (OSHSSCMS) (Photo 4-31) was similar to hardbottom subtypes 3 and 4 but with lower relief and fewer coral mounds, sponges, and octocorals and associated fish life. It occurred mainly north of the proposed development area and encompassed a large portion of the outer shelf in water depths starting from 45 feet out to the coral wall transition at 100 feet (11-28 m). The absence of deep sand on the outer shelf exposed the underlying flat Pleistocene bedrock and followed the pattern seen inshore of decreasing loose sand and sandy beaches as the distance from Bottle Bay Beach extended to the northwest.

No evidence of human-related damage (e.g., anchoring, dredging, trash/debris) were encountered in this habitat.

Photo 4-31. Offshore Hardbottom with Sparse Scattered Coral Mounds and Sponges–Hardbottom Habitat Subtype 5

10. Fore Reef (FR)

Fore reef habitat occurs offshore along the eastern side of LHP along the break in the shelf slope located approximately one-half mile from shore in 8 to 15 m water depth. These habitats are located outside of the direct impact area of the Project and were not extensively investigated. Moderate currents are common in the area, likely associated with hydrodynamic conditions over the shallow “bridge” that separates Exuma Sound from the Atlantic. The southeast LHP area is protected from large Atlantic waves by the adjacent shallow bank and Little San Salvador Island to the east. This provides sheltered conditions for corals heads and clumps to grow vertically below the shallow wave base. Fore reefs have high structural relief [i.e., up to 16 ft (5 meters)] and are dominated by massive stony corals (star corals), abundant gorgonians, and some sponges (Photo 4-32).

Coral species diversity and abundance in this area is high (i.e., the highest for the LHP area), with the occurrences of the endangered Staghorn coral (*Acropora cervicornis*) and rare Pillar coral (*Dendrogyra cylindrus*). Coral reef condition data from 2016 AGRRA surveys of four areas along the east side fore reefs had average live stony coral cover of about 10 percent in these habitats (Appendix D), with evidence of past disturbances based on moderately high partial and complete coral mortality. Fish biomass averages approximately 800 g/100 m^2, significantly higher than south coast hardbottom habitats but less than some of the mid-shelf patch reef habitats. Grouper (particularly Tiger and Black) are fairly common. Sharks including Black tip and Reef sharks were also observed utilizing this habitat. Overall, these habitats are some of the best areas for diving in the LHP area.

Coral Wall Transition

The Coral Wall Transition was a distinct habitat observed along the south coast where an outer shelf was observed to break off sharply at depths of ~100 feet (30.5 m) forming a steep wall that precipitously dropped down to over 1,000 feet (~300 m). A well-developed coral reef buildup was found at this transition between the flat sandy outer shelf and the wall with a lip of coral structure that is 10-15 feet (3-5 m) in height. Towards the southeast, where abundant loose sand occurred on the outer shelf, gaps in the coral lip have apparently allowed the sand to cascade over the wall (Photo 4-33), transporting it permanently off the shelf.

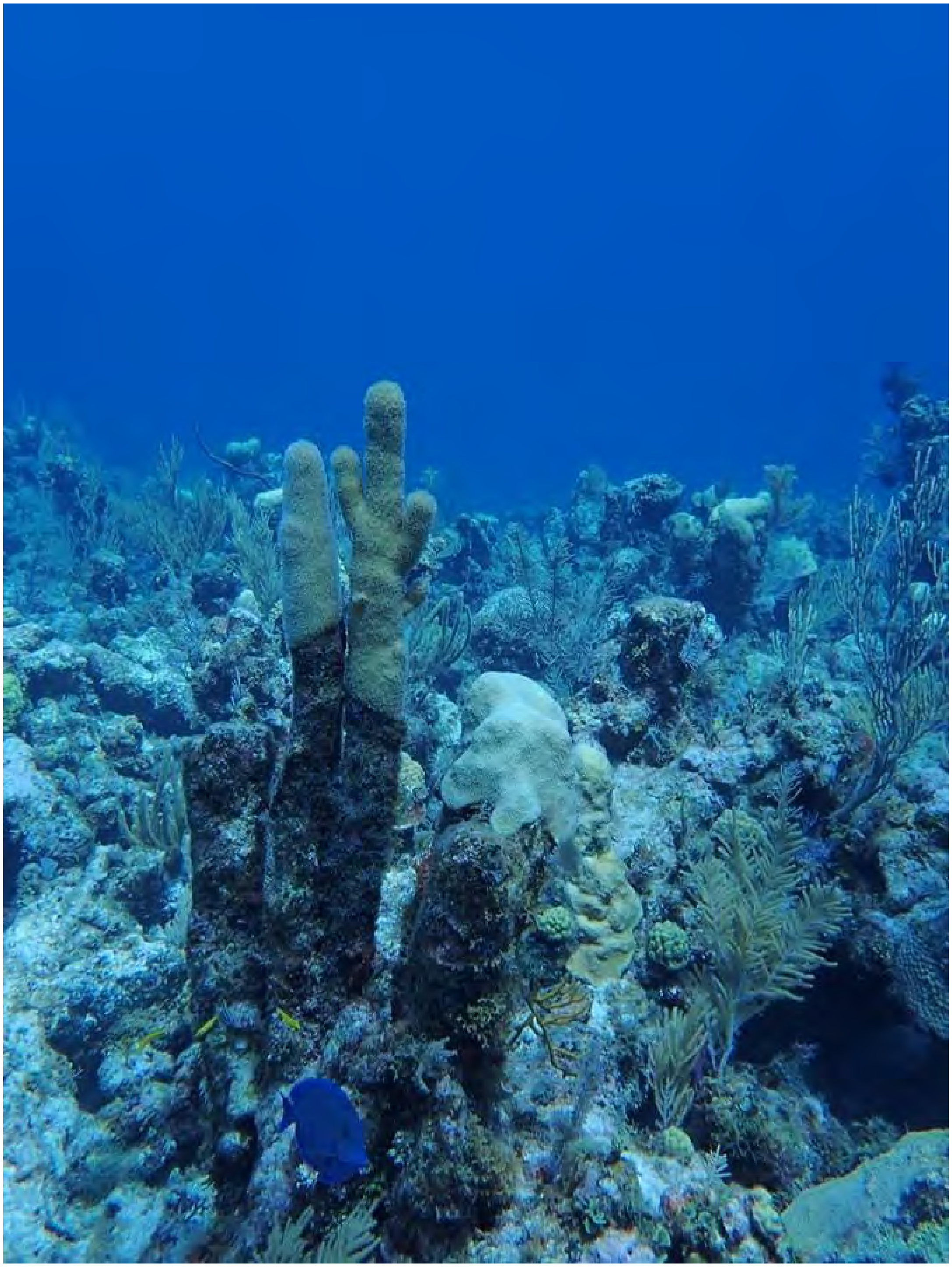


Photo 4-32. Fore Reef

Photo 4-33. Coral Wall Transition (CWT) Habitat Showing Sloping Coral and Sand Interface

Stony coral cover was estimated to cover up to 20 percent of the benthos, with large overlapping colonies of mountainous star coral (*Orbicella faveolata, O. franksi*) dominating along with colonies of large platy white star coral (*Agaricia lamarcki*) and smaller fragile saucer coral (*A. fragilis*). Evidence of recent coral bleaching (termed remnant bleaching) was observed on many of these deeper corals during the November 2019 assessments. Fish life was concentrated along the edge of the wall and particularly notable in places where the coral buildup was high. A single reef shark (*Carcharhinus perezii*) was seen swimming along the inner edge of the wall transition. This habitat type, while fairly narrow in width, is likely important habitat for many commercial fish species. It also has significant value for tourism for deep technical diving.

No evidence of human-related damage (e.g., anchoring, dredging, trash/debris) were encountered in this habitat.

4.2.2.1.1. Elkhorn Colonies

Elkhorn coral colonies (Photo 4-34) are the dominant reef building species on many of the patch reefs that occur along the east side of Project area. Notable for their robust large stature and ability to withstand high wave energy, large healthy stands which once occurred throughout The Bahamas are relatively rare today. Their vulnerability to increasing ocean temperatures, deteriorating water quality, changes in sea level, storms and damages that result from human activity has made them one of the most critically endangered corals in the Caribbean and the focus of reef rehabilitation efforts. Rehabilitation of elkhorn and staghorn colonies is a key component of Disney's marine conservation work.

Photo 4-34. Elkhorn Coral

At least 13 small populations of *Acropora* corals were encountered during the investigations within the assessment area. Many of these were found in nearshore marine areas within 150 feet (approximately 46 m) in the east and south regions of the assessment area. Elkhorn coral, ranging from individual colonies to large thickets of several colonies, was fairly common on several patch reefs in the central and western part of Lighthouse Bay Beach and at many locations off the east-facing beaches. Staghorn coral and fused staghorn coral were less common but were observed in the patch reef in the western part of Lighthouse Point Beach, and offshore of the east-facing beaches, particularly in the fore reef habitat. It is likely that more intensive searches would reveal the presence of additional elkhorn and staghorn coral colonies in other areas close to shore and offshore of the east-facing beaches at LHP. Local residents and oceanographic researchers (Perry Institute for Marine Sciences) have indicated that colonies of elkhorn corals do occur further offshore on the east side in both shore-perpendicular and shore-parallel alignments, much of which was beyond the limits of this assessment.

4.2.2.2 Condition of Lighthouse Point Marine Communities

Coral reef ecosystems in The Bahamas are composed of a mosaic of habitat types including reefs (patch, crests, fore, wall), seagrass, sand, and many hardbottom types which naturally vary in size, development, and species present. Based on AGRRA indicator thresholds developed by the Healthy Reefs Initiative (www.healthyreefs.org), which ranks habitats on a scale from "Critical" to "Very Good," the overall condition of surveyed reefs is considered average with a median score of "Fair". Patch reefs and fore reefs do not occur within the marine facilities footprint. Hardbottom habitats comprise 68 percent of the impacted area within the footprint. These habitats are in good condition but scored low on the benthic index when compared to reefs in Eleuthera and The Bahamas; a lower index score is considered typical for this type of habitat within The Bahamas. Within these hardbottom habitats, the overall combined live planar area for soft/stony coral and barrel sponges was calculated to be 0.0152 acres, which represents 0.3 percent of the directly impacted areas. The other two habitats found within the footprint, sand and submerged aquatic vegetation, were also found to be in good condition.

Condition of LHP Hardbottom Habitats

The marine area along the south coast, where the proposed marine facilities are located, contained mostly hardbottom habitats. These hardbottom habitats were surveyed using the AGRRA methodology to characterize their structure and function in comparison to reef habitats in the area and around Eleuthera and The Bahamas.

Hardbottom habitats comprise 68 percent of the area within the proposed Project footprint. These habitats are in good condition but scored low on the benthic index when compared to reefs in Eleuthera and The Bahamas; a lower index score is considered typical for this type of habitat within The Bahamas. Within these hardbottom habitats, the overall combined live planar area for soft/stony coral and barrel sponges was calculated to be 0.0152 acres, which represents 0.3 percent of the directly impacted areas. Similar to other hardbottom habitats in The Bahamas, the Lighthouse Point hardbottoms were dominated by turf algal/sediment, soft corals and sponges, with naturally low stony coral cover (<1 percent). Gorgonians and sponges were abundant further from shore on elevated bedrock features and in areas of the shelf with strong daily tidal currents. All hardbottom habitats surveyed had the lowest benthic index score indicating they were poor areas for stony coral settlement, growth, and survivorship compared to more highly developed patch reefs or fore reef habitat types. Structural relief varied among the hardbottom types, averaging 36 cm in vertical relief (range 13 to 86 cm). Fish biomass averaged 1,646 g/100 m^2 (range 31 to 3,909 g/100 m^2), with greater biomass on hardbottom with higher vertical relief and further offshore. Parrotfish biomass averaged 571 g/100 m^2 (range 0 to 1568 g/100 m^2). Grouper biomass averaged 115 g/100 m^2 (range 0 to 531g/100 m^2).

Evidence of partial stony coral mortality and standing dead octocorals in areas affected by sediment stress was common on hardbottom communities. No active coral or gorgonian diseases were observed. Comparing structural and functional indicators across the LHP hardbottom habitats shows they are strongly structured around differences in physical conditions (e.g., waves, currents, sand movement) from inshore to offshore and from east to west. Hardbottom habitats are fundamentally different ecosystems than coral reefs. They provide lower productivity (e.g., fish biomass and coral growth) and services (e.g., wave attenuation) than reefs, but more than sand or seagrass, and are important habitat for many marine species. They also contribute to the larger scale shelf ecosystem processes and habitat complexity and connectivity to the area. Detailed comparison of some of the AGRRA indicators can be found in Appendix D.

Condition of LHP Reef Habitats

Coral reefs east of the Lighthouse Point Project site have high biological and ecosystem service value. They contained the greatest abundance of stony coral, highest structural relief, and the highest abundance of fishes. Because no Project-related infrastructure is proposed in this vicinity, only one AGRRA survey was conducted on one of these patch reefs. AGRRA data from reef surveys done in 2016 along the east side of Lighthouse Beach offshore from the Project area, (EL004, EL0014 and EL0015) were also examined – data available from the AGRRA database (www.agrra.org). Coral cover at LHP averaged 9 percent and was similar to the Lighthouse Beach sites (averaged 10 percent). Fleshy macroalgae at LHP averaged 27 percent cover, also similar to Lighthouse Beach (25 percent). Total fish biomass at LHP was 15,235 g/100 m^2, due to large schools of fishes (e.g., chubs), and was higher than the Lighthouse Beach reefs (average 3, 867 g/100 m^2). Parrotfish biomass at LHP averaged 1,704 g/100 m^2, like Lighthouse Beach (1,406 g/100 m^2). Grouper biomass at LHP averaged 710 g/100 m^2, which was higher than Lighthouse Beach (231 g/100 m^2).

Overall, the condition of LHP reefs is considered to be "Fair" based on the thresholds of AGRRA indicators developed by the Healthy Reefs Initiative (www.healthyreefs.org). Typical of reefs, their condition was highly variable with some clear patterns associated with distance from shore and sediment stress influencing colonization and growth of corals. Numerous old dead coral skeletons were common, suggesting an earlier time of more prolific coral growth than what is observed today. It is well known that coral reefs Caribbean wide have been declining in condition since the mid-1980s attributed to a combination of regional stressors (coral disease, bleaching, increasing sea surface temperatures), coupled with localized human impacts (overfishing, nutrient enrichment). Coral diseases have likely affected the LHP reefs in the past, but no active disease was observed during our surveys. Evidence of recent bleaching was observed on shallow reefs five miles northwest of LHP and on the Coral Wall Transition habitat during the November 2019 assessment survey. LHP reefs also showed evidence of past large-scale bleaching events (e.g., 1998, 2005) in The Bahamas. Recovery through re-sheeting of live tissue over old dead portions of the coral skeletons was observed. More detailed comparative AGRRA data for LHP reefs to other reefs in Eleuthera and The Bahamas is shown in Appendix D.

4.2.2.3 Endangered and Threatened Species and Fish Spawning Aggregations

Populations of many species of corals and other types of marine life are currently facing threats due to a variety of human-related activities and nature-inflicted events and are therefore included as species that are designated for protection by national and international laws, regulations and treaties (Appendix E). Species so designated that were encountered during the marine investigations are identified in Table 4-12.

No visual evidence was observed of any fish spawning aggregations. On-line inquiries and personal interviews with staff from CEI have revealed that no fish spawning aggregations have been documented around the Project site. Perry Marine Institute concurs with this conclusion. CEI was approached to provide assistance but declined to formally work with the Developer.

Table 4-12. Protected Marine Species Encountered and/or Likely to Occur within the Assessment Area

Common Name	Scientific Name	Designation	Comments
Staghorn Coral	*Acropora cervicornis*	IUCN – Critically endangered CITES – Appendix II	Uncommon, 5-40 ft deep
Elkhorn Coral	*Acropora palmata*	IUCN – Critically endangered	Occasional w/in areas inspected; in shallow waters
Lobed Star Coral	*Orbicella annularis*	IUCN – Endangered	Common, mostly below ~ 20 ft deep
Mountainous Star Coral	*Orbicella faveolata*	IUCN – Endangered CITES Appendix II	Common, Variable depths – from <10 feet to >100 ft deep
Boulder Star Coral	*Orbicella franksi*	IUCN – Vulnerable CITES Appendix II	Occasional, Variable depths from shallow to coral walls > 100 ft deep& deeper reefs
Elliptical Star Coral	*Dichocoenia stokesi*	IUCN – Vulnerable CITES Appendix II	Common, mostly below ~ 20 ft deep
Pillar Coral	*Dendrogyra cylindrus*	IUCN – Vulnerable CITES Appendix II	Uncommon, 5-40 ft deep
Lettuce Coral	*Agaricia agaricites*	IUCN – Least Concern CITES – Appendix II	Occasional, from shoreline rock to > 40 ft deep
Low-relief Lettuce Coral	*Agaricia fragilis*	IUCN – Least Concern CITES – Appendix II	Occasional, mostly below ~ 20 ft deep
Low-relief Lettuce Coral	*Agaricia humilis*	IUCN – Least Concern CITES – Appendix II	Occasional, mostly below ~ 20 ft deep
Boulder Brain Coral	*Colpophyllia natans*	IUCN – Least Concern CITES – Appendix II	Occasional, mostly below ~ 20 ft deep
Grooved Brain Coral	*Diploria labyrinthiformis*	IUCN – Least Concern CITES – Appendix II	Occasional, mostly below ~ 20 ft deep
Smooth Flower Coral	*Eusmilia fastigata*	IUCN – Least Concern CITES – Appendix II	Occasional, mostly below 20 ft deep

Table 4-12. Protected Marine Species Encountered and/or Likely to Occur within the Assessment Area

Common Name	Scientific Name	Designation	Comments
Golfball Coral	*Favia fragum*	IUCN – Least Concern CITES – Appendix II	Occasional, mostly 10-40 ft deep
Sunray Lettuce Coral	*Helioseris cucullata*	IUCN – Least Concern CITES – Appendix II	Uncommon, mostly below 25 ft deep
Rough Star Coral	*Isophyllastrea rigida*	IUCN – Least Concern CITES – Appendix II	Uncommon, Mostly ~ 15-30 ft deep Formerly *Isophylla rigida*
Sinuous Cactus Coral	*Isophyllia sinuosa*	IUCN – Least Concern CITES – Appendix II	Uncommon, mostly ~ 5-30 ft deep
Ten-ray Star Coral	*Madracis decactis*	IUCN – Least Concern CITES – Appendix II	Common, variable depths, but mostly below ~15 ft deep
Rose Coral	*Manicina areolata*	IUCN – Least Concern CITES – Appendix II	Often on bottoms with sand, Inshore Hardbottom and in SAV beds
Maze Coral	*Meandrina meandrites*	IUCN – Least Concern CITES – Appendix II	Common, Mostly between 25 & 75 ft deep
Fire Coral	*Millepora alcicornis*	IUCN – Least Concern	Abundant, from shoreline rock to > 30 ft deep
Blade Fire Coral	*Millepora complanata*	IUCN- Least Concern	Abundant, mostly near shorelines & to ~10 ft deep
Rose Coral	*Manicina areolata*	IUCN – Least Concern CITES Appendix II	Occasional, from ~ 3 ft deep to ~ 20 ft deep
Maze Coral	*Meandrina meandrites*	IUCN – Least Concern CITES – Appendix II	Occasional, mostly from ~20 to > 40 ft deep
Great Star Coral	*Montastrea cavernosa*	IUCN – Least Concern CITES – Appendix II	Occasional, mostly greater than ~20 ft deep
Ridged Cactus Coral	*Mycetophyllia lamarckiana*	IUCN – Least Concern CITES – Appendix II	Occasional, mostly from ~25 to 75 ft deep
Mustard Hill Coral	*Porites astreoides*	IUCN – Least Concern CITES – Appendix II	Abundant, from nearshore shallows to > 30 ft deep
Thin Finger Coral	*Porites furcata*	IUCN – Least Concern CITES – Appendix II	Occasional, variable depths, from <10 ft to > 100 ft deep

Table 4-12. Protected Marine Species Encountered and/or Likely to Occur within the Assessment Area

Common Name	Scientific Name	Designation	Comments
Finger Coral	*Porites*	IUCN – Least Concern CITES – Appendix II	Occasional, most colonies < 6" tall, usually encountered at depths below ~ 15 ft
Knobby Brain Coral	*Pseudodiploria clivosa*	IUCN – Least Concern CITES – Appendix II	Common, from low-profile individuals near shoreline rock to larger colonies > 30 ft deep
Symmetrical Brain Coral	*Pseudodiploria strigosa*	IUCN – Least Concern CITES – Appendix II	Common, mostly > ~ 20 ft deep
Lesser Starlet Coral	*Siderastrea radians*	IUCN – Least Concern CITES – Appendix II	Common, mostly > 20 ft deep
Massive Starlet Coral	*Siderastrea siderea*	IUCN – Least Concern CITES – Appendix II	Common, mostly > 20 ft deep
Blushing Star Coral	*Stephanocoenia intersepta*	IUCN – Least Concern CITES – Appendix II	Common, variable depths, from < 10 ft to > 100 ft deep

4.2.2.4 Bonefish

The extent to which recreationally important bonefish species (*Albula vulpes*) are utilizing the LHP marine habitats is not well known. The most suitable bonefish habitats in the LHP area are thought to be shallow nearshore hardbottom, seagrass, and sand habitat types, especially near headlands and within coves along the western coast. To date, no bonefish have been sighted in the area of the proposed small boat marina or any of the other areas/habitats during any of the LHP field surveys, estimated at over 63 hours underwater during varying times over a several-year period. Additionally, discussions with local fishers (pers comm, Capt'n Calvin Jolly) have indicated that the LHP areas is not used by bonefish fishing guides.

Juvenile bonefish in The Bahamas mostly prefer open, sandy-mud bottoms in shallow, mangrove-lined bays (Adams and Cooke, 2015), habitats which do not occur in the LHP area. Recent research suggests that in The Bahamas, adult bonefish populations appear to establish in close proximity to juvenile bonefish habitat, although adult bonefish are found along beaches of the eastern shoreline of Eleuthera. Adult bonefish forage primarily on benthic invertebrates associated with shallow tidal flats and tidal creek habitats, which also do not occur on the LHP property. On-going research on bonefish in Eleuthera has found at least five distinct populations, with the population nearest to the LHP area being the SW Eleuthera population which is concentrated around the extensive tidal flats and creeks of the Cape Eleuthera area 15 miles north of the LHP area (Danylchuk et al., 2011; Buress, 2018). Bonefish on Eleuthera are documented to migrate up to 80 km monthly to aggregate and spawn between October and June each year (Murchie et al., 2013). Recent studies have found that bonefish migrate along shorelines in large schools to protected bays that are close to the shelf edge and deep water (>1,000 feet) (Murchie et al., 2019).

Since 2016, CEI scientists have been involved in a cooperative research project focused on bonefish (*Albula vulpes*). The CEI project, which is being conducted in partnership with Fisheries Conservation Foundation and visiting researchers from the Illinois Natural History Survey, Florida Institute of Technology, and the Florida Fish and Wildlife Conservation Commission and funded by the Bonefish and Tarpon Trust and the Hutchins Family Foundation has identified five areas around Eleuthera that may be important bonefish pre-spawning and spawning sites. One of these is located on the southwest coast of the island, in the area between Lighthouse Point and Cape Eleuthera, more than five miles northwest of the Lighthouse Point tract and outside the limits of potential impact of the Project.

4.2.2.5 <u>Spawning Aggregations</u>

Locations of fish spawning aggregations for food fish species (e.g., Nassau Grouper) are not widely publicized, due to concerns regarding over-harvesting. Research to date has revealed that the known fish spawning aggregation site closest to the Project site is approximately 30 miles to the northwest, far outside the limits of potential impact of the Project. Research by CEI, however, has revealed that the waters and creeks on the western side of South Eleuthera are home to large numbers of nurse sharks that form several summertime mating aggregations. No such creeks, however, are present on or near the Lighthouse Point tract.

4.2.2.6 Invasive Species Issues

The only marine species designated as invasive that was encountered in the waters around the Lighthouse Point site was the red lionfish (*Pterois volitans*), which was present in low numbers within the assessment area.

4.2.2.7 Cetaceans, Elasmobranchs and Marine Reptiles

4.2.2.7.1. Cetaceans

Cetaceans (marine mammals including whales, dolphins and porpoises) are large marine organisms that generally have large home-range territories. As it is unlikely that the presence of most of these species would happen to coincide with the baseline marine assessments conducted at the Lighthouse Point site, the following information is provided as the product of literature searches of scientific databases, on-line inquiries and personal interviews with researchers and individuals with local knowledge and experience with these species. Manatees are infrequently encountered in The Bahamas.

According to The Bahamas National Trust, The Bahamas Marine Mammal Survey, The Bahamas Marine Mammal Research Organisation, The Bahamas Marine Mammal Stranding Network and personal observations of members of the EIA team, over 20 species of marine mammals are known to spend all or part of their lives in Bahamian waters (Table 4-13).

The spatial distribution, seasonal variation, and residency of these species vary tremendously from species to species. Individuals of some species may spend their entire lives in Bahamian waters, while individuals of other species may include only a part of The Bahamas in their wide-ranging territories. All marine mammals are protected species in The Bahamas pursuant to Chapter 244A (refer to Section 5), and several of these species are included in databases tracked by the International Union of the Conservation of Nature (IUCN) and designated as Critically Endangered, Endangered or Vulnerable.

Although no marine mammals were encountered during the marine assessments at the subject site, interviews with local boat captains have revealed seasonal occurrences of bottlenose, spotted dolphins, and pilot whales in the general vicinity from December through April. Migratory populations of humpback whales (*Megaptera novaeangliae*) migrate through the Western Atlantic and along the coast on the east side of the assessment area between

December and March and beaked whales (*Mesoplodon* spp., *Ziphius cavirostris*), are present in offshore waters year-round. Of the 34 documented sightings of killer whales in The Bahamas reported by Dunn and Claridge (2013), one was to the west of South Eleuthera. Interviews with the local boat captains indicated manatees are very rare in the area.

Table 4-13. Marine Mammals of The Bahamas Common Name, Scientific Name, IUCN Status, and Hearing Frequency Category

Common Name	Scientific Name	IUCN Status	Hearing Frequency
North Atlantic right whale	*Eubalaena glacialis*	Critically Endangered	Low
Bryde's whale	*Balaenoptera edeni*	Least Concern	Low
Fin whale	*Balaenoptera physalus*	Vulnerable	Low
Humpback whale	*Megaptera novaeangliae*	Least Concern	Low
Pygmy killer whale	*Feresa attenuata*	Least Concern	Mid
Short-finned pilot whale	*Globicephala macrorhyncus*	Least Concern	Mid
Fraser's dolphin	*Lagenodelphis hosei*	Least Concern	Mid
Risso's dolphin	*Grampus griseus*	Least Concern	Mid
Killer whale	*Orcinus orca*	Data Deficient	Mid
Melon-headed whale	*Peponocephala electra*	Least Concern	Mid
False killer whale	*Pseudorca crassidens*	Near Threatened	Mid
Pantropical spotted dolphin	*Stenella attenuata*	Least Concern	Mid
Striped dolphin	*Stenella coeruleoalba*	Least Concern	Mid
Atlantic spotted dolphin	*Stenella frontalis*	Least Concern	Mid
Rough-toothed dolphin	*Steno bredanensis*	Least Concern	Mid
Common bottlenose dolphin	*Tursiops truncatus*	Least Concern	Mid
Sperm whale	*Physeter catodon*	Vulnerable	Mid
Gervais' beaked whale	*Mesoplodon europaeus*	Data Deficient	Mid
Blainville's beaked whale	*Mesoplodon densirostris*	Data Deficient	Mid
West Indian Manatee	*Trichechus manatus* ssp. *latirostris*	Endangered	Mid
Cuvier's beaked whale	*Ziphius cavirostris*	Least Concern	Mid
Pygmy sperm whale	*Kogia breviceps*	Least Concern	High
Dwarf sperm whale	*Kogia sima*	Least Concern	High
North Atlantic right whale	*Eubalaena glacialis*	Critically Endangered	Low
Bryde's whale	*Balaenoptera edeni*	Least Concern	Low

The area between South Eleuthera and Little San Salvador has been identified by CEI and others as a very important habitat as a travel corridor for cetaceans and as an intersection for pelagic and more coastal species. In its October 2018 newsletter, CEI states:

> “The narrow undersea bank stretching from Lighthouse Point to Half Moon Cay, known as The Bridge, is rich with marine life. Pelagic fishes seem to

congregate here along both the northern and southern drop-offs to feed on tight schools of baitfsh skipping across the surface. Birds dive down from above to forage alongside bonita and mahi-mahi, and sharks patrol between ancient coral heads rising up from the seafloor."

4.2.2.7.2. Elasmobranchs

Elasmobranchs are a sub-class of cartilagineous marine organisms that include sharks, rays, and skates. More than 20 species of elasmobranchs are known to spend all or part of their lives in Bahamian waters (Table 4-14).

Table 4-14. Elasmobranchs of The Bahamas

Common Name	Scientific Name
Sharks	
Caribbean Reef Shark	*Carcharhinus perezi*
Blacktip Reef Shark	*Carcharhinus limbatus*
Tiger Shark	*Galeocerdo cuvier*
Nurse Shark	*Ginglymostoma cirratum*
Bull Shark	*Carcharhinus leucas*
Oceanic Whitetip Shark	*Carcharhinus longimanus*
Gulper, Cuban dogfsh s	*Squalus cubensis*
Atlantic sixgill Shark	*Hexanchus vitulus*
Spinner Shark	*Carcharhinus brevipinna*
Sandbar or Brown Shark	*Carcharhinus plumbeus*
Blacknose Shark	*Carcharhinus acronotus*
Lemon Shark	*Negaprion brevirostris*
Great White Shark	*Carcharodon carcharias*
Great Hammerhead Shark	*Sphyrna mokarran*
Scalloped Hammerhead Shark	*Sphyrna lewini*
Bonnethead Shark	*Sphyrna tiburo*
Whale Shark	*Rhincodon typus*
Atlantic Sharpnose Shark	*Rhizoprionodon terraenovae*
Silky Shark	*Carcharhinus falciformis*
Shortfin Mako	*Isurus oxyrinchus*
Sand Tiger Shark	*Carcharias taurus*
Rays and Skates	
Yellow stingray,	*Urobatis jamaicensis*
Caribbean Torpedo	*Torpedo andersoni*
Lesser Electric Ray	*Narcine bancroftii*
Caribbean Whiptail Stingray	*Himantura schmardae*

Table 4-14. Elasmobranchs of The Bahamas

Common Name	Scientific Name
Southern Stingray	*Dasyatis americana*
Roughtail Stingray	*Dasyatis centroura*
Spotted Eagle Ray	*Aetibatus narinari*
Oceanic Manta Ray	*Manta birostris*
Caribbean Manta Ray	*Manta birostris birostris*

At the Cape Eleuthera Institute, the Shark Research and Conservation Program (SRCP) was established in 2006 to provide a focus on elasmobranch science in The Bahamas and the greater Caribbean region. Shark long-lining studies in the southeast Bahamas have revealed an abundance of tiger sharks utilize the "bridge" near the LHP area (Talwar et al., 2020). Marine investigations of the LHP area on snorkel and SCUBA have sighted several sharks in the area including Caribbean reef shark, blacktip reef shark, and the great hammerhead.

Of the 74 shark attacks in The Bahamas included in the Global Shark Attack File data-base (http://www.sharkattackdata.com/place/bahamas), no fatal and three non-fatal shark attacks are reported to have occurred on/near Eleuthera. None were reported to have occurred in the Lighthouse Point area.

4.2.2.7.3. Marine Reptiles

Several species of sea turtles are known to inhabit Bahamian Waters (Table 4-15). Existing laws in The Bahamas prohibit the harvesting, possession, purchase and sale of sea turtles and their eggs found either within Bahamian waters or on any of its beaches.
Juvenile sea turtles (species not identified), were observed during marine assessments conducted at the subject site. Suitable nesting habitat appears to exist on the site's beaches, but to date, no systematic turtle nesting surveys have been conducted on the site, and no evidence (e.g., tracks, published papers) have been found that indicate the use of the site for nesting by one or more species of marine turtles. Future systematic surveys are planned to determine if nesting is occurring on the site.

Analysis of the marine species tracking database compiled by Ocearch did not reveal that any of the individuals of any of the species they track, which includes sharks and sea turtles, had been documented to occur anywhere near the subject site, or Eleuthera.

Table 4-15. Sea Turtles in The Bahamas

Common Name	Scientific Name
Loggerhead sea turtle	*Caretta caretta*
Green Turtle	*Chelonia mydas*
Leatherback Turtle	*Dermochelys coriacea*
Hawksbill Turtle	*Eretmochelys imbricata*
Atlantic Ridley Sea Turtle	*Lepidochelys kempii*

Several species of sea turtles are known to inhabit Bahamian Waters (Table 4-15). Existing laws in The Bahamas prohibit the harvesting, possession, purchase and sale of sea turtles and their eggs found either within Bahamian waters or on any of its beaches. Juvenile green sea turtles and one hawksbill were observed during marine assessments conducted at the subject site. Suitable nesting habitat appears to exist on the site's beaches, but to date, no systematic turtle nesting surveys have been conducted on the site, and no evidence (e.g., tracks, published papers) has been found that indicate the use of the site for nesting by one or more species of marine turtles. Bird surveys include beach transects. No sea turtle nesting activity has been noted to date, but surveys were started outside of nesting season (started in November 2019). Interviews with several boat captains have indicated turtles nesting to the north of the property but no nesting activity was known by them to be in the immediate area. That being said, surveys for nesting will be performed applying the same standards that are in use at Disney's Vero Beach Resort (USFWS-endorsed protocols) during the duration of the development. If no turtle nests are detected over several years, the Project would adopt a reporting system for the employees to report any observations of turtle nesting activity. If turtle nesting activity is detected at any point, nest protection protocols employed at Disney's Vero Beach Resort, which abide by the regulations of the U.S. Fish and Wildlife Service (Marine Turtle Conservation Handbook, FWC, 2016) and can be found at https://myfwc.com/license/wildlife/marine-turtle-permit/, will be implemented.

Over the course of the Project investigations, several avian surveys and other site work has been completed, and at no time has there been any indications of active turtle nesting on any of the beaches. The most recent site work, in July and October 2020, did not indicate any presence of turtle nesting.

4.2.3 NATIONAL PARKS AND PROTECTED AREAS WITHIN AREA OF INFLUENCE

No national parks or Marine Protected Areas are presently designated in the vicinity of the site. Several parcels of Crown Lands, however, are present on the site (see Figure 4-1), including Big Pond, White Pond, property in the vicinity of the lighthouse and an ocean-fronting tract on the east coast.

As described elsewhere in this EIA, approximately 193 acres of the privately owned lands will form the Disney Donated Public Lands. This includes 190 acres within the Disney Donated Public Lands parcel and 3 acres near the lighthouse area on the point.

4.3 SOCIO-ECONOMIC FEATURES

Oxford conducted a detailed economic study for the Project. An excerpt of the report is provided in Appendix H.

4.3.1 EXISTING SURROUNDING COMMUNITY DEMOGRAPHICS

The Bahamas is an archipelagic nation comprising 700 islands and cays situated over 100,000 square miles of the Atlantic Ocean. Located east of Florida and north of Cuba, The Bahamas has a population of 390,690 persons, of which 70 percent reside on New Providence. Collectively, New Providence, Grand Bahama, and Abaco represent 90 percent of the population (Worldometers.com).

Eleuthera is located east of the capital island of New Providence. The narrow island is 110 miles long from the settlement of Current in the north to Bannerman Town in the south. Lighthouse Point, also known as East End, is the southernmost point on Eleuthera.

According to the 2010 Census, 11,515 persons reside on Eleuthera which includes Spanish Wells and Harbor Island, representing more than 2 percent of total population in The Bahamas. The area of Lighthouse Point is considered to be part of South Eleuthera. The population for area of John Millar and Bannerman Town is 65 persons, with 27 males and 38 females.

The average household size is 3.42 persons, with a total of 19 occupied dwellings. Compared to New Providence, which is the most densely populated area, with a population density 3,079 persons per square mile, Eleuthera average 43.9 persons per square mile.

4.3.2 PROPOSED PROJECT STAFFING

The Project when completed will host at least 150 staff in well-paying roles with benefits and opportunities for advancement. This is in addition to opportunities for Bahamian tour operators, vendors and others.

4.3.3 PROPOSED UTILITY INFRASTRUCTURE

Existing infrastructure on Lighthouse Point is non-existent and there are no public services provided.

4.3.4 PROPOSED TRAFFIC/TRANSPORTATION INFRASTRUCTURE

Presently, access to Lighthouse Point is restricted by a rough unpaved road with large holes and ruts. It can only be accessed by four-wheel drive and high clearance vehicles. Future primary and secondary roads, tramways and footpaths are proposed.

The developer is also improving the unpaved public access segment of Queens Highway, immediately north of the main Project entrance. This will facilitate the efficient movement of people, goods and equipment to the site. This segment of roadway will be paved to enhance capacity and safety characteristics to the benefit of the local community and visitors to the site. In its current state, the unpaved shell base road infrastructure is capable of carrying a very small volume of traffic, and at very low speeds. Once paved as a two-lane rural roadway, the improved roadway segment will have much higher capacity. The proposed Project would utilize just a small fraction of this total capacity, resulting in substantially enhanced mobility within the affected roadway segment.

4.4 CULTURAL RESOURCES

4.4.1 HISTORICAL ACCOUNT OF PROPERTY

4.4.1.1 Cultural Summary

A *Preliminary Historic Resource Survey of Lighthouse Point, South Eleuthera* was prepared by Colin Brooker of Brooker Architectural Design Consultants in 2019 with additional in depth review provided in 2020 "*Historic Resource Survey, Lighthouse Point, South*

Eleuthera, The Bahamas." The full report is provided in Appendix G. Brooker has conducted extensive cultural investigations throughout The Bahamas and Eleuthera.

In February 2019 and then again in January 2020, Brooker travelled to Nassau and South Eleuthera to identify heritage resources on the property site and to determine if these resources meet the criteria for listing on The Bahamas National Register of Historic Resources. On February 12, 2020, Dr. Grace Turner, Senior Archaeologist and Research Officer – National Museum of The Bahamas/AMMC, and Gammell Deal, Senior Project Officer at DEPP performed a site visit to review discovered cultural resources.

At present and in addition to the lighthouse, there are nine structures/ruins and several ancillary features, notably ovens, which have been identified on site. These structures exist predominantly in the northernmost section of the property in relative proximity to Old Bannerman. Structures 7-9 were discovered after Brooker's field visit; GPS coordinates identify ruin locations on the site.

Summary of Structures 1-5

Structures 1-5 are situated along a north/south linear axis with Structure 1 positioned on the property's northern boundary line. These structures, in varying states of deterioration, accommodated both residential and service functions and constitute a relatively coherent vernacular building group by use of tabby as the primary material for external walls in residential and ancillary building.

Collectively, Brooker considers Structures 1-5 a significant historic resource with potential eligibility for inclusion on The Bahamas National Register of Historic Resources.

Summary of Structure 6(a-d)

Structure 6(a) and its dependencies are situated at an elevation of approximately 75 with probable expansive sea views when the surrounding area was likely cleared. The building is of exceptionally high quality given the precipitous approach and apparent isolated location southeast of Structures 1-5. With four entry points, the function of Structure 6 is unknown.

Brooker recommends an archaeological investigation of Structure 6 and its ancillary features to determine function, construction sequence, temporal development, and extent. Prior to an investigation, Brooker recommends a buffer zone of 150 ft north, 150 ft west, 200 ft east, and 150 ft south. At a minimum, additional investigations are recommended to provide the necessary details for consideration for inclusion to The Bahamas National Register of Historic Resources.

Elsewhere, historic aerial imagery indicates pockets of past human disturbance likely for agricultural purposes. Should there be additional discoveries of antiquities, AMMC will be notified immediately.

Historic Resources in Context of Project Features

With the discovery of antiquities in the proposed BOH, an alternative BOH to the east of Big Pond is proposed to avoid cultural resources impacts. No impacts are anticipated to known historic structure discoveries with additional investigation to Structure 6 to be coordinated with AMMC to facilitate and document knowledge of Bahamian history.

Discussions are on-going with AMMC regarding the discovery of antiquities and artifacts at Lighthouse Point in accordance with the Antiquities, Monuments, and Museum Act 1998 and Antiquities, Monuments, and Museum Regulations 1999.

4.4.1.1.1. Methodology

To establish historic context, Brooker performed a literature search of published and unpublished resources. Document searches in Nassau took place at the Department of Archives and Department of Lands and Surveys. Documents identified at Government departments were as follows:

- Specification Books of the Bahamian Ministry of Public Works (Lighthouse drawings)
- 1959 survey map of ownership
- Ann Millar's will

Field surveys took place over a consecutive 3-day visit to South Eleuthera in February 2019 and a 4-day visit in January 2020. These field surveys were guided by research gathered at the Government departments, online, and aerial imagery. Time in the field was prioritized to areas slated for development, with access to the site interior largely limited to cut lines due to dense vegetation. In January 2020, field surveys extended to cultural resources identified during preclearance botanical survey for geotechnical investigations. Several additional structures were identified by the geotechnical survey team during Brooker's field visit. Brooker's findings for Structures 1 through 6(d) are detailed in Appendix G.

Historic resources encountered on the Project site were positioned by means of a handheld GPS device and photographed using a Nikon digital camera.

A walkover survey was performed parallel to Lighthouse Bay in an effort to make a discovery of any readily observed prehistoric surface artifacts as previously documented by the Eleuthera Institute Island School. A detailed description of the field methodology is provided in the report.

In addition, to develop an historic and architectural context for this resource survey, Brooker made brief visits to two historic settlements located north of the site, Millar's Plantation and Old Bannerman. No subsurface investigation or collection of artifacts by Brooker was attempted anywhere on the Project site based on the relatively large area and no specific areas of note in historical document reviews.

4.4.1.1.2. Historic Context – South Eleuthera

In context, the history of Lighthouse Point is linked to nearby settlements, notably Old Bannerman Town and Millar's Plantation. In 1806, Robert Millar and an unknown number of slaves from his late father's estate on Long Island (Strawberry Hill), relocated to South Eleuthera with an initial grant for approximately 1,000 acres to establish a new settlement, henceforth called Millar's. From the Millar's relocation in 1806 to Ann Millar's death in 1871, the Millar family had a profound influence on the development and settlement of South Eleuthera. Upon the death of Anne Millar in 1871, her will deeded her Eleutheran properties to former slaves, servants, and their descendants "forever."

Regarding Old Bannerman Town located to the north of the site, the heavily buttressed Anglican Church was established in 1873; 2 years after Anne Millar's death and 40 years after slavery was abolished in in all British Possessions by an Act brought before Parliament on August 28, 1833. In July 1836, Governor Colebrooke reported that Mr. Millar had freed his slaves and accounted for their then present occupations.

4.4.1.1.3. Findings

Structures 1-6

Structure I

In February 2019, a ruined structure, Structure 1, located on the property's boundary line and identified by the surveyor was documented by Brooker. Reexamination of this structure and its surrounding area was performed by Brooker in January 2020. Structure 1 is a substantially ruined single story domestic dwelling built of tabby.

Structure 2

Located south of Structure 1, Structure 2 is poorly preserved with only two fragmentary exterior walls standing. Too little superstructure survives to determine if Structure 2 was residential in function or an ancillary building used for storage or other activities related to agricultural production. An apparent boundary wall running approximately east/west roughly 8 ft south of Structure 2 suggests that the larger tract granted to G. Mackey was possibly subdivided.

Structure 3

Structure 3 is incompletely preserved though careful finishing around openings and the relative structure sturdiness are consistent with domestic occupation though smaller in size to Structure 1 and Structure 5, both of which provide evidence for internal room division.

Structure 4

Structure 4 has incomplete wall fragments with disassociated foundations. Located south of Structure 3, residential usage seems likely given its apparent size but is difficult to discern with the existing structure remnants.

Structure 5

Structure 5 is clearly domestic in character, though now substantially ruined. Structure 5 continues the linear southward placement of the identified structures.

Structure 6

Structure 6 and its dependency Structures 6(b-d) are situated at an elevation of approximately 75 ft and previously affording panoramic views of the sea when the vegetation was cleared. This structure is of exceptionally high quality and distinct with an entrance at each façade. Located a short distance from the building are the remnant four posts of lignum vitae barely visible in the ground forming a rectangle. This rectangular structure measures 22 ft, 9” by 15 ft, 8 inches. Structures 6a and 6b appear to have been supported by two ruined circular bread ovens. The use of Structure 6 is unknown.

Stone Walls

Structures 1-5

Structure I was originally enclosed by dry stacked stone walls. Portions of this enclosure still exist but it is no longer intact. Surviving wall segments represent a historic land use pattern probably dating to the mid-nineteenth century. It is recommended that these field walls be preserved ‘as is.’

Northwest Property Boundary

A stonewall was observed to the south of the northwestern property line along a southwest-to-northeast orientation. This stone wall aligns with the stone wall shown on the 1959 land survey map.

Jack Millar Farmstead

Contiguous stonewalled compounds visible on satellite imagery at the Project site’s western shore north of Big Bluff Point are identified on Figure 4-20. This resource was not accessible to Brooker due to dense vegetation in February 2019 and January 2020. The Jack Millar Farmstead is of likely historic significance and potentially eligible for nomination to The Bahamas National Register of Historic Resources.

4.4.1.1.4. Prehistoric Occupation

Previous investigation by students at the Cape Eleuthera Institute Island School identified possible traces of a prehistoric (Lucayan) human presence on and in the vicinity of East End Point. A walkover survey was performed parallel to Lighthouse Bay in an effort to make a discovery of a prehistoric surface artefacts. No artefacts were discovered. Coastal processes heavily influence area and prehistoric artefacts, if any, are onsite would be subsurface.

It is recommended that an accredited archaeologist with knowledge of Bahamian prehistory conduct systematic shovel tests in the shoreline areas north and south of Lighthouse Point to determine if the site has the potential to yield 'important information about prehistory'. Any archaeological investigation will require consultation with AMMC. It is recommended that development be avoided in the areas selected for testing by AMMC including any subsurface activity resulting in disturbance.

4.4.1.1.5. Lighthouse

In the immediate vicinity of and therefore within the area of influence, the lighthouse at Lighthouse Point, though situated on Crown Land, was reviewed as a historic resource. The Specification Books of the Bahamian Ministry of Public Works contained a detailed description of the South East Eleuthera Lighthouse. This book established that the lighthouse was erected in 1901 by a contractor named Joseph H. Cox.

Mr. Brooker recommends that some minor repairs take place to maintain building integrity and public safety. Additionally, the entire building should be examined by a qualified structural engineer or architect to identify any structural deficiencies. Any improvements and access to the lighthouse by the responsible party must be discussed with AMMC.

4.4.1.1.6. Eligibility for The Bahamas National Register of History Resources

Collectively, Brooker considers Structures 1-5 a significant historic resource with potential eligibility for inclusion on The Bahamas National Register of Historic Resources. With regards to Structure 6, Brooker recommends an archaeological investigation of Structure 6 and its ancillary features to determine function, construction sequence, temporal development, and extent. At a minimum, additional investigations are recommended to provide the necessary details for consideration for inclusion to The Bahamas National Register of Historic Resources. Dr. Grace Turner notes that the National Register of Historic Resources does not include these structures.

Criteria for eligibility on The Bahamas National Register of Historic Resources for Structures 1-9 and any antiquity not yet discovered are outlined below:

- **Date of Antiquity** – Generally a property must be fifty years of age or more to be considered a historic resource.
- **Historic Significance**
    - Association with historic events or activities

  - Association with important persons,
  - Distinctive design or physical characteristics, or
  - Potential to provide important information about prehistory or history.
- **Historic Integrity** – Historic Integrity must also be evident through historic qualities including location, design, setting, materials, workmanship, feeling, and association.
- **Historic Context** – Information in relation to major trends of history in their community, island or the nation. Information about historic properties and trends is organized by their place and time which can be used to weigh the historic significance and integrity of a property/resource.

Recommendations of eligibility provided by Brooker are opinions based upon the writer's professional experience in The Bahamas and with the National Historic Register property nominations in the United States. Final determination of eligibility will be made by AMMC.

5.0 LEGAL AND REGULATORY FRAMEWORK

Lighthouse Point is within the constituency of Central and South Eleuthera, which is represented by Member of Parliament Hank Johnson.

5.1 RELEVANT REGULATIONS/POLICIES: ENVIRONMENTAL LAWS OF THE BAHAMAS

Table 5-1. Environmental Laws of The Bahamas

Environmental Law, Regulation, Policy	Subject	Summary
Antiquities, Monuments, and Museum Corporation Act 1998, Chapter 51	To protect antiquities	An Act to provide for the preservation, conservation, restoration, documentation, study and presentation of sites and objects of historical, anthropological, archaeological and paleontological interest, to establish a National Museum, and for matters ancillary thereto or connected therewith.
Archipelagic Waters and Maritime Jurisdiction Act, 1993	To establish the waters of The Bahamas and its exclusive economic zone	An Act respecting the territorial sea, archipelagic waters, and internal waters and the exclusive economic zone of The Bahamas.
Bahamas Maritime Authority Act 1995, Chapter 238	To enact The Bahamas Maritime Authority	The purpose of the Authority is to promote ship registration and maritime administration in The Bahamas, regulate shipping per the Merchant Shipping Act, represent The Bahamas in international organizations and to assist the development of the maritime industry in The Bahamas.
Bahamas National Trust Act, 1959 Bahamas National Trust Amendment, 2013 Bahamas National Trust Amendment, 2019	Designation and management responsibility for National Parks	This Act and Amendment founded The Bahamas National Trust and grant it authority for the provision and oversight of National Parks in The Bahamas. 2019 Amendment: To Amend the Bahamas National Trust Act to expand the duties of the Bahamas National Trust; to revise the constitution of the council; to expand authorized capital investments; and for connected purposes.
Bahamas Public Parks and Beaches Authority Act, 2014	To establish the parks and beaches authority and its responsibilities	An Act to establish the Public Parks and Beaches Authority, to provide for the property rights and liabilities of the Authority and to identify, regulate, maintain, develop, and conserve public parks and beaches and for connected purposes.
The Biological Resources and Traditional Knowledge Protection and Sustainable Use Act, 2020* *Passed in February 2021	To provide for the regulation and access to biological resources and associated traditional knowledge.	An Act to provide for the regulation and access to biological resources, and associated traditional knowledge, sustainable use of its components, prohibiting unlawful genetic and bio-prospecting and gathering and for search for The Bahamas and its people fair and equitable sharing of the benefits arising out of the use of biological resources, traditional knowledge, and to establish the necessary administrative structures and processes for the implementation and enforcement of such principles and for matters connected therewith or incidental thereto.

Table 5-1. Environmental Laws of The Bahamas

Environmental Law, Regulation, Policy	Subject	Summary
Coast Protection Act, 1968 Chapter 204	To protect the coast	An Act to make provision for the protection of the coast against erosion and encroachment by the sea and for the purposes connected therewith. Coast protection work means any work or construction alteration, protection, repair, maintenance, demolition or removal for the purpose of the protection of any land and includes the sowing or planting of vegetation for said purpose. Protection means protection against erosion or encroachment by the sea. The Coast Protection Act stipulates in Section 3(1) that the Minister may carry out coast protection work as appears to be necessary or expedient.
Conservation and Protection of the Physical Landscape of The Bahamas, 1997 Chapter 260	Excavation, Landfill, Quarrying, Mining, Protected Trees Listing	This Act makes provisions for the regulation of activities including excavation, landfill, quarrying, mining, and harvesting of protected trees in The Bahamas for the purpose of conservation of maintenance of the environment. The Regulations include a list of protected tree species in The Bahamas.
Environmental Health Services (Collection and Disposal of Wastes) Regulations 2004	To administer and outline waste collection and management facilities	Environmental Health Services (Collection and Disposal of Wastes) Regulations 2004 establish the collection and control of waste including waste facilities and other matters relating to wastes.
Environmental Health Services (Fees and Services) Regulations 2000	To establish fees and services performed by the Department of Environmental Health Services	The Fees and Services regulations outline services and associated fee rates performed by the Department of Environmental Health Services. The Department may provide testing for air quality, water quality, and radioactive materials.
Environmental Health Services Act 1987	To promote and protect the public health and to provide for the conservation and maintenance of the environment	An Act to promote the conservation and maintenance of the environment in the interest of health for proper sanitation in matters of food and drinks, and generally for the provision and control of services, activities, and other matters connected therewith or incidental thereto.
Environmental Planning and Protection Act 2019	To establish the Department of Environmental Planning and Protection	An Act to establish the Department of Environmental Planning and Protection; and to provide for the prevention and control of pollution; the regulation of activities, and the administration, conservation and sustainable use of the environment and for connected purposes. The Act defines procedures for environmental reporting requirements for protection of natural resources.
Environmental Impact Assessment Regulations 2020	To provide procedures for a Certificate of Environmental Clearance	The Regulations provide procedures for the review of proposed projects inclusive of monitoring and compliance requirements. The Regulations dictate the requirements for a Certificate of Environmental Clearance (CEC).
Fisheries Resources (Jurisdiction and Conservation) Act 1977	To protect fisheries and provide regulation for marine reserves/protected areas	An Act to make provision with respect to the conservation and management of the fishery resources of The Bahamas and to extend the limits of the jurisdiction of The Bahamas over such fishery resources and for matters connected therewith and incidental thereto. The Act establishes the economic fishery zone of The Bahamas.

Table 5-1. Environmental Laws of The Bahamas

Environmental Law, Regulation, Policy	Subject	Summary
Fisheries Resources (Jurisdiction and Conservation) Regulations (1986) Chapter 244 Amendment (2015)	To protect fisheries and provide regulation for commercial and recreational activities	Regulations to permit activities related to fisheries. These regulations guide catch methods, size requirements, and to establish specific species regulations related to closed seasons. The regulations provide specific remarks for crawfish, conch, turtle, scale fish, stone crab, marine mammals, sponge with limitations placed on export. No person shall within the exclusive fishery zone, fish for, molest, or otherwise interfere with any marine mammal without authorized permission of the Minister. In 2009, it became illegal to buy, sell, or possess marine turtles, marine turtle parts, or turtle eggs, or to disturb a turtle nest. The 2015 amendment established an annual duration for the closed season of grouper commencing 1 December in any year to 28 February of the immediate succeeding year.
Forestry Act of 2010	To protect the forests and make declarations to use	The Act provides for utilization of forest products and non-timber forest products from the forest estate. It sets forth the management and conservation of the Forest estate and associated industries.
Health and Safety at Work Act 2002	To protect human health and safety at work	The purpose of the Act is to: secure the health, safety and welfare of persons at work- protect persons other than persons at work against risks to health or safety arising out of or in connection with the activities of persons at work- control the storage and use of explosive or highly flammable or otherwise dangerous substances, and generally preventing the unlawful acquisition, possession and use of such substances.
Marine Mammal Protection Act 2005 & Regulations 2005	To protect marine mammals	To make provision and regulation for the protection of marine mammals.
Merchant Shipping (Oil Pollution) Act, Chapter 275	To address oil pollution by ship and to effect to International Conventions relating to pollution of the sea	An Act to make provision concerning oil pollution of navigable waters by ship; to provide for the civil liability for oil pollution by merchant ships; to give effect to certain International Conventions relating to pollution of the sea; and for matters connected with and incidental to the foregoing.
Planning and Subdivision Act, 2010 Planning and Subdivision Regulations (Application Requirements), 2011	To regulate the built environment	This Act regulates the development of the built environment though physical planning protocols across the archipelago of The Bahamas. The Act stipulates the process for subdivision approval subject to specific conditions with respect to the features of the proposed development or project including the preparation of an Environmental Impact Assessment/Statement.

Table 5-1. Environmental Laws of The Bahamas

Environmental Law, Regulation, Policy	Subject	Summary
Port Authorities Act 1962	To provide regulation for the management and control of navigational areas	An Act to provide for the constitution and appointment of port authorities for New Providence and the Out Islands whereby the various ports and harbours of The Bahamas and the pilots and pilotage thereof and therein may be better regulated and controlled. A letter of notification for coastal activity must be sent to the Port Department for any activity occurring in the sea.
Public Works Act 1963	To provide for the physical development of The Bahamas	An Act to provide for the construction, management and development of public works, buildings, and road.
Water and Sewerage Act 1976	To establish the Water and Sewerage Corporation and to control water resources	An Act to establish a Water and Sewerage Corporation for the grant and control of water rights, the protection of water resources, regulating the extraction, use and supply of water, the disposal of sewage and for connected purposes.
Wild Animals Protection Act 1968	To protect wild animals of The Bahamas	The Act provides a listing of protected animal species in The Bahamas.
Wild Birds Protection Act 1987 Wild Bird Protection Act (Reserves),	To protect wild birds of The Bahamas	The Act protects the wild birds of The Bahamas and makes provision for the dedication of time periods for the hunting of specific species.
Wildlife Conservation and Trade Act	To implement CITES	An Act to implement the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) with a view to the protection of wild species from harm through unsustainable exploitation.

5.2 RELEVANT REGULATIONS/POLICIES: ENVIRONMENTAL POLICIES OF THE BAHAMAS

Table 5-2. Environmental Policies of The Bahamas

Relevant National Policies	Subject	Summary
Bahamas National Maritime Policy, 2015	The National Maritime Policy provides a guidance to expand the maritime sector through safe and sustainable practices.	The Objectives of The Bahamas National Maritime Policy are: 1) to expand the maritime sector for future economic development 2) to provide employment opportunities for Bahamians both nationally and internationally 3) to facilitate the training of mariners consistent with international norms 4) to establish programmed and protocols that enhance the safety of mariners and vessels 5) to upgrade port infrastructure and port services throughout the country
National Energy Policy 2013-2033	The National Energy Policy 2013 – 2033 outlines a plan for a modern diversified and efficient energy system that is affordable and secure while ensuring sustainability prosperity.	The National Energy Policy acknowledges the influence of atmospheric greenhouse gas emissions as contributors to global climate change. Reducing dependence on fossil fuels while increasing investment for renewable energy sources show commitment by The Bahamas to adapt to climate change.
National Policy for the Adaptation to Climate Change 2005/2014	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 (UNFCC). The Bahamas is committed to reduce greenhouse gases and address climate change impacts. The Bahamas prepared its Second National Climate Change Communication to UNFCC in September 2014.
The Bahamas National Wetland Policy	The goal of the National Wetlands policy is to conserve, manage, and restore wetland wisely in conjunction with sustainable development practices.	The Bahamas National Wetland Policy outlines a national framework to meet the goals and objectives of the Ramsar Convention, which The Bahamas signed on June 7, 1997. This policy paper provides direction to the Government for the management of wetlands and to identify wetlands of national importance.
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).
National Biodiversity Strategy and Action Plan, 1999	A plan to maintain biodiversity through sustainable development for a small island developing nation.	The Government of The Bahamas 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.

5.3 RELEVANT REGULATIONS/POLICIES: INTERNATIONAL CONVENTIONS AND AGREEMENTS

Table 5-3. International Conventions and Agreements

International Convention/Organization	Subject	Summary
Cartagena Convention Ratified: June 24, 2010	An agreement for the protection and development of the marine environment in the wider-Caribbean region	The Convention provides a legal framework for cooperation in the wider Caribbean region. Contracting parties must adopt measures to prevent, reduce, and control pollution from: ships, dumping, sea-bed activities, airborne pollution, and pollution from land-based sources and activities.
Convention on Biological DiversitySigned: June 12, 1992	To preserve species diversity	The Bahamas is a signatory to the Convention on Biological Diversity which came into force December 1993. It has three main goals: a) The conservation of biological diversityb) The sustainable use of components of biological diversityc) The fair and equitable sharing of the benefits arising out of the utilization of genetic resources.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Signed: March 20, 1979	To protect species through the regulation of wildlife trade	CITES regulates the trade of wildlife through a classification system that restricts movement of endangered species. Trading of species may require permits as dictated by the Convention.
Convention for the Prevention of Pollution from Ships (MARPOL 73/78) Signed: June 7, 1983	To prevent the pollution of the sea by maritime traffic	MARPOL 73/78 outlines measure for the prevention of pollution of the marine environment by ships from operational or accidental.
Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention) Signed: June 7, 1997	This convention provides a framework for the international protection of wetlands as contributors for human resources and moreover, for avifauna which do not adhere to international boundaries.	The Bahamas is a signatory to the Convention on Wetlands of International Importance, also known as the Ramsar Convention. Ramsar defines wetlands as ‘areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters. The Bahamas has 1 site, Great Inagua National Park, designated as Wetlands of International Importance (Ramsar Sites).
United Nations Convention on the Law of the Sea Signed: July 29, 1983	To govern the sea with delineation of national boundaries and rights	The Bahamas ratified the Law of the Sea in 1983 and the Convention came into force in 1994. The premise of UNCLOS is to provide for good ocean governance, define the exclusive economic zone (EEZ), and establish innocent passage and the rights of States to limit the rights of innocent passage related to marine resources conservation and pollution control.
United Nations Convention to Combat Desertification and Drought Signed: November 10, 2000	To combat desertification and to mitigate the effects of drought	The Convention is a proponent for sustainable development by addressing social and economic issues that directly impact land degradation.

Table 5-3. International Conventions and Agreements

International Convention/Organization	Subject	Summary
United Nations Framework on Climate Change Signed: June 1992 Kyoto Protocol Signed: April 9, 1999 Paris Agreement Ratified: August 22, 2016	To stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with climate systems	The Bahamas is a signatory to UNFCC which entered into force in March 1994. The UNFCC was the culmination of climate negotiation at the Rio Earth Summit in 1992. This summit established a framework with an aim to stabilize atmospheric greenhouse gas. The Paris Agreement as put forth at the Conference of the Parties (COP21) in December 2015. The agreement sets forth a global action plan to combat climate change by limiting global temperature rise to below 2 degrees Celsius.
Hamilton Declaration on Collaboration for the Conservation of the Sargasso Sea Signed: September 2016 Not yet in force	To conserve the Sargasso Sea	The Hamilton Declaration is currently signed by seven (7) nations, including The Bahamas. The Sargasso Sea covers nearly 5 million square kilometers and is so named for the seaweed, Sargassum. Sargassum mats and windrows act as major nursery and spawning areas. Of note, it is the only place where the European and American eel are known to spawn.

5.4 GOVERNMENT DEPARTMENTS AND LOCAL NON-GOVERNMENTAL ORGANIZATIONS

- Ministry of Public Works
- Ministry of the Environment and Housing
- Department of Environmental Planning and Protection
- Port Department
- Department of Physical Planning
- Department of Environmental Health
- Water and Sewerage Corporation
- Bahamas Power and Light
- Local Government of the district of South Eleuthera
- Department of Marine Resources

6.0 IDENTIFICATION AND ASSESSMENT OF POTENTIAL ENVIRONMENTAL IMPACTS

This section of the report identifies possible environmental, socioeconomic, and cultural impacts that may occur as the result of the Lighthouse Point development. *Impact* is defined as a change to the existing property, including the site's natural resources, environment, economic and employment conditions, property values, cultural value, etc. Both positive and negative impacts can reasonably be expected to take place either directly or indirectly as the result of the proposed Project being completed. It should be noted that until the start of development, master plan changes might occur as a method to mitigate potential negative impacts and improve development efficiency.

6.1 IMPACTS TO TERRESTRIAL RESOURCES

This section identifies impacts to each of the vegetative communities identified on the site.

Overlaying the proposed site plan on the vegetative communities map reveals that development of the Project will have varying degrees of impact on the existing communities. Table 6-1 identifies the acreage of impacts, after which potential direct and indirect impacts are identified and described.

6.1.1 DIRECT AND INDIRECT IMPACTS TO DRY BROADLEAF EVERGREEN FOREST

Development of the Project will directly impact 39.2 acres of dry broadleaf evergreen forest. These impacts are mostly associated with the BOH, guest recreation areas and related site infrastructure, including primary and secondary circulation corridors (i.e., roads), the adventure camp, and the access road that is proposed to be constructed to allow Bahamians and other non-cruise ship passengers to access the beach through the Disney Donated Public Lands parcel. Although the estimate of forest impacts assumes a worst-case scenario of land-clearing, in actuality, impacts may be less, provided notable features (e.g., specimen-size lignum vitae trees) are preserved in-situ, and other species (e.g., *Encyclia* orchids) are relocated prior to land clearing and used for re-vegetation.

Indirect and secondary impacts to dry broadleaf evergreen forest are more difficult to quantify but may include fragmentation of habitat and increased exposure of remaining forest when protective vegetation is removed.

Table 6-1. Direct Impacts to Terrestrial Resources

Vegetative Community	Existing Acreage[1]	Acreage to be Impacted	Area to Remain Acres	Area to Remain Percent
Dry Broadleaf Evergreen Forest	471.9	39.2	432.7	92%
Sand Strand	265.3	49.1	216.2	81.5%
Sand[2]	40.5	40.5	40.5	100%
Herbaceous and Shrub-dominated Dunes	24.7	13.2	11.5	47%
Casuarina-dominated Dunes[3]	22.1	22.1	0	0
Conocarpus	16.4	0.3	16.1	98%
Exposed Rock	11.1	1.1	10.0	90%
Roads – Existing[4]	2.9	2.9	2.9	100%
Herbaceous Wetland	2.1	0	2.1	100%
Mixed Mangroves	5.4	0	5.4	100%
Ponds				
Big Pond	84.0	0	84.0	100%
White Pond	19.8	0	19.8	100%
Shad Pond	8.30	0	8.3	100%
Northwest Pond	3.50	0	3.5	100%

[1] Acreages listed may be different than other totals identified elsewhere in this EAI, as Crown Lands, including Big Pond and White Pond and sandy beaches are included.
[2] No dredging or filling or replacement of sandy beaches is proposed, so there will be no reduction in sandy beaches. However, due to expected increased human use, both within the subject property and within the Disney Donated Public Lands, all 100% of this community is expected to be impacted.
[3] Invasive non-native *Casuarina* trees are proposed to be removed. Removal of these trees will rehabilitate areas of this habitat to shrub-dominated dunes.
[4] All existing roads will be improved to address safety and environmental deficiencies.

Removal of mature dry broadleaf evergreen forest will result in shifts in species abundance and distribution. Species that prefer densely forested thickets (e.g., thick-billed vireos, gray catbirds) will avoid areas where dry broadleaf forest is impacted due to development. Species that prefer less dense areas (e.g., common ground-doves, bananaquits, most migratory warblers, including Cape May, magnolia, northern parula, palm, prairie, Kirtland's, etc.) are likely to benefit due to the creation of this type of habitat. In general terms however, because 80 percent or more of the property will remain in its existing condition, these shifts in species usage are unlikely to result in significant changes in the populations of individual species of birds or other animals.

Ecologically, the installation of the proposed communication tower is likely to offer both potential benefits and impacts. Observations of existing cellular telecommunications towers on South Eleuthera have revealed that most are being used for nesting by ospreys, large fish-eating birds that typically choose to construct nests on the tallest suitable structure within a pair of bird's home-range territory. Two existing communication towers in the Bannerman Town and Princess Cays vicinity were actively being used for nesting by ospreys during the winter 2018-2019 nesting season. Awareness of this situation will allow Project designers to consider integration of a nest platform into the design of the proposed communications tower – at a location where a future nest will not pose a threat to telecommunications equipment. Simultaneously, however, telecommunication towers are known to result in bird deaths, primarily when migratory birds, many of which migrate at night and at low altitudes, unknowingly strike newly installed structures. Available BMPs such as lighting will be considered to help minimize any such impacts.

6.1.2 DIRECT AND INDIRECT IMPACTS TO SAND STRAND

The majority of the Sand Strand community will remain unaffected by the proposed Project. The BOH, East Family Beach, which includes a children's play area and dining pavilion area, Art and Culture Center, and other guest service areas, will have the most significant effects on the Sand Strand community. Additional direct impacts will result from land-clearing to construct transportation corridors, both on Developer-owned lands and in fulfillment of the Developer's commitment to provide access to the lands being donated to the Government of The Bahamas as a new park.

Indirect and secondary impacts to the sand strand community and its inhabitants will include fragmentation of habitat, reductions in vegetation that provide foraging and nesting habitat for birds and other fauna and when areas adjacent to cleared lands become more exposed to wind and salt spray.

Benefits will accrue to areas within the Sand Strand community when invasive *Casuarina* trees are removed.

In the southeast portion of the property, the proposed transportation corridor and other guest-related development are close to the existing bluff. Protection of this notable geologic feature will be addressed in the EMP.

6.1.3 DIRECT AND INDIRECT IMPACTS TO SAND

Although no fill is proposed to be placed below the water line on the existing beaches, direct impacts are anticipated to occur on all beach areas. Native sand will be placed above the water line where necessary to create a guest friendly beach with no hazards. Both negative and positive ecological impacts are expected. Presently, tidal wrack that is naturally deposited on the beach by winds and water currents become part of the beach and dune system. Accumulation of “seaweed”, which usually consists of Sargassum and blades of seagrass, provide habitat for populations of amphipods which are then preyed upon by ruddy turnstones and other shorebirds. During windy conditions, wind-blown sand tends to accumulate on this wrack, which, as it decomposes, provides micro-habitat conditions for the establishment of pioneer plants.

Direct adverse impacts to this natural system are likely to occur when beach maintenance and removal of seaweed is implemented to make the beaches safer and more visually appealing for visitors. Other direct impacts may include disturbance of birds, ghost crabs and other wildlife (particularly sea turtles if monitoring reveals the beaches are used for nesting by sea turtles) as a result of increased human activity and noise due to the routine use of equipment on the beach.

Positive impacts include the planned clean-up of beaches that are presently strewn with plastics, Styrofoam and a wide variety of solid waste. Removal of this component of flotsam and jetsam for appropriate upland disposal as part of an ongoing beach management program will be beneficial to the environment.

The Disney Donated Public Lands for use by residents and citizens of The Bahamas, a public roadway and other amenities will facilitate public access to the northeast beaches. The Project will also provide improved access and amenities for visitors at other beaches onsite.

Limited site reviews during sea turtle nesting season have not determined if the beaches are used for nesting. If future monitoring reveals that one or more of the beaches do provide habitat for nesting turtles, beach management standards equivalent to U.S. standards (https://www.ircgov.com/departments/public_works/Coastal_Engineering_Section/HCP/HCP2013.pdf) should be established to avoid adverse impacts to this resource.

Proposed beach expansion will occur landward of the foredune. Sand placement will be restricted to landward of the mean high water line. Significant impacts to sea turtle nesting activities are not anticipated. That being said, if turtles are documented to nest at Lighthouse Point, Disney will be using sea turtle protocols based on the Florida Fish and Wildlife Conservation Commission Marine Turtle Conservation Handbook protocols, which it has been using in its Vero Beach Resort for the past 17 years (https://myfwc.com/license/wildlife/marine-turtle-permit/; FWC, 2016).

The number of guests traveling on DCL ships will range from 11,400 to 26,600 per week depending on the season, and it is estimated that approximately 70 percent of guests will visit the beaches. Guests and employees will have access to 10,000 linear feet or 54 percent of the 21,700 ft of property shoreline at Lighthouse Point. It is hard to anticipate how this will influence shorebird populations, as it is species specific (including species and individual behaviors as well as degrees of habituation) but effects on foraging and nesting are primary issues to consider (Baudains & Lloyd, 2007; Yasué, M. 2005; Kerlinger et al., 2013; Burger, 1995). To better understand this dynamic, monthly bird surveys will resume following temporary COVID-19 travel restrictions, to further establish baseline conditions and will continue into operations. Adaptive management practices will be implemented to mitigate impacts on shorebirds on the rest of the shoreline as more information becomes available.

Bird Foraging: Increased human activity is likely to impact shorebird foraging behavior, either by altering habitat use (i.e., avoiding areas of high human activity) or increasing vigilance behavior and thereby reducing foraging rates. Species can habituate to people and there is evidence to suggest that when human-free zones are established, other birds will preferentially forage in these locations. The majority of the southwestern shoreline and the donated beach region are predicted to have relatively little human traffic.

Bird Nesting: Increased human activity impacts bird nesting behavior but does not necessarily lead to reduced reproductive success, depending on the species. All species increase vigilance, which cascades to impact parental care, but in some cases, this does not lead to reduced fledging rates. If active bird nesting is detected, the area will be temporarily fenced off at appropriate distances and signage will be added to allow the appropriate buffer.

Dogs: Dogs are a primary threat to shorebirds and often have greater impacts than beach goers. Service animals are allowed on cruises, but a strict leash requirement will be enforced.

Birds of particular interest on the Lighthouse Point shoreline are piping plovers, which have a high level of wintertime site fidelity, a somewhat unusual trait for many species of migratory birds. Piping plovers were observed in the same general area of the site during separate site visits in October and December 2017, November and December 2018, and January, October and November 2019. The location where the piping plovers were most often encountered is shown on Figure 4-20, which also shows other notable landside features. The Developer will incorporate a piping plover conservation program into the into the wildlife management plan as part of the Environmental Management Plan. A portion of the point on Bottle Bay where these plovers have been consistently observed will be protected with buffers to prevent or reduce the potential for disturbance.

Guests/Wayfinding: On-island interpretative signage and environmental education programs for employees and visitors will be implemented that include environmental conservation messages on local species.

It is further noted and accepted that:

1. All of the beach shoreline will not be populated at the same time;
2. Fencing and signage will be implemented if there is noticeable frequent nesting; and
3. Many of the birds that inhabit the beach are seasonal residents.

Indirect and secondary impacts to beaches are difficult to quantify. Shorebirds, including ruddy turnstones and piping plovers may be disturbed when beaches that are presently seldom used become preferred destinations for guests. Indirect adverse impacts can be addressed through development and implementation of a beach management plan.

Monitoring, implementation of BMPs and adaptive beach management will be necessary to ensure that adverse impacts are avoided to the extent practicable and minimized where impacts are unavoidable.

6.1.4 DIRECT AND INDIRECT IMPACTS TO HERBACEOUS AND SHRUB-DOMINATED DUNES

Approximately 13.2 acres of this vegetative community will be impacted by the development of Guest Beach Areas on the southern part of the east-facing beach and near Lighthouse Bay Beach. These impacts have been calculated as a worst-case-scenario, that all vegetation within the footprint of the proposed Guest Beach Areas will be removed. In actuality, the use of dune cross-over boardwalks and selective clearing could reduce this impact, and unavoidable impacts can at least be partially mitigated through the use of native dune vegetation when *Casuarina* trees and other invasive non-native vegetation are removed.

Another positive effect of development in this community will be the removal of *Scaevola taccada*, a designated invasive species that is presently common in the shrub-dominated dunes along the east-facing beach and other areas of the property. As identified previously on Table 4-9, this species is the only plant species observed on the site which is also designated by the Government of The Bahamas as being recommended for eradication.

Indirect and secondary impacts to this community are difficult to quantify. Removal of some of this community will expose adjoining areas to higher levels of salt spray, which may have negative effects on nearby areas of this same habitat and areas of Sand Strand.

Benefits will accrue to areas within the Herbaceous and Shrub-dominated Dunes when invasive *Casuarina* trees are removed.

6.1.5 DIRECT AND INDIRECT IMPACTS TO *CASUARINA*-DOMINATED DUNES

Casuarina equesitifolia is designated by the Government of The Bahamas as a species “Recommended for Control”. Management of this species in and near the development area of the property would be beneficial, both ecologically and financially, as its’ uncontrolled presence will lead to further dispersal through its prolific seed dispersal.

Management of this species would positively address its adverse allelopathic effects on native plants, enhancing the ability of native dune plants to become re-established.

One potential adverse impact of the removal of this resource is the loss of shade from the sun, as *Casuarina* is one of the few existing shade-producing trees in the back-dune zone. This situation can be addressed through mitigative efforts to re-establish native shade-producing trees or other shade-producing infrastructure that is harmonious with the property (e.g., tiki huts).

An indirect adverse impact that will likely occur as a result of the removal of this resource is that salt spray will penetrate further onto the property when the existing tall and dense *Casuarina* are no longer present as wind/spray shield.

Casuarina on the property will be addressed in variable ways, depending on the degree of infestation, as described hereafter. In areas of dense *Casuarina* infestation (e.g., areas mapped as *Casuarina*-dominated dunes), where trees and tall (i.e., < 25 feet in height) and dense, *Casuarina* will likely be removed mechanically. They will be transported by heavy equipment (e.g., front-end loaders) to designated vegetation management areas. Although the ultimate disposal method(s) have not been determined, it is likely that they will either be burned in approved burn boxes upon approval by DEPP, which will be addressed in the EMP, mulched for future use on trails, or salvaged for use by artisans. *Casuarina* are prolific seed producers, so burn boxes may be more desirable than transporting them long distances, during which seeds could potentially be dispersed into areas of the property where they do not presently exist.

In areas where *Casuarina* are intermittently present, they will be controlled on a case-by-case basis, with the decision being based on the degree to which high-quality natural habitat is present in the vicinity. In areas that are easily accessible (e.g., along the edge of the existing access road), and which are already impacted, they will likely be mechanically removed and transported to designated vegetation management areas for burning, mulching or salvaged for woodcraft artisans.

At other locations, where they may be present in low numbers amid high-quality natural communities, they will either by treated by a basal-bark herbicide and left to die in place as standing dead-wood, or their trunks may be cut at/near ground level, stumps treated with herbicide, and the trunks either left to decompose naturally, or cut into pieces and transported for burning, mulching or local woodcrafts Individual *Casuarina* trees that are far removed from areas that are to be impacted during site development and operations will be addressed on a case-by-case basis.

Without regard to their method of initial disposal, the property will have an active management plan for routine maintenance removal of *Casuarina* and other invasive species (refer to Section 7) to prevent them from becoming re-established.

6.1.6 DIRECT AND INDIRECT IMPACTS TO CONOCARPUS

Direct impacts, secondary impacts and indirect impacts to *Conocarpus* are expected to be minimal.

Approximately 0.3 acre of *Conocarpus*-dominated wetland located near the northeast corner of the property will be impacted for the development of the road that will allow the residents and citizens of The Bahamas and tourists to access the Disney Donated Public Lands area. The crossing will be elevated or culverted and the impacts during the development will be limited to access for pile supports and framing of the crossing. Because a corridor of salt ponds that begins at Big Pond extends north of the property, providing Bahamas residents, citizens and tourists access to the east requires a crossing of this open-water/wetland at some location. The least impactful site for a crossing has been selected, as it was determined that crossing through the wetland at its narrowest point would have less of an impact than building a bridge across a wider, open-water area.

The elevated road crossing will use standard development practices commonly used in sensitive wetland areas world-wide. This includes working from the structure as the roadway extends out and reducing work from the ground areas as work progresses. Only environmentally approved materials will be used in the development. The roadways and any walkways will be designed to be above projected wet-season water levels and will not adversely affect localized or regional hydrology, and are not constructed with materials that contain toxins, so their installation and long-term presence are expected to be insignificant.

6.1.7 DIRECT AND INDIRECT IMPACTS TO EXPOSED ROCK

Impacts to Exposed Rock are expected to occur at locations where proposed infrastructure (e.g., trestle landfall, service ramp) intersects with this habitat. It is estimated that 10 percent or less of exposed rock will be impacted (Figure 3-1 and Table 6-1).

Adverse impacts can be reduced if minimally motile fauna are removed prior to development and relocated to other exposed rock areas that will remain undisturbed.

6.1.8 DIRECT AND INDIRECT IMPACTS TO ROADS

Improvement of the existing road through the property will be a positive effect. The existing road is heavily rutted, washed out in places and has been widened through repetitive use in areas where previous drivers have sought safer passageways, resulting in impacts to the adjoining dry broadleaf forest. Additionally, the existing road has no system for collection and management of rainwater, so its presence immediately adjacent to Big Pond, White Pond and Shad Pond appears to be having adverse impacts on water quality in these ponds. Improving this road to current engineering standards will likely eliminate or reduce existing adverse impacts (Photo 6-1) from stormwater runoff and result in the construction and long-term presence of the roads having a negligible negative overall effect.

Photo 6-1. Rain Runoff Depositing Sand from Existing Road into Shad Pond

It is possible that, once it has been improved, increased use of the road will result in increased mortality of land crabs, which are known to cross roads, particularly during rainy periods and during the breeding season. BMPs for minimizing road-induced mortality will be addressed during road development and as part of the EMP.

6.1.9 DIRECT AND INDIRECT IMPACTS TO HERBACEOUS WETLAND

No impacts are proposed in the area of the herbaceous wetland vegetation that encircles White Pond. To ensure protection of these Crown Lands, a variable width buffer (Figure 6-1) has been established around White Pond where no development will occur.

6.1.10 DIRECT AND INDIRECT IMPACTS TO MIXED MANGROVES

The mixed mangrove community will remain un-impacted. Earlier plans called for the service ramp to be located in this area. However, to eliminate impacts to the mangroves, this pier has been moved away from the mangrove area situated between Northwest Pond and the north property line. Additionally, to ensure long-term protection of this feature, a variable width buffer (Figure 6-1) where no development is to take place, has been established around this pond.

6.1.11 DIRECT AND INDIRECT IMPACTS TO PONDS

6.1.11.1 Big Pond

No dredging or filling is proposed in Big Pond. Buffers are proposed around the entire perimeter of Big Pond, and within the Disney Donated Public Lands (Figure 6-1). Within this buffer, the only activities proposed to be undertaken are upgrades of the existing road that extends through uplands west of Big Pond, and the development of a nature trail for pedestrians.

6.1.11.2 White Pond

No dredging or filling is proposed in White Pond, and a variable-width buffer will totally encircle this pond. The only activity proposed to be undertaken nearby is an upgrade of the existing road that extends through uplands adjacent to the pond.

LEGEND - LANDSIDE COMMUNITIES:	AREAS (ACRES)	IMPACTED AREAS
Dry Broadleaf Evergreen Forest	471.9	39.2
Sand Strand	265.3	49.1
Sand	40.5	40.5
Casuarina - Dominated Dunes	22.1	22.1
Herbaceous + Shrub-Dominated Dunes	24.7	13.2
Conocarpus	16.4	0.3
Exposed Rock	11.1	1.1
Mixed Mangroves	5.4	0
Road	2.9	2.9
Herbaceous Wetland	2.1	0

NOTES:

1. Mapping by Applied Technology & Management, Inc. based on analyses of aerial photography and ground-truthing during 2018 and 2019 primarily in areas where development is proposed.
2. Base Map Source: Apollo Mapping. Date: April 5, 2016.

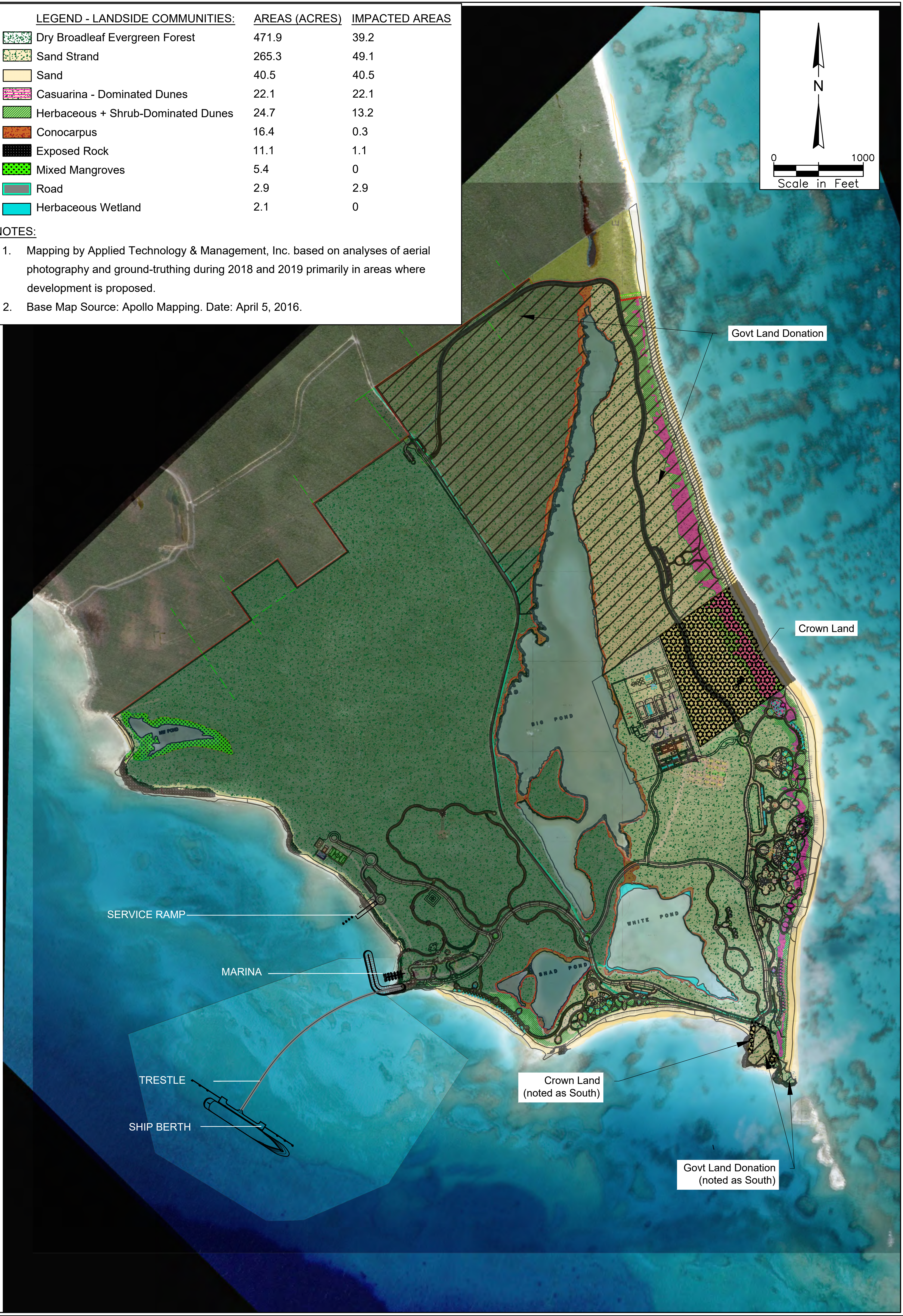


FIGURE 6-1
1:1000 OVERVIEW WITH ILLUSTRATIVE CONCEPT PLAN
LIGHTHOUSE POINT, BAHAMAS
NOVEMBER 10, 2020

ATM

6.1.11.3 Shad Pond

No dredging or filling is proposed in Shad Pond, and a variable-width buffer will totally encircle this pond. Within this buffer, the only activity proposed to be undertaken is an upgrade of the existing road that extends through uplands on its east side.

6.1.11.4 Northwest Pond

No dredging or filling is proposed in Northwest Pond, and a variable-width buffer will totally encircle this pond.

6.1.12 IMPACTS TO THREATENED, ENDANGERED AND NOTABLE LANDSIDE SPECIES

Three species that the Government of The Bahamas designates as "Protected Trees" were encountered within areas that are proposed to be impacted. Two of these species, lignum vitae and blolly, are fairly common in the dry broadleaf evergreen forest and sand strand communities.

Narrow-leaved blolly was particularly common within the area that is proposed for development of the BOH facilities. While it is noted that it will be necessary to obtain a permit from the Forestry Unit to harvest protected trees prior to initiating land clearing, sixteen 30-foot radius plots were analyzed in the BOH area to help identify order-of-magnitude impacts to this species. Within the plots, numbers of narrow-leaved blollies were separated into saplings, shrubs and trees. An approximate density of 257 trees/ha (104/acre) was calculated for the BOH area. With the BOH area estimated to be approximately 8.09 ha (20 acres) in size, a total of approximately 2080 narrow-leaved blolly trees was estimated. Within the shrub layer, an average density of 48 narrow-leaved blolly shrubs/ha (19.4/acre) was calculated, totaling approximately 385 shrubs within the BOH area. For narrow-leaved blolly saplings, an average density of five saplings/ha (2/acre) was calculated, totaling approximately 39 narrow-leaved blolly saplings within the BOH area. Variations in these densities were observed as the distance from shore increased, with higher densities of mature trees in the more forested areas further from shore, and higher densities of shrubs and saplings in the areas closer to shore.

The other protected tree species encountered, horseflesh (*Lysiloma sabicu*), was uncommon, but was also encountered in the dry broadleaf evergreen forest. It is recognized that a tree removal permit will be required prior to any removal of trees of these species. The largest specimens of lignum vitae were observed on the rocky western hillside in the northern part of the property.

Two additional protected tree species (i.e., Holy Lignum vitae (*Guaiacum officinale)*, and mahogany (*Sweitenia mahagoni*) were observed on the property, but not within the less than 16 percent of the property that will be impacted by the proposed Project. Per the EMP, a tree survey will be performed to obtain a permit from the Forestry Unit to harvest protected trees prior to initiating land clearing. Individuals of other protected tree species may be encountered during future site investigations.

Several plant species that are designated as endemics were encountered within areas that are proposed for development. These include *Agave bahamana*, *Bursera frenningae*, *Chromoleana lucayanum*, *Evolvulus squamosus*, *Lantana demutata, Varronia bahamensis*, *Wedelia bahamensis* and *Ziziphus taylorii.* Other endemics (e.g., *Catesbaea foliosa, Thouinia discolor, Lantana balsamifera*, and *Stachytarpheta fruticosa*) were encountered on the site, but the extent to which they are present within the footprint of development has not been determined. Endemism is related to spatial distribution, not rarity, and although no data were collected on numbers of each endemic species within areas proposed for development, individuals of all endemics were also observed in the approximately 80 percent of the site that will remain undisturbed.

Native *Encyclia* orchids and *Tillandsia utriculata* air plants were found to be present within the dry broadleaf evergreen forest. As epiphytes that are transplanted with high levels of success, impacts to individuals of these species could be eliminated or reduced if a plant relocation program is implemented prior to initiating land clearing, if individuals of these species are determined to be present within areas that are proposed for development.

Impacts to several species that are included on lists by CITES and/or IUCN are likely to occur during land clearing but impacts to these species could be minimized through micro-siting and/or relocation prior to land clearing.

As part of the permitting process under the Forestry Unit, locations for the transplanting of protected trees will be identified. It is likely that receiver areas will be a combination of:

a) areas of suitable habitat on the subject property where no development is proposed; and/or b) as landscape plants after site development has concluded.

Because of the interruption of geotechnical work due to government orders related to COVID-19, full tree survey reports have not been completed. Protected tree species are listed in Sections 4.2.1, Table 4-6, Table 4-8, 4.2.15, and Section 7.6. Additional protected tree data will be collected by qualified individuals as COVID-19 restrictions allow enhanced baseline and impact data analyses to be completed. Per the EMP, a tree survey will be performed to obtain a permit from the Forestry Unit to harvest protected trees prior to initiating land clearing. Individuals of other protected tree species may be encountered during future site investigations. This information will be provided as soon as it is completed.

6.1.13 IMPACTS TO INVASIVE SPECIES

Two plant species that are included in The Bahamas National Invasive Species Strategy are present within area that are proposed for development. Australian pine and Asian *Scaevola* are both present, primarily near the east-facing beaches, but intermittently in other areas of the property. Individuals of these species will be removed, and an active maintenance removal program will be implemented to remove new recruits of these species in and near Project development areas where there is easy access without the potential for environmental impacts.

Several additional non-native species that are not identified in the National Invasive Species Strategy but are considered invasive in other countries [e.g., Egyptian Crowfootgrass (*Dactylctenium aegyptium*) and African bowstring hemp (*Sansevieria hyacinthoides*)] were also observed on the property (refer to Section 4.2.1.6). The absence of these species in the NISS may either be because their degree of invasiveness has not been analyzed by the Government of The Bahamas or that they have been evaluated and were determined to not be a posing a significant enough threat to native ecosystems to warrant their designation as needing eradication or control. Without regard to why they are not designated for eradication or control, no effort to manage populations of these species will be undertaken on the property until/unless the Government of The Bahamas identifies them in a subsequent update to the NISS.

6.1.14 PROPOSED IMPACTS

6.1.14.1 Utility and Support Infrastructure

Utility infrastructure requirements include the RO potable water production plant, the WWTP, the solid waste management facility, electrical facilities, maintenance areas, and an administrative complex. Conceptual site plans for these facilities call for 5 to 10 acres of clearing in the dry broadleaf evergreen forest.

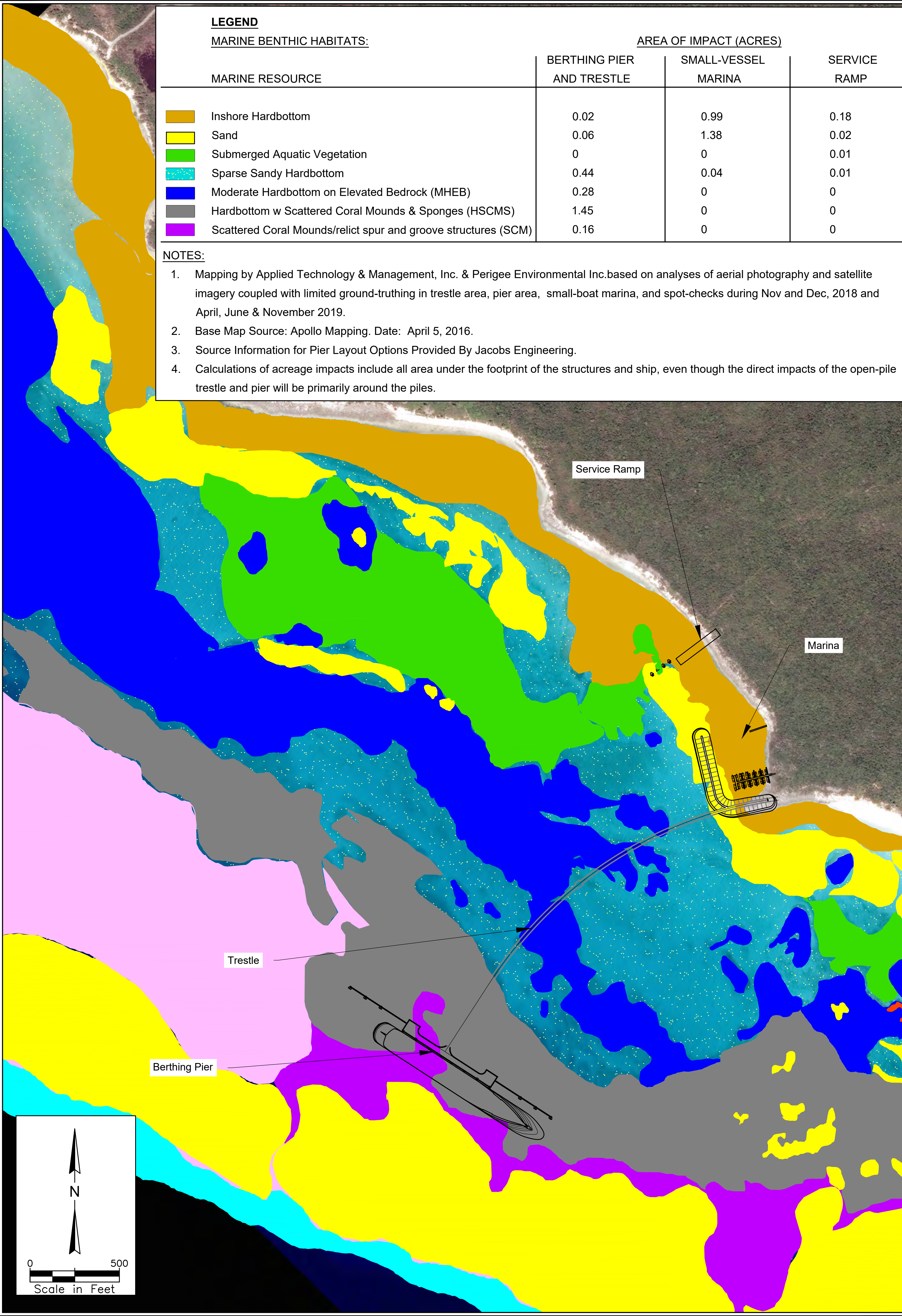
6.2 IMPACTS TO MARINE RESOURCES

Development and the long-term presence of various Project components have the potential to affect marine resources (Figure 6-2). Potential impacts to these resources are described in this section, and recommendations for minimizing these impacts and mitigating for unavoidable impacts are addressed in Section 7, Proposed Mitigation Measures.

