SEV Consulting Group

Environmental Management Plan for Nassau Cruise Port Project, New Providence

SEV Consulting Group
October 2020

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Environmental Management Plan for the Nassau Cruise Port Project, New Providence

ABSTRACT

Revision Record

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Environmental Management Plan

Nassau Cruise Port Project

October 2020

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1.0 Executive Summary

The Nassau Cruise Port project consists of the expansion of Nassau Harbour inclusive of extending and repairing piers to accommodate larger cruise ships. The project will also transform the existing cruiseship terminal to accommodate more tourist arrivals and enhance the Woodes Rogers Walk with the construction of a retail space. Other components of the project are an amphitheater, impact theater and a Junkanoo museum.

The Environmental Management Plan (EMP) has been developed to assist ENKA, the design-build contractor for the Port, in achieving its Health, Safety, Social and Environmental (HSSE) Policy to ensure that all its activities during construction are carried out in a manner that causes minimum adverse impacts to the environment through the establishment and implementation of an environmental management system as well as associated environmental goals.

The EMP will also guide Nassau Cruise Port Ltd. (NCP) in its operation of the Port to ensure its activities will have minimum adverse impacts on the environment.

The EMP details mitigation measures that will be employed by ENKA management, staff and subcontractors during construction and NCP during operation of the Port.

The Nassau Cruise Port project can be executed in a sustainable manner once the mitigation measures and strategies detailed in this EMP are adhered to. Utilizing these recommended measures and strategies can eliminate or minimize any negative environmental impacts resulting from project activities during construction and operation of the Nassau Cruise Port.

2.0 Introduction

2.1 EMP purpose

The Environmental Management Plan (EMP) has been developed to assist ENKA, the design-build contractor for the Port, in achieving its Health, Safety, Social and Environmental (HSSE) Policy to ensure that all its activities are carried out in a manner that causes minimum adverse impacts to the environment through the establishment and implementation of an environmental management system as well as associated environmental goals. The EMP will also guide Nassau Cruise Port Ltd. (NCP) in its operation of the Port to ensure its activities will have minimum adverse impacts on the environment.

The objectives of the EMP are two-fold:

1. To detail the mitigation measures identified through the EIA process to minimize/eliminate those potential negative environmental and social impacts of the proposed project; and
2. To ensure the Nassau Cruise Port project utilizes best environmental practices and proceeds in an environmentally sustainable manner.

2.2 EMP scope and content

The EMP details environmental and social mitigation measures that will be employed by ENKA management, staff and subcontractors during construction and NCP during operation of the Port.

The Nassau Cruise Port project can be executed in a sustainable manner once the mitigation measures and strategies detailed in this EMP are adhered to. Utilizing these recommended measures and strategies can eliminate or minimize any negative environmental impacts resulting from project activities during construction and operation of the Nassau Cruise Port.

3.0 Project Description

The Nassau Cruise Port project is located on the island of New Providence in The Bahamas within Nassau Harbour. Map 3-1 shows the location of the project on New Providence.

Map 3-1: NCP Geographic Location

The Nassau Cruise Port project consists of the expansion of Nassau Harbour inclusive of extending and repairing piers to accommodate larger cruise ships. The project will also transform the existing cruiseship terminal to accommodate more tourist arrivals and enhance the Woodes Rogers Walk with the construction of a retail space. Other components of the project are an amphitheater, impact theater and a Junkanoo museum.

The site plan for the Nassau Cruise Port is attached at Appendix A.

4.0 Relevant Environmental Legislation and Standards

The subsections detail the national and international environmental legislation and standards that the NCP project will comply with.

4.1 National laws and regulations

The laws and regulations of The Bahamas which are relevant to this project include:

Environmental Health Services Act 1987

This Act promotes conservation and maintenance of the environment and also addresses the control of contaminants and pollutants that may adversely affect the environment and human health