To minimize impacts to benthic habitats, the Project has intentionally avoided an open channel/land side berth design. The cruise ship pier, berth and service ramp will be constructed as pile supported structures and have been sited at locations and engineered such that no dredging or filling of the sea floor is required. Together with a small-boat marina with floating docks and a protective revetment, the over-water footprint of all marine facilities will be approximately 5.04 acres, mostly over sand and hardbottom. This is a reduction of 2.64 acres from the original berth plan and marina layout, which would have impacted 7.68 acres. While direct impacts will be primarily due to pile placement locations and structures directly over resources, seasonal shading and changes in current flow around piling bases may contribute to secondary impacts in this area. These impacts were factored into the overall impact calculations for habitats and notable marine resources which include the entire infrastructure footprint.

A detailed analysis of benthic resources including corals within the footprint of the marine facilities has been completed in order to understand potential impacts, avoidance and minimization strategies, and conservation opportunities. Based on final Project plans, Disney will develop a relocation plan to move corals of listed species (i.e., species designated by the IUCN as Critically Endangered or Endangered) and adult reef-building coral colonies ≥10 cm in size that are good candidates for relocation to similar, matched habitat in the Lighthouse Point vicinity.

CMYERS LOCATION G:\WESTPALMBEACH SHARES\DRAWINGS\PROJECTS\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\18-3297_NEW BENTHIC HABITATS ADDED_NOV 25 2019.DWG



LEGEND

MARINE BENTHIC HABITATS:

MARINE RESOURCE	AREA OF IMPACT (ACRES) BERTHING PIER AND TRESTLE	SMALL-VESSEL MARINA	SERVICE RAMP
Inshore Hardbottom	0.02	0.99	0.18
Sand	0.06	1.38	0.02
Submerged Aquatic Vegetation	0	0	0.01
Sparse Sandy Hardbottom	0.44	0.04	0.01
Moderate Hardbottom on Elevated Bedrock (MHEB)	0.28	0	0
Hardbottom w Scattered Coral Mounds & Sponges (HSCMS)	1.45	0	0
Scattered Coral Mounds/relict spur and groove structures (SCM)	0.16	0	0

NOTES:

1. Mapping by Applied Technology & Management, Inc. & Perigee Environmental Inc.based on analyses of aerial photography and satellite imagery coupled with limited ground-truthing in trestle area, pier area, small-boat marina, and spot-checks during Nov and Dec, 2018 and April, June & November 2019.
2. Base Map Source: Apollo Mapping. Date: April 5, 2016.
3. Source Information for Pier Layout Options Provided By Jacobs Engineering.
4. Calculations of acreage impacts include all area under the footprint of the structures and ship, even though the direct impacts of the open-pile trestle and pier will be primarily around the piles.

FIGURE 6-2
1:500 MARINE BENTHIC HABITATS - AREAS OF IMPACTS.
LIGHTHOUSE POINT, BAHAMAS
NOVEMBER 11, 2020

ATM

Disney's success of 90 percent survivability of coral transplants near Castaway Cay over the last 13 years provides context to its ability to successfully execute translocations. In coordination with Perry Institute's Reef Rescue Network Program, Disney will also implement an in-water monitoring and conservation program.

While at berth, the vessel will cycle approximately 5,000 cubic meters/hour of water through its internal system for cooling of chillers and other ship operations. The water is not mixed with any other systems or waste streams but will return the water approximately 5°F warmer from intake to discharge. The berth is located in deep, unconfined water with measured currents upward of 1.5 knots, either in the flood or ebb stage. The water discharged from the vessel will mix rapidly with surrounding waters and no net, local increase in water temperature will occur. While not modeled for this EIA, the dissipation of the warmer waters within the surrounding cooler waters is not anticipated to be an impact to surrounding HSCMS and SCM communities.

Primary impacts, buffers and secondary impacts have been addressed in the EIA and will be key to the relocation plan. Final Project plans will be available upon completion of the design process.

A longer-term coral rehabilitation program will be part of the overall mitigation plan for impacted hardbottom habitats. It is proposed that rehabilitation efforts be focused on enhancing coral populations on degraded reefs, building on Disney's existing efforts at Castaway Cay, which includes using coral nurseries to rehabilitate elkhorn and staghorn corals. Disney has substantial experience working with corals and reef systems in The Bahamas, having successfully transplanted approximately 1,800 coral colonies, with more than 90 percent survival rates on the main reef that is being rehabilitated. Disney teams are part of the greater Reef Rescue Project by Perry Institute for Marine Science and have been rehabilitating patch reefs in Southern Abaco for the past 13 years as a dedicated coral conservation project and were the first to start coral nurseries in The Bahamas. Disney is also a key partner in the AZA-Florida Reef Tract Rescue Project, addressing Stony Coral Tissue Loss Disease (SCTLD) off the Florida coast and across the Caribbean. The disease has recently been observed off Grand Bahama and New Providence.

6.2.1 PROJECT IMPACTS

Adverse impacts to marine resources will occur during the construction of three Project features: 1) the open pile trestle and berthing pier; 2) the small vessel marina and associated marina protection armoring; and 3) the service ramp. Based on the results of benthic community mapping and the location and design of these features, direct impacts will occur to the extent identified in Table 6-2 and described thereafter.

Table 6-2. Direct Impacts to Marine Resources

	Area of Impact in Acres*		
Marine Resource	Berthing Area and Trestle	Small-Vessel Marina	Service Ramp
Hardbottom Subtype 1- IH	0.02	0.99	0.18
Sand -S	0.06	1.38	0.02
Submerged Aquatic Vegetation -SAV	0	0	0.01
Hardbottom Subtype 2 - SSH	0.44	0.04	0.01
Hardbottom Subtype 3 - MHEB	0.28	0	0
Hardbottom Subtype 4- HSCMS	1.45	0	0
Scattered Coral Mounds - SCM	0.16	0	0
Patch Reef - PR**	0	0	0
Hardbottom Subtype 5 - OSHSSCMS**	0	0	0
Fore Reef – FR**	0	0	0
Coral Wall Transition - CWT**	0	0	0

* The calculated areas include the entire footprint of the structures, even though direct impacts will occur mostly in the footprint of the support pilings. ** These habitats are outside of the direct footprint of the Project.

6.2.1.1 Direct Impacts to Notable Marine Resources

Direct impacts to marine resources will occur as a result of construction and permanent placement of materials on the sea floor during the three main Project features. Direct impacts to the benthic habitats will result in loss of the corals, sponges and other sessile fauna in these areas.

Stony corals: Within the combined marine development footprint, it was estimated that the combined planar live tissue area of stony corals was 0.0071 acres (307.8 ft^2 /286,029 cm^2).

Barrel sponges: The total number of barrel sponges (*Xestospongia muta*) was estimated to be 0.0063 acres (275.6 ft^2/256,031 cm^2) occupying the seafloor.

Gorgonians (soft corals) are a major component of the hardbottom habitats that provide important habitat structure and recruit rapidly to these substrates. However, they are not considered to have the same high biological value as the longer-lived reef-building stony corals and barrel sponges. Quantitative gorgonian coverage on the seafloor within the impacted area is provided for completeness and is based on the average diameter of their holdfasts (i.e., the root-like structure only that occupies space on the seafloor that does not include their vertical branch canopy). Their combined seafloor coverage was estimated to be 0.0018 acres (77.6 ft^2 /72,129 cm^2) within the development area.

The estimated combined amount of live surface area (stony corals, barrel sponges and gorgonians) that will be impacted within the marine development footprint was estimated to be 0.0152 acres (661.1 ft^2/614,190 cm^2). Additional impacts outside of the development footprint during construction may occur. Details on the final engineering designs and construction methodology will be necessary in order to better estimate and quantify these impacts. Adding a buffer around the infrastructure perimeter to account for equipment and vessels, which may be necessary for construction, can provide an initial estimate. A moderate construction buffer of 75 feet placed around all proposed Project marine infrastructure would increase the potential cumulative impact to corals, sponges, and gorgonians approximately by a factor of seven to ~0.145 acres (6,324 ft^2/5,875,312 cm^2). Continued avoidance and minimization efforts and employment of Best Management Practices (BMPs) during design and construction will help to minimize impacts in these areas.

The biological value of benthic habitats is associated with the ecosystem structure and functions that they support. Hardbottom habitats that are dominated by soft corals (octocorals) and sponges typically have lower species diversity and abundance compared to coral reef habitats which are characterized by higher structural relief and are dominated by calcium carbonate producing stony corals. The Project proposes focusing translocation efforts to species of highest value, such as reef-building stony corals species that have been shown to have high transplantation success. This is consistent with guidelines of the Florida Department of Environmental Protection (FDEP) for mitigation to coral reef and hardbottom communities in Florida. Soft corals (octocorals) and sponges can also be relocated but techniques are not as well developed as those for stony corals, and success is less certain. Moreover, many of the sponge and octocoral species have been shown to have high background levels of natural recruitment from the water column and will repopulate the seafloor within the impacted area once it is stabilized. An exception to this is the long-lived barrel sponges. The Project is consulting with sponge experts to explore the feasibility of relocating the larger barrel sponges as part of the proposed mitigation work (Luckhurst and Luckhurst, 1978; Harborne et al., 2006; Wilson et al., 2007; Alvarez-Filip et al., 2009; Harborne et al., 2012; Graham and Nash, 2013; Nash et al., 2013; and Ferrari et al., 2018).

There are no significant impacts expected outside the development footprint and buffer area during construction. The EMP will include monitoring of water quality and other parameters and operational responses designed to avoid such impacts. Additional Project design and construction methodology details are pending completion of the design process.

6.2.1.2 Water Flow and Shading Impacts

The open trestle pier is not expected to cause a significant reduction in water flow or increases in sedimentation to the area, both of which can have negative impacts to fish structure and function. Shading associated with the trestle will occur directly beneath and within up to 35 feet on both sides of the pier based on the proposed height of 20 feet above the water surface. These shaded areas were included in the secondary impact area calculations (Section 6.2.1.1). Shading associated with piers has been documented to negatively impact fish community structure and function by influencing fish movement and migration (Hair and Bell, 1992) and foraging, particularly for fish species that are sight-dependent feeders (Bulleri, Chapman & Underwood, 2004). There is evidence that piers attract more of the adult piscivorous species such as snappers, barracuda and jacks and fewer juveniles than adjacent habitats. Similarly, the pier structures may be expected to have fewer carnivores, herbivores, and planktivores than adjacent habitats. Invasive species such as lionfish might also be expected to be in higher abundance around artificial pier structures than on adjacent habitats. Monitoring of the fish community structure under the trestle area and in adjacent habitats will occur before, during, and after construction. Results and recommendations for minimizing further impacts to fish community structure and function will be incorporated into the EMP for the site. Possible recommendations may include quarterly removal of invasive lionfish beneath the trestle and pier, for example. The Project is finalizing a design to enhance the structural characteristics beneath the trestle to provide fish habitat corridors to encourage natural passage of migratory and resident fish and increase benthic invertebrate and fish diversity.

6.2.1.3 Impacts to Structural Habitat Relief

Impacts to three-dimensional structure associated with relief features may occur within the development footprint. To estimate the potential loss to structural relief, a Structural Relief Equivalency (SRE) was calculated based on the average relief measured along five 30-m-long transects that were 2 m wide (60 m^2) for each of the habitat types as part of the AGRRA surveys. The SRE represents the volume of six 1-m radius cylinders with a height equivalent to the measured average maximum relief measured along six points of a transect. This yields an approximate equivalent cylinder volume per transect as the measured habitat relief and can be scaled up based on calculated habitat areas within the development footprint. This calculation yields an estimate of 28 yd^3 (21.4 m^3) of structure within the development footprint. Factoring in potential construction related impacts, including a buffer of 75 feet around all proposed structures along with potential secondary impacts caused by berthing of vessels, would increase this estimate by a factor of six to about 168 yd^3 (128 m^3). These are considered the very high end of estimates of potential structural loss, as the actual structural loss on these habitats will certainly be much less based on the current pile-supported design for the trestle and berthing pier.

6.2.1.4 Impacts to Fisheries

The Project may adversely affect fish populations due to the loss of habitat associated with the placement of infrastructure. Important commercial and recreational fisheries in the area are grouper, snapper, and bonefish. Grouper and snapper were seen utilizing habitats that will be affected by construction. Inshore Hardbottom habitats are important for juvenile stages of several reef fish, while the higher relief Hardbottom with Coral Mounds and Sponges habitat provides shelter for adults. Loss of nearshore habitat, which bonefish often use for foraging, may affect these populations. Secondary effects related to an increase in visitors is not known, but bonefish tend to avoid using areas with high use by people (construction, boats, swimmers, etc.). Therefore, adaptive conservation strategies to promote sustainable fisheries and responsible seafood consumption will be addressed in the EMP. The Developer is looking for opportunities to build underwater structures in concert with open habitat in ways that will be valuable to fish populations and help to offset any adverse impacts. Educational programs to reduce overfishing and increase overall management practices are already being supported by Disney in The Bahamas and will be extended to Eleuthera as part of their longer-term conservation commitment.

The extent to which recreationally important bonefish species (*Albula vulpes*) are utilizing the Lighthouse Point marine habitats is not well known. The most suitable bonefish habitats in the Lighthouse Point area are thought to be shallow nearshore hardbottom, seagrass, and sand habitat types especially near headlands and within coves along the western and southern coasts. A total of 2.6 acres of these habitat types will be directly impacted by the development, with the proposed footprint of the small boat marina being the most significant. To date, no bonefish have been sighted in the proposed small boat marina or any of the other areas/habitats during any of the Lighthouse Point field surveys, estimated at over 30 hours underwater during several times of the year. Additionally, discussions with local fishers (pers comm, Capt'n Calvin Jolly) have indicated that the Lighthouse Point areas is not used by bonefish fishing guides.

Juvenile bonefish in The Bahamas prefer open sandy-mud bottoms in shallow, mangrove-lined bays (Adams and Cooke, 2015), which do not occur in the Lighthouse Point area. Recent research suggests that in The Bahamas, adult bonefish populations appear to establish in close proximity to juvenile bonefish habitat. Adult bonefish forage primarily on benthic invertebrates associated with shallow tidal flats and tidal creek habitat, which also do not occur on the Lighthouse Point property. Ongoing research into bonefish on Eleuthera has found at least five distinct populations, with the nearest population to the Lighthouse Point area being the southwest Eleuthera population, which is concentrated around the extensive tidal flats and creeks of the Cape Eleuthera area 15 miles north of the Lighthouse Point area (Danylchuk et al., 2011; Buress, 2018). Bonefish on Eleuthera are documented to migrate up to 80 km monthly to aggregate and spawn between October and June each year (Murchie et al., 2013). Recent studies have found that bonefish migrate along shorelines in large schools to protected bays that are close to the shelf edge and deep water (>1,000 feet) (Murchie et al., 2019). These conditions do not appear to exist at Lighthouse Point, but this will continue to be an area of ongoing investigations. The nearest potential bonefish aggregation area near Lighthouse Point is thought to be around Wemyss Bight, approximately 7 miles to the northwest.

Therefore, potential impact to bonefish from the proposed development may be associated with possible interference to their movement through the Lighthouse Point area to reach spawning areas. The population of bonefish along much of the east coast of Eleuthera and the Lighthouse Point area is thought to be fairly low, largely consisting of small schools and individuals, because of the absence of significant juvenile bonefish habitat (i.e., well-protected bays and tidal/mangrove systems) along these shorelines. The extent to which these east coast bonefish migrate to the west side of Eleuthera to join well-documented bonefish spawning aggregations is not known. However, this will be an area of ongoing investigation at Lighthouse Point. If any evidence emerges of bonefish utilizing the area or migrating through the area, the Project will support the development of a targeted bonefish-specific conservation plan to minimize potential impacts to this species. In addition, as discussed earlier, fish-friendly thinking and measures such as fish migration corridors will be incorporated into the design of proposed in-water structures (e.g., trestle, service ramp, revetment around the small boat marina) to facilitate/reduce impedance to their migration movement through the area. In addition, if research indicates greater use of the Lighthouse Point area by bonefish, the Lighthouse Point EMP will include measures to reduce potential impacts to bonefish from guests utilizing the nearshore areas during bonefish migration periods (October-May).

6.2.1.5 Habitat-Specific Impacts

6.2.1.5.1. Direct and Indirect Impacts to Hardbottom Subtype 1 - Inshore Hardbottom (IH)

Inshore hardbottom habitat runs parallel along the southeast coastline and is present near the small boat marina, service ramp and the nearshore portion of the trestle. Direct impacts to these areas are expected to occur during construction and will affect 0.02 acres near the berthing area and trestle, 0.99 acres near the small vessel marina and 0.18 acres at the service ramp. The construction of the protection barrier/revetment for the small-vessel marina will involve placing rock directly onto the benthic substrate which will replace existing hardbottom habitat and benthic sessile and minimally motile organisms. The trestle and piers will be piling-supported, so direct impacts will be primarily in the area of piling placement. Other secondary impacts associated with the small vessel marina revetment may occur to adjacent nearshore areas as a result of changes to wave energy, circulation, and tidal flow. These secondary impacts can be minimized with ecologically minded engineering designs for the revetments to allow for flow, while providing the required wave attenuation. Direct impacts associated with shading, and potential changes to wave energy in adjacent areas, have been included in the impact habitat area calculations. To minimize effects, key motile benthic organisms (e.g., long-spined urchins) or large marine invertebrates (e.g., queen conch) will be relocated out of direct footprint area (e.g., marina revetment, trestle pilings) prior to construction. Indirect and secondary impacts may include sedimentation stress, shading, physical damage from small vessels and propeller wash, and change in water quality associated with marina/boat or upland sources. Adaptive management plans will be developed to monitor and respond to any adverse environmental conditions that are observed over time.

The Project may adversely affect fish populations due to the loss of 1.19 acres of habitat associated with the placement of infrastructure. Important commercial and recreational fisheries in the area are grouper, snapper and bonefish. Grouper and snapper were seen utilizing habitats that will be affected by construction. Inshore Hardbottom habitats are important for juvenile stages of several reef fish, while the higher relief Hardbottom with Coral Mounds and Sponges habitat provides shelter for adults. Grouper migration is not expected to be impacted since the deep walls they use to migrate is approximately 1200 ft offshore of the end of the berth (Dahlgren et al., 2016). Loss of nearshore habitat, which bonefish often use for foraging, may affect these populations. Secondary effects related to increase in visitors is not known, but adaptive conservation strategies to promote sustainable fisheries and responsible seafood consumption will be addressed in the EMP. The Developer is working on efforts to help to offset any adverse impacts. Possible recommendations may include quarterly removal of invasive lionfish beneath the trestle and pier, for example. The Project is also finalizing a design to enhance the structural characteristics beneath the trestle to provide fish habitat corridors to encourage natural passage of migratory and resident fish and increase benthic invertebrate and fish diversity. Details of the structures will be provided as they become available and may include approved materials from offsite sources (e.g., Grand Bahama).

Disney has a long history of commitment to communities in The Bahamas and to the conservation of natural resources in the region. Since 1997, the Disney Conservation Fund has given approximately $4 million to support education, research and conservation projects in The Bahamas.

Disney Animals, Science, and Environment (ASE) with Cruise Line created an environmental activity book focused on Bahamian wildlife and distributed it to primary school students.

Since 2004, DCL has provided tens of thousands of dollars to support summer eco-camps throughout the Abacos. Disney's ASE Team is currently involved in a multi-year conservation and education initiative in the Abacos. Initiatives include a coral restoration project near Disney's Castaway Cay and assistance with the development of public school science and summer eco-camp curriculum.

Other long-term secondary adverse impacts could occur to stony corals, crustose coralline algae and other marine life very near shore in shallow water depths as a result of the substantial increase in human activity in the vicinity of these resources.

Unintentional damage could occur as a result of careless and/or inexperienced snorkelers kicking corals or stirring up sediments that then drift onto these resources. Protective measures such as buoys to minimize human contact, underwater snorkeling trails to minimize the spatial extent of impacts, and education programs that will educate guests about the importance of habitats, conservation and protective measures will be developed as part of the EMP and/or future education programs.

6.2.1.5.2. Direct and Indirect Impacts to Sand (S)

Portions of the open pier trestle, small-vessel marina and associated marina protection barrier and the service ramp are proposed to be constructed over barren sand bottoms affecting 0.06 acres associated with the berthing area and trestle, 1.38 acres related to the small-vessel marina, and 0.02 acres near the service ramp. Ecological impacts associated with the development of these Project components are expected to be minimal. Benthic organisms (e.g., sand dollars, lugworms), some benthic fish, such as rays and razorfish that inhabit barren bottoms, and sparse seagrass will be adversely affected when structures (e.g., pilings, marina protection barrier) are placed directly into the sand. Recovery of sand habitat from direct construction and structure placement impacts is thought to be likely. Indirect impacts caused by increased sedimentation and long-term shading from structures is also possible and will be addressed as part of the Proposed Mitigation Measures (Section 7).

6.2.1.5.3. Direct and Indirect Impacts to Dense Submerged Aquatic Vegetation (SAV)

In the Project area, submerged aquatic vegetation (SAV) is located between the service ramp and the boat marina/revetment. Most of the Project structures have been sited to avoid these areas, but direct impacts to SAV will affect 0.01 acres due to the construction and use of the service ramp. Secondary effects that may have negative effects on SAV include sedimentation, shading and potential damage due to increased boat traffic activity.

Best management practices will be adopted to reduce potential boat traffic impacts and educate guests, vendors, and employees on protection of these natural resources.

6.2.1.5.4. Direct and Indirect Impacts to Patch Reefs (PR)

At this time, no direct impacts are currently expected to occur on the patch reef habitats, which are located outside of the Project footprint in the nearshore areas south of the pier and along east-facing beaches. Substantial increase in human activity in the nearshore shallow areas will affect corals, sponges and other marine life.

Unintentional damage could occur as a result of careless and/or inexperienced snorkelers kicking corals or stirring up sediments that then drift onto these resources. Protective measures such as buoys to minimize human contact, underwater snorkeling trails to minimize the spatial extent of impacts and education programs that will educate guests about the importance of habitats, conservation and protective measures will be developed as part of the EMP and/or future education programs.

Additionally, chemicals in many sunscreens are reported to adversely affect marine life, including corals, prompting some governments to ban their use. The substantial increase in water-based recreation that is anticipated to occur in the vicinity of these resources as a result of the Project has the potential to adversely affect corals and other marine life, if not controlled. Although the direct impact of sunscreen on corals is not well understood, guests will have access to “reef-friendly sunscreens” on the ships and at Lighthouse Point, as well as educational information about coral conservation. Disney has substantial experience working with corals and reef systems in The Bahamas. Adaptive management plans will be developed to monitor and respond to any adverse environmental conditions that are observed over time.

Potential protective and mitigative procedures that could minimize these impacts are identified in Section 7, Proposed Mitigation Measures, and include reducing snorkel-related damage and prohibiting the use of sunscreens that are not reef friendly, and/or offering only “reef-friendly sunscreens” for sale.

6.2.1.5.5. Direct and Indirect Impacts to Hardbottom Subtype 2 - Sparse Sandy Hardbottom (SSH)

A large portion of the shelf area along the south and west regions of Lighthouse Point was characterized as sparse sandy hardbottom that contains sparse octocorals, sponges, stony corals and algae. Direct impacts to sparse sandy hardbottom are expected to occur as a result of construction of the trestle and pier (0.44 acres), small-vessel marina and associated marina protection barrier (0.04 acres) and the service ramp (0.01 acres). The protection barrier for the small-vessel marina, which will involve placing rock directly onto the substrate will replace existing marine resources such as corals and sponges. The trestle and berth will be piling-supported, so direct impacts will be primarily in the area of piling placement. Adverse indirect impacts of marine resources may include sedimentation stress, long-term shading, physical damage from small vessels and propeller wash, and changes in water quality associated with marina/boat or upland sources. Adaptive management plans will be developed to monitor and respond to any adverse environmental conditions that are observed over time.

6.2.1.5.6. Direct and Indirect Impacts to Hardbottom Subtype 3 -Moderate Hardbottom on Elevated Bedrock (MHEB)

Moderate hardbottom on elevated bedrock habitat extends along the western side of the island and has greater structural relief and higher abundance of flora and fauna than SSH. Given the lack of patch reefs in these areas, MHEB habitat provides important structural habitat for commercially important fish and shellfish and for coastal protection by reducing wave energy. Direct impacts to this resource are expected to affect 0.28 acres as a result of development of the trestle when the pilings that support this structure replace existing resources. MHEB areas adjacent to the service ramp may also be affected during construction process. Additional direct and indirect impacts may occur in localized areas in the vicinity of these features through shading, as a result of temporary increases in sedimentation during development and removal of structural habitat (e.g., shelter for fish, invertebrates).

6.2.1.5.7. Direct and Indirect Impacts to Hardbottom Subtype 4 – Hardbottom with Scattered Coral Mounds and Sponge (HSCMS)

Hardbottom with scattered coral mounds and sponges are found further offshore parallel to the coastline (25-44 ft depth), with a large area located near the proposed ship pier and offshore trestle area. This habitat has low coral, sponge and octocoral cover and provides habitat for lobster and conch. Direct impacts to this resource are expected to affect 1.45 acres of this habitat as a result of the development of the trestle and berthing area when the pilings that support these structures replace existing marine resources. Additional indirect impacts may occur in localized areas due to sedimentation and shading during construction and future use of cruise ship bow thrusters and/or stern thrusters.

While at berth, the vessel will cycle approximately 5,000 cubic meters/hour of water through its internal system for cooling of chillers and other ship operations. The water is not mixed with any other systems or waste streams but will return the water approximately 5°F warmer from intake to discharge. The berth is located in deep, unconfined water with measured currents upward of 1.5 knots, either in the flood or ebb stage. The water discharged from the vessel will mix rapidly with surrounding waters and no net, local increase in water temperature will occur. While not modeled specifically for this EIA, the dissipation of the warmer waters within the surrounding cooler waters will occur rapidly and continuously and is not anticipated to be an impact to surrounding HSCMS and SCM communities.

6.2.1.5.8. Direct and Indirect Impacts to Scattered Coral Mounds/Relict Spur and Groove Structures (SCM)

Scattered coral mounds/relict spur and groove habitats, extending parallel to the coastline but are further offshore, are coral dominated outcrops with larger-sized corals and higher biodiversity. Direct impacts to this resource are expected to affect 0.16 acre of this habitat as a result of development of the trestle and berthing area when the pilings that support these structures replace existing marine resources, which is a significant reduction from the original berthing plan. Additional indirect impacts may occur in localized areas in the vicinity of these features through shading, as a result of temporary increases in sedimentation during construction and during future use of cruise ship bow thrusters and/or stern thrusters.

6.2.1.5.9. Direct and Indirect Impacts to Hardbottom Subtype 5 - Offshore Hardbottom with Sparse Coral Mounds and Sponges (OSHSSCMS)

The OSHSSCMS community is expected to remain unaffected by the proposed Project because it is more than 500 feet in distance away from Project-related infrastructure.

6.2.1.5.10. Direct and Indirect Impacts Fore Reefs (FR)

The Fore Reef community occurs primarily on the east side of the LHP outside the Project footprint by over 1.5 miles and is not expected to experience any direct impacts or secondary impacts associated with construction. Substantial increase in human activity in the nearshore shallow areas on the east side may have some secondary impacts to offshore fore reef areas similar to what has been described for patch reef habitat. As the fore reef areas offer some of the most attractive diving, it is also possible that they will experience increased visitation and associated unintentional damage as a result of careless and/or inexperienced divers. Protective measures such as buoys to minimize human contact and education programs that will educate guests about the importance of habitats, conservation and protective measures will be developed as part of the EMP and/or future education programs.

6.2.1.5.11. Direct and Indirect Impacts to Coral Wall Transition (CWT)

The coral wall transition area is located further offshore in deeper water and contains a well-developed coral wall. This community will remain unaffected by the proposed Project as it is 500 feet to more than 1000 feet in distance from Project-related infrastructure.

6.2.1.6 <u>Construction Noise Impacts</u>

Construction in the marine environment will be likely be limited to pile techniques because dredging is not planned. Construction noise has the potential to impact local marine fauna, particularly marine mammals that are present in the surrounding waters. The impacts of noise on marine organisms are poorly understood; however, recent studies with marine mammals indicate that some types of noise may adversely affect cetacean populations, upsetting their use of echolocation or damaging their sensory organs (Richardson, Greene Jr, Malme, & Thomson, 2013, Southhall et al. 2007). Some research suggests that low-level noise, such as that arising from boat engines and navigation equipment such as depth sounders, does not result in behavioral alterations while others have found contextual behavioral changes (Mattson et al., 2005; Pirrotta et al., 2015, Gomez et al., 2016).

Humpback whales are considered low-frequency cetaceans, with optimal hearing between 7 Hz and 35 kHz. The non-baleen whale species anticipated to be in the area are considered mid-frequency cetaceans, with optimal hearing between 150 Hz and 160 kHz, but the two species of *Kogia* found in deep water are high considered to have high-frequency hearing, 275 Hz to 160 kHz (NMFS, 2018). According to United States regulations, a “Level A take” can cause physical damage or hearing loss (either permanent or temporary). Hearing loss can be caused by sudden high-amplitude sounds or longer-term exposure to lower amplitude sounds, which is why NMFS (2018) sets acoustic Level A thresholds with two different acoustic metrics (peak and weighted cumulative sound exposure level). NMFS (2018) Level A thresholds will be used to estimate potential acoustic impact from construction and operation, and this will be used to inform mitigation and monitoring strategies.

According to Unites States regulations, a “Level B take” is considered the area within which the animals’ behaviors can be influenced. These distances are less clear and dependent on context (Ellison et al., 2011, Southall et al., 2007, Pirrotta et al., 2012). Alteration of humpback whale foraging behavior due to anthropogenic noise has been documented (Blair et al., 2016). Male humpback singing has also been demonstrated to be temporarily impacted by ship noise (Tsujii et al., 2018). However, it is worth noting that these effects were observed due to noise from ships in transit at sea and at nominal interaction distances on the order of 500 to 1000 meters between the ship and whale. Beaked whales have been studied extensively and have been shown to have behavioral changes from ship noise at 5.2 km (Pirrotta et al., 2012). This may be influenced by differing acoustic transmission loss in deep versus shallow water. This encounter scenario is different than what would occur for a fixed construction barge in shallow water. In this case, the cetaceans would have to advance towards the barge (in shallow water), as the barge remains in a fixed location (although it moves short distances between piling installation locations). It is additionally notable that ship sound increases with vessel speed, while construction noise levels are attributable primarily to machine noise and noise generated by excavation and subsurface construction. The primary distinctions between the two vessel types and scenarios (i.e., ships in transit and anchored construction barges) are: 1) the comparative lack of mobility of the barge; 2) the barge’s operational location in comparatively shallow waters near the shoreline, and 3) unlikely occurrence of having marine mammals moving toward a stationary source of discomfort in shallow water.

Similarly, noise associated with pile driving has the potential to impact cetaceans in the region. The noise level associated with pile driving varies significantly depending on the equipment utilized, the overall size of the piles, the substrate into which the piles are driven, the force applied and the distance to the source. To demonstrate this variation, two size pilings at the same distance, the larger diameter pile would have a higher amplitude but, as the distance from the source changes, the dynamics change. This is demonstrated in an example referenced in Dahl, de Jong and Popper (2015). The typical maximum (source level) reported a value of 220 dB (re. 1 μPa^2) for a 0.75-meter diameter pile at a range of about 10 meters while a 5-meter diameter pile at a range of 300 meters has a value of 200 dB (re. 1 μPa^2). The NOAA mid-frequency cetacean threshold for Level B impulsive sound is 160 dB re 1µPa (rms). For Level A, the thresholds are 230 dB re 1µPa (0-peak) and 185 dB re 1$\mu Pa^2 s$ (frequency weighted, cumulative SEL). The Level A zone is predicted to be a small area from what is currently known. The proposed construction is in shallower water, which may attenuate the noise, but it is uncertain at this point. It should also be noted that a portion of the noise for migrating humpback whales will be attenuated by the shallow water and island to the north and east of the construction site.

Table 6-3 demonstrates that using received level amplitude is useful for determining upper limits that could result in hearing damage, but behavioral disturbance is usually present at lower levels and is ultimately dependent upon context (Southall et. al, 2007). To date, no uniform acceptable international standard exists for acceptable noise levels relative to marine mammals, though several countries have adopted noise restrictions (Dahl, de Jong and Popper, 2015). In terms of application, these restrictions predominantly define an avoidance zone (distance) around the activity, requiring cessation of the activity if a marine mammal of concern is within the area. Identification of the size and boundaries of these zones at the subject site will be based on U.S. guidelines (NMFS 2018) and calculated once the final construction techniques are determined.

Table 6-3. Sound Levels and Behavioral Impacts (Southall et al., 2007)

	Sound Type	
Cetacean Type	Single Pulse	Multiple Pulses
Low-Freq.	Considered disturbed if calculated received level of SPL >224 dB re: 1μPa or SEL >183 dB re: 1μPa^2-s	Non-linear response to noise level. Behavior scores ranged from 0-6 at every volume tested (110-180 dB). [*Noise source=airguns; species=gray, bowhead, and humpback whales.]*
Medium-Freq.	Considered disturbed if calculated received level of SPL >224 dB re: 1μPa or SEL >183 dB re: 1μPa^2-s	Non-linear response to noise level. Behavior scores were 0 at 100-120 dB, either 0 or 6 at 120-140 and 170-180 dB, and 6 at 140-150 dB. [*Noise source=small explosions or airguns; species=sperm, false killer whales, and beluga.]*

6.2.1.7 Impacts to Shoreline and Coastal Processes

6.2.1.7.1. Proposed Impacts

Alterations to Localized Wave Climate, Storm Surge and Storm Issues

Implementing the proposed site plan is not anticipated to cause any significant adverse impacts to the localized wave climate.

The Project area is prone to direct and indirect storm impacts. Some of the impacts would be storm surge, wind-waves and wave run-up, and wind damage. The proposed Project involves removing a small portion of the upland vegetation with minimal or non-existent changes to the upland topography along the shoreline.

6.2.1.7.2. Future Phase Impacts

No future phases to the site plan presented in this document are planned at this time. However, the timing of development and design of certain plan elements are dependent upon final Project planning, design and market conditions. Those elements include future beach cabanas. When initial development is complete, routine maintenance of beaches and other Project areas will commence.

6.2.1.7.3. Impacts Due to Beach Area Enhancements

As identified in Section 4.6, there are areas of hardbottom and coral close to the shoreline. The proposed Project would enhance the existing shoreline in some areas. Because all of the sand for beach improvements would be placed upland of the mean high water line, there would be no direct impacts to the nearshore regions in the areas of the beach fills. The placed sand and stabilization structures would provide a stable shoreline and additional protection to upland structures from potential storm damage. The expansion of beaches could have secondary impacts on some nearshore hardbottom, corals and submerged aquatic vegetation if subsequent shoreline erosion takes place. This would be in addition to natural accretion and erosion of beaches that occur in the natural condition. Direct impacts should be nonexistent or minimal, provided beach widenings are created by removing *Casuarina* trees and naturally occurring vegetation from the backdune as planned.

Beach area expansion is planned to extend landward from the foredune in the beach areas as shown on Figure 3-1. Impacts to landside resources are detailed in Section 6.1. Additional design details are pending completion of the design process.

6.2.1.7.4. Impacts to Landside Resources from Beach Area Enhancements

Although detailed plans for beach enhancement have not been developed, current plans call for enhancements and/or modifications to all the beach areas designated as guest access. Impacts vary from beach to beach and may include removal of invasive plant species, re-grading of upland areas and replacement of existing vegetative communities with widened beaches, and guest barriers/exclusion structures such as fencing, and installation of dune walk-over structures.

6.2.1.7.5. Impacts to Local Ocean Circulation and Currents

The creation of the marine facilities is expected to have little or no impacts to the local circulation since the concept calls for an open trestle design.

6.2.1.7.6. Impacts to Surface Water and Ground Water Quality

Without proper design and development BMPs, potential impacts to surface water quality due to the development of Lighthouse Point could come from the following sources:

- Short-term impacts during excavation and development
- Any potential inadvertent discharge of pollutants within the small-vessel basin and subsequent export to offshore waters
- Potential leaching and runoff of nutrients and pesticides from areas to be developed
- Impacts from RO concentrate discharged into deep water at the pier or through underground injection.

The following sections outline the potential levels of impact from these sources, along with discussion of BMPs that will help to avoid or minimize any impacts to surface and ground water quality.

6.2.1.8 Development Impacts

Potential impacts due to development will be limited through the use of sustainable design solutions and a limited Project footprint – 16 percent of the total site – and the use of an open-trestle pier and berth design and no dredging. Impacts will be further limited through implementation of site-specific controls. Proposed development involves the development of the cruise ship pier, small-vessel marina and service ramp, guest activity parcels in upland areas, BOH, primary and secondary transportation corridors and trails. Suspended sediment impacts to the nearby waters are always a concern when construction activities occur in or near surface waters. BMPs will be employed to avoid turbidity issues during construction. Landside measures may include installation of silt screen, run-off containment and treatment as required. Marine construction BMPs will be employed as needed. Suspended sediment issues are not expected due to the nature of the planned marine construction – pile driving with no dredging, in areas with little to no silt and limited sand cover.

After the completion of marine geotechnical investigations, and the identification of construction methodologies, detailed protocols and operations for reductions of turbidity issues during construction will be identified in the EMP. Silt curtains and other BMPs will be employed in development areas where needed to ensure protection of adjacent areas. Details on BMPs to be employed will be outlined within the EMP.

6.2.1.8.1. Noise Level Avoidance During Construction

Construction activities will generate noise levels that may have potential to adversely affect marine mammals, as discussed in the previous section. Whale migration season is typically from December through March, with many whales migrating south through the northern Atlantic Ocean offshore of The Bahamas.

It is recommended that this issue be addressed through a construction condition that establishes an avoidance zone around the construction activity, similar to other regulatory strategies that have been adopted by other countries. This condition would require that noise-generating construction operations, such as pile driving and other marine construction activities, would cease immediately if a humpback whale or other cetacean is observed within the exclusion zone and will be re-initiated upon unhindered passage of the mammal from the zone. For the purposes of this condition, the applicant is amenable to the implementation of an exclusion zone based on U.S. guidelines (NMFS, 2018) and calculated once the final construction techniques are determined. Documentation of any zone incursion by marine mammals would be included within the daily report, and DEPP would be notified of the occurrence. The Developer is further amenable to the adoption of a 'soft start' to pile driving operations, in which work is initiated with a reduced hammer energy (and noise level) that is gradually increased.

6.2.1.8.2. Stormwater Impacts

Stormwater runoff from roads and other impervious surfaces that are proposed to be constructed on Lighthouse Point will be handled in such a manner as to provide sedimentation and water quality treatment that will prevent discharges that could harm aquatic life.

6.2.1.8.3. Reverse Osmosis Effluent

After brackish water is desalinated through the RO process, the salt and minerals that are filtered from the "concentrate" must be disposed.

The two most common options for brine management are deep well injection and piping to an off-shore location. Final design for this Project is pending. Groundwater injection or routing via pipe to the well-mixed waters of Exuma Sound will be utilized. The pretreatment of source waters and the efficiency of the membranes will remove most of the salt, minerals and other constituents. The excess salt brine is not expected to adversely affect the environment due to dilution if to groundwater, and to dilution and dynamic flushing by receiving waters if off-shore.

The planned source of water for the RO system is groundwater from a deep well. Brine disposal will be through groundwater injection pending final Project design details. The wells will be designed, sited, and operated in a manner that ensures no adverse impacts to any freshwater resources on or off site.

6.2.1.9 Marine Ecology Impacts from Landside Development

Several proposed development activities have the potential to adversely affect the surrounding marine environment. These include both direct and indirect impacts from marine construction. Less direct impacts, but equally important issues, are those impacts derived from land-based activities that can filter down to the marine environment. These impacts may occur in the short-term construction phase or the longer-term operation of the Project.

The EMP will address avoidance and minimization techniques to address potential marine ecology impacts that could arise from the substantial increase in numbers of people that will experience the near-shore environment as recreational users (e.g., swimmers, snorkelers, beachcombers). The EMP will include recommendations for the for the use of sun protection BMPs, including the use of sun-blocking clothing, “reef-friendly sunscreen” and how to effectively apply, and prohibit the collection of marine organisms (e.g., cushion stars) as souvenirs as well as the protection and conservation of wildlife and sensitive habitats including corals.

6.3 SOCIOECONOMIC IMPACTS

6.3.1 LAND USE CHANGE IMPACTS

Currently, the area encompassing Lighthouse Point is limited to recreational activities on the upland, land-crab harvesting by local residents, and commercial fishing activities in the water areas. The proposed Project plan does not alter the current land or water use areas other than the small direct areas of impact –up to 152 acres will be utilized for Project development, and at least 606 acres will remain undisturbed.

At the completion of the Project development process, Bahamian citizens and residents have full access to the Project site except for the secure port facilities and BOH. The general public will have access to the Disney Donated Public Lands.

6.3.2 AESTHETIC IMPACTS

The Lighthouse Point Project is designed to blend with the natural beauty and scenery of the local area. Up to 152 acres will be utilized for Project development, and at least 606 acres will remain undisturbed. The goal is to retain, as much as possible, the present tropical nature of the site while providing the amenities and associated components of the destination.

In keeping with the creation of a quiet island atmosphere, native vegetation will be used to help demark the usage areas on the Project. The architectural design of the buildings will be complementary to the surroundings. The BOH and service areas will be screened from view by landscaping but will remain accessible to maintenance personnel. The proposed cruise ship berthing location is approximately 1 mile west-southwest from the existing lighthouse.

6.3.3 UTILITIES

Currently, Lighthouse Point is undeveloped with no local infrastructure. The following sections outline the infrastructure and utilities to be constructed on or provided to the Lighthouse Point development.

Based on a more intense land use approved for this site (see Appendix J) and similar projects that have been approved in The Bahamas, it is expected any impacts on surrounding habitats from generator noise would be limited. The generators are located within an enclosed building. They will be designed and operated in a manner such that they are not a noise nuisance or other concern for nearby employee facilities or adjacent residents. Similarly, air emissions are expected to dissipate quickly and not expected to be the source of any significant impacts on surrounding habitats.

Electricity

Electrical power on Lighthouse Point will be provided through generators and solar power. The Developer is evaluating the potential for using higher levels of renewable energy. The Project is designed to be self-sufficient and will not rely on outside infrastructure pending final negotiations with Government of The Bahamas.

Water

Potable water will be produced on Lighthouse Point by RO system units and freshwater/reuse storage tanks.

Wastewater

Wastewater generated at Lighthouse Point will be collected via a central sewer system that will include lift stations to pump through forced mains, a treatment plant, and a surge tank.

6.3.3.1 Positive Benefits to Community

The Lighthouse Point Project will have negligible negative impacts upon the neighboring communities on Eleuthera. The Project will provide significant positive impacts to these communities through increased employment opportunities, additional revenue based upon increased tourism activities both directly and indirectly, as described in the Socio-Economic Study (Appendix H), and direct community support.

6.3.3.2 Air Resources

The primary point sources for air emissions on the Project site are likely to originate from generators and ship exhaust when in port, with lesser sources of emissions coming from automobiles, boats, maintenance equipment, and waste combustion. Due to the unique operating plan for the site, these sources are likely to generate lower levels of emissions than those typical of more intensive residential and commercial development projects. Disney is committed to minimizing the operating impacts on the island community, with plans to power at least 30 percent of energy needs from renewable sources, offsetting generator usage. Disney is currently studying the feasibility of implementing additional renewable penetration as well as other technologies, including electric vehicles and aerobic waste digestion systems to further reduce air emissions. Disney cruise line's current three ships under construction will have the potential to burn liquid natural gas (LNG), one of the best options currently available to the marine industry. LNG yields a more than 20% reduction in carbon emissions and an 85 to 100% reduction in other emissions (e.g., sulfur, particulate, nitrogen oxide). Additionally, the dynamic atmospheric conditions characteristic of The Bahamas that include persistent sea breezes help to ensure rapid dissipation of air emissions.

Disney's three new ships being built will be powered primarily from LNG. Disney's current ships are designated by the U.S. Coast Guard (USCG) as E-Zero, which means they have consistently adhered to environmental compliance, while also demonstrating an immense commitment to environmental stewardship. As of January 2020, only 51 ships globally have this USCG designation. DCL has sailed more than 10 years in Alaska, where opacity laws

(18 AAC 50) restrict visual smoke from ships and have not had a single violation in those 10 years. The ships also call on areas where the North America Emissions Control Area is in effect and maintain compliance with these rules as they burn a low sulfur diesel fuel at 0.1 percent sulfur content. As of January 2020, IMO has lowered the required sulfur content of all ship's fuel to 0.5 percent, but DCL made the decision to only burn 0.1 percent fuel throughout all operations globally, which exceeds the most stringent requirements. No on-ship incineration will be conducted in port. Considering the time the vessel is at berth in a 24-hour day and exhaust discharge height and open air conditions, it is reasonable to conclude that there will be no adverse effects on the local air quality due to ship activity while at berth. DCL's internal policy is to keep visible emissions below 20 percent opacity while in port, except for initial startup and shut down of engines. Combustion of LNG emits virtually no particulate matter and Disney's three new ships have been designed and will be managed in a way that effectively reduces the chance of methane leaks.

The average length of stay associated with the ships that dock at this location is 10 hours per call day - early morning to early evening.

Due to the number and type of emission sources for this Project, air emissions are expected to be similar to Castaway Cay which has not realized any measurable impacts.

6.3.3.3 Traffic/Transportation (Vessel/Vehicle)

The Lighthouse Point development will increase the potential number of visitors traveling through South Eleuthera. The projected increases would primarily be related to day excursions for cruise passengers, residents who work or sell goods onsite, Bahamian citizens otherwise visiting the site, tourists visiting the Disney Donated Public Lands area, and vendors delivering goods to the Project site.

The Developer is improving the public access portion of the roadway network just north of the Project site to facilitate the efficient movement of visitors, goods and equipment to the site. A portion of this network immediately north of the Project site, namely the "Queens Highway" will be paved, will provide enhanced capacity and safety characteristics to benefit the local community and the overall island population that will visit this area. In its current state, the unpaved shell base road infrastructure is capable of carrying a very small volume of traffic, and at very low speeds. Once paved as a two-lane rural roadway, the section of roadway improved by the Project will have the capacity to service more than 15,000 vehicles per day if necessary. The proposed Project would utilize just a small fraction of this total capacity, resulting in substantially enhanced mobility within the affected area.

6.3.3.4 Employment/Entrepreneurial Opportunities

It is understood that the employment of Bahamians in the development of the Project, and in the operation of the Property as a cruise port and an entertainment destination for guests, is of importance to the Government. The Developer shall ensure that a minimum of 120 Bahamians will be employed directly during the development of the Project. The parties agree over the life of such development phase to aim for an overall ratio of 80 percent Bahamian workers to 20 percent non-Bahamian workers, subject as hereinbefore acknowledged and subject always to qualified Bahamian candidates being available to allow the Developer to meet such ratio.

The Developer estimates that at least 150 jobs will be created during the operation of the Project. As is done at Castaway Cay, during the operation of the Project the Developer will offer employment positions to Bahamians that encompass a breadth of disciplines, including horticulture, transportation, security, maintenance, custodial, food and beverage, recreation/lifeguards, as well as management positions and opportunities for advancement. The Developer will provide all employees with health benefits. The Developer will also work closely with the Government and local communities to develop training and professional development programs for Bahamians desiring to work during the operation of the Project.

The Developer has previously engaged the Government of The Bahamas in a similar project known as Castaway Cay, which was developed and is operated by The Developer as a cruise port and entertainment destination for Disney Cruise Line's guests pursuant to a Heads of Agreement with the Government of The Bahamas (Appendix I). The proposed development at Lighthouse Point will be a larger investment than made at Castaway Cay.

Oxford Economics, one of the world's leading providers of economic analysis, forecasts and consulting advice, to identify the economic impacts associated with the Project. The study employed a proprietary input-output model developed by Oxford Economics to complete the economic impact modelling. The analysis examined a 25-year timeline, including four years of development, and capturing ongoing operations from 2023 to 2043. Over the 25-year time horizon, the Project is expected to provide an $805.1 Million increase in Bahamian GDP and a $357.5 Million increase in Government of The Bahamas revenues. See Appendix H for more information.

6.4 IMPACTS OF PROJECT ON CLIMATE CHANGE

The emissions for Lighthouse Point have been estimated to be approximately 3,100 MT CO_2/year. This is approximately 25% less than the five-year average of Castaway Cay, where emissions will also continue to decrease given the company's significant investment in renewable energy there. Sustainability planning has been part of the project at Lighthouse Point from the beginning, which will enable efficient design of the built environment and the use of renewable energy.

The project is not expected to have a material impact on climate change. The developer is employing sustainable building practices, and there is not expected to be a loss of marine or terrestrial biodiversity as a result of the development. The developer intends to employ design and building techniques that will enable the Project to withstand any impacts due to climate change. The developer is making a significant investment in this Project, and it is in the developer's best interest to ensure it is prepared for any impacts.

The Walt Disney Company recently released its environmental goals for 2030, which serve as a compass for the company's business globally, including Disney Cruise Line. The developer recognizes the role that greenhouse gas emissions play in climate change. While powering cruise ships currently requires the use of fossil fuels, Disney Cruise Line is investigating a number of alternatives. Disney Cruise Line is committed to collaborating with industry groups and investing in research and development for low carbon fuel innovation and technologies to provide more efficient movement through the water, and the company intends to ramp up its use of low carbon fuels over time as sources become available, accessible and economical in the marketplace. Disney Cruise Line has already reduced its emissions since 2013 through HVAC modifications, fuel use reduction technologies, modified propeller arrangements, modified itineraries, an efficient hull coating and more.

6.4.1 DISNEY ENVIRONMENTAL TARGETS

Targets are an important tool that help measure WDI's progress and guide its ambitions. WDI strives to meet its long-term vision of attaining net zero greenhouse gas emissions and waste, while conserving water resources throughout its diverse businesses. To help achieve this, WDI is working towards the following targets (Note: Data is based off 2020 Targets: Disney, like many companies, has experienced widespread disruption because of the COVID-19 pandemic, and this has affected its ability to update a number of its environmental goals at this time. WDI's commitment to environmental stewardship remains steadfast and it look forward to releasing a new generation of environmental goals for the company for 2030 by the end of the calendar year.)

6.4.2 REDUCING EMISSIONS

By 2020, WDI aims to reduce its net emissions by 50 percent compared to a 2012 baseline. In 2019, the company successfully reduced its net emissions by 47 percent compared to 2012. Even though the current initial development calls for no less than 30 percent renewables, the difference will be measured and added to the company-wide mitigation strategy. WDI achieved this reduction through a mix of investments in sustainable design innovations, energy efficiencies, low-carbon fuel sources, renewable electricity, and carbon offsets through the Natural Climate Solutions program.

6.4.2.1 Efforts to Reduce Carbon Emissions Via the Lighthouse Point Project

Sustainable Design

The Project will utilize sustainable design, building, and management practices that will conserve natural resources, while allowing limited use of the land. Sustainable design practices are reflected in the limited Project footprint, Disney-donated Public Lands, areas of extensive undisturbed vegetation, design of the open trestle pier, and other initiatives detailed in other sections.

Energy Efficiencies

WDI continues to drive emissions reductions with a portfolio of projects such as heating and air conditioning upgrades, lighting efficiencies, and operational enhancements across the company. For example, this year Disney Cruise Line was the first in the industry to utilize an innovative hull coating on the Disney Magic and Disney Wonder that is 100 percent non-toxic to the marine environment and increases fuel efficiency by reducing surface resistance in open water. Additionally, DCL installed an air lubrication system onboard the Disney Magic that reduces the resistance between the hull and seawater, leading to energy savings. The Disney Dream and Disney Fantasy have been designed to be even more hydrodynamic vessels than their predecessors, with optimized propulsion systems for increased efficiency.

The Cruise Line also continues to utilize shore power if the option is available at ports DCL ships visit. Throughout its land and sea operations, WDI is also focused on behavior change initiatives for our guests, visitors, and employees.

6.4.3 RENEWABLE ELECTRICITY

Since 2009, Disney has operated under a long-term vision to achieve net zero greenhouse gas emissions. In 2019, the company reduced its net emissions by 47 percent from 2012 business as usual, putting WDI on track to reach its 2020 target to reduce net emissions by 50 percent from 2012 levels.

As part of the company's long-term goal to achieve net zero greenhouse gas emissions, Disney is making ongoing investments in renewable energy across our operations. WDI continues to seek innovative ways to bring clean electricity to our local energy grids and increase our own renewable energy portfolio. For many years, DCL has utilized solar power to heat water for employee areas at Disney Castaway Cay in The Bahamas. DCL recently embarked on a new environmental initiative bringing a five-acre solar facility online at Castaway Cay. This solar facility includes 4,320 solar panels and will generate approximately 70 percent of the island's power once complete. At Lighthouse Point, 30 percent of the power generated will be from renewable resources. Further augmentation of solar capacity is being assessed and will depend on financial viability balanced with land development impacts. Ultimately the goal at Lighthouse Point will be to achieve up to 70 percent renewable energy sources and proactive energy conservation similar to Castaway Cay.

6.4.4 WATER CONSERVATION

Production, movement and conditioning of water also produces carbon. WDI's most recent water target, achieved in 2018, was to hold global potable water use flat to its 2013 levels. In 2019, WDI has again achieved this goal. The company continues to manage its operational water footprint through overall conservation measures and by transitioning its operations to non-potable water sources where feasible. For example, many of its facilities use reclaimed water for irrigation and cooling towers to reduce potable water consumption. On DCL ships, condensation from the shipboard air conditioning units is reclaimed and reused to wash the decks, saving up to 30 million gallons of fresh water each year. WDI also continues to explore ways in which the company can be better stewards of the local watersheds in which it operates and is driving future water planning and strategies in ways that are responsive to the specific watershed challenges at each site. For example, in 2019, WDI supported The Nature Conservancy in Florida in its ongoing work to protect and inform management of lands in the Everglades.

6.4.5 NATURAL CLIMATE SOLUTIONS

For the remaining balance of carbon produced by the company, Disney is engaged in funding the regeneration and protection of natural areas like forests and reducing the amount of carbon dioxide in the atmosphere through investment in high quality, certified natural climate solutions. WDI supports scalable projects that are developed using peer-reviewed protocols grounded in science and resulting in verified emissions reductions. The company has invested in more than 25 projects around the world that conserve habitat for wildlife, create jobs, protect water resources, and reduce impacts from floods and soil erosion.

WDI investments over the last decade have:

1. Conserved over 1 million acres of forests,
2. Protected over 760 miles of rivers,
3. Planted over 9 million trees,
4. Improved accessibility to recreational areas through trail development and maintenance,
5. Created over 800 jobs, and
6. Provided socio-economic benefits to thousands of families

<u>Monitoring</u>

A major aspect of reaching these targets is monitoring and adapting. The company's Sustainability Team is responsible for this effort by calculating the carbon produced by each operation and working with the company to find solutions. There are also local monitoring efforts that include Environmental Officers that are present on each ship.   Environmental Officers are responsible for overseeing compliance with multiple regulations and onboard environmental programs, including all shipboard recycling and sanitation efforts, as well as monitoring the ship's overall water quality and supply.

Overall, The Walt Disney Company is committed to protecting the planet and delivering a positive environmental legacy for future generations as it operates and grows its business. WDI is dedicated to leveraging creativity, innovation and operational excellence to being good stewards of the environment, and to inspiring its employees, guests, and business associates to protect the planet it share, and the company's commitment is represented in this Project.

7.0 PROPOSED MITIGATION MEASURES

Mitigation measures were discussed in a meeting with DEPP staff on January 30, 2019, and covered within the Terms of Reference. Preferred mitigation alternatives will be developed in consultation with DEPP. The comprehensive environmental mitigation program will consist of a variety of community, cultural, landside and marine initiatives in collaboration with Government of The Bahamas and conservation organizations. The program intent is to address all significant Project impacts. Reporting of monitoring and other results of these initiatives will be determined in consultation with DEPP and detailed in the EMP.

The Project-specific mitigation commitments below are provided consistent with Disney's regional and global environmental initiatives. Since 1995, the Disney Conservation Fund (DCF) has distributed more than $100 million through grants to support research and conservation projects led by various non-profits and educational institutions worldwide. The Disney Conservation Fund has a strong conservation record in The Bahamas, awarded approximately $4 million in grant funding to nearly 20 organizations working in the region since 1997. In addition, the DCF has been supporting an initiative to reverse the decline of coral reefs across The Bahamas, helping to advance collaborative and strategic efforts involving multiple organizations to deliver conservation outcomes. In 2019, the DCF expanded this funding to help foster greater conservation opportunities and skills development to support the future conservation leaders and scientists of The Bahamas.

The Lighthouse Point comprehensive environmental mitigation program will include the following initiatives:

1. Low Impact Development – The Developer has agreed to limit the Project footprint to 16 percent or less of the total site, much of it for low density uses, like the placement of beach chairs, umbrellas and small support structures for food and beverage, merchandise, as well as walking and bike paths and other similar uses, and using sustainable building practices and methods in the development of the Project where possible, including practices that emphasize water and energy conservation. This will conserve the vast majority of the Project site's landscape features, wildlife habitats and other natural resources. This minimizes direct impacts to the greatest extent feasible, and minimizes secondary impacts, such as fragmentation of habitat.

2. Disney Donated Public Lands – The Developer has designated a portion of the Property comprising approximately 190 acres, and the southernmost point of the Property comprising approximately 3 acres, as identified in Exhibit C of the Heads of Agreement, as Disney Donated Public Lands. The appraised value of the Government Land is B$6,290,000. The Developer will also undertake to construct a roadway through the Government Land, construct a parking lot and beach amenities such as restrooms, and at the request of the Government provide environmentally friendly access to the southernmost point of the Property identified in Heads of Agreement Exhibit C, all at Developer's sole cost.
3. Bahamian Residents Site Access – At the completion of the Project development process, Bahamian citizens and residents have full access to the Project site except for the secure port facilities and BOH. The general public will have access to the Disney Donated Public Lands.
4. Cultural- and Ecosystem-Specific Initiatives as described hereafter.

7.1 COMMUNITY OUTREACH, CULTURAL INTEGRATION AND RESOURCE CONSERVATION

Among other commitments contained in the approved Heads of Agreement, the Developer will work with the Government and Bahamian historians, artists and cultural experts to integrate Bahamian voices and artistic expression in the design of the Project, making it a reflection of The Bahamas, rooted in local stories and traditions. The Developer will collaborate with the Government and local communities to meaningfully contribute to initiatives that meet local community needs, with a special focus on children and families. In particular, the Developer will work with local communities to identify schools near the Property that the Developer can assist by providing things that may include facilities upgrades, technology solutions, school supplies, curriculum assistance, visits where Disney employees spend time reading with students, and Disney characters visits. In addition, The Developer will assist the Relevant Governmental Agencies and the local Eleuthera community to identify and enhance tourist heritage sights in South Eleuthera.

The Developer shall put in place and sustain during the development phase and during operation of the Project multi-disciplinary on-the-job technical skills-training programs designed to equip its Bahamian employees with the level of technical proficiency necessary for promotion and advancement. Upon request, the Developer shall provide information relating to such on-the- job training programs to the Department of Labour or any other agency designated by the Government during the course of the Project.

The Developer has employed cultural resource experts to assess onsite resources and provide recommendations for conservation and interpretation. Further assessments are planned, and the Developer will work with Government to implement responses to the findings and recommendations of these experts.

7.2 MARINE RESOURCES

To mitigate for unavoidable impacts to marine resources in the proposed ship berthing area, trestle area, small-vessel marina area and service ramp/pier area, a comprehensive Marine Mitigation Plan will be developed. Components that should be included in the plan are described hereafter, recognizing that each component will require a more detailed feasibility analysis that also includes a closer examination of secondary impacts. These impacts can only be accurately determined after the completion of marine geotechnical analyses, which will allow details of the design and construction methods to be developed. All mitigation actions will also include consideration of alternatives to maximize overall benefits to the impacted marine resources.

Components of the Plan will likely include: 1) Direct actions to rehabilitate impacted resources and services to, or as close as is practical to, the baseline condition (e.g., translocation of impacted reef-building corals); 2) A comprehensive long-term monitoring program of the marine resources in the area, and; 3) Support to others for marine education, research, and conservation of coral and other marine resources. Details of the program will be developed in coordination with the Government of The Bahamas.

Mitigation elements under consideration include:

- Pre-construction transplanting of select coral colonies from the impact area to adjacent recipient areas;
- Longer-term coral nursery and rehabilitation program for the area focused on large reef-building corals;
- Comprehensive long-term coral monitoring to guide adaptive management and lionfish control programs for the LHP Site;

- Investigating the opportunity and feasibility of incorporating coral and fish recruitment-friendly requirements into the design of planned artificial structures (e.g., the boat basin breakwater);
- Support to the Government of The Bahamas to help achieve their mission to expand conservation areas throughout the archipelago;
- On-island interpretive signage and environmental programs for visitors and employees;
- Support to develop or expand community conservation education programs, including sustainable fisheries and responsible seafood consumption;
- Construction of a facility at Lighthouse Point to propagate conch and grow coral specimens to enhance long-term reef rehabilitation efforts in The Bahamas; and
- An education program that addresses BMPs and protocols for whales and other marine wildlife observations, will be developed and provided to guests, vendors, and others who operate recreational watercraft or provide excursions and other services in association with the port facility.

It is recognized that implementation of some or all these mitigation activities may require permits and/or approvals by the Government of The Bahamas. Implementation of mitigation activities will be done with necessary approvals by the relevant government agencies.

7.2.1 CORALS

Mitigation for hardbottom habitats directly impacted by the proposed development will likely focus on transplanting stony corals, which are of the highest value given the essential role they play in the hardbottom ecosystem. These include the framework-building corals that have slower growth but more potential to provide structural habitat over time, rather than coral species that provide comparatively lower ecological function (e.g., *Porites*, *Agaricia*), and are characterized by rapid growth, limited accretion rate, and relatively short lifespans.

Other species of high value that may be considered for translocation include giant barrel sponges (*Xestospongia muta*) and select other motile invertebrates (e.g., *Diadema antillarum*). Translocation efforts of *Diadema* would focus on the nearshore hardbottom habitats within the proposed impact area, where they are most abundant. Disney has extensive experience relocating *Diadema* at their Castaway Cay facility. The science necessary for translocation of barrel sponges is less well developed than for stony corals and further consultation with experts will be necessary to determine what may be practical and feasible. The remainder of the stony coral population and all octocorals in the impact area will be left in place as they are primarily species that have comparatively lower functional values and which presently demonstrate high levels of natural recruitment in the area.

The Developer will examine feasibility of reattaching hardbottom substrate including stony and soft corals that may have been dislodged during the piling installation process.

A longer-term coral rehabilitation program will be part of the overall mitigation plan for impacted hardbottom habitats. It is proposed that rehabilitation efforts be focused on enhancing coral populations on degraded reefs, building on Disney's existing efforts at Castaway Cay, which includes using coral nurseries to rehabilitate elkhorn and staghorn corals. Disney has substantial experience working with corals and reef systems in The Bahamas, having successfully transplanted approximately 1,800 coral colonies, with over 90 percent survival rates on the main reef that is being rehabilitated. Disney teams have been rehabilitating the patch reefs in Southern Abaco for the past 13 years as a dedicated coral conservation project and were the first to start coral nurseries in The Bahamas.

It is also proposed that a long-term coral monitoring program be developed for the LHP site as part of the Environmental Management Plan. Coral monitoring will be performed using video mosaicing at fixed 10m-x-10m plots supplemented with standardized AGRRA surveys for benthos and fish. Monitoring will take place before development, during and immediately after development, and on an ongoing basis to monitor for any construction-related impacts and day-to-day operations on and around Lighthouse Point. Regular environmental monitoring will enable changes to be detected early on, and potentially allow causes to be addressed by either relocating certain coral specimens or modifying guest and/or operational activities.

The long-term coral monitoring program will be developed for the Lighthouse Point site as part of the Environmental Management Plan. Baseline (before development) AGRRA reef surveys around Lighthouse Point and southern Eleuthera have been conducted in 2016 and during 2019 and 2020 as part of the investigations of marine resources. An initial network of 26 fixed monitoring stations has been established in 10 of the 11 benthic habitats that are found around LHP (see Figure 4-25). These sites were selected utilizing a Before and After Control Impact (BACI) sampling design with strategically chosen sites within and outside the Project impact areas (Green 1979). Baseline (before development) video within 10x10 m plots were collected at all 26 sites and are presently being mosaiced and prepared for analysis. Twelve of these fixed stations have been instrumented with underwater temperature loggers. The monitoring program and adaptive management plan will continue to be refined as details of the Project design are finalized. Environmental monitoring is planned to operate for the foreseeable future as it is currently occurring at Disney's other destination port at Castaway Cay. The monitoring will continue as long as Disney is onsite.

Coral monitoring will be utilized to document baseline conditions and track trends on coral reefs and other benthic habitats in the LHP area. Patch reefs and selected inshore hardbottom areas immediately adjacent to shore where snorkeling for cruise ship passengers may occur will be of particular emphasis. Monitoring results will be used to inform adaptive management approaches in order to minimize secondary impacts to these areas as a result of site activities, including guest in-water activities. Options that may be considered could include prohibiting access to sensitive habitat areas or requiring that all snorkeling be conducted with a trained guide. Although potential impact of sunscreen on corals is not well understood, guests will have access to “reef-friendly sunscreens” on the ships and at Lighthouse Point. Disney has substantial experience working with corals and reef systems in The Bahamas. Disney will provide education concerning the best types of sunscreens and how to apply to mitigate potential environmental impacts.

Healthy corals form the basis of healthy coral reefs which, in turn, ensure healthy fish populations. Disney proposes to construct a facility at Lighthouse Point to propagate and grow coral specimens before establishing them in the ocean in an effort to help rehabilitate those reefs. This proposed facility will be constructed on public land and will be open to Bahamian visitors and Disney guests. Additionally, in recognition of the cultural importance of conch in the region, efforts to culture queen conch for restocking purposes will also be undertaken. Disney or its vendors or partners will not benefit from these activities. It is understood that the facility will require permitting with the appropriate Bahamian authorities. This facility and action are not under consideration for this EIA and will be treated as a separate approval.

Recently, Stony Coral Tissue Loss Disease has been identified to be present in Grand Bahama. If the disease tracks like in other countries, it will likely spread. Even though not proven, the epidemiology trends would highly suggest that it is spread by boats and possibly scuba gear. The cruise ships only exchange bilge waters in the middle of trans-Atlantic crossings. Small boat operational protocols will instruct that bilge is discharged as much as possible in deep water when crossing between islands. SCUBA gear will be disinfected after each use with chemicals that are approved by The Bahamian government.

7.2.2 HABITAT STRUCTURE

Providing new man-made, three-dimensional structure to replace natural structures such as elevated hardbottom that may be impacted due to the proposed development has the potential to enhance fish and invertebrate habitat and coral establishment, if designed and constructed properly. Valuable marine resource benefits could be provided by integrating sustainable, ecological and biological design principles into the engineering plan of the proposed revetment infrastructure around the small vessel marina. Collectively, this would serve to facilitate coral and other invertebrate settlement and utilization of the artificial structure as habitat. However, any possible ecological benefits would be secondary to the primary purpose of the artificial structure; these actions would not be intended to directly mitigate for lost habitat structure but could provide ancillary benefits to marine life.

There is also an increasing body of restoration science that has demonstrated the use of artificial structure in the design of rehabilitation projects to increase overall ecological outcomes. As part of the overall mitigation plan, other actions that may be explored in an effort to replace lost habitat structure would be the design and construction of coral transplantation onto natural reef structure and/or artificial habitats where coral transplantation and/or coral relocation efforts could be incorporated.

Any efforts to design and build environmentally-friendly artificial structures would proceed with careful consideration of materials and location and with consideration of potential unintended adverse consequences. Small-scale pilot projects to test these various elements and locations would be necessary before any larger-scale efforts are undertaken.

The construction of the protective jetty surrounding the small vessel marina will utilize native rock materials and will provide new habitat for various species. While exact dimensions are not known at this time, it is anticipated that several acres of new habitat will be created. Details will become available as the design process is completed.

7.2.3 SEA TURTLES

There have been no observations of nesting activity and the team has received no reports of turtle nesting on the site. The extent to which beaches on the property are used for nesting by marine turtles is not known. Monthly bird surveys include beach transects, but most of those surveys have all occurred outside of sea turtle nesting season. Interviews with several boat captains have indicated turtles nesting to the north of the property but no known nesting activity on the property's beaches. Disney proposes to continue annual surveys using the Florida Fish and Wildlife Conservation Commission (FWC) guidelines that are in use at Disney's Vero Beach Resort. Since 2003, Disney's Animals, Science, and Environment (ASE) team has conducted nesting surveys along a 7-kilometer stretch of one of the world's highest density nesting beaches located in northern Indian River County, FL, USA, neighboring the southern border of the Archie Carr National Wildlife Refuge. Disney is a permitted organization through FWC and their work is conducted under Marine Turtle Permit #260. They participate in Florida's Statewide Nesting Beach Survey (SNBS) program and the Nest Productivity Assessment (NPA) program, both of which are managed by the State of Florida's Fish & Wildlife Research Institute (FWRI). These programs comprise a network of over 170 organizations, including Disney and is a shining example of the integration of successful citizen science with public sea turtle education.

If no turtles are detected over several years, Disney will adopt a reporting system for the employees to report any turtle nesting activity. If turtle nesting activity is detected, the Project would adopt the FWC nest protection protocols used at Disney's Vero Beach Resort, protocols that abide by the regulations of the U.S. Fish and Wildlife Service. The goals of the program will be to: 1) Prevent facility construction and operations from having adverse impacts on marine turtles, and; 2) Actively promote sea turtle conservation through monitoring, protection, and guest/community engagement. The protection plan will consider the effects of increased human activity on nesting beaches and turtle's well-documented sensitivity to artificial beachfront lighting. Recommendations will follow the FWC's best practices (https://myfwc.com/media/18511/seaturtle-lightingguidelines.pdf), including outfitting ocean-facing infrastructure with lighting fixtures that satisfy three basic principles; 1) Keep it low (mount fixtures low to the ground); 2) Keep it shielded (add shields to fixtures to prevent exposure to the beach), and; 3) Keep it long (referring to long wavelength light - use red or amber-colored LED bulbs). One exception may be the marina location which will have to adhere to Government of The Bahamas regulations for safety and security.

7.2.4 MARINE MAMMALS

It is recognized that cetaceans can be impacted by noise from construction activities. Noise levels and duration are considerations when developing sustainable construction techniques for marine facilities. From literature searches and interviews with local captains, most cetacean species (except for possible beaked whales) will not frequent the area from April to October, which will help to avoid some of the potential interactions. Prior to construction, the Developer will acoustically monitor the local environment to detect local cetacean species and ambient noise. The Developer will engage with an expert in marine mammals and marine construction to determine best practices. Once construction techniques are finalized, computer modeling (based on technique, size, number and placement of pilings) will be used to determine Level A and Level B exclusion zones, at which time the Developer will develop a plan that will give observers the ability to react accordingly and temporarily halt construction immediately if cetaceans are seen within the zones of concern and resume construction upon unhindered passage of the mammal from the zone. Documentation of any zone incursion by marine mammals would be included within the daily report, and DEPP would be notified of the occurrence. The applicant is further amenable to the adoption of a 'soft start' to pile driving operations, in which work is initiated with a reduced hammer energy (and noise level) that is gradually increased in order to give animals warning so they can choose to move away. The Owner recognizes that the shortest possible length of construction is best to minimize long-term disturbances and has committed to expedite the components of construction that generate underwater noise.

Additionally, the Owner will develop and implement an education program that addresses Best Management Practices (BMPs) and protocols for appropriate behavior around whales, dolphins and other marine wildlife during both construction and operation of the port facility. These BMPs will be provided to construction employees, guests, vendors, and others who operate watercraft or provide excursions and other services associated with the port facility. In addition, protocols will be established and implemented for ship navigation procedures that will be followed when whales and/or other slow-moving marine species are sighted during ship transit, such that the potential for ship and whale collisions will be minimized.

7.2.5 RESOURCE CONSERVATION

7.2.5.1 Installation of Mooring Buoys Around Lighthouse Point

Boating activity around Lighthouse Point has the potential to damage benthic resources through anchoring and propeller dredging in shallow areas. The Developer will work with the Government of The Bahamas and the local community to determine the appropriateness of installing mooring buoys and/or aids to navigation around the nearshore coastal environment to help prevent indiscriminate anchoring on reefs and other sensitive benthic habitats.

7.3 LANDSIDE RESOURCES

7.3.1 WILDLIFE MONITORING AND CONSERVATION

An EMP will be developed that will include bird monitoring on the shoreline and inland before construction, during construction, immediately after development, and on an on-going basis during facility operation to monitor bird populations.

Disney has extensive experience monitoring bird populations. For more than two decades, they have provided nesting boxes for purple martins, migratory songbirds that travel to Florida from the Brazilian rainforest. Since 2013, they have partnered with a Brazilian non-profit organization to track the birds with devices that supply data to help better understand the birds' flight path and nesting behaviors. Each year nearly 1,000 eggs are laid at Walt Disney World Resort and more than 200 breeding pairs having been identified. They also have a long-standing program to monitor dozens of native bird species in wildlife management areas at the Walt Disney World Resort and they partner with local non-profit organizations through volunteer efforts to conduct annual bird count surveys in surrounding communities. In conjunction with state wildlife agencies, Disney also conducts breeding survey of shorebird populations on a 7-kilometer beach route near Disney's Vero Beach Resort. These surveys are reported to Florida Fish and Wildlife Conservation Commission.

At Lighthouse Point, the proposed cellular telecommunication tower should employ state-of-the-art design principles (e.g., lighting) and development principles to minimize adverse impacts on birds.

Additionally, to offset and/or reduce net adverse impacts on birds that may occur as a result of removal of plants that provide foraging, roosting and/or nesting habitat for birds, the Project will integrate into landscape plantings the use of native plants that provide such habitats. Provided they are commercially available and/or could feasibly be grown onsite, examples that will be considered include the use of gum elemi trees, whose fruits provide food for white-crowned pigeons, use of *Ernodea littoralis*, whose flowers provide nectar for woodstar hummingbirds, and use of *Chiococcoa alba*, *Erithalis fruticosa* and *Lantana involucrata*, plants whose fruits have been documented to be important food items for Kirtland's warblers (Wunderle et al., 2010).

Three particularly notable bird species have been encountered on the property – piping plovers, great lizard cuckoos and Kirtland's warblers. As a migratory shorebird that nests in the northern United States and Canada and winters in The Bahamas and the Caribbean, piping plovers are protected by international treaties. Great lizard cuckoos on the site are part of an endemic population that is recognized as a sub-species that is found only in The Bahamas, and only in limited numbers on Eleuthera, Andros and possibly still on New Providence. Kirtland's warblers, migratory birds that are present in The Bahamas and Eleuthera annually from October through April and are presently listed as Endangered were documented on the property during the October and November 2019 monitoring events. Monitoring and mitigation procedures for these three species follow.

7.3.1.1 Piping Plovers

Piping plovers are known to have a high level of winter-time site fidelity, and a small group (three to eight individuals) of them has been sighted during separate site visits in October and December 2017, November and December 2018, and January, October and November 2019, at a location on Bottle Bay Beach where they are likely to be subjected to disturbance due to future Project-induced human activity.

To reduce the likelihood that increased human activity will cause piping plovers to abandon what appears to be an established wintering site, the Developer will undertake monitoring to determine the spatial use of the property by these birds. A section of the EMP will be based on the results of this investigation, perhaps in consultation with plover experts in the United States or Canada, from which at least one of the plovers observed at Lighthouse Point is known to migrate. The Developer will participate in winter piping plover censuses, which are conducted internationally every five years, the next one of which is scheduled to be conducted in January 2021.

The Developer will incorporate a piping plover conservation program into the EMP. A portion of the point on Bottle Bay where these plovers have been consistently observed will be protected with buffers to prevent disturbance.

On-going coordination with the US Fish and Wildlife Service, the Bird Banding Laboratory (BBL) and/or biologists with Environment and Climate Change Canada is recommended regarding the repeated sightings of an individual piping plover that was banded in Quebec's Magdalen Islands and winters at the Project site.

7.3.1.2 Great Lizard Cuckoos

Great lizard cuckoos are comparatively large, forest dwelling birds, whose habitat can easily be adversely affected by fragmentation. Because new transportation corridors are proposed through the dry broadleaf evergreen forest that is inhabited by this species, the Project has the potential to adversely affect the home range territory of this species and potentially cause the species to abandon the site. A study will be undertaken to attempt to identify the size of the population and the size and juxtaposition of the home range territory(ies) of the population of this species on the Lighthouse Point property. The Project consolidated the BOH layout to keep broader sections of forest intact. A section of the Environmental Management Plan will be based on the results of this investigation, perhaps in consultation with local experts, the goal of which will be to maintain the population of great lizard cuckoos on the property and/or south Eleuthera.

7.3.1.3 Kirtland's Warblers

Kirtland's warblers were observed on the site in October 2019 and January and February 2020. Potentially suitable wintering habitat for this species is presently minimal, but disturbance to the vegetation that will result from the Project could possibly eventually create new areas of the early successional vegetative cover that is used by this species.

In April 2018, Kirtland's warblers were proposed by the U.S. Fish and Wildlife Service for delisting based on the success of recovery actions that have taken place subsequent to the species designation as Endangered in 1967. As of this date, final agency action on the proposed delisting has not occurred, but a plan has been drafted for post-delisting monitoring (USFWS, 2018). While most of the monitoring is to be conducted at the species' nesting habitat in the northern Unite States, the plan also includes recommendations for monitoring on the birds' wintering grounds in The Bahamas.

Bird surveys conducted on the Lighthouse Point property during October through April (the months that individuals of this species are present on Eleuthera) are including searches for this species. Once the habitat usage of this species is documented to occur, notification will be made to the Kirtland's Warbler Conservation Team and/or the Kirtland's Warbler Alliance. A section of the EMP will be based on the results of this investigation, the goal of which will be to maintain or enhance the population of Kirtland's warblers on the property and/or south Eleuthera.

In recognition of the value these plants provide for Kirtland's warblers, it is recommended that native, fruit-producing shrubs, including *Chiococcoa alba*, *Erithalis fruticosa* and *Lantana involucrata* be considered within the palette of plant species that are considered for future landscaping.

7.3.1.4 Ospreys

Ospreys have been observed on the site on several occasions during baseline ecological assessments, and an inactive nest was observed near the beach in the eastern part of the property. Ospreys are well-known to nest on man-made structures, and their nests have been observed on telecommunication towers in the Bannerman Town area. The Project proposes to install a telecommunications tower on the site. The Developer will work with a design team to determine the feasibility of installing a nesting platform for ospreys integrated into or separate from the telecommunications tower.

7.3.1.5 Seabirds

The small cays situated just offshore of Lighthouse Point were identified in 2007 as providing summer-time nesting habitat for over 100 pairs of nesting sooty terns. Although the Project does not propose any activity on these cays and adjacent lands are publicly owned or will be publicly owned through Disney Donated Public Lands, increased human activity near the lighthouse and the southern tip of the island has the potential to disturb this nesting colony. At other locations. setback distances from bird nesting colonies vary, based on species, location and degree of human use. A bird survey conducted during June 2019 revealed some nesting by seabirds on these cays, but in very small numbers (less than five nests each of sooty terns and bridled terns) at locations not visible from Lighthouse Point and in excess of 300 ft from the southern tip of Lighthouse Point. Bird monitoring will be conducted in the future at the site in accordance with the EMP to more fully determine the extent to which the cays are still being used by nesting seabirds, and if so, what portions of the cays are being used, by what species and during which months of the year. Management protocols will be developed, perhaps in consultation with seabird experts, and implemented as part of the EMP, in an effort to protect and maintain their populations and prevent potential disturbance of the colony.

7.3.2 BATS

Of the approximately ten species of bats that are known to inhabit The Bahamas, bat expert Dr. Ted Fleming reports that “Only three species of bats are reported from Eleuthera -- Waterhouse's big-eared bat (*Macrotus waterhousii*), buffy flower bat (*Erophylla sezekorni*), and Gevais' funnel-eared bat (*Natalus lepidus*) but this list is incomplete. Based on our work in The Bahamas, I would expect three more species to also live there: big brown bat (*Eptesicus fuscus*), red bat (*Lasiurus borealis*), and Mexican free-tailed bat (*Tadarida brasiliensis*).”

After previous evening-hour visual observations in suitable habitat were un-productive, an Echo Meter acoustic detector was deployed during November 2019. Of the identifiable sounds, Mexican free-tailed bat (*Tadarida brasiliensis),* big brown bats (*Eptesicus fuscus*), and eastern red bats (*Lasiurus borealis*) were identified in small numbers. No large bat maternity caves were observed on the property.

If bats are documented to occur in caverns or rock voids in areas that are proposed for development, management protocols will be developed and implemented as part of the EMP, in an effort to protect and maintain their populations.

7.3.3 MINIMALLY MOBILE FAUNA

Minimally mobile fauna [e.g., seagrape snails (*Hemitrochus* sp.)] were observed to be locally abundant on upland vegetation in the herbaceous and shrub-dominated dunes and sand strand areas near the east-facing beach. Population estimates suggest that several thousand may inhabit the areas that are proposed for development into Guest Beach Areas and the Art and Culture Center near the east-facing beaches. Although this species is not currently protected by The Bahamas or international treaties, the Developer will implement a relocation program as part of the Environmental Management Plan through which listed species and notable sedentary and/or other minimally mobile fauna will be collected prior to land clearing and relocated to areas that will not be impacted by site development.

7.4 REMOVAL AND MANAGEMENT OF INVASIVE SPECIES

In recognition that invasive species are a serious threat to biodiversity, The Government of The Bahamas has adopted a National Invasive Species Strategy 2013 (NISS). Invasive species crowd out endemic species and may create a monoculture. *Casuarina* are particularly problematic due to their tendency to acidify surface soils with fallen needles, rendering soil conditions unacceptable to many native dune-adapted plants.

Removal of *Casuarina* trees, *Asiatic scaevola*, and any other land-based species listed in the NISS that may be encountered during subsequent field work, will be removed in and near development lands where there is easy access without potential for significant adverse environmental impacts." Additional text will be added to Section 6.1.5 of the EIA identifying techniques for *Casuarina* control. Text is being added to the EMP will include BMPs to be employed for removal of *Casuarina* to minimize the transfer of seeds from one site to another including: 1) No *Casuarina* are to be removed from the Project site if there is any potential for transfer of seeds to an off-site location, and 2) Transport of *Casuarina* from removal location to disposal location will be direct so that *Casuarina* seeds are not transferred to unintended locations. Text was added to the EIA to include the acknowledgement that an on-going program for maintenance removal of *Casuarina* will be needed after the Phase 1 removal has been completed, and the BMPs will be employed to minimize the transfer of seeds from one site to another, as follows:

Casuarina on the property will be dealt with in variable ways, depending on the degree of infestation, as described hereafter. In areas of dense *Casuarina* infestation (e.g., areas mapped as *Casuarina*-dominated Dunes), where trees are tall (i.e., < 25 feet in height) and dense, *Casuarina* will likely be removed mechanically. They will be transported by heavy equipment (e.g., front-end loaders) to designated vegetation management areas. Although the ultimate disposal method(s) have not been determined, it is likely that they will either be burned in burn boxes if approved by DEPP, mulched for future use on trails, or salvaged for use by artisans. Details of burn boxes will be provided to DEPP. *Casuarina* are prolific seed-producers, so burn boxes may be more desirable than transporting them long distances, during which seeds could potentially be dispersed into areas of the property where they do not presently exist.

In areas where *Casuarina* are intermittently present in other areas, they will be controlled on a case-by-case basis, with the decision being based on the degree to which high-quality natural habitat is present in the vicinity. In areas that are easily accessible (e.g., along the edge of the existing access road), and which are already impacted, they will likely be mechanically removed and transported to designated vegetation management areas for burning, mulching or salvaged for woodcraft artisans.

At other locations, where they may be present in low numbers amid high quality natural communities, they will either by treated by a basal-bark herbicide and left to die in place as standing dead-wood, or their trunks may be cut at/near ground level, stumps treated with herbicide, and the trunks either left to decompose naturally, or cut into pieces and transported for burning, mulching or local woodcrafts.

Without regard to their method of initial disposal, the property will have an active management plan for routine maintenance removal of *Casuarina* and other invasive species (See Section 7) to prevent them from becoming re-established. Individual *Casuarina* trees that are far removed from areas that are to be impacted during site development and operations will be addressed on a case by-case basis.

If an osprey nest remains present in a *Casuarina* tree on the east side of the property when other *Casuarina* trees are removed, that single tree may be poisoned and allowed to remain standing while other *Casuarina* trees are removed.

7.4.1 LANDSIDE INVASIVES

Removal of *Casuarina* trees, Asiatic *scaevola*, and any other land-based species listed in the NISS that may be encountered during subsequent field work, will be removed in and near development lands where there is easy access without potential for significant adverse environmental impacts.

Feral cats and unrestrained dogs (both of which are identified in the NISS) were occasionally observed on the property during site assessments. The EMP will include sections regarding actions to address impacts of these and other non-native species that are identified in the NISS as species for appropriate management.

The EMP will address long-term control/management of invasive species through ongoing maintenance programs that will be undertaken to prevent recolonization after initial treatment/removal. Periodic removal of new recruits will be undertaken to prevent re-establishment of NISS-designated invasives.

7.4.2 MARINE INVASIVES

Lionfish were encountered during marine assessment work at the Lighthouse Point site in fairly low abundances. This highly destructive non-native fish can disrupt the ecological trophic balance by consuming large numbers of small invertebrates and fish. The Developer will work with the local community and the Government of The Bahamas to support a lionfish management program within the LHP area. It is noted that the Cape Eleuthera Institute and others have conducted extensive work with lionfish in Rock Sound and the Cape Eleuthera area.

7.5 WETLANDS

No wetland impacts are anticipated to be impacted based on the new site plan, which included moving the Back of House (BOH) to the eastern portion of the property. However, if a wetland area is encountered, mitigation activities that are proposed to minimize these impacts and offset this impact will be included in the EMP. Implementation of these BMPs will include the following:

- Engineering and/or geotechnical studies should be conducted to ensure that the substrate is adequate to support vehicular use.
- Prior to initiating land clearing, ecological assessments are to be completed within areas that will be affected by the development of the road.
- Notable flora and/or fauna (e.g., protected trees, orchids) that are determined to be within the footprint of clearing are to be re-located, if feasible. If nesting birds are

determined to be present within the areas to be cleared, development is to be delayed until after there are no nest-dependent young.

- Temporary silt fencing or other erosion-prevention materials are to be installed and maintained until road development has been completed and the ground surface stabilized in order to prevent unnecessary adverse impacts in adjacent areas. Details of these protective measures are to be addressed in the EMP.

The geotechnical work was interrupted by the COVID-19 government orders. No geotechnical work has been completed that would result in additional information.

Mitigation to offset the unavoidable impacts at these locations will be through the recognition of the Disney Donated Public Lands, including wetlands to the Government of The Bahamas, and through the development and long-term maintenance of a surface water management system that will pre-treat rainwater run-off to prevent suspended material from entering existing salt ponds and their associated wetlands.

7.6 PROTECTED TREES AND RELOCATION OF NOTABLE VEGETATION

Development of some components of the Project will require the removal of trees that are designated by the Government of The Bahamas as Protected. If detailed tree inventories within the footprint of proposed development reveal the presence of notable populations of these trees that cannot be avoided, the Developer will work with the Department of Forestry within the Ministry of the Environment and Housing to develop an appropriate tree mitigation program, which will include recognition of the forested, approximately 193 acres of the privately owned lands that will form the Disney Donated Public Lands. Elements of the mitigation program may include in-situ preservation of some individuals, conservation of specimen trees on the property and potential relocation/transplanting.

7.6.1 RELOCATION OF OTHER NOTABLE VEGETATION

Populations of native orchids that are protected by international treaties are present within areas that are to be cleared for development. The Developer will consider developing and implementing an in-house program or collaborating with local experts to relocate easily transplantable species that have a high likelihood of survival. Relocatable individuals may be moved onto other areas of the property that are not to be impacted, moved onsite onto existing Crown Lands or the future Disney Donated Public Lands, or moved offsite to enhance populations at Leon Levy or other Government-owned properties.

Native Encyclia orchids and *Tillandsia utriculata* air plants were found to be present within the dry broadleaf evergreen forest. As epiphytes that are transplanted with high levels of success, impacts to individuals of these species could be eliminated or reduced if a plant relocation program is implemented prior to initiating land clearing, if individuals of these species are determined to be present within areas that are proposed for development. The Ministry of Agriculture and Marine Resources will be notified and the requisite permit obtained prior to the relocation of any orchid.

7.7 WASTE REMOVAL AND COASTAL CLEANUP

The accumulation of flotsam, jetsam, debris and other litter that washes onto shore and debris that has been carelessly discarded onto the property presents the potential for transfer into the terrestrial and marine environment. An ongoing waste management program and regular coastal cleanups will provide adequate refuse collection points and continued monitoring of shoreline for marine debris washed ashore within the Project area.

7.8 EMPLOYEE, VENDOR AND GUEST EDUCATION PROGRAMS

The Developer will follow an extensive operational EMP that includes an extensive on-island interpretive educational programs for guests and employees of Lighthouse Point. The educational programs will highlight the species found in Bahamian terrestrial and marine environments, especially on Lighthouse Point.

7.9 THE DISNEY CONSERVATION FUND

It is noted that the DCF has a strong conservation record in The Bahamas, having awarded approximately $4 million in grant funding to agencies working in the region since 1997. In addition, the DCF has been supporting an initiative to reverse the decline of coral reefs across The Bahamas, helping to advance collaborative and strategic efforts involving multiple organizations to deliver conservation outcomes.

8.0 ENVIRONMENTAL MANAGEMENT PLAN

Following completion of geotechnical investigation in landside and marine areas and after construction methodologies are identified, detailed Construction and Operational EMPs will be submitted under separate cover and will include specific details regarding Project development, monitoring, and mitigation. The EMP will ensure that the development and operation of Lighthouse Point Project proceeds with adequate controls that protect the long-term health of the environmental resources of the Project site and immediate vicinity.

Items to be covered under the EMP will include, but not limited to:

1. Construction planning
2. Upland BMPs
3. BMPs for the marina and berthing area
4. Construction safety issues
5. Methods for berthing basin construction
6. Marina operations
7. Cultural resources
8. Notable species of flora and fauna
9. Sediment and erosion control measures
10. Construction materials and fill spoils storage
11. Measure for protection of sensitive environmental features
12. An environmental monitoring and adaptive management program
13. Emergency response plans
14. Details on proposed mitigation efforts

9.0 PUBLIC CONSULTATION

Public consultation for the proposed development will occur in coordination with the Department of Environmental Planning and Protection per the procedures and policies as established by the Environmental Planning and Protection Act 2019 and Environmental Impact Assessment Regulations 2020. Consultation with local stakeholders is encouraged to facilitate transparency, communication, participation and buy-in on Project components. The venue and time shall be coordinated between the developer and the Government of The Bahamas.

10.0 CONCLUSIONS

To prepare this EIA document, extensive studies were conducted addressing infrastructure and utility requirements, water quality, coastal erosion and stabilization, and terrestrial and marine ecological impacts.

Disney has earned worldwide recognition and a reputation for its long-term commitment to the environment and sustainable practices. It has worked collaboratively to design the Lighthouse Point Project to be compatible with the local environment and to protect the most valuable habitats on the site.

The marine ecosystems adjacent to Lighthouse Point have a variety of hardbottom and coral reef habitats that provide important ecosystem services. Based on AGRRA indicator thresholds developed by the Healthy Reefs Initiative (www.healthyreefs.org), which ranks habitats on a scale from “Critical” to “Very Good,” the overall condition of surveyed reefs is considered average with a median score of “Fair”. Reefs do not occur within the marine facilities footprint. Hardbottom habitats comprise 68 percent of the impacted area within the footprint. These habitats are in good condition but scored low on the benthic index when compared to reefs in Eleuthera and The Bahamas; a lower index score is considered typical for this type of habitat within The Bahamas. Within the proposed Project marine development footprint, the overall combined live planar area for soft/stony coral and barrel sponges that will be impacted was calculated to be 0.0152 acres, which represents 0.3 percent of the directly impacted areas. The other two habitats found within the footprint, sand and submerged aquatic vegetation, were also found to be in good condition. Construction and long-term operation of the Lighthouse Point Project have the potential to adversely impact these resources. A detailed EMP will be developed and implemented and the mitigation strategies identified will be conscientiously implemented and refined when appropriate, so that the Project can be constructed and operated with a net positive impact on the marine environment and community.

Based on the results of site investigations and species encountered, construction and operation of the Project is not expected to result in any loss of marine biodiversity.

No unique habitats or species have been documented to occur within the proposed directly impacted development footprint. The directly impacted areas are primarily sandy and hardbottom habitats, not coral reefs, which support higher species diversity and do not occur in the facilities' area of influence. In addition, the total amount of benthic habitat directly impacted (5.04 acres) by the development is relatively small (~1 percent) in proportion to the amount of similar adjacent habitats within the Lighthouse Point area which will not be directly impacted. The Project proposes focusing translocation efforts on species of highest value, which are the larger, slower growing stony corals species that have been shown to have high transplantation success. This is consistent with guidelines of FDEP for mitigation for coral reef and hardbottom communities in Florida. Soft corals (octocorals) and sponges can also be relocated, but techniques are not as well developed as those for stony corals, and success is less certain. Moreover, many of these species have been shown to have high background levels of natural recruitment from the water column and will repopulate the seafloor within the impacted area once it is stabilized. A quantitative analysis has not been performed.

Guests, employees, and citizens and residents of The Bahamas will have access to most of the 10,000 linear feet of sandy beach at Lighthouse Point. It is likely that wrack line removal as part of beach maintenance will affect shorebird foraging behavior. Birds will have other areas on the property including the north-half of east beach (4,675 linear feet) and the southwest portions of the property (1,370 ft, plus Bottle Bay Point, 850 ft), where wrack line removal will not occur. A portion of the point on Bottle Bay where piping plovers have been consistently observed will be protected with buffers to prevent disturbance. The wrack line will not be removed in these areas to help maintain an environment for natural shorebird feeding. The Developer will incorporate a piping plover conservation program into the EMP.

Similarly, much of the landside portion of the property consists of terrestrial habitats that are in a healthy condition. Care will be taken to prevent or minimize adverse ecological impacts on endemic, endangered and/or notable plants and animals, including consolidating the BOH with the guest area to keep larger areas of undisturbed habitat intact. As part of the Project, micro-siting will preserve notable species (e.g., Lignum vitae) in their original location where feasible, and as amenities around proposed visitor use areas so that they will not be impacted. The Developer will work collaboratively with the relevant government agency regarding permitting for removal of protected trees, with a goal of constructing and operating the facility in a manner that will have minimal net adverse impact on the terrestrial environment.

Although no quantitative studies have been completed in the areas where no construction is proposed, all plant and animal species that were observed within the areas that are proposed to be impacted are also present in the approximately 80 percent of the property where no construction is proposed. It is recognized that populations of some species may be reduced and that populations of other species may increase during construction and operation of the Project but, based on the results of site investigations and species encountered, construction and operation of the Project is not expected to result in any loss of terrestrial biodiversity on the property. A minor reduction in biodiversity could occur if the conscientious efforts to remove and/or control invasive non-native species that are listed in The Bahamas National Invasive Species Strategy are successful.

Construction and operation of a state-of-the-art reverse osmosis system, wastewater treatment plant and surface water management system will allow the Project to be built and operated without having significant adverse ecological impacts or freshwater resources.

Environmental stewardship is a standard component of Disney's business. This Project will be accomplished with thoughtful planning, attention to detail during construction, and conscientious adherence to the Construction and Operational EMPs.

Recommendations

Recommended BMPs for the cruise port and entertainment facility at Lighthouse Point, Eleuthera, will be contained within in the subsequent Environmental Management Plan. The following focus areas will be included.

- Marine Infrastructure. The cruise port and marina will use best management practices to limit impacts. A detailed summary of BMPs to be implemented during construction and operations will be provided in the EMP. Topics will include water quality controls including turbidity reduction, storm water discharge and prevention, and spill prevention.

- Beach Management Program. A comprehensive beach management program will be established to provide information, environmental management, and appropriate safety for the guests. Comprehensive cleanup of the existing beach will be conducted during construction. Beach maintenance will be conducted on Developer-owned properties during the operational phase.

- Marine Resource Management Plan: A comprehensive management and monitoring plan will be developed to limit Project impacts to nearshore patch reefs and notable inshore hardbottom habitats. Topics will include best management practices to minimize guest impacts to nearshore sensitive areas; feasibility of incorporating ecological design into pier and marina breakwater construction; long-term monitoring program to guide adaptive management, and a coral nursery and rehabilitation program.

- Limited Clearing Footprint. Clearing for all required areas will be limited to the immediate area necessary for construction and development amenities. Adjacent area clearing will be restricted to thinning underbrush and selective removal of poisonous and invasive plants.

- Sediment and Erosion Controls. BMPs, including site-specific controls and turbidity management measures will be followed to minimize impacts to water quality in the pier and berth areas; a turbidity management plan will be part of the EMP. BMPs will be employed during land clearing activities to limit impacts and reduce the potential for sediment transport during storm events, with a focus on avoiding impacts to subsurface voids, ponds, wetlands, and the marine environment.

- Materials Storage and Fuel Storage. Materials storage will be kept away from sensitive environmental features. Fuel storage and refueling will adhere to best practices, including raised storage with either 110 percent containment mechanism or doubled walled tanks in the event of spill.

- Sensitive Environmental Features. Geotechnical investigations will test for the presence of freshwater in the vicinity of any potential freshwater areas discovered.

- Planting with Native Tree and Shrub Species. Removal of invasive species which are considered a threat to small island nations, will slow the proliferation of unwanted plant species that threaten local biodiversity. It is recommended that the Developer perform routine removal of saplings to prevent recolonization. A landscaping program that uses a palette of native trees and shrubs will encourage visits by native fauna.

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12.0 REVIEW OF LITERATURE

Lighthouse Point – Cruise Port Relevant Scientific Literature

Peer-Reviewed Literature

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The Walt Disney Company Environmental Policy. The Walt Disney Company.

13.0 LIST OF CONTRIBUTORS

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Tamanji Bethel (November) Marine AGRRA Surveys

Caribbean Coastal Services

Latesha Gibson (November, December, January, February)- Junior Environmental Scientist, Environmental Monitor

Dene Rankine (December-February)-Environmental Specialist

Mark Daniels-Environmental Specialist-Plants, for Geotechnical Investigation Preclearance Survey/Alternate BOH Botanical Assessment

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Brooker Architectural Design Consultants

ATM-Greg Braun-Ecologist

Disney's Animals, Science, and Environment

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Dr. Jason Fischer (November-January)-Ornithologist

John Thomson (October)-Master Naturalist

Rebekah Lindborg (October)-Conservation Technician

Jacobs Engineering Group

Meetings

April 19, 2018	DCL receives first correspondence from MP Hank Johnson discussing 17 areas for discussion, including potential environmental impact
May 8, 2018	DCL meets for first time with leaders of the newly formed Eleuthera Community Support Group
Aug. 2, 2018	Eleuthera Community Support Group hosts public meeting to discuss LHP project in Eleuthera; DCL does not attend but receives feedback from Eleuthera Community Support Group members
Aug. 29-30, 2018	DCL President has several meetings in Nassau to discuss LHP project, including Bahamas Investment Authority, Bahamas Minister of Tourism,

	U.S. Embassy, Bahamas National Trust, Bahamas Chamber of Commerce and Eleuthera Chamber of Commerce.
Sept. 11-13, 2018	DCL President and Dr. Mark Penning (head of Disney Animals, Science and Environment team) meets with more than 100 Eleuthera residents set up by members of the Eleuthera Community Support Group to present latest LHP project details and engage with the community
Sept. 16, 2018	Members of Eleuthera Community Support Group visit Castaway Cay to better understand how DCL operates it
Sept. 25-26, 2018	DCL President does media interviews with several print, television and radio reporters in Nassau re: the LHP project
Oct. 10, 2018	Prime Minister hosts Town Hall in South Eleuthera to discuss the LHP project; Disney is not in attendance but there is overwhelming support from attendees
Oct. 17, 2018	Eleuthera pastors issue letter of support for LHP project; on the same day, members of the Eleuthera Community Support Group deliver more than 1,000 signatures of support to the Prime Minister
Oct. 19, 2018	National Economic Council approves proposal submitted by Disney Cruise Line
Nov. 1-2, 2018	Disney Cruise Line visits Eleuthera to provide updates to Eleuthera Community Support Group and other community leaders
Nov. 11-14, 2018	DCL and Walt Disney Imagineering begin cultural conversations during trip to Eleuthera and Nassau; meeting with Eleuthera Community Support Group Eleuthera also held
Feb. 4-8, 2019	DCL Port Adventures team visits Eleuthera to research Port Adventure opportunities and meet with existing and potential future tour providers; Meeting with Eleuthera Community Support Group also held
Feb. 24-28, 2019	Bahamas delegation visits Disney's Aulani Resort in Hawaii to understand how culture is integrated into the experience, to speak privately with Disney's cultural advisors in Hawaii and to speak with Disney employees; attendees include both MPs from Eleuthera, Manika Munroe from BIA, Bahamian artists Antonius Roberts and Kevin Cooper and two members of the Eleuthera Community Support Group
March 7, 2019	HOA is signed in Nassau
April 25-26, 2019	DCL hosts The Bahamas Small Business Development Center in Orlando to better understand the services the SBDC plans to provide on Eleuthera and tour the local National Entrepreneur Center in Orlando to share best practices
April 29, 2019	DCL meets with University of The Bahamas Hospitality Department
April 29, 2019	DCL meets with Ministry of Labour in Nassau to gain insights

April 30, 2019	DCL meets with Meet with Eleuthera Labour Officer to continue gain insights on local labour market
April 30, 2019	DCL tours medical facilities on Eleuthera to understand current state of medical care on Eleuthera
May 1, 2019	DCL tours construction sites on Eleuthera to meet local contractors
May 1, 2019	DCL hosts meeting for Island Administrators, local councils, and key department heads such as the Royal Bahamas Police Force, Ministry of Tourism, Traffic Department, and Customs and Immigration on Eleuthera to provide project update
May 1-2, 2019	DCL holds information sessions on Eleuthera for hundreds of potential vendors, employees, suppliers, tour operators, retailors, contractors, and operators
May 3, 2019	DCL meets with Bahamas Contractors Association; Bahamas Engineers, Architects and Allied Professionals; Bahamas Chamber
June 5-6, 2019	DCL presents LHP project a meeting of Bahamas Contractors Association and then meets 1:1 with contractors interested in working on the project
June 26, 2019	DCL meets with Ministry of Agriculture and Marine Resources, the International Institute for Cooperation on Agriculture (IICA), and tours vendor locations to understand food and beverage opportunities available in The Bahamas
June 27-28, 2019	DCL visits Eleuthera to meet with local leaders, local commercial fisherman, Bahamas Agriculture Industrial Cooperation representatives from the Ministry of Agriculture, and also tour several facilities and local farms
July 11, 2019	DCL meets with the Ministry of Public Works and Bahamas Society of Engineers in Nassau
Aug. 13-15, 2019	DCL Security team visits Eleuthera to meet with Royal Bahamas Police Force and potential security vendors to discuss security opportunities and needs
Oct. 4, 2019	DCL meets with Bahamas National Trust Board on Eleuthera to share project updates
Oct. 21, 2019	DCL sponsors and attends the University of The Bahamas Culinary Week
Nov. 13, 2019	DCL meets with MP Hank Johnson, Administrator Gregory Knowles and several local department heads to provide an update on the project, including the start of geotechnical review at the site
Nov. 13, 2019	DCL meets with Eleuthera Support Committee to provide an update on the project, including the start of geotechnical review at the site

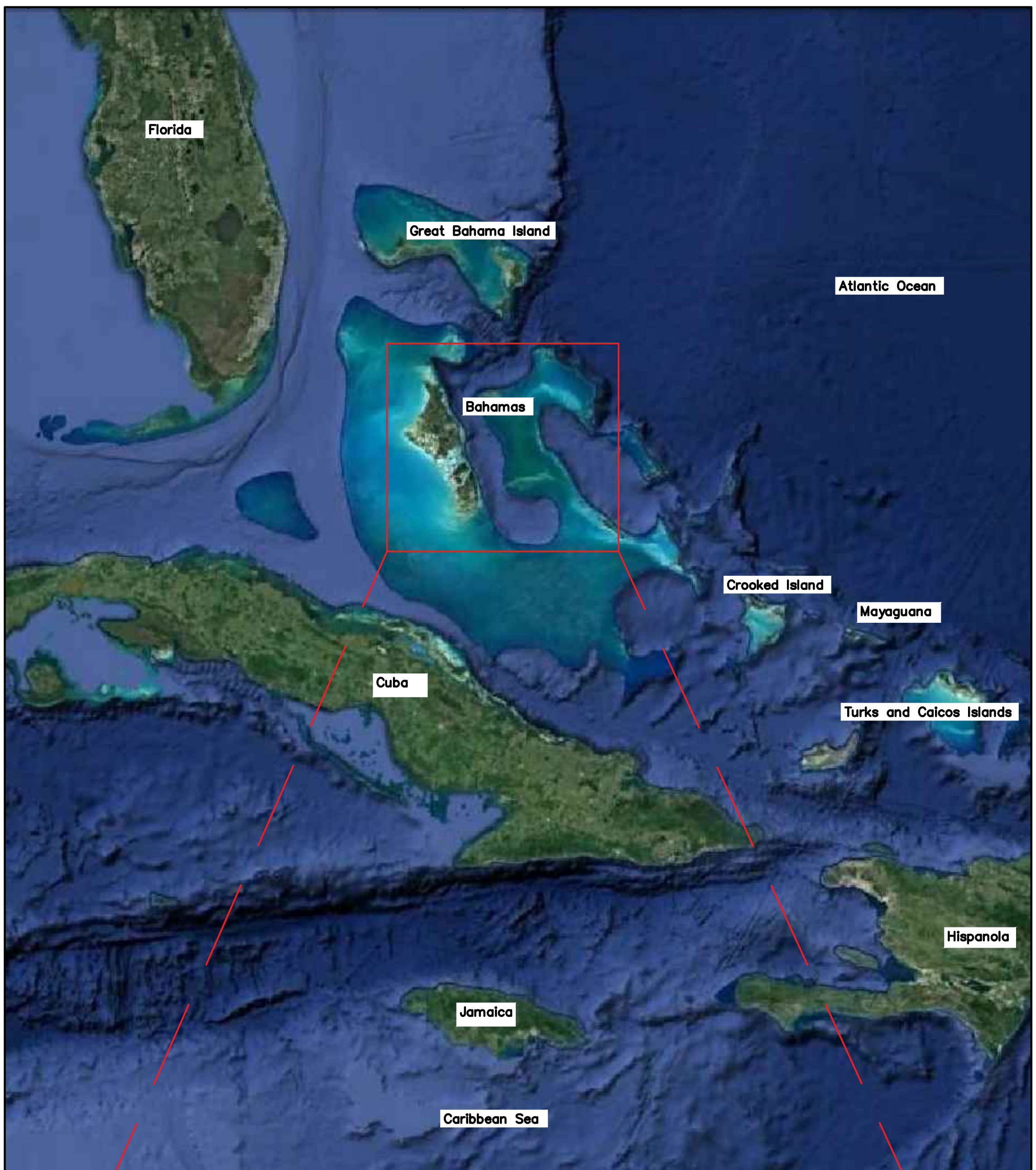
Nov. 19-22, 2019	DCL Human Resources and Recruitment teams visit Nassau and Eleuthera to build relationships and gain important cultural, academic and business insights to create a DCL workforce development strategy and provide employment opportunities for residents of Eleuthera; Meetings held with University of The Bahamas, Bahamas Technical and Vocational Institute, National Training Agency, Atlantis Resort, Junior Achievement, Eleuthera Department of Labour representative Simone Thurston, and Member of Parliament Stephen Hank Ferguson
Dec. 9, 2019	DCL meets with Eleuthera Assistant Superintendent of Policy Franklyn Neely
Dec. 10-12, 2019	DCL hosts information sessions for Bahamian companies to meet one-on-one with the three companies that have submitted bids for design and construction of the Lighthouse Point project (Nassau and Eleuthera)
Dec. 19, 2020	Disney submits EIA to BEST Commission
Jan. 23, 2020	DCL meets with the Ministry of Public Works and representatives from Bahamas Power and Light and the Water and Sewage Corporation
Feb. 11, 2020	DCL meets with Clara Young (Ministry of Youth, Sports and Culture) in Eleuthera to discuss potential program related to Junkanoo
Feb. 12, 2020	Disney Parks Chairman and DCL President hosts lunch for community leaders in Eleuthera
Feb. 12, 2020	DCL meets with BNT chairman to provide project updates
Feb. 13, 2020	DCL commits more than $1 million to prepare small businesses in projects underway on Eleuthera and signs Memorandum of Understanding with the Access Accelerator Small Business Development Center and Eleuthera Chamber of Commerce
Feb. 13, 2020	DCL makes contribution to support Junior Junkanoo at Preston H. Albury High School
Feb. 13, 2020	DCL meetings with Eleuthera District Education Officer Michael Culmer to further discuss school needs
March 6, 2020	DCL awards scholarships to four Bahamian female cadets attending the LJM Maritime Academy during ceremony in Nassau
Dec. 14, 2020	DCL meets with Eleuthera MP Stephen Hank Johnson to discuss EIA
Dec. 17, 2020	DCL meets with South Eleuthera Island Administrator Gregory Knowles to discuss EIA
Dec. 18, 2020	DCL meets with Bahamas National Trust to discuss EIA
Dec. 18, 2020	DCL meets with Perry Institute for Marine Sciences and SeaLegacy to discuss EIA
Jan. 25, 2021	DCL meets with South Eleuthera District Council to discuss EIA
Jan. 26, 2021	DCL meets with leadership of Bahamas Society of Engineers and Bahamas Contractors Association to discuss EIA and project updates

Feb. 3, 2021	DCL meets with the Eleuthera Chamber of Commerce Board of Directors to discuss EIA and project updates
Feb. 5, 2021	DCL meets with Eleuthera Pastors Council to discuss EIA
Feb. 11, 2021	DCL meets with Bahamas Chamber of Commerce and Employer's Confederation Executive Committee to discuss EIA and project updates
Feb. 23, 2021	DCL meets with group of more than 50 Eleuthera community representatives to discuss EIA and project updates

Appendix A Lighthouse Point Regional Bathymetric Survey

CMYERS LOCATION M:\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT BAHAMAS_USFT.DWG

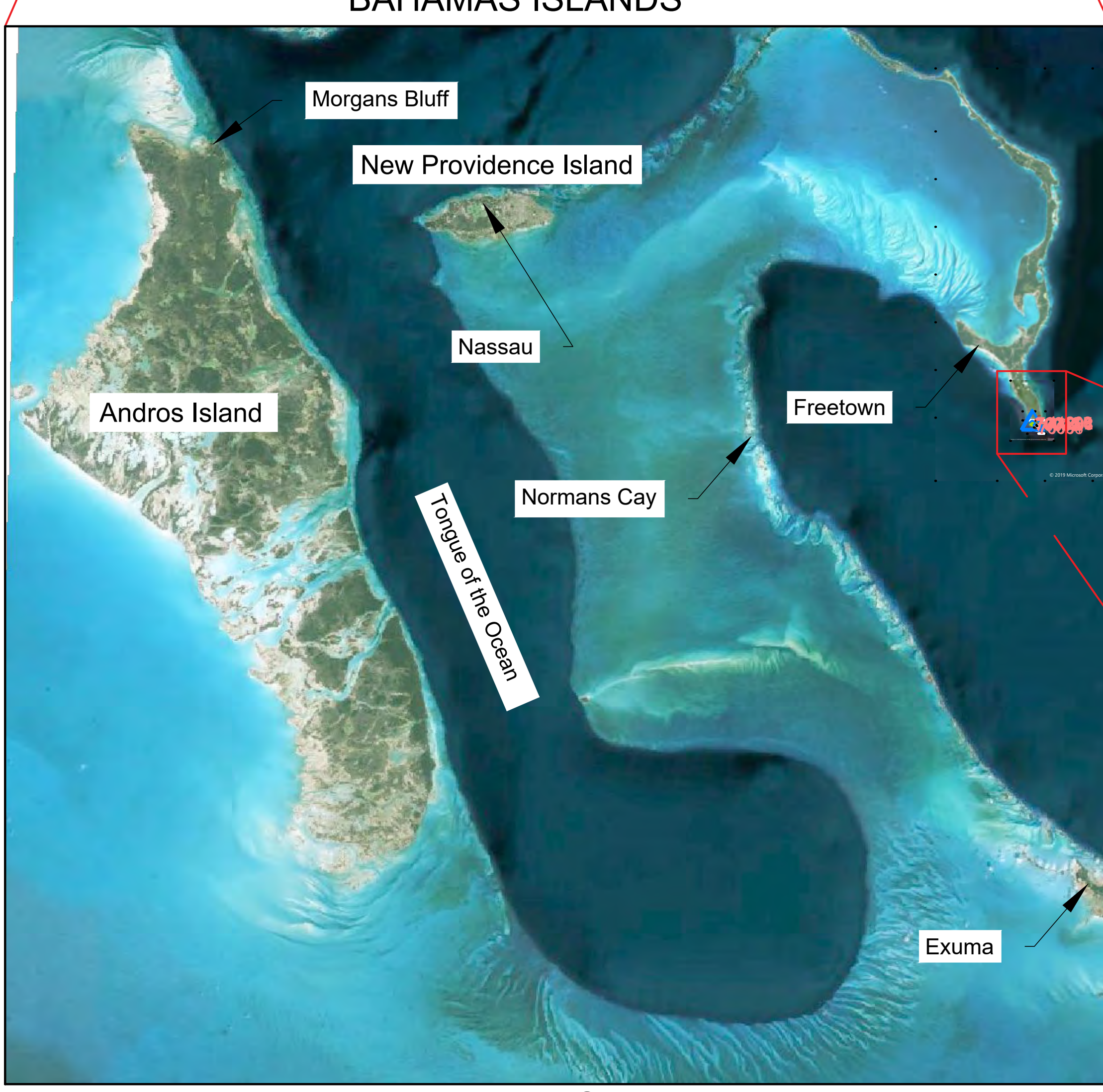
REGIONAL MAP



N.T.S.

SITE LOCATION MAP

BAHAMAS ISLANDS



N.T.S.

FIGURE 1
GENERAL LOCATION MAP
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 11, 2019

ATM

CMYERS LOCATION M:\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT BAHAMAS_USFT.DWG

SURVEYOR'S NOTES

1. FIELD SURVEY COMPLETED BY ATM ON NOVEMBER 12, 2018.

2. HORIZONTAL SURVEY GRID BASED ON THE UNIVERSAL TRANSVERSE MERCATOR, ZONE 18 NORTH, WGS 84, IN US SURVEY FEET.

3. ELEVATIONS ARE IN FEET, REFERENCED TO APPROXIMATE LOCAL MLLW. APPROXIMATE LOCAL TIDAL DATUM VALUES BASED ON A VERY SHORT TERM TIDE STUDY.

4. OFFSHORE HORIZONTAL POSITIONING DETERMINED WITH DIFFERENTIAL GLOBAL POSITIONING SYSTEM TECHNOLOGY (DGPS). DIFFERENTIAL CORRECTIONS FROM FURGO'S OMNISTAR SYSTEM.

5. SOUNDINGS WERE MADE WITH AN ODOM HYDROTRAC, SINGLE BEAM ECHOSOUNDER OPERATING AT 200 kHz AND HAVE BEEN CORRECTED FOR MEASURED TIDAL VARIATIONS.

6. THE INFORMATION SHOWN HEREON REPRESENTS THE RESULTS OF SURVEYS MADE ON THE DATES INDICATED ABOVE AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS AT THAT TIME. THIS MAP IS NOT INTENDED FOR NAVIGATIONAL PURPOSES.

7. THIS SURVEY WAS PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT(S) SHOWN HEREON.

8. LANDS SHOWN HEREON WERE NOT ABSTRACTED FOR RIGHTS-OF WAY, EASEMENTS OF RECORD, ABANDONMENTS, ZONING SETBACKS, DEED RESTRICTIONS OR OWNERSHIP

Table 2. Static GPS Survey Results & Comparisons w/ Local Values

#	Control Points: Description/Stamping	Latitude WGS84	Longitude WGS84	UTM (Zone 18N) WGS84 Northing meters	UTM (Zone 18N) WGS84 Easting meters	UTM (Zone 18N) WGS84 Northing US Survey Feet	UTM (Zone 18N) WGS84 Easting US Survey Feet	Elevation MLLW Feet	Local datum Elevation Feet	Local UTM (Zone 18N) Bahams NAD27 Northing Imperial Feet	Local UTM (Zone 18N) Bahams NAD27 Easting Imperial Feet
1	BAHAMAS GEODETIC CONTROL "EL 14 1959"	N24º36'52.93577"	W076º08'43.68459"	2722768.423	384048.229	8932949.39	1259998.23	40.44	40.10	8932343.79	1259893.20
2	Coastal Systems LHP002 EST.07	N24º37'02.07749"	W076º09'32.09854"	2723061.031	382689.150	8933909.39	1255539.32	16.35	16.01	8933303.09	1255433.14
3	1009	N24º36'56.65406"	W076º09'12.51515"	2722889.574	383238.445	8933346.87	1257341.46	26.44	26.10	8932740.35	1257235.76

Local Values provided by Target Surveying & Engineering, LTD

US Survey Feet: 1m=3.28083333
Imperial Feet: 1m = 3.2808455ft

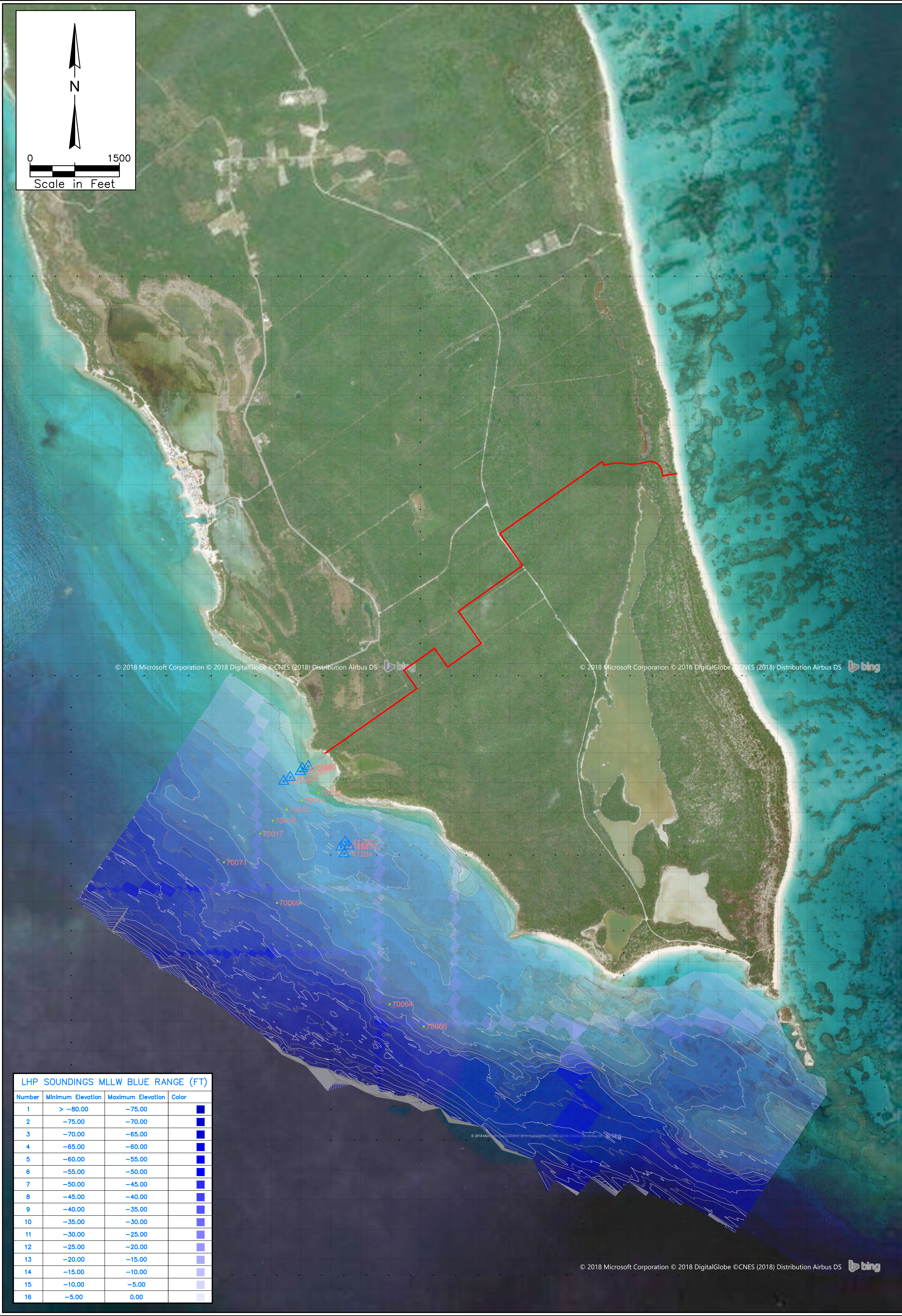
Table 1. Project Site Tidal Datums

	MLLW Datum (ft)
MHHW	2.9
MHW	2.7
MTL	1.4
Local	0.34
MLW	0.1
MLLW	0.00

FIGURE 2
SURVEYORS NOTES
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 11, 2019

ATM

CMYERS LOCATION M:\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT BAHAMAS_USFT.DWG



LHP SOUNDINGS MLLW BLUE RANGE (FT)			
Number	Minimum Elevation	Maximum Elevation	Color
1	> −80.00	−75.00	
2	−75.00	−70.00	
3	−70.00	−65.00	
4	−65.00	−60.00	
5	−60.00	−55.00	
6	−55.00	−50.00	
7	−50.00	−45.00	
8	−45.00	−40.00	
9	−40.00	−35.00	
10	−35.00	−30.00	
11	−30.00	−25.00	
12	−25.00	−20.00	
13	−20.00	−15.00	
14	−15.00	−10.00	
15	−10.00	−5.00	
16	−5.00	0.00	

FIGURE 3
1:1500 OVERVIEW
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 11, 2019

ATM

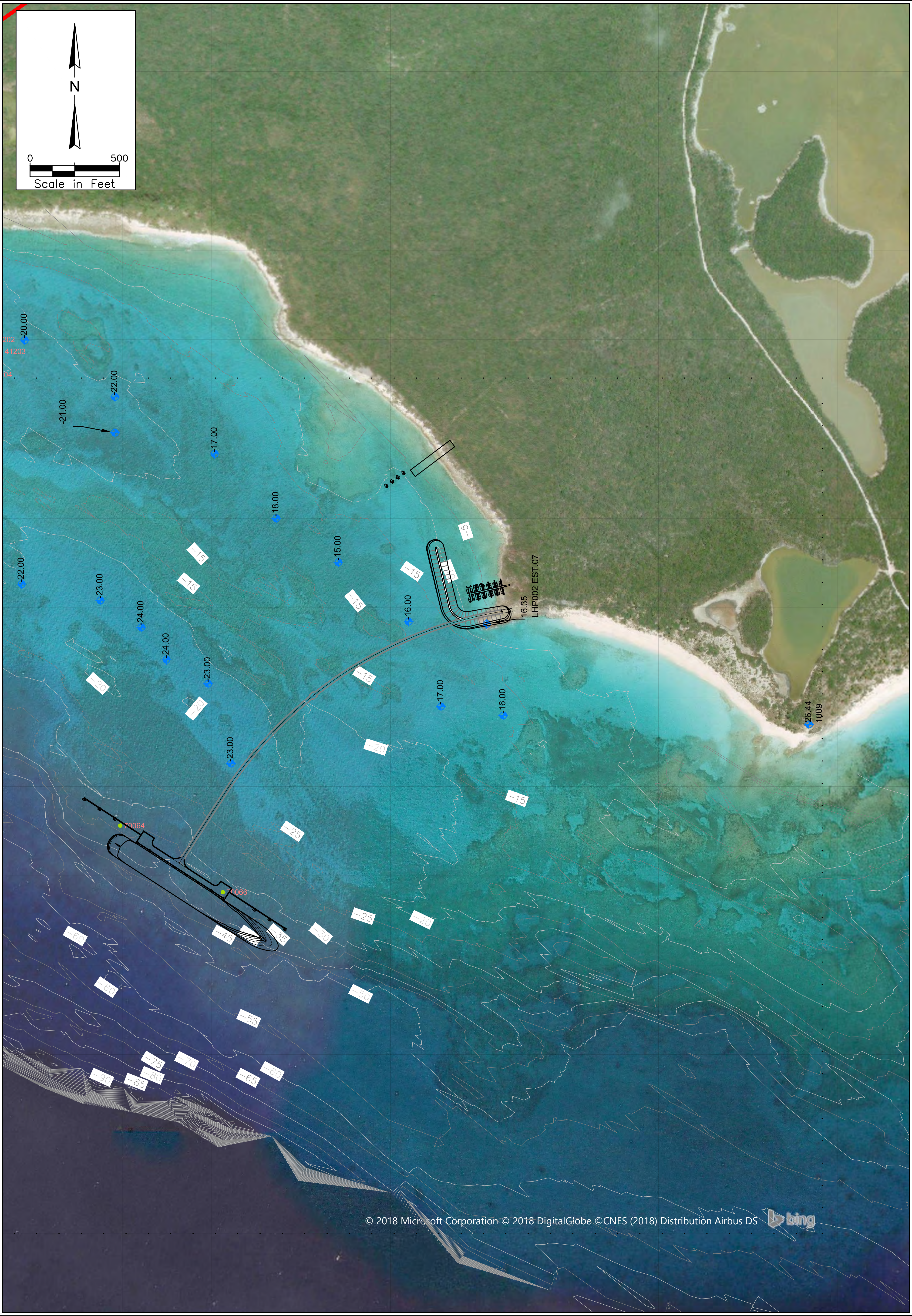


FIGURE 4
1:500 PIER WITH 5' & 10' CONTOURS
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 11, 2019

ATM

CMYERS LOCATION M:\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT BAHAMAS_USFT.DWG

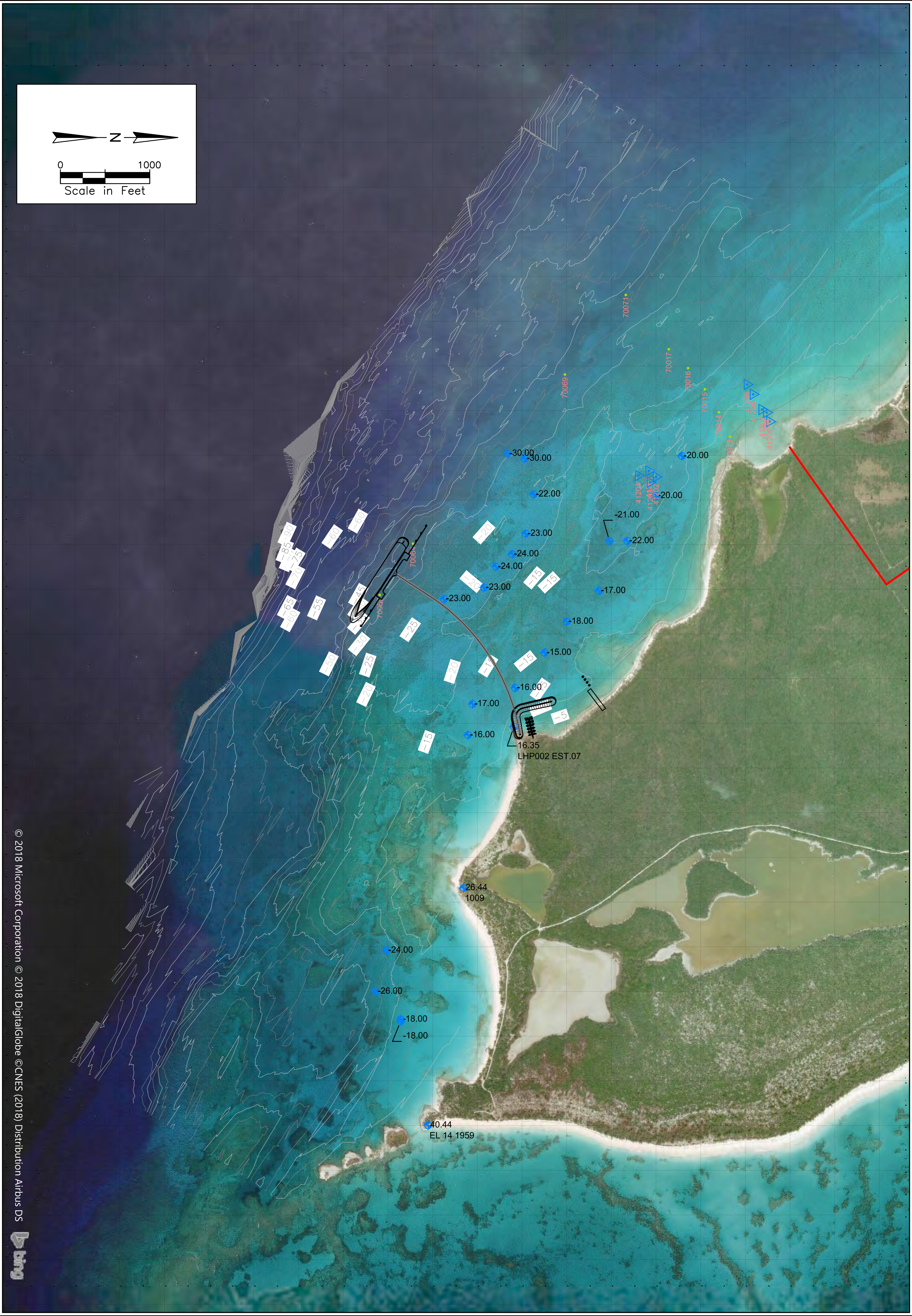


FIGURE 5
1-1000 ROTATED. PIER WITH CONTOURS
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 11, 2019

ATM

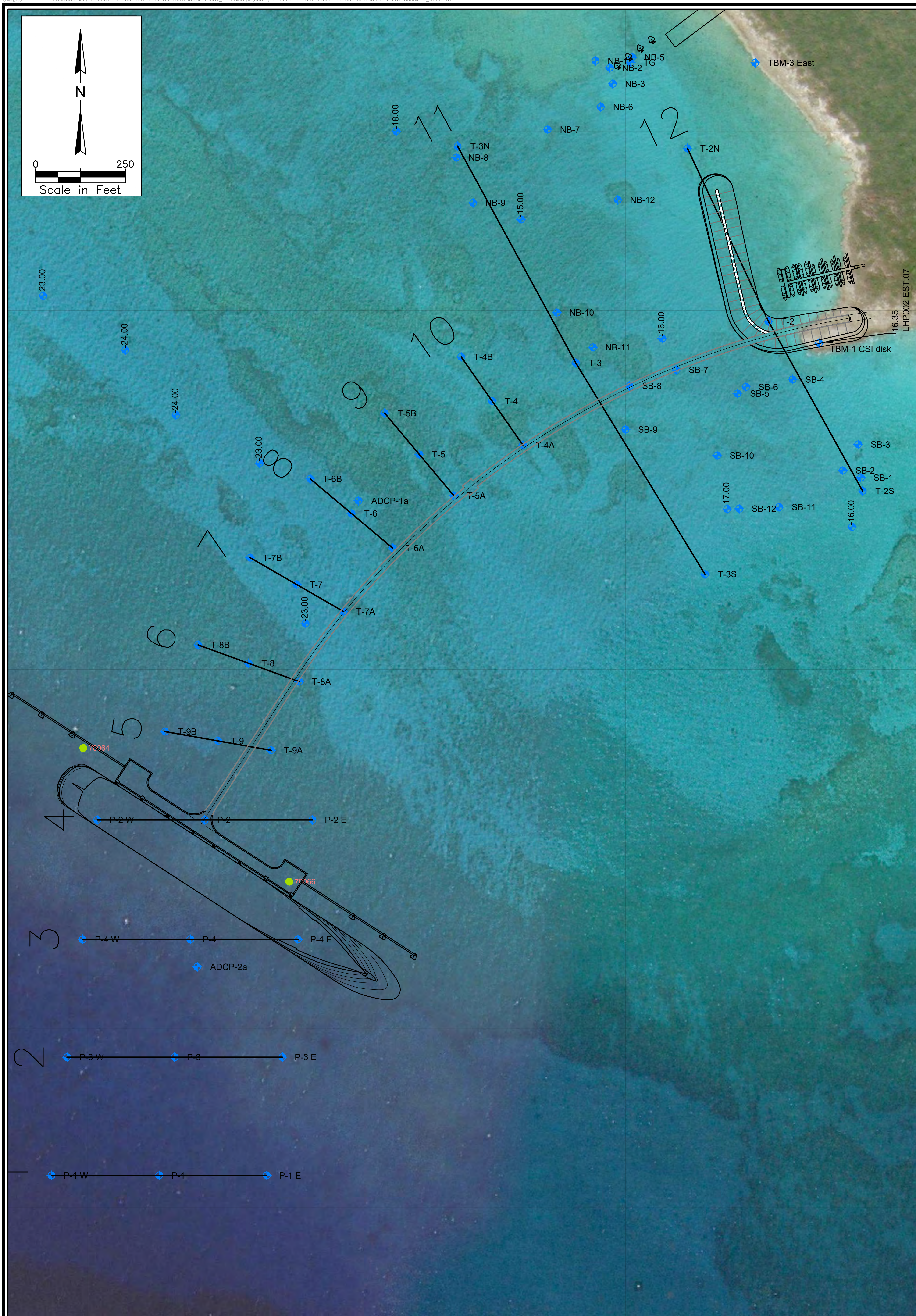
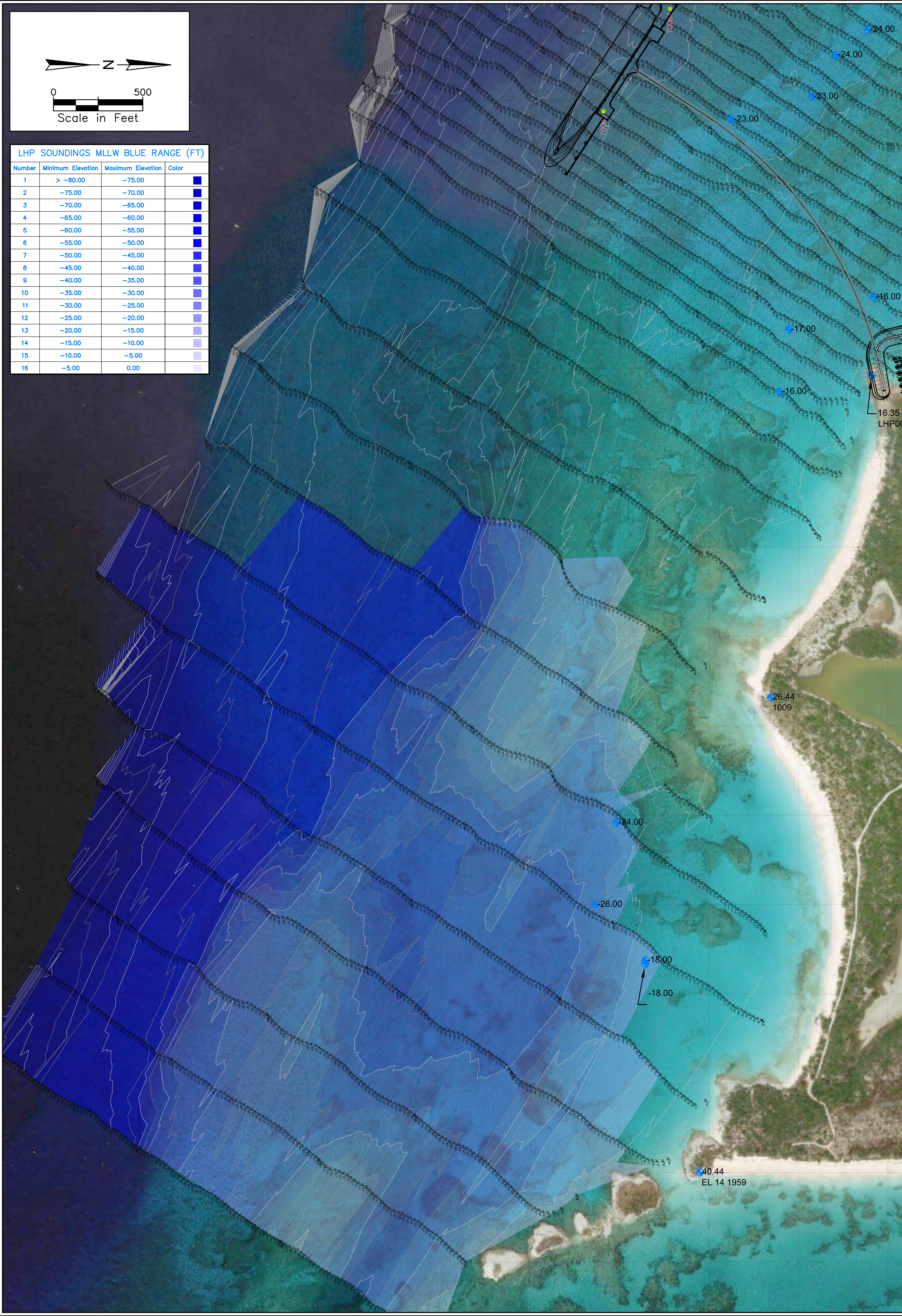


FIGURE 6
BENTHIC TRANSECTS OF PIER AREA
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 11, 2019

ATM

CMYERS LOCATION M:\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT BAHAMAS_USFT.DWG

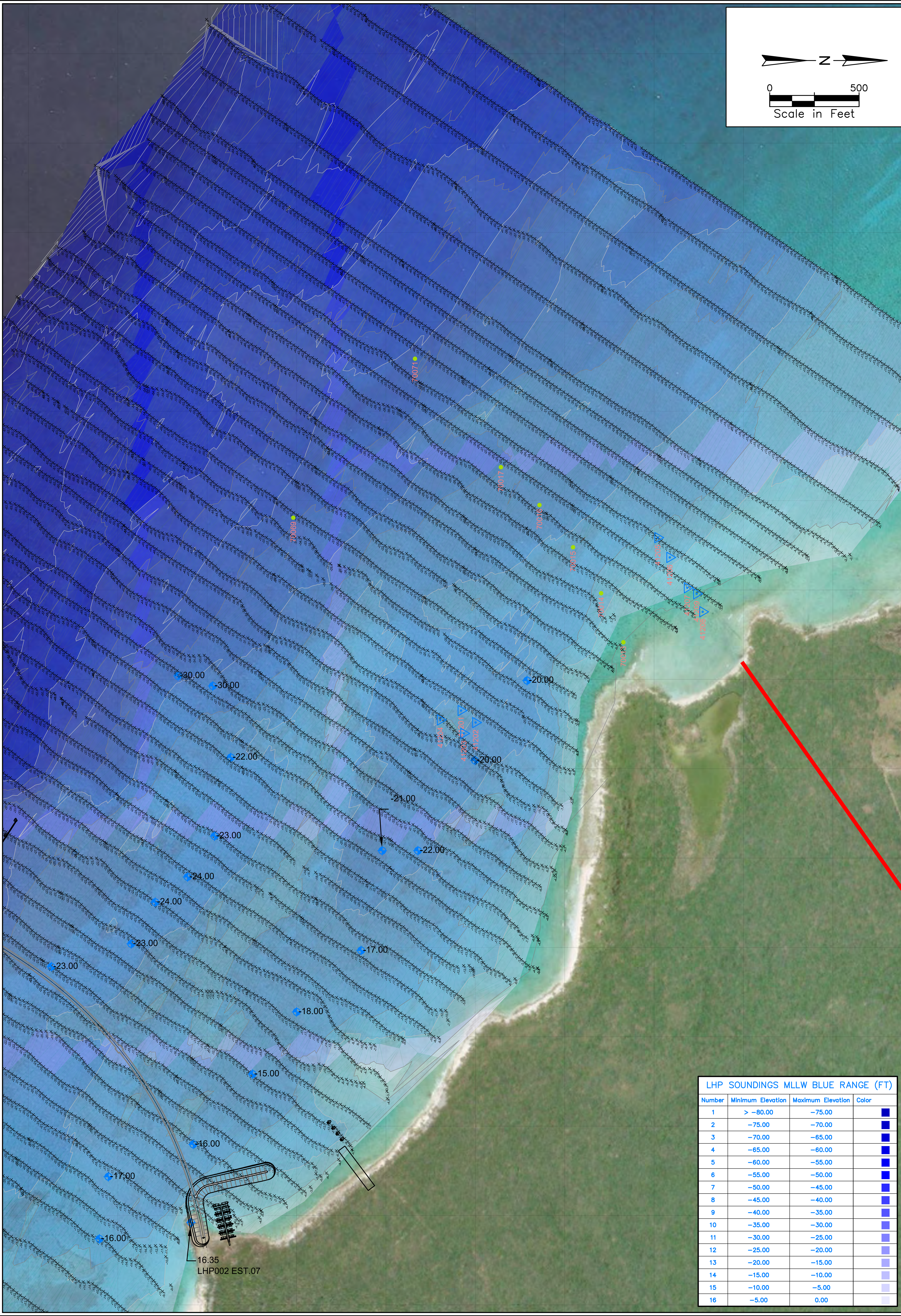


LHP SOUNDINGS MLLW BLUE RANGE (FT)			
Number	Minimum Elevation	Maximum Elevation	Color
1	> −80.00	−75.00	
2	−75.00	−70.00	
3	−70.00	−65.00	
4	−65.00	−60.00	
5	−60.00	−55.00	
6	−55.00	−50.00	
7	−50.00	−45.00	
8	−45.00	−40.00	
9	−40.00	−35.00	
10	−35.00	−30.00	
11	−30.00	−25.00	
12	−25.00	−20.00	
13	−20.00	−15.00	
14	−15.00	−10.00	
15	−10.00	−5.00	
16	−5.00	0.00	

FIGURE 7
1:500 ROTATED. POINTS WITH CONTOURS & BLUE EL.RANGE. SE SECTION.
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 11, 2019

ATM

CMYERS LOCATION M:\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT BAHAMAS_USFT.DWG



LHP SOUNDINGS MLLW BLUE RANGE (FT)			
Number	Minimum Elevation	Maximum Elevation	Color
1	> −80.00	−75.00	
2	−75.00	−70.00	
3	−70.00	−65.00	
4	−65.00	−60.00	
5	−60.00	−55.00	
6	−55.00	−50.00	
7	−50.00	−45.00	
8	−45.00	−40.00	
9	−40.00	−35.00	
10	−35.00	−30.00	
11	−30.00	−25.00	
12	−25.00	−20.00	
13	−20.00	−15.00	
14	−15.00	−10.00	
15	−10.00	−5.00	
16	−5.00	0.00	

FIGURE 8
1:500 ROTATED. POINTS WITH CONTOURS & BLUE EL.RANGE. NW SECTION.
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 11, 2019

ATM

CMYERS LOCATION M:\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT BAHAMAS_USFT.DWG

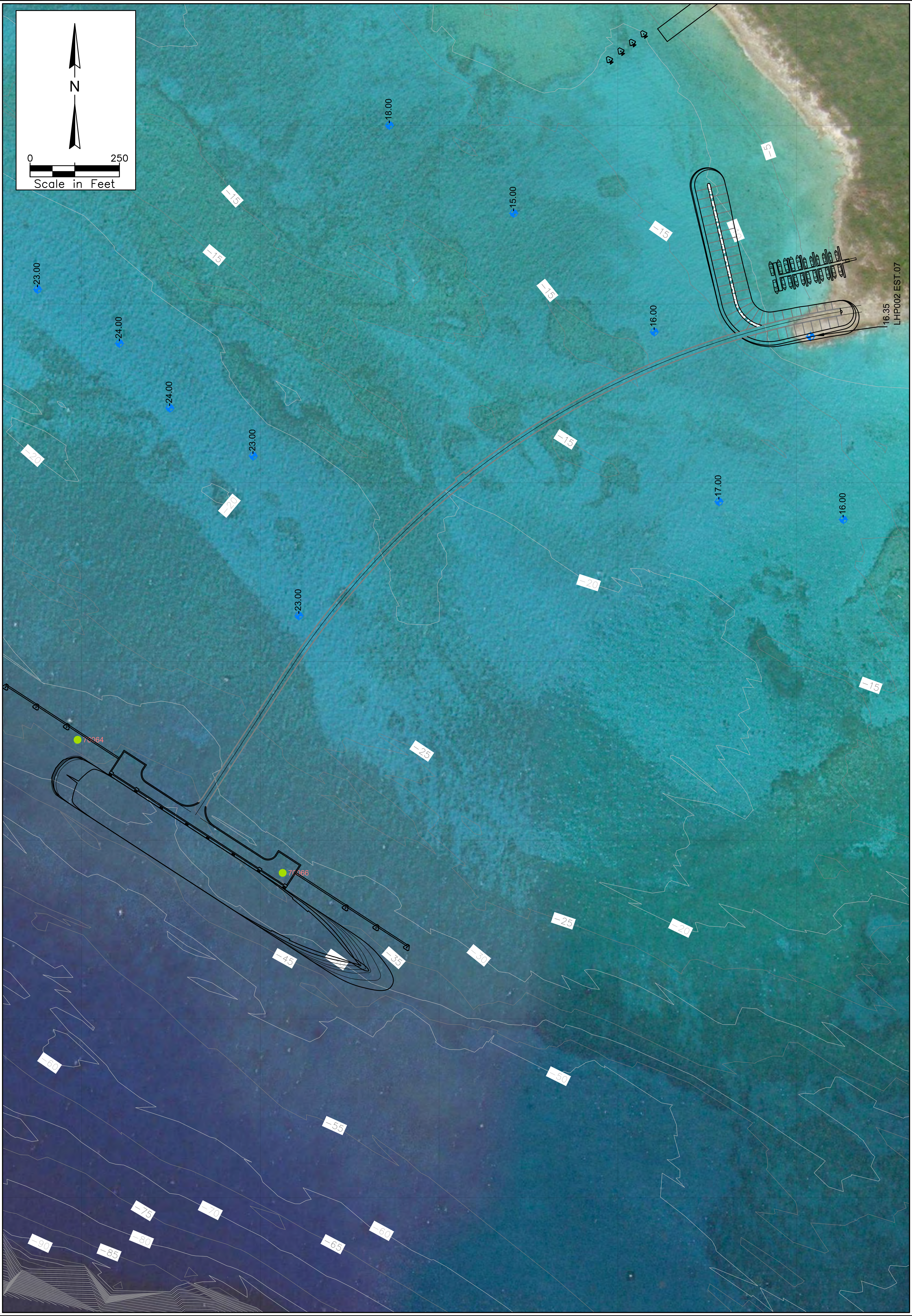
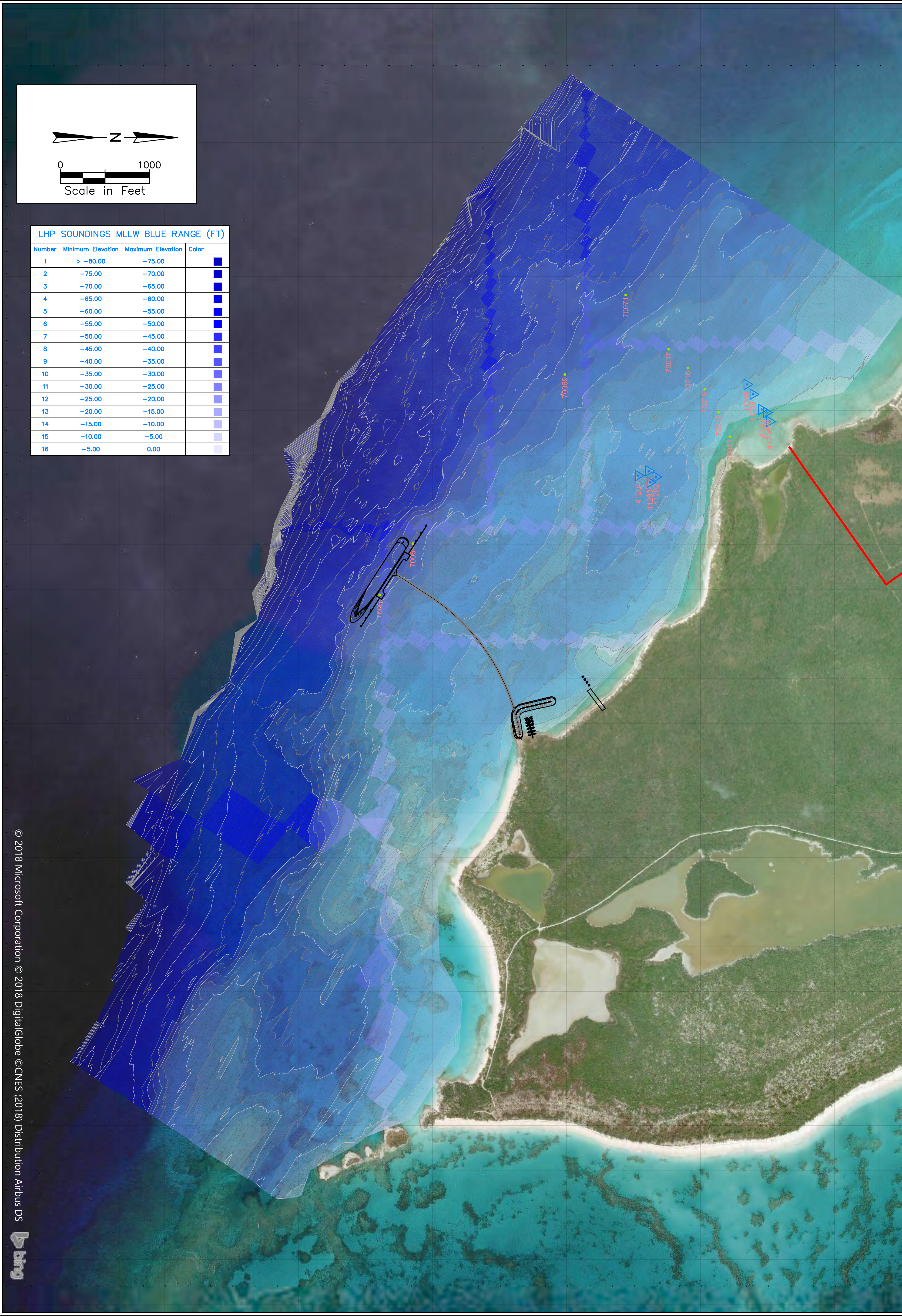


FIGURE 9
1:250 PIER WITH CONTOURS & LABELS
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 11, 2019

ATM

CMYERS LOCATION M:\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT BAHAMAS_USFT.DWG



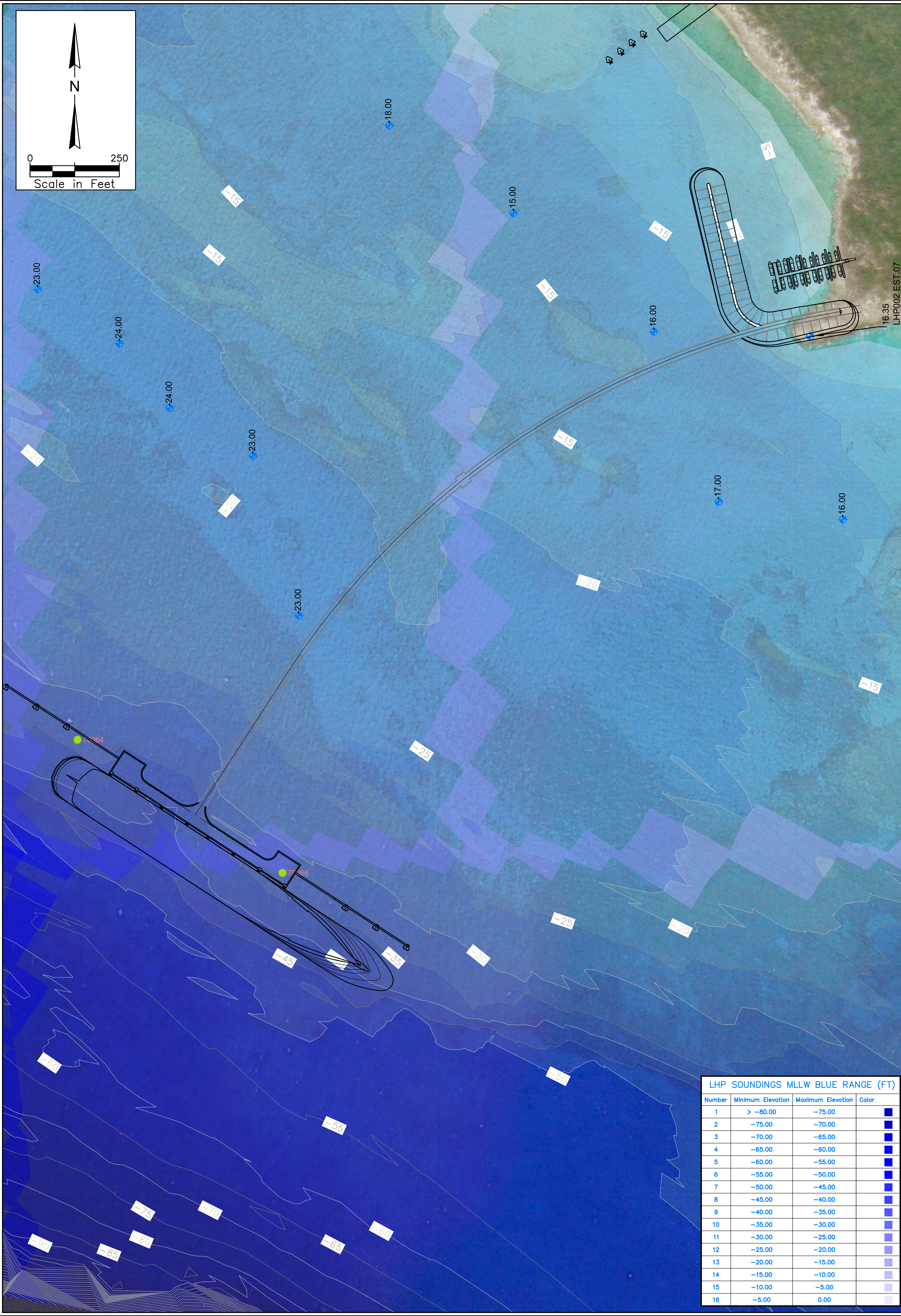
LHP SOUNDINGS MLLW BLUE RANGE (FT)

Number	Minimum Elevation	Maximum Elevation	Color
1	> -80.00	-75.00	
2	-75.00	-70.00	
3	-70.00	-65.00	
4	-65.00	-60.00	
5	-60.00	-55.00	
6	-55.00	-50.00	
7	-50.00	-45.00	
8	-45.00	-40.00	
9	-40.00	-35.00	
10	-35.00	-30.00	
11	-30.00	-25.00	
12	-25.00	-20.00	
13	-20.00	-15.00	
14	-15.00	-10.00	
15	-10.00	-5.00	
16	-5.00	0.00	

FIGURE 10
1:1000 ROTATED. PIER WITH CONTOURS & BLUE ELEVATION RANGE
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 11, 2019

ATM

CMYERS LOCATION M:\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT BAHAMAS_USFT.DWG

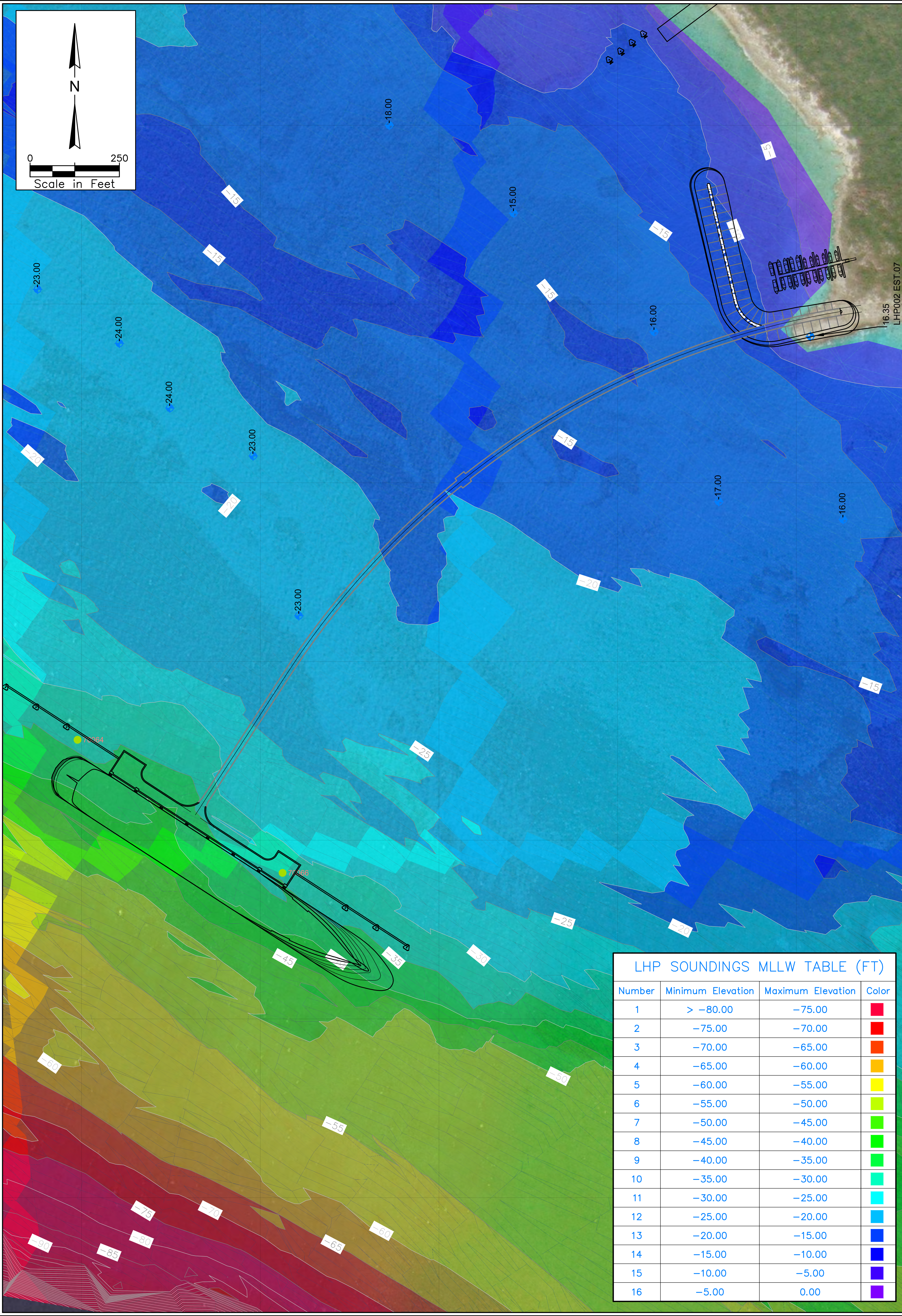


LHP SOUNDINGS MLLW BLUE RANGE (FT)			
Number	Minimum Elevation	Maximum Elevation	Color
1	> −80.00	−75.00	
2	−75.00	−70.00	
3	−70.00	−65.00	
4	−65.00	−60.00	
5	−60.00	−55.00	
6	−55.00	−50.00	
7	−50.00	−45.00	
8	−45.00	−40.00	
9	−40.00	−35.00	
10	−35.00	−30.00	
11	−30.00	−25.00	
12	−25.00	−20.00	
13	−20.00	−15.00	
14	−15.00	−10.00	
15	−10.00	−5.00	
16	−5.00	0.00	

FIGURE 11
1:250 PIER WITH CONTOURS, LABELS & BLUE ELEVATION RANGE
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 11, 2019

ATM

CMYERS LOCATION M:\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT BAHAMAS_USFT.DWG



LHP SOUNDINGS MLLW TABLE (FT)			
Number	Minimum Elevation	Maximum Elevation	Color
1	> −80.00	−75.00	
2	−75.00	−70.00	
3	−70.00	−65.00	
4	−65.00	−60.00	
5	−60.00	−55.00	
6	−55.00	−50.00	
7	−50.00	−45.00	
8	−45.00	−40.00	
9	−40.00	−35.00	
10	−35.00	−30.00	
11	−30.00	−25.00	
12	−25.00	−20.00	
13	−20.00	−15.00	
14	−15.00	−10.00	
15	−10.00	−5.00	
16	−5.00	0.00	

FIGURE 12
1:250 PIER WITH CONTOURS & FULL COLOR ELEVATION RANGE
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 11, 2019

ATM

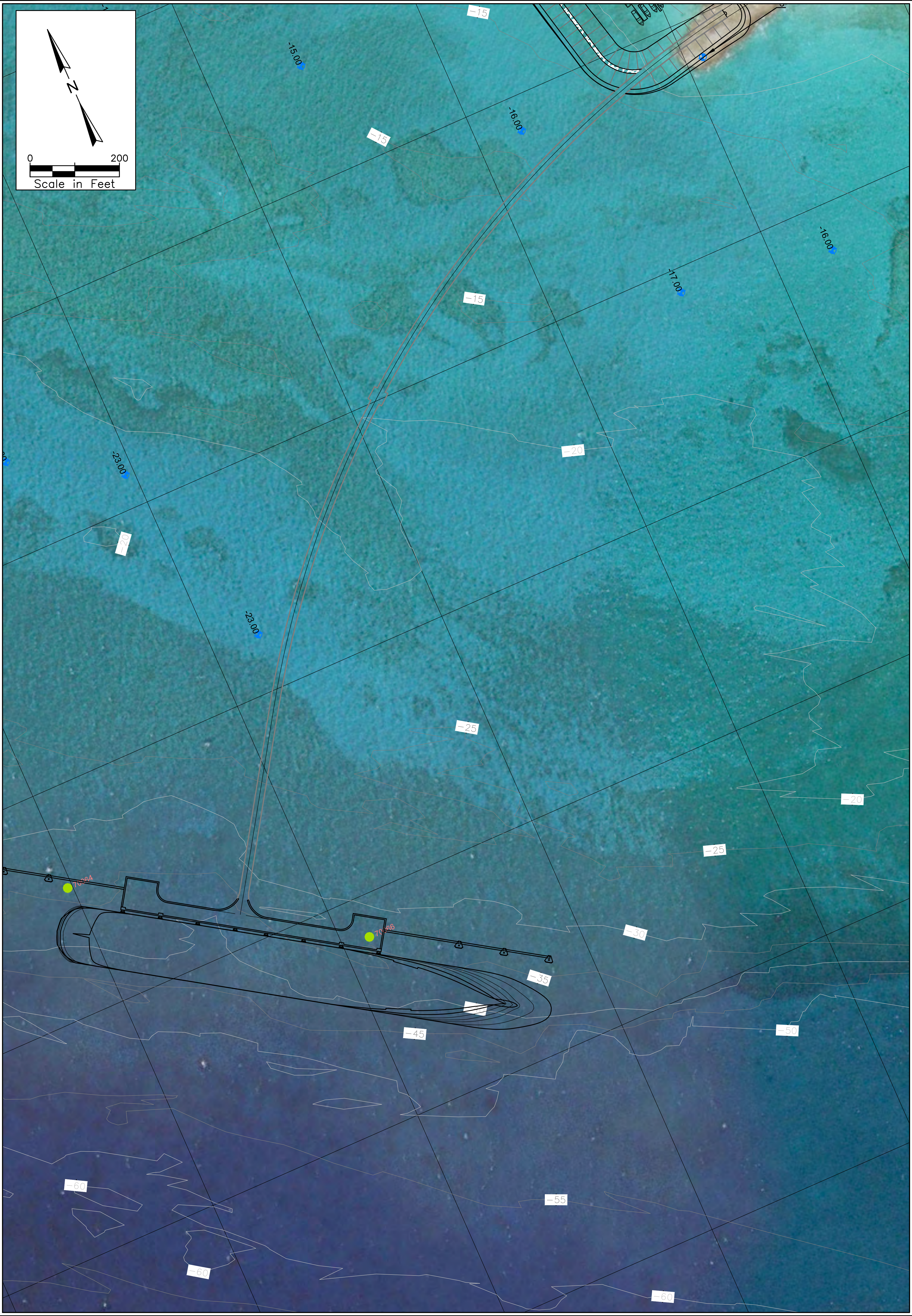


FIGURE 13
1:200 CUSTOM ROTATED PIER WITH CONTOURS & LABELS.
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 11, 2019

ATM

CMYERS LOCATION M:\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT_BAHAMAS\X\BASE\18-3297 BS WDI CRUISE SITING LIGHTHOUSE POINT BAHAMAS_USFT.DWG

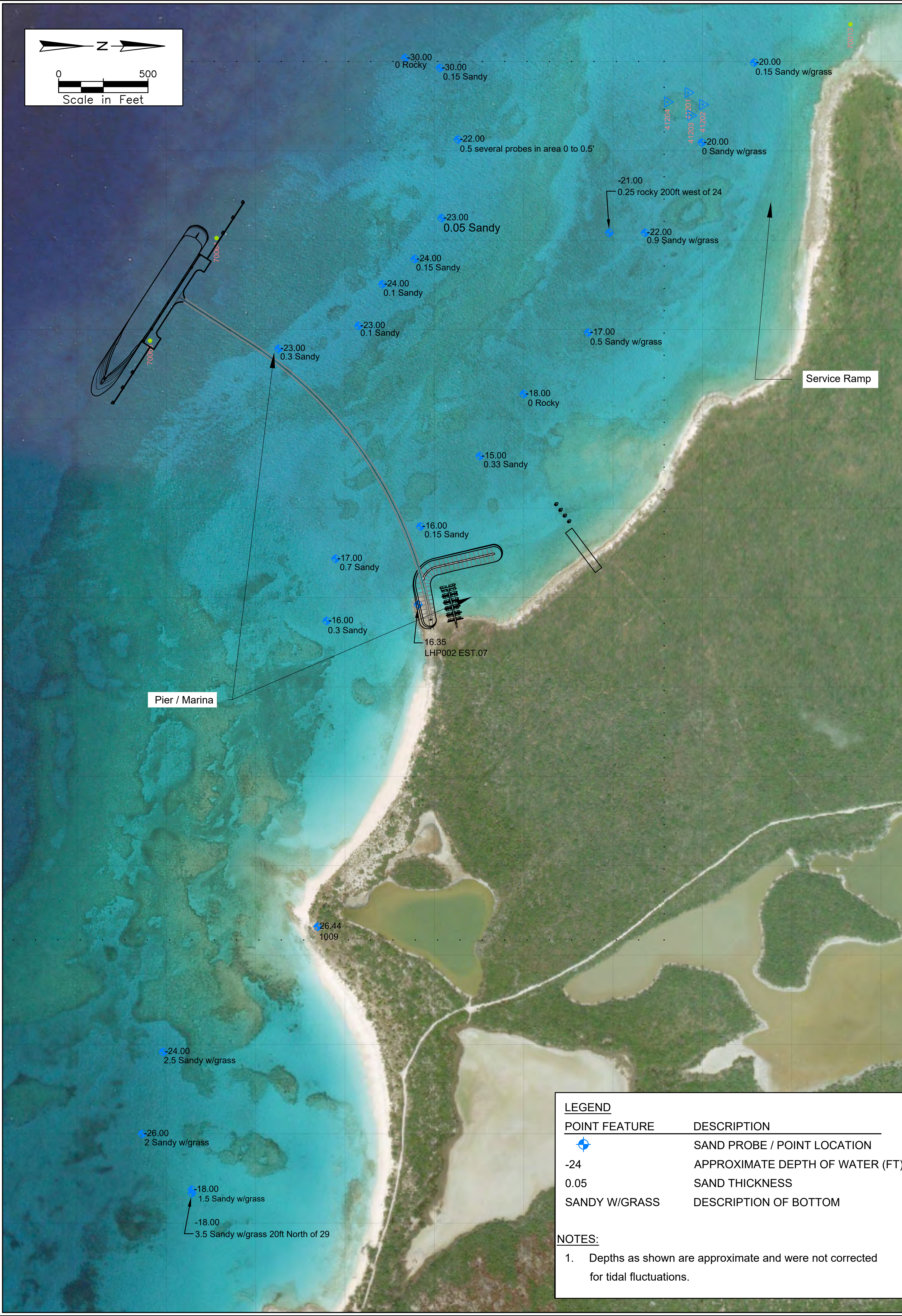


FIGURE 14
SAND PROBES
LIGHTHOUSE POINT, BAHAMAS
OCTOBER 11, 2019

ATM

Appendix B Baseline Landside Species Lists

Lighthouse Point Plant List

The following species were observed and identified during visits to the Lighthouse Point site at various times during 2017, 2018, 2019 and 2020. The list should be considered as a work-in-progress, and that additional species will likely be identified when additional surveys are conducted, particularly during different times of the year, when other plants would be in bloom. Nomenclature follows "Flora of the Bahama Archipelago' by D.S. Correll and H.B. Correll and/or 'Flowers of the Bahamas and the Turks and Caicos Islands' by K. McNary Wood, with name changes, where appropriate.

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance [1]	Comments
MONOCOTS					
AGAVACEAE					
Agave bahamana	Century Plant	Herb	Rocky plains, ridges, coppices	Occasional	Endemic (Fried)
Agave sisalana	Century Plant	Herb	Rocky plains, coppices	Occasional	Reportedly previously farmed
Sansevieria hyacinthoides	African Bowstring Hemp	Shrub	Coppices, Disturbed sites	Uncommon	Present near former habitation
AMARYLLIDACEAE					
Hymenocallis arenicola	Dune Spider Lily	Herb	Grassy dunes along coasts	Common	
ARECACEAE (PALMAE)					
Coccothrinax argentata	Silver Thatch, Silver Top	Tree	Coastal Coppices, Coppices, Whitelands	Abundant	
Cocos nucifera	Coconut Palm	Tree	Coastal sands, Cultivated areas	Occasional	
Pseudophoenix sargentii	Hog Palm, Buccaneer Palm	Tree	Sandy & rocky soils in coppices & thickets	Uncommon	
Sabal palmetto	Pond-top, Pond Thatch	Tree	Edges of and in marshes, Blacklands	Occasional	
BROMELIACEAE					
Tillandsia recurvata	Thread-leaved Wild Pine	Epiphyte		Uncommon	
Tillandsia utriculata	Swollen Wild Pine	Epiphyte	Coppice, Blacklands, Whitelands	Common	
CYPERACEAE					
Cladium jamaicensis	Sawgrass	Herb	Wet depressions, edges of ponds	Uncommon	
Cyperus planifolius	Coast Cyperus	Herb	s behind dunes & edges of beaches & cop	Common	
Cyperus spp.	Limestone Turf Sedge	Herb	Pioneer plant on coastal rocks	Uncommon	
Fimbrystylis ferruginea	Rusty Sedge	Herb	Moist saline soils	Uncommon	
Rhynchospora floridensis	White-top, White-headed Rush	Herb	Open disturbed areas, roadsides	Uncommon	
Scleria lithosperma	Slender Nut-rush	Herb	Dry thickets, open coppices, scrublands	Occasional	
HYDROCHARITACEAE					
Thalassia testudinum	Turtle grass	Herb	Seagrass	Occasional	Marine
ORCHIDACEAE					
Encyclia altissima	Tall Orchid	Epiphyte	Coppices, Rocky Scrublands	Occasional	formerly *E. hodgeana*
Encyclia sp.	Orchid	Epiphyte	Coppices, Rocky Scrublands	Occasional	
POACEAE (GRAMMINEAE)					
Andropogon glomeratus	Bushy Beard Grass, Bluestem	Herb	Open, disturbed areas	Uncommon	
Cenchrus spinifex	Southern Burgrass	Herb	Sandy waste areas, coppice borders	Occasional	
Dactyloctenium aegyptium	Crowfoot Grass	Herb	Road shoulders, disturbed areas	Uncommon	
Distichlis spicata	Seashore Saltgrass	Herb	Salt flats, mangrove areas	Occasional	

Lighthouse Point Plant List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance [1]	Comments
Eleusine indica	Goosegrass	Herb	Disturbed areas, sandy soils	Occasional	
Lasiacis divaricata	Wild Cane	Herb	Coppices, Roadsides	Occasional	
Panicum amarulum	Sea-beach Grass	Herb	Beach Sands and dunes	Occasional	
Paspalum blodgettii [1]	Coral Paspalum	Herb	Open areas, old fields, among rocks	Uncommon	
Poaceae	Un-identified grass #1	Herb	Coastal strand	Occasional	
Poaceae	Un-identified grass #1	Herb	Coastal strand	Occasional	
Sporobolus domingensis [1]	Domingan Dropseed-grass	Herb	Sandy soils	Uncommon	
Sporobolus virginicus	Seashore Rush-grass	Herb	Beach foredune	Occasional	
Uniola paniculata	Sea Oats	Herb	Beach foredune, sand dunes	Abundant	
Uniola virgata	Spike-grass	Herb	Saline flats, sand nr beaches & in coppice	Occasional	
RUPIACEAE					
Ruppia maritima	Widgeon-grass	Aquatic	Shallow ponds, lagoons, marshes	Uncommon	Only observed in White Pond
SMILACEAE					
Smilax havanensis	Prickly Saw-brier	Vine	Coppices, Brushlands, open areas	Common	
DICOTS					
ACANTHACEAE					
Oplonia spinosa	Prickly Bush	Shrub	Scrublands, Thickets, Coppices	Common	
AIZOACEAE					
Sesuvium portulacastrum	Pondweed, Sea purslane	Groundcover	Sandy beaches, saline flats, rocky areas	Uncommon	
AMARANTHACEAE					
Iresine flavescens	Coastal Iresine	Shrub	Dunes, rock flats, disturbed areas	Occasional	
ANACARDIACEAE					
Metopium toxiferum	Poisonwood	Tree	Coppices, Scrublands	Occasional	
APOCYNACEAE					
Echites umbellata	Devil's Potato	Vine	Coppices, Scrublands, Pinelands	Common	
Pentalinon luteum	Wild Unction	Vine	Coppices, saline flats, open rocky areas	Uncommon	fka Urechites lutea
Plumeria obtusa	White Frangipani	Tree	Rocky scrublands, coppices	Occasional	
Vallesia antillana	Pearl Berry	Shrub	Coppices, scrublands	Occasional	
ASCLEPIADACEAE					
Cryptostegia grandiflora [1]	Rubber Vine	Vine	Ornamental	Uncommon	
Cynanchum bahamense		Vine	Whitelands, scrublands, coastal thickets	Occasional	
Cynanchum sp		Vine	Coastal sands	Occasional	
ASTERACEAE					
Ambrosia hispida	Sweet Bay, Bay tansy, Soap-bush	Groundcover	Beach foredune, sandy shores	Occasional	
Baccharis dioica	Broom-bush	Shrub	Wet flats, coppices along coast	Occasional	
Borrichia arborescens	Lavender, Sea Marigold	Shrub	Coastal sands and rock, brackish margins	Uncommon	

Lighthouse Point Plant List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance [1]	Comments
Borrichia frutescens	Sea Ox-eye, Bay Marigold	Shrub	Marshes and mud flats near brackish lakes	Occasional	
Chromolaena (fka Eupatorium) luca	Bitter Bush, Tonka Bean, Jack-in-the-	Shrub	Thickets, coppices, disturbed areas	Occasional	Endemic (C&C)
Conyza canadensis	Smooth Horseweed	Shrub	Disturbed areas	Uncommon	
Eupatorium odoratum	Bitter Bush, Tonka Bean	Shrub	Thickets, coastal coppices, waste areas	Occasional	
Gundlachia corymbosa	Horse Bush	Shrub	Rocky saline flats, Marshes, Coppice edge	Abundant	
Koanophyllon villosum	Jackmada, Bitter Sage	Shrub	Coppices, coastal brushlands	Uncommon	
Iva imbricata	Beach Iva	Shrub	Beach and dune sands	Occasional	
Pluchea symphytifolia [1]	Bushy Fleabane	Shrub	Disturbed areas, oradsides	Uncommon	
Salmea petrobioides	Shanks, Bushy Salmea	Shrub	Coastal rocks, dunes & coppices	Occasional	
Wedelia bahamensis	Rong Bush	Shrub	Coastal thickets & scrublands	Uncommon	Endemic (C&C, Freid)
AVICENNACEAE	Mangrove				
Avicennia germinans	Black Mangrove	Tree	Mangrove lagoons, tidal shores	Occasional	
BIGNONIACEAE					
Tabebuia bahamensis	White Cedar, Five Fingers	Tree	Scrublands, Pinelands, Coppices	Common	
BORAGINACEAE					
Bourreria succulenta	Chink Bush, Pigeon Berry	Shrub/Tree	Coppices,	Abundant	
Heliotropium angiospermum	Horse-bush, Scorpion-tail	Shrub	Open coppices, disturbed areas	Uncommon	
Heliotropium curassavicum	Seaside Heliotrope	Herb	Sandy soils near beaches, ponds & salt flat	Uncommon	
Heliotropium gnaphalodes	Wild Bay, Sea Lavender	Shrub	Sandy beaches, Foredunes	Occasional	
Heliotropium nanum [1]	White Pussley	Shrub	Savannas, dunes, sandy soils	Uncommon	Endemic (Freid)
Myriopus volubilis	Soldier-bush	Vine	Coppices, coppice edges	Common	(fka Tournefortia volubilis)
Rochefortia spinosa [1]					
Varronia bahamensis	Cocobey	Shrub	Scrublands, coppices, savannas	Common	Endemic (Freid)
Varronia brittonii [1]		Shrub	Scrublands, coppices, savannas	Uncommon	
BURSERACEAE					
Bursera simaruba	Gum-elemi, Gumbo Limbo	Tree	Coppices, Scrublands	Abundant	
Bursera frenningae		Tree	Coppices, Scrublands	Common	Endemic (C&C, Freid)
CACTACEAE					
Cephalocereus millspaughii	Old Man Cactus	Shrub	Rocky hillsides, coppices, thickets	Uncommon	
Consolea (Opuntia) nashii	Cactus Tree, Nash's Prickly Pear	Shrub	Scrublands and rocky plains and hills	Uncommon	Endemic (C&C)
Opuntia stricta	Prickly Pear Cactus	Herb	Maritime and coastal rocks, dunes	Occasional	
CASUARINACEAE					
Casuarina equisetifolia	Beefwood, Australian Pine	Tree	Sandy Shores, Disturbed coastal areas	Common	NISS
CELASTRACEAE					
Crossopetalum rhacoma	Maiden Berry, Mating Berry	Shrub	Coppices, Thickets, Scrublands	Uncommon	
Schaefferia frutescens	Boxwood	Tree	Thickets and open woodlands	Occasional	

Lighthouse Point Plant List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance [1]	Comments
CHENOPODIACEAE					
Salicornia ambigua	Woody Glasswort	Groundcover	Coastal marshes and flats	Occasional	
CHRYSOBALANACEAE					
Chrysobalanus icaco	Coco Plum	Shrub	Coastal swamps, thickets, saline soils	Occasional	
Conocarpus erectus	Buttonwood	Shrub/Tree	Coastal wetlands, savannas, salina edges	Occasional	
Conocarpus erectus v. sericea	Silver Buttonwood	Shrub/Tree	Coastal wetlands, savannas, salina edges	Uncommon	
Laguncularia racemosa	White Mangrove	Tree	Borders of mangrove mud	Uncommon	
CONVOLVULACEAE					
Evolvulus squamosus	Broom Bush	Shrub	Rocky Coppice, Scrublands	Occasional	Endemic (C&C)
Ipomoea alba	Moon-vine	Vine	Disturbed sites	Occasional	
Ipomoea microdactyla	Wild Potato	Vine	Whitelands, blacklands, coppices	Uncommon	
Ipomoea pes-caprae	Bay Hops, Bay Winders	Vine	Beaches & coastal rocks	Occasional	
Ipomoea (stolonifera) imperati	Morning Glory	Vine	Beaches, Coastal dunes	Occasional	
Ipomoea triloba [1]	Littlebell	Vine	Disturbed sites	Uncommon	
Jacquemontia havanensis	Jacquemontia	Vine	Coppices, pinelands	Common	
CRUCIFERAE					
Cakile lanceolata	Southern Sea Rocket	Herb	each foredune, maritime sands, whiteland	Occasional	
EBENACEAE					
Diospyros crassinervis	Feather-bed	Shrub	Coppices, scrublands	Occasional	
ERYTHROXYLACEAE					
Erythroxylum areolatum	Swamp Redwood, Paperleaf	Shrub	Coppices, thickets, scrublands	Occasional	
Erythroxylum rotundifolium	Rat-wood	Shrub	Coppices, thickets, scrublands	Occasional	
EUPHORBIACEAE					
Chamaecrista lineata	Narrowpod Sensitive Pea	Shrub	Almost ubiquitous, esp dry sandy soils	Occasional	
Chamaesyce sp.	Spurge	Groundcover	Disturbed areas	Uncommon	
Croton eluteria	Sweetwood, Cascarilla	Shrub	Coppices	Occasional	
Croton linearis	Granny-bush, Bay Wormwood	Shrub	Scrublands, rock formations, sandy areas	Common	
Croton lucidus	Fire-Bush	Shrub	Coppice, coastal ridges, rock flats	Occasional	
Euphorbia cayensis		Herb	oastal white sands, rock flats, depression	Common	Endemic (C&C, Freid)
Euphorbia hyssopifolia [1]	Hyssop Leaf Sandmat	Herb	Disturbed Areas	Uncommon	
Euphorbia mesembrianthemifolia	Coast spurge, Seaside spurge	Herb	Maritime sands, Beach dunes	Uncommon	
Grimmeodendron eglandulosum	Poison Bush, Young Manchioneel	Tree	Open or Dense Coppices	Uncommon	
Gymnanthes (fka Ateramnus) lucida	Crabwood	Shrub	Coastal coppices	Common	
Pera bumefolia	Black Ebony	Shrub	Coppices	Occasional	
Phyllanthus epiphyllanthus	Abraham-bush, Hardhead	Herb	Rocky places, Whitelands	Occasional	
FABACEAE					
Caesalipinia bahamensis		Shrub	Coppices and scrublands	Occasional	

Lighthouse Point Plant List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance [1]	Comments
Caesalpinia bonduc	Gray Nicker	Vine	Coastal thickets, open, disturbed areas	Occasional	
Caesalpinia major	Large Yellow Nicker	Vine	Coastal thickets, open, disturbed areas	Occasional	
Canavalia rosea	Bay Bean, Beach Pea	Vine	Coastal sands, rocks, disturbed areas	Occasional	
Centrosema virginianum	Butterfly Pea, Wild Pea	Vine	Variable habitats, disturbed areas	Occasional	
Chamaecrista lineata	Narrowpod Sensitive Pea	Shrub	Sandy or rocky soils	Occasional	formerly Cassia lineata
Desmanthus virgatus	Virgate Mimosa	Shrub	Coppice, disturbed areas	Uncommon	
Galactia rudolphoides [1]	Red Milk Pea	Vine	Scrublands, pinelands, open areas	Uncommon	
Galactia spiciformis	Spiciform Milk-pea	Vine	Coppice	Occasional	
Leucaena luecocephala	Jumbie Bean, Jumbay (Cow Bush	Tree	Coppices, fields, thickets, disturbed areas	Common	
Lysiloma latisiliquum	Wild Tamarind	Tree	Coppices, Scrublands, Open areas	Occasional	
Lysiloma sabicu	Horseflesh	Tree	Coppices and Scrublands	Uncommon	Protected
Piscidia piscipula	Fish Poison, Jamaican Dogwood	Tree	Edges of slopes, rocky slopes, dunes	Occasional	
Pithecellobium keyense	Blackbead	Tree	Coppices	Abundant	
Senna chapmanii	Bahama Senna, Stinking Pea	Shrub	Coastal dunes, coppices	Uncommon	formerly Cassia chapmanii
Sophora tomentosa	Coast Sophora, Necklace pod	Tree	Coastal Coppices, Beach backdunes	Uncommon	
Stylosanthes hamata	Sweet Weed, Pencil Flower	Groundcover	Variable, mostly dryish soils	Uncommon	
Tamarindus indica	Tamarind	Tree	Cultivated	Occasional	
Vachellia choriophylla	Cinnecord	Tree	Coppices	Common	fka Acacia choriphylla
Zapoteca formosa [1]	White Zapoteca	Shrub	Scrublands, edges of disturbed areas	Uncommon	
GOODENACEAE					
Scaevola plumieri	Inkberry, Black-soap	Shrub	Coastal dunes	Common	
Scaevola taccada	Ornamental Candlewood	Shrub	Beaches & coastal areas; non-native	Occasional	
LAURACEAE					
Cassytha filiformis	Woe-vine, Love Vine	Vine	Beach backdune, coppices, disturbed areas	Common	
Ocotea (Nectandra) coriacea	Black Torch, Sweet Torchwood	Shrub	Coppices and Scrublands	Uncommon	
LOGANIACEAE					
Spigelia anthelmia	Pink	Herb	Weed of disturbed areas	Uncommon	
MALPIGHIACEAE					
Malpighia polytricha	Touch-me-not, Wild Cherry	Shrub	Rocky open coppices, scrublands	Occasional	
Triopteris jamaicensis [1]	Cough Vine	Vine	Coppice, Scrublands	Uncommon	
MALVACEAE					
Helicteres jamaicensis	Cow-bush, Blind Eye Bush	Shrub	Coppices, rock flats, saline fields	Occasional	
Helicteres semitriloba	Wild Salve	Shrub	Coppices, scrublands	Occasional	
Phymosia abutiloides	Bahama Phymosia	Shrub	Open coppices, roadsides	Uncommon	Endemic (C&C)
Sida acuta	Wire-weed	Shrub	Fields, open coppices, disturbed areas	Uncommon	
Sida ciliaris [1]	Fringed Sida	Shrub	Dryish open soils, disturbed areas	Uncommon	

Lighthouse Point Plant List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance [1]	Comments
MELIACEAE					
Swietenia mahagani	Mahogany	Tree	Coppices, Roadsides	Uncommon	Protected, IUCN-Endangered
MORACEAE					
Ficus citrifolia	Short-leaved Wild Fig	Tree	Coppices, Pinelands, sinks, rock outcrops	Uncommon	
MYRTACEAE					
Calyptranthes pallens	Spice-wood	Shrub	Coppices, scrublands	Occasional	
Eugenia axillaris	White Stopper	Shrub	Coppices, Scrublands	Occasional	
Eugenia confusa	Red-berry Stopper	Shrub	Coppices, Scrublands	Common	
Eugenia foetida	Spanish Stopper, White Wattle	Shrub	Scrublands, Coppices	Occasional	
Eugenia rhombea	Red Stopper	Shrub	Coppices, Scrublands	Occasional	
Mosiera fka Psidium - longipes	Bahama Stopper	Shrub	Coastal coppices	Occasional	
Myrcianthes fragrans	Pale Stopper	Shrub	Rocky slopes, coppices	Occasional	
Myrica cerifera	Bay-berry, Wax-berry	Shrub	Sandy or rocky thickets, coppices	Occasional	
NYCTAGINACEAE					
Guapira discolor	Blolly	Tree	Coppices, Scrublands, rock flats	Abundant	Protected
PASSIFLORACEAE					
Passiflora cupraea	Devil's Pumpkin	Vine	Coastal coppices, thickets, disturbed areas	Occasional	
Passiflora suberosa	Juniper-berry, Small Passion-flowe	Vine	Variable habitats	Occasional	
PHYTOLACCACEAE					
Rivina humilis	Wild tomato, Pigeon-berry	Shrub	Low coppices, disturbed areas, scrublands	Occasional	
PLUMBAGINACEAE					
Plumbago scandens	Doctor-bush, White Plumbago	Shrub	Thickets, disturbed areas	Occasional	
POLYGONACEAE					
Coccoloba diversifolia	Pigeon-plum	Tree	Coppices, Scrubland	Common	
Coccoloba krugii	Crabwood, Bow-pigeon, wild grape	Shrub/Tree	Scrublands and Coppices	Occasional	
Coccoloba northropiae		Tree	Coppices, Pinelands	Occasional	
Coccoloba uvifera	Seagrape	Tree	Coastal thickets, coastal coppices	Occasional	
PUTRANJIVACEAE					
Drypetes diversifolia	Whitewood, Milkbark	Tree	Coastal coppices, scrublands	Occasional	
RHAMNACEAE					
Auerodendron northropianum		Shrub	Thickets, coppices, rocky coastal ledges		
Colubrina elliptica [1]	Smooth Snake-bark, Soldierwood	Shrub	Coppices, dunes, rocky scrublands	Uncommon	
Krugiodendron ferreum	Strong Back	Tree		Common	
Reynosia septentrionalis	Darling Plum	Shrub	Coppices, scrublands, and rocky flats	Abundant	
Ziziphus taylorii		Shrub	Coppices, scrublands, and rocky flats	Uncommon	Endemic (C&C)
RHIZOPHORACEAE					
Rhizophora mangle	Red Mangrove	Tree	Muddy shores, estuarine swamps	Occasional	

Lighthouse Point Plant List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance [1]	Comments
RUBIACEAE					
Antirhea myrtifolia	False Myrtle	Shrub	Pinelands, coppices, scrublands	Occasional	
Borreria sp.		Herb	Coastal sands	Uncommon	
Casasia clusiifolia	Seven-year Apple	Shrub	Coastal Rocks, Coppices	Abundant	
Catesbaea foliosa		Shrub	Whitelands, scrublands, coppices	Uncommon	Endemic (C&C)
Catesbaea parviflora	Catesbaea	Shrub	Beach Coppices & coastal rock	Uncommon	
Chiococca alba	Snowberry, Snakeroot	Shrub	Coppices	Common	
Erithalis fruticosa	Black Torch, Candlewood	Shrub	Beach dunes, coastal coppices, pinelands,	Abundant	
Ernodea littoralis	Golden Creeper, Cough Bush	Shrub	Dunes, coastal coppices, disturbed areas	Common	
Exostema caribaeum	Fustic	Shrub	Coppices	Uncommon	
Guettarda elliptica	Common Velvet-seed	Shrub	Coppices and scrublands	Occasional	
Guettarda scabra	Rough Velvet Berry	Shrub	Coppices, thickets	Occasional	
Randia aculeata	Box briar	Shrub	Ubiquitous	Abundant	
Rhachicallis americana	Hog-bush, Sandfly-bush	Shrub	Maritime rocks, coastal coppices	Occasional	
Spermacoce tenuoir [1]		Herb	Swales, Depressions	Uncommon	
Strumpfia maritima	Mosquito Bush, Candle Torch	Shrub	Coastal rocks, rocky flats, Coastal coppice	Uncommon	
RUTACEAE					
Amyris elemifera	Torchwood	Tree	Thickets, rocky coppices and sandy soils	Common	
Zanthoxylum coriaceae	Prickly Ash	Tree	Rocky Coppices	Uncommon	
Zanthoxylum fagara	Wild lime, Satin-wood	Shrub/Tree	Coppices, scrublands, rocky areas	Occasional	
Zanthoxylum flavum	Yellow-wood, Satin-wood	Tree	Coppices, hills, dunes, scrublands	Common	
SAPINDACEAE					
Hypelate trifoliata	White Ironwood	Tree	Coppices, Scrublands	Uncommon	
Thouinia discolor	Nakedwood	Tree	Coppices, scrublands	Occasional	Endemic (C&C, Freid)
SAPOTACEAE					
Manilkara bahamensis	Wild Dilly	Tree	Coppices, Scrublands, Coastal areas	Occasional	
Manilkara zapota	Sapodilla	Tree	Coppices, cultivated urban areas	Occasional	
Sideroxylon (Bumelia) salicifolia	Willow bustic, Wild Cassada	Tree	Coppices, Scrublands	Occasional	
SCROPHULARIACEAE					
Capraria biflora	Goat Weed, Stow-weed	Herb	Waste areas, fields, open coppices	Occasional	
SIMAROUBACEAE					
Alvaradoa amorphoides	Alvaradoa	Shrub	Coppices and Scrublands	Common	
SOLANACEAE					
Solanum bahamense	Canker Berry, Bahamas Nightshad	Shrub	Disturbed areas	Occasional	
STERCULIACEAE					
Melochia tomentosa	Velvety Melochia	Shrub	Whitelands, Scrublands, Coppices	Uncommon	
Waltheria indica	Sleepy Morning	Shrub	Open, sandy areas, disturbed areas	Uncommon	

Lighthouse Point Plant List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance [1]	Comments
SURIANACEAE					
Suriana maritima	Bay Cedar	Shrub	Beach mid-dune, Rocky shorelines	Occasional	
THEOPHRASTACEAE					
Jacquinia keyensis	Joe-wood, Ironwood	Shrub	Coastal rocks, Coppices, Scrublands	Occasional	
TURNERACEAE					
Turnera diffusa		Shrub	Old fields, edges of Coppices	Occasional	
Turnera ulmifolia	Buttercups, Yellow Alder	Shrub	Beaches, Coastal dunes, Scrublands	Common	
VERBENACEAE					
Lantana involucrata	Sage Cop, Wild Sage	Shrub	Scrublands, Edges of thickets	Common	
Lantana bahamensis	Black Sage	Shrub	Scrublands, Edges of thickets	Occasional	
Lantana balsamifera [1]	Inagua Sagebush	Shrub	Sandy soil in open coppices	Uncommon	Endemic (C&C, Freid)
Lantana demutata	Bahama Sagebrush	Shrub	Open rocky flats, open coppices	Uncommon	Endemic (C&C)
Stachytarpheta jamaicensis	Blue Porterweed	Groundcover	Waste areas, salt flats, cleared lands	Occasional	Primarily along roadsides
Stachytarpheta fruticosa	Bahama Vervain, Blue Rat Tail	Shrub	Coppices, Disturbed areas, Scrublands	Uncommon	Endemic (C&C)
VITACEAE					
Cissus intermedia	Bull-vine	Vine	Edges of coppices, open areas	Uncommon	
ZYGOPHYLLACEAE					
Guaiacum officinale	Lignum vitae	Tree	Coastal coppices, coppices	Uncommon	Protected, IUCN-Endangered
Guaiacum sanctum	Lignum vitae	Tree	Coastal coppices, coppices	Common	Protected, IUCN-Endangered

Notes:
Occurrence Categories:
Abundant = Present in more than 20 of the 125 plots
Common = Present in 11-20 of the 125 plots
Occasional = present in 1-10 of the 125 plots
Uncommon = Observed on the property, but was not present in any of the plots
Green shading = Species identified as protected by the Government of the Bahamas and/or international treaties
Pink shading = Species identified in Bahamas National Invasive Species Strategy
[1] = Species not encountered during EAI site visits, but previously identified on the site by Dr. Ethan Freid and/or Mark Daniels
Endemic status based on designations by Freid, et. al. (2014) and Correll & Correll (1982)

Lighthouse Point - Landside Animals

The following species were observed during landside field assessments conducted at the Lighthouse Point tract on Eleuthera during various visits in 2017, 2018, 2019 and early 2020. This list should be considered as a work-in-progress, and that additional species will be identified as additional surveys are conducted, particularly during different times of the year.

Scientific Name	Common Name	Habitat	Abundance
MAMMALS			
Canus lupus familiaris	Dog	Typically urban areas; observed on east be	Occasional
Eptesicus fuscus	Big Brown Bat	Nocturnal, roosts in tree cavities, caves	Occasional
Lasiurus borealis	Eastern Red Bat	Migratory, in Bahamas coppice during win	Occasional
Tadarida brasiliensis	Mexican free-tailed bat	Nocturnal, roosts in tree cavities, caves	Occasional
Felis catus	Feral cat	Typically urban areas; observed in coppice	Occasional
CRUSTACEANS and ARTHROPODS			
Achelous ordwayi	Redhair Swimming Crab	Sandy Shorelines	Uncommon
Ocypode quadrata	Ghost Crab	Sandy Shorelines	Uncommon
Cardisoma guanhumi	Land Crab	Coastal lowlands	Occasional
Coenobita clypeatus	Land Hermit Crab	Above mean high water, among plants	Uncommon
Gecarcinus lateralis	Blackback Land Crab	Mostly sand strand and coppice	Abundant
Gecarcinus ruricola	Black Crab	Mostly sand strand and coppice	Abundant
Grapsus adscensionis	Atlantic Sally Lightfoot Crab	Splash zone on rocky shores	Uncommon
Uca minax	Fiddler Crab	Saline flats, White Pond, NW Pond	Occasional
MOLLUSKS			
Cerion sp.	Peanut snail	Herbaceous & other low-growing vegetation	Common

Scientific Name	Common Name	Habitat	Abundance
Hemitrochus sp.	Seagrape snail	Coastal uplands	Occasional
Nerita peloronta	Bleeding Tooth Nerite	Intertidal rocks	Common
Cenchritis muricatus	Beaded Periwinkle	Supra-tidal rocks	Common
FISH			
Cyprinodon sp	Fish	NW Pond and White Pond	Uncommon
BIRDS [1]			
Spatula discors	Blue-winged Teal	Freshwater and moderate-salinity ponds	Uncommon
Anas bahamensis	White-cheeked Pintail	Freshwater and moderate-salinity ponds	Occasional
Aythya affinis	Lesser Scaup	Ponds	Uncommon
Tachybaptus dominicus	Least Grebe	Ponds	Uncommon
Patagioenas leucocephala	White-crowned Pigeon	Coastal hammock, usu roosts & nests on islan	Uncommon
Columba passerina	Common Ground-dove	Sparsely-vegetated uplands	Common
Geotrygon chrysia	Key West Quail Dove	Thick coppice, scrub; saw nr Bannermantown	Uncommon adjoining tract
Zenaida aurita	Zenaida Dove	Urban/residential	Occasional
Crotophaga ani	Smooth-billed Ani	Open areas, bushes, golf courses	Occasional
Coccyzus minor	Yellow-billed Cuckoo	Dense scrub and coppice	Uncommon
Coccyzus minor	Mangrove Cuckoo	Dense scrub and coppice	Uncommon
Coccyzus merlini	Great Lizard Cuckoo	Dense Coppice, also pinewoods	Uncommon
Chordeiles gundlachii	Antillean Nighthawk	Nests on open ground	Occasional
Nesophlox evelynae	Bahama Woodstar	Coppice, typically nr nectar-producing flowers	Uncommon

Lighthouse Point - Landside Animals

Scientific Name	Common Name	Habitat	Abundance
Rallus longirostris	Mangrove (Clapper) Rail	Mangrove swamps, wetlands	Occasional
Himantopus mexicanus	Black-necked Stilt	Shallow inland wetlands, salt ponds	Common
Haematopus palliatus	American Oystercatcher	Rocky shorelines	Occasional
Pluvialis squatarola	Black-bellied Plover	Sandy shorelines	Occasional
Charadrius vociferus	Killdeer	Open grasslands, pond edges	Occasional
Charadrius semipalmatus	Semi-palmated Plover	Beaches, pond edges	Uncommon
Charadrius melodus	Piping Plover	Sandy beaches, salt pond fringes	Occasional
Charadrius wilsonia	Wilson's Plover	Beaches, pond edges	Occasional
Arenaria interpres	Ruddy Turnstone	Sandy beaches, rocky shorelines	Common
Calidris alba	Sanderling	Shorelines	Uncommon
Calidris minutilla	Least Sandpiper	Shorelines, wetland fringes	Occasional
Limnodromus griseus	Short-billed Dowitcher	Shallow inland wetlands	Occasional
Tringa flavipes	Lesser Yellowlegs	Shallow inland wetlands	Occasional
Tringa semipalmata	Willet	Beaches, pond edges	Occasional
Tringa solitaria	Solitary Sandpiper	Pond edges, interior wetlands	Uncommon
Tringa melanoleuca	Greater Yellowlegs	Shallow inland wetlands	Occasional
Leucophaeus atricilla	Laughing Gull	Shorelines, scavenger	Common
Anous stolidus [2]	Brown Noddy	Coastal areas, feeds on fish, nests nr water	Uncommon
Onychoprion fuscatus [2]	Sooty Tern	Coastal areas, feeds on fish, nests nr water	Uncommon
Onychoprion anaethetus [2]	Bridled Tern	Coastal areas, feeds on fish, nests nr water	Uncommon
Sternula antillarum	Least Tern	Coastal areas, feeds on fish, nests nr water	Uncommon
Gelochelidon nilotica	Gull-Billed Tern	Coastal areas, feeds on fish, nests nr water	Uncommon

Scientific Name	Common Name	Habitat	Abundance
Sterna dougallii	Roseate Tern	Coastal areas, feeds on fish, nests nr water	Uncommon
Thalasseus maximum	Royal Tern	Nearshore open waters, roosts on beaches	Occasional
Phaethon lepturus [2]	White-tailed Tropicbird	Coastal areas, feeds on fish, nests nr water	Uncommon
Calonectris diomedea [2]	Cory's Shearwater	Coastal areas, feeds on fish, nests nr water	Uncommon
Ardenna gravis [2]	Great Shearwater	Coastal areas, feeds on fish, nests nr water	Uncommon
Puffinus lherminieri [2]	Audubon's Shearwater	Coastal areas, feeds on fish, nests nr water	Uncommon
Fregata magnificens [2]	Magnificent Frigatebird	Aerial over the sea	Uncommon
Ardea herodias	Great Blue Heron	Shorelines & shallow inland wetlands	Uncommon
Ardea alba	Great Egret	Shorelines & shallow inland wetlands	Occasional adjoining tract
Egretta caerulea	Little Blue Heron	Shorelines, coastal &/or freshwater	Uncommon
Egretta thula	Snowy Egret	Shorelines, coastal &/or freshwater	Occasional
Egretta tricolor	Tri-colored Heron	Shorelines, coastal &/or freshwater	Occasional
Egretta rufescens	Reddish Egret	Coastal wetlands, sand flats	Common
Bubulcus ibis	Cattle Egret	Typically in urban and suburban areas	Occasional
Butorides virescens bahamensis	Green Heron	Shorelines & shallow inland wetlands	Uncommon (Adults & young)
Nyctanassa violacea	Yellow-crowned Night-heron	Shorelines & shallow inland wetlands	Common
Pandion haliaetus ridgwayi	Osprey	Coastal areas, feeds on fish, nests nr water	Uncommon
Athene cunicularia	Burrowing Owl	Observed in roadside coppice	Uncommon
Ceryle alcyon	Belted Kingfisher	Near open water, feeds on small fish	Uncommon
Sphyrapicus varius	Yellow-bellied Sapsucker	Forests; observed foraging on *Cocos nucifera*	Uncommon
Falco columbarius	Merlin	Observed atop snag in coppice	Common in winter

Lighthouse Point - Landside Animals

Scientific Name	Common Name	Habitat	Abundance
Falco peregrinus	Peregrine Falcon	Often along shorelines	Transient
Myiarchus sagrae lucayensis	La Sagra's Flycatcher	Thick coppice, bushy forest edges	Uncommon
Tyrannus dominicensis	Gray Kingbird	Urban areas, coppice	Uncommon
Contopus virens	Eastern Wood Pewee	Coppice	Uncommon
Contopus caribaeus	Cuban Pewee	Coppice	Uncommon
Vireo crassirostris	Thick-billed Vireo	Thick coppice, bushy forest edges	Common
Vireo philadelphicus	Philadelphia Vireo	Coppice	Uncommon
Vireo olivaceus	Red-eyed Vireo	Coppice	Uncommon
Vireo altiloquus	Black-whiskered Vireo	Coppice, secondary growth	Occasional
Dumetella carolinensis	Gray Catbird	Thickets, shrublands	Occasional
Mimus gundlachii	Bahama Mockingbird	Coppice, Scrub, woodlands	Occasional
Mimus polyglottos	Northern Mockingbird	Urban areas, coppice	Uncommon
Melospiza lincolnii	Lincoln's Sparrow	Coppice	Uncommon
Spindalis zena	Western Spindalis	Pinewoods, coppice, thickets, gardens	Occasional
Seiurus aurocapilla	Ovenbird	Forest floors	Ucommon
Helmintheros vermivorum	Worm-eating Warbler	Forest floors - Coppice, thickets & forests	Uncommon
Parkesia noveboracensis	Northern Waterthrush	Shrubby wetland edges	Uncommon
Setophaga caerulescens	Black and White Warbler	Coppice, thickets & forests	Uncommon
Limnothlypis swainsonii	Swainson's Warbler	Coppice, thickets & forests	Uncommon
Leiothlypis peregrina	Tennessee Warbler	Coppice, thickets & forests	Uncommon
Geothlypis rostrata	Bahama Yellowthroat	Coppice	Uncommon
Geothlypis trichas	Common Yellowthroat	Shrubs in wet areas	Uncommon

Scientific Name	Common Name	Habitat	Abundance
Setophaga ruticilla	American Redstart	Coppice, thicket & forest	Uncommon
Setophaga kirtlandii	Kirtland's Wabler	Broadleaf scrub	Uncommon
Setophaga tigrina	Cape May Warbler	Coppice, thickes & forest	Uncommon
Setophaga americana	Northern Parula	Coppice, thickets, & forests	Uncommon
Setophaga magnolia	Magnolia Warbler	Open areas, often near ground	Uncommon
Setophaga caerulescens	Black-throated Blue Warbler	Coppice, thickets, & forests	Uncommon
Setophaga palmarum	Palm Warbler	Coppice, thicket, urban areas, agricultural area	Common
Setophaga pinus	Pine Warbler	Coppice, thickets	Uncommon
Setophaga dominica	Yellow-throated Warbler	Coppice, thickets	Uncommon
Setophaga discolor	Prairie Warbler	Coppice, thicket & forest	Common
Setophaga virens	Black-throated Green Warbler	Coppice, thickets, & forests	Uncommon
Passerina cyanea	Indigo Bunting	Coppice, thickets	Uncommon
Hirundo rustica	Barn Swallow	Aerial, over various habitats	Uncommon
Coerba flaveola	Bananaquit	Coppice, thicket & forest	Common
Melopyrrha violacea	Greater Antillean Bullfinch	Dense thickets, dense coppice	Occasional
Tiaris bicolor	Black-faced Grassquit	Semi-open grasslands	Common
REPTILES and AMPHIBIANS			
Pholidoscelis auberi	Blue-tailed Lizard	Semi-open uplands	Uncommon
Anolis distichus	Bark Anole	Enountered in sand strand	Uncommon
Anolis sagrei	Brown Anole	Semi-open uplands	Common
Anolis smaragdinus	Green Anole	Semi-open uplands	Uncommon

Scientific Name	Common Name	Habitat	Abundance
Anolis sp.	Anole	Semi-open uplands	Occasional
Cubophis vudii	Bahamas Brown Racer	Coppice	Uncommon
Leiocephalus carinatus virescen	Northern Curly-tailed Lizard	Coppices, urban areas	Abundant
Mabuyidae	Skink	Semi-open rocky areas	Occasional
Osteopilus septrionalis	Cuban Tree Frog	Only observed in lighthouse cistern	Uncommon
INSECTS			
Butterflies and Moths			
Agraulis (Dione) vanillae	Gulf Fritillary Butterfly	Semi-open areas, host plant is Passifloraceae	Common
Ascalapha odorata	Money Bat Moth, Black Witch	Shady areas, esp rock walls	Uncommon
Composia fidelissima	Faithful Beauty	Observed in Sand Strand	Uncommon
Danaus plexippus	Monarch	Roadsides	Uncommon
Dryas iulio	Julia Butterfly	Semi-open areas, host plant is Passifloraceae	Common
Erynnis horatius	Horace's Duskywing	Roadsides	Uncommon
Euphyes sp possibly	Skipper	Observed in coastal dunes	Uncommon
Heraclides andreamon bonhotei	Bahama Swallowtail	Likely forage on Asclepiaceae	Occasional
Junonia evarete	Black Mangrove Buckeye Butterfly	Shorelines, host plants are black mangroves	Uncommon
Kricogonia lyside	Lyside Sulphur	Observed feeding on Turner diffusa	Uncommon
Leptotes cassius	Cassia Blue Butterfly	Weedy areas	Uncommon
Lerema accius	Clouded Skipper	Observed feeding on Stachytarphaeta	Uncommon
Lucinia sida	Caribbean Banner	Observed in coppice near west shoreline	Uncommon

Scientific Name	Common Name	Habitat	Abundance
Phoebis agarithe antillia	Large Orange Sulphur	Observed on roadsides	Common
Pieridae	Sulfur Butterfly	Observed in weedy groundcovers	Uncommon
Pierinae	White Butterfly	Semi-open areas, host plants are Brassicaceae	Common
Polygonus leo	Hammock Skipper	Feeds on Legumes	Uncommon
Urbanus proteus	Long-tailed Skipper	Semi-open areas, host plants are Fabaceae	Common
Unidentified Skipper	Dark Skipper	Semi-open areas	Uncommon
Spiders			
Argiope argentata	Silver argiope	in Strumpfia in coastal spray zone	Uncommon
Gasteracantha cancriformis	Crablike Spiny Orb Weaver	Coppice	Uncommon
Latrodectus mactans	Black Widow	Coppice	Uncommon
Nephila clavipes	Banana spider, Golden Silk Orb Weaver	Coppice	Uncommon
Other Insects & Terrestrial Arthropods			
Aedes sp.	Mosquitos	Shorelines, coppice, forests, wetlands	Abundant
Aeshnidae	Dragonfly	Coppice, near salt ponds	Occasional
Apis mellifera	Honeybee	Coppice	Occasional
Eurycotis bahamensis	Bahamas Cockroach	Encountered in coppice leaf litter	Uncommon
Campsomeris sp.	Scoliid wasp	Encountered in coppice leaf litter	Uncommon
Ceratopogonidae	No see ums	Wind-less shorelines and coastal coppice	Abundant
Coenagrionidae	Damselfly	Coppice, near ponds	Occasional
Diceroprocta bonhotei	Cicada	Observed in sand strand	Occasional
Dytiscidae or Hydrophilidae	Water Beetle	Salt ponds	Occasional

Lighthouse Point - Landside Animals

Scientific Name	Common Name	Habitat	Abundance
Formicidae	Ants	Agricultural shrublands	Abundant
Musca domesticus	House Fly	Urban environments	Occasional
Myrmeleontidae	Antlion	Sandy Areas	Occasional
Nasutitermes costalis	West Indian nasute termites	Coppice and forests	Common
Oxysarcodexia sp.	Flesh Fly	Encountered in sand strand	Uncommon
Reticulitermites flavipes	Subterranean termite	Encountered in coastal coppice	Uncommon
Sacrophaga sp.	Fly	Encountered in sand strand	Uncommon
Schistocerca americana	American Bird Grasshopper	Evergreen shrublands	Occasional
Tettigoniidae	Bush Katydid	Encountered in mature coppice	Uncommon
Pompilidae	Tarantula hawk, spider wasp	Observed in sand strand	Uncommon
Scorpionida	Scorpion	Leaf litter in coppice and sand strand	Uncommon
Tabanus sp.	Horsefly	Encountered in sand strand	Uncommon
Tachypompilus sp	Spider Wasp	Sandy patches	Uncommon
Vespidae	Wasp	Underside of palm leaves	Occasional

[1] Bird list organized in accordance with American Ornithological Society - Check-list of North American Birds (online), 2019.

[2] Observed only over nearshore waters

Appendix C Baseline Marine Species Lists

Lighthouse Point Area - Marine Organisms Species List

The following marine 20fe species were observed and identified during underwater assessments conducted in the vicinity of Lighthouse Point, Eleuthera, at various times from November 2017 through November 2020. The list should be considered a work-in-progress, and it is likely that additional species would be identified as additional surveys are conducted.

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance	Comments	CITES	IUCN
SHORELINE WETLAND VEGETATION							
Avicennia germinans	Black Mangrove	Tree	Shorelines	Abundant	In transition zone to land		
Conocarpus erectus	Buttonwood	Tree	Shorelines	Occasional	In transition zone to land		
Rhizophora mangle	Red Mangrove	Tree	Shorelines	Abundant	In transition zone to land		
MARINE PLANTS							
SEAGRASSES							
Halodule wrightii	Shoal grass	Seagrass	Typically shallow bays	Occasional	Sparse		
Syringodium filiforme	Manatee-grass	Seagrass	Typically shallow bays	Occasional	Sparse to dense		
Thalassia testudinum	Turtle grass	Seagrass	Typically shallow bays	Abundant	Sparse to dense		
MACROALGAE							
Rhodophyta							
Amphiroa fragilissima	Amphiroa	Red Algae	Coral rubble, Grassbeds	Occasional	Occasionally dense		
Amphiroa sp.	Amphiroa	Red Algae	Coral rubble, Grassbeds	Occasional			
Chondria capillaris		Red Algae	Attached to rubble	Common	On sandy bottoms		
Chondria sp.		Red Algae	On hard substrates	Common			
Galaxaura obtusata	Calcareous red algae	Red Algae	On hard substrates	Occasional			
Hypnea cervicornis		Algae	Attached to rubble	Occasional			
Hydrolithon boergesenii	Calcareous red algae	Crustose	On hard substrates	Common	Inshore hardbottom		
Hydrolithon farinsum	Calcareous red algae	Crustose	On hard substrates	Common	Inshore hardbottom		
Jania adhaerens		Red Algae	Attached to rubble	Occasional			
Laurencia poiteaui		Red Algae	On sand & hard substrates	Common	E beach rocks		
Laurencia intricata		Red Algae	On sand & hard substrates	Common	Attached to sand dollars		

Lighthouse Point Area - Marine Organisms Species List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance	Comments	CITES	IUCN
Laurencia poiteaui		Red Algae	Coral rubble	Occasional			
Neogoniolithon spectabile	Calcareous red algae	Red Algae	On hard substrates	Occasional			
Neogoniolithon strictum	Calcareous red algae	Red Algae	Inshore hardbottom	Common	Rocky promontories		
Solieria filiformis		Red Algae	Nestled in grassbeds	Occasional	Only noticed on east beach rocks		
Phaeophyta							
Dictyota cervicornis		Brown Algae	On hard substrates	Occasional			
Dictyota sp.		Brown Algae	On hard substrates	Common			
Lobophora variegata	Fluffy Ruffles	Brown Algae	On hard substrates	Occasional	Mostly east side		
Padina sanctae-crucis	Scroll Algae	Brown Algae	On hard substrates	Abundant	A in E beach rocks		
Sargassum hystrix	Sargassum Weed	Seaweed	Drift, sometimes rooted	Occasional			
Sargassum fluitans	Sargassum Weed	Seaweed	Drift, sometimes rooted	Occasional			
Sargassum sp.	Sargassum Weed	Seaweed	Drift, sometimes rooted	Common			
Turbinaria turbinata	Blistered Saucer Leaf alga	Brown Algae	Solid substrates	Occasional			
Chlorophyta							
Acetabularia calyculus	Mermaid's Wine Glass	Green Algae	Sandy areas nr reefs	Occasional			
Acetabularia crenulata	Mermaid's Wine Glass	Green Algae	Sandy areas nr reefs	Occasional			
Avrainvillea sp.	Green fan	Green Algae	Sandy areas	Common			
Batophora oerstedii	Batophora	Green Algae	Attached to solid substrat	Common	Incl White Pond		
Cladophora cetenata		Green Algae	Solid substrates	Occasional			
Cymopolia barbata		Green Algae	Attached to solid substrate	Occasional	Near Service Ramp		
Enteromorpha flexuosa	Algae	Green Algae	Attached to solid substrate	Occasional			
Halimeda cryptica		Calcareous Green Algae	Offshore coral mounds	Common			
Halimeda incrassata	Three-finger Leaf Algae	Green Algae	Grassbeds and reefs	Common	Interspersed w/ seagrass		
Halimeda sp.	Algae	Green Algae	Attached to rocks	Occasional			

Lighthouse Point Area - Marine Organisms Species List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance	Comments	CITES	IUCN
Halimeda opuntia	Watercress Algae	Green Algae	Reefs	Occasional			
Halimeda tuna	Stalked Lettuce-Leaf Algae	Green Algae	Attached to rocks	Occasional			
Microdictyon marinum	Network Algae	Green Algae	Attached to reefs	Occasional			
Penicillus capitatus	Bristle Ball Brush	Green Algae	Mud and sand bottoms	Occasional	Variable densities		
Penicillus sp.	Shaving Brush	Calcareous Green Algae	Sandy areas	Common			
Rhipocephalus phoenix	Pine cone Algae	Green Algae	Sandy bottoms	Common			
Udotea luna		Green Algae	Sandy areas, betw reefs	Common			
Udotea spinulosa	Mermaid's Fan	Green Algae	Sandy areas, betw HB	Common			
Udotea sp.	Mermaid's Fan	Green Algae	Sandy areas, betw HB	Occasional			
SPONGES							
Agelas citrina	Citron Sponge	Sponge	Reefs	Occasional			
Agelas clathrodes	Orange Elephant Ear Sponge	Sponge	Offshore hardbottom	Occasional			
Agelas conifera	Brown Tube Sponge	Sponge	Coral reefs, grassbed	Common			
Aiolochroia crassa	Branching Tube Sponge	Sponge	Coral reefs	Occasional			
Anthosigmella varians	Brown Variable Sponge	Sponge	Coral Reefs	Occasional	Now *Cliona varians*		
Aplysina cauliformes	Row Pore Rope Sponge	Sponge	Steep slopes & walls	Occasional			
Aplysina fistularis	Yellow Tube Sponge	Sponge	Offshore hardbottom	Common			
Aplysina fulva	Scattered-pore Rope Sponge	Sponge	Coral reefs	Occasional			
Aplysina insularis	Branchlet Sponge	Sponge	Coral reefs	Occasional			
Callyspongia plicifera	Azure vase sponge	Sponge	Coral reefs	Occasional			
Cliona caribbaea	Coral Encrusting Sponge	Sponge	Hardbottom	Common			
Cliona delitrix	Red Boring Sponge	Sponge	Reefs and hardbottom	Common			
Cliona sp.	Green Boring Sponge	Sponge	Hardbottom	Common			

Lighthouse Point Area - Marine Organisms Species List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance	Comments	CITES	IUCN
Cliona varians	Brown Variable Sponge	Sponge	Coral Reefs	Occasional			
Cribrochalina vasculum	Brown Bowl Sponge	Sponge	Reefs, walls, rubble	Occasional			
Demospongiae	Green Encrusting Sponge	Sponge	Hardbottom	Common			
Ectyoplasia ferox	Brown Octopus Sponge	Sponge	Offshore hardbottom	Common			
Geodia neptuni	Leathery Barrel Sponge	Sponge	Coral reefs	Occasional			
Iotrochota birotulata	Green Finger Sponge	Sponge	Coral Reefs	Common			
Ircinia campana	Vase Sponge	Sponge	Coral Reefs	Occasional			
Ircinia strobilina	Black-ball Sponge	Sponge	Coral Reefs	Occasional			
Mycale laxissima	Strawberry Vase Sponge	Sponge	Reefs, hardbottom	Uncommon	Only encountered 1		
Neofibularia nolitangere	Touch-me-Not	Sponge	Reefs, hardbottom	Uncommon			
Niphates digitalis	Pink Vase Sponge	Sponge	Coral Reefs	Occasional			
Niphates erecta	Lavender Rope Sponge	Sponge	Coral Reefs	Occasional			
Oceanapia bartschi	Rough Tube Sponge	Sponge	Walls & ledges	Uncommon			
Plakortis angulospiculatus	Viscous Sponge	Sponge	Reefs, hardbottom	Common			
Spheciospongia vesparium	Loggerhead Sponge	Sponge	Coral Reefs	Common			
Svenzea zedi	Dark Volcano Sponge	Sponge	Hardbottom, SAV, reefs	Occasional			
Verongula gigantea	Netted Barrel Sponge	Sponge	Reefs	Occasional			
Verongula rigida	Pitted Sponge	Sponge	Reefs	Occasional			
Xestospongia muta	Barrel Sponge	Sponge	Hardbottoms and Coral Mounds	Common			
CRUSTACEANS							
Acheolus ordwayi	Redhair Swimming Crab	Crab	Floating Sargassum	Uncommon			
Calappa flammea	Flame-streaked Box Crab	Crab	Sandy bottoms	Occasional	Found several shells		
Cardisoma guanhumi	Land Crab	Crab	Mangrove edges	Common	In Landside habitats		

Lighthouse Point Area - Marine Organisms Species List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance	Comments	CITES	IUCN
Cinetorhynchus manningi	Red Night Shrimp	Shrimp	Reefs	Common			
Cymothoidea	Isopod	Isopod	on Grouper	Uncommon	Ecto-parasite		
Ocypode quadrata	Ghost Crab	Crab	Beaches	Occasional			
Diogenidae	Hermit Crab	Crab	Reefs, Hardbottom, SAV	Occasional			
Hepatus epheliticus	Calico Box Crab	Crab	Reefs	Occasional			
Mithracidae	Decorator Crab	Crab	Reefs, Hardbottom	Occasional			
Panulirus argus	Spiny Lobster	Lobster	Reef recesses	Occasional			
Periclimenes pedersoni	Pederson Cleaner Shrimp	Shrimp	Reefs, esp w anemones	Occasional			
Squillidae	Mantis Shrimp	Shrimp	Sandy substrates	Occasional	Only saw burrows		
Uca pugilator	Fiddler Crab	Crab	Mangrove shorelines	Occasional			
MOLLUSKS							
Acanthopleura granulata	Fuzzy Chiton	Chiton	Intertidal rocks	Occasional			
Arca zebra	Zebra Ark	Bivalve	Sandy Bottoms	Occasional	Shells on shore		
Asaphis deflorata	Gaudy Asaphis	Clam	Sandy areas w/ rock	Uncommon			
Bulla occidentalis	West Indian Bubble	Snail	Sandy areas, grassbeds	Occasional	Mostly on shore		
Caribachlamas sentis	Scaly Scallop	Bivalve	Sandy bottoms	Occasional	Shells in nearshore		
Cassis flammea	Flame Helmet	Snail	Seagrass beds	Occasional			
Cassis sp.	Helmet	Snail	Seagrass beds	Occasional			
Cassis tuberosa	King Helmet	Snail	Seagrass beds	Occasional			
Cerithium litteratum	Stocky Cerith	Snail	Seagrass beds	Common	Occasional in lg groups		
Cittarium pica	West Indian Top Shell	Snail	Rocky shorelines	Occasional			
Columbella mercatoria	Common Dove Snail	Snail	Hardbottom	Uncommon			
Conus daucus	Carrot Cone	Snail	Sandy bottoms	Occasional	Shells on shore		
Conus mindanus	Bermuda Cone	Snail	Sandy bottoms	Occasional			
Cyphoma gibbosum	Flamingo Tongue	Snail	Reefs, esp sea fans	Occasional			

Lighthouse Point Area - Marine Organisms Species List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance	Comments	CITES	IUCN
Cyphoma signatum	Fingerprint Cyphoma	Snail	Reefs, esp sea fans	Occasional			
Cypraea spurca acicularis	Atlantic Yellow Cowrie	Snail	Sandy bottoms	Occasional	Shells on shore		
Cypraecassis testiculus	Reticulate cowrie-helmet	Snail	Rocky Reefs	Occasional			
Diadora sp.	Limpet	Snail	Rocky shorelines	Uncommon			
Erosaria acicularis	Yellow Cowrie	Snail	Rocky areas	Occasional	Shells on shore		
Fissurella sp	Keyhole limpet	Limpet	Rocky shores	Uncommon			
Glycymeris sp.	Bittersweet Clam	Clam	Sandy substrates	Uncommon			
Isognomon radiatus	Lift Purse Oyster	Bivalve	Sandy bottoms	Occasional	Shells on shore		
Laciolina magna	Great Tellin	Clam	Sandy bottoms	Occasional	Shells on shore		
Lobatus (fka Strombus) costatus	Milk Conch	Conch	Grassbeds, sand flats	Occasional			
Limaria pellucida	Antillean Lima	Bivalve	Sandy bottoms	Occasional	Shells on shore		
Lithopoma Americanum	American Star	Snail	Sandy bottoms	Occasional	Shells on shore		
Lobatus raninus	Hawkwing Conch	Conch	Seagrasses, sands	Occasional			
Loliginidae	Squid	Squid	Over reefs	Occasional			
Lucinus pectinata	Buttercup Lucine	Bivalve	Sandy botoms	Occasional			
Luria cinerea	Atlantic Gray Cowrie	Snail	Sandy bottoms	Occasional	Shells on shore		
Macrocypraea zebra	Measled Cowrie	Snail	Sandy bottoms	Occasional	Shells on shore		
Naticarius canrena	Colorful Moon	Snail	Sands, seagrasses	Uncommon	Shells on shore		
Nerita peloronta	Bleeding Tooth	Snail	Intertidal rocks	Occasional	On shore		
Nerita versicolor	Four-tooth Nerite	Snail	Intetidal rocks	Occasional	On shore		
Octopus vulgaris	Common Octopus	Octopus	Nearshore	Occasional			
Polymesoda floridana	So. Marsh Clam	Clam	Intertidal crks, ponds	Common	In White Pond		
Potamididae		Snail	Tidal creeks, ponds	Uncommon	In White Pond		

Lighthouse Point Area - Marine Organisms Species List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance	Comments	CITES	IUCN
Purpura patula	Wide-Mouthed Purpura	Snail	Sandy bottoms	Occasional	Shells on shore		
Semicassis granulata	Scotch Bonnet	Snail	Sandy bottoms	Occasional			
Sepioteuthis sepioidea	Caribbean Reef Squid	Squid	Patch reefs	Occasional			
Spondylus spp.	Atlantic Thorny Oyster	Bivalve	Reefs	Occasional	Shells in nearshore		
Stramonita rustica	Rustic Rock-shell	Snail	Rocky shorelines	Occasional			
Strombus gigas	Queen Conch	Conch	Grassbeds, sand flats	Occasional	Mostly juveniles		
Tectarius muricatus	Beaded Periwinkle	Snail	Shoreline Coastal Rock	Common	On rocks near water line		
Tellina alternata	Alternate Tellin	Bivalve	Sandy bottoms	Occasional	Shells on shore		
Tellina lineata	Rose Petal Tellin	Bivalve	Sandy bottoms	Occasional	Shells on shore		
Tellina radiata	Sunrise Tellin	Clam	Sand flats	Occasional			
Tellina similis	Candy Stick Tellin	Bivalve	Sandy bottoms	Occasional	Shells on shore		
Tonna pennata	Atlantic Partridge Tun	Snail	Shallows nr coral reefs	Occasional			
Niveria pediculus	Coffee Bean Trivia	Snail	Reefs, hardbottoms	Occasional			
Turbinella angulata	West Indian Chank Shell	Snail	Sandy bottoms	Occasional			
ECHINODERMS							
Ascidiacea	Tunicate	Tunicate	Solid substrate in SAV	Occasional			
Brissidae	Heart Urchin	Sea Urchin	Sandy bottoms	Uncommon			
Clypeaster rosaceus	West Indian Sea Biscuit	Sea urchin	Seagrasses, Coral rubble	Common	Only saw empty tests		
Davidaster rubiginosa	Golden Crinoid	Feather Star	Reefs	Uncommon	Only saw at Miller's		
Diadema antillarum	Long-spined Urchin	Sea urchin	Reefs	Common			
Echinometra lucunter	Rock-boring Urchin	Sea urchin	Reefs, coral rubble	Occasional			
Holothuria mexicana	Donkey Dung Sea Cucumber	Sea Cucumber	Grassbeds	Occasional			
Lytechinus variegatus	Variegated Urchin	Sea Urchin	Hardbottom, grassbeds	Occasional			
Leodia (Mellita) sexiesperforata	Six-Keyhole Sand Dollar	Sand dollar	Sandy areas	Common	Saw mostly dead tests		

Lighthouse Point Area - Marine Organisms Species List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance	Comments	CITES	IUCN
Meoma ventricosa	Red Heart Urchin	Sea Urchin	Reefs, sandy areas	Common			
Tripneustes ventricosus	West Indian Sea Egg Urchin	Sea urchin	Seagrass beds, reefs	Occasional			
ANNELIDS							
Amphinomidae	Fireworm	Worm	Reefs, hardbottom	Uncommon			
Anamobaea oerstedi	Split-crown feather-duster	Worm	Reefs	Occasional			
Arenicola cristata	Southern Lugworm	Worm	Sandy bottoms	Common			
Bispira brunnea	Social Feather Duster	Worm	Reefs	Common			
Phoronida	Horseshoe Worm	Worm	Reefs & hard substrate	Uncommon			
Sedentaria	Spaghetti/Medusa Worm	Worm	Reefs, coral rubble	Occasional			
Spirobranchus giganteus	Christmas-tree Worm	Worm	Coral reefs	Occasional			
CNIDARIANS							
Actinoporus elegans	Elegant Anemone	Anemone	Sand & rubble	Occasional			
Condylactis gigantea	Pink-tipped (Giant) Anemone	Anemone	Reefs & lagoons	Occasional			
Epicystis crucifer	Beaded Anemone	Anemone	Sand and rubble	Occasional			
Hydroida	Hydroid	Hydroid	Reefs	Occasional			
Lebrunia danae	Branching Anemone	Anemone	Sand and rubble	Occasional			
Palythoa caribaeorum	White Encrusting Zoanthid	Zooanthid	Patch reefs	Occasional			
Pennaria disticha	X-mas tree Hydroid	Hydroid	Shallow reefs	Occasional			
Stichodactyla helianthus	Sun Anemone	Anemone	Sand and rubble	Occasional			
TUNICATES							
Trididenum solidum	Overgrowing Mat Tunicate	Tunicate	Patch reefs	Occasional			
Didemnum conchyliatum	White Speck Tunicate	Tunicate	Hardbottom	Occasional			

Lighthouse Point Area - Marine Organisms Species List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance	Comments	CITES	IUCN
CORALS							
Hydrocorals							
Millepora alcicornis	Fire Coral	Coral	Reefs	Common		App. II	Least Concern
Millepora complanata	Blade Fire Coral	Coral	Reefs	Occasional		App. II	Least Concern
Millepora striata	Ridged Fire Coral	Coral	Reefs	Uncommon			
Octocorals							
Antillogorgia bipinnata	Bipinnate Sea Plume	Coral	Reefs	Occasional			
Antillogorgia sp.	Sea Plumes	Coral	Reefs	Occasional			
Briareum asbestinum	Corky Sea Fingers	Coral	Reefs	Common			
Eunicea sp.	Sea Rod	Coral	Reefs, walls	Occasional			
Eunicea mammosa	Swollen-knob Candleabrum	Coral	Shallow hardbottoms, reefs	Occasional			
Gorgonia ventalina	Common Sea Fan	Coral	Reefs, esp seaward side	Common			
Muricea muricata	Spiny Sea Fan	Coral	Reefs	Occasional			
Plexaura flexuosa	Bent Sea Rod	Coral	Reefs	Occasional			
Plexaura sp.	Sea Rods	Coral	Reefs	Occasional			
Plexaurella homomalla	Black Sea Rods	Coral	Reefs	Occasional			
Plexaurella nutans	Giant Slit-Pore Sea Rod	Coral	Reefs, hardbottoms	Occasional			
Plexaurella sp.	Slit-pore Sea Rod	Coral	Reefs	Occasional			
Pseudoplexaura sp.	Porous Sea Rods	Coral	Reefs	Occasional			
Pseudopterogorgia sp.	Sea Plumes	Coral	Reefs	Common	To + 1 meter height		
Pseudopterogorgia amer-icana	Slimy Sea Plume	Coral	Reefs	Common	To + 1 meter height		
Pterogorgia anceps	Angular Sea Whip	Coral	Reefs, hardbottom	Common			
Pterogorgia citrina	Yellow Sea Whip	Coral	Reefs, hardbottom	Occasional			
Pterogorgia guadalupensis	Grooved-Blade Sea Whip	Coral	Reefs, hardbottom	Occasional			

Lighthouse Point Area - Marine Organisms Species List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance	Comments	CITES	IUCN
Stony Corals							
Acropora cervicornis	Staghorn Coral	Coral	Reefs	Uncommon		App. II	Critically Endangered
Acropora palmata	Elkhorn Coral	Coral	Shallow reefs	Uncommon	Some dead	App. II	Critically Endangered
Agaricia agaricites	Lettuce Coral	Coral	Reefs, hardbottom	Common		App. II	Least Concern
Agaricia fragilis	Fragile Saucer Coral	Coral	Reefs	Occasional		App. II	Least Concern
Agaricia humilis	Low-relief Lettuce Coral	Coral	Reefs	Occasional		App. II	Least Concern
Agaricia lamarcki	Whitestar Sheet Coral	Coral	Coral Wall	Common		App. II	Vulnerable
Colpophyllia natans	Boulder Brain Coral	Coral	Reefs	Occasional		App. II	Least Concern
Dendrogyra cylindrus	Pillar Coral	Coral	Reefs	Uncommon		App. II	Vulnerable
Dichocoenia stokesii	Elliptical Star Coral	Coral	Reefs, hardbottom	Common		App. II	Vulnerable
Diploria labyrinthiformis	Grooved Brain Coral	Coral	Reefs	Occasional		App. II	Least Concern
Eusmilia fastigiata	Smooth Flower Coral	Coral	Reefs	Occasional	Only offshore	App II	Least Concern
Favia fragum	Golfball Coral	Coral	Shallow reefs	Occasional		App II	Least Concern
Helioseris cucullata	Sunray Lettuce Coral	Coral	Reefs	Uncommon		App II	Least Concern
Isophylla sinuosa	Sinuous Cactus Coral	Coral	Reefs	Occasional		App II	Least Concern
Isophyllastrea rigida	Rough Star Coral	Coral	Reefs	Uncommon	Some in distress	App. II	Least Concern
Madracis decactis	Ten-ray star coral	Coral	Reefs	Common		App. II	Least Concern
Manicina areolata	Rose Coral	Coral	Sandy bottoms	Commom	Inshore hardbottom	App. II	Least Concern
Meandrina jacksoni	Whitevalley Maze Coral	Coral	Reefs	Occasional			
Meandrina meandrites	Maze Coral	Coral	Reefs, hardbottom	Common		App. II	Least Concern
Montastrea cavernosa	Great Star Coral	Coral	Hardbottom/Reefs	Common		App II	Least Concern
Mycetophyllia lamarckiana	Ridged Cactus Coral	Coral	Reefs	Occasional		App II	Least Concern
Orbicella annularis	Boulder Star Coral	Coral	Reefs	common	fka Montastrea	App II	Endangered

Lighthouse Point Area - Marine Organisms Species List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance	Comments	CITES	IUCN
Orbicella faveolata	Mountainous Star Coral	Coral	Reefs	Common	fka Montastrea	App II	Endangered
Orbicella franksi	Boulder Star Coral	Coral	Coral Wall/deeper reefs	Occasional		App II	Vulnerable
Porites astreoides	Mustard Hill Coral	Coral	Reefs, hardbottom	Common		App. II	Least Concern
Porites furcata	Thin Finger Coral	Coral	Reefs, hardbottom	Occasional		App. II	Least Concern
Porites porites	Finger Coral	Coral	Reefs, hardbottom	Common		App. II	Least Concern
Pseudodiploria clivosa	Knobby Brain	Coral	Inshore Hardbottom	Common		App. II	Least Concern
Pseudodiploria strigosa	Brain Coral	Coral	Hardbottom/Reefs	Occasional		App. II	Least Concern
Scleratinia	Cup Coral	Coral	Reefs	Occasional			
Scolymia sp.	Disc coral	Coral	Reefs	Occasional			
Siderastrea radians	Lesser Starlet Coral	Coral	Hardbottom	Common		App. II	Least Concern
Siderastrea sidera	Massive Starlet Coral	Coral	Reefs, hardbottom	Common		App. II	Least Concern
Stephanocoenia intersepta	Blushing Star Coral	Coral	Reefs	Common		App. II	Least Concern
FISH, incl. rays, sharks							
Holacanthus ciliaris	Queen Angelfish	Fish	Reefs, hardbottom	Occasional			
Pomacanthus arcuatus	Gray Angelfish	Fish	Reefs, hardbottom	Occasional			
Holacanthus tricolor	Rock Beauty	Fish	Reefs	Occasional			
Chaetodon striatus	Banded Butterflyfish	Fish	Reefs, hardbottom	Occasional			
Chaetodon capistratus	Foureye Butterflyfish	Fish	Reefs, hardbottom	Occasional			
Chaetodon ocellatus	Spotfin Butterflyfish	Fish	Reefs, hardbottom	Occasional			
Chaetodon sedentarius	Reef Butterflyfish	Fish	Reefs, hardbottom	Occasional			
Acanthus caeruleus	Blue Tang	Fish	Reefs, hardbottom	Common			
Acanthurus tractus	Ocean Surgeonfish	Fish	Reefs, hardbottom	Common			
Acanthurus chirurgus	Doctorfish	Fish	Reefs, hardbottom	Common			
Caranx crysos	Blue Runner	Fish	Reefs & Sandy bottoms	Occasional			
Caranx ruber	Bar Jack	Fish	Over reefs	Occasional			

Lighthouse Point Area - Marine Organisms Species List

Family/Scientific Name	**Common Name**	**Life Form**	**Habitat**	**Abundance**	**Comments**	**CITES**	**IUCN**
Sphyraena barracuda	Great Barracuda	Fish	Reefs, hardbottom	Common			
Seriola rivoliana	Almaco Jack	Fish	Offshore hardbottom	Rare			
Exocoetidae	Atlantic Flyingfish	Fish	At or near surface	Occasional	Observed en-route		
Atherinidae sp.	Silversides	Fish	Patch reefs	Common			
Calamus calamus	Saucereye Porgy	Fish	Reefs, hardbottom	Occasional			
Calamus sp.	Porgy	Fish	Reefs, hardbottom	Occasional			
Kyphosus sectatrix/biggibus	Bermuda/Gray Chub	Fish	Reefs	Common	Patch reefs		
Haemulon flavolineatum	French Grunt	Fish	Reefs, hardbottom	Common			
Haemulon macrostomum	Spanish Grunt	Fish	Reefs	Occasional			
Haemulon parra	Sailors Choice	Fish	Reefs, hardbottom	Occasional			
Haemulon plumierii	White Grunt	Fish	Reefs, hardbottom	Common			
Haemulon sciurus	Bluestriped Grunt	Fish	Reefs, hardbottom	Occasional			
Haemulon sp.	Grunt	Fish	Reefs	Occasional			
Haemulon aurolineatum	Tomtate	Fish	Reefs	Occasional			
Haemulon melanurum	Cottonwick	Fish	Offshore hardbottom	Occasional			
Lutjanus analis	Mutton Snapper	FIsh	Reefs, hardbottom	Occasional			
Lutjanus apodus	Schoolmaster	Fish	Reefs	Common	Also in mangroves		
Lutjanus mahogoni	Mahogany Snapper	Fish	Reefs	Common			
Lutjanus synagris	Lane Snapper	Fish	Reefs	Occasional			
Luthanus griseus	Gray Snapper	Fish	Reefs, Inshore	Common			
Lutjanus sp.	Juvenile Snapper	Fish	Mangroves	Occasional			
Ocyurus chrysurus	Yellow-tail Snapper	Fish	Reefs	Occasional			
Stegastes partitus	Bicolor Damselfish	Fish	Reefs, hardbottom	Occasional			
Stegastes planifrons	Three Spot Damselfish	Fish	Reefs	Common			

Lighthouse Point Area - Marine Organisms Species List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance	Comments	CITES	IUCN
Microspathodon chrysurus	Yellowtail Damselfish	Fish	Reef tops, forereefs	Common			
Pomacentridae	Damselfish	Fish	Reefs, hardbottom	Common			
Abudefduf saxatilis	Sergeant Major	Fish	Rocks, shorelines	Occasional			
Chromis cyanea	Blue Chromis	Fish	Reefs, hardbottom	Occasional			
Chromis multilineata	Brown Chromis	Fish	Reefs, hardbottom	Occasional			
Epinephelus striatus	Nassau Grouper	Fish	Reefs, hardbottom	Occasional			Endangered
Mycteroperca bonaci	Black Grouper	Fish	Reef ledges	Occasional			
Mycteroperca tigris	Tiger Grouper	Fish	Reef ledges	Occasional			
Mycteroperca venenosa	Yellowfin Grouper	Fish	Reef ledges	Occasional			
Cephalopholis cruentata	Graysby	Fish	Reef ledges	Occasional			
Epinephelus guttatus	Red Hind	Fish	Reefs	Occasional			
Epinephelus adscensionis	Rock Hind	Fish	Reefs and hardbottom	Common			
Cephalopholis fulvus	Coney	Fish	Reefs, hardbottom	Occasional			
Serranus tigrinus	Harlequin bass	Fish	Reefs, hardbottom	Occasional			
Serranus tabacarius	Tobaccofish	Fish	Reefs, hardbottom	Occasional			
Gramma loreto	Fairy basslet	Fish	Reefs	Occasional			
Scarus guacamaia	Rainbow Parrotfish	Fish	Reefs	Uncommon			
Sparisoma aurofrenatum	Redband Parrotfish	Fish	Reefs	Common			
Sparisoma chrysopterum	Redtail Parrotfish	Fish	Reefs	Occasional			
Sparisoma rubripinne	Yellowtail Parrotfish	Fish	Reefs	Occasional			
Sparisoma viridae	Stoplight Parrotfish	Fish	Reefs	Common			
Scarus iseri	Striped Parrotfish	Fish	Reefs	Common			
Scarus taeniopteris	Princess Parrotfish	Fish	Reefs	Occasional			
Scarus vetula	Queen Parrotfish	Fish	Reefs	Occasional			
Lachnolaimus maximus	Hogfish	Fish	Reefs, hardbottom	Occasional			

Lighthouse Point Area - Marine Organisms Species List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance	Comments	CITES	IUCN
Halichoeres gamoti	Yl-head Wrasse	Fish	Reefs	Occasional			
Thalassoma bifasciatum	Bluehead Wrasse	Fish	Reefs	Occasional			
Halichoeres bivittatus	Slippery Dick	Fish	Reefs, grassbeds	Common			
Halichoeres radiatus	Puddingwife	Fish	Reefs	Common			
Holocentrus adscensionis	Squirrelfish	Fish	Crevices in reef/rocks	Common			
Coryphopterus sp.	Goby	Fish	Reefs, hardbottom	Uncommon			
Malacoctenus triangulatus	Saddled Blenny	Fish	Reefs, hardbottom	Occasional			
Opistognathus aurifrons	Yellowhead Jawfish	Fish	Sandy rubble	Rare			
Mulloidichthys martinicus	Yellow Goatfish	Fish	Patch reefs	Common			
Bothus lunatus	Peacock Flounder	Fish	Sandy Bottoms	Occasional			
Pterois volitans	Lionfish	Fish	Ledges	Occasional	Invasive Non-native		
Aulostomus maculatus	Trumpetfish	Fish	Reefs	Occasional			
Fistularia tabacaria	Blue-spotted Cornetfish	Fish	SAV nr patch reefs	Uncommon			
Malacanthus plumieri	Sand Tilefish	Fish	SAV nr patch reefs	Uncommon			
Pseudupeneus maculatus	Spotted Goatfish	Fish	Sandy bottoms	Uncommon			
Canthigaster rostrata	Sharpnose Puffer	Fish	Reefs	Common			
Acanthostracion polygonius	Honeycomb Cowfish	Fish	Over rubble	Occasional			
Lactophrys triqueter	Smooth Trunkfish	Fish	Midchannel hardbottom	Occasional			
Balistes vetula	Queen Trigger	Fish	Offshore hardbottom	Occasional			Vulnerable
Canthidermis sufflamen	Ocean Triggerfish	Fish	Reefs	Occasional			
Melichthys niger	Black Durgon	Fish	Fore reefs	Occasional			
Cantherhines macrocerus	Whitespotted Filefish	Fish	Reefs, hardbottom	Uncommon			
Cantherines pullus	Orangespotted Filefish	Fish	Reefs, hardbottom	Occasional			
Gymnothorax moringa	Spotted Moray	Eel	Reefs, rubble, grassbeds	Uncommon			

Lighthouse Point Area - Marine Organisms Species List

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance	Comments	CITES	IUCN
Ginglymostoma cirratum	Nurse Shark	Shark	Various bottoms	Uncommon			
Carcharhinus limbatus	Blacktip Shark	Shark	Forereefs	Rare			
Carchahinus perezii	Reef Shark	Shark	Coral Wall	Uncommon			
Dasyatis americana	Southern Stingray	Fish	Sandy Areas	Occasional			
Urolophus jamaicensis	Yellow Stingray	Fish	Sandy Areas	Uncommon			
Reptiles							
Chelonia mydas	Green Turtle	Turtle	Reefs, hardbottom	Uncommon	Juveniles	App. I	Endangered
Eretmochelys imbricata	Hawksbill Turtle	Turtle	Reefs, hardbottom	Uncommon		App. I	Critically Endangered

Appendix D Corals Information

Appendix D-Supplemental Information on LHP Marine Resources

Preliminary results of AGRRA surveys for hardbottom and patch reef habitats

November, 2019

Prepared for DCL by Perigee Environmental Inc.

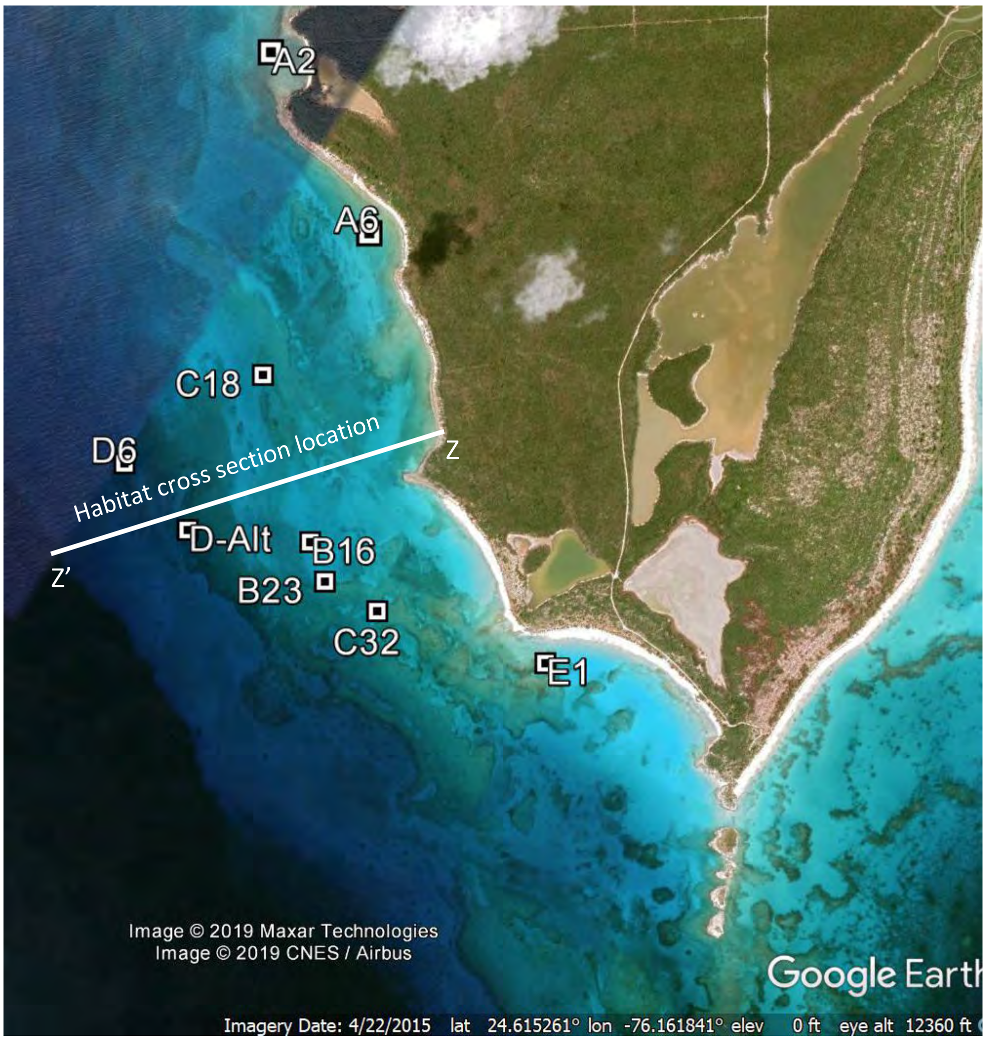


Figure D-1: Location of AGRRA habitat characterization survey sites which were randomly chosen using an early version of the benthic habitat map. Sites A2 and A6 = Inshore Hardbottom (IH); B16 & B23 = Sparse Sandy Hardbottom (SSH); C18 & C32 = Moderate Hardbottom on Elevated Bedrock (MHEB); D6 and D-Alt = Hardbottom with Coral Mounds and Sponges (HCMS)/Scattered Coral Mounds (SCM) (surveyed transitional area between both habitats); E1= Patch Reef. Line Z-Z'; shows the approximate location for the schematic cross section shown in Figure D2.

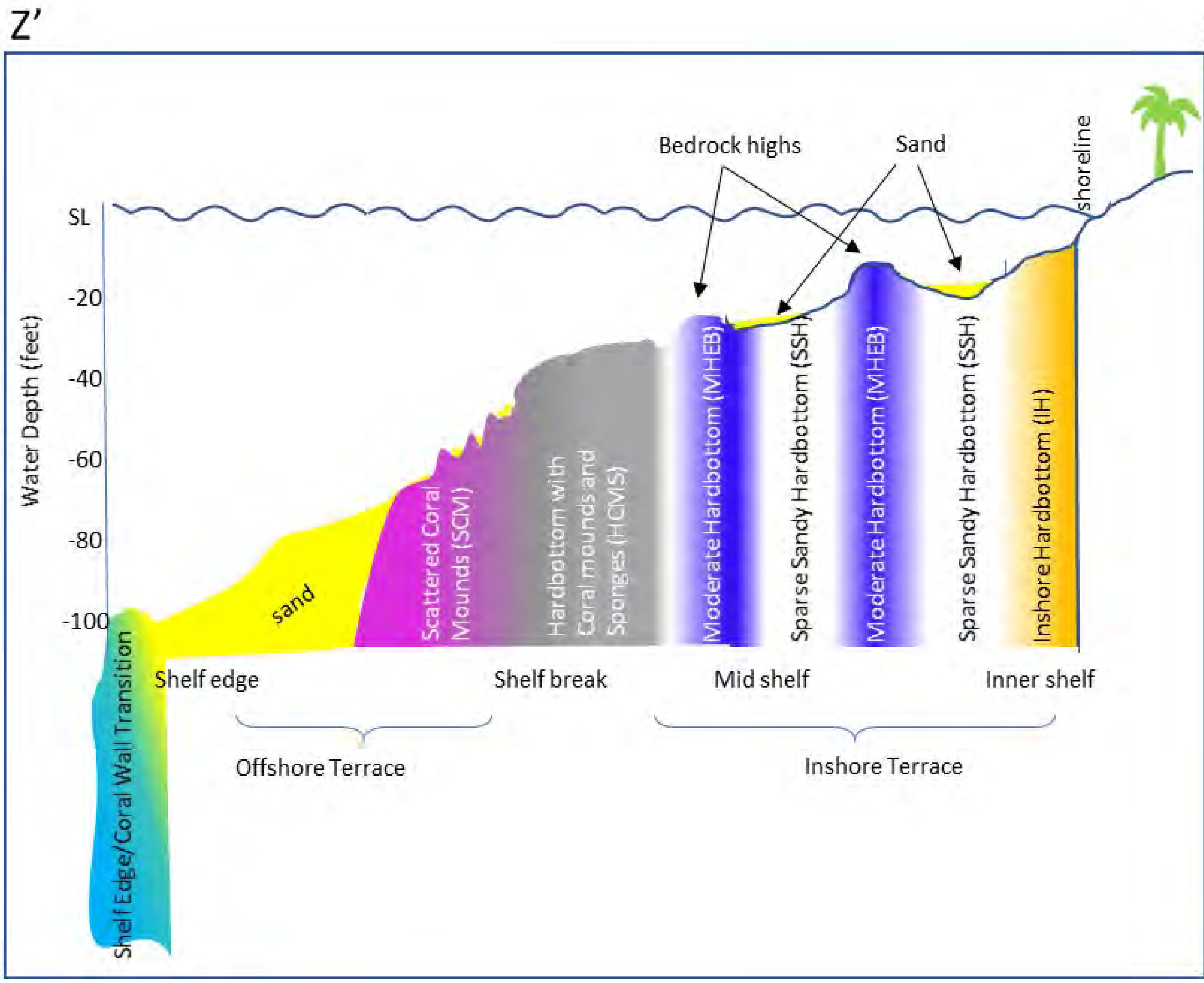
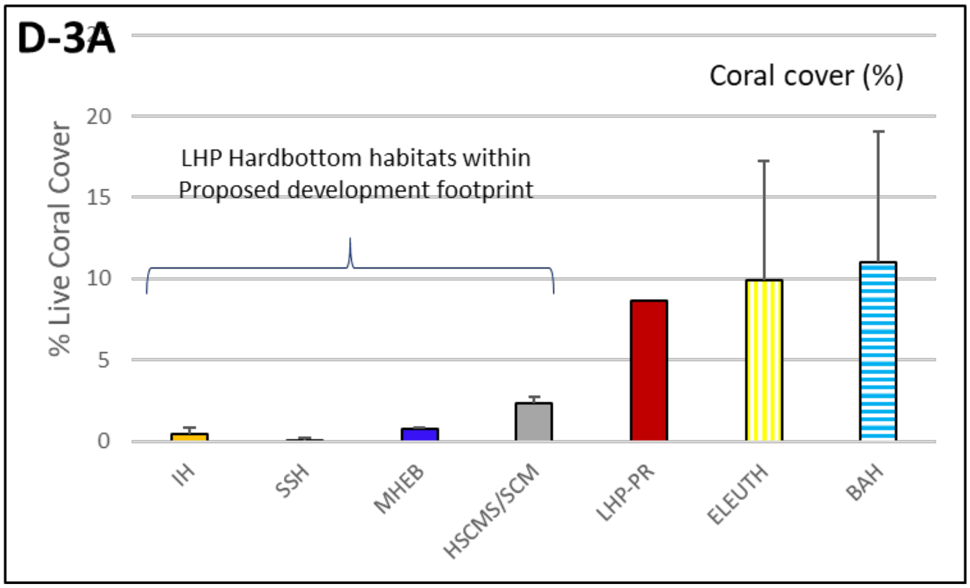


Figure D-2: Schematic cross section of southwest facing shelf in the vicinity of the proposed infrastructure showing the distribution of major benthic habitat types. Colors of the habitat types correspond to the benthic habitat map shown in Figure 4-28 and are also maintained for the comparative bar graphs (Figures D-3 through D-5).



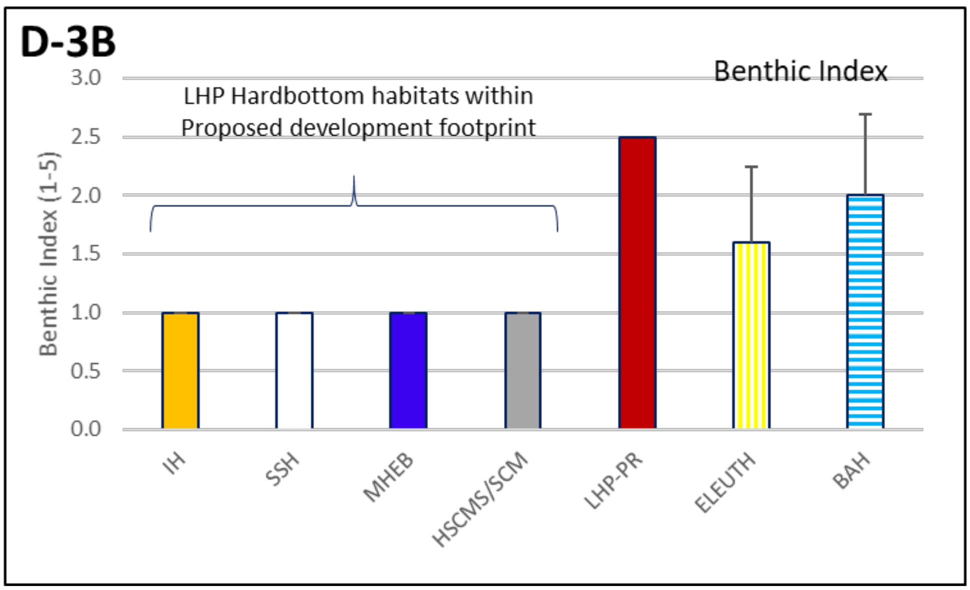
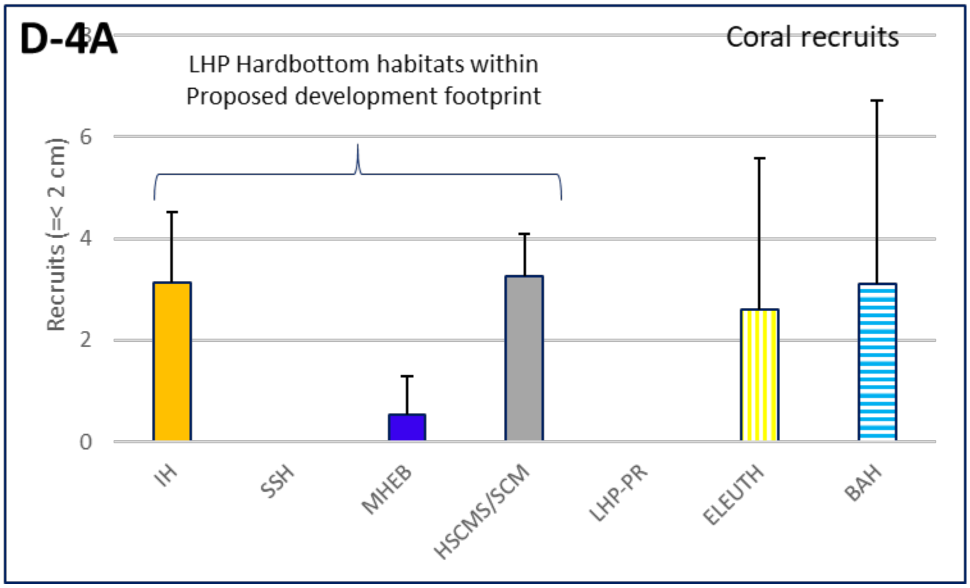


Figure D-3A: Comparison of Live stony coral cover indicator for LHP hardbottom and reef habitats. Hardbottom habitats had very low coral cover (<3%) with increasing cover occurring further offshore. All hardbottom habitats had significantly lower coral cover than patch reef habitat or compared to other reef areas in Eleuthera and Bahamas.

Figure D-3B: Comparison of Benthic Index indicator for LHP hardbottom and reef habitats. Benthic Index is a scale from 1 to 4 and represents the difference between ranked positive and negative benthic components. Higher scores indicate better conditions for reef growth.). All of the hardbottom habitats surveyed had the lowest possible benthic index score indicating that they were poor areas for stony coral settlement, growth, and survivorship compared to patch reefs or other reefs in Eleuthera and the Bahamas.

Figure Habitat Abbreviation Key: Inshore Hardbottom; SSH =Sparse Sandy Hardbottom; HSCMS/SCM= Hardbottom with Scattered Coral Mounds and Sponges/SCM= Scattered Coral Mounds; LPR-PR= Light House Point Patch Reef; ELEUTH= site average values from Eleuthera reefs (AGRRA database); Bah=site average values from all Bahamas Reefs (AGRRA database).



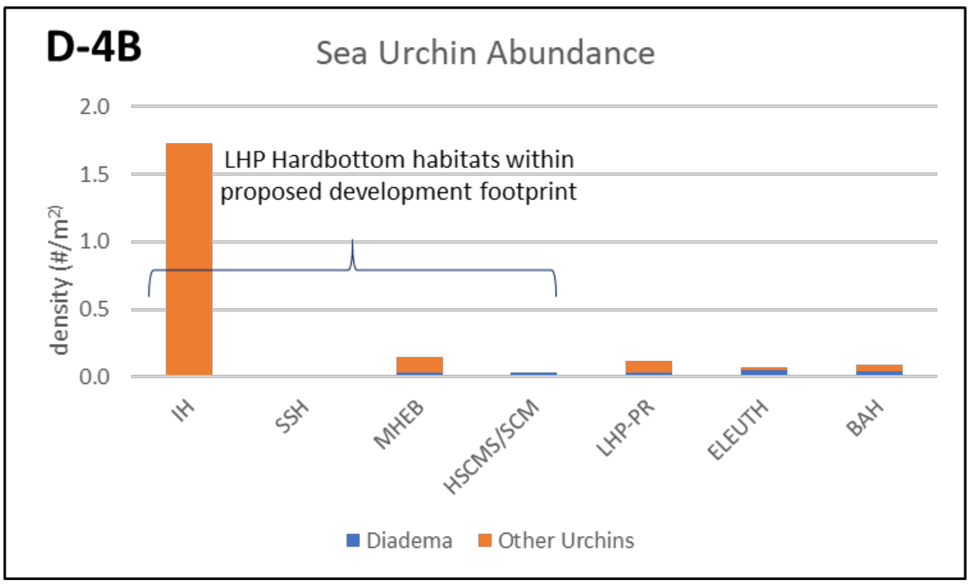
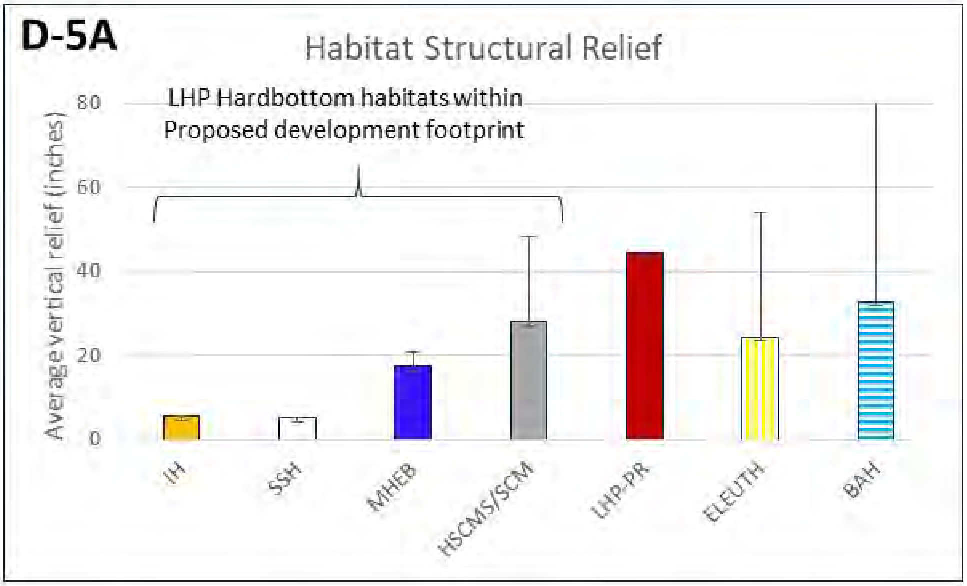


Figure D-4A: Comparison of stony coral recruit density indicator for LHP hardbottom and reef habitats. Coral recruits are an indication of the amount of coral larvae in the water column and the suitability of habitat substrate for settlement and growth. Several of the hardbottom habitats high levels of recruitment which is surprising given their low abundance of adult corals. This may be related to the close proximity of strong daily tidal currents that sweep over these hardbottom areas and bring in larvae.

Figure D-4B: Comparison of sea urchin abundance for LHP hardbottom and reef habitats. Urchins are important herbivorous grazers of algae. The black long spine urchin (*Diadema antillarum*) was present in low numbers on all habitats except for SSH. Inshore hardbottom habitats contained particularly high numbers of Diadema and the boring rock urchin.

Figure Habitat Abbreviation Key: Inshore Hardbottom; SSH =Sparse Sandy Hardbottom; HSCMS/SCM= Hardbottom with Scattered Coral Mounds and Sponges/SCM= Scattered Coral Mounds; LPR-PR= Light House Point Patch Reef; ELEUTH= site average values from Eleuthera reefs (AGRRA database); Bah=site average values from all Bahamas Reefs (AGRRA database).



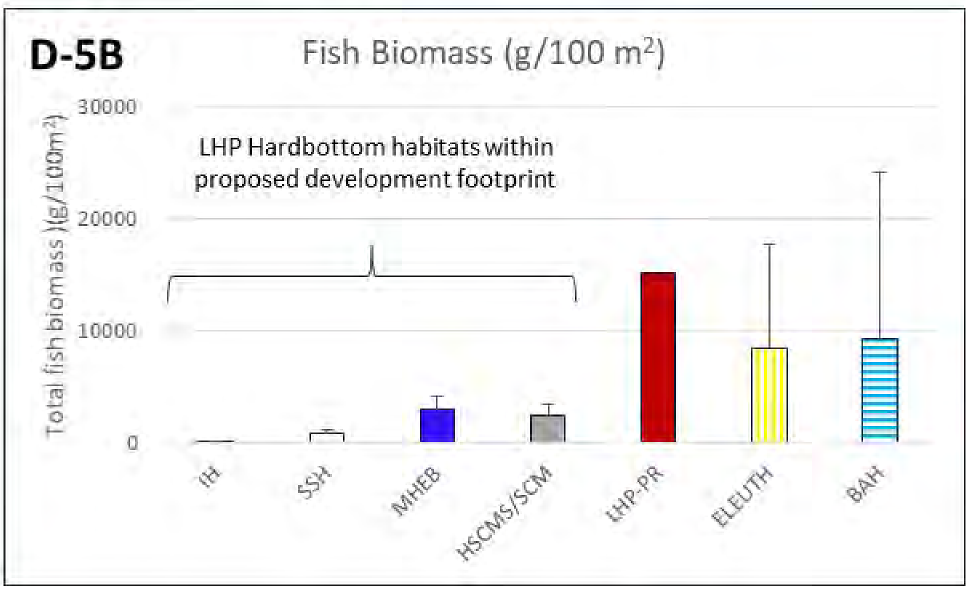


Figure D-5A: Comparison of average maximum vertical relief indicator for LHP hardbottom and reef habitats. Vertical relief provides 3-dimensional structure for fish and other fauna. Except for the offshore HSCMS/SCM habitat types, LHP hardbottom habitats were much lower in relief than patch reef and other coral reefs in Eluethera and the Bahamas.

Figure D-5B: Comparison of the total fish biomass for LHP hardbottom and reef habitats. Fish biomass estimates the weight of the combined fish counted based on their sizes. The lowest fish biomasses were found inshore where small juvenile fish were more common. All LHP hardbottom habitats supported significantly less fish than patch reef and other reef habitats in Eleuthera and the Bahamas.

Figure Habitat Abbreviation Key: Inshore Hardbottom; SSH =Sparse Sandy Hardbottom; HSCMS/SCM= Hardbottom with Scattered Coral Mounds and Sponges/SCM= Scattered Coral Mounds; LPR-PR= Light House Point Patch Reef; ELEUTH= site average values from Eleuthera reefs (AGRRA database); Bah=site average values from all Bahamas Reefs (AGRRA database).

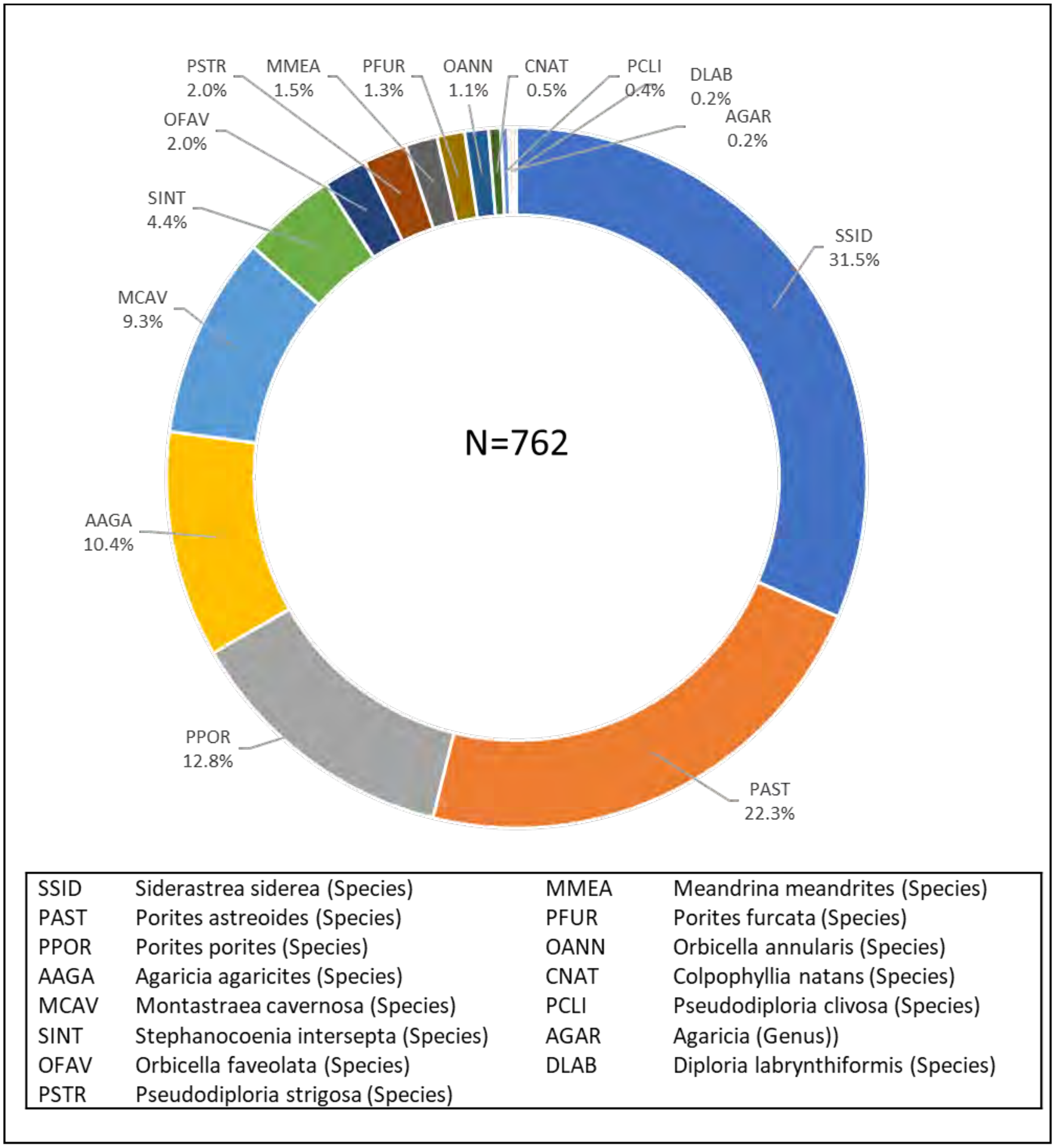


Figure D-6: Species composition for stony corals* assessed within the proposed LHP development footprint. Four species (SSID, PAST, PPOR, AAGA) constituted nearly 70% of the hardbottom stony coral population. All are fast recruiting, fast growing, and short lived species compared to slower growing framework building mound corals (MCAV, OFAV, OANN, SINT, CNAT, PSTR) all of which are more prevalent on LHP patch reef and other coral reef habitats in Eleuthera and the Bahamas.

*Stony coral counts do not include the hydrocoral *Millepora alcicornis* or detached coral fragments or the rose coral- *Manicina areolata*

Appendix E IUCN List and CITES Species

IUNC Species List Designations

Scientific Name	Common Name	Designation and date
Aetobatus narinari	BONNETRAY (E) = SPOTTED EAGLE RAY	NT ver 3.1 (2001)
Alopias vulpinus	THRESHER SHARK (E)	DD ver 3.1 (2001)
Amazona leucocephala	CUBAN PARROT (E)	NT ver 3.1 (2001)
Ammodramus caudacutus	SALTMARSH SHARP-TAILED SPARROW	VU B2ab(i,ii,iii,iv,v) ver 3.1 (2001)
Anthus spragueii	SPRAGUE'S PIPIT (E)	VU A2bc+3bc ver 3.1 (2001)
Ardeola idae	MADAGASCAR POND-HERON (E)	EN C2a(ii) ver 3.1 (2001)
Ateleia popenoei		DD ver 2.3 (1994)
Balaenoptera acutorostrata	COMMON MINKE WHALE (E)	LR/nt ver 2.3 (1994)
Balistes vetula	QUEEN TRIGGERFISH (E)	VU A2d ver 2.3 (1994)
Brachyphylla nana	CUBAN FRUIT-EATING BAT (E)	LR/nt ver 2.3 (1994)
Carcharhinus brevipinna	SPINNER SHARK (E)	LR/nt ver 2.3 (1994)
Carcharhinus leucas	BULL SHARK (E)	LR/nt ver 2.3 (1994)
Carcharhinus limbatus	BLACKTIP SHARK (E)	LR/nt ver 2.3 (1994)
Carcharhinus longimanus	OCEANIC WHITETIP SHARK (E)	VU A2ad+3d+4ad ver 3.1 (2001)
Carcharhinus obscurus	DUSKY SHARK (E)	LR/nt ver 2.3 (1994)
Carcharhinus perezi	CARIBBEAN REEF SHARK (E)	NT ver 3.1 (2001)
Carcharhinus plumbeus	SANDBAR SHARK (E)	LR/nt ver 2.3 (1994)
Carcharias taurus	GREY NURSE SHARK (E) = SAND TIGER	VU A1ab+2d ver 2.3 (1994)
Carcharodon carcharias	GREAT WHITE SHARK (E)	VU A1cd+2cd ver 2.3 (1994)
Caretta caretta	LOGGERHEAD (E)	EN A1abd ver 2.3 (1994)
Cesonia irvingi	KEY GNAPHOSID SPIDER (E)	DD ver 2.3 (1994)
Charadrius melodus	PIPING PLOVER (E)	NT ver 3.1 (2001)
Chelonia mydas	GREEN TURTLE (E)	EN A2bd ver 3.1 (2001)
Chlorostilbon bracei	BRACE'S EMERALD (E)	EX ver 3.1 (2001)
Chlorostilbon elegans	GOULD'S EMERALD (E)	EX ver 3.1 (2001)
Coccothrinax inaguensis	THATCH PALM (E)	DD ver 2.3 (1994)
Cyclura carinata	BAHAMAS ROCK IGUANA (E)	CR B1ab(i,ii,iii,iv,v) ver 3.1 (2001)
Cyclura cychlura	NORTHERN BAHAMIAN ROCK IGUANA	VU A2bce; B1ab(i,ii,iii,iv,v)
Cyclura rileyi	ACKLIN'S GROUND IGUANA (E)	EN C2a ver 2.3 (1994)
Dasyatis americana	SOUTHERN STINGRAY (E)	DD ver 3.1 (2001)
Dendrocygna arborea	WEST INDIAN WHISTLING-DUCK (E)	VU B2ab(i,ii,iii,iv,v) ver 3.1 (2001)
Dendroica cerulea	CERULEAN WARBLER (E)	VU A2bc+3bc ver 3.1 (2001)
Dendroica kirtlandii	KIRTLAND'S WARBLER (E)	NT ver 3.1 (2001)
Dermatolepis inermis	MARBLED GROUPER (E)	VU A2d ver 2.3 (1994)
Dermochelys coriacea	LEATHERBACK (E)	CR A1abd ver 2.3 (1994)
Epinephelus itajara	GOLIATH GROUPER (E)	CR A2d ver 3.1 (2001)
Epinephelus morio	RED GROUPER (E)	NT ver 3.1 (2001)
Epinephelus niveatus	SNOWY GROUPER (E)	VU A1d+2d, B1+2e
Epinephelus striatus	NASSAU GROUPER (E)	EN A2ad ver 3.1 (2001)
Eretmochelys imbricata	HAWKSBILL TURTLE (E)	CR A1bd ver 2.3 (1994)
Eubalaena glacialis	NORTH ATLANTIC RIGHT WHALE (E)	EN D ver 2.3 (1994)
Feresa attenuata	PYGMY KILLER WHALE (E)	DD ver 2.3 (1994)

IUNC Species List Designations

Scientific Name	Common Name	Designation and date
Galeocerdo cuvier	TIGER SHARK (E)	LR/nt ver 2.3 (1994)
Geocapromys ingrahami	BAHAMIAN HUTIA (E)	VU D2 ver 2.3 (1994)
Ginglymostoma cirratum	NURSE SHARK (E)	DD ver 3.1 (2001)
Grampus griseus	GREY DOLPHIN (E)	DD ver 2.3 (1994)
Guaiacum officinale	COMMONER LIGNUM VITAE (E)	EN C2a ver 2.3 (1994)
Guaiacum sanctum	HOLYWOOD LIGNUM VITAE (E)	EN C2a ver 2.3 (1994)
Hippocampus erectus	LINED SEAHORSE (E)	VU A4cd ver 3.1 (2001)
Hippocampus reidi	LONGSNOUT SEAHORSE (E)	DD ver 3.1 (2001)
Hippocampus zosterae	DWARF SEAHORSE (E)	DD ver 3.1 (2001)
Isurus oxyrinchus	SHORTFIN MAKO (E)	LR/nt ver 2.3 (1994)
Juniperus barbadensis		VU B1+2c ver 2.3 (1994)
Lachnolaimus maximus	HOGFISH (E)	VU A2d ver 2.3 (1994)
Lagenodelphis hosei	FRASER'S DOLPHIN (E)	DD ver 2.3 (1994)
Laterallus jamaicensis	BLACK RAIL (E)	NT ver 3.1 (2001)
Lucifuga spelaeotes	NEW PROVIDENCE CUSK-EEL (E)	VU A1ce, B1+2bc, D2
Lutjanus analis	MUTTON SNAPPER (E)	VU A2d, B1+2e ver 2.3 (1994)
Lutjanus cyanopterus	CUBERA SNAPPER (E)	VU A2d ver 2.3 (1994)
Mellisuga helenae	BEE HUMMINGBIRD (E)	NT ver 3.1 (2001)
Mesoplodon densirostris	BLAINVILLE'S BEAKED WHALE (E)	DD ver 2.3 (1994)
Mesoplodon europaeus	GERVAIS' BEAKED WHALE (E)	DD ver 2.3 (1994)
Mesoplodon mirus	TRUE'S BEAKED WHALE (E)	DD ver 2.3 (1994)
Monachus tropicalis	CARIBBEAN MONK SEAL (E)	EX ver 2.3 (1994)
Mustelus canis	DUSKY SMOOTHHOUND (E)	LR/nt ver 2.3 (1994)
Mycteroperca venenosa	YELLOWFIN GROUPER (E)	NT ver 3.1 (2001)
Natalus tumidifrons	BAHAMAN FUNNEL-EARED BAT (E)	VU D2 ver 2.3 (1994)
Negaprion brevirostris	LEMON SHARK (E)	LR/nt ver 2.3 (1994)
Nyctiellus lepidus	GERVAIS'S FUNNEL-EARED BAT (E)	LR/nt ver 2.3 (1994)
Orcinus orca	KILLER WHALE (E)	LR/cd ver 2.3 (1994)
Passerina ciris	PAINTED BUNTING (E)	NT ver 3.1 (2001)
Patagioenas leucocephala	WHITE-CROWNED PIGEON (E)	NT ver 3.1 (2001)
Prionace glauca	BLUE SHARK (E)	LR/nt ver 2.3 (1994)
Pristiophorus schroederi	AMERICAN SAWSHARK (E)	DD ver 3.1 (2001)
Procyon maynardi	BAHAMAN RACCOON (E)	EN C2a ver 2.3 (1994)
Pterodroma cahow	BERMUDA PETREL (E)	EN D ver 3.1 (2001)
Pterodroma hasitata	BLACK-CAPPED PETREL (E)	EN B1ab(i,ii,iii,iv,v) ver 3.1 (2001)
Rhincodon typus	WHALE SHARK (E)	VU A1bd+2d ver 2.3 (1994)
Scarus guacamaia	RAINBOW PARROTFISH (E)	VU A1d+2d ver 2.3 (1994)
Scyliorhinus meadi	BLOTCHED CATSHARK (E)	DD ver 3.1 (2001)
Somersiella sterreri		CR B1+2c ver 2.3 (1994)
Sphyrna lewini	SCALLOPED HAMMERHEAD (E)	LR/nt ver 2.3 (1994)
Sphyrna mokarran	GREAT HAMMERHEAD (E)	DD ver 2.3 (1994)
Sphyrna zygaena	SMOOTH HAMMERHEAD (E)	LR/nt ver 2.3 (1994)

IUNC Species List Designations

Scientific Name	Common Name	Designation and date
Squalus acanthias	CAPE SHARK (E)	VU A2bd+3bd+4bd ver 3.1 (2001)
Squalus cubensis	CUBAN DOGFISH (E)	DD ver 3.1 (2001)
Stenella clymene	ATLANTIC SPINNER DOLPHIN (E)	DD ver 2.3 (1994)
Stenella frontalis	ATLANTIC SPOTTED DOLPHIN (E)	DD ver 2.3 (1994)
Stenella longirostris	LONG-BEAKED DOLPHIN (E)	LR/cd ver 2.3 (1994)
Steno bredanensis	ROUGH-TOOTHED DOLPHIN (E)	DD ver 2.3 (1994)
Swietenia mahagoni	AMERICAN MAHOGANY (E)	EN A1cd ver 2.3 (1994)
Tachycineta cyaneoviridis	BAHAMA SWALLOW (E)	VU B1ab(iii,v) ver 3.1 (2001)
Tadarida brasiliensis	BRAZILIAN FREE-TAILED BAT (E)	LR/nt ver 2.3 (1994)
Thunnus alalunga	ALBACORE TUNA (E)	DD ver 2.3 (1994)
Thunnus obesus	BIGEYE TUNA (E)	VU A1bd ver 2.3 (1994)
Thunnus thynnus	NORTHERN BLUEFIN TUNA (E)	DD ver 2.3 (1994)
Trachemys stejnegeri	CENTRAL ANTILLEAN SLIDER (E)	LR/nt ver 2.3 (1994)
Trichechus manatus	AMERICAN MANATEE (E)	VU A2d ver 2.3 (1994)
Tryngites subruficollis	BUFF-BREASTED SANDPIPER (E)	NT ver 3.1 (2001)
Tyrannus cubensis	GIANT KINGBIRD (E)	EN B1ab(i,ii,iii,iv,v); C2a(i)
Vermivora bachmanii	BACHMAN'S WARBLER (E)	CR D ver 3.1 (2001)
Vermivora chrysoptera	GOLDEN-WINGED WARBLER (E)	NT ver 3.1 (2001)
Zamia angustifolia		DD ver 3.1 (2001)
Zamia integrifolia		NT ver 3.1 (2001)
Zamia lucayana		NT ver 3.1 (2001)
Zanthoxylum flavum	WEST INDIAN SATINWOOD (E)	VU A1c ver 2.3 (1994)
Ziphius cavirostris	CUVIER'S BEAKED WHALE (E)	DD ver 2.3 (1994)



Index of CITES species

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CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. At the time of writing the present introduction (September 2013), 178 countries were party to CITES.

The United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) is the specialist biodiversity assessment centre of the United Nations Environment Programme (UNEP), the world's foremost intergovernmental environmental organization. The Centre has been in operation for over 30 years, combining scientific research with practical policy advice.

The geographical designations employed in this publication do not imply the expression of any opinion whatsoever on the part of the compilers, the CITES Secretariat or the United Nations Environment Programme concerning the legal status of any country, territory or area, or concerning the delimitation of its frontiers or boundaries.

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FOREWORD AND ACKNOWLEDGEMENTS

The advent of new and innovative information and communication technologies provides CITES Parties with electronic tools and resources that can be used to facilitate the implementation of the Convention. Among these resources is the database-driven 2013 edition of the *Checklist of CITES species*, which offer a number of innovative ways to use nomenclatural information on CITES-listed species.

For example, this new edition allows users to download information on species in different data formats compatible with databases and other datasets. This will make it far easier to ensure consistency between national checklists and the nomenclature adopted by the Conference of the Parties to CITES. In addition, it is now possible to generate customized checklists where information can be collated using different criteria, including countries, Appendices or taxa, or any combination thereof. This possibility to tailor checklists to one's needs will make this resource much more flexible and capable of meeting the needs of a wide range of users. Another bonus is that, because the online *Checklist* will be updated as necessary, Parties will always have access to the most up-to-date information.

Equally exciting is the possibility of partnerships with other organizations developing projects to meet the needs of Parties. In this regard, the CITES Secretariat is working with the UNEP World Conservation Monitoring Centre (UNEP-WCMC) to develop a system where data from the *Checklist of CITES species* will be integrated with those from checklists from other multilateral environmental agreements, with a view to promoting and facilitating harmonization of nomenclature.

A database-driven *Checklist* also makes information more accessible to the public through the provision of easy-to-use search criteria, including by country or Appendix. As a result, the *Checklist* can now serve a dual role, first as the official digest of scientific names contained in the official standard references, as recognized in Resolution Conf. 12.11 (Rev. CoP16) on *Standard nomenclature*, and, second, as an educational resource for students and teachers.

The CITES Secretariat is planning to enhance the *Checklist of CITES species* with a number of new services before the 17th meeting of the Conference of the Parties, scheduled for 2016. Such services will give CITES Management Authorities the possibility to update their own systems with amendments to the CITES Appendices as they are made, which will also reduce the risk of introducing errors in copying species names. Another possibility will be to "pull" the names of species and the Appendices they are included in directly into a CITES electronic permit or certificate. This function will also assist in the reduction of clerical errors, thereby making trade easier to monitor and trace.

This database-driven *Checklist* was developed by UNEP-WCMC using data from the CITES species database, under contract to the CITES Secretariat. I would like to acknowledge the excellent work of UNEP-WCMC, and most particularly the staff responsible for the meticulous work involved. I also recognize the contribution of the specific staff of the CITES Secretariat who not only gave guidance to the UNEP-WCMC production team but also helped to update the text and prepared the output received for final publication.

The *Checklist* was also reviewed by the nomenclature specialists of the CITES Animals and Plants Committees, Ms Ute Grimm and Mr Noel McGough, and the Secretariat is grateful for their work and their comments.

The production and publication of the *Checklist* have been made possible through the generous funding of the European Union. I should therefore like to express my sincere thanks to the European Union, not only for this project but also for their continued general support for CITES activities.

The *Checklist of CITES species* is widely used and appreciated by CITES Management Authorities, Scientific Authorities, Customs officers and others involved in the implementation and enforcement of CITES, as well as by intergovernmental entities, international and national non-governmental organizations, academics, the media and many others. We trust that this new electronic edition will be of value to you, and we very much welcome any feedback and suggestions on ways to improve this resource in the future.

John E. Scanlon
CITES Secretary-General

INTRODUCTION

The Conference of the Parties recognizes the *Checklist of CITES species* as an official digest of scientific names contained in the official standard references. The *Checklist of CITES species* is now dynamically linked to Species+, a database of information on MEA-listed species that is managed by UNEP-WCMC, allowing, for the first time, taxonomic and listing changes to be reflected within this document as they are updated. This will include amendments to CITES Appendix III made between meetings of the Conference of the Parties. For this reason, it will be important for users of the *Checklist* to take note of the date of download, as outputs will change over time on the basis of changes adopted by Parties.

The Checklist website also provides the flexibility to create tailored outputs by higher taxonomic group, Appendix and country or region, with additional “Advanced options” for including or excluding elements such as Authors' names, scientific synonyms and common names. If filters have been applied, some of the descriptions below may not be applicable. For instance, if scientific synonyms have been excluded, the synonym records will not appear in the output.

Structure

The *Checklist of CITES species* comprises two parts: the *Index of CITES species* (the present output) and the *History of CITES listings*. While users can choose to download tailored outputs of the *Index of CITES species,* the complete publication is an alphabetical list of all animal and plant taxa included in the CITES Appendices. The only exceptions to this are Appendix-II orchids. These are only included if they are listed in the *CITES Orchid Checklist*, volumes 1-4, published by the Royal Botanic Gardens, Kew, or in the *Checklist for* Bulbophyllum *and allied taxa* (Sieder, Rainer & Kiehn, 2007). For the orchid species not found in these references, the *CITES Species Index* contains a record of the genera to which they belong, e.g. *Aa* spp, but not of the individual species in each genus.

Three types of record are included in the *Index of CITES species*:

1) scientific names, which are the main records and contain all information;

2) common names, which refer to the main record; and

3) scientific synonyms, which refer to the main record.

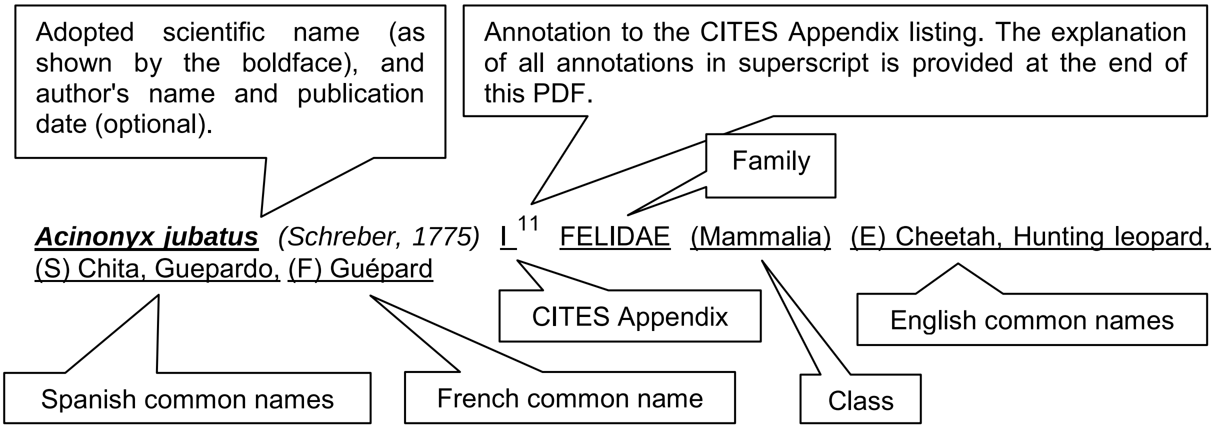
1 The scientific name record

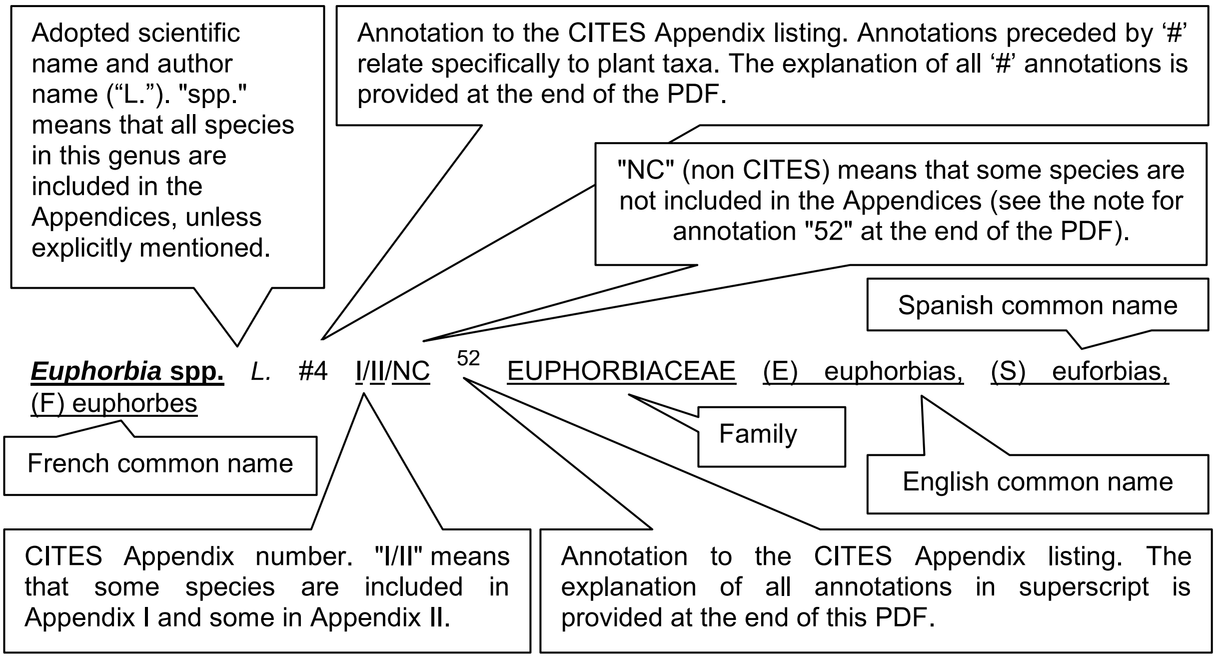
This record is the main record that contains all the information available for each taxon.

Taxonomic names that have been officially adopted by the Conference of the Parties [see the list of standard nomenclatural references in Resolution Conf. 12.11 (Rev. CoP16)] appear in boldface in the *Checklist*, e.g. ***Acinonyx jubatus*** (the cheetah). This is the case for most taxa. In some cases, nevertheless, a standard nomenclatural reference for the constituent species of a higher taxon has not yet been adopted. In such instances, a reference identified by UNEP-WCMC has been used. The names of these taxa are not in boldface, e.g. *Tridacna maxima* (or any Tridacnidae species).

Higher taxa are only included when there is an Appendix listing at that level or if the higher taxon has inherited a listing from another higher taxon. For instance, a genus within Scleractinia spp. would be included so that it would be clear to readers that all species within the genus are listed (e.g. *Acropora* spp.). If, alternatively, the inclusion in the Appendices goes no further up than the species level, as in the case of *Dugong dugon,* the genus, family or order would not appear in this case (e.g. *Dugon,* Dugongidae and Sirenia would not appear).

Examples of scientific name records and explanation





Key to abbreviations and annotations

I	listed in Appendix I
II	listed in Appendix II
III	listed in Appendix III
NC	non CITES
spp.	all species of a higher taxon
var.	variety
Superscript annotations 1 to 74.	see the key for *Annotations not preceded by "#"* at the end of this PDF
#1-#14 (flora only)	see Key to # *annotations* at the end of the PDF

2 The common name record

Where available, English (E), Spanish (S) and French (F) common names are provided. The common name is followed by the corresponding scientific name under which all information is recorded. There is only one entry for each common name, e.g. there is an entry for 'Eagle, Golden' but not for 'Golden Eagle'.

Examples of common name records and explanation

1) Hummingbird, Emerald-chinned (E): *Abeillia abeillei*

   = go to "*Abeillia abeillei*" to see the full record of the "emerald-chinned hummingbird".

2) parrots (E): PSITTACIFORMES (Aves)

   = go to "PSITTACIFORMES" to see the full record of "parrots".

3) orchids, slipper (E): *Paphiopedilum* spp. / *Phragmipedium* spp.

   = go to "*Paphiopedilum* spp." and "*Phragmipedium* spp." to see the full record of "slipper orchids", because the same common name is used for both genera.

3 The synonym record

A synonym is followed by '=' and the scientific name under which all information is recorded.

Example and explanation

Loxodonta cyclotis = *Loxodonta africana*

Explanation: *Loxodonta cyclotis* is a synonym of *Loxodonta africana.* Go to "*Loxodonta africana*" to see the full record.

Note: A same species name may be displayed as both a synonym and an accepted name when it has been given by different authors to different species. Thus, the *Index of CITES species* contains the following consecutive entries:

Porites solida = *Porites astreoides*

Porites solida **II** PORITIDAE (Anthozoa)

Selecting "Author's name" in the *Advanced options* will display the authors' names both on screen and in the downloads, thereby clarifying these records as:

Porites solida Verrill, 1868 = *Porites astreoides* Lamarck, 1816

Porites solida (Forskål, 1775) **II** PORITIDAE (Anthozoa)

In other words, the Conference of the Parties to CITES has adopted *Porites astreoides*, as named by Lamarck in 1816, and *Porites solida*, as named by Forskål in 1775, as the scientific names of two CITES-listed species. In addition, it is recognized that the species that Verrill named *Porites solida* in 1868 is the same as the one known to CITES as *Porites astreoides*.

FAUNA

Abanico gris (S): *Antipathes atlantica*

Acanthopathes humilis (Pourtalès, 1867) **II** APHANIPATHIDAE (Anthozoa)

Accipiter chionogaster (Kaup, 1852) = Accipiter striatus Vieillot, 1807

Accipiter erythronemius (Kaup, 1850) = Accipiter striatus Vieillot, 1807

Accipiter striatus Vieillot, 1807 **II** [28] ACCIPITRIDAE (Aves) (E) Sharp-shinned Hawk (S) Azor chico, Esparvero chico, Gavilán americano, Gavilán arrastrador, Gavilán pajarero (F) Épervier brun

Accipiter ventralis Sclater, 1866 = Accipiter striatus Vieillot, 1807

Acropora cervicornis (Lamarck, 1816) **II** ACROPORIDAE (Anthozoa) (E) Staghorn Coral (S) Coral cuerno de ciervo (F) Corail cornes de cerf

Acropora palmata (Lamarck, 1816) **II** ACROPORIDAE (Anthozoa) (E) Elkhorn Coral (S) Coral cuerno de alce (F) Corail cornes d'élan

Acropora prolifera (Lamarck, 1816) **II** ACROPORIDAE (Anthozoa) (E) Fused Staghorn Coral (S) Coral córneo fundido

Agarice fragile (F): *Agaricia fragilis*

Agarice laitue (F): *Agaricia agaricites*

Agaricia agaricites (Linnaeus, 1758) **II** AGARICIIDAE (Anthozoa) (E) Leaf Coral, Lettuce Coral (S) Coral de lechuga (F) Agarice laitue

Agaricia crassa Verrill, 1901 = Agaricia agaricites (Linnaeus, 1758)

Agaricia fragilis (Dana, 1846) **II** AGARICIIDAE (Anthozoa) (E) Fragile Saucer Coral (S) Coral frágil (F) Agarice fragile

Agaricia purpurea LeSueur, 1820 = Agaricia agaricites (Linnaeus, 1758)

Águila cabeciblanca (S): *Haliaeetus leucocephalus*

Águila cabeza blanca (S): *Haliaeetus leucocephalus*

Águila pescadora (S): *Pandion haliaetus*

Águila sangual (S): *Pandion haliaetus*

Aguililla colirroja (S): *Buteo jamaicensis*

Aguilucho pálido (S): *Circus cyaneus*

Aigle à tête blanche (F): *Haliaeetus leucocephalus*

Aigle pêcheur (F): *Pandion haliaetus*

Alcachofa de mar (S): *Scolymia cubensis*

Alcaraván americano (S): *Burhinus bistriatus*

Alcaraván venozolano (S): *Burhinus bistriatus*

Allopora miniata Pourtalès, 1868 = Stylaster miniatus (Pourtalès, 1868)

Alopecias chilensis Philippi, 1902 = Alopias vulpinus Bonnaterre, 1788

Alopias macrourus Rafinesque, 1810 = Alopias vulpinus Bonnaterre, 1788

Alopias profundus Nakamura, 1935 = Alopias superciliosus Lowe, 1841

Alopias superciliosus Lowe, 1841 **II** ALOPIIDAE (Elasmobranchii) (E) Bigeye thresher (S) Zorro ojón (F) Renard à gros yeux

Alopias vulpinus Bonnaterre, 1788 **II** ALOPIIDAE (Elasmobranchii) (E) Common thresher, Thresher shark (S) Zorro (F) Renard

Amazona cubana (S): *Amazona leucocephala*

Amazona de Cuba (S): *Amazona leucocephala*

Amazona leucocephala (Linnaeus, 1758) **I** PSITTACIDAE (Aves) (E) Bahamas Parrot, Caribbean Amazon, Cuban Amazon, Cuban Parrot (S) Amazona cubana, Amazona de Cuba, Loro de cabeza blanca (F) Amazone à tête blanche, Amazone de Cuba

Amazon, Caribbean (E): *Amazona leucocephala*

Amazon, Cuban (E): *Amazona leucocephala*

Amazone à tête blanche (F): *Amazona leucocephala*

Amazone de Cuba (F): *Amazona leucocephala*

Amphelia galapagensis (Vaughan, 1906) = Madrepora oculata Linnaeus, 1758

Amphelia oculata (Linnaeus, 1758) = Madrepora oculata Linnaeus, 1758

Amphihelia adminicularis Rehberg, 1892 = Enallopsammia rostrata (Pourtalès, 1878)

Amphihelia moresbyi Alcock, 1898 = Madrepora oculata Linnaeus, 1758

Amphihelia oculata (Linnaeus, 1758) = Madrepora oculata Linnaeus, 1758

Amphihelia rostrata Pourtalès, 1878 = Enallopsammia rostrata (Pourtalès, 1878)

Anas arborea Linnaeus, 1758 = Dendrocygna arborea (Linnaeus, 1758)

Anas autumnalis Linnaeus, 1758 = Dendrocygna autumnalis (Linnaeus, 1758)

Anas bicolor Vieillot, 1816 = Dendrocygna bicolor (Vieillot, 1816)

Anisopsammia amphelioides (Alcock, 1902) = Enallopsammia rostrata (Pourtalès, 1878)

Anisopsammia rostrata (Pourtalès, 1878) = Enallopsammia rostrata (Pourtalès, 1878)

Anomocora fecunda (Pourtalès, 1871) **II** CARYOPHYLLIIDAE (Anthozoa) (E) Prolific Coral (S) Coral prolifico

Anthemiphyllia patera Pourtalès, 1878 **II** ANTHEMIPHYLLIIDAE (Anthozoa)

Anthracothorax prevostii (Lesson, 1832) **II** TROCHILIDAE (Aves) (E) Green-breasted Mango (S) Mango pechiverde (F) Mango de Prévost

Antipathella atlantica (Gray, 1858) = Antipathes atlantica Gray, 1858

Antipathella brooki Johnson, 1900 = Antipathes atlantica Gray, 1858

Antipathella paniculata (Duchassaing & Michelotti, 1864) = Antipathes atlantica Gray, 1858

Antipathes abietina Pourtalès, 1874 = Elatopathes abietina (Pourtalès, 1874)

Antipathes americana Duchassaing & Michelotti, 1861 = Stylopathes americana (Duchassaing & Michelotti, 1860)

Antipathes atlantica Gray, 1858 **II** ANTIPATHIDAE (Anthozoa) (E) Grey Sea-fan Black Coral (S) Abanico gris (F) Corail noir éventail gris

Antipathes barbadensis (Brook, 1889) = Tanacetipathes barbadensis (Brook, 1889)

Antipathes caribbeana Opresko, 1996 **II** ANTIPATHIDAE (Anthozoa) (E) King's Black Coral (S) Cepillo de botella de King (F) Corail noir des Caraïbes

Antipathes columnaris (Duchassaing, 1870) = Stylopathes columnaris (Duchassaing, 1870)

Antipathes eupteridea Lamouroux, Bory de Saint Vincent & Deslongchamps, 1824 = Distichopathes filix (Pourtalès, 1867)

Antipathes filix Pourtalès, 1867 = Distichopathes filix (Pourtalès, 1867)

Antipathes furcata Gray, 1858 **II** ANTIPATHIDAE (Anthozoa) (E) Branched Bottle-brush Black Coral (S) Cepillo de botella ramificado

Antipathes glaberrima Esper, 1792 = Leiopathes glaberrima (Esper, 1792)

Antipathes humilis Pourtalès, 1867 = Acanthopathes humilis (Pourtalès, 1867)

Antipathes melancholica Duchassaing, 1870 = Distichopathes filix (Pourtalès, 1867)

Antipathes pennacea Pallas, 1766 = Plumapathes pennacea (Pallas, 1766)

Antipathes pluma Gray, 1858 = Plumapathes pennacea (Pallas, 1766)

Antipathes rigida Pourtalès, 1880 = Phanopathes rigida (Pourtalès, 1880)

Antipathes tanacetum Pourtalès, 1880 = Tanacetipathes tanacetum (Pourtalès, 1880)

Antipathes thamnea Warner, 1981 = Tanacetipathes thamnea (Warner, 1981)

Antipathes umbratica Opresko, 1996 **II** ANTIPATHIDAE (Anthozoa)

Aphanipathes abietina (Pourtalès, 1874) = Elatopathes abietina (Pourtalès, 1874)

Aphanipathes barbadensis Brook, 1889 = Tanacetipathes barbadensis (Brook, 1889)

Aphanipathes eupteridea (Lamouroux, Bory de Saint Vincent & Deslongchamps, 1824) = Distichopathes filix (Pourtalès, 1867)

Aphanipathes filix (Pourtalès, 1867) = Distichopathes filix (Pourtalès, 1867)

Aphanipathes humilis (Pourtalès, 1867) = Acanthopathes humilis (Pourtalès, 1867)

Aphanipathes pennacea (Pallas, 1766) = Plumapathes pennacea (Pallas, 1766)

Aphanipathes rigida (Pourtalès, 1880) = Phanopathes rigida (Pourtalès, 1880)

Aphanipathes salix rigida (Pourtalès, 1880) = Phanopathes rigida (Pourtalès, 1880)

Arachnopathes columnaris Duchassaing, 1870 = Stylopathes columnaris (Duchassaing, 1870)

Arachnopathes paniculata Duchassaing & Michelotti, 1864 = Antipathes atlantica Gray, 1858

Archilochus colubris (Linnaeus, 1758) **II** TROCHILIDAE (Aves) (E) Ruby-throated Hummingbird (S) Colibrí gorjirrubí (F) Colibri à gorge rubis

Asio flammeus (Pontoppidan, 1763) **II** [31] STRIGIDAE (Aves) (E) Short-eared Owl (S) Búho campestre, Búho orejicorto, Lechuza campestre, Lechuza orejicorta, Lechuzón campestre (F) Hibou brachyote, Hibou des marais

Astrange solitaire (F): *Astrangia solitaria*

Astrangia braziliensis Vaughan, 1906 = Astrangia solitaria (LeSueur, 1817)

Astrangia epithecata Duncan, 1876 = Astrangia solitaria (LeSueur, 1817)

Astrangia granulata Duchassaing & Michelotti, 1860 = Astrangia solitaria (LeSueur, 1817)

Astrangia minuta Duncan, 1876 = Astrangia solitaria (LeSueur, 1817)

Astrangia neglecta Duchassaing & Michelotti, 1860 = Astrangia solitaria (LeSueur, 1817)

Astrangia solitaria (LeSueur, 1817) **II** RHIZANGIIDAE (Anthozoa) (E) Dwarf Cup Coral (S) Coral tacita solitario (F) Astrange solitaire

Astrangia solitaria portoricensis (LeSueur, 1817) = Astrangia solitaria (LeSueur, 1817)

Astrea annularis (Ellis & Solander, 1786) = Montastrea annularis (Ellis & Solander, 1786)

Astrea argus Lamarck, 1816 = Montastrea cavernosa (Linnaeus, 1767)

Astrea conferta Milne Edwards & Haime, 1850 = Montastrea cavernosa (Linnaeus, 1767)

Astrea decactis Lyman, 1859 = Madracis decactis (Lyman, 1859)

Astrea intersepta (Esper, 1795) = Stephanocoenia intersepta (Esper, 1795)

Astrea radiata (Ellis & Solander, 1786) = Montastrea cavernosa (Linnaeus, 1767)

Astrea rigida Dana, 1846 = Isophyllastrea rigida (Dana, 1846)

Astrocoenia pharensis Heller, 1868 = Madracis pharensis (Heller, 1868)

Astropsammia pedersenii Verrill, 1869 = Tubastraea coccinea Lesson, 1829

Athene cunicularia (Molina, 1782) **II** [31] STRIGIDAE (Aves) (E) Burrowing Owl (S) Búho llanero, Cucú, Lechucita común, Lechucita de las viscacheras, Mochuelo de Hoyo, Mochuelo de madriguera (F) Chevêche des terriers, Chouette de terrier

Axhelia mirabilis (Duchassaing & Michelotti, 1860) = Madracis myriaster (Milne Edwards & Haime, 1849)

Axhelia myriaster Milne Edwards & Haime, 1849 = Madracis myriaster (Milne Edwards & Haime, 1849)

Axohelia dumetosa (Duchassaing, 1870) = Madracis myriaster (Milne Edwards & Haime, 1849)

Axohelia mirabilis (Duchassaing & Michelotti, 1860) = Madracis myriaster (Milne Edwards & Haime, 1849)

Axohelia myriaster (Milne Edwards & Haime, 1849) = Madracis myriaster (Milne Edwards & Haime, 1849)

Axohelia schrammii Pourtalès, 1874 = Madracis myriaster (Milne Edwards & Haime, 1849)

Azor chico (S): *Accipiter striatus*

Balaena glacialis (P. L. S. Müller, 1776) = Eubalaena glacialis (P. L. S. Müller, 1776)

Balaenoptera acutorostrata Lacépède, 1804 **I/II** [21] BALAENOPTERIDAE (Mammalia) (E) Lesser Rorqual, Little Piked Whale, Minke Whale, Northern Minke

Chelonia mydas (Linnaeus, 1758) **I** CHELONIIDAE (Reptilia) (E) Green Turtle (S) Tortuga blanca, Tortuga verde (F) Tortue comestible, Tortue franche, Tortue verte

Chelonia pelasgorum Bory, 1833 = Caretta caretta (Linnaeus, 1758)

Chelonia pseudocaretta Lesson, 1834 = Eretmochelys imbricata (Linnaeus, 1766)

Chelonia pseudomydas Lesson, 1834 = Eretmochelys imbricata (Linnaeus, 1766)

Chelonia radiata Cuvier, 1829 = Eretmochelys imbricata (Linnaeus, 1766)

Chelonias lutaria Rafinesque, 1814 = Dermochelys coriacea (Vandelli, 1761)

Chelonia tenuis Girard, 1858 = Chelonia mydas (Linnaeus, 1758)

Chelonia virgata Schweigger, 1812 = Chelonia mydas (Linnaeus, 1758)

Chevêche des terriers (F): *Athene cunicularia*

Chilabothrus angulifer (Bibron, 1843) = Epicrates angulifer Bibron, 1840

Chilabothrus chrysogaster (Cope, 1871) = Epicrates chrysogaster (Cope, 1871)

Chilabothrus exsul (Netting & Goin, 1944) = Epicrates exsul Netting & Goin, 1944

Chilabothrus striatus (Fischer, 1856) = Epicrates striatus (Fischer, 1856)

Chilabothrus strigilatus (Cope, 1862) = Epicrates striatus (Fischer, 1856)

Chiriría caribeña (S): *Dendrocygna arborea*

Chlorostilbon ricordii (Gervais, 1835) **II** TROCHILIDAE (Aves) (E) Cuban Emerald (S) Esmeralda zunzún (F) Émeraude de Ricord

Chouette de terrier (F): *Athene cunicularia*

Chouette effraie (F): *Tyto alba*

Circus cyaneus (Linnaeus, 1766) **II** [28] ACCIPITRIDAE (Aves) (E) Hen Harrier, Marsh Hawk, Northern Harrier (S) Aguilucho pálido, Gavilán rastrero (F) Busard Saint-Martin

Cladopsammia manuelensis (Chevalier, 1966) **II** DENDROPHYLLIIDAE (Anthozoa)

Coelosmilia fecunda Pourtalès, 1871 = Anomocora fecunda (Pourtalès, 1871)

Coenocyathus bartschi Wells, 1947 = Rhizosmilia maculata (Pourtalès, 1874)

Coenocyathus caribbeana Cairns, 2000 **II** CARYOPHYLLIIDAE (Anthozoa)

Coenocyathus parvulus (Cairns, 1979) **II** CARYOPHYLLIIDAE (Anthozoa) (E) Small Coral (S) Coral párvulo

Coenocyathus vermiformis Pourtalès, 1868 = Stenocyathus vermiformis (Pourtalès, 1868)

Coenopsammia affinis Duncan, 1889 = Tubastraea coccinea Lesson, 1829

Coenopsammia aurea (Quoy & Gaimard, 1833) = Tubastraea coccinea Lesson, 1829

Coenopsammia coccinea (Lesson, 1834) = Tubastraea coccinea Lesson, 1829

Coenopsammia ehrenbergiana Milne Edwards & Haime, 1848 = Tubastraea coccinea Lesson, 1829

Coenopsammia manni Verrill, 1866 = Tubastraea coccinea Lesson, 1829

Coenopsammia radiata Verrill, 1864 = Tubastraea coccinea Lesson, 1829

Coenopsammia tenuilamellosa Milne Edwards & Haime, 1848 = Tubastraea coccinea Lesson, 1829

Coenopsammia urvillii Milne Edwards & Haime, 1848 = Tubastraea coccinea Lesson, 1829

Coenopsammia willeyi Gardiner, 1899 = Tubastraea coccinea Lesson, 1829

Coenosmilia arbuscula Pourtalès, 1874 **II** CARYOPHYLLIIDAE (Anthozoa) (E) Dwarf Tree Coral (S) Coral arbolito

Coffre (F): *Caretta caretta*

Colangia immersa Pourtalès, 1871 **II** CARYOPHYLLIIDAE (Anthozoa) (E) Lesser Speckled Cup Coral (S) Coral tazón manchado (F) Corail calice mouchetée

Colangia simplex Pourtalès, 1878 = Gardineria simplex (Pourtalès, 1878)

Colibri à gorge rubis (F): *Archilochus colubris*

Colibrí de las Bahamas (S): *Calliphlox evelynae*

Colibri des Bahamas (F): *Calliphlox evelynae*

Colibri d'Helen (F): *Mellisuga helenae*

Colibrí gorjirrubí (S): *Archilochus colubris*

Colibri roux (F): *Selasphorus rufus*

Colibrí rufo (S): *Selasphorus rufus*

Colibrí zunzuncito (S): *Mellisuga helenae*

Colpophyllia natans (Houttuyn, 1772) **II** FAVIIDAE (Anthozoa) (E) Boulder Brain Coral (S) Coral cerebro macizo (F) Corail cerveau natan

Concha reina del Caribe (S): *Strombus gigas*

Conch, Pink (E): *Strombus gigas*

Conch, Queen (E): *Strombus gigas*

Conure veuve (F): *Myiopsitta monachus*

Corail balle de golf (F): *Favia fragum*

Corail cactus à bulbes (F): *Mycetophyllia reesi*

Corail cactus à crêtes basses (F): *Mycetophyllia daniana*

Corail cactus ridé (F): *Mycetophyllia lamarckiana*

Corail cactus sinueux (F): *Isophyllia sinuosa*

Corail calice mouchetée (F): *Colangia immersa*

Corail cerveau bosselé (F): *Diploria clivosa*

Corail cerveau natan (F): *Colpophyllia natans*

Corail cerveau symétrique (F): *Diploria strigosa*

Corail cierge (F): *Dendrogyra cylindrus*

Corail coeur d'artichaut (F): *Scolymia cubensis*

Corail cornes de cerf (F): *Acropora cervicornis*

Corail cornes d'élan (F): *Acropora palmata*

Corail de feu feuillu (F): *Millepora complanata*

Corail-dentelle rose (F): *Stylaster roseus*

Corail étoile elliptique (F): *Dichocoenia stokesii*

Corail étoilé massif (F): *Montastrea annularis*

Corail étoile rougissant (F): *Stephanocoenia intersepta*

Corail étoile rugueux (F): *Isophyllastrea rigida*

Corail fleur des grottes (F): *Thalamophyllia riisei*

Corail fleur doux (F): *Eusmilia fastigiata*

Corail fleur épineux (F): *Mussa angulosa*

Corail méandreux (F): *Meandrina maeandrites*

Corail noir de barbade (F): *Tanacetipathes barbadensis*

Corail noir des Caraïbes (F): *Antipathes caribbeana*

Desmophyllum nobile Verrill, 1885 = Javania cailleti (Duchassaing & Michelotti, 1864)
Desmophyllum riisei Duchassaing & Michelotti, 1860 = Thalamophyllia riisei (Duchassaing & Michelotti, 1860)
Desmophyllum serpuliforme Gravier, 1915 = Desmophyllum dianthus (Esper, 1794)
Desmophyllum simplex Verrill, 1870 = Thalamophyllia riisei (Duchassaing & Michelotti, 1860)
Desmophyllum solidum Pourtalès, 1871 = Thalamophyllia riisei (Duchassaing & Michelotti, 1860)
Desmophyllum striatum Cairns, 1979 **II** CARYOPHYLLIIDAE (Anthozoa) (E) Striated Cup Coral (S) Coral tazón estriado
Desmophyllum vitreum Alcock, 1898 = Javania cailleti (Duchassaing & Michelotti, 1864)
Devorador de hombres (S): *Carcharodon carcharias*
Dichocoenia stokesii Milne Edwards & Haime, 1848 **II** MEANDRINIIDAE (Anthozoa) (E) Elliptical Star Coral, Pineapple Coral (S) Coral piña (F) Corail étoile elliptique
Diploria cerebriformis (Lamarck, 1816) = Diploria labyrinthiformis (Linnaeus, 1758)
Diploria clivosa (Ellis & Solander, 1786) **II** FAVIIDAE (Anthozoa) (E) Knobby Brain Coral (S) Coral cerebro verrugoso (F) Corail cerveau bosselé
Diploria geographica Whitfield, 1901 = Diploria labyrinthiformis (Linnaeus, 1758)
Diploria labyrinthiformis (Linnaeus, 1758) **II** FAVIIDAE (Anthozoa) (E) Common Brain Coral, Grooved Brain Coral (S) Coral cerebro surcado (F) Cerveau de neptune
Diploria mammosa (Dana, 1846) = Diploria clivosa (Ellis & Solander, 1786)
Diploria stokesii Milne Edwards & Haime, 1849 = Diploria labyrinthiformis (Linnaeus, 1758)
Diploria strigosa (Dana, 1846) **II** FAVIIDAE (Anthozoa) (E) Symmetrical Brain Coral (S) Coral cerebro parejo (F) Corail cerveau symétrique
Distichopathes filix (Pourtalès, 1867) **II** APHANIPATHIDAE (Anthozoa)
Distichopora sulcata Pourtalès, 1867 **II** STYLASTERIDAE (Hydrozoa)
Dolphin, Atlantic Spinner (E): *Stenella clymene*
Dolphin, Atlantic Spotted (E): *Stenella frontalis*
Dolphin, Bottlenose (E): *Tursiops truncatus*
Dolphin, Bottle-nosed (E): *Tursiops truncatus*
Dolphin, Bridled (E): *Stenella attenuata*
Dolphin, Clymene (E): *Stenella clymene*
Dolphin, Grey (E): *Grampus griseus*
Dolphin, Helmet (E): *Stenella clymene*
Dolphin, Long-beaked (E): *Stenella longirostris*
Dolphin, Long-snouted (E): *Stenella longirostris*
Dolphin, Narrow-snouted (E): *Stenella attenuata*
Dolphin, Pantropical Spotted (E): *Stenella attenuata*
Dolphin, Risso's (E): *Grampus griseus*
Dolphin, Rough-toothed (E): *Steno bredanensis*
Dolphin, Short-beaked Bottlenose (E): *Tursiops truncatus*
Dolphin, Spinner (E): *Stenella longirostris*
Eagle, Bald (E): *Haliaeetus leucocephalus*
Eagle, White-headed (E): *Haliaeetus leucocephalus*
Effraie africaine (F): *Tyto alba*
Effraie des clochers (F): *Tyto alba*
Eguchipsammia cornucopia (Pourtalès, 1871) **II** DENDROPHYLLIIDAE (Anthozoa)
Elanio del Mississipí (S): *Ictinia mississippiensis*
Elanio tijereta (S): *Elanoides forficatus*
Elanoides forficatus (Linnaeus, 1758) **II** [28] ACCIPITRIDAE (Aves) (E) American Swallow-tailed Kite, Swallow-tailed Kite (S) Elanio tijereta, Gavilán tijereta, Milano tijereta (F) Milan à queue fourchue
Elatopathes abietina (Pourtalès, 1874) **II** APHANIPATHIDAE (Anthozoa) (E) Spear Black Coral (S) Coral de lanza
Electra (S): *Peponocephala electra*
Emerald, Cuban (E): *Chlorostilbon ricordii*
Émeraude de Ricord (F): *Chlorostilbon ricordii*
Enallopsammia adminicularis (Rehberg, 1892) = Enallopsammia rostrata (Pourtalès, 1878)
Enallopsammia amphelioides (Alcock, 1902) = Enallopsammia rostrata (Pourtalès, 1878)
Enallopsammia rostrata (Pourtalès, 1878) **II** DENDROPHYLLIIDAE (Anthozoa) (E) Beaked Cup Coral (S) Coral pocillo curvo
Epaulard (F): *Orcinus orca*
Épervier brun (F): *Accipiter striatus*
Epicrates angulifer Bibron, 1840 **II** BOIDAE (Reptilia) (E) Cuban Boa, Cuban Tree Boa (S) Boa de Cuba, Maja de Sta. María (F) Boa de Cuba
Epicrates chrysogaster (Cope, 1871) **II** BOIDAE (Reptilia) (E) Bahamas Islands Boa, Turks Islands Boa (F) Boa de l'île Turques
Epicrates exsul Netting & Goin, 1944 **II** BOIDAE (Reptilia) (E) Abaco Island Boa (F) Boa de l'île Abaco
Epicrates relicquus Barbour & Shreve, 1935 = Epicrates chrysogaster (Cope, 1871)
Epicrates striatus (Fischer, 1856) **II** BOIDAE (Reptilia) (E) Fischer's Tree Boa, Haitian Boa (F) Boa d'Haïti
Epicrates striatus chrysogaster (Fischer, 1856) = Epicrates chrysogaster (Cope, 1871)
Epicrates striatus relicquus (Fischer, 1856) = Epicrates chrysogaster (Cope, 1871)
Epicrates versicolor Steindachner, 1863 = Epicrates striatus (Fischer, 1856)
Eretmochelys imbricata (Linnaeus, 1766) **I** CHELONIIDAE (Reptilia) (E) Hawksbill Turtle (S) Tortuga carey, Tortuga de carey (F) Caret, Tortue à bec de faucon, Tortue à écailles, Tortue imbriquée
Eretmochelys squamata Agassiz, 1857 = Eretmochelys imbricata (Linnaeus, 1766)
Errina cochleata Pourtalès, 1867 **II** STYLASTERIDAE (Hydrozoa)
Errina glabra Pourtalès, 1867 = Lepidopora glabra (Pourtalès, 1867)
Esmeralda zunzún (S): *Chlorostilbon ricordii*
Esmerejón (S): *Falco columbarius*
Espadachin (S): *Pristis pectinata*
Espadarte (S): *Orcinus orca*
Espadon (S): *Pristis pectinata*
Esparvero chico (S): *Accipiter striatus*
estrella, Coral (E): *Madracis pharensis*

Eubalaena glacialis (P. L. S. Müller, 1776) **I** BALAENIDAE (Mammalia) (E) Black Right Whale, Northern Right Whale, Right Whale (S) Ballena, Ballena franca del Norte, Ballenga (F) Baleine de Biscaye, Baleine des Basques, Baleine franche
Eubalaena sieboldi Gray, 1864 = Eubalaena glacialis (P. L. S. Müller, 1776)
Euphyllia aspera Dana, 1846 = Eusmilia fastigiata (Pallas, 1766)
Eusmilia aspera (Dana, 1848) = Eusmilia fastigiata (Pallas, 1766)
Eusmilia fastigiata (Pallas, 1766) **II** CARYOPHYLLIIDAE (Anthozoa) (E) Smooth Flower Coral (S) Coral floral liso (F) Corail fleur doux
Eusmilia knorrii Milne Edwards & Haime, 1848 = Eusmilia fastigiata (Pallas, 1766)
Explanaria annularis (Ellis & Solander, 1786) = Montastrea annularis (Ellis & Solander, 1786)
Explanaria argus (Lamarck, 1816) = Montastrea cavernosa (Linnaeus, 1767)
Explanaria radiata (Ellis & Solander, 1786) = Montastrea cavernosa (Linnaeus, 1767)
Fabo calderón (S): *Grampus griseus*
Falco columbarius Linnaeus, 1758 **II** [28] FALCONIDAE (Aves) (E) Merlin, Pigeon Hawk (S) Esmerejón, Halcón migratorio, Halcón palomero (F) Faucon émerillon
Falco cyaneus Linnaeus, 1766 = Circus cyaneus (Linnaeus, 1766)
Falco forficatus Linnaeus, 1758 = Elanoides forficatus (Linnaeus, 1758)
Falco haliaetus Linnaeus, 1758 = Pandion haliaetus (Linnaeus, 1758)
Falco jamaicensis Gmelin, 1788 = Buteo jamaicensis (Gmelin, 1788)
Falco kreyenborgi Kleinschmidt, 1929 = Falco peregrinus Tunstall, 1771
Falco leucocephalus Linnaeus, 1766 = Haliaeetus leucocephalus (Linnaeus, 1766)
Falco madens Ripley & Watson, 1963 = Falco peregrinus Tunstall, 1771
Falco mississippiensis Wilson, 1811 = Ictinia mississippiensis (Wilson, 1811)
Falcon, Peregrine (E): *Falco peregrinus*
Falco peregrinus Tunstall, 1771 **I** FALCONIDAE (Aves) (E) Duck Hawk, Peregrine, Peregrine Falcon (S) Halcón blancuzco, Halcón común, Halcón peregrino, Halcón real, Halcón viajero (F) Faucon pèlerin
Falco sparverius Linnaeus, 1758 **II** [28] FALCONIDAE (Aves) (E) American Kestrel (S) Cernícalo americano, Cernícalo primito, Halconcito, Halconcito común, Halcón primito (F) Crécerelle américaine, Crécerelle d'Amérique
Faucon émerillon (F): *Falco columbarius*
Faucon pèlerin (F): *Falco peregrinus*
Favia coarctata Duchassaing & Michelotti, 1860 = Favia fragum (Esper, 1793)
Favia fragum (Esper, 1793) **II** FAVIIDAE (Anthozoa) (E) Golfball Coral, Small Star Coral (S) Coral empelotado (F) Corail balle de golf
Favia incerta Duchassaing & Michelotti, 1860 = Favia fragum (Esper, 1793)
Favia whitfieldi Verrill, 1901 = Favia fragum (Esper, 1793)
Flabellum atlanticum Cairns, 1979 **II** FLABELLIDAE (Anthozoa)
Flabellum pavoninum atlanticum Lesson, 1831 = Flabellum atlanticum Cairns, 1979
Flamant de Cuba (F): *Phoenicopterus ruber*
Flamant rose (F): *Phoenicopterus ruber*
Flamant rouge (F): *Phoenicopterus ruber*
Flamenco (S): *Phoenicopterus ruber*
Flamenco común (S): *Phoenicopterus ruber*
Flamenco de Cuba (S): *Phoenicopterus ruber*
Flamenco rojo (S): *Phoenicopterus ruber*
Flamingo, American (E): *Phoenicopterus ruber*
Flamingo, Caribbean (E): *Phoenicopterus ruber*
Foca fraile del Caribe (S): *Monachus tropicalis*
Fungiacyathus aleuticus Keller, 1976 = Fungiacyathus marenzelleri (Vaughan, 1906)
Fungiacyathus durus Keller, 1976 = Fungiacyathus symmetricus (Pourtalès, 1871)
Fungiacyathus marenzelleri (Vaughan, 1906) **II** FUNGIACYATHIDAE (Anthozoa) (E) Marenzeller's Mushroom Coral (S) Coral hongo de Marenzeller
Fungiacyathus symmetricus (Pourtalès, 1871) **II** FUNGIACYATHIDAE (Anthozoa) (E) Symmetrical Mushroom Coral (S) Coral hongo simétrico
Fungia symmetrica Pourtalès, 1871 = Fungiacyathus symmetricus (Pourtalès, 1871)
Galaxea eburnea Pourtalès, 1871 = Javania cailleti (Duchassaing & Michelotti, 1864)
Gardineria minor Wells, 1973 **II** GARDINERIIDAE (Anthozoa)
Gardineria simplex (Pourtalès, 1878) **II** GARDINERIIDAE (Anthozoa)
Gavilán americano (S): *Accipiter striatus*
Gavilán arrastrador (S): *Accipiter striatus*
Gavilán pajarero (S): *Accipiter striatus*
Gavilán pescador (S): *Pandion haliaetus*
Gavilán rastrero (S): *Circus cyaneus*
Gavilán tijereta (S): *Elanoides forficatus*
Globicephala macrorhynchus Gray, 1846 **II** [20] DELPHINIDAE (Mammalia) (E) Pacific Pilot Whale, Short-finned Pilot Whale (S) Caldrón negro (F) Globicéphale tropical
Globicephala sieboldii Gray, 1846 = Globicephala macrorhynchus Gray, 1846
Globicéphale tropical (F): *Globicephala macrorhynchus*
Goreaugyra memorialis Wells, 1974 = Meandrina maeandrites (Linnaeus, 1758)
Grampus (F): *Grampus griseus*
Grampus griseus (G. Cuvier, 1812) **II** [20] DELPHINIDAE (Mammalia) (E) Grey Dolphin, Risso's Dolphin (S) Delfín de Risso, Fabo calderón (F) Dauphin de Risso, Grampus
Grand corail étoilé (F): *Montastrea cavernosa*
Grand Dauphin (F): *Tursiops truncatus*
Grand requin blanc (F): *Carcharodon carcharias*
Grand requin-marteau (F): *Sphyrna mokarran*
Guaraguao (S): *Buteo jamaicensis*

Isophyllia sinuosa (Ellis & Solander, 1786) **II** MUSSIDAE (Anthozoa) (E) Sinuous Cactus Coral (S) Micetocoral sinuoso (F) Corail cactus sinueux

Jaquetón (S): *Carcharodon carcharias*

Jaquetón blanco (S): *Carcharodon carcharias*

Jaquetón de ley (S): *Carcharodon carcharias*

Javania cailleti (Duchassaing & Michelotti, 1864) **II** FLABELLIDAE (Anthozoa) (E) Caillet's Fan Coral (S) Coral abanico de Caillet

Javania delicata (Yabe & Eguchi, 1942) = Javania cailleti (Duchassaing & Michelotti, 1864)

Javania eburnea (Pourtalès, 1871) = Javania cailleti (Duchassaing & Michelotti, 1864)

Javania galapagensis (Vaughan, 1906) = Javania cailleti (Duchassaing & Michelotti, 1864)

Javania nobile (Verrill, 1885) = Javania cailleti (Duchassaing & Michelotti, 1864)

Javania pseudoalabastra Zibrowius, 1974 **II** FLABELLIDAE (Anthozoa)

Javania vitrea (Alcock, 1898) = Javania cailleti (Duchassaing & Michelotti, 1864)

Kestrel, American (E): *Falco sparverius*

Kite, American Swallow-tailed (E): *Elanoides forficatus*

Kite, Mississippi (E): *Ictinia mississippiensis*

Kite, Swallow-tailed (E): *Elanoides forficatus*

Kogia breviceps (Blainville, 1838) **II** [20] PHYSETERIDAE (Mammalia) (E) Pygmy Sperm Whale (S) Cachalote cabeza chica, Cachalote pigmeo (F) Cachalot pygmée

Kogia sima (Owen, 1866) **II** [20] PHYSETERIDAE (Mammalia) (E) Dwarf Sperm Whale, Owen's Pygmy Sperm Whale (S) Cachalote enano (F) Cachalot nain

Kogia simus (Owen, 1866) = Kogia sima (Owen, 1866)

Labyrinthocyathus langae Cairns, 1979 **II** CARYOPHYLLIIDAE (Anthozoa) (E) Labyrinthic Cup Coral (S) Coral tazón laberíntico

Lagenorhynchus electra Gray, 1846 = Peponocephala electra (Gray, 1846)

Lamantin d'Amérique du nord (F): *Trichechus manatus*

Lamantin des Antilles (F): *Trichechus manatus*

Lamantin des Caraïbes (F): *Trichechus manatus*

Lamantino norteamericano (S): *Trichechus manatus*

Lambis (F): *Strombus gigas*

Lamie (F): *Carcharodon carcharias*

Leatherback (E): *Dermochelys coriacea*

Lechucita común (S): *Athene cunicularia*

Lechucita de las viscacheras (S): *Athene cunicularia*

Lechuza campestre (S): *Asio flammeus*

Lechuza común (S): *Tyto alba*

Lechuza de campanario (S): *Tyto alba*

Lechuza orejicorta (S): *Asio flammeus*

Lechuzón campestre (S): *Asio flammeus*

Leiopathes glaberrima (Esper, 1792) **II** LEIOPATHIDAE (Anthozoa) (E) Smooth Black Coral

Lepidopora biserialis Cairns, 1986 **II** STYLASTERIDAE (Hydrozoa)

Lepidopora cochleata (Pourtalès, 1867) = Errina cochleata Pourtalès, 1867

Lepidopora glabra (Pourtalès, 1867) **II** STYLASTERIDAE (Hydrozoa)

Lithophyllia argemone Duchassaing & Michelotti, 1860 = Mussa angulosa (Pallas, 1766)

Lobophyllia angulosa (Pallas, 1766) = Mussa angulosa (Pallas, 1766)

Lobophyllia aurea Quoy & Gaimard, 1833 = Tubastraea coccinea Lesson, 1829

Loggerhead (E): *Caretta caretta*

Lophelia californica Durham, 1947 = Lophelia pertusa (Linnaeus, 1758)

Lophelia pertusa (Linnaeus, 1758) **II** CARYOPHYLLIIDAE (Anthozoa) (E) Spider Hazards, Tuft Coral (S) Coral mechón

Lophelia prolifera (Pallas, 1766) = Lophelia pertusa (Linnaeus, 1758)

Lophelia subcostata Milne Edwards & Haime, 1850 = Lophelia pertusa (Linnaeus, 1758)

Lophohelia affinis Pourtalès, 1868 = Lophelia pertusa (Linnaeus, 1758)

Lophohelia candida Moseley, 1881 = Madrepora oculata Linnaeus, 1758

Lophohelia carolina Pourtalès, 1871 = Madrepora carolina (Pourtalès, 1871)

Lophohelia exigua Pourtalès, 1871 = Madrepora carolina (Pourtalès, 1871)

Lophohelia investigatoris Alcock, 1898 = Madrepora oculata Linnaeus, 1758

Lophohelia tenuis Moseley, 1881 = Madrepora oculata Linnaeus, 1758

Lophohelia tubulosa Studer, 1878 = Lophelia pertusa (Linnaeus, 1758)

Lophosmilia rotundifolia Milne Edwards & Haime, 1848 = Oxysmilia rotundifolia (Milne Edwards & Haime, 1848)

Loro de cabeza blanca (S): *Amazona leucocephala*

Luth (E): *Dermochelys coriacea*

Madrace à dix rayons (F): *Madracis decactis*

Madrace étoile (F): *Madracis pharensis*

Madracis decactis (Lyman, 1859) **II** POCILLOPORIDAE (Anthozoa) (E) Green Cactus Coral, Ten-ray Finger Coral, Ten-ray Star Coral (S) Coral de diez rayos (F) Madrace à dix rayons

Madracis luciphila Wells, 1973 = Madracis pharensis (Heller, 1868)

Madracis mirabilis (Duchassaing & Michelotti, 1860) = Madracis myriaster (Milne Edwards & Haime, 1849)

Madracis myriaster (Milne Edwards & Haime, 1849) **II** POCILLOPORIDAE (Anthozoa) (E) Striate Finger Coral, Yellow Pencil Coral (S) Coral estriado de dedos

Madracis pharensis (Heller, 1868) **II** POCILLOPORIDAE (Anthozoa) (E) Coral estrella, Star Coral (F) Madrace étoile

Madrepora agaricites Linnaeus, 1758 = Agaricia agaricites (Linnaeus, 1758)

Madrepora alcocki Faustino, 1927 = Madrepora oculata Linnaeus, 1758

Madrepora angulosa Pallas, 1766 = Mussa angulosa (Pallas, 1766)

Madrepora annularis Ellis & Solander, 1786 = Montastrea annularis (Ellis & Solander, 1786)

Madrepora areolata Linnaeus, 1758 = Manicina areolata (Linnaeus, 1758)

Manta birostris (Walbaum, 1792) **II** MYLIOBATIDAE (Elasmobranchii) (E) Giant Manta Ray, Oceanic Manta Ray, Pacific Manta Ray
Manta ehrenbergii (Müller & Henle, 1841) = Manta birostris (Walbaum, 1792)
Manta hamiltoni Hamilton & Newman, 1849 = Manta birostris (Walbaum, 1792)
Manta raya Baer, 1899 = Manta birostris (Walbaum, 1792)
Marrajo (S): *Carcharodon carcharias*
Meandrina cerebriformis Lamarck, 1816 = Diploria labyrinthiformis (Linnaeus, 1758)
Meandrina cylindrus (Ehrenberg, 1834) = Dendrogyra cylindrus (Ehrenberg, 1834)
Meandrina filograna (Esper, 1791) = Diploria clivosa (Ellis & Solander, 1786)
Meandrina grandilobata Milne Edwards & Haime, 1849 = Diploria clivosa (Ellis & Solander, 1786)
Meandrina interrupta Dana, 1846 = Diploria clivosa (Ellis & Solander, 1786)
Meandrina maeandrites (Linnaeus, 1758) **II** MEANDRINIIDAE (Anthozoa) (E) Maze Coral (S) Coral laberíntico (F) Corail méandreux
Meandrina mammosa Dana, 1846 = Diploria clivosa (Ellis & Solander, 1786)
Meandrina memorialis (Wells, 1974) = Meandrina maeandrites (Linnaeus, 1758)
Meandrina pectinata Lamarck, 1801 = Meandrina maeandrites (Linnaeus, 1758)
Meandrina strigosa Dana, 1846 = Diploria strigosa (Dana, 1846)
Meandrina superficialis Milne Edwards & Haime, 1849 = Diploria clivosa (Ellis & Solander, 1786)
Meandrina truncata Dana, 1846 = Diploria labyrinthiformis (Linnaeus, 1758)
Mellisuga helenae (Lembeye, 1850) **II** TROCHILIDAE (Aves) (E) Bee Hummingbird (S) Colibrí zunzuncito (F) Colibri d'Helen
Merlin (E): *Falco columbarius*
Mesoplodon de Blainville (F): *Mesoplodon densirostris*
Mesoplodon de Gervais (F): *Mesoplodon europaeus*
Mesoplodon densirostris (de Blainville, 1817) **II** [20] ZIPHIIDAE (Mammalia) (E) Blainville's Beaked Whale (S) Ballena de pico de Blainville (F) Mesoplodon de Blainville
Mesoplodon de True (F): *Mesoplodon mirus*
Mesoplodon europaeus (Gervais, 1855) **II** [20] ZIPHIIDAE (Mammalia) (E) Gervais's Beaked Whale, Gulf Stream Beaked Whale (S) Ballena de pico de Gervais (F) Mesoplodon de Gervais
Mesoplodon gervaisi Deslongchamps, 1866 = Mesoplodon europaeus (Gervais, 1855)
Mesoplodon mirus True, 1913 **II** [20] ZIPHIIDAE (Mammalia) (E) True's Beaked Whale (S) Ballena de pico de True (F) Mesoplodon de True
Micetocoral angular (S): *Mussa angulosa*
Micetocoral áspero (S): *Isophyllastrea rigida*
Micetocoral crestado (S): *Mycetophyllia lamarckiana*
Micetocoral de poca cresta (S): *Mycetophyllia daniana*
Micetocoral liso (S): *Mycetophyllia reesi*
Micetocoral sinuoso (S): *Isophyllia sinuosa*
Micristodus punctatus Gill, 1865 = Rhincodon typus Smith, 1828
Milan à queue fourchue (F): *Elanoides forficatus*
Milan du Mississippi (F): *Ictinia mississippiensis*
Milano del Misisipi (S): *Ictinia mississippiensis*
Milano misisipero (S): *Ictinia mississippiensis*
Milano tijereta (S): *Elanoides forficatus*
Millepora alcicornis Linnaeus, 1758 **II** MILLEPORIDAE (Hydrozoa) (E) Branching Fire Coral, Finger Coral, Ginger Coral (S) Coral de fuego
Millepora carthaginiensis Duchassaing & Michelotti, 1864 = Millepora alcicornis Linnaeus, 1758
Millepora complanata Lamarck, 1816 **II** MILLEPORIDAE (Hydrozoa) (E) Bladed Fire Coral (S) Coral de fuego aplastado (F) Corail de feu feuillu
Millepora cristagalli Duchassaing & Michelotti, 1864 = Millepora alcicornis Linnaeus, 1758
Millepora delicatula Duchassaing & Michelotti, 1864 = Millepora alcicornis Linnaeus, 1758
Millepora moniliformis Dana, 1846 = Millepora alcicornis Linnaeus, 1758
Millepora plicata Esper, 1794 = Millepora alcicornis Linnaeus, 1758
Millepora ramosa Pallas, 1766 = Millepora alcicornis Linnaeus, 1758
Millepora schrammi Duchassaing & Michelotti, 1864 = Millepora alcicornis Linnaeus, 1758
Mobula hypostoma Bancroft, 1831 **II** MYLIOBATIDAE (Elasmobranchii)
Mochuelo de Hoyo (S): *Athene cunicularia*
Mochuelo de madriguera (S): *Athene cunicularia*
Monachus tropicalis (Gray, 1850) **I** PHOCIDAE (Mammalia) (E) Caribbean Monk Seal, West Indian Monk Seal, West Indian Seal (S) Foca fraile del Caribe
Monomyces tulipa (Pourtalès, 1874) = Polymyces fragilis (Pourtalès, 1868)
Montastrea annularis (Ellis & Solander, 1786) **II** FAVIIDAE (Anthozoa) (E) Boulder Star Coral, Lobed Star Coral (S) Coral estrella macizo (F) Corail étoilé massif
Montastrea cavernosa (Linnaeus, 1767) **II** FAVIIDAE (Anthozoa) (E) Cavernous Star Coral, Great Star Coral (S) Coral cavernoso macizo (F) Grand corail étoilé
Montastrea cavernosa hirta (Linnaeus, 1767) = Montastrea cavernosa (Linnaeus, 1767)
Montastrea faveolata (Ellis & Solander, 1786) **II** FAVIIDAE (Anthozoa) (E) Mountainous Star Coral (S) Coral montañoso
Montastrea franksi (Gregory, 1895) **II** FAVIIDAE (Anthozoa) (E) Boulder Star Coral, Franks's Boulder Star Coral (S) coral macizo de Franks
Montastrea hispidula (Verrill, 1901) = Montastrea annularis (Ellis & Solander, 1786)
Montlivaultia poculum Pourtalès, 1878 = Trochocyathus rawsonii Pourtalès, 1874
Morfillo (S): *Sphyrna lewini*
Mussa angulosa (Pallas, 1766) **II** MUSSIDAE (Anthozoa) (E) Large Flower Coral, Spiny Flower Coral (S) Micetocoral angular (F) Corail fleur épineux

Mycedia fragilis Dana, 1846 = Agaricia fragilis (Dana, 1846)
Mycedia gibbosa Dana, 1846 = Agaricia agaricites (Linnaeus, 1758)
Mycedium danai Duchassaing & Michelotti, 1860 = Agaricia agaricites (Linnaeus, 1758)
Mycedium lessoni Duchassaing & Michelotti, 1860 = Agaricia agaricites (Linnaeus, 1758)
Mycedium sanctijohannis Duchassaing & Michelotti, 1864 = Agaricia agaricites (Linnaeus, 1758)
Mycedium vesparium Duchassaing & Michelotti, 1860 = Agaricia agaricites (Linnaeus, 1758)
Mycetophyllia daniana Milne Edwards & Haime, 1849 **II** MUSSIDAE (Anthozoa) (E) Lowridge Cactus Coral (S) Micetocoral de poca cresta (F) Corail cactus à crêtes basses
Mycetophyllia lamarckiana Milne Edwards & Haime, 1848 **II** MUSSIDAE (Anthozoa) (E) Ridged Cactus Coral (S) Micetocoral crestado (F) Corail cactus ridé
Mycetophyllia reesi Wells, 1973 **II** MUSSIDAE (Anthozoa) (E) Ridgeless Cactus Coral (S) Micetocoral liso (F) Corail cactus à bulbes
Myiopsitta luchsi (Finsch, 1868) = Myiopsitta monachus (Boddaert, 1783)
Myiopsitta monachus (Boddaert, 1783) **II** [30] PSITTACIDAE (Aves) (E) Grey-breasted Parakeet, Monk Parakeet, Quaker Parakeet (S) Catita común, Cotorra argentina (F) Conure veuve, Perruche-souris
Neoporites subtilis Duchassaing & Michelotti, 1864 = Porites astreoides Lamarck, 1816
Oculina diffusa Lamarck, 1816 **II** OCULINIDAE (Anthozoa) (E) Diffuse Ivory Bush Coral (S) Coral expansivo de marfil (F) Oculine diffuse
Oculina pallens Ehrenberg, 1834 = Oculina diffusa Lamarck, 1816
Oculina virginea (Linnaeus, 1758) = Oculina diffusa Lamarck, 1816
Oculine diffuse (F): *Oculina diffusa*
Odontocyathus coronatus (Pourtalès, 1867) = Stephanocyathus coronatus (Pourtalès, 1867)
Oedicnème américain (F): *Burhinus bistriatus*
Oedicnème Bistrié (F): *Burhinus bistriatus*
Onychochelys kraussi Gray, 1873 = Eretmochelys imbricata (Linnaeus, 1766)
Orbicella annularis (Ellis & Solander, 1786) = Montastrea annularis (Ellis & Solander, 1786)
Orbicella braziliana Verrill, 1901 = Montastrea cavernosa (Linnaeus, 1767)
Orbicella cavernosa (Linnaeus, 1766) = Montastrea cavernosa (Linnaeus, 1767)
Orbicella hispidula Verrill, 1901 = Montastrea annularis (Ellis & Solander, 1786)
Orca (S): *Orcinus orca*
Orca (E): *Orcinus orca*
Orcinus glacialis Berzin & Vladimirov, 1983 = Orcinus orca (Linnaeus, 1758)
Orcinus nanus Mikhalev, Ivashin, Savusin & Zelenaya, 1981 = Orcinus orca (Linnaeus, 1758)
Orcinus orca (Linnaeus, 1758) **II** [20] DELPHINIDAE (Mammalia) (E) Killer Whale, Orca (S) Espadarte, Orca (F) Epaulard, Orque
Ornismya ricordii Gervais, 1835 = Chlorostilbon ricordii (Gervais, 1835)
Orque (F): *Orcinus orca*
Orthorhyncus helenae Lembeye, 1850 = Mellisuga helenae (Lembeye, 1850)
Osprey (E): *Pandion haliaetus*
Oulophyllia spinosa Milne Edwards & Haime, 1849 = Isophyllia sinuosa (Ellis & Solander, 1786)
Owl, Barn (E): *Tyto alba*
Owl, Burrowing (E): *Athene cunicularia*
Owl, Short-eared (E): *Asio flammeus*
Oxysmilia portoricensis (Vaughan, 1901) = Oxysmilia rotundifolia (Milne Edwards & Haime, 1848)
Oxysmilia rotundifolia (Milne Edwards & Haime, 1848) **II** CARYOPHYLLIIDAE (Anthozoa) (E) Big-leaf Coral (S) Coral rotundo
Pandion haliaetus (Linnaeus, 1758) **II** [28] PANDIONIDAE (Aves) (E) Osprey (S) Águila pescadora, Águila sangual, Gavilán pescador, Guincho (F) Aigle pêcheur, Balbugard fluviatile, Balbuzard pêcheur
Paracyathus confertus Pourtalès, 1868 = Paracyathus pulchellus (Philippi, 1842)
Paracyathus defilippii Duchassaing & Michelotti, 1860 = Paracyathus pulchellus (Philippi, 1842)
Paracyathus flos Pourtalès, 1878 = Phacelocyathus flos (Pourtalès, 1878)
Paracyathus laxus Pourtalès, 1880 = Trochocyathus rawsonii Pourtalès, 1874
Paracyathus pulchellus (Philippi, 1842) **II** CARYOPHYLLIIDAE (Anthozoa) (E) Papillose Cup Coral (S) Coral tazón papilar
Parakeet, Grey-breasted (E): *Myiopsitta monachus*
Parakeet, Monk (E): *Myiopsitta monachus*
Parakeet, Quaker (E): *Myiopsitta monachus*
Parantipathes abietina (Pourtalès, 1874) = Elatopathes abietina (Pourtalès, 1874)
Parantipathes columnaris (Duchassaing, 1870) = Stylopathes columnaris (Duchassaing, 1870)
Parantipathes filix (Pourtalès, 1867) = Distichopathes filix (Pourtalès, 1867)
Parasmilia arbuscula (Pourtalès, 1874) = Anomocora fecunda (Pourtalès, 1871)
Parasmilia fecunda (Pourtalès, 1871) = Anomocora fecunda (Pourtalès, 1871)
Parasmilia punctata Lindström, 1877 = Oxysmilia rotundifolia (Milne Edwards & Haime, 1848)
Parastrea fragum (Esper, 1797) = Favia fragum (Esper, 1793)
Parrot, Bahamas (E): *Amazona leucocephala*
Parrot, Cuban (E): *Amazona leucocephala*
Pato silbón común (S): *Dendrocygna bicolor*
Pato silbón de Cuba (S): *Dendrocygna arborea*
Pato silbón ventrinegro (S): *Dendrocygna autumnalis*
Pavo cristatus **III** PHASIANIDAE (Aves) (E) Common Peafowl, Indian Peafowl, Peafowl
Peafowl (E): *Pavo cristatus*
Peafowl, Common (E): *Pavo cristatus*
Peafowl, Indian (E): *Pavo cristatus*
Pejepeine (S): *Pristis pristis*

Pejepeine (S): *Pristis pectinata*
Pejes sierra (S): *Pristis pectinata*
Peponocephala electra (Gray, 1846) **II** [20] DELPHINIDAE (Mammalia) (E) Melon-headed Whale (S) Electra (F) Péponocéphale
Péponocéphale (F): *Peponocephala electra*
Peregrine (E): *Falco peregrinus*
Perruche-souris (F): *Myiopsitta monachus*
Petit corail starlette (F): *Siderastrea radians*
Petit rorqual (F): *Balaenoptera acutorostrata*
Pez dama (S): *Rhincodon typus*
Pez espada (S): *Pristis pectinata*
Pez martillo (S): *Sphyrna lewini*
Pez mular (S): *Tursiops truncatus*
Pez rastrillo (S): *Pristis pectinata*
Pez sierra (S): *Pristis pectinata*
Pez sierra común (S): *Pristis pristis*
Pez sierra común (S): *Pristis pectinata*
Phacelocyathus flos (Pourtalès, 1878) **II** CARYOPHYLLIIDAE (Anthozoa) (E) Two-tone Cup Coral (S) Coral tazón veteado (F) Caryophille bicolore
Phanopathes rigida (Pourtalès, 1880) **II** APHANIPATHIDAE (Anthozoa)
Philodice evelynae (Bourcier, 1847) = Calliphlox evelynae (Bourcier, 1847)
Phoenicopterus roseus Pallas, 1811 = Phoenicopterus ruber Linnaeus, 1758
Phoenicopterus ruber Linnaeus, 1758 **II** PHOENICOPTERIDAE (Aves) (E) American Flamingo, Caribbean Flamingo (S) Flamenco, Flamenco común, Flamenco de Cuba, Flamenco rojo, Tococo (F) Flamant de Cuba, Flamant rose, Flamant rouge
Physeter catodon Linnaeus, 1758 = Physeter macrocephalus Linnaeus, 1758
Physeter macrocephalus Linnaeus, 1758 **I** PHYSETERIDAE (Mammalia) (E) Cachalot, Cachelot, Pot Whale, Spermacet Whale, Sperm Whale (S) Ballena esperma, Cachalote (F) Cachalot
Pigargo americano (S): *Haliaeetus leucocephalus*
Pigargo cabeciblanco (S): *Haliaeetus leucocephalus*
Pigargo cabeciblanco meridional (S): *Haliaeetus leucocephalus*
Pijiji aliblanco (S): *Dendrocygna autumnalis*
Pijiji canelo (S): *Dendrocygna bicolor*
Placopsammia darwini Duncan, 1876 = Tubastraea coccinea Lesson, 1829
Platygyra cerebriformis (Lamarck, 1816) = Diploria labyrinthiformis (Linnaeus, 1758)
Platytrochus coronatus Pourtalès, 1867 = Stephanocyathus coronatus (Pourtalès, 1867)
Plesiastrea goodei Verrill, 1900 = Stephanocoenia intersepta (Esper, 1795)
Pliobothrus symmetricus Pourtalès, 1868 **II** STYLASTERIDAE (Hydrozoa) (E) Symmetrical Hydrocoral (S) Hidrocoral simétrico
Pluma de mar (S): *Plumapathes pennacea*
Plumapathes pennacea (Pallas, 1766) **II** MYRIOPATHIDAE (Anthozoa) (E) Feather Black Coral (S) Pluma de mar (F) Corail noir plumeux
Pointer, White (E): *Carcharodon carcharias*
Poisson-scie commun (F): *Pristis pristis*
Poisson-scie tident (F): *Pristis pectinata*
Polycyathus mayae Cairns, 2000 **II** CARYOPHYLLIIDAE (Anthozoa)
Polymyces fragilis (Pourtalès, 1868) **II** FLABELLIDAE (Anthozoa) (E) Twelve-root Cup Coral (S) Coral abanico frágil
Porite digitée (F): *Porites porites*
Porite étoile (F): *Porites astreoides*
Porites agaricus Duchassaing & Michelotti, 1860 = Porites astreoides Lamarck, 1816
Porites astreoides Lamarck, 1816 **II** PORITIDAE (Anthozoa) (E) Mustard Hill Coral (S) Coral mostaza (F) Porite étoile
Porites branneri Rathbun, 1887 **II** PORITIDAE (Anthozoa) (E) Blue Crust Coral (S) Coral crustoso azul (F) Coraux à pores
Porites clavaria Lamarck, 1816 = Porites porites (Pallas, 1766)
Porites guadalupensis Duchassaing & Michelotti, 1860 = Porites astreoides Lamarck, 1816
Porites hentscheli Thiel, 1928 = Porites astreoides Lamarck, 1816
Porites incerta Duchassaing & Michelotti, 1860 = Porites astreoides Lamarck, 1816
Porites polymorphus Link, 1807 = Porites porites (Pallas, 1766)
Porites porites (Pallas, 1766) **II** PORITIDAE (Anthozoa) (E) Club Finger Coral, Clubtip Finger Coral (S) Coral de dedos chatos (F) Porite digitée
Porites solida Verrill, 1868 = Porites astreoides Lamarck, 1816
Porites superficialis Duchassaing & Michelotti, 1860 = Porites astreoides Lamarck, 1816
Porites verrilli Rehberg, 1892 = Porites astreoides Lamarck, 1816
Pourtalocyathus hispidus (Pourtalès, 1878) **II** GUYNIIDAE (Anthozoa) (E) Rough Guyniid Coral (S) Coral guynidio áspero
Premocyathus cornuformis (Pourtalès, 1868) **II** CARYOPHYLLIIDAE (Anthozoa) (E) Lesser Horn Coral (S) Coral cuernito chico
Pristis acutirostris Duméril, 1865 = Pristis pectinata Latham, 1794
Pristis antiquorum Latham, 1794 = Pristis pristis (Linnaeus, 1758)
Pristis canaliculata Bloch & Schneider, 1801 = Pristis pristis (Linnaeus, 1758)
Pristis granulosa Bloch & Schneider, 1801 = Pristis pectinata Latham, 1794
Pristis megalodon Duméril, 1865 = Pristis pectinata Latham, 1794
Pristis pectinata Latham, 1794 **I** PRISTIDAE (Elasmobranchii) (E) Comb shark, Smalltooth Sawfish, Smooth-tooth Sawfish, Wide Sawfish (S) Espadachin, Espadon, Pejepeine, Pejes sierra, Pez espada, Pez rastrillo, Pez sierra, Pez sierra común, Sägefisch (F) Poisson-scie tident, Requin-scie
Pristis pristis (Linnaeus, 1758) **I** PRISTIDAE (Elasmobranchii) (E) Common Sawfish (S) Pejepeine,

Siderastrea siderea dominicensis (Ellis & Solander, 1786) = Siderastrea siderea (Ellis & Solander, 1786)

Snake, Wood (E): *Tropidophis curtus*

Snake, Wood (E): *Tropidophis canus*

Souffleur (F): *Tursiops truncatus*

Speotyto cunicularia (Molina, 1782) = Athene cunicularia (Molina, 1782)

Sphargis angusta Philippi, 1899 = Dermochelys coriacea (Vandelli, 1761)

Sphargis coriacea (Linnaeus, 1766) = Dermochelys coriacea (Vandelli, 1761)

Sphargis mercurialis Merrem, 1820 = Dermochelys coriacea (Vandelli, 1761)

Sphyrna diplana (Springer 1941) = Sphyrna lewini (Griffith & Smith, 1834)

Sphyrna lewini (Griffith & Smith, 1834) **II** SPHYRNIDAE (Elasmobranchii) (E) Bronze hammerhead shark, gebuchteter Hammerhai, Hammerhead, Hammerhead shark, Kidney-headed shark, Scalloped hamerhead, Scalloped Hammerhead, Scalloped hammerhead shark, Southern hammerhead shark (S) Cachona, Cornúa, Cornuda, Cornuda comun, Cornuda común, Cornuda martillo, Cornuda negra, Morfillo, Pez martillo, Tiburón martillo, Tiburón martillo festoneado (F) Requin marteau, Requin-marteau halicorne

Sphyrna mokarran (Rüppell 1837) **II** SPHYRNIDAE (Elasmobranchii) (E) Great hammerhead, Great hammerhead shark (S) Cornuda gigante (F) Grand requin-marteau

Squalus alopecias Gronow, 1854 = Alopias vulpinus Bonnaterre, 1788

Squalus caninus Osbeck, 1765 = Carcharodon carcharias (Linnaeus, 1758)

Squalus vulpes Gmelin, 1788 = Alopias vulpinus Bonnaterre, 1788

Stenella attenuata (Gray, 1846) **II** [20] DELPHINIDAE (Mammalia) (E) Bridled Dolphin, Narrow-snouted Dolphin, Pantropical Spotted Dolphin (S) Delfín manchado, Delfín pintado (F) Dauphin tacheté pantropical

Stenella attenuata frontalis (Gray, 1846) = Stenella frontalis (G. Cuvier, 1829)

Stenella clymene (Gray, 1846) **II** [20] DELPHINIDAE (Mammalia) (E) Atlantic Spinner Dolphin, Clymene Dolphin, Helmet Dolphin (F) Dauphin de Clymène

Stenella dubia attenuata Cuvier, 1812 = Stenella attenuata (Gray, 1846)

Stenella frontalis (G. Cuvier, 1829) **II** [20] DELPHINIDAE (Mammalia) (E) Atlantic Spotted Dolphin (S) Delfín manchado del Atlántico (F) Dauphin tacheté de l'Atlantique

Stenella graffmani Lönnberg, 1934 = Stenella attenuata (Gray, 1846)

Stenella longirostris (Gray, 1828) **II** [20] DELPHINIDAE (Mammalia) (E) Long-beaked Dolphin, Long-snouted Dolphin, Spinner Dolphin (S) Delfín tornillón (F) Dauphin longirostre

Stenella malayana Lesson, 1826 = Stenella attenuata (Gray, 1846)

Stenella microps Gray, 1846 = Stenella longirostris (Gray, 1828)

Stenella pernettensis (de Blainville, 1817) = Stenella frontalis (G. Cuvier, 1829)

Stenella plagiodon Cope, 1866 = Stenella frontalis (G. Cuvier, 1829)

Stenella roseiventris Wagner, 1853 = Stenella longirostris (Gray, 1828)

Sténo (F): *Steno bredanensis*

Steno bredanensis (G. Cuvier in Lesson, 1828) **II** [20] DELPHINIDAE (Mammalia) (E) Rough-toothed Dolphin (S) Delfín de pico largo (F) Sténo

Stenocyathus decamera Ralph & Squires, 1962 = Stenocyathus vermiformis (Pourtalès, 1868)

Stenocyathus vermiformis (Pourtalès, 1868) **II** GUYNIIDAE (Anthozoa) (E) Worm Coral (S) Coral gusanero

Stenocyathus washingtoni Cecchini, 1914 = Stenocyathus vermiformis (Pourtalès, 1868)

Stenohelia complanata (Pourtalès, 1867) = Stylaster complanatus Pourtalès, 1867

Stenohelia virginis (Lindström, 1877) = Stylaster complanatus Pourtalès, 1867

Stephanocoenia goodei (Verrill, 1900) = Stephanocoenia intersepta (Esper, 1795)

Stephanocoenia intersepta (Esper, 1795) **II** ASTROCOENIIDAE (Anthozoa) (E) Blushing Star Coral (S) Coral estrella sonrojado (F) Corail étoile rougissant

Stephanocoenia michelinii Milne Edwards & Haime, 1848 = Stephanocoenia intersepta (Esper, 1795)

Stephanocyathus coronatus (Pourtalès, 1867) **II** CARYOPHYLLIIDAE (Anthozoa) (E) Crowned Cup Coral (S) Coral tazón coronado

Stephanocyathus diadema (Moseley, 1876) **II** CARYOPHYLLIIDAE (Anthozoa) (E) Diadem Cup Coral (S) Coral diadema

Stephanocyathus discoides (Moseley, 1876) = Stephanocyathus diadema (Moseley, 1876)

Stephanocyathus laevifundus Cairns, 1977 **II** CARYOPHYLLIIDAE (Anthozoa)

Stephanocyathus paliferus Cairns, 1977 **II** CARYOPHYLLIIDAE (Anthozoa)

Stephanotrochus diadema (Moseley, 1876) = Stephanocyathus diadema (Moseley, 1876)

Stephanotrochus discoides (Moseley, 1876) = Stephanocyathus diadema (Moseley, 1876)

Stereopsammia rostrata (Pourtalès, 1878) = Enallopsammia rostrata (Pourtalès, 1878)

Strix alba Scopoli, 1769 = Tyto alba (Scopoli, 1769)

Strix cunicularia Molina, 1782 = Athene cunicularia (Molina, 1782)

Strix flammea Pontopiddan, 1763 = Asio flammeus (Pontoppidan, 1763)

Strombe Géant (F): *Strombus gigas*

Strombus gigas Linnaeus, 1758 **II** STROMBIDAE (Gastropoda) (E) Pink Conch, Queen Conch (S) Concha reina del Caribe (F) Lambis, Strombe Géant

Stylaster complanatus Pourtalès, 1867 **II** STYLASTERIDAE (Hydrozoa) (E) Bladed Lace Coral

FLORA

Acajou de Cuba (S): *Swietenia mahagoni*
Acajou de Santo Domingo (S): *Swietenia mahagoni*
Aeranthes jamaicensis Rchb.f. & Wullschl. = Campylocentrum jamaicense (Rchb.f. & Wullschl.) Benth. ex Fawc.
Aeranthes lindenii (Lindl.) Rchb.f. 1864 = Dendrophylax lindenii (Lindl.) Benth. ex Rolfe
Alpargata (S): *Consolea macracantha*
Anacheilium cochleatum arrogans (Ames) Small = Encyclia cochleata (L.) Lemée
Anacheilium cochleatum (L.) Hoffmanns = Encyclia cochleata (L.) Lemée
Angraecum lindenii (Lindl.) Cogn. 1910 = Dendrophylax lindenii (Lindl.) Benth. ex Rolfe
Angraecum lindenii (Lindl.) Garay 1969 = Dendrophylax lindenii (Lindl.) Benth. ex Rolfe
Angraecum maculatum = Oeceoclades maculata (Lindl.) Lindl.
Angraecum monophyllum = Oeceoclades maculata (Lindl.) Lindl.
Anoectochilus querceticola (Lindl.) Veitch ex R.Hogg = Aspidogyne querceticola (Lindl.) Meneguzzo
Arrowroot, Florida (E): *Zamia integrifolia*
Arthrothamnus cassythoides (Boissier) Millspaugh = Euphorbia cassythoides Boiss
Aspidogyne maculata (Hook.) Meneguzzo = Aspidogyne querceticola (Lindl.) Meneguzzo
Aspidogyne mayoriana (Kraenzl.) Meneguzzo = Aspidogyne querceticola (Lindl.) Meneguzzo
Aspidogyne querceticola (Lindl.) Meneguzzo #4 **II** [66] ORCHIDACEAE
Aspidogyne sagrana (A.Rich.) Meneguzzo = Aspidogyne querceticola (Lindl.) Meneguzzo
Aspidogyne vaginata (Hook.) Meneguzzo = Aspidogyne querceticola (Lindl.) Meneguzzo
Aulizeum cochleatum (L.) Lindl. ex Stein = Encyclia cochleata (L.) Lemée
Bois de Gaïac (F): *Guaiacum officinale*
Bois de Gaïac (F): *Guaiacum sanctum*
Bois de saint (F): *Guaiacum officinale*
Bois de vie (F): *Guaiacum officinale*
Brachystele polyantha (Rchb.f.) Burns-Bal., 1982 #4 **II** [66] ORCHIDACEAE
Broughtonia lindenii (Lindl.) Dressler #4 **II** [66] ORCHIDACEAE
Cactus, Aboriginal Prickly-apple (E): *Harrisia gracilis*
Cactus, Fragrant Prickly-apple (E): *Harrisia gracilis*
Cactus, Fragrant Woolly (E): *Harrisia gracilis*
Cactus, Nash's Prickly-pear (E): *Consolea macracantha*
Cactus, Organ (E): *Pilosocereus royenii*
Cactus, Pope's Head (E): *Melocactus intortus*
Cactus, Red-topped Barrel (E): *Melocactus intortus*
Cactus, Simpson's Prickly-apple (E): *Harrisia gracilis*
Cactus, Turk's Cap (E): *Melocactus intortus*
Cactus, Turk's Head (E): *Melocactus intortus*
Cactus, Turk's Island Prickly-pear (E): *Opuntia lucayana*
Cactus, Yellow Prickly -apple (E): *Harrisia gracilis*
Callista flavescens (Lindl.) Kuntze = Polystachya concreta (Jacq.) Garay & H.R.Sweet
Campylocentrum jamaicense (Rchb.f. & Wullschl.) Benth. ex Fawc. #4 **II** [66] ORCHIDACEAE
Caoba Española (S): *Swietenia mahagoni*
Cattleyopsis northropiorum Cogn. 1910 = Broughtonia lindenii (Lindl.) Dressler
Cephalocereus bahamensis Britton & Rose = Pilosocereus polygonus (Lamarck) Byles & Rowley
Cephalocereus barbadensis Britton & Rose = Pilosocereus royenii (L.) Byles & Rowley
Cephalocereus brooksianus (Britton & Rose) = Pilosocereus royenii (L.) Byles & Rowley
Cephalocereus gaumeri (Britton & Rose) = Pilosocereus royenii (L.) Byles & Rowley
Cephalocereus keyensis Britton & Rose = Pilosocereus polygonus (Lamarck) Byles & Rowley
Cephalocereus millspaughii Britton = Pilosocereus royenii (L.) Byles & Rowley
Cephalocereus monoclonos (De Candolle) Britton & Rose = Pilosocereus royenii (L.) Byles & Rowley
Cephalocereus nobilis (Haw.) Britton & Rose = Pilosocereus royenii (L.) Byles & Rowley
Cephalocereus polygonus (Lam.) Britton & Rose = Pilosocereus polygonus (Lamarck) Byles & Rowley
Cephalocereus robinii (Lem.) Britt. et Wils. = Pilosocereus polygonus (Lamarck) Byles & Rowley
Cephalocereus royenii Britton & Rose = Pilosocereus royenii (L.) Byles & Rowley
Cephalocereus swartzii (Griseb.) Britton & Rose = Pilosocereus royenii (L.) Byles & Rowley
Cereus boeckmannii Otto ex Salm-Dyck = Selenicereus pteranthus (Link & Otto) Britton & Rose
Cereus gracilis Miller = Harrisia gracilis (Miller) Britton
Cereus portoricensis Urb. = Harrisia gracilis (Miller) Britton
Cereus pteranthus Link & Otto = Selenicereus pteranthus (Link & Otto) Britton & Rose
Cereus robinii (Lemaire) L.Benson = Pilosocereus polygonus (Lamarck) Byles & Rowley
Consolea falcata (Ekman & Werdermann) F.Knuth = Consolea macracantha (Grisebach) Berger
Consolea macracantha (Grisebach) Berger #4 **II** [52] CACTACEAE (E) Nash's Prickly-pear Cactus (S) Alpargata, Tuna de cruz
Consolea millspaughii (Britton) Berg = Consolea macracantha (Grisebach) Berger
Consolea nashii (Britton) Berger = Consolea macracantha (Grisebach) Berger
Consolea nashii gibarensis A.E.Areces-Kallea = Consolea macracantha (Grisebach) Berger
Coontie, Florida (E): *Zamia integrifolia*
Cranichis muscosa Sw. #4 **II** [66] ORCHIDACEAE
Dalbergia brownei (Jacq.) Schinz, p.p. = Dalbergia ecastaphyllum (L.) Taub.
Dalbergia ecastaphylla (L.) Taub. [Spelling variant] = Dalbergia ecastaphyllum (L.) Taub.
Dalbergia ecastaphyllum (L.) Taub. #15 **II** LEGUMINOSAE

Dalbergia ecastophyllum (L.) Taub. [Spelling variant] = Dalbergia ecastaphyllum (L.) Taub.

Dendrophylax lindenii (Lindl.) Benth. ex Rolfe #4 **II** 66 ORCHIDACEAE

Diacrium bidentatum (Lindl.) Hemsl. = Encyclia boothiana (Lindley) Dressler

Dinema paleaceum Lindl. = Nidema boothii (Lindl.) Schltr.

Eltroplectris calcarata (Sw.) Garay & H.R.Sweet 1972 #4 **II** 66 ORCHIDACEAE

Encyclia altissima Schltr. #4 **II** 66 ORCHIDACEAE

Encyclia bahamensis (Grisebach.) Britton & Millsp. = Encyclia rufa (Lindl.) Britt. & Millsp.

Encyclia boothiana (Lindley) Dressler #4 **II** 66 ORCHIDACEAE

Encyclia boothiana erthronioides (Small) Hágsater ex Christenson,Lindl. = Prosthechea boothiana (Lindl.) W.E.Higgins

Encyclia cochleata (L.) Lemée #4 **II** 66 ORCHIDACEAE

Encyclia cochleata (L.) Dressler = Prosthechea cochleata (L.) W.E.Higgins

Encyclia fehlingii (Sauleda) Sauleda & R.M. Adams #4 **II** 66 ORCHIDACEAE

Encyclia gracilis (Lindley) Schltr. #4 **II** 66 ORCHIDACEAE

Encyclia hodgeana (Hawkes) Beckner #4 **II** 66 ORCHIDACEAE

Encyclia inaguensis Nash ex Britton & Millsp. #4 **II** 66 ORCHIDACEAE

Encyclia paleacea (Lindl.) A.Lemée 1955 = Nidema boothii (Lindl.) Schltr.

Encyclia rufa (Lindl.) Britt. & Millsp. #4 **II** 66 ORCHIDACEAE

Encyclia selligera (Bateman ex Lindley) Schltr. #4 **II** 66 ORCHIDACEAE

Encyclia tampensis (Lindl.) Small #4 **II** 66 ORCHIDACEAE

Encyclia withneri (Sauleda) Sauleda & R.M. Adams #4 **II** 66 ORCHIDACEAE

Epicladium boothianum Lindl. Small = Encyclia boothiana (Lindley) Dressler

Epidendrum auritum Lindl. (1843) = Nidema boothii (Lindl.) Schltr.

Epidendrum bahamense Grisebach. = Encyclia rufa (Lindl.) Britt. & Millsp.

Epidendrum bidentatum Lindl. = Encyclia boothiana (Lindley) Dressler

Epidendrum boothianum Lindl. = Encyclia boothiana (Lindley) Dressler

Epidendrum boothii (Lindl.) L.O.Williams (1939) = Nidema boothii (Lindl.) Schltr.

Epidendrum cochleatum L. = Encyclia cochleata (L.) Lemée

Epidendrum erythronioides Small = Encyclia boothiana (Lindley) Dressler

Epidendrum lindenianum Rich. & Galeotti 1845 = Nidema boothii (Lindl.) Schltr.

Epidendrum ottonis Rchb.f. = Nidema ottonis Ames & C.Schweinf.

Epidendrum paleaceum (Lindl.) Rchb.f. (1866) = Nidema boothii (Lindl.) Schltr.

Epidendrum primulinum Bateman ex Lindl. = Encyclia rufa (Lindl.) Britt. & Millsp.

Epidendrum rigidum Jacq. #4 **II** 66 ORCHIDACEAE

Epidendrum rufum Lindl. = Encyclia rufa (Lindl.) Britt. & Millsp.

Epidendrum selligerum Bateman ex Lindl. = Encyclia selligera (Bateman ex Lindley) Schltr.

Epidendrum tampense Lindl. = Encyclia tampensis (Lindl.) Small

Epidendrum triandrum (Ames) House = Encyclia cochleata (L.) Lemée

Epidendrum violodora Gal. ex Lindl. = Encyclia selligera (Bateman ex Lindley) Schltr.

Erythrodes maculata (Hook.) Ames = Aspidogyne querceticola (Lindl.) Meneguzzo

Erythrodes mayoriana (Kraenzl.) Ames = Aspidogyne querceticola (Lindl.) Meneguzzo

Erythrodes querceticola (Lindl.) Ames = Aspidogyne querceticola (Lindl.) Meneguzzo

Erythrodes sagrana (A.Rich.) León = Aspidogyne querceticola (Lindl.) Meneguzzo

Erythrodes trinitatis Ames = Aspidogyne querceticola (Lindl.) Meneguzzo

Erythrodes vaginata (Hook.) Ames = Aspidogyne querceticola (Lindl.) Meneguzzo

Euphorbia cassythoides Boiss #4 **II** 55 EUPHORBIACEAE

Euphorbia prostrata Aiton #4 **II** 55 EUPHORBIACEAE

Euphorbia punicea Swartz #4 **II** 55 EUPHORBIACEAE

Gaïac (F): *Guaiacum officinale*

Gayac (F): *Guaiacum sanctum*

Gayac (F): *Guaiacum officinale*

Goodyera querceticola (Lindl.) Chapm. = Aspidogyne querceticola (Lindl.) Meneguzzo

Govenia utriculata (Sw.) Lindl. #4 **II** 66 ORCHIDACEAE

Guaïac (F): *Guaiacum sanctum*

Guaiacum (E): *Guaiacum officinale*

Guaiacum (E): *Guaiacum sanctum*

Guaiacum bijugum Stokes = Guaiacum officinale L.

Guaiacum guatemalense Planch. ex Hemsl. = Guaiacum sanctum L.

Guaiacum guatemalense Planch. ex Rydb. = Guaiacum sanctum L.

Guaiacum, Gum (E): *Guaiacum sanctum*

Guaiacum, Gum (E): *Guaiacum officinale*

Guaiacum multijugum Stokes = Guaiacum sanctum L.

Guaiacum officinale L. #2 **II** ZYGOPHYLLACEAE (E) Brazil Wood, Commoner Lignum Vitae, Guaiac Tree, Guaiacum, Guaiacum Resin, Guaiacum Wood, Gum Guaiacum, Lignum Vitae, Pockwood, Tree of Life, Vera, Wood of life (S) Guajacum, Guayacán negro, Guayaco, Leno de Guayaco, Palo de vida, Palosanto, Palo Santo, Pau Santo (F) Bois de Gaïac, Bois de saint, Bois de vie, Gaïac, Gayac, Resina de Gayaco, Resin de Gaïac

Guaiacum sanctum L. #2 **II** ZYGOPHYLLACEAE (E) Bastard Lignum-vitae, Brazil Wood, Guaiacum, Guaiacum Resin, Guaiacum Wood, Gum Guaiacum, Holywood Lignum Vitae, Pockwood (S) Guajacum, Guayacan, Guayacán blanco, Guayacancillo, Guayacán real, Lenha de Guayaco, Palasanto (F) Bois de Gaïac, Gayac, Guaïac, Resina de Guayaco, Resin de Gaïac

Guaiacum sloanei Shuttl. ex A.Gray = Guaiacum sanctum L.

Guaiacum verticale Orteg. = Guaiacum sanctum L.

Guajacum (S): *Guaiacum officinale*

Guajacum (S): *Guaiacum sanctum*

Guayacan (S): *Guaiacum sanctum*

Guayacán blanco (S): *Guaiacum sanctum*

Guayacancillo (S): *Guaiacum sanctum*

Guayacán negro (S): *Guaiacum officinale*

Guayacán real (S): *Guaiacum sanctum*

Guayaco (S): *Guaiacum officinale*

Gyrostachys aphylla (Hook.) Kuntze 1891 = Sacoila lanceolata (Aubl.) Garay

Gyrostachys ensifolia (Rchb.f.) Kuntze = Spiranthes vernalis Engelm. & A.Gray

Gyrostachys lanceolata (Aubl.) Kuntze = Sacoila lanceolata (Aubl.) Garay

Gyrostachys linearis Rydb. = Spiranthes vernalis Engelm. & A.Gray

Gyrostachys orchidioides (Sw.) Kuntze = Sacoila lanceolata (Aubl.) Garay

Gyrostachys praecox (Britton, Sterns & Poggenb.) Kuntze = Spiranthes vernalis Engelm. & A.Gray

Gyrostachys reverchonii Small = Spiranthes vernalis Engelm. & A.Gray

Gyrostachys speciosa (Jacq.) Kuntze 1891 = Stenorrhynchos speciosum (Jacq.) L.C.Rich. ex Spreng.

Gyrostachys stenorrhynchus Kuntze 1891 = Sacoila lanceolata (Aubl.) Garay

Gyrostachys vernalis (Engelm. & A.Gray) Kuntze = Spiranthes vernalis Engelm. & A.Gray

Gyrostachys xyridifolia Small = Spiranthes vernalis Engelm. & A.Gray

Habenaria alata Hook. #4 **II** [66] ORCHIDACEAE

Habenaria floribunda Lindl. #4 **II** [66] ORCHIDACEAE

Harrisia aboriginum Small ex Britton & Rose = Harrisia gracilis (Miller) Britton

Harrisia brookii Britton = Harrisia gracilis (Miller) Britton

Harrisia deeringii Backeberg = Harrisia gracilis (Miller) Britton

Harrisia divaricata (Lamarck) Backeberg = Harrisia gracilis (Miller) Britton

Harrisia donae-antoniae M.L.Hooten = Harrisia gracilis (Miller) Britton

Harrisia fernowii Britton = Harrisia gracilis (Miller) Britton

Harrisia fragrans Small ex Britton & Rose = Harrisia gracilis (Miller) Britton

Harrisia gracilis (Miller) Britton #4 **II** [52] CACTACEAE (E) Aboriginal Prickly-apple Cactus, Fragrant Prickly-apple Cactus, Fragrant Woolly Cactus, Simpson's Prickly-apple Cactus, Yellow Prickly -apple Cactus

Harrisia hurstii W.T.Marshall = Harrisia gracilis (Miller) Britton

Harrisia nashii Britton = Harrisia gracilis (Miller) Britton

Harrisia portoricensis Britton = Harrisia gracilis (Miller) Britton

Harrisia serruliflora (Haworth) Lourteig = Harrisia gracilis (Miller) Britton

Harrisia simpsonii Small ex Britton & Rose = Harrisia gracilis (Miller) Britton

Harrisia taylori Britton = Harrisia gracilis (Miller) Britton

Harrisia taylorii = Harrisia gracilis (Miller) Britton

Head, Cactus, Pope's (E): *Mammillaria nivosa*

Hormidium boothianum (Lindl.) Brieger = Encyclia boothiana (Lindley) Dressler

Hormidium boothii (Lindl.) Brieger 1977 = Nidema boothii (Lindl.) Schltr.

Hormidium cohleatum (L.) Brieger = Encyclia cochleata (L.) Lemée

Ibidium coloratum House 1915 = Stenorrhynchos speciosum (Jacq.) L.C.Rich. ex Spreng.

Ibidium cristallgerum salisb. 1812 = Sacoila lanceolata (Aubl.) Garay

Ibidium lucayanum Britton = Mesadenus lucayanus (Britton) Schltr.

Ibidium speciosum (Jacq.) Salisb. 1812 = Stenorrhynchos speciosum (Jacq.) L.C.Rich. ex Spreng.

Ibidium vernale (Engelm. & A.Gray) House = Spiranthes vernalis Engelm. & A.Gray

Lenha de Guayaco (S): *Guaiacum sanctum*

Leno de Guayaco (S): *Guaiacum officinale*

Life, Tree of (E): *Guaiacum officinale*

life, Wood of (E): *Guaiacum officinale*

Lignum-vitae, Bastard (E): *Guaiacum sanctum*

Limodorum lanceolatum Aubl. 1775 = Sacoila lanceolata (Aubl.) Garay

Macradenia lutescens R. Br. #4 **II** [66] ORCHIDACEAE (E) Trinidad Macradenia

Macradenia, Trinidad (E): *Macradenia lutescens*

Mahogani de Saint-Dominique (F): *Swietenia mahagoni*

Mahogani petites feuilles (F): *Swietenia mahagoni*

Mahogany (E): *Swietenia mahagoni*

mahogany, American (E): *Swietenia mahagoni*

Mahogany, Cuban (E): *Swietenia mahagoni*

Mahogany, West Indian (E): *Swietenia mahagoni*

Malaxis spicata Sw. #4 **II** [66] ORCHIDACEAE (E) Florida Adder's-mouth Orchid

Mammillaria flavescens Haworth = Mammillaria nivosa Link ex Pfeiffer

Mammillaria nivosa Link ex Pfeiffer #4 **II** [52] CACTACEAE (E) Cactus, Pope's Head

Maxillaria boothii Lindl. 1838 = Nidema boothii (Lindl.) Schltr.

Melocactus communis Link & Otto = Melocactus intortus (Miller) Urban

Melocactus coronatus (Lamarck) Backeberg = Melocactus intortus (Miller) Urban

Melocactus intortus (Miller) Urban #4 **II** [52] CACTACEAE (E) Pope's Head Cactus, Red-topped Barrel Cactus, Turk's Cap Cactus, Turk's Head Cactus (F) Tête a l'anglais

Melocactus perezassoi Areces = Melocactus intortus (Miller) Urban

Mesadenus lucayanus (Britton) Schltr. #4 **II** [66] ORCHIDACEAE

Mesadenus stahlii (Cogn.) Garay = Mesadenus lucayanus (Britton) Schltr.

Microchilus querceticola (Lindl.) D.Dietr. = Aspidogyne querceticola (Lindl.) Meneguzzo

Neottia aphylla Hook. 1828 = Sacoila lanceolata (Aubl.) Garay

Neottia lanceolata (Aubl.) Willd. = Sacoila lanceolata (Aubl.) Garay

Neottia orchidioides (Sw.) Willd. = Sacoila lanceolata (Aubl.) Garay

Neottia speciosa Jacq. 1970 = Stenorrhynchos speciosum (Jacq.) L.C.Rich. ex Spreng.

Neottia squamulosa Kunth = Sacoila lanceolata (Aubl.) Garay

Nidema boothii (Lindl.) Schltr. #4 **II** [66] ORCHIDACEAE

Nidema ottonis Ames & C.Schweinf. #4 **II** [66] ORCHIDACEAE

Nidema palacea Lindl. 1840 = Nidema boothii (Lindl.) Schltr.

Oeceoclades maculata (Lindl.) Lindl. #4 **II** [66] ORCHIDACEAE

Oncidium ensatum Lindl. #4 **II** [66] ORCHIDACEAE

Oncidium floridanum Ames #4 **II** [66] ORCHIDACEAE (E) Florida Orchid

Oncidium lucayanum Nash ex Britton & Millsp. #4 **II** [66] ORCHIDACEAE

Oncidium sasseri Moir #4 **II** [66] ORCHIDACEAE

Opuntia anahuacensis Griffiths = Opuntia stricta (Haworth) Haworth

Opuntia atrocapensis Small = Opuntia stricta (Haworth) Haworth

Opuntia bahamana Britton & Rose = Opuntia stricta (Haworth) Haworth

Opuntia dillenii (Ker-Gawler) Haworth = Opuntia stricta (Haworth) Haworth

Opuntia falcata Ekman & Werdermann = Consolea macracantha (Grisebach) Berger

Opuntia keyensis Britton & Small = Opuntia stricta (Haworth) Haworth

Opuntia lucayana Britton #4 **II** [52] CACTACEAE (E) Turk's Island Prickly-pear Cactus

Opuntia macracantha (Grisebach) Berger = Consolea macracantha (Grisebach) Berger

Opuntia macrarthra Gibbes = Opuntia stricta (Haworth) Haworth

Opuntia magnifica Small = Opuntia stricta (Haworth) Haworth

Opuntia melanosperma Svenson = Opuntia stricta (Haworth) Haworth

Opuntia millspaughii Britton = Consolea macracantha (Grisebach) Berger

Opuntia nashii Britton = Consolea macracantha (Grisebach) Berger

Opuntia nejapensis Bravo = Opuntia stricta (Haworth) Haworth

Opuntia nitens Small = Opuntia stricta (Haworth) Haworth

Opuntia stricta (Haworth) Haworth #4 **II** [52] CACTACEAE

Opuntia subsphaerocarpa Spegazzini = Opuntia stricta (Haworth) Haworth

Opuntia tehuantepecana (Bravo) Bravo = Opuntia stricta (Haworth) Haworth

Opuntia tenuiflora Small = Opuntia stricta (Haworth) Haworth

Opuntia zebrina Small = Opuntia stricta (Haworth) Haworth

Orchid, Florida (E): *Oncidium floridanum*

Orchid, Florida Adder's-mouth (E): *Malaxis spicata*

Orchid, Variegated (E): *Tolumnia bahamensis*

Palasanto (S): *Guaiacum sanctum*

Palo de vida (S): *Guaiacum officinale*

Palosanto (S): *Guaiacum officinale*

Palo Santo (S): *Guaiacum officinale*

Pau Santo (S): *Guaiacum officinale*

Pear, Vine (E): *Pilosocereus royenii*

Pelexia setacea Lindl. = Eltroplectris calcarata (Sw.) Garay & H.R.Sweet 1972

Phadrosanthus cochleatus (L.) Kuntze = Encyclia cochleata (L.) Lemée

Physurus commelinifolius Rchb.f. = Aspidogyne querceticola (Lindl.) Meneguzzo

Physurus humidicola Schltr. = Aspidogyne querceticola (Lindl.) Meneguzzo

Physurus jamaicensis Fawc. & Rendle = Aspidogyne querceticola (Lindl.) Meneguzzo

Physurus maculatus Hook. = Aspidogyne querceticola (Lindl.) Meneguzzo

Physurus mayorianus Kraenzl. = Aspidogyne querceticola (Lindl.) Meneguzzo

Physurus parviflorus Schltr. = Aspidogyne querceticola (Lindl.) Meneguzzo

Physurus querceticola Lindl. = Aspidogyne querceticola (Lindl.) Meneguzzo

Physurus sagranus A.Rich. = Aspidogyne querceticola (Lindl.) Meneguzzo

Physurus trilobulatus Schltr. = Aspidogyne querceticola (Lindl.) Meneguzzo

Physurus vaginatus Hook. = Aspidogyne querceticola (Lindl.) Meneguzzo

Pilosocereus bahamensis (Britton) Byles & Rowley = Pilosocereus polygonus (Lamarck) Byles & Rowley

Pilosocereus barbadensis (Britton & Rose) Byles & Rowley = Pilosocereus royenii (L.) Byles & Rowley

Pilosocereus brooksianus (Vaupel) Byles & Rowley = Pilosocereus polygonus (Lamarck) Byles & Rowley

Pilosocereus deeringii (Small) F.M.Knuth = Pilosocereus polygonus (Lamarck) Byles & Rowley

Pilosocereus gaumeri (Britton & Rose) Backeberg = Pilosocereus royenii (L.) Byles & Rowley

Pilosocereus keyensis (Britton & Rose) Byles & Rowley = Pilosocereus polygonus (Lamarck) Byles & Rowley

Pilosocereus monoclonos (De Candolle) Byles & Rowley = Pilosocereus royenii (L.) Byles & Rowley

Pilosocereus nobilis (Haworth) Byles & Rowley = Pilosocereus royenii (L.) Byles & Rowley

Pilosocereus polygonus (Lamarck) Byles & Rowley #4 **II** [52] CACTACEAE

Annotations key

Annotations not preceded by "#"

[1] ***Antilocapra americana***
Only the population of Mexico is included in Appendix I. No other population is included in the Appendices.

[2] ***Bos gaurus***
Excludes the domesticated form, which is referenced as *Bos frontalis*, and is not subject to the provisions of the Convention.

[3] ***Bos mutus***
Excludes the domesticated form, which is referenced as *Bos grunniens*, and is not subject to the provisions of the Convention.

[4] ***Bubalus arnee***
Excludes the domesticated form, which is referenced as *Bubalus bubalis* and is not subject to the provisions of the Convention.

[5] ***Ovis aries***
Except the subspecies included in Appendix I, the subspecies *Ovis aries isphahanica*, *Ovis aries laristanica*, *Ovis aries musimon* and *Ovis aries orientalis* which are not included in the Appendices, and the domesticated form *Ovis aries aries* which is not subject to the provisions of the Convention

[6] ***Ovis canadensis***
Only the population of Mexico; no other population is included in the Appendices.

[7] ***Vicugna vicugna***
Except the populations of: Argentina (the populations of the Provinces of Jujuy and Catamarca and the semi-captive populations of the Provinces of Jujuy, Salta, Catamarca, La Rioja and San Juan), Chile (population of the Primera Región), Ecuador (the whole population), Peru (the whole population) and the Plurinational State of Bolivia (the whole population), which are included in Appendix II.

[8] ***Moschus* spp.**
The populations of Afghanistan, Bhutan, India, Myanmar, Nepal and Pakistan are included in Appendix I. All other populations are included in Appendix II.

[8] ***Moschus* spp.**
Except the populations of Afghanistan, Bhutan, India, Myanmar, Nepal and Pakistan, which are included in Appendix I.

[9] **TAYASSUIDAE spp.**
Except the species included in Appendix I (*Catagonus wagneri*) and the populations of *Pecari tajacu* of Mexico and the United States of America, which are not included in the Appendices.

[10] ***Canis lupus***
Except the populations of Bhutan, India, Nepal and Pakistan, which are included in Appendix I. Excludes the domesticated form and the dingo which are referenced as *Canis lupus familiaris* and *Canis lupus dingo*.

[11] **FELIDAE spp.**
Included in Appendix II, except for the species included in Appendix I. Specimens of the domesticated form are not subject to the provisions of the Convention.

[12] ***Acinonyx jubatus***
Included in Appendix I. Annual export quotas for live specimens and hunting trophies are granted as follows: Botswana: 5; Namibia: 150; Zimbabwe: 50. The trade in such specimens is subject to the provisions of Article III of the Convention.

[13] ***Caracal caracal***
Except the Asian population, which is included in Appendix I.

[14] ***Panthera leo***
For *Panthera leo* (African populations): a zero annual export quota is established for specimens of bones, bone pieces, bone products, claws, skeletons, skulls and teeth removed from the wild and traded for commercial purposes. Annual export quotas for trade in bones, bone pieces, bone products, claws, skeletons, skulls and teeth

for commercial purposes, derived from captive breeding operations in South Africa, will be established and communicated annually to the CITES Secretariat.

15 ***Prionailurus bengalensis bengalensis***

Except the populations of Bangladesh, India and Thailand, which are included in Appendix I.

16 ***Prionailurus rubiginosus***

Except the population of India, which is included in Appendix I.

16 ***Prionailurus rubiginosus***

Only the population of India; all other populations are included in Appendix II.

17 ***Puma yagouaroundi***

Except the populations of Central and North America, which are included in Appendix I.

18 ***Aonyx capensis microdon***

Only the populations of Cameroon and Nigeria; all other populations are included in Appendix II.

19 ***Ursus arctos***

Only the populations of Bhutan, China, Mexico and Mongolia; all other populations are included in Appendix II.

19 ***Ursus arctos***

Except the populations of Bhutan, China, Mexico and Mongolia, which are included in Appendix I.

20 **CETACEA spp.**

Included in Appendix II, except for the species included in Appendix I. A zero annual export quota has been established for live specimens from the Black Sea population of Tursiops truncatus removed from the wild and traded for primarily commercial purposes.

21 ***Balaenoptera acutorostrata***

Population of West Greenland.

22 ***Pteropus* spp.**

Except *Pteropus brunneus* and the species included in Appendix I.

23 ***Chaetophractus nationi***

Included in Appendix II. A zero annual export quota has been established. All specimens shall be deemed to be specimens of species included in Appendix I and the trade in them shall be regulated accordingly.

24 ***Equus africanus***

Excludes the domesticated form, which is referenced as *Equus asinus* and is not subject to the provisions of the Convention.

25 ***Ceratotherium simum simum***

Only the populations of South Africa and Swaziland; all other populations are included in Appendix I. For the exclusive purpose of allowing international trade in live animals to appropriate and acceptable destinations and hunting trophies. All other specimens shall be deemed to be specimens of species included in Appendix I and the trade in them shall be regulated accordingly

26 ***Loxodonta africana***

The populations of Botswana, Namibia, South Africa and Zimbabwe are listed in Appendix II for the exclusive purpose of allowing:

a) trade in hunting trophies for non-commercial purposes;
b) trade in live animals to appropriate and acceptable destinations, as defined in Resolution Conf. 11.20, for Botswana and Zimbabwe and for in situ conservation programmes for Namibia and South Africa;
c) trade in hides;
d) trade in hair;
e) trade in leather goods for commercial or non-commercial purposes for Botswana, Namibia and South Africa and for non-commercial purposes for Zimbabwe;
f) trade in individually marked and certified ekipas incorporated in finished jewellery for non-commercial purposes for Namibia and ivory carvings for non-commercial purposes for Zimbabwe;
g) trade in registered raw ivory (for Botswana, Namibia, South Africa and Zimbabwe, whole tusks and pieces) subject to the following:
i) only registered government-owned stocks, originating in the State (excluding seized ivory and ivory of unknown origin);
ii) only to trading partners that have been verified by the Secretariat, in consultation with the Standing Committee,

to have sufficient national legislation and domestic trade controls to ensure that the imported ivory will not be re-exported and will be managed in accordance with all requirements of Resolution Conf. 10.10 (Rev. CoP14) concerning domestic manufacturing and trade;
iii) not before the Secretariat has verified the prospective importing countries and the registered government-owned stocks;
iv) raw ivory pursuant to the conditional sale of registered government-owned ivory stocks agreed at CoP12, which are 20,000 kg (Botswana), 10,000 kg (Namibia) and 30,000 kg (South Africa);
v) in addition to the quantities agreed at CoP12, government-owned ivory from Botswana, Namibia, South Africa and Zimbabwe registered by 31 January 2007 and verified by the Secretariat may be traded and despatched, with the ivory in paragraph g) iv) above, in a single sale per destination under strict supervision of the Secretariat;
vi) the proceeds of the trade are used exclusively for elephant conservation and community conservation and development programmes within or adjacent to the elephant range; and
vii) the additional quantities specified in paragraph g) v) above shall be traded only after the Standing Committee has agreed that the above conditions have been met; and
h) no further proposals to allow trade in elephant ivory from populations already in Appendix II shall be submitted to the Conference of the Parties for the period from CoP14 and ending nine years from the date of the single sale of ivory that is to take place in accordance with provisions in paragraphs g) i), g) ii), g) iii), g) vi) and g) vii). In addition such further proposals shall be dealt with in accordance with Decisions 14.77 and 14.78 (Rev. CoP15).

On a proposal from the Secretariat, the Standing Committee can decide to cause this trade to cease partially or completely in the event of non-compliance by exporting or importing countries, or in the case of proven detrimental impacts of the trade on other elephant populations.

All other specimens shall be deemed to be specimens of species included in Appendix I and the trade in them shall be regulated accordingly.

27 ***Chinchilla* spp.**

Specimens of the domesticated form are not subject to the provisions of the Convention

28 **FALCONIFORMES spp.**

Except *Caracara lutosa* and the species of the family Cathartidae, which are not included in the Appendices; and the species included in Appendices I and III.

29 ***Falco newtoni***

Only the population of Seychelles.

29 ***Falco newtoni***

Except the population of the Seychelles, which is included in Appendix I.

30 **PSITTACIFORMES spp.**

Included in Appendix II, except for the species included in Appendix I and *Agapornis roseicollis, Melopsittacus undulatus, Nymphicus hollandicus* and *Psittacula krameri*, which are not included in the Appendices.

31 **STRIGIFORMES spp.**

Except *Sceloglaux albifacies* and the species included in Appendix I.

32 ***Struthio camelus***

Only the populations of Algeria, Burkina Faso, Cameroon, the Central African Republic, Chad, Mali, Mauritania, Morocco, Niger, Nigeria, Senegal and Sudan are included in Appendix I. No other population is included in the Appendices.

33 ***Caiman latirostris***

Except the population of Argentina, which is included in Appendix II.

34 ***Crocodylus acutus***

Population of the Integrated Management District of Mangroves of the Bay of Cispata, Tinajones, La Balsa and Surrounding Areas, Department of Córdoba, Colombia, and the population of Cuba.

35 ***Crocodylus moreletii***

Only the population of Belize, which is included in Appendix II with a zero quota for wild specimens traded for commercial purposes, and the population of Mexico.

36 ***Crocodylus niloticus***

Populations of Botswana, Egypt (subject to a zero quota for wild specimens traded for commercial purposes), Ethiopia, Kenya, Madagascar, Malawi, Mozambique, Namibia, South Africa, Uganda, the United Republic of

Tanzania (subject to an annual export quota of no more than 1,600 wild specimens including hunting trophies, in addition to ranched specimens), Zambia and Zimbabwe.

36 ***Crocodylus niloticus***

Included in Appendix I, except the populations of Botswana, Egypt (subject to a zero quota for wild specimens traded for commercial purposes), Ethiopia, Kenya, Madagascar, Malawi, Mozambique, Namibia, South Africa, Uganda, the United Republic of Tanzania (subject to an annual export quota of no more than 1,600 wild specimens including hunting trophies, in addition to ranched specimens), Zambia and Zimbabwe, which are included in Appendix II

37 ***Crocodylus porosus***

Only the populations of Australia, Indonesia, Malaysia [wild harvest restricted to the State of Sarawak and a zero quota for wild specimens for the other States of Malaysia (Sabah and Peninsular Malaysia), with no change in the zero quota unless approved by the Parties] and Papua New Guinea; all other populations are included in Appendix I.

38 ***Abronia* spp.**

Except the species included in Appendix I. Zero export quota for wild specimens for *Abronia aurita, A. gaiophantasma, A. montecristoi, A. salvadorensis* and *A. vasconcelosii*.

39 **LANTHANOTIDAE spp.**

Zero export quota for wild specimens for commercial purposes.

40 ***Vipera ursinii***

Only the population of Europe, except the area which formerly constituted the Union of Soviet Socialist Republics; these latter populations are not included in the Appendices.

41 ***Chelodina mccordi***

Zero export quota for specimens from the wild.

42 ***Batagur borneoensis***

Zero quota for wild specimens for commercial purposes.

43 ***Batagur trivittata***

Zero quota for wild specimens for commercial purposes.

44 ***Cuora* spp.**

Zero quota for wild specimens for commercial purposes for *Cuora aurocapitata, C. bourreti, C. flavomarginata, C. galbinifrons, C. mccordi, C. mouhotii, C. pani, C. picturata, C. trifasciata, C. yunnanensis* and *C. zhoui*.

45 ***Heosemys annandalii***

Zero quota for wild specimens for commercial purposes.

46 ***Heosemys depressa***

Zero quota for wild specimens for commercial purposes.

47 ***Mauremys annamensis***

Zero quota for wild specimens for commercial purposes.

48 ***Orlitia borneensis***

Zero quota for wild specimens for commercial purposes.

49 **TESTUDINIDAE spp.**

Included in Appendix II, except for the species included in Appendix I. A zero annual export quota has been established for Centrochelys sulcata for specimens removed from the wild and traded for primarily commercial purposes.

50 ***Rheobatrachus* spp.**

Except *Rheobatrachus silus* and *Rheobatrachus vitellinus*.

51 ***Panax ginseng***

Only the population of the Russian Federation; no other population is included in the Appendices.

52 **CACTACEAE spp.**

Included in Appendix II, except for the species included in Appendix I, and for *Pereskia* spp., *Pereskiopsis* spp. and *Quiabentia* spp., which are not included in the Appendices. Additionally, artificially propagated specimens of the following hybrids and/or cultivars are not subject to the provisions of the Convention: – Hatiora x graeseri – Schlumbergera x buckleyi – Schlumbergera russelliana x Schlumbergera truncata – Schlumbergera orssichiana x

Schlumbergera truncata – Schlumbergera opuntioides x Schlumbergera truncata – Schlumbergera truncata (cultivars) – Cactaceae spp. colour mutants grafted on the following grafting stocks: Harrisia 'Jusbertii', Hylocereus trigonusor Hylocereus undatus – Opuntia microdasys (cultivars).

53 ***Dicksonia* spp.**

The populations of the Americas are included in Appendix II. No other population is included in the Appendices.

54 ***Diospyros* spp.**

Population of Madagascar.

55 ***Euphorbia* spp.**

Succulent species are included in Appendix II, except for *Euphorbia misera* and the species included in Appendix I. Other species are not included in the Appendices.
Additionally, artificially propagated specimens of cultivars of *Euphorbia trigona*, artificially propagated specimens of crested, fan-shaped or colour mutants of *Euphorbia lactea*, when grafted on artificially propagated root stock of *Euphorbia neriifolia*, and artificially propagated specimens of cultivars of *Euphorbia* 'Milii' when they are traded in shipments of 100 or more plants and readily recognizable as artificially propagated specimens, are not subject to the provisions of the Convention.

56 ***Euphorbia cremersii***

Included in Appendix I. Includes the forma *viridifolia* and the variety *rakotozafyi*.

57 ***Euphorbia cylindrifolia***

Included in Appendix I. Includes the subspecies *tuberifera*.

58 ***Euphorbia decaryi***

Included in Appendix I. Includes the varieties *ampanihyensis, robinsonii and spirosticha*.

59 ***Euphorbia moratii***

Included in Appendix I. Includes the varieties *antsingiensis, bemarahensis* and *multiflora*.

60 ***Aloe* spp.**

Included in Appendix II, except for the species included in Appendix I. Also excludes *Aloe vera*, also referenced as *Aloe barbadensis*, which is not included in the Appendices.

61 ***Aloe compressa***

Included in Appendix I. Includes the varieties *paucituberculata, rugosquamosa* and *schistophila*.

62 ***Aloe haworthioides***

Included in Appendix I. Includes the variety *aurantiaca*.

63 ***Aloe laeta***

Included in Appendix I. Includes the variety *maniaensis*.

64 ***Cedrela odorata***

Population of Guatemala.

65 ***Swietenia macrophylla***

Neotropical populations.

66 **ORCHIDACEAE spp.**

Included in Appendix II, except for the species included in Appendix I.
Additionally, artificially propagated hybrids of the following genera are not subject to the provisions of the Convention, if conditions, as indicated under a) and b), are met: *Cymbidium, Dendrobium, Phalaenopsis* and *Vanda*:
a) Specimens are readily recognizable as artificially propagated and do not show any signs of having been collected in the wild such as mechanical damage or strong dehydration resulting from collection, irregular growth and heterogeneous size and shape within a taxon and shipment, algae or other epiphyllous organisms adhering to leaves, or damage by insects or other pests; and
b) i) when shipped in non-flowering state, the specimens must be traded in shipments consisting of individual containers (such as cartons, boxes, crates or individual shelves of CC-containers) each containing 20 or more plants of the same hybrid; the plants within each container must exhibit a high degree of uniformity and healthiness; and the shipment must be accompanied by documentation, such as an invoice, which clearly states the number of plants of each hybrid; or
ii) when shipped in flowering state, with at least one fully open flower per specimen, no minimum number of specimens per shipment is required but specimens must be professionally processed for commercial retail sale, e.g. labelled with printed labels or packaged with printed packages indicating the name of the hybrid and the

country of final processing. This should be clearly visible and allow easy verification.
Plants not clearly qualifying for the exemption must be accompanied by appropriate CITES documents.

67 ***Aerangis ellisii***

Included in Appendix I. Seedling or tissue cultures obtained in vitro, in solid or liquid media, and transported in sterile containers are not subject to the provisions of the Convention only if the specimens meet the definition of 'artificially propagated' agreed by the Conference of the Parties in Resolution Conf. 11.11 (Rev. CoP15), i.e. plant specimens: a) grown under controlled conditions; and b) grown from seeds, cuttings, divisions, callus tissues or other plant tissues, spores or other propagules that either are exempt from the provisions of the Convention or have been derived from cultivated parental stock.

68 ***Dendrobium cruentum***

Included in Appendix I. Seedling or tissue cultures obtained in vitro, in solid or liquid media, and transported in sterile containers are not subject to the provisions of the Convention only if the specimens meet the definition of 'artificially propagated' agreed by the Conference of the Parties in Resolution Conf. 11.11 (Rev. CoP15), i.e. plant specimens: a) grown under controlled conditions; and b) grown from seeds, cuttings, divisions, callus tissues or other plant tissues, spores or other propagules that either are exempt from the provisions of the Convention or have been derived from cultivated parental stock.

69 ***Laelia jongheana***

Included in Appendix I. Seedling or tissue cultures obtained in vitro, in solid or liquid media, and transported in sterile containers are not subject to the provisions of the Convention only if the specimens meet the definition of 'artificially propagated' agreed by the Conference of the Parties in Resolution Conf. 11.11 (Rev. CoP15), i.e. plant specimens: a) grown under controlled conditions; and b) grown from seeds, cuttings, divisions, callus tissues or other plant tissues, spores or other propagules that either are exempt from the provisions of the Convention or have been derived from cultivated parental stock.

70 ***Laelia lobata***

Included in Appendix I. Seedling or tissue cultures obtained in vitro, in solid or liquid media, and transported in sterile containers are not subject to the provisions of the Convention only if the specimens meet the definition of 'artificially propagated' agreed by the Conference of the Parties in Resolution Conf. 11.11 (Rev. CoP15), i.e. plant specimens: a) grown under controlled conditions; and b) grown from seeds, cuttings, divisions, callus tissues or other plant tissues, spores or other propagules that either are exempt from the provisions of the Convention or have been derived from cultivated parental stock.

71 ***Paphiopedilum* spp.**

Included in Appendix I. Seedling or tissue cultures obtained in vitro, in solid or liquid media, and transported in sterile containers are not subject to the provisions of the Convention only if the specimens meet the definition of 'artificially propagated' agreed by the Conference of the Parties in Resolution Conf. 11.11 (Rev. CoP15), i.e. plant specimens: a) grown under controlled conditions; and b) grown from seeds, cuttings, divisions, callus tissues or other plant tissues, spores or other propagules that either are exempt from the provisions of the Convention or have been derived from cultivated parental stock.

72 ***Peristeria elata***

Included in Appendix I. Seedling or tissue cultures obtained in vitro, in solid or liquid media, and transported in sterile containers are not subject to the provisions of the Convention only if the specimens meet the definition of 'artificially propagated' agreed by the Conference of the Parties in Resolution Conf. 11.11 (Rev. CoP15), i.e. plant specimens: a) grown under controlled conditions; and b) grown from seeds, cuttings, divisions, callus tissues or other plant tissues, spores or other propagules that either are exempt from the provisions of the Convention or have been derived from cultivated parental stock.

73 ***Phragmipedium* spp.**

Included in Appendix I. Seedling or tissue cultures obtained in vitro, in solid or liquid media, and transported in sterile containers are not subject to the provisions of the Convention only if the specimens meet the definition of 'artificially propagated' agreed by the Conference of the Parties in Resolution Conf. 11.11 (Rev. CoP15), i.e. plant specimens: a) grown under controlled conditions; and b) grown from seeds, cuttings, divisions, callus tissues or other plant tissues, spores or other propagules that either are exempt from the provisions of the Convention or have been derived from cultivated parental stock.

74 ***Renanthera imschootiana***

Included in Appendix I. Seedling or tissue cultures obtained in vitro, in solid or liquid media, and transported in sterile containers are not subject to the provisions of the Convention only if the specimens meet the definition of 'artificially propagated' agreed by the Conference of the Parties in Resolution Conf. 11.11 (Rev. CoP15), i.e. plant specimens: a) grown under controlled conditions; and b) grown from seeds, cuttings, divisions, callus tissues or other plant tissues, spores or other propagules that either are exempt from the provisions of the Convention or have been derived from cultivated parental stock.

75 ***Cyclamen* spp.**

Included in Appendix II. Artificially propagated specimens of cultivars of *Cyclamen persicum* are not subject to the provisions of the Convention. However, the exemption does not apply to such specimens traded as dormant tubers.

76 ***Osyris lanceolata***

Populations of Burundi, Ethiopia, Kenya, Rwanda, Uganda and the United Republic of Tanzania.

77 ***Siphonochilus aethiopicus***

Populations of Mozambique, South Africa, Swaziland and Zimbabwe.

Annotations preceded by ”#”

Annotations are used in the CITES Appendices to indicate which population, parts or derivatives are concerned by the listing or to clarify its scope. The meaning of the # annotations (applicable to flora only) has changed over the years. The # annotations that are currently valid are those adopted at the 16th Conference of the Parties (CoP 16). These are provided below.

CoP17	Valid from 02/01/2017
#1	All parts and derivatives, except: a) seeds, spores and pollen (including pollinia); b) seedling or tissue cultures obtained in vitro, in solid or liquid media, transported in sterile containers; c) cut flowers of artificially propagated plants; and d) fruits, and parts and derivatives thereof, of artificially propagated plants of the genus *Vanilla*
#2	All parts and derivatives except: a) seeds and pollen; and b) finished products packaged and ready for retail trade
#3	Designates whole and sliced roots and parts of roots, excluding manufactured parts or derivatives, such as powders, pills, extracts, tonics, teas and confectionery.
#4	All parts and derivatives, except: a) seeds (including seedpods of Orchidaceae), spores and pollen (including pollinia). The exemption does not apply to seeds from Cactaceae spp. exported from Mexico, and to seeds from *Beccariophoenix madagascariensis* and *Dypsis decaryi* exported from Madagascar; b) seedling or tissue cultures obtained in vitro, in solid or liquid media, transported in sterile containers; c) cut flowers of artificially propagated plants; d) fruits, and parts and derivatives thereof, of naturalized or artificially propagated plants of the genus *Vanilla* (Orchidaceae) and of the family Cactaceae; e) stems, flowers, and parts and derivatives thereof, of naturalized or artificially propagated plants of the genera *Opuntia* subgenus *Opuntia* and *Selenicereus* (Cactaceae); and f) finished products of *Euphorbia antisyphilitica* packaged and ready for retail trade
#5	Logs, sawn wood and veneer sheets
#6	Logs, sawn wood, veneer sheets and plywood
#7	Logs, woodchips, powder and extracts
#8	Underground parts (i.e. roots, rhizomes): whole, parts and powdered
#9	All parts and derivatives except those bearing a label: “Produced from *Hoodia* spp. material obtained through controlled harvesting and production under the terms of an agreement with the relevant CITES Management Authority of [Botswana under agreement No. BW/xxxxxx] [Namibia under agreement No. NA/xxxxxx] [South Africa under agreement No. ZA/xxxxxx]”
#10	Logs, sawn wood, veneer sheets, including unfinished wood articles used for the fabrication of bows for stringed musical instruments
#11	Logs, sawn wood, veneer sheets, plywood, powder and extracts. Finished products containing such extracts as ingredients, including fragrances, are not considered to be covered by this annotation.
#12	Logs, sawn wood, veneer sheets, plywood and extracts. Finished products containing such extracts as ingredients, including fragrances, are not considered to be covered by this annotation
#13	The kernel (also known as ’endosperm’, ’pulp’ or ’copra’) and any derivative thereof
#14	All parts and derivatives except: a) seeds and pollen; b) seedling or tissue cultures obtained in vitro, in solid or liquid media, transported in sterile containers; c) fruits; d) leaves; e) exhausted agarwood powder, including compressed powder in all shapes; and f) finished products packaged and ready for retail trade; this exemption does not apply to wood chips, beads, prayer beads and carvings

#15 All parts and derivatives are included, except:
a) Leaves, flowers, pollen, fruits, and seeds;
b) Non-commercial exports of a maximum total weight of 10 kg. per shipment;
c) Parts and derivatives of *Dalbergia cochinchinensis*, which are covered by Annotation # 4;
d) Parts and derivatives of *Dalbergia* spp. originating and exported from Mexico, which are covered by Annotation # 6
Refer to Notification No. 2017/078 for an interim definition of the terms used in paragraph b) of annotation #15.

#16 Seeds, fruits, oil and live plants

Appendix F Additional Photographs, Lighthouse Point

Oblique Aerial – View Looking North

Oblique Aerial – View Looking Northwest

Oblique Aerial Photographs
Lighthouse Point

Oblique Aerial at Northwest Corner and Northwest Pond

Existing Lighthouse Structures

Lighthouse Area

Landside Photographs
Lighthouse Point


Vertical Void in Rock Substrate in Vicinity of Proposed Solar Panel

Vertical Void in Rock Substrate Occasionally Led to Horizontal Underground Void Extending Several Feet

Typical Rock Wall in Dry Broadleaf Evergreen Forest near North Property Line

Surveyor's Cairn along North Property Line at North 24 degrees 38 min 17.5 sec - West 076 Degrees 01min 22.3sec

Seagrape Snail on Cocobey

Consolea - Formerly *Opuntia - nashii* - Cactus Tree - *Cactaeceae* - Bahamian Archipelago Endemic

Landside Photographs
Lighthouse Point

Encyclia altissima Orchid

Caribbean Banner Butterfly – *Lucinia sida*

Eight Camouflaged Piping Plovers on Bottle Bay Beach

Ruddy Turnstones, One Banded in New Jersey, Foraging along East-Facing Beach

Ruddy Turnstones Foraging in Tidal Wrack

Bahama Mockingbird - A Year-Round Resident that Nests on the Site


Male Bananaquit – A Year-Round Resident that Nests on the Site


Male Greater Antillean Bullfinch – A Year-Round Resident that Nests on the Site

Male Bahama Woodstar Hummingbird - A Year-Round Resident that Nests on the Site

Thick-Billed Vireo – A Year-Round Resident that Nests on the Site

Antillean Nighthawk near Nest in Coastal Rock on West Shore

Kirtland's Warbler – Fall, winter & spring resident on South Eleuthera


Western Spindalis – A Year-Round Resident that Nests on the Site

Black-Necked Stilt in White Pond - A summer-time breeding species that Nests on the Site

White-Cheeked Pintails in Shad Pond

Rain Runoff Depositing Sand from Existing Road into Shad Pond


Bahamas Brown Racer


Curly-Tailed Lizard

Mound of West Indian Termites

Golden Silk Spider - *Nephila clavipes*

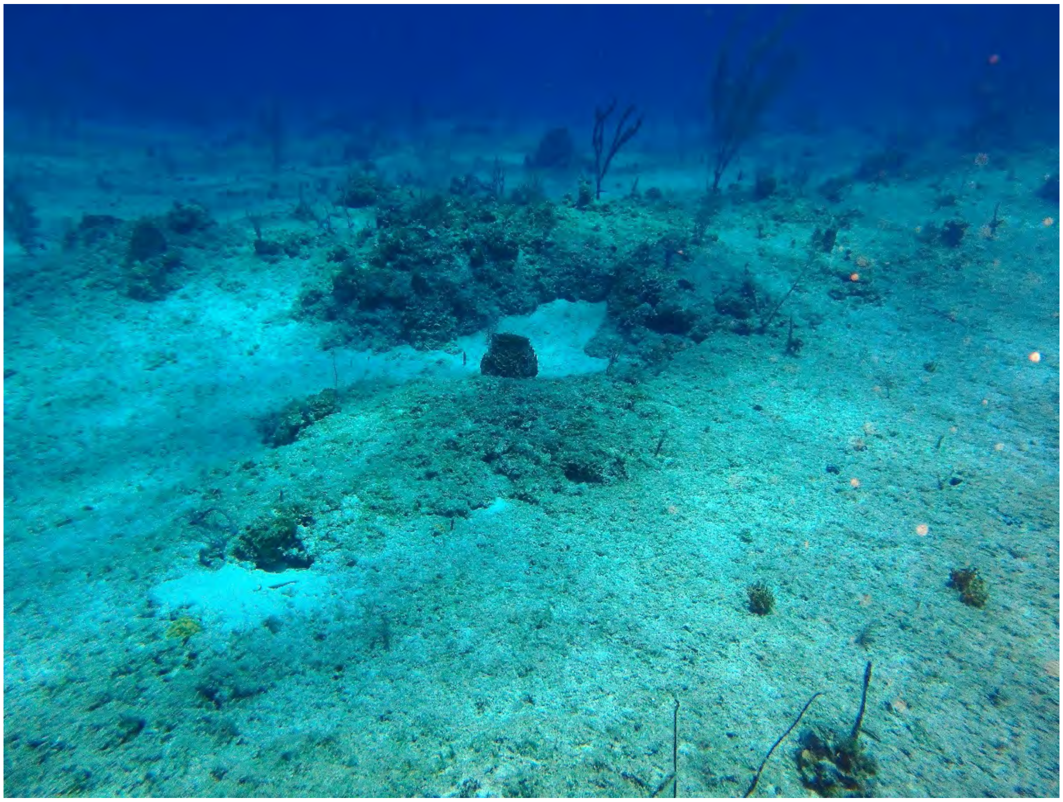
Landside Photographs
Lighthouse Point

View Looking North from near the Southeast Tip

Giant Barrel Sponge in Scattered Coral Mounds/Relict Spur and Groove Structures

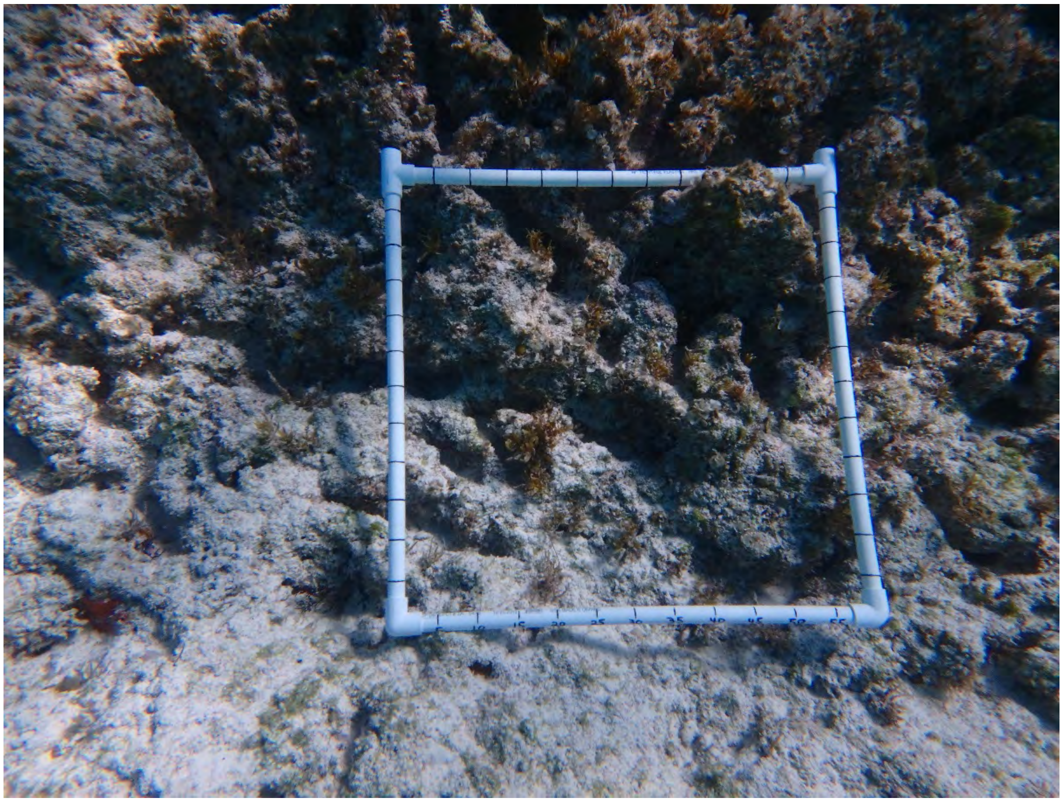
Typical Scattered Coral Mounds/Relict Spur and Groove Structures (SCM)

Marine Photographs
Lighthouse Point



Scattered Coral Mounds/Relict Spur and Groove Structures (SCM)

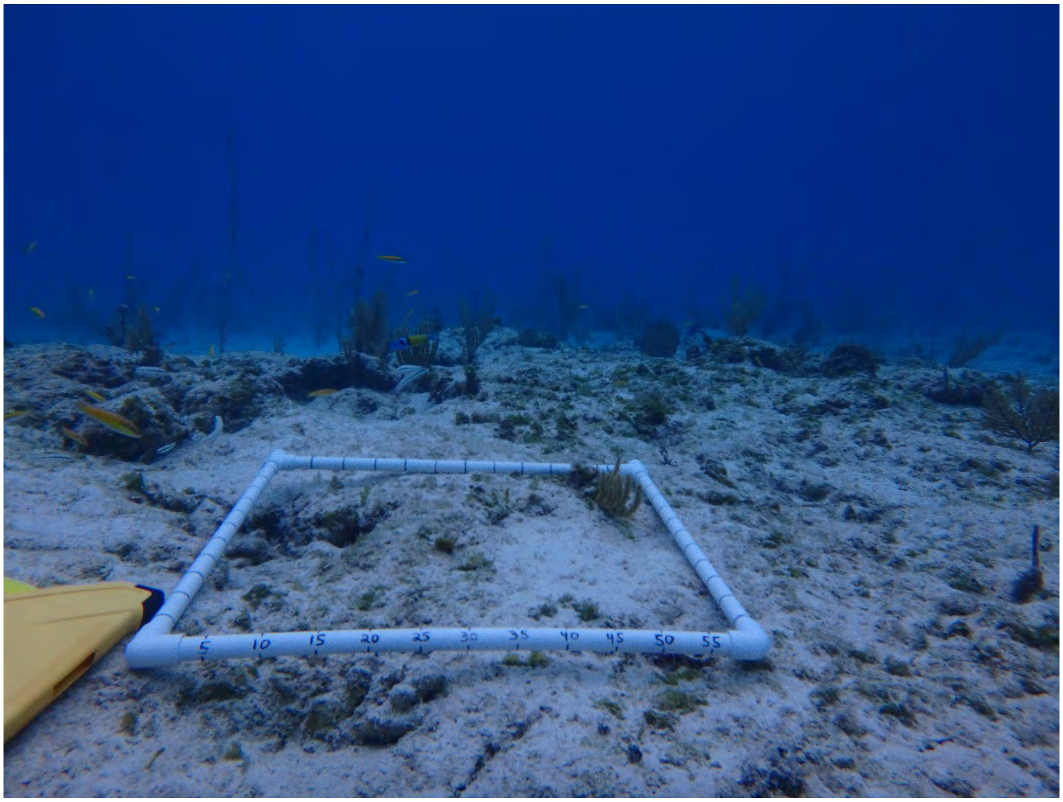
Seagrass – Submerged Aquatic Vegetation



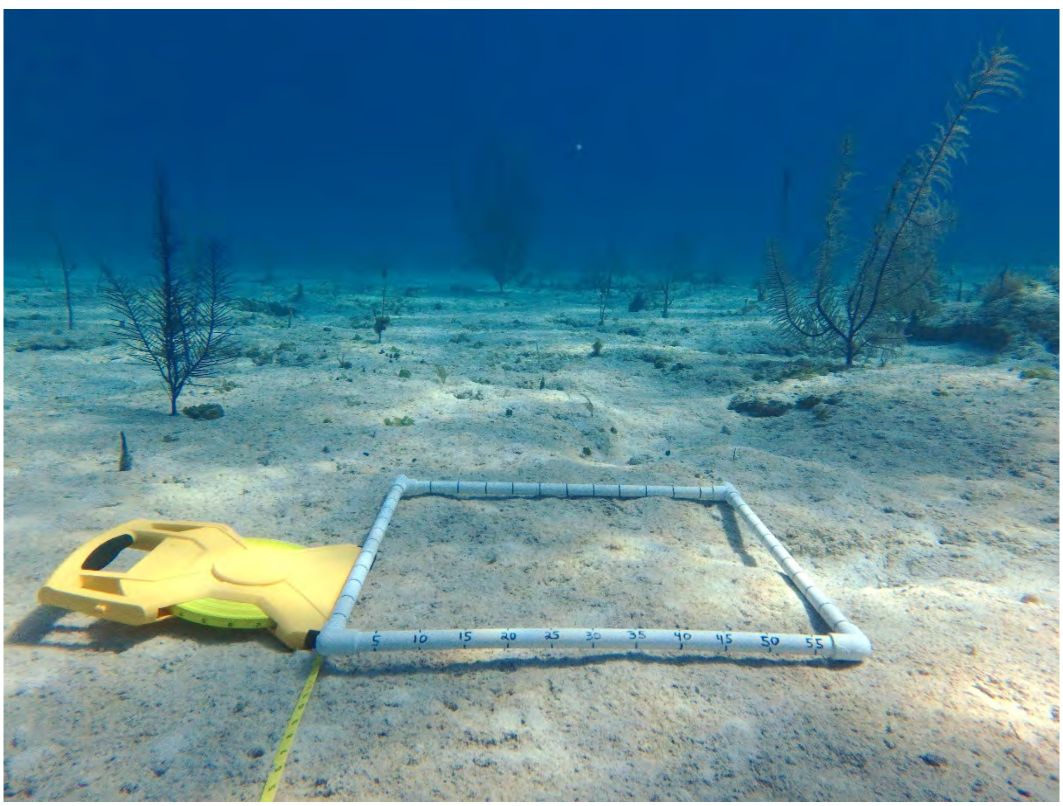
Typical Rock Substrate at Landfall of Proposed Trestle

Typical Moderate (foreground) and Sparse SAV

Marine Photographs
Lighthouse Point



Typical Moderate Hardbottom on Elevated Bedrock (MHEB)

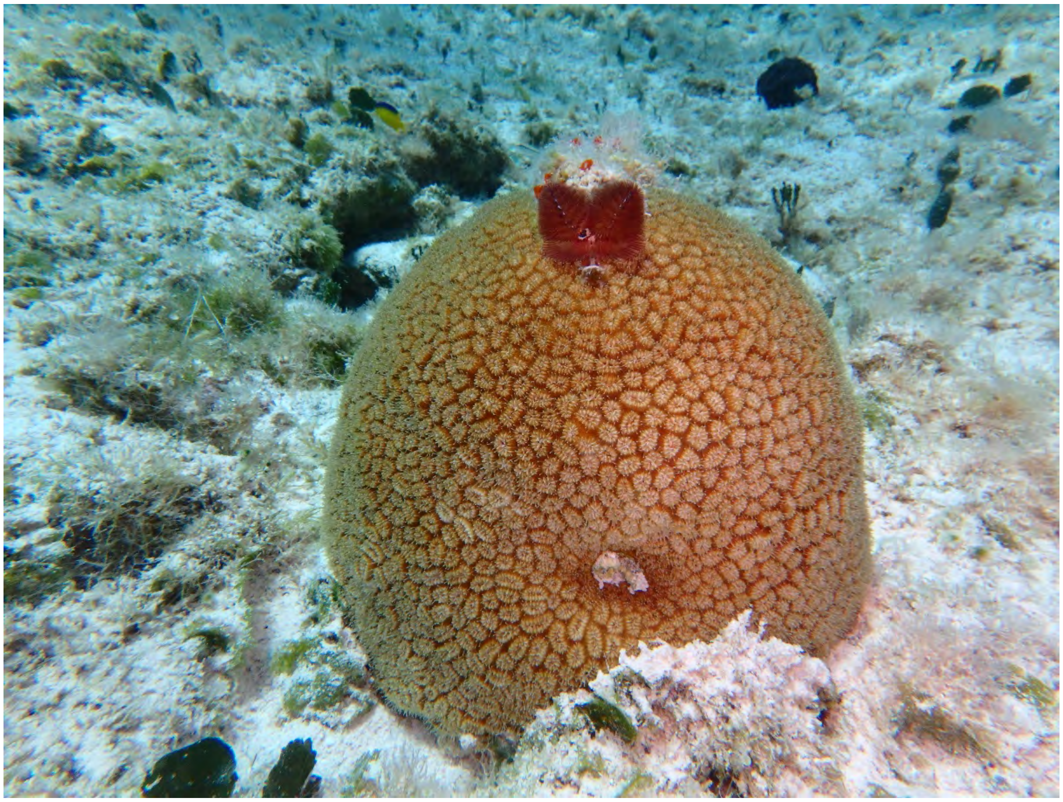


Example of Octocoral Presence on Hardbottom

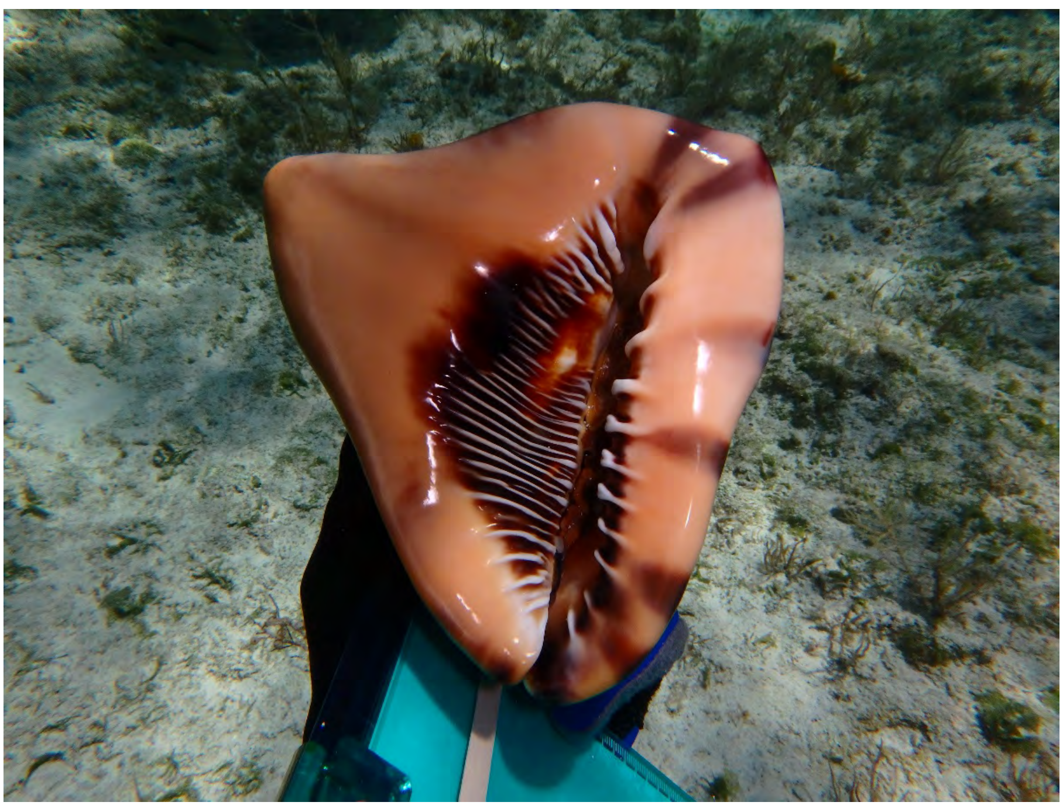
Marine Photographs
Lighthouse Point

Typical Scattered Coral Mounds/Relict spur and groove structures

Typical Moderate Hardbottom on Elevated Bedrock (MHEB)



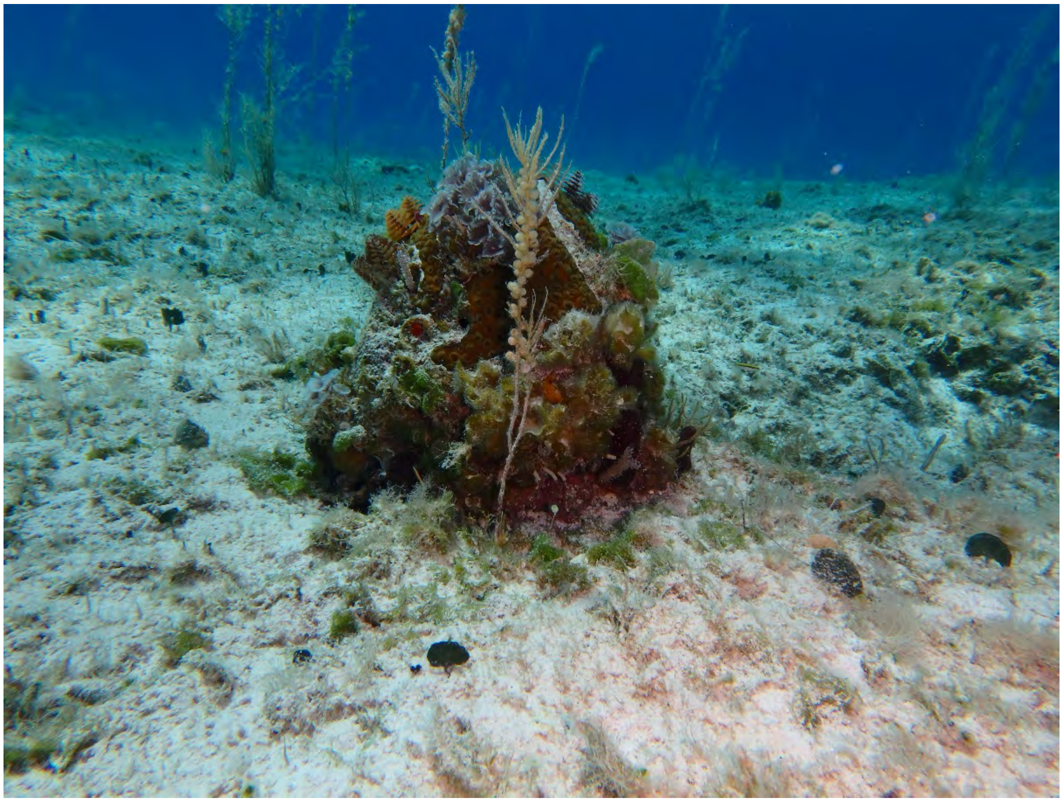
Elliptical Star Coral with Christmastree Worm



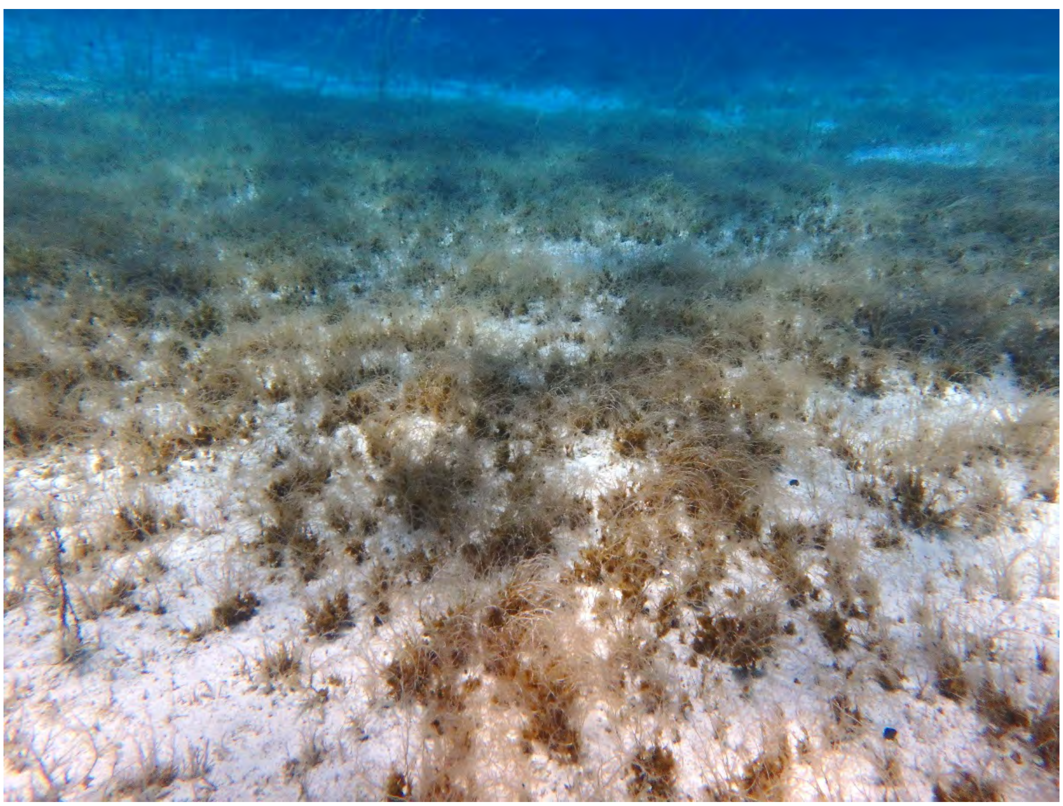
King Helmet


Nurse Shark in Nearshore Shallows along East-Facing Beach

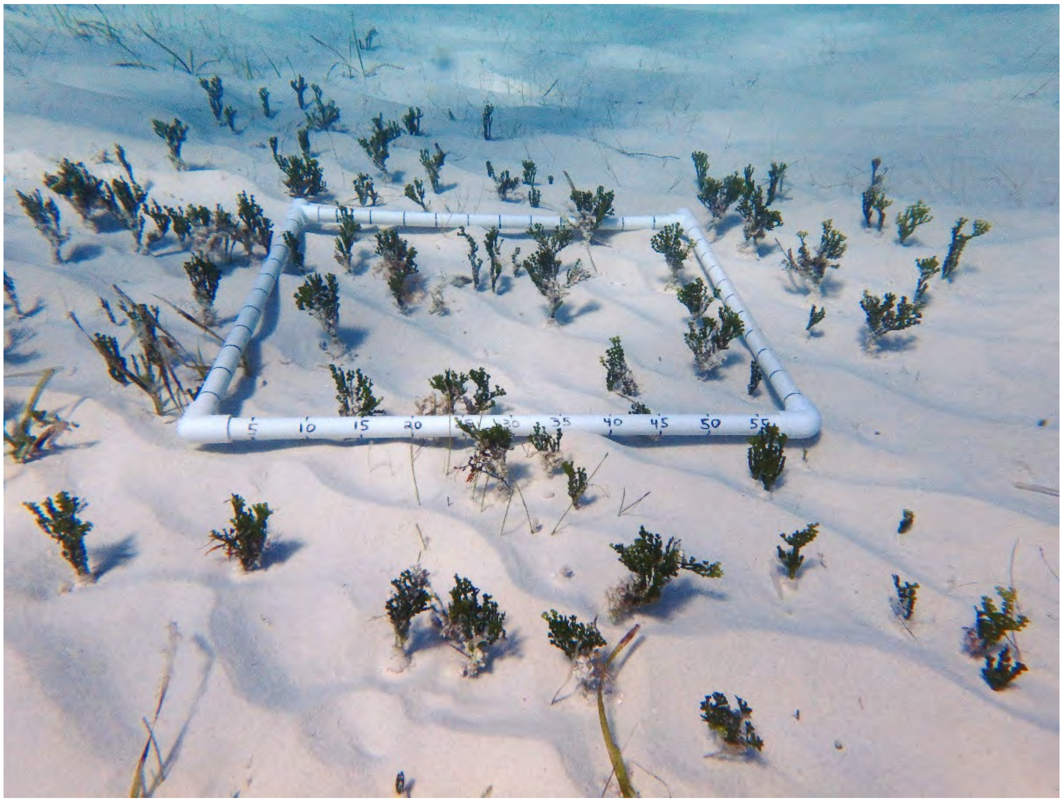

Bacterial Mats and Possible Stromatolites Were Observed in Big Pond



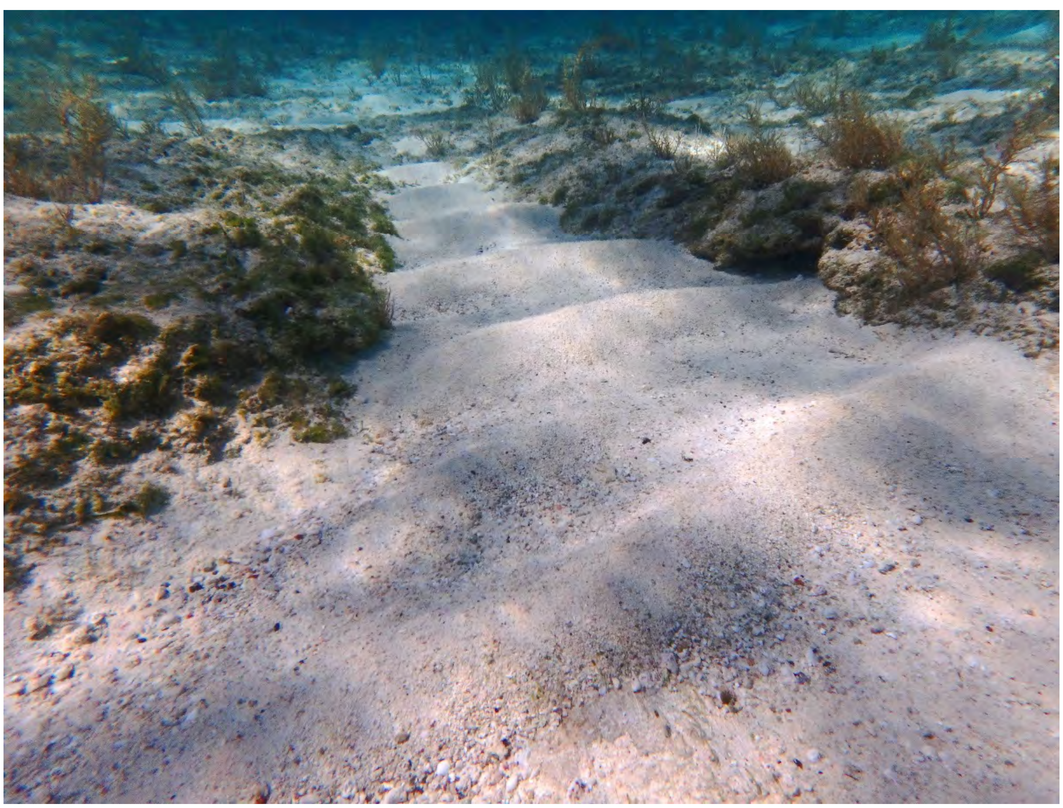
Example of a Diverse Marinelife Assemblage on Hardbottom



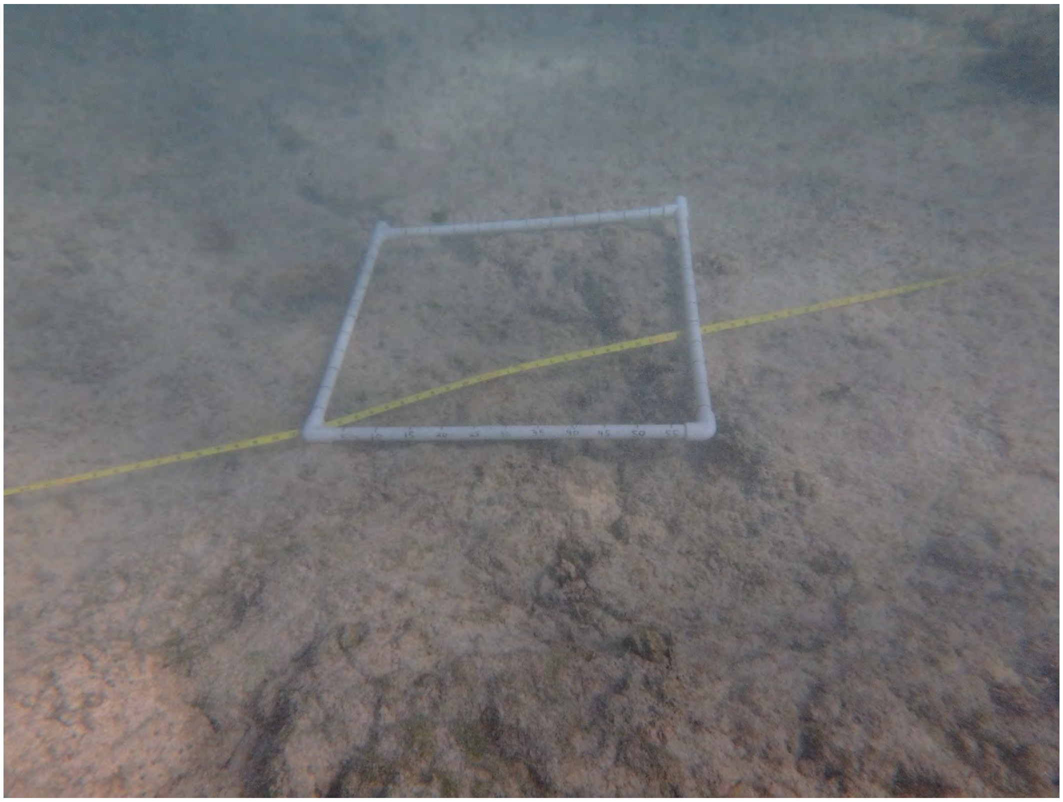
Dense Macroalgae in Submerged Aquatic Vegetation Bed



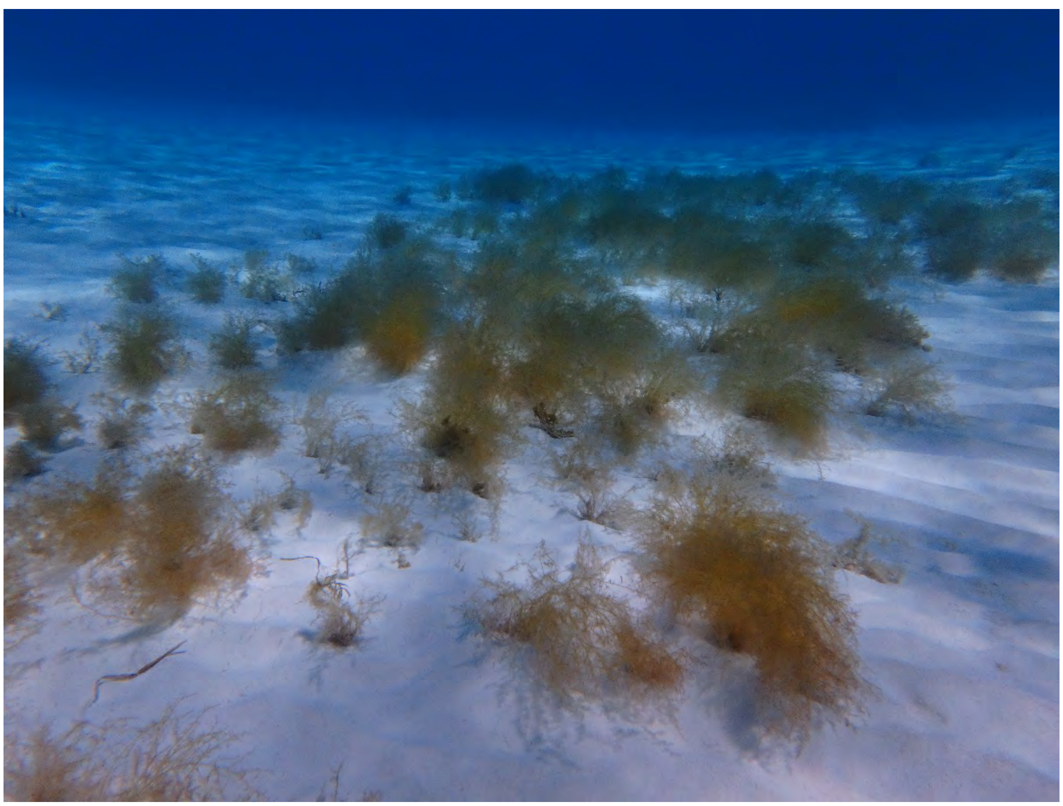
Macroalgae *Halimeda* Rooted in Sand on Hardbottom



Sand Accumulating in Low Area in Inshore Hardbottom



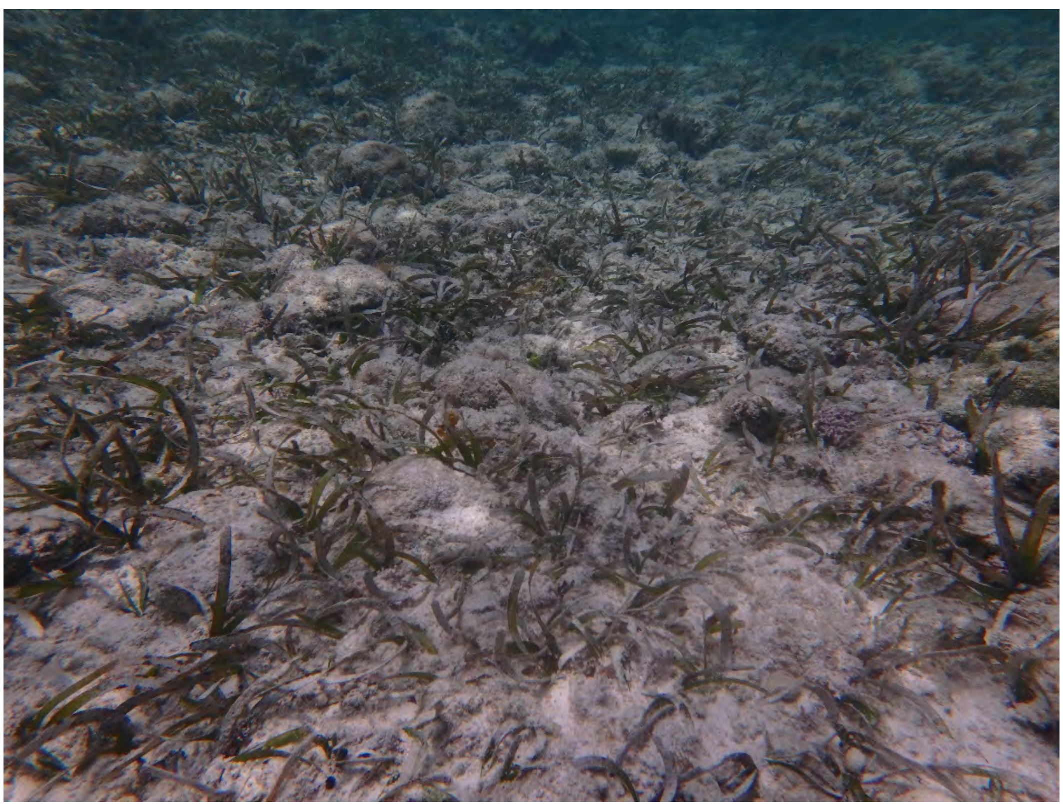
Sediments on Inshore Hardbottom Are Easily Suspended When Seas Are Rough



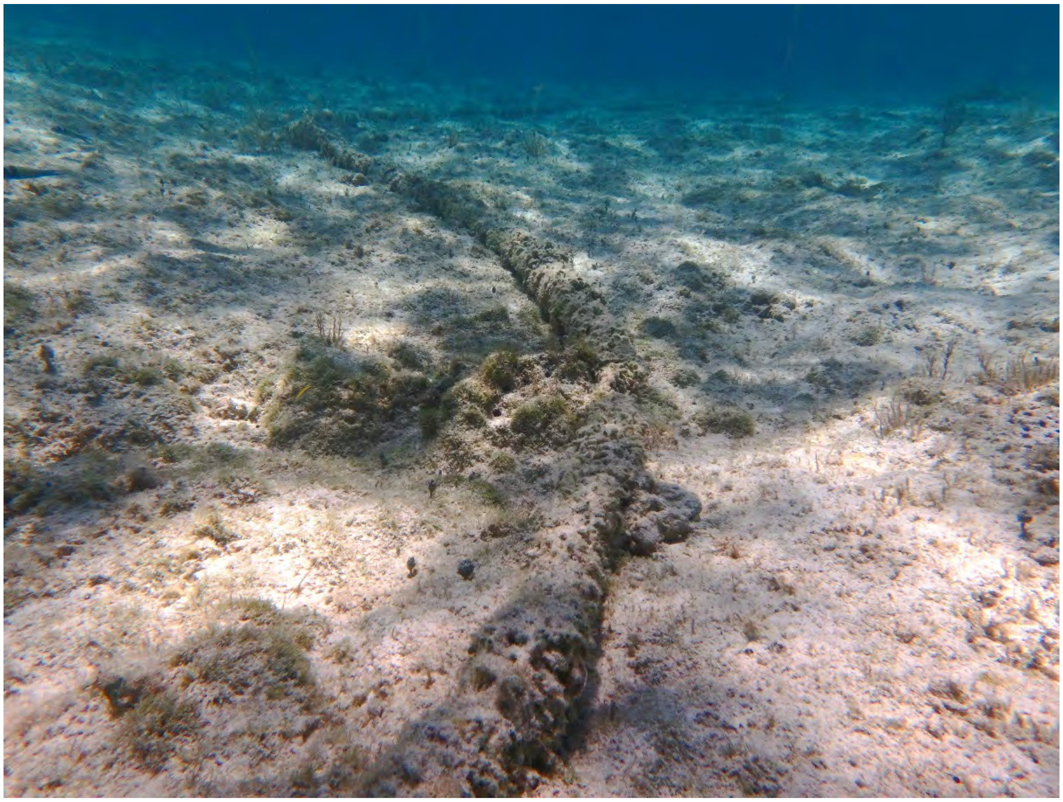
Rooted Macroalgae Northwest of Proposed Small-Vessel Marina

Marine Photographs
Lighthouse Point

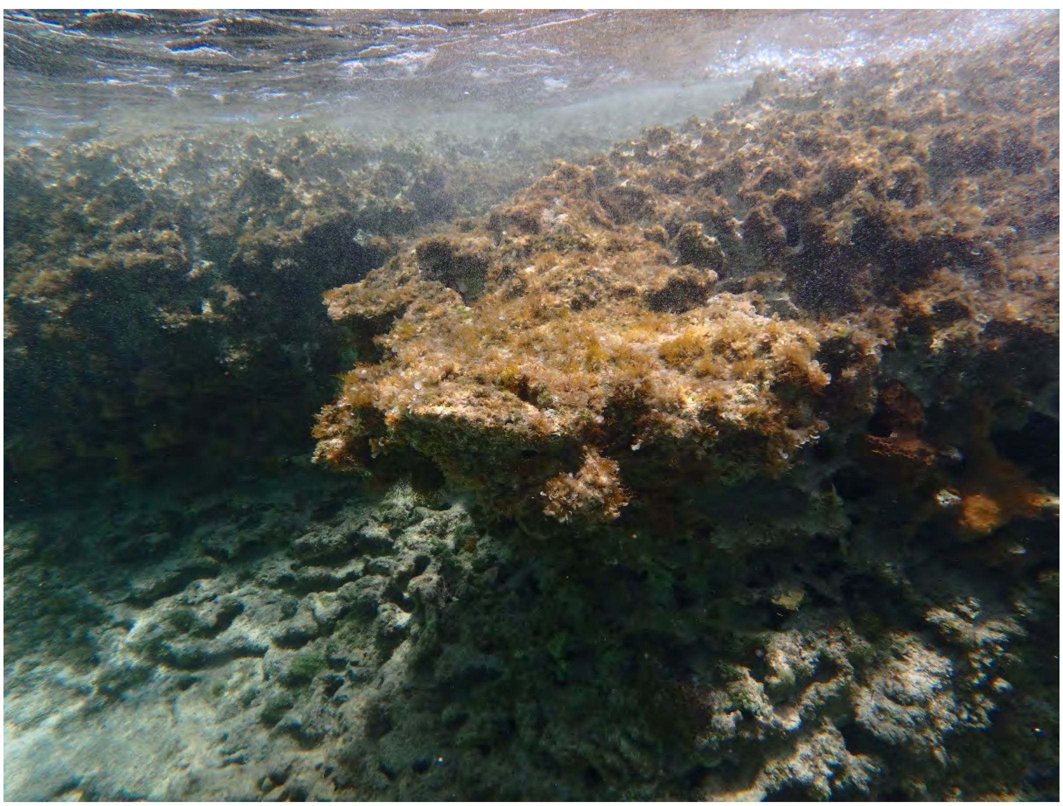
Rooted Macroalgae with Fire Coral in Small-Vessel Marina



Inshore Hardbottom with Seagrass near the Northwest Property Boundary

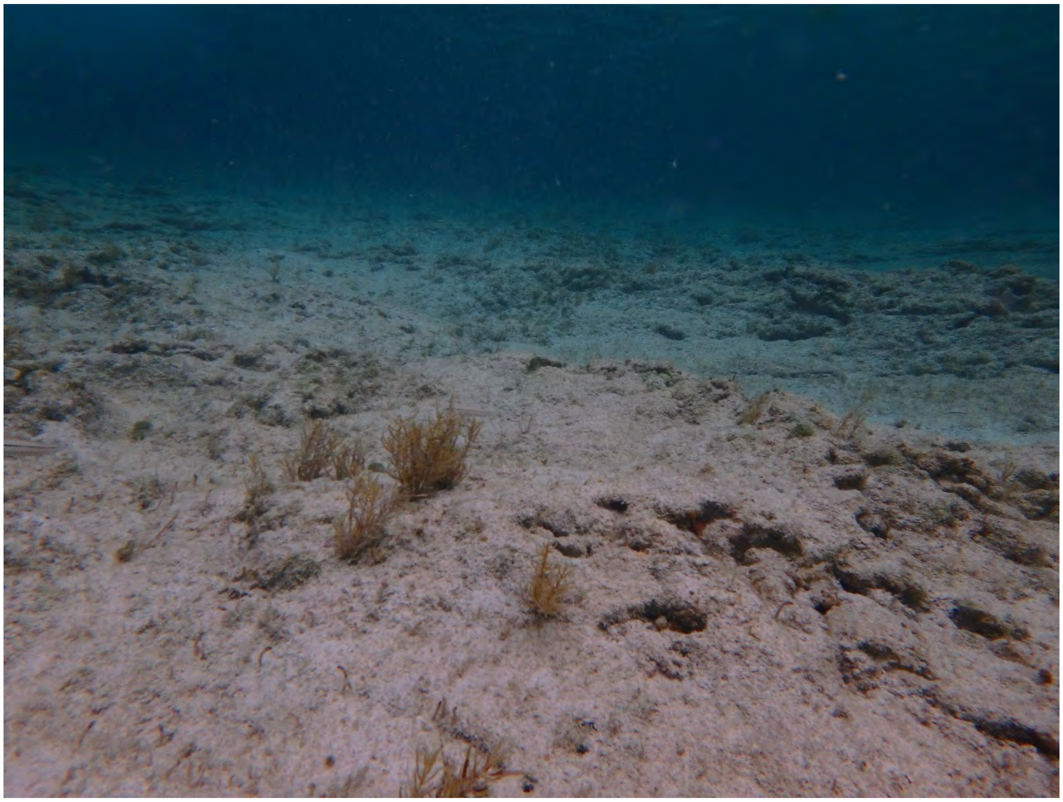


Loosely-laid Telecommunications Cable near the Northwest Property Boundary

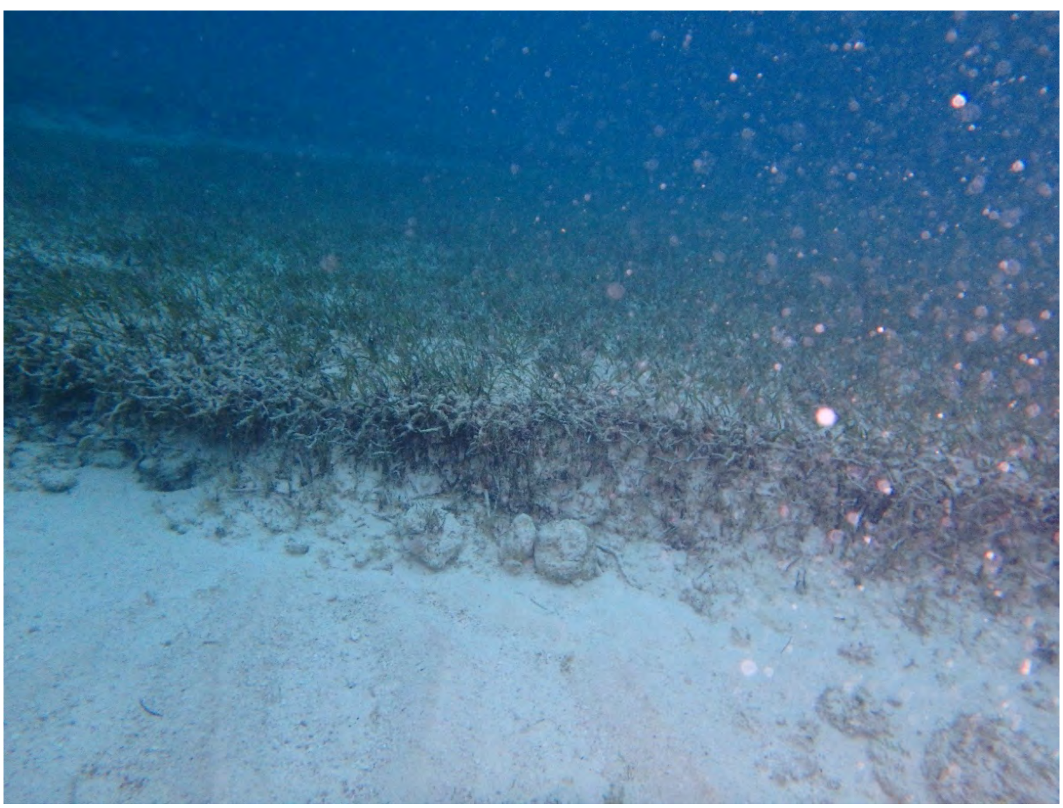


Algae-Dominated Inshore Hardbottom near Proposed Landfall of the Service Ramp

Marine Photographs
Lighthouse Point



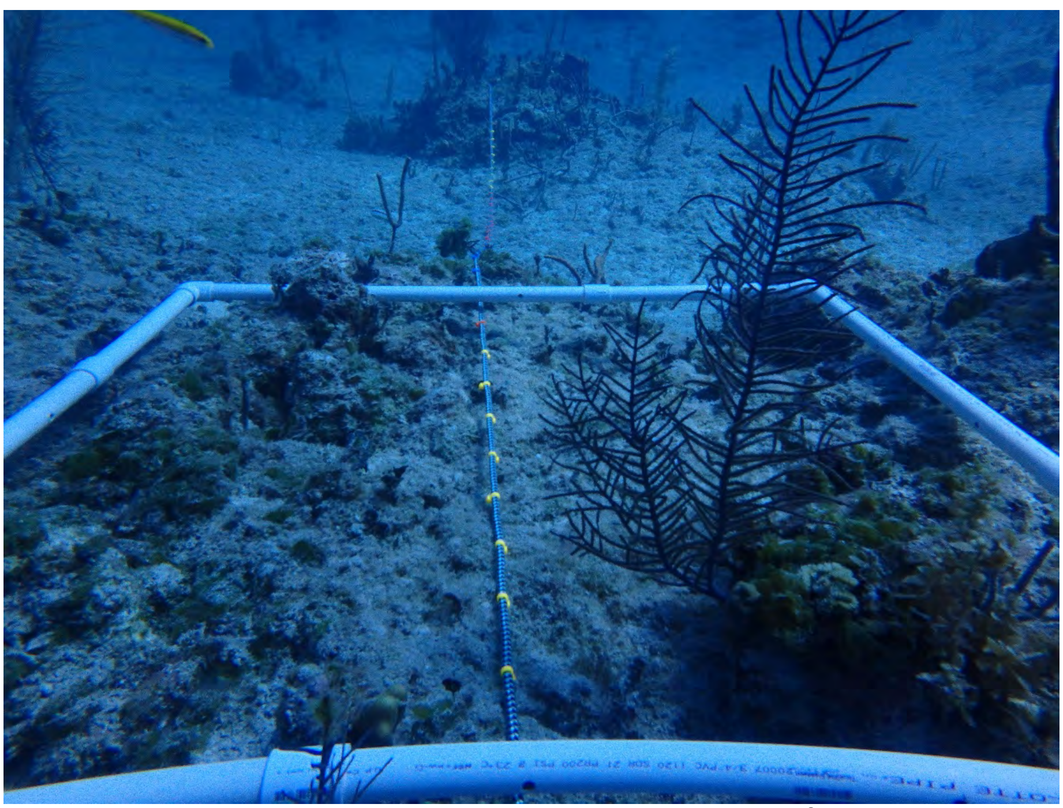
Typical Inshore Hardbottom with Sparse Coral and Macroalgae in the Area of the Proposed Service Ramp



Moderate Erosion along Perimeter of SAV Bed

Marine Photographs
Lighthouse Point

AGRRA-certified Scientific Divers Collecting Coral and Benthic Data



Coral and Benthic data were Collected in a Series of 1-m^2 Quadrats Placed Sequentially Along Belt Transects 10 m in Length

Appendix G Cultural Investigation

Historic Resource Survey, Lighthouse Point, South Eleuthera, The Bahamas

March 2020
Brooker Architectural Design Consultants
Heritage Planning and Historic Preservation
10 Sams Way, Beaufort, South Carolina

Historic Resource Survey, Lighthouse Point, South Eleuthera, The Bahamas

Colin Brooker, Dip. Arch,; M. Arch.

Introduction

The following Report presents results of a Historic Resource Survey of the tract known as Lighthouse Point, (here in called the Project Site) located at the southeast extremity of Eleuthera, The Bahamas. It is based on a reconnaissance conducted by Brooker Architectural Design Consultants working under contract for Waypoint Consulting Ltd. Nassau over three days in February 2019 and more intensive fieldwork spread over a four day period in January 2020 at a time when the Client's Geophysical Team were operating on the property - activity which greatly facilitated identification of the historic resources described below.[1]

In 2019 we found a ruined dwelling (here designated Structure 1) immediately south of the Project Site's northern boundary. After completion of our preliminary report it was learned that this ruin had previously been plotted by Target Surveying and Engineering Ltd, Nassau and is shown on their "*Land Title Survey of the Southeastern End of Eleuthera*" dated 27 July, 2018. Reexamination of this resource and its surroundings in February 2020 revealed that Structure 1 is in fact one of five ruined structures (here designated Structure 2 through Structure 5) extending southwards on the Project Site in an apparent orderly north/south line (see Plate 23).

Our attention was also directed by the aforementioned Geophysical Team to what at first seemed an isolated cut-stone building here designated Structure 6(a) located further south at an elevation of about seventy-five feet above sea level. Subsequently, scrub clearance immediately east of Structure 6(a) revealed a set of timber posts that outlined an otherwise lost framed building designated Structure 6(b) and broken remains of two masonry-built bread ovens designated Structure 6(c) and Structure 6(d).

We also attempted to reach an area previously identified from satellite and drone imagery as the J. Millar Farmstead however as in 2019 our attempt in 2020 was thwarted by dense vegetation and extensive storm generated rock berms blocking passage from the adjacent shore.

Standing in close proximity and linked by extensive use of formed materials in their construction, Structures 1 - 5 are here treated as an architectural group designated **Lighthouse Point Historic Resource Group A**.

Differing markedly in typology and construction, Structure 6 and its dependencies are treated separately under the heading **Lighthouse Point Historic Resource Group B**.
It should be emphasised that insofar as deduced from surface artefacts, the time-frame represented by the various structures described is narrow, suggesting all saw occupation during

[1] Results of the 2019 Survey are summarised in our "*Preliminary Historic Resource Survey of Lighthouse Point, South Eleuthera*" submitted for Client review in April 2019.

the last half of the nineteenth century, such occupation apparently extending in some instances well into the twentieth century.

Commentary and analysis here presented is prefaced by a brief synopsis of findings concerning the Project Site's occupational history largely taken from our previous (2019) submission. Descriptions of pertinent structures follow and assessments are made concerning their Historic Significance.

In our view Structure 6 and its dependencies require further investigation by a qualified archaeologist to settle outstanding questions concerning function, chronology and the exact boundaries of this important historic resource.

In all cases, buffer zones are suggested to protect structures from accidental damage during ongoing development, protect the public from potential hazards and safeguard the integrity of resources themselves.

Synopsis of Occupational History.

Soon after Emancipation, Crown Land not previously granted north of Lighthouse Point was made available to local residents - many perhaps formerly enslaved or the descendants of slaves - presumably for agricultural purposes and support of exploitive activities such as salt raking and fishing. The pattern which slowly evolved during the 1850's - a time probably coincident with the establishment of old Bannerman Settlement (located immediately north of the Project Site) is complex, a multiplicity of holdings averaging twenty acres in size being depicted on land surveys of the period (see Bahamas Department of Lands and Surveys, Plan Eleuthera, No. 162).

Regarding agricultural pursuits, testimony given before the UK Privy Council in 2017 provides useful insight detailing recent activities which probably differ little from those pursued during the late 19th and early 20th century, these including "growing of their own food - tomatoes, bananas, peanuts and some fruit, the cutting of silver tops for basket making, foraging for crabs, the keeping of goats and the stripping and preparation of cascarilla bark ("barking') for sale to the alcoholic liquor industry." [2]

Local informants also recall that pineapple cultivation was once important, pines being shipped from a dock located south of what is now Princess Cay or possibly taken to Rock Sound where a canning factory was established some time before 1890.[3] Tomato canning was another standby, an establishment called Bahamas Best Products Ltd. run by George Baker (former MP for Eleuthera) operating in Rock Sound down until the 1960's (?) when closed in the face of "tremendous losses."[4]

[2] Privy Council Appeal Nos 0068 of 2017. Judgement, 15 Oct. 2018. Bannerman Town, Millars and John Millars Eleuthera Association versus Eleuthera Properties, Ltd.

[3] *House of Commons Sessional Papers, 45*.Colonial Reports, Bahamas. HM Stationary Office, London 1901:18.

[4] *Eleutheran*, February 15, 2013.

Scattered artefacts indicate that some structures located on the Project Property (notably Structure 5 described below) remained occupied or in use down until the late 1940's or 1950's. However, Old Bannerman Settlement with its public buildings and large Anglican church was largely abandoned decades before as local residents caught up in cycles of extreme economic hardship migrated to Nassau or Miami in search of financial opportunity. Informants recall - not without bitterness - that George Baker ultimately obtained possession of most individual land holdings in the settlement's vicinity in exchange for 'cans of corned beef and a few dollars.'

Currently the entire Project Site - incorporating over 700 acres - is devoid of habitation, lands once given over to agriculture having reverted to scrub which is now slowly regenerating into a dry tropical forest association.

Figure 1. Bahamas Best Product Ltd., label, salvaged from the Rock Sound Cannery.

PART I

LIGHTHOUSE POINT HISTORIC RESOURCE GROUP A

Structure 1 - Structure 5

Location and Date. Structure 1; Structure 2; Structure 3 and Structure 4 occupy portions of a rectangular tract of land incorporating twenty-two acres (designated G 126 by The Bahamas Department of Lands and Surveys) granted to George Mackey located southeast of Old Bannerman Town Settlement as depicted on a chart (registered as *Lands and Surveys Plan No. 162 Eleuthera*) dated August 1959. Now substantially ruined, the four structures are arranged in an approximate north/south line adjacent to the tract's western boundary with Structure 1 occupying a position very close to - if not quite coincident with - the tract's northwest corner while Structure 4 is located near the tract's southwest corner (see Plate 23). Displaying a variety of vernacular construction modes, structures themselves give architectural evidence of being built at different times most likely by different individuals. However no records were found at the Department of Lands and Surveys to indicate that George Mackey's land was subdivided prior to its eventual (unregistered) acquisition during the 1930's or 1940's (?) by George Baker which opens the possibility that the four structures under discussion were erected by individuals linked by kinship to the original grantee.

Abundant surface artefacts (including ceramics and glass) suggest construction ranging from the late 1860's to the early 1900's for this building group. Most structures have plantings of *Sanseveria trifasciata* in their immediate vicinity which might indicate that fibre from this species was extracted hereabouts as a substituted for sisal.[5]

The line of structures described is continued southwards by Structure 5, a ruined house situated close to the northwest corner of a fifty-four acre holding originally granted to G. Butler (designated G162 on Lands and Surveys, Plan 162), located immediately south of George Mackey's tract. As preserved, Structure 5 is the most substantial of the group being somewhat larger in area and enclosed by thicker walls, traces of internal division and a west facing porch confirming its domestic function. Chronological indicators (ceramics, glass, architectural hardware) suggest that construction here was probably completed during the 1880's or slightly later with occupation perhaps continuing into the 1950's.

While these five structures were almost certainly linked by an unmade road or tracks, the exact line of these conjectured features is obscured by secondary vegetation. Likewise, the extent and exact configuration of damaged stone walls seen in the vicinity remains undetermined.

Numbered in sequence from north to south, individual structures are described below insofar as their present ruined and incomplete condition allows.

Structure 1

(Plates 1-3,)

[5]See *Natural Fibres Handbook*, National Institute of Industrial Research. New Delhi (n.d): 364

General. Located at N54 35' 59" 12.88" Structure 1 is a substantially ruined single storey dwelling built of tabby. Raised 18" above ground on a masonry plinth, it measures approximately 24' north/ south x 20' -5" east /west in plan. Preservation is far from complete. Thus, the north exterior wall has collapsed, roof timbers have fallen in, interior partitions are missing and flooring mostly destroyed. Moreover, those exterior walls that survive display extensive dissociation while floor and window frames are predominantly loose or missing. Nevertheless, enough remains of the dwelling to allow the following outline reconstruction of its original configuration.

Plan. This dwelling was organized symmetrically in plan about two entrance-ways, one positioned off center on its east facade the other situated opposite on the now heavily damaged and incomplete west facade. Despite losses it is still obvious that each entrance was flanked by a single window right and left. North and south facades were each pierced by three windows matching in size and detail windows flanking the two entrance doorways. Exterior doors themselves were relatively narrow, measuring at most 2'- 4"wide in the clear. About 2'- 6" wide x 4' high, window openings were spanned by 1"thick timber boards which acted as lintels, pintles surviving *in situ s*howing windows were equipped with side hung timber shutters. Similarly fixings indicate entrance doors consisted - as often the case in The Bahamas - of two side-hung leaves secured by iron bolts on the exterior.

Evidence for internal spatial division is tenuous. Groove-like impressions in plaster wall finishes indicate thin (perhaps 3/4" wide) board partitions created four spaces of unequal size. Two subsidiary rooms to the east appear separated by a small lobby centered on the east entranceway. West, there were two larger rooms, one (to the north) bigger than the other. The building was entered from the exterior by stone steps centered on both east and west facades. No evidence for porches was observed.

Roof. The roof frame has totally collapsed inwards now being reduced to a tangled mass of fallen timbers. But elements still extant, including a ridge rafter, show the roof was hipped in form. Surviving common rafters measure 2 ½" x 1 ¾" in section. Wall sockets indicate these members were originally spaced approximately 2'-8" on center, rafter pairs being strengthened by simple timber collars. No evidence for roof coverings was identified, leaving open the question as to whether the roof frame was enclosed by timber shingles or palm thatch.

*Floors***.** Little remains *in situ* of either floor joists or floor boards. There is evidence that joists (measuring about 7¾" x 5" in section) running east/west were supported at their far extremities on an internal ledge created by a reduction in wall thickness 12" or so above current ground level. A low (15" wide) stone sleeper wall running north/ south reduced the total floor span, this sleeper also supporting the partition defining the two smaller rooms on the dwelling's eastern side. Another north/south running support (apparently of timber) was supported on low *lignum vitae* posts spaced about 5'-6" apart, this support system being distanced 6'-7" off the interior face of the west exterior wall.

Exterior Walls. Structure I's exterior walls (measuring 10" in width above plinth level) are of a composite material called as tabby which consists of broken limestone rubble bound with copious amounts of lime mortar formed incrementally between removable timber shutters, the tabby being finished with one or two coats of lime-mortar both inside and out. Exterior walls are supported on a low (approximately 18" high) foundation plinth of compacted limestone rubble and mortar made about 3" wider than the wall above, this producing an interior ledge which, as already mentioned, provided bearing for now dislodged floor joists. While impressions around window and door openings leave no doubt that walls were cast between timber forms much as used today when casting concrete, we found no evidence for either the height of forms employed nor the number of successive ‘rounds’ or lifts required to carry walls up to the desired height.

However, spalling of exterior stucco revealed a technique for strengthening walls around door and window openings which ensured that top plates were securely anchored. Typically, prior to commencement of casting, this involved placing into position, an approximately 8' high timber post measuring 4" x 5" in section right and left of every planned wall opening Once all posts were set in place, the foundation plinth was cast around them and allowed to set. Subsequently, casting work on the thinner, upper wall proceeded until it reached a height slightly less high than the timber posts. Timber top plates were then set in place all around the building and pegged to each vertical post. Casting resumed, the final, uppermost pour (around 9" high) tying everything together. Work then began on hoisting rafters and all other elements of the roof frame into position. Finally, applied exterior stucco concealed lower and uppermost portions of the posts from view.

All timber posts are of *lignum vitae* (*Guaiacum sanctum*) an almost indestructible hardwood native to The Bahamas which is an abundant local species, several giant specimens and innumerable seedling being observed in near proximity to the structure. An incised ship drawing depicting a small vessel under sail is located on the exterior west facade slightly to the right of the building’s west entrance. Often associated with slaves and slavery, this example is important since it demonstrates that ship drawings were still being made after Emancipation.

Construction Date and Ownership. Surface artefacts strewn around Structure I indicate occupation from at least the later 1850's down until the 1950's. Direct ownership records have not been traced beyond the original land grant comprising twenty acres of Crown Land to George Mackey c.1840. Mackey also acquired an adjacent tract to the east (Lands and Surveys Book G page 68) in 1842, the Mackey family name appearing on numerous other small tracts of former Crown Land distributed around Old Bannerman Town. According to *Lands and Surveys Plan No. 162 Eleuthera* dated 1959, G126 on which Structure I stands, was then in possession of George Baker, MP for South Eleuthera from the 1960's down until 2005.

Structure 2

(Plate 4)

General. Located south of Structure 1, Structure 2 is poorly preserved, only two fragmentary exterior walls still standing. Both are leaning out of vertical and exhibit marked disassociation. Nevertheless Structure 2 is of considerable architectural interest owing to construction of a kind more commonly associated with Plantation Era rather than post-Emancipation building.

Plan. Judging by extant wall fragments and ill defined foundation remnants, the original building footprint measured approximately 12'-3" north/south x 15'-6" east/west. There are indications for an entrance of uncertain width centered on the west facade but not enough fabric is preserved to determine if it was matched by a similar opening centered on the opposite (i.e. east) facade. Similarly, no wall fragment now stands higher than 3'-2" above present grade which means that all window details (assuming fenestration existed) are lost. Likewise, roofing materials have disappeared without trace. Nevertheless, surviving wall fragments are instructive, lower portions of the south facade presenting clear evidence for the construction method employed for this enigmatic yet still significant structure.

Construction. As with Structure I, exterior wall construction is of tabby consisting of small pieces of broken limestone bound with lime mortar cast in place to a total width ranging between 8" and 9"around vertical timber posts (measuring 4" x 4"in section), set at regular intervals (typically 5'-3" to 5'-7" on center) along the length of each wall. Care was taken to ensure that each vertical post was encased by an equal thickness of the tabby mix on all sides, fragments of the south exterior wall preserving clear impressions of a corner post (at the building's southwest extremity) and two similar intervening timber members.(Figure). Both interior and exterior wall faces were finished with relatively thick coats of hard lime mortar finished smooth, the lime probably made from an argillaceous rock obtained locally.

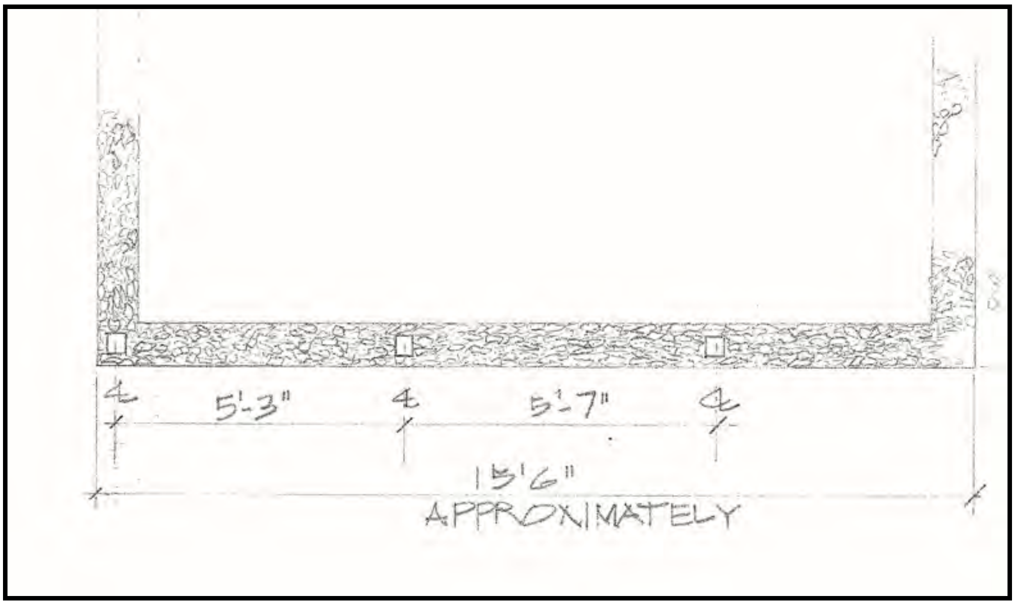


Figure 2. Structure 2, south facade, sketch plan detail showing post holes.

Function. Too little superstructure survives to determine if Structure 2 was residential in function or an ancillary building used for storage or other activities related to agricultural production. Relatively thin walls of a kind notoriously subject to warping, splitting and (as in the present instance) overturning coupled with an apparent lack of a raised or alternatively, mortar floor argues against permanent habitation, the scarcity of artefacts relating to domestic activity either within the building or scattered around its periphery adding weight to the argument. If the latter supposition is correct then it remains to be determined which of several buildings in the near vicinity Structure 2 was designed to service or support. In this regard, an apparent boundary wall running approximately east/west roughly eight feet south of the building suggests that the larger tract grated to G. Mackey was subdivided, this subdivision possibly defining separate farmsteads.

Structure 3

(Plates 5- 6)

Plan and elevations. Located south of Structure 2, Structure 3 is incompletely preserved. Fortunately wall segments defining three of the rectangular building's four corners survive, these defining a built footprint measuring 18'-3" north/ south x 15'-6" east/west. Although damaged, the north exterior wall still stands to a height of about 7' and retains clear evidence for its original configuration. Apart from a single doorway measuring 2'- 4" in width located towards its eastern extremity, this wall lacked other openings, either for windows or another door. Now damaged the extant doorway itself was 6'-2" high and spanned by a timber lintel (now lost) no more than 1"thick. Remnants of the east exterior wall retain jambs belonging to two windows - each window was about 4'-2" high and - extrapolating from broken wall falls- approximately 2'-8" wide. The opposite west wall was most likely very similar, however while there is evidence for fenestration, overall organization of the south exterior wall cannot be recovered with any certainty. Similarly, all sign of interior spatial division has gone though extensive traces indicate the building's floor was of lime mortar poured over top soil (or rock) and finished smooth.

Construction. All exterior walls were fabricated in tabby consisting of lime mortar and broken limestone cast in 10" vertical increments to a width of 1'-1" finished smooth with a hard lime mortar inside and out. Windows openings were framed by 4"x 4" timber posts, but, compared with Structure I, use of such posts was limited, there being no posts flanking the north doorway nor at building corners.

Roof framing is completely lost, having either blown away during a storm or been salvaged for reuse elsewhere.

Function. Careful finishing around openings and relative sturdiness are consistent with domestic occupation though this building is smaller than Structure 1 and Structure 5 both of which give evidence for internal room division as might be expected in a family dwelling. Surface ceramics were found to be sparse but included polychrome transfer wares and so called gaudy painted wares, both inexpensive British exports manufactured during the later19th century.

Located on a smallish lot cut out of George Mackey's holding and enclosed by stacked stone field walls on at least three sides, it appears that Structure 3 functioned as an independent or semi- independent entity.

Structure 4

(Plates 7- 8)

Plan. More than half of Structure 4 has suffered destruction, incomplete wall fragments and disassociated foundations indicating it originally measured an undetermined dimension in excess of 20'-6" north/south x 15'-4" east-west. Today only broken portions of the northeast corner and short interrupted sections of the west exterior wall still stand along with an incomplete segment of an interior dividing wall (measuring at maximum 5' in length) running east/west centered approximately 13' east of the northeast corner. Nothing remains to attest the number or disposition of windows. A possible entrance (incompletely preserved) pierced the east exterior wall at a point just north of where intersected by the interior dividing wall, however too little fabric survives to ascertain any details.

Construction. Wall construction (including the interior divider) consists of tabby, cast to a uniform thickness of 9" throughout finished inside and out with a hard lime mortar. Masses of broken lime mortar scattered across the site represent the original floor which appears built up in certain places with rock and mortar to produce a level surface. No trace of the roof frame or its covering survives.

Function. Given its fragmented state it is now impossible to determine this building's function. Residential usage seems likely considering its apparent size and those few construction details now visible but such attribution is obviously speculative. It is worth observing that the dividing wall is an unusual feature in that its width matches the width of exterior walls still extant. Moreover surfaces are inscribed with graffiti which include a ship drawing and what may be insignia- all very worn and almost impossible to decipher. [6]

Structure 5

(Plates 9 - 10; Plate 25 (sketch of south and west facades).

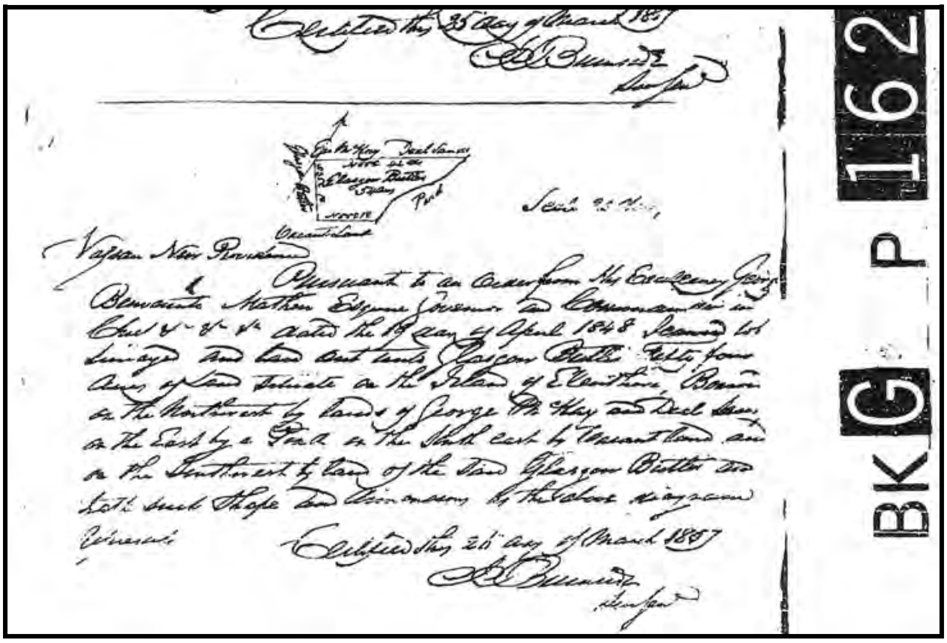


Figure 3 Original grant of fifty-four acres to Glasgow Butler, 1848. Department of Lands and Surveys, Nassau, Book G Page 162.

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[6] A local informant read one inscription featuring what might be a compass rose as sailing directions. This is an attractive possibility which, unfortunately, cannot yet be verified.

Structure 5 continues the line southwards established by Structure1 - Structure 4. However - as previously mentioned - Structure 5 is situated close to the northwest corner of the tract designated G162 by the Bahamas Department of Lands and Surveys , a fifty-four acre holding originally granted (in 1848) to Glasgow Butler located immediately south of George Mackey's tract.[7]

Plan. Clearly domestic in character, Structure 5originally measured approximately 22'-3" north/south x 23'-10"east /west in plan excluding a relatively narrow porch running along the entire length of the south facade. The structure is now substantially ruined. Two external walls (north and west) have suffered near total collapse, the east wall is badly cracked, roof framing no longer *in situ* and interior partitions lost. Enough remains to indicate entrances positioned slightly off center on both north and south facades opened into a through hall or passage which probably divided the house into two unequal sections, there being indications that further subdivision created a small room (measuring no more than 5'- 5" north/south) in the building's north-east corner.

Of the four facades, only the south example preserves its original appearance more or less intact. Here the central doorway measuring 3'-3" wide x 7'-4 "high is flanked by a single widow opening right and left, each window opening measuring approximately 3'-2" wide x 5'-0" high. Door and window frames were of *lignum vitae* throughout the building, styles, cills and heads all being carefully morticed together. Heads of windows and doorways line up in elevation, a convention that brings a satisfying sense of unity to the building as a whole. In addition to being supported by window and door frames (typically measuring 3" x 3" or 4"x 4" in section) construction above openings was originally carried by 1" thick timber lintels.

Construction. Wall construction is of tabby consisting of small pieces of broken limestone bound with copious amounts of lime mortar. Raised 14" or 15" above grade upon a foundation plinth 14"-15" wide, upper walls are typically just over 12" thick and stand 10' high at maximum. Unlike the composite system described from Structure 1 which involved setting timber uprights into the foundation plinth before casting of tabby commenced, Structure 5 gives no evidence of similar timber uprights being used either at wall openings or building corners. Rather it appears that formwork was supported independently as casting proceeded though exactly how cannot be determined.

It should be noted that the building is now extremely fragile, major cracks in what remains of the north facade and to a lesser degree, east facade threatening to bring down more sections of the exterior wall. Intrinsically unsafe, Structure 5 should therefore be approached with caution and placed off limits to the public.

Lighthouse Point Group A: Parallels and Antecedents

Although diverse in size and probably accommodating both residential and service functions, Structures 1- 5 as described above constitute a relatively coherent vernacular building group. The term 'vernacular' is notoriously difficult to define but most architectural historians would agree

[7] According to *Lands and Surveys Plan No. 162 Eleuthera*, G162 (like G 126) was in possession of George Baker by 1959.

that "vernacular builders use whatever materials are available and whatever skills they possess" a concept exemplified by construction modes utilized for all five buildings.[8] From this viewpoint, exterior tabby walls are of particular interest. As late as 1950 the Commissioner for Eleuthera, with a condescension not untypical of Colonial administrators, wrote: "the coloured and labouring class on Harbour Island build their houses of 'Tabby'- rocks of uneven sizes and shapes poured into forms and then plastered - this is much cheaper than block construction." [9]

When built, there was nothing novel about the formed building mode the Commissioner described. Indeed, widespread poverty before and after Emancipation had made tabby the material of choice for small houses and outbuildings erected in isolated communities scattered all across the Family Islands where inhabitants were struggling to scratch a living from land or sea, fighting malnutrition and desperately high rates of infant mortality. The technique utilized local rather than imported resources - rock for lime burning, conch shells for plaster work, Caribbean pine for roof framing, *lignum vitae* for lintels and more often than not, ubiquitous silver-top palm for thatching - items available with little or no outlay beyond the builder's own skilled labor.

Frequent association of this building technique with plantation sites suggests it was first introduced into The Bahamas by Loyalist planters who settled in The Bahamas during or soon after the American Revolution.[10] Materials with this name and its variants (i.e. *tabby*, *tapia* sometimes *tappy*) are widely distributed along the Southeastern Coastal Plain of the United States. In South Carolina and Georgia the earliest extant examples date from the 1730's. The tradition is older in northeast Florida, being known from St. Augustine as far back as the late 1600's. Like Bahamian tabby, Southeastern tabby was fabricated by casting lime-based mortar into re-usable timber forms, a technique with long antecedents in Spain and North Africa which entered North America via Spain's Caribbean or Cental American colonies. Mixes employed in the Southeastern Atlantic states typically consisted of lime made from burning oyster shell, sand and a coarse shell aggregate all mixed with water. In The Bahamas lime was usually made by burning limestone or conch shell, small pieces of broken rock being substituted for oyster shell aggregates. Otherwise, casting methods from the two traditions were essentially similar.

Locally, tabby construction is typified by numerous small structures at Millar's Settlement (formerly Millar's Plantation) located near modern Bannerman Town, Eleuthera. At Millar's the earliest such building extant is likely a single storey ruin measuring 14'- 4" x 16'- 8"overall which has an entrance back and front plus two side windows.Walls retain clear evidence for construction, exhibiting pour lines left by formwork measuring approximately 12" in height. The tabby mix employed was rich in lime which bound small, roughly shaped stone blocks and pieces of unworked rock. Chronological sequences at Millar's are undetermined, however, we

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[8]Upton, Dell and Vlach, John Michael. *Common Places, Readings in American Vernacular Architecture*. University of Georgia Press, Athens, 1986: xvii

[9]Commissioner's Report for Eleuthera, 1950. Department of Archives, Nassau.

[10]See Baxter, J. E., Barton, J.D.& Frye, S. *Learning from Landscapes: Understanding Cultural Change and Practice at Polly Hill Plantation.* Proceedings 12th Symposium on Natural History of San Salvador, Gerace Research Centre, San Salvador, Bahamas, 2009:12

suspect this building was a slave house erected soon before Emancipation or a tenant house erected shortly thereafter. Either way, numerous tabby dwellings erected in Old Bannerman Town after 1840 indicate there was no clear break in vernacular building traditions as former plantation life dissolved, residents of South Eleuthera - many of whom had close associations with Millar's former masters - continuing to utilize tabby for building purposes down until the end of the nineteenth century or beginning of the twentieth century even as spatial standards improved and occupation patterns changed.

Thus, the distinctive use of *lignum vitae* uprights to define wall openings and secure top plates displayed by Structure I is matched by a small outbuilding in Old Bannerman Town, ruined houses at Millar's and an abandoned church located near the entrance of what is now Princess Cay.[11] Not as yet detected outside The Bahamas, this technique - which integrated timber and formed masonry into one coherent structural system was probably devised as an inexpensive way of limiting damage by hurricane force winds to the somewhat fragile exterior building skins preferred by local residents.

Structure 2 presents more distant analogies, the fabrication method described and spacing of vertical posts closely resembling construction dated to the late 1780's from Spanish era St. Augustine, Florida reported by Albert Manucy as follows:

> As in modern concrete construction, tabby walls were made by tamping the mortar into wooden frames. Unlike today's concrete, however, the old lime mortar hardened very slowly....One means of reinforcing the green mortar and hastening construction was to insert vertical wooden posts at about 5-foot intervals.....The posts not only stiffened the wall, but carried the weight of the roof, thus relieving the new tabby of premature strain." [12]

That Structure 2 perpetuates building methods introduced by Spanish settlers during their brief foray into The Bahamas during the 1770's seems implausible. However, it should be noted that a similar structural system is documented from South Ocean, New Providence where several ruined slave houses retain stacked rubble walls strengthened at regular intervals by timber posts which presumably supported roof construction. These dwellings are attributable to the late 1780's being built on land granted to the Loyalist John Moultrie, former Lt. Governor of East Florida whose enslaved work force included masons almost certainly trained in the vicinity of St. Augustine.

Buildings (including dwellings and a possible pineapple sorting or precessing shed) from the small mid -nineteenth century Freedman village (now abandoned) at Barque Bay, South Abaco exhibit closer relationship, these having (like Structure 2) thin tabby exterior walls cast around

[11]Very similar construction is exemplified by a small singe storey structure located at the entrance to what is now Princess Cay identified by local residents as a packing shed for produce being prepared for onward shipment from Old Bannerman Settlement.

[12]Manucy, Albert. *Houses of St. Augustine, 1565-1821*. St. Augustine Historical Society, 1978: 69.

timber posts designed to receive roof loads.[13]

At the Project Site, Structure 5 presents another variant type of tabby, its exterior walls being of broken stone and mortar cast incrementally into forms. There is no evidence here for use of timber uprights at window or wall openings. Rather the entire exterior wall system appears monolithic, a circumstance which explains why this building mode is sometimes considered analogous to modern cast concrete.

With regard to planning and facade treatment, buildings designed for domestic occupation (Structure 1, Structure 5) were single storey and organized around entranceways more or less centered on both front and back facades, entrances being reached by stone steps.[14] Internal division is now lost, "ghost" impressions left by partitions indicating one large room entered directly from the exterior flanked by two subsidiary spaces - presumably used for sleeping - was the norm. This arrangement is reflected by principal facades comprising a narrow doorway flanked right and left by one window. Side elevations also exhibit tripartite organization defined by windows matching those of entrance facades. It is likely - but not entirely certain - that windows were glazed. Side hung timber shutters are attested for both windows and - as often the case in The Bahamas - exterior doors. Floors were raised between 14" and 18" above grade on joists typically measuring 7¾" in depth.

Figure 4. Traditional 'rubble' (tabby?) dwelling Wemyss Bight, S. Eleuthera.

[13] Brooker, Colin, Miller, James and Maura, June. *A Survey of Heritage Resources at High Bank and Lantern Head Properties, South Abaco, The Bahamas.* Report on file AMMC, Nassau, The Bahamas.

[14] The majority of late nineteenth century houses in Old Bannerman Town exhibit near identical plans and elevations.

All roofs have now collapsed however Structure 1retains evidence in the form of rafters for a hipped solution of type commonly seen among traditional buildings of South Eleuthera such as the example from Wemyss Bight of uncertain date illustrated (Figure 3) which according to a local informant is 'rubble' (most likely tabby) built. [15]As previously mentioned, all roof coverings have disappeared without trace.

A striking resemblance in plan, dimension, facade treatment and construction detail exists between Structure 5and houses previously studied at Alexandria and High Bank, two abandoned settlements established near the southern extremity of Great Abaco during the latter half of the nineteenth century. Resemblances are close enough to suggest that builders in South Abaco and Bannerman Town vicinity were working from near identical sets of drawings or blueprints. Given the wide geographical distance involved, the probable - admittedly speculative - explanation for this phenomenon is supply of model designs. Regrettably, early Specification Books of the Department of Public Works - which might be expected to have played a role in such activity if it existed - have disappeared from Bahamian national collections. It is hoped that future research into other sources - notably UK Colonial Office Records - will produce better information than currently available concerning the entire process of post-Emancipation resettlement and the crucial role it played in the modern history of The Bahamas.

Lighthouse Point Historic Resource Group A: Evaluation of Historic Significance.

While progress has been made in documenting the material culture of enslaved peoples in The Bahamas during the Plantation era, little has as yet been published concerning to what degree such material culture persisted or changed after Emancipation came into effect during the 1840's. One significant avenue for research is presented by settlements established across The Bahamas by Government agents determined to improve living standards for newly freed slaves and Liberated Africans by "putting land into the hands of the emancipated." Acting under instructions issued by H.M. Government for effective settlement Crown Lands, eighty-four lots 60 foot front by 150 foot depth were disposed of at Dunmore Town, Harbour Island as early as 1836, buyers including former slaves and apprentices recently manumitted. Similar development in South Eleuthera is attested by the now abandoned settlement of Old Bannerman Town.

While no pertinent documentation has yet surfaced it appears that the latter settlement was established some time later - during the late 1840's perhaps or early 1850's. Whatever the case, architectural evidence still extant shows that like many other similar settlements, Bannerman Town was laid out on a grid-like plan, provision being made for a church, some kind of government center and wharf from where, according to local informants, produce was shipped to Nassau or more distant markets. Unfortunately, Old Bannerman Town's full extent is not

[15]The roof covering in this example is a modern composition replacement.

yet known.[16] However, we have no doubt that Structures 1-5 described above were part of this settlement and ordered on the same rectilinear model as its other buildings. It is also clear that in their construction, Structures 1 - 5 followed local precedent, which saw tabby used as the primary material for external walls in both residential and ancillary building.

Crucially, the five structures described demonstrate that this building mode was not entirely homogenous, Structure 1; Structure 2 and Structure 5 exhibiting variation within the broader vernacular tradition which may or may not represent evolution over time or alternatively the preferences - even experience - of individual builders. Associated artefacts indicate that although governed by local conventions with respect to spatial usage, style and building technique, occupants had access - direct or otherwise - to distant markets, manifested by a surprisingly wide range of British exports (principally ceramics), patent medicines from the United States and liquor probably bottled in The Bahamas.

How exactly such access was supported remains to be determined, fishing tackle, isolated relics of the once profitable - although short lived - fibre trade (including specimens of sisal and Sansevieria still growing in the vicinity) together with vague memories of pineapple growing related by local residents providing tantalizing hints of occupations pursued by what according to oral testimony, was once a thriving, predominately black community.

In summary. To borrow a phrase from Louis P. Nelson's recent discussion on the post-Emancipation architecture of Jamaica, "these buildings represent strategies by free blacks to fashion a way of life in critical material circumstances shaped by challenging climatic conditions and profound social injustice."[17]

Although ruined, the components of Lighthouse Point Historic Resource Group A here enumerated (Structures 1 through Structure 5) are collectively considered significant historic resources potentially eligible for inclusion on The Bahamas National Register of Historic Resources since they meet the following criteria:

1. All are more than fifty years old.

2. The building group is associated with historic events and activities, having been built as part of Old Bannerman Town, a settlement founded following Emancipation most likely to allow former enslaved individuals to acquire property and become householders in their own right.

3. Construction is distinctive, comprising exterior walls fabricated from tabby, a vernacular building technique with probable Loyalist Period antecedents characteristic of the Family Islands. The ship drawing incised on the exterior west facade of Structure 1 and incised

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[16] The 1959 Lands and Surveys map is ambiguous, showing Bannerman Town Settlement as consisting of two parallel streets running approximately east/west joined by a diagonal track running north-southwest. While perhaps reflecting what was then visible to the Crown Surveyors, this depiction does not accurately portray what extant ruins show to be a far more complex and extensive development pattern.

[17] Nelson, Louis P. *Architecture and Empire in Jamaica.* Yale University Press, New Haven and London, 2016: 234.

drawings on an interior wall of Structure 2 are important features which add to the historic value of Group A as a whole.

4. Future site investigation has the potential to yield information concerning Bahamian history in general and more particularly the material culture of South Eleuthera in the early post-Emancipation period, a period not well represented in the archaeological record though crucial to development of the modern Bahamian Commonwealth.

Lighthouse Point Historic Resource Group A: Recommendations.

1. Pending final determination of Lighthouse Point Historic Resource Group A's eligibility for inclusion in The Bahamas National Register of Historic Resources by AMMC, it is recommended that a buffer zone be established around each structure extending seventy-five feet in all directions. Construction should be excluded from such buffer zones. Since major components of LHP Historic Resource Group A are very fragile and subject to sudden collapse, it is important that heavy equipment, machinery and vehicles also be excluded from buffer zones. Zones themselves must be clearly marked and defined by fences or other suitable means.

2. In the interest of safety, no public access to the ruins should be permitted and warning notices posted indicating that said ruins constitute a serious danger to adults and children alike.

3. Field walls associated with historic resources here enumerated constitute elements of a cultural landscape important for understanding the lifeways of occupants /users of the building group described. It is therefore recommended that these walls be preserved 'as is' and protected from accidental damage.

PART II

LIGHTHOUSE POINT HISTORIC RESOURCE GROUP B
Structure 6(a) and Dependancies Structure 6(b) and Structure 6(c)


Figure 5 Structure 6 vicinity, *Aloe vera.*

Site. Structure 6(a) and its apparent dependencies stand at an elevation of about seventy-five feet above sea level on a tract of land incorporating... acres originally granted to Glasgow Butler in (Department of Lands and Surveys, Nassau, Deed Book G-57). Here designated Structure 6(a), the principal building now extant is a cut stone edifice standing on ground which slopes precipitously downwards north and north-west, levels somewhat then rises less steeply to the south. Currently this site is densely wooded, *lignum vitae* and logwood (*Haematoxylum campechianum*)[18] being abundant in the vicinity, a small patch of *Aloe vera* probably attesting a former garden planted slightly north of the principal structure.[19]

Structure 6(a)

Plates 12-19; Plate 25 (sketch south and west facades); Plate 26 (sketch plan).

Plan. Lighthouse Point Historic Resource Group B's principal building - Structure 6(a) - is carefully orientated about cardinal compass points and measures 24'-4" north /south x 15'-3" east/west in plan. With an entrance centered on each facade, approached by stone steps, the structure itself is strictly symmetrical, but how - or indeed if - the interior was divided is not attested by any visible feature. Doorways (measuring 3'-6" in width x 6'-6" high) centered on each long facade are flanked by a window opening right and left measuring on average 3'-2" wide x 3'-8" high. Doorways centered on north and south facades are similar in dimension, these two facades being otherwise devoid of openings. Where preserved, window frames measure about 2¾" x 4" in section, are of hardwood (*lignum vitae* or perhaps mahogany) with cills and styles pegged and morticed together. All openings are spanned by a pair of 2" thick *lignum vitae* lintels laid side by side and well bedded.

Construction. Considering the building's isolated location and precipitous approach construction is of an exceptionably high quality. Exterior walls (1'-8" thick) are fabricated

[18]Introduced into The Bahamas from Central America by pirates (or so it is said) this species was formerly valued for the red dye produced when its heartwood is soaked in water. If utilized locally for such purpose is not established. See Patterson, Jack, *Native Trees of The Bahamas*, Bahamas National Trust, 2OO2:96

[19]According to the Leon Levey Native Plant Preserve, Eleuthera, *Aloe vera* (originally native to North Africa) is now found on all island groups of The Bahamas where long grown for medicinal purposes.

from carefully finished and shaped limestone blocks raised on a foundation plinth about 1'-4" high and 2' wide. The difference in thickness between the plinth and upper wall levels created an interior ledge running all around the building which judging by impressions supported floor joists (now lost) measuring at minimum 5" in depth. Tops of exterior walls are eroded, enough fabric surviving to indicate they originally stood at maximum 9'-3" above present grade. Despite excellent workmanship, cut stone walls were stuccoed inside and out with relatively thin coats of lime mortar.

Roofing materials are lost except perhaps for several scraps of red and black slate. If used as a roof cover (as common in nineteenth century urban contexts) this slate (probably imported from the United Kingdom) would indicate a building of consequence more likely erected by some central authority - either civilian or military - than a private individual.

In terms of style, Structure 6(a) is difficult to date with any precision. Workmanship is consistent with erection by a well trained group of masons. Comparison reveals stylistic affinities with construction completed at Millar's before 1840 however, abundant artefacts show the project site was intensively occupied post-Emancipation, perhaps as late as the 1880's.

Function. In terms of typology, Structure 6(a) is anomalous having no obvious architectural parallels and offering few clues as to how - with its multiple points of entrance - it might have been utilized. Interior division into two sections or organization around a central hallway are both possible scenarios but neither arrangement is certain. What is perhaps more significant in the context of any functional analysis, is the site itself which when cleared (as once the case) must have offered sweeping panoramic views out to sea. Privateers, pirates and slavers before Emancipation and 'wrackers' thereafter are known to have plagued South Eleuthera. Could this indicate that Structure 6(a) served as a lookout? Answers are elusive, but it should be noted that small protective installations and observation posts (though largely undocumented) are found overlooking well trafficked sea lanes throughout The Bahamas.[20] Whatever its function, it is certain that Structure 6(a) did not stand alone, partial clearing of vegetation in February 2020 exposing several associated features.

Structure 6(b)

Plates 20-21

Located a short distance (between 12' and 10'-6") east of the main building, Structure 6(b) has all but disappeared above ground now being represented by a series of *lignum vitae* posts (6" -9" in diameter) and three sets of crudely fabricated stone steps which doubtless gave access to a raised timber framed structure measuring approximately 22'-9" north/south x 15'-8" in plan. Corner posts are carefully set out to produce an almost perfect rectangle but insofar as can be determined given their differential preservation, intermediate posts were ordered in line but at variable intervals. The best preserved stands 2' above present grade and retains a tenon designed to engage with a timber sill. Steps are in poor condition and slightly displaced.

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[20]Examples include small installations on Harbour Island; Crab Cay, Exuma; Marine Farm and Hope Great House, Crooked Island and Signal Hill, Masons Bay, Acklins.

Originally it seems this building was approached by steps centered on its east and west sides, another set being positioned toward its southwest corner.

Sills have disappeared and all evidence for the conjectured timber wall framing is absent. The roof frame and its covering are also missing. Within the building's perimeter and for some distance around, artefacts are abundant, consisting of architectural elements (notably rim locks for doors), pipe stems, ceramics and glass including patent medicine bottles attributable to the 1880's. Ceramics are predominantly British in origin and include a variety of transfer, annular and white wares dating to the late 19th century.

Structure 6(c) and Structure 6(d)

(Plate 22)

The quantity and variety of artefacts is consistent with relatively intensive occupation of the two larger buildings described , a circumstance confirmed by two ruined circular bread ovens situated downslope east of Structure 6(a). Both ovens are substantially ruined, the better preserved northern example, Structure 6(c) measuring approximately 6' in diameter being fabricated of roughly shaped limestone block laid radially in quantities of lime mortar. The second example, Structure 6(d) located a few yards south of the first is essentially similar though more heavily damaged. Both were probably beehive shaped in form and possessed a single orifice lined with lime mortar.

Lighthouse Point Historic Resource Group B: Recommendations.

1. Given that fundamental questions exist concerning the function, construction sequence, temporal development and actual extent of Group B, it is recommended that its site be tested more fully by a qualified archaeologist deemed acceptable to AMMC.

At minimum such investigation should establish site boundaries and develop chronological frameworks through systematic shovel testing, test unit excavation and GPS mapping of identified features sufficient for determination of the Group B's eligibility for inclusion in The Bahamas National Register of Historic Resources. Additionally, presentation of results are to include recommendations regarding the management of heritage resources so identified.

2. Prior to archaeological investigation it is recommended that a buffer zone be established around Structure 6a extending 150 feet north; 150 feet west; 200 feet east; 150 feet south. All construction, heavy equipment, machinery and vehicles should be excluded from the buffer zone. The Zone itself must be clearly marked and defined by fences or other suitable means. To ensure personal safety and avoid damage to historic resources, public access should also be excluded from the buffer zone until investigation is complete.

Plate 1. Structure 1, detail of west facade showing doorway and window opening.

Plate 2. Structure 1, view of interior southeast corner.

Plate 3a. Structure 1, roof framing, detail of fallen rafters

Plate 3b. Structure 1, roof framing, detail of fallen ridge rafter.

Plate 4a. Structure 2, west extremity of south facade.

Plate 4b. Structure 2, south facade, plan view showing tabby and rectangular post hole.

Plate 5. Structure 3. Remnants of southeast exterior corner showing traces of windows.

Plate 6. Structure 3. Oblique view, interior north facade.

Plate 7. Structure 4. Interior view looking north showing cross wall (left) and mortar floor.

Plate 8. Structure 4. Detail of northeast corner, interior view.

Plate 9. Structure 5. South facade, interior view (composite).

Plate 10. Structure 5. Interior view of southwest corner showing dangerous structural disassociation. Narrow vertical grooves in plaster represent otherwise lost timber internal partitions.

Plate 11. *Lignum vitae* (*Guaiacum sanctum*) growing in close proximity to Structure 4.

Plate 12. Structure 6(a). Detail of east facade showing doorway.

Plate 13. Structure 6(a). Detail of northeast exterior corner.

Plate 14. Structure 6(a). Detail southwest exterior corner.

Plate 15. Structure 6 (a). Detail of west facade showing cut stone masonry around window opening.

Plate 16. Structure 6(a). View, interior southwest corner.

Plate 17a. Structure 6(a). *Lignum vitae* lintel over window opening.

Plate 17b. Structure 6 (a). *Lignum vitae* window sill.

Plate 18. Structure 6(a). East facade, detail of *lignum vitae* lintel over window opening, interior view showing bearing.

Plate 19. Structure 6(a). South Entrance

Plate 20. Structure 6(b). Surface collection of predominately late 19th century artefacts placed on southeast entrance steps.

Structure 6 (b). Footprint outlined by red tape, detail southeast corner showing entrance steps far right.

Structure 6(b).Corner posts of *lignum vitae*, northeast (above); southeast to right.

Plate 21. Structure 6(b).

Plate 22. Structure 6 (c), north oven, view looking east.

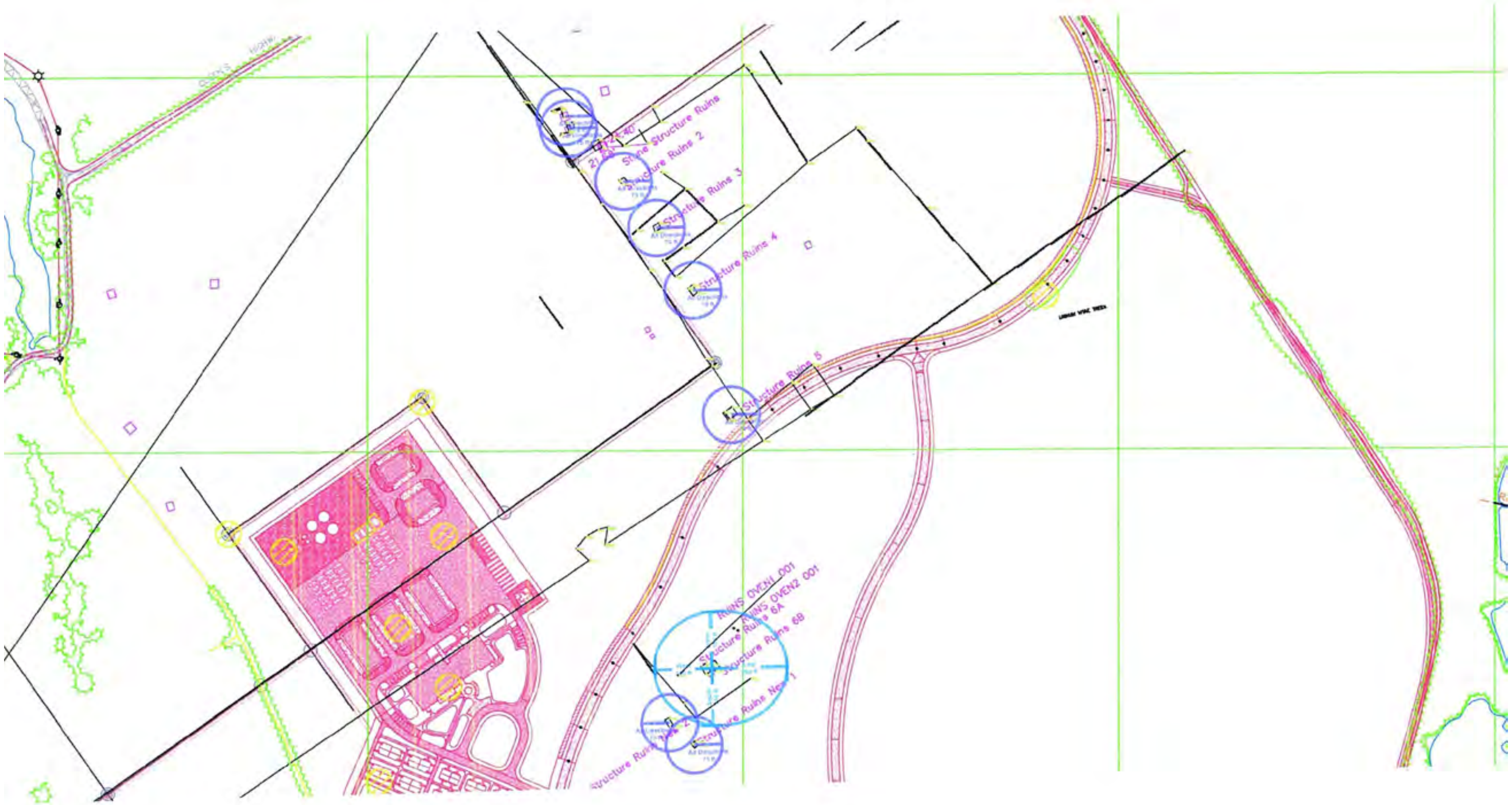

Plate 1. Lighthouse Point, South Eleuthera. Development map showing Historic Structures and proposed Buffer Zones.

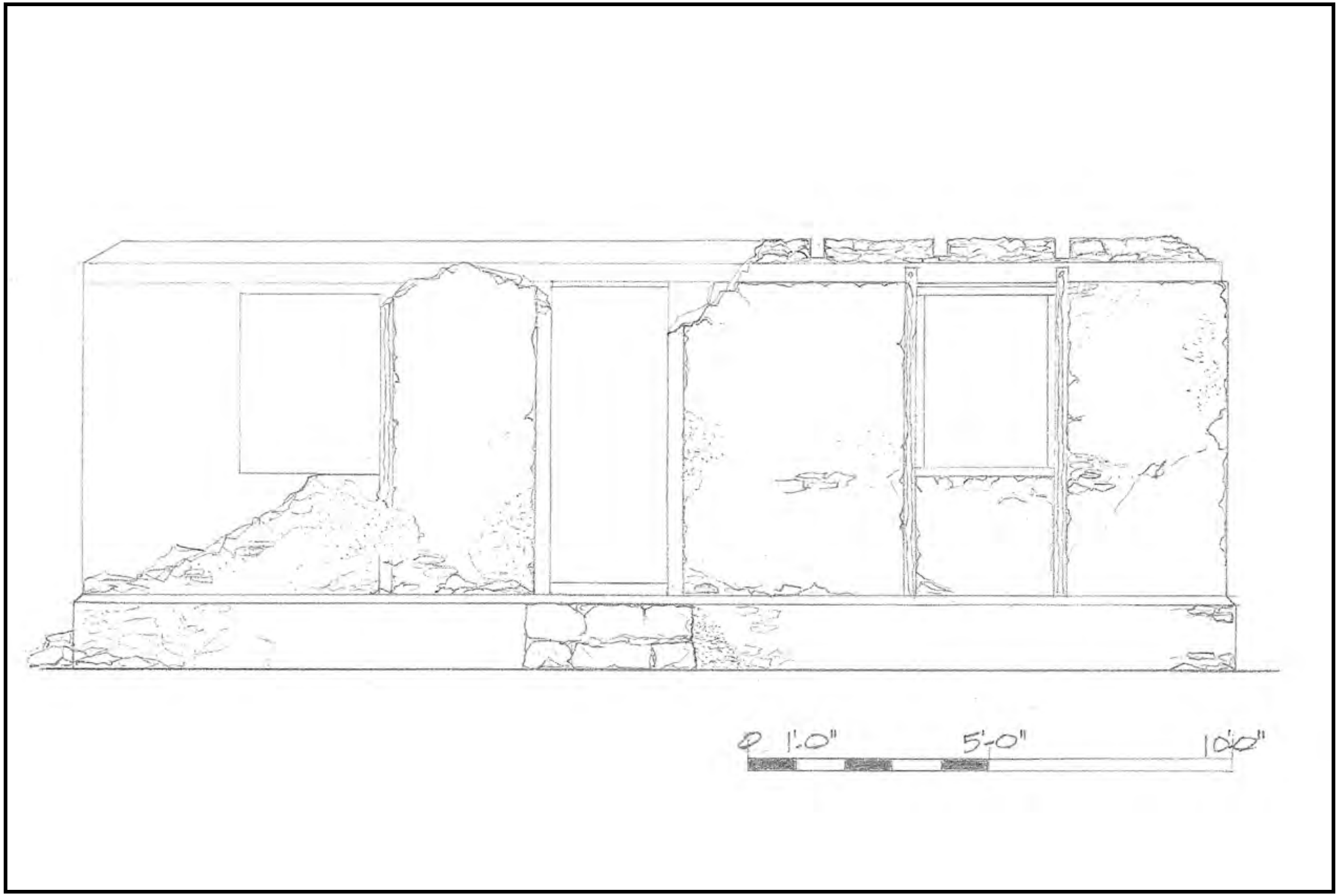

Plate 24. Lighthouse Point, South Eleuthera Historic Structure 1, West Facade part restored.

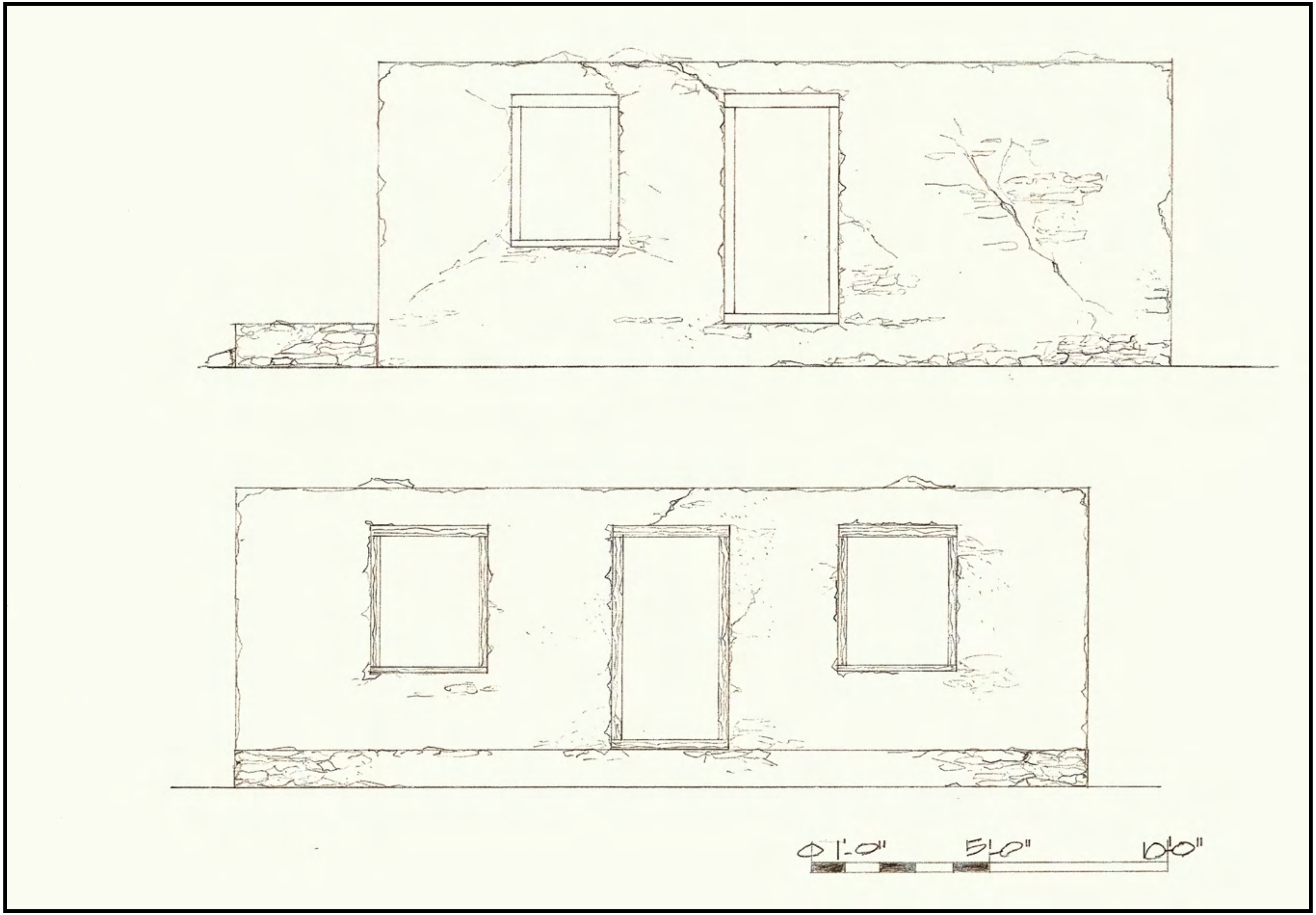

Plate 25. Lighthouse Point, South Eleuthera Historic Structure 5. South Facade (top), West Facade (below).

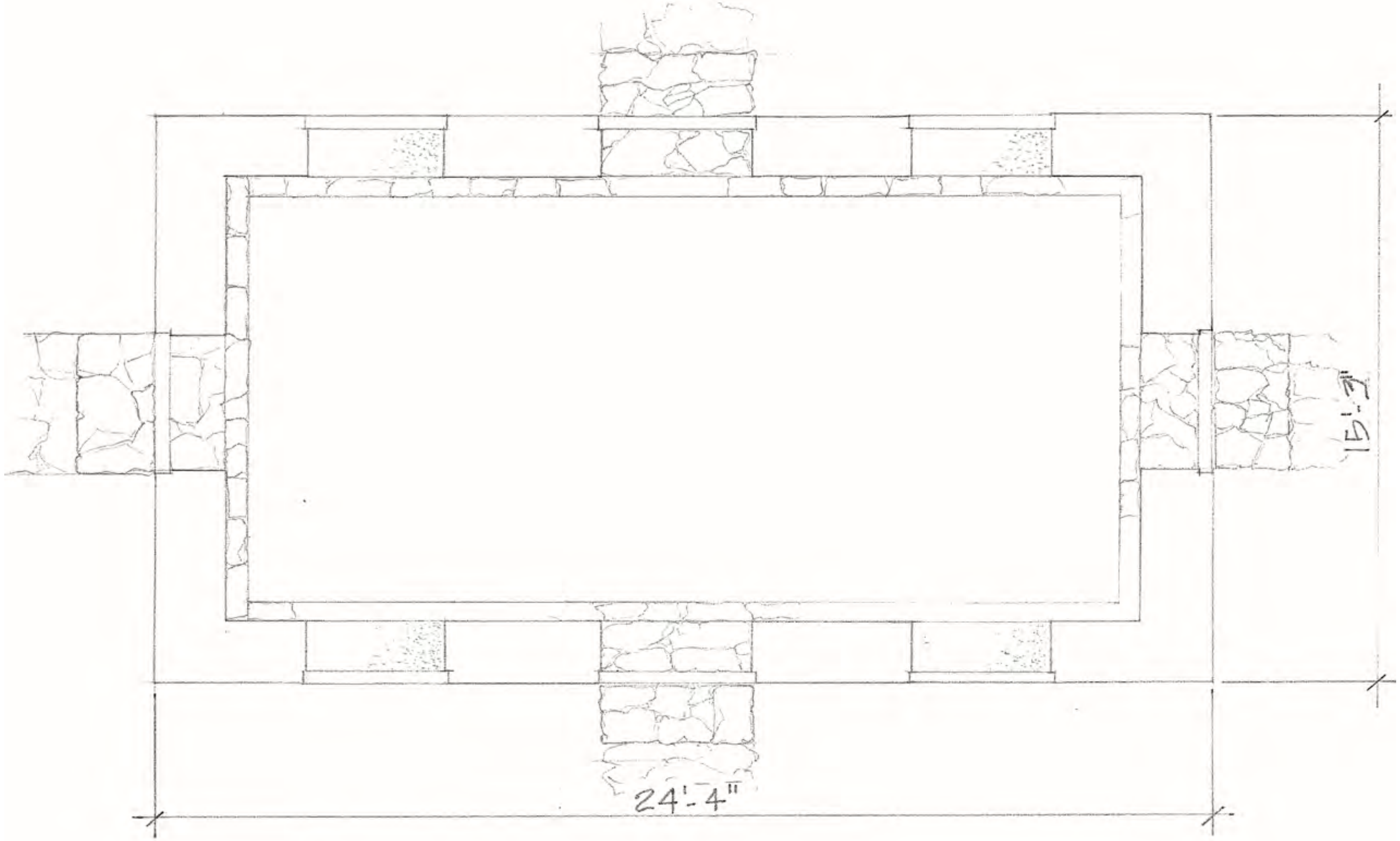

Plate 26. Structure 6 (a). Sketch plan.

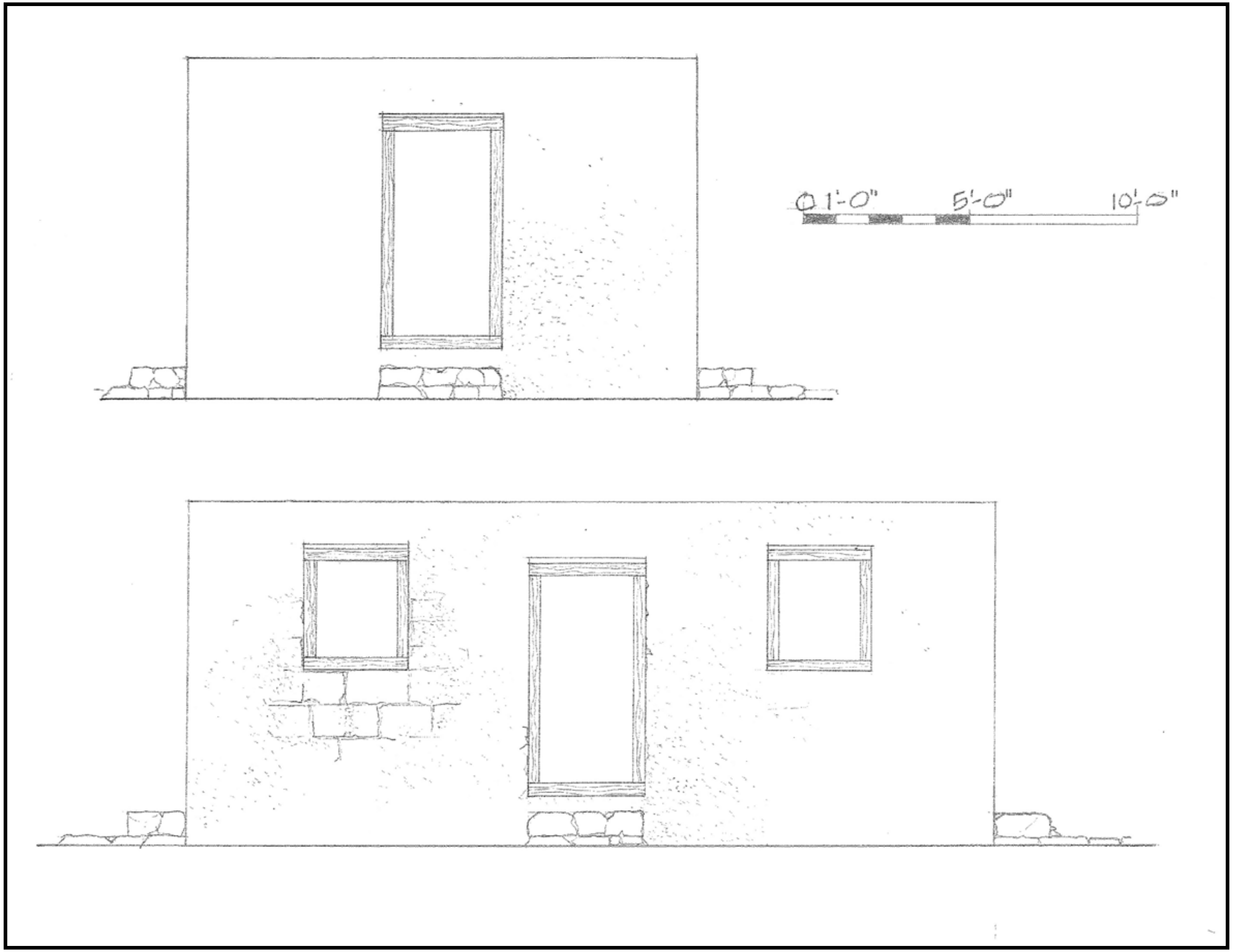

Plate 27. Lighthouse Point, South Eleuthera. Historic Structure 6 (a). North Facade (top), East Facade (below), restored.

Report on a Site Visit to Lighthouse Point, south Eleuthera, 12 February, 2020

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National Museum of The Bahamas/AMMC
Nassau, Bahamas
25th March, 2020

On 12 February I travelled with Mrs. Gammell Deal, of the BEST Commission, to south Eleuthera for the site visit. We were accompanied by Mr. Steve Norton, Senior Construction Manager for the project and Mr. David Chiaradonna, Senior Project Manager. Also joining us was Mr. Adrian Williams, surveyor for the project. Mr. Williams' survey team had initially discovered the ruins of six (6) historic structures in plotting points for the location of paths and roadways (see Google map, Figure 1). For this site visit Mr. Williams was responsible for guiding the group to the structures

Fig.1 Google map locating the six historic structures and parts of an historic period dry-stone wall.

Structure 1 (see Figure 2 below) is located atop a ridge. This was the first of the historic ruins that was located for archaeological assessment. The walls are of cut limestone blocks and stuccoed with a smooth, lime plaster. There are doorways in the center of each wall and windows at least in the north and south walls. Wooden lintels in doorways and window openings were all hand-planed, which would indicate that these were in place well before 1900. A surface collection of artifacts in the vicinity produced a variety of ceramics and bottle glass all dating to about the mid-19th century (see artifact photos, Figures 3-5). My preliminary archaeological assessment of this structure is that it was more likely a commercial, or industrial building rather than a dwelling house. Such a site would be consistent with the several agricultural industries which dominated the Bahamian economy after emancipation and on into the second half of the 19th century; on Eleuthera in particular.

Fig.2 Structure 1 was constructed using relatively small cut limestone blocks.

Fig.3 Gin Liquor Bottle, c.1840s-1850s

Figs.4-5 European manufactured ceramics, c. 1840s-1850s

Several feet south of Structure 1 is the footprint of a wooden structure (see Figure 6). Surface collections around this structure produced examples of early 19th century ceramics (see Figures 7 and 8); which would suggest that this structure likely dated to that earlier period. However, without more extensive archaeological investigation no further assessment could be made.

Fig.6 Red survey tape outlines wooden post holes cut into the bedrock for a wood-frame building.

Fig.7 Top – Banded ware, c. 1790s-1810

Fig.8 Below – Pearlware – Shell Edged, Blue (Left); Sepia Printed (Right) – c. 1800-1820

Structure 2 - The group followed remains of a dry-stone rock wall down the hill to this structure (see Figure 9). While the stone structure atop the hill was constructed using mainly cut limestone blocks, this significantly smaller structure was made using tabby construction. This building technique was introduced into The Bahamas in the 1780s by loyalist refugees from Britain's former American colonies. As tabby construction was used in The Bahamas until about the 1930s it is difficult to ascertain a more specific period of construction and use without finding other associated cultural material. The walls were finished off at about six feet. This suggests that this structure likely originally had a thatched roof. The tabby walls and thatched roof would suggest this structure was built and used by Bahamians of African descent, as these were less expensive because these required building materials that were readily available in the local environment.

One of the few surface finds in this area was a small bottle with a manganese content that had become solarized (see Figure 10); i.e. it now has a lavender hue because of its exposure to ultra violate rays. Clear glass using this formula was usually manufactured in the 1870s and 1880s.

Fig.9 Structure 2- Note finished height of the walls

Fig.10 Solarized Glass Bottle, c.1870s

Structure 3 is a short distance from Structure 2; all three of the other building ruins visited are down the hillside from Structure 1. This building is also of tabby construction, however, the hand-hewn window and door frames were put together using wire nails (i.e. round nails) which only came into general use in the 1860s and after (see Figure 11).

Fig.11 Note the wire nail in the wood frame

The widest selection of cultural materials was evident in this area. Artifacts ranged from ceramic chamber pots (19th century port-a-potties!); the ubiquitous glass bottles; and the copper alloy frame of a horse-drawn carriage, or buggy (see Figures 12, 13, and 14). Also found were several fragments of iron Dutch oven cooking vessels. This broader selection of cultural near this structure is an indication that this building may have been used as a dwelling house. However, this could only be more definitively determined through more extensive archaeological investigation.

Fig.12 Hand-painted Chamber Pot, c.1860s-1870s **Fig.13 Embossed Ironstone Chamber Pot, c.1860s-1870s**

Fig.14 Ornate copper alloy frame of a horse-drawn buggy, c.1860s-1890s

Structure 4 – The last building visited was Structure 4. This is the largest of the three structures seen and is the only building that showed structural evidence of having been divided into rooms (see Figures 15a and 15b). This building had a covered verandah along its western side as well as across the northern façade which overlooked the ocean. The majority of associated cultural material around this building were glass bottles; a number of which date to the first three decades of the 20th century (see Figures 16-17). A metal bed frame leaned against the south wall dates circa 1950s-1960s. Cultural material associated with this building indicates that it remained in use until the mid-20th century.

Fig.15a Lines in the stucco indicate original wooden dividing walls.

Fig.15b Wire nails secure hand-planed wooden door and window frames.

Fig.16 Fernandez Rum, Trinidad, c.1900-1910

Fig.17 Sun Crest Soda Bottle, c.1940s-1960s

Overall Assessment – The remaining two structures that had been previously located were not visited as the survey team indicated that these ruins are not on property involved in the Lighthouse Point development. However, all structures visited were originally built in the mid to late 19th century; none of the buildings show signs of later repairs or additions. Based on associated cultural material, Structure 4 continued in use at least until about the 1960s.

A check of south Eleuthera sites currently listed on the National Register of Historic Resources does not include this area and these structures. The outlay of these buildings and the associated dry-stone walls suggest that they all, at one time, operated as a cohesive unit. Some of the buildings were likely not used primarily as dwelling houses.

To understand more about who constructed these buildings, when, and why there needs to be more extensive archaeological investigations done around each structure. It is also important to conduct archival research on this area using earlier maps, plans, and other documentary evidence as Resident Magistrates' and Commissioners' reports.

Appendix H Socio-Economic Study

Summary of the proposed development

- **Over the 25-year time horizon, Disney's proposed development at Lighthouse Point is expected to drive significant increases in employment, income, GDP and government revenues**
  - A total investment of B$350 million
  - More than 300 new calls annually to The Bahamas
  - Between 600k-700k incremental cruise passengers will come to The Bahamas annually
  - 508 new Bahamian jobs annually during the development phase
  - 752 new Bahamian jobs annually during operations
  - B$805.1 million (in B$2018) increase in Bahamian GDP
  - B$339.2 million (in B$2018) in income earned in the Bahamas
  - B$357.5 million (in B$2018) increase in Bahamian government revenues, outweighing proposed concessions by a factor of 1.7

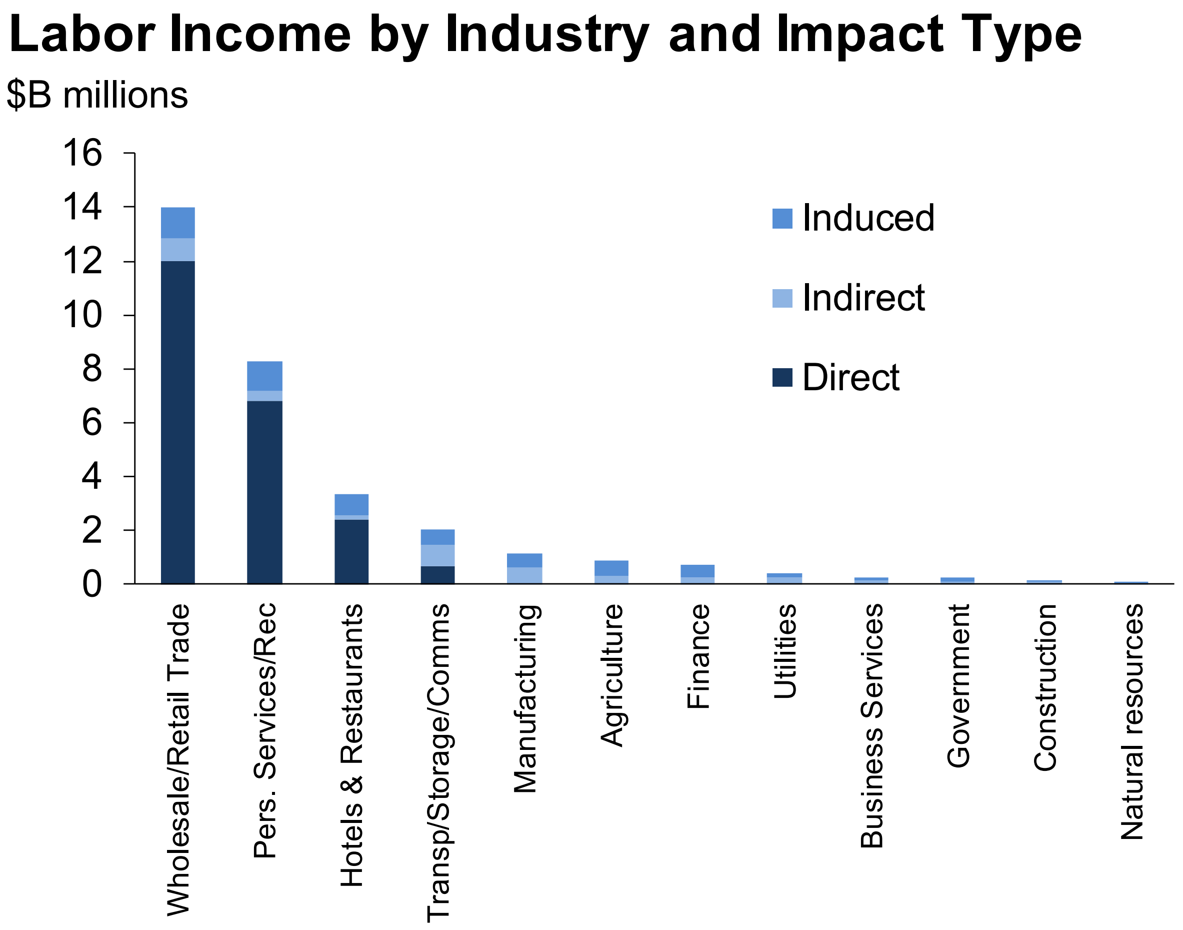
Summary table of Lighthouse Point impacts

Disney Cruise Line Lighthouse Point Project Impacts 2019 to 2043 25-year cumulative economic impacts				
	Direct	Indirect	Induced	Total
Development (2019-2022)				
Output (B$2018, millions)	99.6	34.5	63.6	197.7
Value added (B$2018, millions)	73.1	22.1	43.7	138.9
Income (B$2018, millions)	12.9	8.1	17.6	38.6
Employment (average)	205	85	218	508
Operations (2023-2043)				
Output (B$2018, millions)	567.6	139.0	192.8	899.4
Value added (B$2018, millions)	442.3	90.7	133.2	666.2
Income (B$2018, millions)	211.8	34.3	54.4	300.6
Employment (average)	562	70	120	752
Total Project				
Output (B$2018, millions)	667.3	173.5	256.4	1,097.1
Value added (B$2018, millions)	515.4	112.8	176.9	805.1
Income (B$2018, millions)	224.7	42.4	72.0	339.2
Employment (average)	505	72	136	713
25-year ROI Factors				
Government Revenues (B$2018, millions)			357.5	
Government Consessions (B$2018, millions)			207.1	
Revenues / Concessions			1.7	
GDP impact / Concessions			3.9	
Source: Tourism Economics				

…1,762 Bahamian jobs across the economy…

Employment Impacts				
	Direct	Indirect	Induced	Total
Agriculture	-	22	38	60
Natural resources	-	0	0	0
Manufacturing	-	24	22	46
Utilities	-	4	3	6
Construction	-	6	5	11
Wholesale and Retail Trade	676	48	65	790
Hotels & Restaurants	148	7	48	203
Transport, Storage & Communication	23	29	21	73
Business Services	-	7	7	14
Personal Services, Recreation	454	25	70	549
Finance	-	2	4	6
Government	-	1	2	3
Total	**1,301**	**175**	**286**	**1,762**
Source: Tourism Economics				

…And B$31.3 million in labor income



OXFORD ECONOMICS

Appendix I Heads of Agreement and Legal Description

EXECUTION VERSION

COMMONWEALTH OF THE BAHAMAS
New Providence

THESE HEADS OF AGREEMENT are made the 7th day of March A.D., 2019.

BETWEEN:

THE GOVERNMENT OF THE COMMONWEALTH OF THE BAHAMAS represented herein by Camille Johnson, the Secretary to the Cabinet (hereinafter called "**the Government**")

and

DCL Island Development, Ltd., a company incorporated under the laws of the Commonwealth of The Bahamas and having its Registered Office in the City of Nassau in said Commonwealth (hereinafter called "**the Developer**").

WITNESSETH:

WHEREAS:-

A. The Developer was incorporated on the 6th day of September, 1995 with an authorised share capital of B$5,000 divided into 5,000 shares of B$1.00 each. All of its issued shares are beneficially owned by The Walt Disney Company. The Developer is the owner and operator of *Castaway Cay* in Abaco, The Bahamas;

B. The Walt Disney Company is a company incorporated under the laws of the State of Delaware, one of the states of the United States of America, and has its principal office in the State of California, another state of the United States of America;

C. The Disney Conservation Fund provides financial grants to support the study of wildlife, protection of habitats, and the development of community conservation and education programs focused on the environment. Through the Disney Conservation Fund, Disney also

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strives to support experiences that connect children and families with nature. Since 1995, the Disney Conservation Fund has distributed more than $75 million through grants to support research and conservation projects led by various non-profits and educational institutions worldwide, including several in The Bahamas. The Disney Conservation Fund has given approximately $3 million to support research and conservation projects in The Bahamas since 1997. Attached as Exhibit A is a summary of environmental and conservation efforts by the Disney Conservation Fund, the Developer and its affiliates.

D. Magical Cruise Company Limited, a wholly owned subsidiary of The Walt Disney Company, currently operates four cruise ships, all of which are registered with the Bahamas Maritime Authority (such entity being hereinafter called "**Disney Cruise Line**"). Disney Cruise Line will add 3 new cruise ships to its fleet in 2021, 2022 and 2023, respectively. Each new ship will have 4000 passenger berths, with the 7-ship fleet having total passenger berths in excess of 25,000. The Developer understands that once the 3 new cruise ships are added to the Disney Cruise Line fleet and in full service in 2024, Disney Cruise Line intends to increase the number of its ships' calls at the Port of Nassau and/or the Port of Freeport by thirty to forty percent (30-40%) over the number of calls made by DCL ships at the Port of Nassau in 2018, subject always to berth availability;

E. The Developer desires to acquire approximately 751 acres from a private owner a parcel of property in South Eleuthera known as "Lighthouse Point" (the "**Property**", which is coloured yellow on Exhibit B attached hereto) for development as a cruise port and an entertainment facility (hereinafter called "**the Acquisition**");

F. Concurrent with completion of the Acquisition and the receipt of necessary permits and approvals, a Conceptual Plan is to be undertaken by the Developer (hereinafter called "**the Project**"). The Developer will undertake the development of the Project

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through contractors and subcontractors; when the context requires in this Heads of Agreement the term "the Developer" shall include such contractors and subcontractors;

G. The Government, being satisfied that completion of the Acquisition and the Project will be of significant economic benefit to The Bahamas and its people, has approved in principle the Acquisition and the Project and has agreed to certain incentives and concessions upon the terms and conditions hereinafter contained; and

NOW, THEREFORE, for and in consideration of the premises and of the mutual covenants and agreements set forth herein, all of which each party respectively agrees constitutes sufficient consideration received at or before the execution and delivery hereof, the parties hereby agree as follows:-

DEFINITIONS

For the purposes of these Heads of Agreement, the following terms shall have the meanings assigned below:

(A) "**Access Accelerator**" means the non-profit company established by the Ministry of Finance, the Chamber of Commerce and the University of The Bahamas for the expansion of small business in The Bahamas by providing training, advisory services, advocacy services and capital;

(B) "**Berth**" means the berth identified and marked on the Conceptual Plan which is sufficient for the safe docking of Disney Cruise Line cruise ships.

(C) "**Conceptual Plan**" means the Project Conceptual Plan attached hereto as Exhibit C. The Developer will continue to refine and improve the Conceptual Plan through Developer's own design and planning work, as well as through consultation with the BEST Commission and other Relevant Governmental Agencies with respect to the Environmental Impact Assessment.

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(D) **"Disney Merchandise"** means any goods or merchandise that incorporates the name, mark or other intellectual property of The Walt Disney Company or its affiliates.

(E) "**Marina**" means the marina identified and marked on the Conceptual Plan for the use and maintenance of smaller vessels operated by shore excursion operators described in Paragraph 3.3 below and by the Developer and its invitees, and will not be open to the public.

(F) "**Pier**" means the pier identified and marked on the Conceptual Plan.

(G) **"Price Index"**, as used herein, shall mean the Consumer Price Index for All Urban Consumers (CPI-U) – U.S. Average, All Items (1982-1984=100), published by the Bureau of Labor Statistics of the U.S. Department of Labor; provided, however, that if the Consumer Price Index described above shall be discontinued, the Price Index shall be the index of consumer prices in the U.S. most closely comparable to the discontinued Price Index, after making such adjustments in items included or method of computation as may be prescribed by the agency publishing the same, or as otherwise may be required to compensate for changes subsequent to the review period of Base Rent.

(H) "**Relevant Governmental Agencies**" includes the National Economic Council, the Office of the Prime Minister, The Bahamas Investment Authority, The Minister responsible for Crown Lands, the Department of Lands and Surveys, the Ministry of Public Works, Ministry of the Environment and Housing, Ministry of Tourism and Aviation, Ministry of Transport and Local Government, Ministry of Finance, Ministry of Agriculture and Marine Resources, Ministry of National Security, Ministry of Health, Central Bank of The Bahamas, Department of Physical Planning, Port Department,

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Bahamas Environment Science and Technology Commission ("**BEST Commission**"), Department of Marine Resources, Royal Bahamas Police Force, Royal Bahamas Defence Force, Department of Labour, Bahamas Immigration Department, Bahamas Customs Department, Water and Sewage Corporation, Department of Environmental Health Services, Bahamas Civil Aviation Authority, Bahamas Power and Light Company Limited ("**BPL**"), the Utilities Regulations and Competition Authority ("**URCA**").

(I) **"Seabed"** means that portion of the Seabed to be leased by the Government to the Developer and shall consist of the Seabed underlying the proposed Pier, Berth, and Marina. The dimensions and location of the seabed described above are under consideration and development by the Developer and will be provided to the Government and the Relevant Governmental Agencies prior to execution of the Lease.

(J) "**Treasurer**" means the Treasurer of the Commonwealth of The Bahamas, a corporate sole established pursuant to section 4 of the Minister of Finance Act, Chapter 23, Statute Law of The Bahamas, 2000.

(K) The singular includes the plural and vice versa.

(L) References to statutes or statutory provisions include references to any orders, or regulations made thereunder and references to any statute, provision, order or regulation include references to that statute, provision, order or regulation as amended, modified, re-enacted or replaced from time to time whether before or after the date thereof.

(M) Reference to any party includes its successors and permitted assigns.

(N) Any phrase introduced by the terms "including", "include", "in particular" or any similar expression shall be construed as illustrative and shall not limit the sense of the words preceding those terms.

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THE PROPERTY

1. The Government recognizes that for the success of the Project, the Developer shall require the necessary licences and approvals from the Relevant Governmental Agencies. In consideration thereof, the Government shall facilitate the expeditious review of the following applications and, provided that the same is in accordance with relevant Government policy and applicable law and the Developer complying with all requirements necessary to obtain approval by the Relevant Governmental Agencies, the Government hereby agrees to:

1.1 Provide all necessary permits and approvals for the acquisition of the Property whether by grant, lease, conveyance or otherwise, subject to the approval of any Relevant Governmental Agencies in accordance with applicable law;.

1.2 In collaboration with the Minister Responsible for Crown Lands and other Relevant Governmental Agencies, to lease the Seabed to the Developer for a term of fifty (50) years (commencing upon the execution and delivery thereof by both the Developer and the Government) with the right to renew for one (1) further term of fifty (50) years (hereinafter the "**Lease**"). Before the Lease may be executed, the Developer shall provide the Government with any and all information necessary for the Relevant Governmental agencies to conclude its review including but not limited to the Environmental Impact Assessment, Environmental Management Plan, geotechnical drawings and engineering drawings.").

1.3 The Government shall lease the Seabed to the Developer at the annual base rent in the amount of One Thousand Dollars ($1,000) per acre (hereinafter called the "Base Rent") for the first ten (10) years and upon such other terms and conditions to be mutually agreed by the parties. A rent review shall be conducted by the Government every ten (10) years thereafter and the rent to be paid thereafter will be the Base Rent increased in proportion to the increase in the "**Price Index**" during the relevant 10 year portion of the term (the initial 10 years or subsequent 10 year portions of the term, as the case may be). The Government agrees to give Developer notice of such increase and its calculation thereof no later than sixty (60) days prior to the Base Rent increase. The parties agree that the payment of any rent due under the Lease shall not be subject to Stamp Duty.

1.4 The Seabed Lease shall be free and clear of all adverse claims of title, lease or encumbrance of any kind and that the Government shall indemnify, defend and hold harmless the Developer from any and all such claims or legal actions whatsoever.

THE PROJECT

2.1. The Developer shall comply with the requirements of all planning and other relevant laws and regulations in relation to the construction and operation of the Project and shall obtain all permits, licences, certificates, approvals and other authorizations of whatever kind necessary for the Project.

2.2 Subject to receipt by the Developer of all necessary permits and approvals from Relevant Government Agencies, the Developer hereby agrees as follows:-

2.2.1 As soon as practicable after completion of plans and designs, and in any event not later than twenty-four (24) months after the date of this Heads of Agreement (such date being subject to extension due to circumstances, delays as described in Paragraph 13 below or as agreed by the Parties), provided the Developer has acquired the Property and all necessary and required permits or approvals have been issued, to commence and pursue diligently the development of the Project, expending a projected amount of between Two Hundred Fifty Million Dollars and Four Hundred Million Dollars in the currency of the United States of America (U.S. $250,000,000 – $400,000,000) with respect thereto.

2.2.2 In the event the Developer spends an amount less than U.S. $250,000,000 to complete the Project over the next Five (5) years after the date of this Heads of Agreement (such

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date being subject to extension due to circumstances, delays as described in Paragraph 13 below or as agreed by the Parties), the concessions granted to the Developer under Paragraph 6.1 of this Heads of Agreement shall be reduced by the "Relative Percentage". The "**Relative Percentage**" shall be 100% minus the amount of the dollars actually invested in or committed to the Project expressed as a percentage of U.S. $250,000,000, being the total investment contemplated herein. The incentives and agreements contained or referred to herein shall otherwise remain in full force and effect.

2.3 Subject to receipt of all relevant approvals, the Project shall include the following:-

(i) construction of the Pier, Berth and Marina;

(ii) construction and operation of (a) dining and beverage facilities, including the sale of alcoholic beverages (b) merchandise and retail facilities for the sale of goods and services, and (c) spa facilities, aquatics and recreational facilities;

(iii) beach expansion, enhancements and improvements;

(iv) themed buildings and themed elements, play areas, attractions and structures;

(v) maintenance and utility plants and facilities; and

(vi) employee dining, housing and recreation facilities.

2.4 The Developer shall make application to the Relevant Governmental Agencies for authorisation and permits for all construction activities as more specifically set forth in Paragraphs 2.2 and 2.3 above and on the Conceptual Plan as may be amended, including those required for:

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(i) drilling, boring and excavating and any other construction activities of the Seabed as necessary for the Pier, Berth and Marina to be constructed;

(ii) use of sand from mining operations to enhance, improve and maintain beaches;

(iii) construction of housing, dining, and recreation facilities on the Property for Developer employees and others affiliated with the construction of the Project and operation and maintenance of the Property;

(iv) construction of themed buildings and structures, play and recreation areas and facilities, attractions, merchandise, retail and spa facilities and other amenities; and

(v) construction of maintenance, storage and utility plants and facilities.

The Developer will work with the Government and Bahamian historians, artists and cultural experts to integrate Bahamian voices and artistic expression in the design of the Project, making it a reflection of The Bahamas, rooted in local stories and traditions.

2.5 During the construction and operation of the Project, the Developer will follow the high level of environmental and conservation stewardship and sensitivity that the Developer, its Disney affiliates and the Disney Conservation Fund have brought to other Disney projects around the world, as evidenced in Exhibit A and on the Disney Conservation and Environmental website at www.disney.com/environment. This commitment includes developing approximately 20 percent of the Property, much of it for low density uses, like the placement of beach chairs, umbrellas and small support structures for food and beverage, merchandise, as well as walking and bike paths and other similar uses, and using sustainable building practices and methods in the development of

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the Project where possible, including practices that emphasise water and energy conservation.

2.6 The Developer commissioned Oxford Economics, one of the world's leading providers of economic analysis, forecasts and consulting advice, to identify the economic impacts associated with the Project. The study employed a proprietary input-output model developed by Oxford Economics to complete the economic impact modelling. The analysis examined a 25-year timeline, including four years of development and construction, and capturing ongoing operations from 2023 to 2043. Over the 25-year time horizon, the project is expected to provide an $805.1 Million increase in Bahamian GDP and a $357.5 Million increase in Bahamian Government revenues.

EMPLOYMENT OF BAHAMIANS AND NON-BAHAMIANS

3. It is mutually agreed that the employment of Bahamians in the construction of the Project, and in the operation of the Property as a cruise port and an entertainment facility for cruise ship passengers and other guests, is of importance to the Government. The Developer, shall ensure that a minimum of 120 Bahamians will be employed directly during the construction of the Project. While it is acknowledged that, having regard to the complexity of some of the construction works (such as the Pier) and the need to ensure the highest levels of technical compliance with international standards, it may be necessary to hire greater numbers of skilled non-Bahamians than hereafter provided; the parties agree over the life of such construction phase to aim for an overall ratio of 80% Bahamian workers to 20% non-Bahamian workers, subject as hereinbefore acknowledged and subject always to qualified Bahamian candidates being available to allow the Developer to meet such ratio. The Developer estimates that approximately 150 permanent jobs will be created for Bahamians during the operation of the Project. As is done at *Castaway Cay*, during the operation of the Project the Developer will offer employment positions to Bahamians that encompass a breadth of

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disciplines, including horticulture, transportation, security, maintenance, custodial, food and beverage, recreation/lifeguards, as well as management positions and opportunities for advancement. The Developer will provide all employees with health benefits. The Developer will also work closely with the Government and local communities to develop training and professional development programs for Bahamians desiring to work during the operation of the Project. Although the Developer intends to employ qualified Bahamians (particularly residents of Eleuthera) prior to employing non-Bahamians, the Government recognises, however, that the timely completion of the Project and the successful operation of the Project to the standards, by which Disney is known, may also involve the employment of some non-Bahamians.

3.1 Subject to the approval of all Relevant Governmental Agencies and in accordance with applicable laws and policies, the Government shall do the following:

(i) enter into a protocol on labour ("**the Protocol**") with the Developer, no later than six (6) months from the date of this Heads of Agreement, in relation to labour, including training of Bahamian personnel and issuance of work permits for non-Bahamian personnel as may be required from time to time to accomplish the timely and successful construction, management, operation and maintenance of the Project, including the granting of work permits for jobs requiring special expertise, for persons filling senior management positions, and for persons performing training functions or on short-term assignments; provided that the grant of such work permits shall be subject to applicable law and shall be predicated on the unavailability in the Bahamian work force of persons having the relevant expertise and reliability, and who are available and qualified for the relevant jobs, positions or assignments. The Developer agrees to undertake to ensure that employment opportunities for Bahamians are adequately publicized within The Bahamas in accordance with applicable law;

(ii) expedite business licenses and other necessary Government or Government agency approvals in respect of non-Bahamian personnel and contractors as the Developer and the project manager shall require, subject to complying in all respects with all relevant laws and the policy of the Government;

3.2. The Developer shall put in place and sustain during the construction phase and during operation of the Project multi-disciplinary on-the-job technical skills-training programs designed to equip its Bahamian employees with the level of technical proficiency necessary for promotion and advancement. Upon request, the Developer shall provide information relating to such on-the-job training programs to the Department of Labour or any other agency designated by the Government during the course of the Project.

3.3 The Developer shall cooperate with and provide reasonable assistance to all Relevant Governmental Agencies to encourage the training of Bahamians with vocational and technical skills required in the development and operation of the Project.

3.4 The Developer shall provide, at a minimal rent, space for Bahamian vendors on the Property selected by the Developer for the retail sale of authentic, high quality Bahamian retail goods, services, souvenirs, arts and crafts, Bahamian tee-shirts and any other merchandise, other than Disney Merchandise, on those days when a Disney Cruise Line ship is in port on the Property. The particular number and type of such vendors shall be determined by the Developer in consultation with the Government, taking into account, among other factors, guest demand therefor, guest satisfaction experiences,

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safety and available space. The lease or other occupancy agreement between the Developer and such vendors shall provide, among other things, that such retail goods, services, souvenirs, arts and crafts and tee-shirts must be acceptable to the Developer for sale to the cruise ship passengers and other guests on the Property and that such vendors shall operate their respective businesses and conduct themselves consistent with the high quality of guest service for which Disney is known.

3.5 The Developer shall provide the opportunity, in exchange for certain arms-length considerations and other terms and conditions to be negotiated between the Developer and such persons, for Bahamian owners and operators of charter deep sea fishing boats, parasailing boats, jet skis, banana boat rides, water-skiing, bone fishing boats, sightseeing boats or tour boats about Eleuthera or other neighbouring islands, and land tours for bird watching, cultural or historical site visits, or nature excursions (ideas for such tours to be developed with the assistance of the Ministry of Tourism and/or the Antiquities Monuments and Museum Corporation, with input from local government and communities), to offer their services to the Developer's guests on the Property on those days when a Disney Cruise Line ship is in port on the Property.

3.6 Such excursion operators referenced in Paragraph 3.5 above shall be selected by the Developer, and the particular number of such excursion operators shall be determined by the Developer giving priority to Bahamians in the first instance and using good faith endeavours to maximize the hiring of Bahamian excursion operators, taking into account, among other factors, experience operating excursions, guest demand therefor, guest satisfaction experiences, safety and available space.

3.7 The licence or other agreement between the Developer and such excursion operators referenced in Paragraph 3.5 above shall provide, among other things, that such persons shall:

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(a) use at the Property only such boats and equipment which are consistent with, and shall operate such boats in a manner which complies with, all applicable laws and regulations and the highest generally accepted small passenger boat safety guidelines and principles,

(b) maintain in full force and effect, and shall furnish satisfactory evidence thereof upon request therefor, passenger liability insurance in such amounts and with such coverages and other terms and conditions as shall be acceptable to the Developer and to Disney Cruise Line, and

(c) operate their respective businesses and conduct themselves consistent with the high quality of guest service for which Disney is known;

3.8 On those days when a Disney Cruise Line ship is in port on the Property, when the Developer elects to feature live entertainment on the Property for the entertainment of the cruise ship passengers and other guests, then the Developer shall use Bahamian entertainers for such purpose; provided that such entertainers are available on days and at times as required by Developer, are available at reasonably competitive rates, and that the performance quality and personal conduct of such entertainers are at all times consistent with the high quality of entertainment for which Disney is known;

3.9 It is understood and agreed that the Developer, Disney Cruise Line or the designee of either shall be permitted, to own and operate merchandise and service locations on the Property for the cruise ship passengers and other guests on the Property, including locations for:

(a) retail sale of Disney Merchandise and sundry items; and

(b) rental of aquatic equipment (including without limitation, sailboats and other self-propelled non-motorized boats, snorkelling equipment, tubes, floats, rafts), bike rentals;

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(c) other recreational concessions and operations other than those provided in Paragraph 3.5;

3.10 To purchase and use at a minimum five percent (5%) of its agricultural and seafood products from Bahamians, including BAMSI, subject to availability, competitive terms, price, quantity, and quality in accordance with standards by which Disney is known, all on a reliably consistent basis.

3. 11 To use Bahamian materials, products and services in connection with all its undertakings under this Heads of Agreement, including the development and operation of the Project, subject to availability, competitive terms, price, quality, and quantity consistent with the high standards by which Disney is known.

PROJECT PERMISSIONS

4. The parties recognise that timing is critical as to commencement and timely completion of the Project, and the Developer and the Government therefore agree as follows:-

4.1 That the Developer shall provide certain environmental assessments in respect of the Property and the Seabed, which environmental assessments shall be under the supervision of the BEST Commission and shall be subject to the approval and satisfaction of the Relevant Governmental Agencies. The Developer agrees not to begin commencement of construction of the Project prior to the review and approval of the Environmental Impact Assessment ("EIA") and the Environmental Management Plan ("EMP") for the Project by the BEST Commission and any other Relevant Government Agencies, and subject to the recommendations, approvals, protocols and permits of the BEST Commission and all other Relevant Governmental Agencies. The Developer agrees to facilitate the inspection of the Project by the BEST Commission and other Relevant Governmental Agencies, during all stages of the Project in order to monitor Developer's compliance with the EMP. The reasonable costs of an environmentally qualified and independent consultant or consultants to be agreed upon by the Developer and the BEST Commission to assist in such monitoring shall be borne by the Developer. The Developer shall take all necessary steps as required by the Relevant Governmental Agencies in accordance with applicable law to remedy or mitigate any damage to the environment resulting from the negligence of the Developer or the Developer's contractors or subcontractors in executing any works connected with the Project. The term "commencement of construction of the Project" shall mean the commencement of construction of the Pier;

4.2 That in consideration of the Developer undertaking to carry out the Project, the Government hereby agrees, to assist with expedited review and (subject to the approval of all Relevant Governmental Agencies) issuance of the necessary licenses, approvals for planning, environmental impact, design, construction and related authorisations and permits, which shall contain reasonable, customary and typical requirements for such licenses, approvals, authorisations and permits, so as to allow the Developer to construct and operate the Project, including without limitation all the elements described in Paragraphs 2.3 and 2.4 above, and to allow the Project to proceed to completion on schedule;

4.3 That subject to receipt by Developer of proper permits, the Developer will be permitted use of sand from mining operations to enhance, improve and maintain beaches. Such use of sand from mining operations shall be subject to the reasonable and customary fees charged from time to time by the Government therefor, which fees shall not be more than fees charged by the Government to other persons for the same or similar rights;

4.4 That the Developer shall make application for the Minister responsible for Maritime Affairs and the Governor General to exercise their powers respectively under

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Sections 7 and 11(a) of the Port Authorities Act or other powers enabling so that the Developer (or Disney Cruise Line, as the case may be) shall be entitled to operate the Pier, Berth and Marina and their related improvements as a private port;

4.5 That the approvals, determinations, licenses, permits, permissions and entitlements referenced in Paragraphs 4.1, 4.2, 4.3, and 4.4 above are critical to the success of the Project and, as such, are a prerequisite to the Developer's obligations under this Heads of Agreement. In the event such approvals, determinations, licenses, permits, permissions and entitlements are not granted or issued by the Relevant Governmental Agencies within Eighteen (18) months after the issuance of approval of the EIA by the BEST Commission, or contain requirements that would materially alter the Project as planned, (the "Project Altering Requirements"), then the Developer may send a written notice to the Government of its intent to not proceed with the Project effective ninety (90) days from the date of the Developer's written notice. If during such 90-day period all outstanding approvals, determinations, licenses, permits, permissions and entitlements are granted, and all Project Altering Requirements are satisfactorily resolved by the Relevant Governmental Agencies and the Developer, then this Heads of Agreement shall remain in full force and effect. If within ninety (90) days from the date of the Developer's written notice, all outstanding approvals, determinations, licenses, permits, permissions and entitlements are not granted, and all Project Altering Requirements are not satisfactorily resolved by the Relevant Governmental Agencies and the Developer, then effective ninety (90) days from the date of the Developer's written notice this Heads of Agreement shall terminate without further action on the part of the Developer or the Government, the Developer and the Government shall be released from their respective obligations under this Heads of Agreement, and the Lease shall be terminated at no cost to or reimbursement by the Government; and

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4.6 That the Government shall designate a senior Governmental official within the Bahamas Investment Authority (or such other Government Ministry charged with responsibility for the Project) with direction and authority to act as liaison between Relevant Governmental Agencies and Local Government and the Developer to aid in expediting approvals and coordinating with various agencies within the Government, all with a goal of completing construction, opening and operation of the Project at the earliest possible date. The Government shall also designate a Governmental official from the Ministry of Tourism (or other appropriate Government Ministry) or Local Government to provide assistance to the Developer with respect to sourcing and recommending competent and appropriate Bahamian vendors and suppliers for the Project (except vendors or suppliers of goods or other materials which incorporate the name, mark or other intellectual property of The Walt Disney Company or its affiliates); PROVIDED, that the Developer shall have the sole right to determine the vendors and suppliers to whom the Developer will award contracts and with whom the Developer will otherwise do business, and such Governmental official shall have no right to approve any vendor or supplier with whom the Developer chooses to do business, or approve the terms and conditions of any such vendor or supplier contracts.

ENVIRONMENTAL PROTECTION

4.7 Environmental assessments shall be under the supervision of the Ministry of the Environment and the BEST Commission and shall be subject to the approval and satisfaction of the Relevant Government Agencies. The Developer agrees not to begin commencement of construction of the Project prior to the review and approval of the Environmental Impact Assessment and the Environmental Management Plan for the Project by the Ministry responsible for the Environment, the BEST Commission and/or the DPP and subject thereto the recommendations, approvals, protocols and permits of the Ministry responsible for the

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Environment, the BEST Commission, and/or the DPP, and all other Relevant Government Agencies.

4.8 Subject to the approval of the BEST and all Relevant Governmental Agencies, the Developer hereby undertakes and agrees to:

(i) maintain and preserve the environmental integrity of the Project;

(ii) include in its contract construction documents penalties for violating sound environmental practices in addition to any other remedies available at law to the Government and to employ responsible persons to ensure compliance therewith by the Developer and any contractor or sub-contractor engaged in the Project;

(iii) facilitate the inspection of the Project by BEST and all Relevant Governmental Agencies, such inspections not to be unreasonably frequent. The reasonable labour and travel costs of such inspection shall be borne by the Developer;

(iv) take all necessary steps as stipulated by BEST or any Relevant Governmental Agencies to remedy or mitigate any damage to the environment resulting from the Developer's negligence or the negligence of any contractor or sub-contractor in executing any works connected with the Project without prejudice to any other rights or remedies available at law to the Government;

(v) fund reasonable labour and travel costs of a qualified consultant or consultants of BEST and other Relevant Governmental Agencies to monitor and audit the Developer's compliance with the EIA and EMP and applicable environmental laws and regulations during development, operation and decommissioning of the Project.

4.9 The Developer shall cease any work which is in violation of the EIA or the EMP without the approval of BEST Commission or any Relevant Governmental Agencies upon

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reasonable notice by the BEST Commission or any Relevant Governmental Agencies, and the Developer will take all necessary steps stipulated by BEST, or other Relevant Governmental Agencies, to remedy or mitigate any damage to the environment resulting from the Developer's negligence or the negligence of any contractor or sub-contractor in executing any works connected with the Project without prejudice to any other rights or remedies available at law to the Government.

4.10 The Developer shall comply with all international conventions to which The Bahamas is a signatory with respect to environmental obligations and general policies established by the Ministry of Tourism for cruise ports and cruise lines operating in The Bahamas.

4.11 The Developer acknowledges that sustainability initiatives with respect to water conservation, climate research, coastal resilience, carbon sequestration, restoration of coastal wetlands, use of renewable energy, reduction of GHG emissions and improve functionality of mangrove ecosystems to increase carbon sink ability to proper management are important to Government.

4.12 The Developer shall make best efforts to incorporate into the construction of the Project the use of environmentally friendly technology and green building practices designed to reduce water usage, increase energy efficiencies in light and any cooling systems and increase efficiences within its physical plant. The Developer shall seek to incorporate in any new buildings and outdoor amenities (e.g. outdoor lighting), effcient energy saving technologies and reduce solid and liquid waste streams, reduce energy usage and increase the efficiency of cooling systems.

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DEVELOPER COMMITMENTS AND AGREEMENTS

5. The Developer agrees as follows:-

5.1 The Developer will provide all citizens and residents of The Bahamas with full access to the Property for non-commercial purposes, while working with the Government to ensure appropriate safety and port security.

5.2 The Developer will collaborate with the Government and local communities to meaningfully contribute to initiatives that meet local community needs, with a special focus on children and families. In particular, the Developer will work with local communities to identify schools near the Property that the Developer can assist by providing things including facilities upgrades, technology solutions, school supplies, curriculum assistance, visits where Disney cast and crew spend time reading with students, and Disney characters visits. In addition, The Developer will assist the Relevant Governmental Agencies and the local Eleuthera community to identify and enhance tourist heritage sights in South Eleuthera.

5.3 The Developer or its affiliates will collaborate with: (a) the LJM Maritime Academy, Maritime Cay off Arawak Cay, to employ suitably qualified Bahamians as crew members on board Disney Cruise Line ships in positions that are commensurate to their qualifications and certifications; (b) the Access Accelerator to assist in the development, creation and funding of programs that will provide advisory and technical support for Bahamian enterprises seeking to do business with the Developer, as set forth in a memorandum of understanding to be entered into between the Developer and the Access Accelerator; (c) the Hospitality Institute of the University of The Bahamas to explore opportunities to assist in the development and/or implementation of courses of study related to hospitality, culinary and tourism; and, (d) the Government and local

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communities to explore opportunities to improve medical facilities that serve the residents of south and central Eleuthera.

5.4 The Developer also agrees to provide reasonable and appropriate office space and meals to such number of Customs/Immigration and Police officials as well as Department of Marine Resources staff which shall be reasonably necessary from time to time (and which the Government shall be obliged to provide) in order to process and administer Customs and Immigration and police matters at the Property during both the development and operational phases of the Project.

5.5 The Developer also agrees to consult with and cooperate with the Ministry of National Security, the Royal Bahamas Police Force, the Royal Bahamas Defence Force, the Bahamas Maritime Authority and the Port Department to assess security issues related to the operation of the Pier, Berth and Marina, the port and the Project.

5.6 If requested by the Government of The Bahamas through the Office of the Prime Minister, Developer agrees to provide services such as hospitality training, way-finding and traffic analysis, master planning peer reviews, image and reputation management, etc. (hereinafter called "Disney Services"), in order to assist the Government on various issues, including by way of example, the enhancement of the tourism experience at certain destinations in The Bahamas. The Disney Services will be contributed on a pro bono basis up to an annual sum of Twenty Thousand US Dollars (U.S. $20,000.00) for the first five (5) years following the execution of this Heads of Agreement. The Disney Services will be valued at cost, without mark-up or profit. Fees for any Disney Services provided in excess of the amount above on an annual basis will abate the amount of Base Rent payable by the Developer pursuant to Paragraph 1.3 above. Disney Services may be provided by the Developer or its affiliates, as determined necessary by the Developer in its sole discretion.

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5.7 The Developer shall consult with the Department of Physical Planning in accordance with the Planning and Subdivision Act, 2010 (or any amendment or replacement thereof) on all approvals required under the said Act and shall as required under applicable law consult with the public in relation to any approvals required thereunder.

5.9 Developer has designated a portion of the Property comprising approximately 190 acres, and the southernmost point of the Property comprising approximately 2.5 acres, as identified in Exhibit C, as land to be conveyed to the Treasurer at a nominal cost of B$10.00 (the "Government Land"). As the Government Land is being conveyed to the Government, the Government shall be responsible for any Stamp Duty payable on conveyance of the Government Land to the Treasurer. The appraised value of the Government Land is B$6,290,000. Developer will also undertake to construct a roadway through the Government Land, construct a parking lot and beach amenities such as restrooms, and at the request of the Government provide environmentally friendly access to the southernmost point of the Property identified in Exhibit C, all at Developer's sole cost. Within six (6) months after the Acquisition, the Government and the Developer shall enter into proper agreements and other documents necessary to transfer and convey the Government Land, and set forth the particulars of the road and amenities to be constructed on the Government Land, as well as other related mutual obligations to be agreed.

5.10 Notwithstanding the provisions of Paragraph 4.1 above, the construction of the roadway and other amenities described above may commence at any time after the conveyance of the Government Land to the Treasurer, subject to any necessary approvals and permits from the BEST Commission or other Relevant Governmental Agencies.

THE DEVELOPER CONCESSIONS

6. The Government, pursuant to the provisions of the Hotels Encouragement Act and Hotels Encouragement (Customs Duties Exemption) Regulations, 1999 and all other powers enabling, hereby agrees:-

6.1 To grant concessions to the Developer pursuant to such legislation that may be necessary or appropriate so that the Developer shall be exempt from:-

(i) customs, excise and stamp duties in connection with both the import to and export from The Bahamas of all construction plants, materials, furnishings, machinery, and equipment and supplies, in developing the Project; **Provided However**, that the Developer shall not be exempt from any Customs or stamp duties upon consumable stores (except with respect to water, fuel and lubricants as hereinafter described in Paragraph 6.2). This concession shall apply to the Developer as well as its contractors, and sub-contractors involved in the development of the Project;

(ii) Real Property Taxes from and after the date of acquisition of the Property and the date of the Lease and for twenty (20) years after the date on which the Project opens for business; and provided that the exemption from Real Property Taxes may be granted for further successive ten (10) year periods provided that the Property has been well maintained and refurbished by the Developer; and

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(iii) any tax, assessment or imposition upon or against any earnings or revenue derived from operations upon the Project and its amenities, and all additions thereto, or upon or against any dividends declared in respect of the shares of the Developer, or upon or against any interest paid by the Developer in respect of its indebtedness, from and after the date of Acquisition and for a period of twenty (20) years after the date the Project opens for business.

6.2 That potable water, fuel and lubricants brought to the Property for use at the Property during construction or operations or for the cruise ships or passenger boats shall be exempt from Customs, excise and stamp duties; and

6.3 That the Developer and Disney Cruise Line will be exempted from Business Licence Fees or similar impositions for ship based (but not land based) operations.

6.4 To provide Customs and Immigration personnel to process and clear the Disney Cruise Line ships, their passengers and cargo, Developer and its contractors personnel and to facilitate clearance of transport barges and/or other vessels at the Property.

6.5 That the Developer shall be entitled to receive any benefits not specifically enumerated in this Heads of Agreement that are or may become available to any other cruise line or their affiliates that develops a cruise line passenger experience in The Bahamas under the Hotels Encouragement Act and Hotels Encouragement (Customs Duties Exemption) Regulations, 1999 or any other relevant Acts.

UTILITIES

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7.1 In the event BPL, Bahamas Telecommunications Company Ltd., Cable Bahamas Ltd., Be Aliv Limited and/or the Water and Sewerage Corporation are unable to provide dependable, reliable electricity, telephone, cable, internet, garbage and/or water and sewerage services at competitive commercial cost and terms, the Developer may, subject to the approval of any Relevant Government Agencies in accordance with applicable law, including that of URCA (where and as applicable), establish, maintain and operate upon the Property any of such utility infrastructure and systems (including potable water (reverse osmosis or desalinization), garbage treatment or disposal, incineration, sanitary sewerage treatment or disposal, electricity, solar or other energy source, fuel transfer and storage), as the Developer shall deem fit and proper for the complete and comfortable use and enjoyment of the Property and its related amenities as an entertainment facility for cruise ship passengers and other guests. The Developer shall ensure that at least thirty percent (30%) of the energy demand of the Project produced by the Developer shall be from renewable energy sources.

7.2 Specifically with respect to electric power and notwithstanding Paragraph 7.1 above, the Developer hereby commits to remain on their own power or be alternatively powered by the Developer's own land-based resources. Failing which and subject to approval of URCA, BPL and any other Relevant Governmental Agencies, the Developer shall enter into an arrangement with BPL for the provision of services upon such terms and conditions as may be agreed between BPL and the Developer.

ANTI-CORRUPTION

8. Each of the parties agree that it has not performed, and will not perform, in connection with this Heads of Agreement, any "Act" (as defined below) for the purposes of improperly influencing any act or decision of any public official or any other person (including inducing any public official to do or omit to do any act in violation of his or her lawful duties or to use his or her influence to affect any act or decision of any government or public enterprise), or for the purpose of obtaining an improper or unfair business advantage. An "Act" is defined as follows:

(a) to make or offer to make, whether directly or through an intermediary, any payment, or offer or promise of payment of anything of value;

(b) to receive, whether directly or through an intermediary, any payment, or offer or promise of payment of anything of value;

Each party shall procure that each party's employees, servants and agents comply with the terms of this Paragraph 8.

MUTUAL WARRANTY AND ACKNOWLEDGEMENT

9.1 Each of the parties warrants its power and authority to enter into these Heads of Agreement and further that the said terms and provisions of these Heads of Agreement shall be enforceable in accordance with said terms and provisions.

9.2 The parties hereto agree that they will work together in a spirit of mutual cooperation and good faith towards the timely completion of the Project and will cooperate with each other to allow reasonable monitoring of compliance with the terms of these Heads of Agreement.

9.3 During the development of the Project, the Developer agrees to provide quarterly reports with respect to employment, construction progress, capital injection into the Project, and a yearly report of the economic impact of the Project to the Ministry of Finance with copies to the Bahamas Investment Authority and to the Secretary of the National Economic Council.

9.4 Either party, upon receipt of a specific request in writing from the other, shall provide such information as the requesting party shall reasonably require enabling such party to monitor compliance of the other with the relevant terms of these Heads of Agreement.

SEVERANCE

10. If any provision of these Heads of Agreement is declared by any judicial or other competent authority to be void, voidable, illegal or otherwise unenforceable, the parties shall amend that provision in such reasonable manner as achieves the intention of the parties without illegality or at the discretion of the parties the provision may be severed from these Heads of Agreement and the remaining provisions of these Heads of Agreement shall remain in full force and effect; **Provided However**, that in the event of any such declaration and either the Developer or Disney Cruise Line (it being understood and agreed that Disney Cruise Line shall be a third party beneficiary of these Heads of Agreement) no longer has the substantial benefit of its bargain under these Heads of Agreement, then, in such event, any of said parties may in its discretion cancel and terminate these Heads of Agreement.

HEADINGS

11. Headings contained in these Heads of Agreement are for reference purposes only and should not be incorporated into these Heads of Agreement and shall not be deemed to be any indication of the meaning of the clauses to which they relate.

COUNTERPARTS

12. These Heads of Agreement may be executed in any number of counterparts, each of which counterpart, when so executed and delivered, shall be deemed to be an original and all of which counterparts, taken together, shall constitute one and the same Heads of Agreement.

DELAYS, ETC.

13. The duties and obligations of the Developer under these Heads of Agreement shall be subject to delays, hindrances or other adverse effects of any Act of God, insurrection, riots, civil commotion, war or warlike operations, strikes, lockouts, force majeure, or any unforeseen or

extraordinary circumstances which may be reasonably considered to be beyond the control of the Developer. In particular and without limiting the generality of the foregoing, in the event of any of the aforesaid circumstances, the length of terms under or with respect to any of the foregoing agreements (e.g., commencement of term period for the Lease) and the foregoing concessions (e.g., abatement of taxes) shall, upon request therefore by the Developer, be extended for such period or periods as shall be necessary to allow the Developer to recoup any and all time lost as a result of such circumstance.

NOTICES

14.1 Any notice required or permitted to be given to the Developer under this Agreement may be delivered either personally or by airmail, addressed to the Developer at the address of the Developer set forth below and if the Developer is represented by Bahamian counsel such notice shall be served in like manner upon the Bahamian counsel:

DCL Island Development, Ltd.
At its Registered Office
c/o: Callenders & Co.
One Millars Court
P.O. Box N-7117
Nassau, Bahamas

And

DCL Island Development, Ltd.
P.O. Box 10299
Lake Buena Vista, FL 32830
USA
Attn: President

With copies to:

Callenders & Co.
Attn: Lester J. Mortimer Jr., Q.C.
One Millars Court
P.O. Box N-7117
Nassau, Bahamas

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Walt Disney World Legal Department
Attn: Chief Counsel
P.O. Box 10000, 4th Floor
Lake Buena Vista, FL 32830

14.2 Any notice required or permitted to be given to the Government under this Heads of Agreement may be delivered either personally or by airmail to the Government at the address of the Government set forth below:

Permanent Secretary
Office of the Prime Minister
Cecil Wallace Whitfield Centre
West Bay Street
P.O. Box CB 10980
Nassau, New Providence,
The Bahamas

With copies to:

Director
Bahamas Investment Authority
Cecil Wallace Whitfield Centre
West Bay Street
P.O. Box CB 10980
Nassau, New Providence,
The Bahamas

OTHER GOVERNMENTAL ACTION

15. The parties hereto acknowledge and agree that it is not the intent of these Heads of Agreement to preclude the Developer or Disney Cruise Line from availing itself of any subsequent Governmental legislation, regulations, orders, or policies which are or may be more favourable to the Developer or Disney Cruise Line than the terms of these Heads of Agreement (such as, by way of illustration only and without being limited to, incentives in the future made available to cruise ship operators who dock at Nassau and who otherwise meet certain specified criteria).

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GOVERNING LAW AND DISPUTE RESOLUTION

16.1 This Agreement shall be governed by and construed in accordance with the laws of The Bahamas, excluding its conflict of law rules and the conflict of law rules of any other jurisdiction.

16.2 In the event of a Dispute, as defined in Paragraph 16.3 below, the parties shall attempt to resolve such Dispute through good faith consultations. If the Dispute is not resolved through good faith consultations within thirty (30) days after one party has served a written notice on the other party describing the matter(s) in dispute in reasonable detail (the "Dispute Notice") and requesting the commencement of consultations, then either party may submit the Dispute for arbitration as provided in Paragraph 16.3.

16.3 Any dispute, controversy or claim arising out of or in connection with these Heads of Agreement, including the validity of or the performance or nonperformance of a party under these Heads of Agreement and whether the claims asserted are arbitrable (a "Dispute"), shall be resolved by final and binding arbitration in accordance with the Rules of Arbitration of the International Chamber of Commerce, effective January 1, 2012 ("ICC Rules"), except as modified herein.

16.4 The arbitral tribunal shall be comprised of a single neutral arbitrator selected in accordance with the ICC Rules. If the parties fail to appoint a sole arbitrator by mutual agreement within the time provided in the Rules, a list procedure for appointment of the sole arbitrator shall be used. No arbitrator shall be (i) a citizen or resident of The Bahamas, (ii) a past or present officer, director, employee or agent of the Government of The Bahamas or any of its ministries, agencies or other authorities, or (iii) a past or present officer, director, employee or agent of the Developer or any of its affiliates. The place of arbitration shall be Nassau, The Bahamas, and the arbitration shall be conducted in the English language.

16.5 The parties shall have the right to conduct reasonable discovery, including the taking of witness statements and affidavits. Except with the consent of all parties to the arbitration proceedings, the tribunal shall not appoint any expert or experts to report to the tribunal. No person may be joined as a party to the arbitration, except as all parties to the arbitration shall agree in writing.

16.6 The tribunal shall render its award within thirty (30) business days after the closure of the hearing, unless the tribunal determines for good cause that a longer period is necessary or appropriate under the circumstances of the case. The arbitral award shall be in writing and shall state the reasons upon which it is based. The decision shall be based upon the law and the facts, and the arbitrator shall have no greater authority to consider equitable factors than would the Supreme Court of The Bahamas. The award of the tribunal shall be final and binding upon the parties and judgment upon the award may be entered in any court having jurisdiction thereof. The arbitral tribunal shall not be authorized to award punitive damages and the parties waive, to the maximum extent not prohibited by law, any right they may have to claim or recover in any arbitration or in any legal proceeding of any kind any award for punitive, exemplary or similar damages, unless a statute requires that compensatory damages be increased in a specified manner.

16.7 Each party shall bear its own costs of the arbitration, including attorney's fees, and shall share equally the arbitrator's fee and the ICC's administrative costs.

16.8 To the extent that either party has or hereafter may acquire in any jurisdiction any immunity (sovereign or otherwise) in respect of its obligations under these Heads of Agreement or from any legal action, suit or proceeding, or from the jurisdiction of any court, or from set-off or any legal process (whether service or notice, attachment prior to judgment, attachment in aid of execution of judgment, execution of judgment or otherwise) with respect to itself or any of its property, whether or not held for its own account, such party hereby irrevocably and unconditionally waives and agrees not to plead or claim such immunity in respect of its obligations under these Heads of Agreement or in connection with any arbitration, in each case to the fullest extent permitted by the laws of such jurisdiction.

WITNESS: Signature: [signature] Print Name: DANYA WALLACE	THE GOVERNMENT OF THE COMMONWEALTH OF THE BAHAMAS By: Camille F. Johnson Print Name: CAMILLE F. JOHNSON Title: Secretary to the Cabinet

WITNESS: Signature: Kymberle Prundy Print Name: Kimberle Prundy	DCL ISLAND DEVELOPMENT, LTD. By: [signature] N. Vahle Print Name: JEFFREY N. VAHLE Title: PRESIDENT

EXECUTION VERSION

EXHIBIT "A"

Disney's Global Commitment to The Environment and Conservation

The Walt Disney Company and its affiliates are committed to using resources wisely and protecting the planet as we operate and grow our business. We conserve nature and inspire kids and families to join us in caring for our planet.

Long-Term Environmental Goals: Events that illustrate the impacts of climate change, from extreme weather to droughts, demand changes in the way society, including businesses, uses natural resources. We strive to meet our long-term goal of attaining a "zero" state of net greenhouse gas emissions and waste, while conserving water resources when and wherever we can.

Reducing Emissions: By 2020, we aim to reduce net emissions by 50%.

Waste Diversion: By 2020, we aim to divert 60% of waste from landfills and incineration.

Water Conservation: We are committed to maintaining potable water consumption at 2013 levels at existing sites by 2018, and developing water conservation plans for new sites.

Disney Conservation Fund – More Than 20 Years of Protecting Wildlife and Wild Places

The Disney Conservation Fund's mission is to provide financial support for programs that protect wildlife and wild places, develop community conservation and education programs, and connect kids with nature. Since its creation on Earth Day in 1995, the Disney Conservation Fund has awarded conservation grants valued at more than $75 million in support of:

- More than 330 nonprofit organizations
- In 115 countries
- To help protect more than 400 species
- Including monkeys, sharks and rays, great apes, big cats, sea turtles and coral reefs

Our Commitment to The Bahamas

Disney has a long history of commitment to communities in The Bahamas and to the conservation of natural resources in the region. Since 1997, the Disney Conservation Fund has given approximately $3 million to support education, research and conservation projects in The Bahamas.

Our intent is to approach the Lighthouse Point project with the same level of environmental stewardship and sensitivity we bring to other Disney projects around the world.

At the Walt Disney World Resort in Florida, we have taken unique approaches to sustainable development that have become a hallmark of our projects there and models held up as best practice. We would like to explore a process in The Bahamas that is similar to what we have done with the Florida model.

We approach new projects with a long-term strategic vision that involves partnering with government leaders, conservation experts, local communities, NGOs and other stakeholders.

In Florida, by using a comprehensive approach to land planning and permitting, Disney offset environmental impacts through donation of significant acreage (more than 8,500 acres) to The Nature Conservancy, creating

The Disney Wilderness Preserve. Funding was provided to enhance and restore natural communities and for long-term management.

Other Bahamas Success Stories

Disney Cruise Line

- Disney Cruise Line created an environmental activity book focused on Bahamian wildlife and distributed it to primary school students. The book was created in partnership with Disney, the Ministry of Education and The Bahamas National Trust.
- Used cooking oil from Disney ships is recycled in Nassau through a partnership with Bahamas Waste Management. It is converted into biodiesel and used to power small vehicles.
- Since 2004, Disney Cruise Line has provided $62,000 to support Friends of the Environment summer eco-camps throughout the Abacos.

On its ships, Disney Cruise Line is committed to minimizing its impact on the environment by utilizing new technologies and ongoing programs to increase fuel efficiency, reduce waste and promote conservation worldwide.

- **Environmental Officers:** All Disney Cruise Line ships have dedicated Environmental Officers who are responsible for overseeing compliance with multiple regulations and onboard environmental programs, including all shipboard recycling and sanitation efforts, as well as monitoring the ship's overall water quality and supply.
- **Recycle/Reuse:** Shipboard recycling processes help to eliminate more than 1,900 tons of metals, plastic, glass and paper from traditional waste streams since 2014. In addition, responsible construction methods have been utilized on the Disney Dream and Disney Fantasy to source flooring and carpeting that is made from sustainable, organic and recyclable alternatives.
- **Fuel Efficiency:** Disney Cruise Line was the first in the industry to utilize an innovative hull coating on the Disney Magic and Disney Wonder that is 100 percent non-toxic to the marine environment and increases fuel efficiency by reducing surface resistance in open water. The Disney Dream and Disney Fantasy have been designed to be even more hydrodynamic vessels than their predecessors, with optimized propulsion systems and hulls for increased efficiency.
- **Energy Conservation:** Condensation from the shipboard air conditioning units is reclaimed and reused to wash the decks, saving up to 30 million gallons of fresh water each year.

Disney's Animals, Science and Environment (ASE)

- Disney's ASE Team is currently involved in a multi-year conservation and education initiative in the Abacos. Initiatives include a coral restoration project near Disney's Castaway Cay, and assistance with the development of Friends of the Environment summer eco-camp curriculum.

Future Initiatives

- Signature environmental projects are being planned at Disney's Castaway Cay that include increasing the use of alternative energy sources.

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EXECUTION VERSION

Walt Disney's Conservation Legacy

"You've probably heard people talk about conservation. Well, conservation isn't just the business of a few people. It's a matter that concerns all of us. It's a science whose principles are written in the oldest code in the world, the laws of nature. The natural resources of our vast continent are not inexhaustible. But if we will use our riches wisely, if we will protect our wildlife and preserve our lakes and streams, these things will last us for generations to come."

— Walt Disney, 1950

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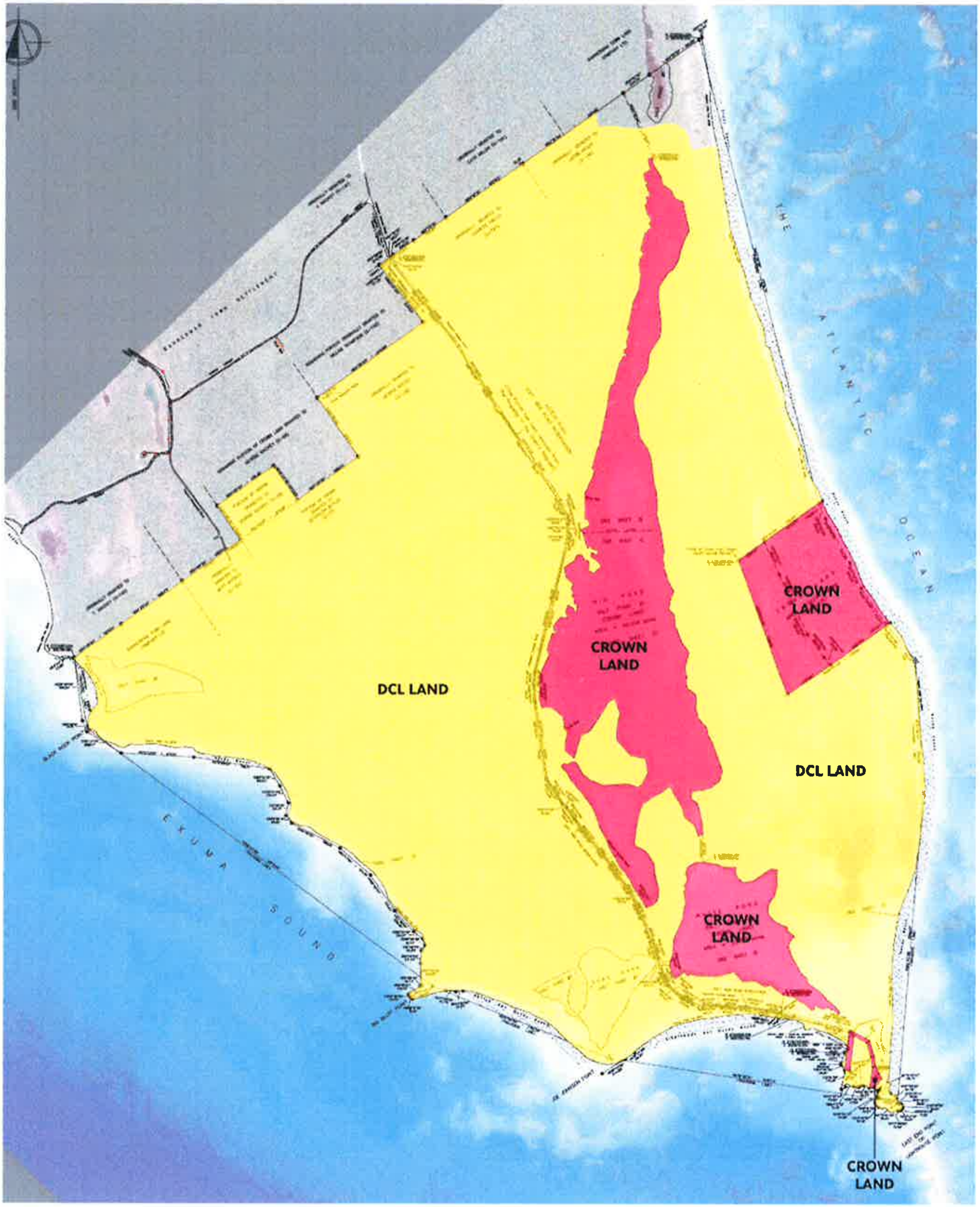
EXECUTION VERSION

EXHIBIT "B"

The Property



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EXECUTION VERSION

EXHIBIT "C"

Conceptual Project Plan

The Property Described Below is Bounded on the East, South and West Sides By The Atlantic Ocean. The High Water Mark As Observed In February 2018 Was Used To Determine The Boundary Lines On The Said Sides Of The Property And As Such Are Defined By The Tide Of The Ocean And Are Subject To Change Due to Natural Causes and May Or May Not Represent The Actual Location Of The Limits of The Title.

The Legal Description Provided Below Was Prepared By The Surveyor At The Client's Request. This Description Describes The Same Property As The Description of Record Being "ALL THOSE Pieces, Parcels Or Tracts Of Land Comprising Approximately **Seven Hundred Fifty-seven and Four Hundred and Seventy-eight Thousandths** <u>(757.478) Acres</u> Situate In The Vicinity Of The Settlement Of Bannerman Town On The Island Of Eleuthera One Of The Islands Of The Commonwealth Of The Bahamas Which Said Pieces, Parcels or Tracts Of Land Together Have Such Positions, Shapes, Boundaries, Marks and Dimensions As Are Shown On D.L.S. Plan No. 906 EL Recorded In The Department Of Lands And Surveys On 13th May, 2008.

More Particularly Describes As:

That Portion Of Land Located At The Southeast Tip Of The Island Of Eleuthera In The Commonwealth Of The Bahamas, Bounded And Described As Follows:
Beginning At A Boundary Marker With Grid Coordinates N 2723807.68m and E 381706.10m; Thence To A Point 54°49'34" A Distance Of 529.94'; Thence To A Point 54°49'34" A Distance Of 682.77';Thence To A Point 54°49'35" A Distance Of 660.04'; Thence To A Point 324°49'35" A Distance Of 379.53'; Thence To A Point 54°49'34" A Distance Of 631.32'; Thence To A Point 144°49'35" A Distance Of 379.53'; Thence To A Point 54°49'35" A Distance Of 688.74'; Thence To A Point 324°50'26" A Distance Of 659.99'; Thence To A Point 54°35'59" A Distance Of 1,191.93'; Thence To A Point 54°35'59" A Distance Of 125.05';Thence To A Point 324°56'21" A Distance Of 659.35'; Thence To Thence To A Point 54°51'00" A Distance Of 230.15'; Thence To A Point 54°53'41" A Distance Of 363.69'; Thence To A Point 54°51'31" A Distance Of 857.87'; Thence To A Point 54°51'34" A Distance Of 1,124.02'; Thence To A Point 54°51'42" A Distance Of 294.39'; Thence To A Point 54°51'05" A Distance Of 561.22'; Thence To A Point 54°51'05" A Distance Of 32.42'; Thence To A Point 186°00'05" A Distance Of 15.59'; Thence To A Point 167°04'09" A Distance Of 24.71'; Thence To A Point 169°18'27" A Distance Of 28.28'; Thence To A Point 167°14'44" A Distance Of 58.41'; Thence To A Point 172°03'10" A Distance Of 37.03'; Thence To A Point 171°24'12" A Distance Of 48.70'; Thence To A Point 167°36'24" A Distance Of 51.19'; Thence To A Point 172°28'28" A Distance Of 61.13'; Thence To A Point 170°47'21" A Distance Of 51.01'; Thence To A Point 168°29'01" A Distance Of 50.85'; Thence To A Point 171°12'42" A Distance Of 45.67'; Thence To A Point 183°24'51" A Distance Of 72.03'; Thence To A Point 177°42'35" A Distance Of 90.54'; Thence To A Point 174°01'20" A Distance Of 81.23'; Thence To A Point 172°09'58" A Distance Of 82.51'; Thence To A Point 168°37'30" A Distance Of 86.89'; Thence To A Point 167°10'06" A Distance Of 80.57'; Thence To A Point 169°30'41" A Distance Of 81.81'; Thence To A Point 169°38'41" A Distance Of 84.60'; Thence To A Point 174°06'10" A Distance Of 88.51'; Thence To A Point 169°56'34" A Distance Of 93.66'; Thence To A Point 172°08'07" A

Distance Of 91.41'; Thence To A Point 171°23'07" A Distance Of 85.92'; Thence To A Point 169°29'23" A Distance Of 92.27'; Thence To A Point 170°16'14" A Distance Of 89.93'; Thence To A Point 172°05'12" A Distance Of 93.37'; Thence To A Point 162°49'08" A Distance Of 91.04'; Thence To A Point 158°45'50" A Distance Of 86.01'; Thence To A Point 161°42'52" A Distance Of 84.37'; Thence To A Point 167°04'44" A Distance Of 87.45'; Thence To A Point 159°12'41" A Distance Of 85.51'; Thence To A Point 164°28'50" A Distance Of 85.71'; Thence To A Point 163°48'38" A Distance Of 95.72'; Thence To A Point 180°24'57" A Distance Of 45.72'; Thence To A Point 143°08'02" A Distance Of 46.29'; Thence To A Point 157°40'41" A Distance Of 85.67'; Thence To A Point 157°09'25" A Distance Of 85.94'; Thence To A Point 157°17'29" A Distance Of 83.33'; Thence To A Point 169°49'59" A Distance Of 86.82'; Thence To A Point 177°04'49" A Distance Of 64.26'; Thence To A Point 137°22'02" A Distance Of 54.46'; Thence To A Point 163°41'00" A Distance Of 82.33'; Thence To A Point 161°30'24" A Distance Of 80.37'; Thence To A Point 162°42'29" A Distance Of 79.40'; Thence To A Point 155°34'15" A Distance Of 83.30'; Thence To A Point 163°33'26" A Distance Of 84.34'; Thence To A Point 171°16'48" A Distance Of 80.45'; Thence To A Point 172°30'47" A Distance Of 75.52'; Thence To A Point 160°31'33" A Distance Of 80.75'; Thence To A Point 155°49'24" A Distance Of 74.47'; Thence To A Point 154°41'14" A Distance Of 83.35'; Thence To A Point 162°12'55" A Distance Of 82.16'; Thence To A Point 155°29'49" A Distance Of 83.66'; Thence To A Point 170°00'35" A Distance Of 79.45'; Thence To A Point 165°00'15" A Distance Of 78.55'; Thence To A Point 162°22'14" A Distance Of 86.79'; Thence To A Point 150°07'12" A Distance Of 81.96'; Thence To A Point 145°58'01" A Distance Of 77.24'; Thence To A Point 157°41'56" A Distance Of 81.48'; Thence To A Point 160°24'01" A Distance Of 80.02'; Thence To A Point 156°16'07" A Distance Of 81.74'; Thence To A Point 147°17'08" A Distance Of 79.97'; Thence To A Point 148°16'34" A Distance Of 81.65'; Thence To A Point 153°39'45" A Distance Of 87.93'; Thence To A Point 152°14'25" A Distance Of 78.15'; Thence To A Point 149°53'38" A Distance Of 79.85'; Thence To A Point 153°55'01" A Distance Of 78.61'; Thence To A Point 154°38'35" A Distance Of 83.18'; Thence To A Point 161°27'46" A Distance Of 88.27'; Thence To A Point 155°05'37" A Distance Of 80.04'; Thence To A Point 143°53'59" A Distance Of 80.44'; Thence To A Point 141°33'45" A Distance Of 78.79'; Thence To A Point 148°57'09" A Distance Of 78.98'; Thence To A Point 146°45'33" A Distance Of 78.52'; Thence To A Point 139°29'52" A Distance Of 84.02'; Thence To A Point 137°32'33" A Distance Of 77.95'; Thence To A Point 139°35'48" A Distance Of 82.69'; Thence To A Point 153°54'31" A Distance Of 81.20'; Thence To A Point 157°07'55" A Distance Of 79.60'; Thence To A Point 150°11'37" A Distance Of 81.14'; Thence To A Point 159°30'29" A Distance Of 78.51'; Thence To A Point 173°11'32" A Distance Of 79.81'; Thence To A Point 172°46'18" A Distance Of 77.65'; Thence To A Point 173°36'03" A Distance Of 76.15'; Thence To A Point 174°51'46" A Distance Of 79.13'; Thence To A Point 179°31'50" A Distance Of 78.42'; Thence To A Point 174°34'48" A Distance Of 81.43'; Thence To A Point 177°23'46" A Distance Of 81.32'; Thence To A Point 172°37'05" A Distance Of 79.34'; Thence To A Point 177°43'24" A Distance Of 74.77'; Thence To A Point 171°17'42" A Distance Of 77.87'; Thence To A Point 172°38'49" A Distance Of 83.51'; Thence To A Point 181°37'15" A Distance Of 80.17'; Thence To A Point 171°23'24" A Distance Of 79.61'; Thence To A Point 177°04'48" A Distance Of 81.37'; Thence To A

Point 183°41'57" A Distance Of 78.97'; Thence To A Point 183°44'39" A Distance Of 77.57'; Thence To A Point 186°18'45" A Distance Of 79.45'; Thence To A Point 188°09'16" A Distance Of 76.27'; Thence To A Point 185°51'24" A Distance Of 78.48'; Thence To A Point 184°15'02" A Distance Of 74.52'; Thence To A Point 188°14'26" A Distance Of 75.87'; Thence To A Point 190°44'22" A Distance Of 75.55'; Thence To A Point 188°35'42" A Distance Of 76.82'; Thence To A Point 189°56'34" A Distance Of 75.90'; Thence To A Point 199°26'31" A Distance Of 82.58'; Thence To A Point 198°17'08" A Distance Of 80.86'; Thence To A Point 204°01'48" A Distance Of 79.16'; Thence To A Point 202°12'24" A Distance Of 80.31'; Thence To A Point 201°43'12" A Distance Of 76.39'; Thence To A Point 193°18'36" A Distance Of 77.36'; Thence To A Point 188°46'11" A Distance Of 78.61'; Thence To A Point 188°09'36" A Distance Of 80.87'; Thence To A Point 189°03'23" A Distance Of 81.93'; Thence To A Point 183°04'38" A Distance Of 78.92'; Thence To A Point 184°51'13" A Distance Of 76.69'; Thence To A Point 181°58'18" A Distance Of 81.29'; Thence To A Point 179°44'32" A Distance Of 83.06'; Thence To A Point 180°59'53" A Distance Of 82.94'; Thence To A Point 175°13'34" A Distance Of 80.29'; Thence To A Point 181°45'52" A Distance Of 81.29'; Thence To A Point 175°57'03" A Distance Of 77.22'; Thence To A Point 179°29'27" A Distance Of 77.69'; Thence To A Point 188°18'33" A Distance Of 80.67'; Thence To A Point 185°40'02" A Distance Of 81.92'; Thence To A Point 180°30'54" A Distance Of 88.77'; Thence To A Point 281°10'21" A Distance Of 12.15'; Thence To A Point 178°44'18" A Distance Of 11.22'; Thence To A Point 100°28'12" A Distance Of 10.72'; Thence To A Point 182°14'52" A Distance Of 82.87'; Thence To A Point 183°03'52" A Distance Of 78.36'; Thence To A Point 190°14'19" A Distance Of 78.09'; Thence To A Point 187°50'27" A Distance Of 21.64'; Thence To A Point 296°45'08" A Distance Of 18.40'; Thence To A Point 160°17'14" A Distance Of 6.39'; Thence To A Point 129°57'53" A Distance Of 12.80'; Thence To A Point 80°00'11" A Distance Of 8.49'; Thence To A Point 138°14'13" A Distance Of 12.30'; Thence To A Point 115°38'32" A Distance Of 18.42'; Thence To A Point 210°48'33" A Distance Of 9.15'; Thence To A Point 208°49'14" A Distance Of 18.29'; Thence To A Point 181°15'02" A Distance Of 19.58'; Thence To A Point 168°10'02" A Distance Of 7.39'; Thence To A Point 227°18'34" A Distance Of 8.34'; Thence To A Point 193°21'05" A Distance Of 7.16'; Thence To A Point 158°17'13" A Distance Of 7.36'; Thence To A Point 146°48'24" A Distance Of 11.35'; Thence To A Point 127°21'01" A Distance Of 13.76'; Thence To A Point 161°00'59" A Distance Of 9.86'; Thence To A Point 80°43'26" A Distance Of 17.78'; Thence To A Point 96°27'37" A Distance Of 25.53'; Thence To A Point 164°17'16" A Distance Of 29.36'; Thence To A Point 165°52'13" A Distance Of 26.74'; Thence To A Point 149°42'07" A Distance Of 27.22'; Thence To A Point 103°41'48" A Distance Of 27.58'; Thence To A Point 158°36'45" A Distance Of 30.04'; Thence To A Point 211°19'53" A Distance Of 36.39'; Thence To A Point 258°59'19" A Distance Of 17.18'; Thence To A Point 257°10'27" A Distance Of 77.27'; Thence To A Point 303°25'55" A Distance Of 20.41'; Thence To A Point 315°21'11" A Distance Of 39.15'; Thence To A Point 291°09'22" A Distance Of 23.49'; Thence To A Point 225°03'13" A Distance Of 16.66'; Thence To A Point 287°37'43" A Distance Of 43.82'; Thence To A Point 323°07'41" A Distance Of 61.31'; Thence To A Point 50°05'11" A Distance Of 51.64'; Thence To A Point 333°44'53" A Distance Of 24.53'; Thence To A Point 26°03'33" A Distance Of 48.92'; Thence To A Point 26°56'33" A Distance Of 43.74';

Thence To A Point 233°41'57" A Distance Of 30.96'; Thence To A Point 253°40'38" A Distance Of 29.80'; Thence To A Point 317°21'01" A Distance Of 28.72'; Thence To A Point 265°23'33" A Distance Of 28.19'; Thence To A Point 244°01'28" A Distance Of 17.80'; Thence To A Point 310°31'13" A Distance Of 24.04'; Thence To A Point 288°12'52" A Distance Of 41.57'; Thence To A Point 243°00'00" A Distance Of 44.43'; Thence To A Point 278°02'27" A Distance Of 68.62'; Thence To A Point 304°10'02" A Distance Of 35.69'; Thence To A Point 283°30'49" A Distance Of 14.71'; Thence To A Point 242°48'41" A Distance Of 26.68'; Thence To A Point 281°24'06" A Distance Of 21.73'; Thence To A Point 06°11'29" A Distance Of 13.67'; Thence To A Point 81°56'29" A Distance Of 9.27'; Thence To A Point 01°46'23" A Distance Of 44.09'; Thence To A Point 39°29'14" A Distance Of 34.81'; Thence To A Point 351°56'24" A Distance Of 44.70'; Thence To A Point 335°50'40" A Distance Of 65.83'; Thence To A Point 241°39'16" A Distance Of 8.62'; Thence To A Point 210°17'27" A Distance Of 5.13'; Thence To A Point 258°25'49" A Distance Of 10.20'; Thence To A Point 341°33'36" A Distance Of 9.75'; Thence To A Point 76°19'41" A Distance Of 22.78'; Thence To A Point 44°32'04" A Distance Of 55.20'; Thence To A Point 353°52'28" A Distance Of 64.43'; Thence To A Point 78°02'28" A Distance Of 14.71'; Thence To A Point 38°40'21" A Distance Of 21.58'; Thence To A Point 01°49'31" A Distance Of 25.10'; Thence To A Point 321°34'50" A Distance Of 46.93'; Thence To A Point 307°20'51" A Distance Of 45.76'; Thence To A Point 296°59'39" A Distance Of 41.88'; Thence To A Point 294°15'31" A Distance Of 49.03'; Thence To A Point 298°30'49" A Distance Of 48.72'; Thence To A Point 285°44'36" A Distance Of 49.86'; Thence To A Point 285°53'10" A Distance Of 45.36'; Thence To A Point 295°19'47" A Distance Of 41.82'; Thence To A Point 264°22'16" A Distance Of 38.16'; Thence To A Point 213°09'52" A Distance Of 16.25'; Thence To A Point 280°33'20" A Distance Of 33.96'; Thence To A Point 344°39'45" A Distance Of 34.65'; Thence To A Point 353°54'27" A Distance Of 21.25'; Thence To A Point 298°41'24" A Distance Of 45.77'; Thence To A Point 280°23'43" A Distance Of 76.90'; Thence To A Point 276°34'47" A Distance Of 81.14'; Thence To A Point 276°10'58" A Distance Of 75.71'; Thence To A Point 280°02'37" A Distance Of 73.47'; Thence To A Point 277°58'41" A Distance Of 71.11'; Thence To A Point 277°27'30" A Distance Of 68.68'; Thence To A Point 268°57'32" A Distance Of 77.07'; Thence To A Point 266°18'02" A Distance Of 79.75'; Thence To A Point 263°55'55" A Distance Of 76.63'; Thence To A Point 262°00'47" A Distance Of 73.00'; Thence To A Point 258°40'02" A Distance Of 72.43'; Thence To A Point 264°37'45" A Distance Of 81.26'; Thence To A Point 259°09'38" A Distance Of 69.57'; Thence To A Point 256°04'09" A Distance Of 70.35'; Thence To A Point 255°48'56" A Distance Of 71.70'; Thence To A Point 250°43'02" A Distance Of 73.25'; Thence To A Point 238°10'43" A Distance Of 75.67'; Thence To A Point 243°51'16" A Distance Of 72.70'; Thence To A Point 236°57'30" A Distance Of 77.68'; Thence To A Point 236°23'39" A Distance Of 82.16'; Thence To A Point 232°30'06" A Distance Of 74.47'; Thence To A Point 221°59'45" A Distance Of 28.15'; Thence To A Point 215°54'22" A Distance Of 11.25'; Thence To A Point 235°38'25" A Distance Of 66.48'; Thence To A Point 226°44'56" A Distance Of 38.65'; Thence To A Point 273°57'47" A Distance Of 16.53'; Thence To A Point 240°07'04" A Distance Of 79.94'; Thence To A Point 264°33'14" A Distance Of 60.98'; Thence To A Point 276°16'43" A Distance Of 75.92'; Thence To A Point 291°44'41" A Distance Of 74.35'; Thence To A Point 294°53'33" A Distance Of 72.36';

Thence To A Point 315°54'20" A Distance Of 77.10'; Thence To A Point 308°52'57" A Distance Of 72.69'; Thence To A Point 308°31'11" A Distance Of 71.46'; Thence To A Point 309°29'26" A Distance Of 73.81'; Thence To A Point 319°23'17" A Distance Of 74.92'; Thence To A Point 309°50'00" A Distance Of 67.80'; Thence To A Point 307°16'43" A Distance Of 75.51'; Thence To A Point 292°50'56" A Distance Of 82.91'; Thence To A Point 299°21'15" A Distance Of 79.60'; Thence To A Point 286°53'18" A Distance Of 76.19'; Thence To A Point 288°56'35" A Distance Of 74.40'; Thence To A Point 294°27'17" A Distance Of 77.09'; Thence To A Point 293°10'50" A Distance Of 69.92'; Thence To A Point 286°55'53" A Distance Of 70.34'; Thence To A Point 293°07'35" A Distance Of 73.32'; Thence To A Point 287°57'39" A Distance Of 75.03'; Thence To A Point 281°39'26" A Distance Of 73.96'; Thence To A Point 280°13'42" A Distance Of 51.51'; Thence To A Point 256°56'26" A Distance Of 24.36'; Thence To A Point 270°31'17" A Distance Of 86.71'; Thence To A Point 260°07'35" A Distance Of 82.67'; Thence To A Point 257°53'27" A Distance Of 98.65'; Thence To A Point 241°35'05" A Distance Of 50.34'; Thence To A Point 264°08'29" A Distance Of 50.59'; Thence To A Point 254°54'41" A Distance Of 76.90'; Thence To A Point 310°37'57" A Distance Of 32.56'; Thence To A Point 326°03'18" A Distance Of 12.37'; Thence To A Point 349°45'01" A Distance Of 22.88'; Thence To A Point 52°00'58" A Distance Of 38.21'; Thence To A Point 103°41'30" A Distance Of 14.83'; Thence To A Point 51°37'34" A Distance Of 80.20'; Thence To A Point 01°56'12" A Distance Of 119.22'; Thence To A Point 359°34'41" A Distance Of 63.16'; Thence To A Point 354°38'40" A Distance Of 59.45'; Thence To A Point 14°51'42" A Distance Of 49.97'; Thence To A Point 355°03'37" A Distance Of 32.92'; Thence To A Point 57°00'50" A Distance Of 46.65'; Thence To A Point 357°52'38" A Distance Of 48.44'; Thence To A Point 322°28'06" A Distance Of 45.56'; Thence To A Point 28°23'53" A Distance Of 18.94'; Thence To A Point 328°10'21" A Distance Of 32.63'; Thence To A Point 299°32'36" A Distance Of 75.39'; Thence To A Point 319°44'03" A Distance Of 100.13'; Thence To A Point 318°16'49" A Distance Of 93.98'; Thence To A Point 317°46'31" A Distance Of 92.10'; Thence To A Point 325°23'56" A Distance Of 94.85'; Thence To A Point 345°42'52" A Distance Of 67.72'; Thence To A Point 326°51'03" A Distance Of 95.59'; Thence To A Point 323°48'08" A Distance Of 93.50'; Thence To A Point 310°33'26" A Distance Of 89.84'; Thence To A Point 307°51'33" A Distance Of 78.82'; Thence To A Point 316°37'44" A Distance Of 101.61'; Thence To A Point 304°27'22" A Distance Of 80.14'; Thence To A Point 297°13'38" A Distance Of 95.93'; Thence To A Point 296°47'42" A Distance Of 102.09'; Thence To A Point 298°48'00" A Distance Of 97.50'; Thence To A Point 310°42'42" A Distance Of 85.89'; Thence To A Point 276°55'33" A Distance Of 87.93'; Thence To A Point 297°31'04" A Distance Of 87.79'; Thence To A Point 326°13'51" A Distance Of 61.48'; Thence To A Point 20°47'45" A Distance Of 53.56'; Thence To A Point 10°57'31" A Distance Of 65.76'; Thence To A Point 335°20'04" A Distance Of 87.45'; Thence To A Point 353°31'24" A Distance Of 27.92'; Thence To A Point 328°40'54" A Distance Of 78.73'; Thence To A Point 324°29'33" A Distance Of 79.37'; Thence To A Point 319°56'31" A Distance Of 81.47'; Thence To A Point 299°10'34" A Distance Of 88.44'; Thence To A Point 292°40'47" A Distance Of 84.76'; Thence To A Point 284°37'47" A Distance Of 78.10'; Thence To A Point 278°40'15" A Distance Of 78.43'; Thence To A Point 275°27'03" A Distance Of 73.89'; Thence To A Point 274°50'48" A Distance Of 77.15'; Thence To A Point 278°33'42" A

Distance Of 76.61'; Thence To A Point 280°38'02" A Distance Of 76.52'; Thence To A Point 276°12'07" A Distance Of 48.47'; Thence To A Point 297°18'28" A Distance Of 49.57'; Thence To A Point 332°43'21" A Distance Of 28.93'; Thence To A Point 278°03'52" A Distance Of 81.12'; Thence To A Point 264°25'18" A Distance Of 88.88'; Thence To A Point 280°16'29" A Distance Of 100.16'; Thence To A Point 278°52'40" A Distance Of 86.86'; Thence To A Point 269°53'57" A Distance Of 83.58'; Thence To A Point 261°57'36" A Distance Of 71.58'; Thence To A Point 278°27'32" A Distance Of 66.38'; Thence To A Point 247°55'36" A Distance Of 90.27'; Thence To A Point 294°01'58" A Distance Of 98.41'; Thence To A Point 285°47'22" A Distance Of 86.92'; Thence To A Point 312°18'03" A Distance Of 76.64'; Thence To A Point 336°00'16" A Distance Of 36.66'; Thence To A Point 292°42'30" A Distance Of 68.73'; Thence To A Point 350°33'39" A Distance Of 61.96'; Thence To A Point 11°47'50" A Distance Of 60.08'; Thence To A Point 27°50'37" A Distance Of 50.63'; Thence To A Point 39°02'13" A Distance Of 78.82'; Thence To A Point 355°46'35" A Distance Of 73.44'; Thence To A Point 351°30'21" A Distance Of 73.37'; Thence To A Point 336°43'31" A Distance Of 74.33'; Thence To A Point 328°12'51" A Distance Of 57.71'; Thence To A Point 325°35'05" A Distance Of 49.16'; Thence To A Point 310°25'52" A Distance Of 53.72'; Thence To A Point 318°55'24" A Distance Of 34.29'; Thence To A Point 317°51'17" A Distance Of 53.04'; Thence To A Point 313°43'17" A Distance Of 27.96'; Thence To A Point 54°49'34" A Distance Of 13.06'; Which Is The Point Of Beginning, Having An Area Of 918.682 Acres.

The above-mentioned Area being inclusive of a Peninsula protruding into "Big Pond" Beginning At A Boundary Marker With Coordinates N 2723548.92m and E 383079.19m; Thence To A Point 194°04'02" A Distance Of 144.17'; Thence To A Point 54°03'10" A Distance Of 31.47'; Thence To A Point 96°10'26" A Distance Of 38.03'; Thence To A Point 63°36'08" A Distance Of 57.80'; Thence To A Point 113°44'07" A Distance Of 27.65'; Thence To A Point 150°15'43" A Distance Of 124.86'; Thence To A Point 126°53'31" A Distance Of 77.58'; Thence To A Point 112°15'27" A Distance Of 125.60'; Thence To A Point 89°32'41" A Distance Of 33.84'; Thence To A Point 86°46'13" A Distance Of 202.77'; Thence To A Point 109°56'21" A Distance Of 92.56'; Thence To A Point 51°28'10" A Distance Of 47.18'; Thence To A Point 28°14'54" A Distance Of 107.94'; Thence To A Point 353°53'18" A Distance Of 133.62'; Thence To A Point 282°56'15" A Distance Of 147.52'; Thence To A Point 317°31'27" A Distance Of 186.08'; Thence To A Point 01°21'26" A Distance Of 124.97'; Thence To A Point 13°19'07" A Distance Of 123.81'; Thence To A Point 339°46'36" A Distance Of 145.42'; Thence To A Point 237°10'34" A Distance Of 75.35'; Thence To A Point 206°29'20" A Distance Of 65.02'; Thence To A Point 213°45'13" A Distance Of 242.21'; Thence To A Point 241°12'32" A Distance Of 90.74'; Thence To A Point 197°28'08" A Distance Of 210.37'; Thence To A Point 308°59'24" A Distance Of 109.13'; Which Is The Point Of Beginning, Having An Area Of 6.708 Acres.

Together With A Parcel Beginning At A Boundary Marker With Coordinates N 2722729.85m and E 383872.45m; Thence To A Point 141°34'50" A Distance Of 13.06'; Thence To A Point 181°49'31" A Distance Of 25.10'; Thence To A Point 218°40'21" A

Distance Of 21.00'; Thence To A Point 06°24'17" A Distance Of 52.05'; Which Is The Point Of Beginning, Having An Area Of 0.009 Acres.

Saving and Excepting A "Less Out 13-acre Parcel To be Retained by The Seller" Bounded And Described As Follows:
Beginning At A Boundary Marker With Coordinates N 2725296.76m and E 383119.13m; Thence To A Point 54°51'34" A Distance Of 481.69'; Thence To A Point 54°51'42" A Distance Of 294.39'; Thence To A Point 54°51'05" A Distance Of 561.22; Thence To A Point 54°51'05" A Distance Of 32.42'; Thence To A Point 186°00'05" A Distance Of 15.59'; Thence To A Point 167°04'09" A Distance Of 24.71'; Thence To A Point 169°18'27" A Distance Of 28.28'; Thence To A Point 167°14'44" A Distance Of 58.41'; Thence To A Point 172°03'10" A Distance Of 37.03'; Thence To A Point 171°24'12" A Distance Of 48.70'; Thence To A Point 167°36'24" A Distance Of 51.19'; Thence To A Point 172°28'28" A Distance Of 61.13'; Thence To A Point 170°47'21" A Distance Of 51.01'; Thence To A Point 168°29'01" A Distance Of 50.85'; Thence To A Point 171°12'42" A Distance Of 45.67'; Thence To A Point 183°24'51" A Distance Of 72.03'; Thence To A Point 177°42'35" A Distance Of 90.54'; Thence To A Point 174°01'20" A Distance Of 81.23'; Thence To A Point 172°09'58" A Distance Of 82.51'; Thence To A Point 168°37'30" A Distance Of 86.89'; Thence To A Point 167°10'06" A Distance Of 80.57'; Thence To A Point 169°30'41" A Distance Of 33.66'; Thence To A Point 260°22'06" A Distance Of 36.17'; Thence To A Point 260°22'06" A Distance Of 206.00'; Thence To A Point Along A Curve With Radius 981.60', Length 54.71', Chord Azimuth 351°09'33" And Chord Length 54.71'; Thence To A Point Along A Curve With Radius 206.11', Length 358.64', Chord Azimuth 305°51'20" And Chord Length 315.08'; Thence To A Point Along A Curve With Radius 819.31', Length 360.47', Chord Azimuth 264°44'05" And Chord Length 357.57'; Thence To A Point Along A Curve With Radius 666.99', Length 363.28', Chord Azimuth 265°36'41" And Chord Length 358.81'; Thence To A Point 324°51'34" A Distance Of 74.03'; Which Is The Point Of Beginning, Having An Area Of 13.000 Acres.

Saving and Excepting Two Adjacent Tracts of Crown Land Bounded And Described As Follows:
Beginning At A Boundary Marker With Coordinates N 2724082.23m and E 383564.12m; Thence To A Point 54°51'43" A Distance Of 290.10'; Thence To A Point 54°51'43" A Distance Of 615.13'; Thence To A Point 54°51'43" A Distance Of 40.85'; Thence To A Point 160°24'01" A Distance Of 51.79'; Thence To A Point 156°16'07" A Distance Of 81.74'; Thence To A Point 147°17'08" A Distance Of 79.97'; Thence To A Point 148°16'34" A Distance Of 81.65'; Thence To A Point 153°39'45" A Distance Of 87.93'; Thence To A Point 152°14'25" A Distance Of 78.15'; Thence To A Point 149°53'38" A Distance Of 79.85'; Thence To A Point 153°55'01" A Distance Of 78.61'; Thence To A Point 154°38'35" A Distance Of 83.18'; Thence To A Point 161°27'46" A Distance Of 88.27'; Thence To A Point 155°05'37" A Distance Of 80.04'; Thence To A Point 143°53'59" A Distance Of 80.44'; Thence To A Point 141°33'45" A Distance Of 78.79'; Thence To A Point 148°57'09" A Distance Of 78.98'; Thence To A Point 146°45'33" A

Distance Of 78.52'; Thence To A Point 139°29'52" A Distance Of 84.02'; Thence To A Point 137°32'33" A Distance Of 16.84'; Thence To A Point 234°51'43" A Distance Of 37.36'; Thence To A Point 234°51'43" A Distance Of 635.50'; Thence To A Point 234°51'43" A Distance Of 487.80'; Thence To A Point 339°51'43" A Distance Of 1,320.00'; Which Is The Point Of Beginning, Having An Area Of 30.197 Acres.

Saving and Excepting A Salt Pond Known As "Big Pond" Bounded And Described As Follows:
Beginning At A Point With Coordinates N 2725203.65m and E 383322.05m; Thence To A Point 179°13'58"A Distance Of 55.27'; Thence To A Point 149°56'13" A Distance Of 141.93'; Thence To A Point 164°11'59" A Distance Of 74.30'; Thence To A Point 125°50'29" A Distance Of 93.20'; Thence To A Point 152°08'07" A Distance Of 79.58'; Thence To A Point 118°42'47" A Distance Of 32.80'; Thence To A Point 107°37'13" A Distance Of 54.22'; Thence To A Point 174°58'00" A Distance Of 37.88'; Thence To A Point 168°04'26" A Distance Of 162.93'; Thence To A Point 164°41'49" A Distance Of 69.83'; Thence To A Point 209°01'38" A Distance Of 74.75'; Thence To A Point 200°37'31" A Distance Of 99.16'; Thence To A Point 194°56'25" A Distance Of 118.13'; Thence To A Point 209°47'43" A Distance Of 92.63'; Thence To A Point 238°10'07" A Distance Of 39.06'; Thence To A Point 230°14'06" A Distance Of 25.03'; Thence To A Point 213°34'11" A Distance Of 141.86'; Thence To A Point 190°47'51" A Distance Of 47.40'; Thence To A Point 179°22'07" A Distance Of 89.70'; Thence To A Point 173°16'36" A Distance Of 221.99'; Thence To A Point 187°08'49" A Distance Of 106.67'; Thence To A Point 211°49'58" A Distance Of 183.39'; Thence To A Point 185°46'50" A Distance Of 142.95'; Thence To A Point 208°29'04" A Distance Of 119.78'; Thence To A Point 210°58'52" A Distance Of 80.10'; Thence To A Point 197°35'01" A Distance Of 104.17'; Thence To A Point 176°17'22" A Distance Of 106.18'; Thence To A Point 163°50'07" A Distance Of 128.63'; Thence To A Point 172°33'54" A Distance Of 123.19'; Thence To A Point 144°28'54" A Distance Of 120.45'; Thence To A Point 160°26'52" A Distance Of 104.73'; Thence To A Point 173°11'22" A Distance Of 205.90'; Thence To A Point 165°57'16" A Distance Of 87.51'; Thence To A Point 176°09'12" A Distance Of 157.77'; Thence To A Point 191°02'50" A Distance Of 51.48'; Thence To A Point 164°40'44" A Distance Of 152.95'; Thence To A Point 171°25'32" A Distance Of 199.28'; Thence To A Point 187°20'11" A Distance Of 59.89'; Thence To A Point 173°35'45" A Distance Of 101.75'; Thence To A Point 160°48'11" A Distance Of 122.98'; Thence To A Point 149°46'42" A Distance Of 99.62'; Thence To A Point 205°02'56" A Distance Of 64.77'; Thence To A Point 190°34'13" A Distance Of 96.28'; Thence To A Point 186°09'03" A Distance Of 17.64'; Thence To A Point 129°56'47" A Distance Of 62.61'; Thence To A Point 170°10'51" A Distance Of 58.45'; Thence To A Point 181°13'07" A Distance Of 50.65'; Thence To A Point 148°20'44" A Distance Of 32.95'; Thence To A Point 158°50'50" A Distance Of 119.99'; Thence To A Point 157°45'47" A Distance Of 19.31'; Thence To A Point 140°47'51" A Distance Of 77.38'; Thence To A Point 156°31'24" A Distance Of 30.52'; Thence To A Point 194°14'35" A Distance Of 146.43'; Thence To A Point 165°20'55" A Distance Of 78.21'; Thence To A Point 186°52'39" A Distance Of 68.43'; Thence To A Point 163°29'09" A Distance Of 47.91'; Thence To A Point 126°23'09" A Distance Of 84.00';

Thence To A Point 161°06'29" A Distance Of 35.21'; Thence To A Point 182°20'39" A Distance Of 65.44'; Thence To A Point 180°46'38" A Distance Of 52.00'; Thence To A Point 158°00'30" A Distance Of 40.03'; Thence To A Point 177°38'06" A Distance Of 19.82'; Thence To A Point 145°20'56" A Distance Of 49.30'; Thence To A Point 135°54'12" A Distance Of 84.48'; Thence To A Point 171°58'39" A Distance Of 62.47'; Thence To A Point 152°08'01" A Distance Of 104.42'; Thence To A Point 160°41'05" A Distance Of 125.47'; Thence To A Point 158°02'27" A Distance Of 101.07'; Thence To A Point 168°17'32" A Distance Of 33.71'; Thence To A Point 197°11'10" A Distance Of 91.49'; Thence To A Point 232°20'51" A Distance Of 98.35'; Thence To A Point 253°58'09" A Distance Of 82.67'; Thence To A Point 263°29'04" A Distance Of 101.93'; Thence To A Point 181°38'53" A Distance Of 69.64'; Thence To A Point 124°51'04" A Distance Of 67.31'; Thence To A Point 162°46'22" A Distance Of 53.15'; Thence To A Point 166°17'07" A Distance Of 138.89'; Thence To A Point 177°09'01" A Distance Of 99.71'; Thence To A Point 251°58'26" A Distance Of 47.71'; Thence To A Point 341°56'36" A Distance Of 105.41'; Thence To A Point 308°24'49" A Distance Of 114.74'; Thence To A Point 345°38'01" A Distance Of 81.59'; Thence To A Point 331°40'38" A Distance Of 52.94'; Thence To A Point 327°11'32" A Distance Of 76.72'; Thence To A Point 332°22'39" A Distance Of 105.48'; Thence To A Point 235°49'20" A Distance Of 93.69'; Thence To A Point 238°52'21" A Distance Of 164.45'; Thence To A Point 232°30'12" A Distance Of 37.47'; Thence To A Point 205°51'31" A Distance Of 56.45'; Thence To A Point 195°06'09" A Distance Of 113.33'; Thence To A Point 188°38'21" A Distance Of 92.66'; Thence To A Point 187°18'43" A Distance Of 101.72'; Thence To A Point 162°52'25" A Distance Of 32.56'; Thence To A Point 112°37'42" A Distance Of 73.37'; Thence To A Point 129°05'54" A Distance Of 53.02'; Thence To A Point 147°32'05" A Distance Of 114.91'; Thence To A Point 173°09'48" A Distance Of 118.78'; Thence To A Point 170°08'29" A Distance Of 46.06'; Thence To A Point 161°11'06" A Distance Of 62.78'; Thence To A Point 179°13'22" A Distance Of 72.94'; Thence To A Point 198°30'54" A Distance Of 52.84'; Thence To A Point 220°58'44" A Distance Of 38.37'; Thence To A Point 244°18'29" A Distance Of 73.89'; Thence To A Point 320°26'47" A Distance Of 34.83'; Thence To A Point 330°39'22" A Distance Of 31.08'; Thence To A Point 330°54'31" A Distance Of 28.88'; Thence To A Point 328°37'04" A Distance Of 65.65'; Thence To A Point 312°25'31" A Distance Of 17.95'; Thence To A Point 326°16'35" A Distance Of 41.94'; Thence To A Point 336°11'00" A Distance Of 47.26'; Thence To A Point 343°30'14" A Distance Of 29.42'; Thence To A Point 316°40'56" A Distance Of 41.87'; Thence To A Point 328°16'09" A Distance Of 41.75'; Thence To A Point 313°38'55" A Distance Of 34.06'; Thence To A Point 324°38'33" A Distance Of 42.35'; Thence To A Point 333°45'06" A Distance Of 40.29'; Thence To A Point 336°03'13" A Distance Of 47.74'; Thence To A Point 325°07'32" A Distance Of 39.74'; Thence To A Point 330°00'52" A Distance Of 67.88'; Thence To A Point 340°34'55" A Distance Of 53.02'; Thence To A Point 335°32'04" A Distance Of 37.72'; Thence To A Point 331°34'22" A Distance Of 80.96'; Thence To A Point 330°14'52" A Distance Of 35.97'; Thence To A Point 345°17'17" A Distance Of 34.83'; Thence To A Point 340°21'40" A Distance Of 110.16'; Thence To A Point 331°03'10" A Distance Of 71.20'; Thence To A Point 324°38'40" A Distance Of 126.75'; Thence To A Point 319°11'21" A Distance Of 178.16'; Thence To A Point 332°39'48" A Distance Of 65.44'; Thence To A Point 310°42'34" A Distance Of 50.47'; Thence To A Point

334°20'42" A Distance Of 33.24'; Thence To A Point 54°03'10" A Distance Of 31.47'; Thence To A Point 96°10'26" A Distance Of 38.03'; Thence To A Point 63°36'08" A Distance Of 57.80'; Thence To A Point 113°44'07" A Distance Of 27.65'; Thence To A Point 150°15'43" A Distance Of 124.86'; Thence To A Point 126°53'31" A Distance Of 77.58'; Thence To A Point 112°15'27" A Distance Of 125.60'; Thence To A Point 89°32'41" A Distance Of 33.84'; Thence To A Point 86°46'13" A Distance Of 202.77'; Thence To A Point 109°56'21" A Distance Of 92.56'; Thence To A Point 51°28'10" A Distance Of 47.18'; Thence To A Point 28°14'54" A Distance Of 107.94'; Thence To A Point 353°53'18" A Distance Of 133.62'; Thence To A Point 282°56'15" A Distance Of 147.52'; Thence To A Point 317°31'27" A Distance Of 186.08'; Thence To A Point 01°21'26" A Distance Of 124.97'; Thence To A Point 13°19'07" A Distance Of 123.81'; Thence To A Point 339°46'36" A Distance Of 145.42'; Thence To A Point 237°10'34" A Distance Of 75.35'; Thence To A Point 206°29'20" A Distance Of 65.02'; Thence To A Point 213°45'13" A Distance Of 242.21'; Thence To A Point 241°12'32" A Distance Of 90.74'; Thence To A Point 197°28'08" A Distance Of 210.37'; Thence To A Point 308°59'24" A Distance Of 109.13'; Thence To A Point 00°51'26" A Distance Of 68.22'; Thence To A Point 13°30'31" A Distance Of 104.49'; Thence To A Point 310°04'55" A Distance Of 49.40'; Thence To A Point 09°40'38" A Distance Of 35.77'; Thence To A Point 345°48'25" A Distance Of 76.99'; Thence To A Point 306°42'53" A Distance Of 137.93'; Thence To A Point 265°52'06" A Distance Of 66.79'; Thence To A Point 290°29'11" A Distance Of 12.34'; Thence To A Point 341°57'43" A Distance Of 82.30'; Thence To A Point 00°33'18" A Distance Of 21.16'; Thence To A Point 07°05'52" A Distance Of 70.86'; Thence To A Point 348°07'44" A Distance Of 50.46'; Thence To A Point 23°04'40" A Distance Of 25.13'; Thence To A Point 355°00'19" A Distance Of 55.06'; Thence To A Point 24°56'11" A Distance Of 57.97'; Thence To A Point 24°09'29" A Distance Of 144.50'; Thence To A Point 05°55'34" A Distance Of 35.53'; Thence To A Point 291°52'22" A Distance Of 22.71'; Thence To A Point 17°32'00" A Distance Of 170.31'; Thence To A Point 102°06'09" A Distance Of 34.64'; Thence To A Point 29°02'22" A Distance Of 10.25'; Thence To A Point 316°50'56" A Distance Of 12.61'; Thence To A Point 300°33'36" A Distance Of 16.23'; Thence To A Point 348°50'23" A Distance Of 47.50'; Thence To A Point 39°06'18" A Distance Of 100.72'; Thence To A Point 94°24'58" A Distance Of 73.15'; Thence To A Point 338°03'59" A Distance Of 58.92'; Thence To A Point 18°00'36" A Distance Of 64.39'; Thence To A Point 119°26'52" A Distance Of 65.22'; Thence To A Point 177°56'04" A Distance Of 17.50'; Thence To A Point 114°37'07" A Distance Of 23.20'; Thence To A Point 51°55'36" A Distance Of 11.75'; Thence To A Point 358°55'19" A Distance Of 51.47'; Thence To A Point 295°20'37" A Distance Of 30.09'; Thence To A Point 356°47'17" A Distance Of 21.53'; Thence To A Point 18°26'18" A Distance Of 28.32'; Thence To A Point 298°30'28" A Distance Of 32.43'; Thence To A Point 12°31'13" A Distance Of 39.93'; Thence To A Point 334°32'33" A Distance Of 43.41'; Thence To A Point 37°14'05" A Distance Of 39.35'; Thence To A Point 315°06'50" A Distance Of 96.89'; Thence To A Point 349°05'02" A Distance Of 92.13'; Thence To A Point 55°40'30" A Distance Of 114.62'; Thence To A Point 26°33'27" A Distance Of 57.99'; Thence To A Point 88°51'56" A Distance Of 41.36'; Thence To A Point 151°49'24" A Distance Of 52.29'; Thence To A Point 109°53'51" A Distance Of 39.82'; Thence To A Point 173°41'35" A Distance Of 46.38'; Thence To A Point 197°46'59" A Distance Of 38.73'; Thence To A

Point 113°58'41" A Distance Of 66.05'; Thence To A Point 39°15'02" A Distance Of 37.10'; Thence To A Point 56°11'21" A Distance Of 36.72'; Thence To A Point 358°59'01" A Distance Of 34.69'; Thence To A Point 311°47'21" A Distance Of 62.28'; Thence To A Point 298°20'06" A Distance Of 41.97'; Thence To A Point 02°28'24" A Distance Of 40.32'; Thence To A Point 106°16'03" A Distance Of 54.74'; Thence To A Point 18°22'15" A Distance Of 32.18'; Thence To A Point 289°50'51" A Distance Of 67.21'; Thence To A Point 25°25'37" A Distance Of 31.54'; Thence To A Point 243°54'47" A Distance Of 55.39'; Thence To A Point 344°19'19" A Distance Of 90.94'; Thence To A Point 341°37'17" A Distance Of 55.80'; Thence To A Point 316°22'27" A Distance Of 37.04'; Thence To A Point 67°20'50" A Distance Of 85.53'; Thence To A Point 29°43'30" A Distance Of 19.21'; Thence To A Point 340°45'39" A Distance Of 38.38'; Thence To A Point 294°00'15" A Distance Of 35.27'; Thence To A Point 00°53'18" A Distance Of 165.71'; Thence To A Point 359°14'32" A Distance Of 68.54'; Thence To A Point 24°52'07" A Distance Of 173.63'; Thence To A Point 14°59'29" A Distance Of 60.36'; Thence To A Point 292°08'29" A Distance Of 25.71'; Thence To A Point 14°16'37" A Distance Of 170.11'; Thence To A Point 24°35'44" A Distance Of 61.20'; Thence To A Point 11°37'00" A Distance Of 389.35'; Thence To A Point 02°51'05" A Distance Of 56.15'; Thence To A Point 12°35'00" A Distance Of 101.57'; Thence To A Point 52°55'25" A Distance Of 38.17'; Thence To A Point 14°32'40" A Distance Of 181.89'; Thence To A Point 26°36'33" A Distance Of 77.85'; Thence To A Point 84°05'07" A Distance Of 30.70'; Thence To A Point 09°24'35" A Distance Of 18.69'; Thence To A Point 282°49'51"A Distance Of 26.17'; Thence To A Point 09°45'15" A Distance Of 31.97'; Thence To A Point 51°05'13" A Distance Of 38.01'; Thence To A Point 341°03'02" A Distance Of 46.48'; Thence To A Point 16°56'36" A Distance Of 96.99'; Thence To A Point 328°27'47" A Distance Of 40.88'; Thence To A Point 25°04'06" A Distance Of 38.66'; Thence To A Point 11°13'02" A Distance Of 212.79'; Thence To A Point 24°02'59" A Distance Of 125.58'; Thence To A Point 07°28'23" A Distance Of 132.18'; Thence To A Point 348°05'23" A Distance Of 46.65'; Thence To A Point 351°03'36" A Distance Of 45.92'; Thence To A Point 09°43'46" A Distance Of 55.09'; Thence To A Point 36°57'28" A Distance Of 61.98'; Thence To A Point 315°21'16"A Distance Of 45.35'; Thence To A Point 13°58'43"A Distance Of 158.25'; Thence To A Point 49°49'27" A Distance Of 84.41'; Thence To A Point 323°13'20" A Distance Of 38.37'; Thence To A Point 25°18'45" A Distance Of 43.05'; Thence To A Point 326°16'00" A Distance Of 64.94'; Thence To A Point 343°28'11" A Distance Of 84.87'; Thence To A Point 62°04'34"A Distance Of 21.69'; Thence To A Point 355°01'28" A Distance Of 61.98'; Thence To A Point 69°33'45" A Distance Of 39.14'; Thence To A Point 336°19'59" A Distance Of 104.92'; Thence To A Point 67°47'27" A Distance Of 28.32'; Thence To A Point 309°48'44"A Distance Of 46.50'; Thence To A Point 350°51'23"A Distance Of 66.12'; Thence To A Point 61°26'13" A Distance Of 52.28'; Thence To A Point 33°10'37" A Distance Of 30.46'; Thence To A Point 337°23'03" A Distance Of 41.57'; Thence To A Point 352°22'00" A Distance Of 36.32'; Thence To A Point 59°49'39" A Distance Of 50.12'; Which Is The Point Of Beginning, Having An Area Of 4007877.38 Square Feet - 92.008 Acres.

Saving and Excepting A Salt Pond Known As "White Pond" Bounded And Described As Follows:
Beginning At A Point With Coordinates N 2723239.49m and E 383465.64m; Thence To A Point 99°17'50" A Distance Of 145.54'; Thence To A Point 112°36'38" A Distance Of 55.72'; Thence To A Point 91°04'18" A Distance Of 110.17'; Thence To A Point 183°22'30" A Distance Of 53.27'; Thence To A Point 157°50'33" A Distance Of 33.85'; Thence To A Point 135°51'35" A Distance Of 74.77'; Thence To A Point 81°53'14" A Distance Of 88.31'; Thence To A Point 61°38'45" A Distance Of 55.37'; Thence To A Point 55°32'54" A Distance Of 150.02'; Thence To A Point 97°15'45" A Distance Of 62.38'; Thence To A Point 183°29'43" A Distance Of 83.04'; Thence To A Point 175°47'19" A Distance Of 62.39'; Thence To A Point 195°57'49" A Distance Of 100.42'; Thence To A Point 219°45'39" A Distance Of 48.25'; Thence To A Point 209°10'51" A Distance Of 33.65'; Thence To A Point 195°35'03" A Distance Of 30.05'; Thence To A Point 185°45'04" A Distance Of 42.77'; Thence To A Point 164°40'53" A Distance Of 21.06'; Thence To A Point 152°48'58" A Distance Of 31.98'; Thence To A Point 133°50'52" A Distance Of 56.57'; Thence To A Point 115°11'06" A Distance Of 126.82'; Thence To A Point 164°51'38" A Distance Of 39.14'; Thence To A Point 128°55'41" A Distance Of 78.23'; Thence To A Point 222°10'02" A Distance Of 67.07'; Thence To A Point 190°39'22" A Distance Of 33.87'; Thence To A Point 173°17'10" A Distance Of 30.45'; Thence To A Point 159°56'56" A Distance Of 90.36'; Thence To A Point 148°05'11" A Distance Of 67.78'; Thence To A Point 153°04'46" A Distance Of 79.20'; Thence To A Point 130°04'53" A Distance Of 84.14'; Thence To A Point 175°04'16" A Distance Of 41.91'; Thence To A Point 123°50'00" A Distance Of 41.67'; Thence To A Point 125°57'48" A Distance Of 42.33'; Thence To A Point 234°44'54" A Distance Of 192.42'; Thence To A Point 321°54'46" A Distance Of 24.32'; Thence To A Point 287°27'22" A Distance Of 48.32'; Thence To A Point 280°47'27" A Distance Of 80.76'; Thence To A Point 307°12'42" A Distance Of 101.23'; Thence To A Point 313°37'22" A Distance Of 40.57'; Thence To A Point 258°13'01" A Distance Of 64.99'; Thence To A Point 301°16'02" A Distance Of 96.44'; Thence To A Point 267°08'12" A Distance Of 116.35'; Thence To A Point 317°01'28" A Distance Of 121.71'; Thence To A Point 254°28'15" A Distance Of 107.02'; Thence To A Point 259°32'22" A Distance Of 74.70'; Thence To A Point 273°49'10" A Distance Of 79.24'; Thence To A Point 271°53'16" A Distance Of 84.69'; Thence To A Point 280°33'15" A Distance Of 68.32'; Thence To A Point 233°53'40" A Distance Of 23.23'; Thence To A Point 320°14'16" A Distance Of 43.30'; Thence To A Point 234°42'33" A Distance Of 98.33'; Thence To A Point 298°58'16" A Distance Of 44.98'; Thence To A Point 349°34'21" A Distance Of 91.73'; Thence To A Point 337°49'01" A Distance Of 10.57'; Thence To A Point 12°57'41" A Distance Of 16.75'; Thence To A Point 14°06'48" A Distance Of 51.44'; Thence To A Point 24°01'29" A Distance Of 41.96'; Thence To A Point 00°28'54" A Distance Of 103.31'; Thence To A Point 17°45'50" A Distance Of 47.67'; Thence To A Point 23°37'58" A Distance Of 178.94'; Thence To A Point 07°02'23" A Distance Of 93.84'; Thence To A Point 23°55'55" A Distance Of 45.30'; Thence To A Point 351°16'21" A Distance Of 119.96'; Thence To A Point 45°14'59" A Distance Of 24.20'; Thence To A Point 344°39'49" A Distance Of 43.42'; Thence To A Point 37°39'06" A Distance Of 41.24'; Thence To A Point 00°54'34" A Distance Of 31.05'; Thence To A Point 338°12'04" A Distance Of 40.53'; Thence To A Point 16°01'57" A Distance Of 63.28';

Thence To A Point 57°59'31" A Distance Of 77.59'; Thence To A Point 85°35'00" A Distance Of 75.76'; Which Is The Point Of Beginning, Having An Area Of 22.971 Acres.

Saving and Excepting A Crown Land Road Reservation Bounded And Described As Follows:
Beginning At A Boundary Marker With Coordinates N 2722822.28m and E 383687.16m; Thence To A Point 100°37'34" A Distance Of 123.41'; Thence To A Point 105°05'34" A Distance Of 534.95'; Thence To A Point 117°53'22" A Distance Of 195.33'; Thence To A Point 162°17'22" A Distance Of 148.75'; Thence To A Point 171°17'34" A Distance Of 92.88'; Thence To A Point 152°25'23" A Distance Of 124.93'; Thence To A Point 215°33'04" A Distance Of 108.91'; Thence To A Point 311°33'31" A Distance Of 16.40'; Thence To A Point 256°34'12" A Distance Of 38.31'; Thence To A Point 07°29'44" A Distance Of 194.48'; Thence To A Point 351°17'34" A Distance Of 90.52'; Thence To A Point 342°17'22" A Distance Of 134.15'; Thence To A Point 297°53'22" A Distance Of 132.20'; Thence To A Point 186°27'47" A Distance Of 321.38'; Thence To A Point 276°35'52" A Distance Of 49.15'; Thence To A Point 12°15'40" A Distance Of 2.42'; Thence To A Point 324°46'46" A Distance Of 1.37'; Thence To A Point 06°24'17" A Distance Of 345.96'; Thence To A Point 285°07'14" A Distance Of 523.32'; Thence To A Point 280°37'34" A Distance Of 142.02'; Thence To A Point 54°44'54" A Distance Of 27.85'; Which Is The Point Of Beginning, Having An Area Of 1.290 Acres.

Saving and Excepting A Crown Land Parcel Bounded And Described As Follows:
Beginning At A Boundary Marker With Coordinates N 2722809.40m and E 383722.76m; Thence To A Point 105°07'14" A Distance Of 523.32'; Thence To A Point 186°24'17" A Distance Of 125.31'; Thence To A Point 321°34'50" A Distance Of 33.87'; Thence To A Point 307°20'51" A Distance Of 45.76'; Thence To A Point 296°59'39" A Distance Of 41.88'; Thence To A Point 294°15'31" A Distance Of 49.03'; Thence To A Point 298°30'49" A Distance Of 48.72'; Thence To A Point 285°44'36" A Distance Of 49.86'; Thence To A Point 285°53'10" A Distance Of 45.36'; Thence To A Point 295°19'47" A Distance Of 41.82'; Thence To A Point 264°22'16" A Distance Of 38.16'; Thence To A Point 213°09'52" A Distance Of 16.25'; Thence To A Point 280°33'20" A Distance Of 33.96'; Thence To A Point 344°39'45" A Distance Of 34.65'; Thence To A Point 353°54'27" A Distance Of 21.25'; Thence To A Point 298°41'24" A Distance Of 45.77'; Thence To A Point 280°23'43" A Distance Of 76.90'; Thence To A Point 276°34'47" A Distance Of 81.14'; Thence To A Point 276°10'58" A Distance Of 74.16'; Thence To A Point 54°44'54" A Distance Of 21.94'; Thence To A Point 54°44'54" A Distance Of 30.27'; Thence To A Point 100°37'34" A Distance Of 142.02'; Which Is The Point Of Beginning, Having An Area Of 0.864 Acres.

Saving and Excepting A Crown Land Parcel Bounded And Described As Follows:
Beginning At A Boundary Marker With Coordinates N 2722713.03m and E 383866.19m; Thence To A Point 78°02'28" A Distance Of 14.71'; Thence To A Point 38°40'21" A Distance Of 0.58'; Thence To A Point 186°24'17" A Distance Of 168.60'; Thence To A Point 144°46'46" A Distance Of 1.37'; Thence To A Point 192°15'40" A Distance Of 2.42'; Thence To A Point 335°50'40" A Distance Of 65.83'; Thence To A Point

241°39'16" A Distance Of 8.62'; Thence To A Point 210°17'27" A Distance Of 5.13'; Thence To A Point 258°25'49" A Distance Of 10.20'; Thence To A Point 341°33'36" A Distance Of 9.75'; Thence To A Point 76°19'41" A Distance Of 22.78'; Thence To A Point 44°32'04" A Distance Of 55.20'; Thence To A Point 353°52'28" A Distance Of 64.43'; Which Is The Point Of Beginning, Having An Area Of 0.057 Acres.

The resulting Net Area of the Original Parcel Defined Above Being <u>758.304 Acres</u>.

All Angular Measurements Stated Are Azimuths Derived From Direct Observation of The Department of Lands & Surveys Control Points EL14 And EL16.

Appendix J Site Plan of a Prior Project at Lighthouse Point Approved by The Government of The Bahamas

LIGHTHOUSE POINT - PRELIMINARY MASTER PLAN

ELEUTHERA, BAHAMAS

AUGUST 28, 2007

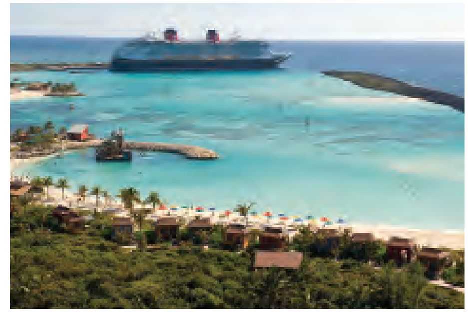
EDSA

Appendix K Disney Cruise Line Environmental Overview

Environmental Overview

Media Contact:
Disney Cruise Line
407.566.3648
http://www.dclnews.com

At Disney Cruise Line, we are dedicated to minimizing our impact on the environment through efforts focused on utilizing new technologies, increasing fuel efficiency, minimizing waste and promoting conservation worldwide. We strive to instill positive environmental stewardship in our cast and crew members and seek to inspire others through programs that engage our guests and the communities in our ports of call.



Fuel Efficiency & Energy Conservation

Aboard our ships, efforts are taken to help increase the efficient use of fuel and energy, including:

- **Fuel:** As of Jan. 1, 2020, the International Maritime Organization instituted a regulation that requires all ships to use .5% sulfur fuel compared to 3.5% previously. Disney Cruise Line has taken this a step further by using .1% low sulfur fuel fleetwide at all times. Additionally, The Walt Disney Company previously announced plans to build three additional cruise ships, which will be powered by liquefied natural gas, or LNG, one of the cleanest-burning fuels available.

- **Shore Power:** Currently, three Disney Cruise Line ships have the equipment necessary to plug into shore power if the option is available at the port. Disney Cruise Line coordinates itineraries to be sure shore power-capable ships sail to ports of call that offer this technology.

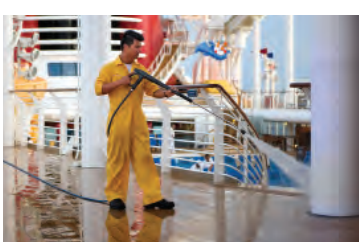
- **Ship Hull Coating:** Disney Cruise Line made history as the first cruise line to utilize an innovative hull coating on its ships that is both 100 percent non-toxic to the marine environment and effective in increasing fuel efficiency by reducing surface resistance in open water. Additionally, an air lubrication system (ALS) has been installed onboard the Disney Magic to reduce the friction of the ship moving through the water.

- **Water Production:** Excess heat from power generators is used to run evaporators, which, combined with other shipboard initiatives, transform approximately 142,000 gallons of seawater into potable water on board each of our ships every day.

- **Additional Efforts:** Disney Cruise Line increases fuel and energy efficiency by automating onboard air conditioning systems for optimum use in both guest and backstage areas, turning off lights when they are not needed and encouraging guests and crew to reuse bath towels, conserving both energy and water. Furthermore, Disney Cruise Line is in the process of converting all four ships to energy-efficient lighting.

The design of the ships' bulbous bow, along with an innovative hull coating that is 100 percent non-toxic to the marine environment, is both effective at reducing resistance in the open water and increasing fuel efficiency.

Guests are encouraged to get involved in conserving water and energy.

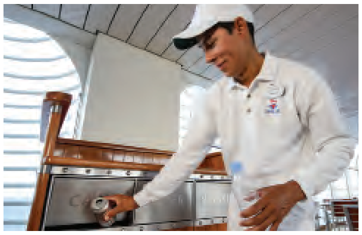


Condensation from the ships' onboard air conditioning units is recycled to supply fresh water and used to clean the outer decks of the ships.

Waste Minimization

Disney Cruise Line takes great care to reduce waste and conserve resources.

- **Plastic Waste:** As part of The Walt Disney Company's overall efforts to reduce the amount of single-use plastics, Disney Cruise Line has taken great measures to eliminate single-use plastics onboard and on Disney Castaway Cay, Disney's island in The Bahamas. In 2018, Disney Cruise Line eliminated the use of plastic straws, removing an annual volume of more than 14.7 million. Additionally, by switching to refillable bath product dispensers in all guest staterooms in 2019, Disney Cruise Line has removed an annual distribution of more than 2.2 million plastic amenity containers across its fleet – a total of 18 tons of plastic waste. Disney Cruise Line has also gone from annually distributing nearly 1 million plastic merchandise bags fleetwide annually to nearly zero. Other measures include the removal of plastic cutlery, stirrers and condiment packets. Disposable polystyrene cups have also been replaced with insulated paper cups. And, in an effort to reduce the use of plastic bottles, refillable water stations have been installed in both guest and crew member areas.
- **Recycling:** Disney Cruise Line is committed to diverting waste from traditional waste streams. Shipboard recycling processes have helped to eliminate on average more than 2,500 tons of metals, glass, plastic and paper from traditional waste streams each year. Each stateroom on all four Disney Cruise Line ships contains a recycling bin for plastic, paper and aluminum.
- **Condensation:** Naturally occurring condensation from the ships' onboard air-conditioning units is recycled to supply fresh water for onboard laundry facilities and for cleaning the outer decks of the ships, saving more than 30 million gallons of fresh water each year.
- **Cooking Oil:** Each week, more than 1,000 gallons of used cooking oil are offloaded and recycled. One hundred percent of the offloaded cooking oil is recycled in ports of call around the world, including Vancouver, Miami and Port Canaveral. Furthermore, Disney Cruise Line enjoys a partnership with Bahamas Waste Management in Nassau to convert the offloaded cooking oil into biodiesel fuel to power a fleet of local vehicles.



Disney Cruise Line crew members are careful to sort recyclables into waste receptacles.

Each week, more than 1,000 gallons of used cooking oil is offloaded and recycled.

Water Purification

Since water is a precious natural resource, Disney Cruise Line has invested in technology to ensure water purity and taken steps to select earth-friendly cleaners.

- **Advanced Wastewater Purification Systems:** All Disney Cruise Line ships feature Advanced Wastewater Purification Systems (AWPS) that utilize natural processes to treat and purify onboard wastewater to levels far exceeding international shipping standards, and in some cases shoreside potable water standards.
- **Environmentally Friendly Cleaning Products:** Crew members use biodegradable cleaning products wherever possible, avoiding potentially harmful phosphates and other chemicals associated with traditional cleaners.

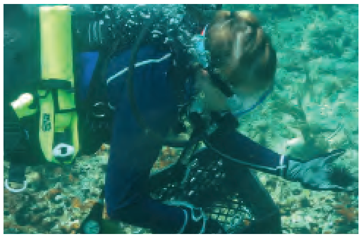
All Disney Cruise Line ships are equipped with Advanced Wastewater Purification Systems.

Environmental Officers

All Disney Cruise Line ships have dedicated Environmental Officers who are ranked among the most senior leaders on board.

- **Highly Specialized Expertise:** Our Environmental Officers possess previous maritime experience and specialized training in environmental regulations and systems.
- **Responsibilities:** These leaders monitor the ships overall water quality and supply, train all officers and crew members on waste minimization and environmental safety programs and oversee multiple environmental initiatives, including all shipboard recycling efforts.

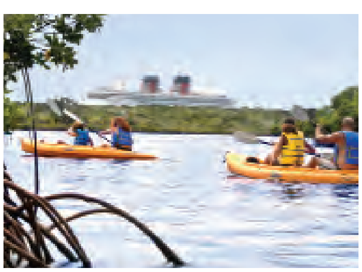
Environmental Officers aboard Disney ships are responsible for monitoring water quality, in addition to other duties.



Disney researchers are transplanting long-spined sea urchins in order to restore the health of coral reefs.

Disney Cruise Line complies with all water and air quality standards.

Disney Cruise Line partners with Disney's animal care experts and researchers to uphold high standards of animal care, professionalism, ethics, conservation and education.



Guests on Castaway Cay participate in Port Adventures that foster an appreciation of the natural habitat.

Conservation & Wildlife

On board our ships and off, Disney Cruise Line strives to promote wildlife conservation and the protection of native animal species in our ports of call and around the world.

- **Disney Conservation Fund:** Guests can join Disney Cruise Line in supporting the Disney Conservation Fund (DCF), a global awards program committed to saving wildlife, inspiring action and protecting the planet. Supported by The Walt Disney Company and supplemented by generous guest contributions, since 1995 DCF has directed more than $100 million to save wildlife and protect the planet and inspired millions of people to take action for nature in their communities. Read more at www.disney.com/conservation.
- **Coral Reef Restoration:** In collaboration with Disney Cruise Line and The Disney Conservation Fund, a team of researchers have worked since 2007 to rehabilitate coral reefs in The Bahamas. They've planted more than 1,000 corals to rehabilitate five coral reefs, providing important habitat for the marine species, including endangered sea turtles, who call coral reefs home. To protect these reefs from excess algae growth, the team also relocates native long-spined sea urchins to the reefs to graze on algae, restoring balance to the ecosystem and allowing new corals to grow. The Disney Conservation Fund is also supporting the Perry Institute for Marine Science to address coral conservation and restoration across The Bahamas alongside more than 20 partner organizations.
- **Disney's Animals, Science and Environment Team:** This internal department of animal care experts and researchers works to uphold high standards of animal care, professionalism, ethics, conservation and education. Disney Cruise Line partners with this team to monitor and review Port Adventures featuring animal experiences, oversee educational excursions highlighting native animals and conduct research on Disney's island, Castaway Cay.
- **Sea Turtle Protection:** Crew members partner with experts from Disney's Animals, Science and Environment Team to protect and monitor loggerhead sea turtle nests on Castaway Cay. Their efforts have helped protect this endangered species. In partnership with Sea Turtle Conservancy and Disney's Vero Beach Resort, Disney Cruise Line is a sponsor of Tour de Turtles, an annual event that follows the marathon migration of sea turtles through the use of satellite telemetry. Scientists follow these sea turtles' journeys from their nesting beaches to their foraging grounds to learn vital data about their habits at sea and identify migratory patterns.
- **Whale-Watching Networks:** Disney Cruise Line voluntarily participates in a program to record sightings of humpback whales off the coast of Alaska for the National Oceanic and Atmospheric Administration (NOAA) during summer sailings.
- **Avoidance with Marine Mammal or Other Marine Life:** Disney Cruise Line is dedicated to avoiding interactions with marine life. We comply with voluntary seasonal shipping lane changes, voluntary reporting and ship speed reductions. Prior to each season in Alaska, we also conduct marine life avoidance refresher training for our captains and first officers to help them with recognizing whale types, their behavior, and migratory patterns, which is the first step in avoiding interactions.
- **Sustainability:** Disney Cruise Line is working toward sustainability by selecting more seafood from wild or farmed sources that do not compromise the well-being of our oceans.

A new solar farm facility is currently underway on Castaway Cay and once complete will generate approximately 70 percent of the island's power.

The vast majority of Disney's island, Castaway Cay, remains in an undeveloped, preserved state.

Disney VoluntEARS clear trash from the Brevard County coastline as part of regular beach cleanups.

Environmental Efforts at Castaway Cay

Disney's island, Castaway Cay, is a 1,000+ acre island located in The Bahamas along the Abacos chain. The vast majority of the island's acreage remains undeveloped and in a preserved state.

Guest activities impact only a small area of the island, and even there, guests are encouraged to "take only memories, leave only footprints."

Among its many attributes, the island features a secluded one-mile beach, a natural lagoon and natural protection for ship docking.

- **Solar Power:** For many years, Disney Cruise Line has utilized solar power to heat water for crew areas. Disney Cruise Line recently embarked on a new environmental initiative bringing a five-acre solar facility online at Castaway Cay. This solar facility includes 4,320 solar panels and will generate approximately 70% of the island's power once complete.

- **Island Restoration:** Disney restores the island's original ground cover by bringing in plant varieties native to the island to create an authentically natural habitat for guests to explore.

Community Outreach, Inspiration and Education

Disney Cruise Line supports efforts both on board and in the local port communities visited by Disney to inspire children and adults alike to take environmental action in their everyday lives.

- **Community Service:** As part of an ongoing effort, cast and crew members regularly donate their time to benefit port communities. Their efforts include giving back to local nonprofits and leading shore cleanups.
- **"Safety Smart Goes Green":** On board, Timon and Pumbaa from "The Lion King" help to inspire responsible environmental action by showcasing small steps everyone can take to make a difference for the environment in their everyday lives.
- **Summer Eco-Camps:** Disney Cruise Line sponsors and provides guidance for summer eco-camps in the Caribbean. The camps focus on local biodiversity and habitats and provide children with information about conservation and recycling.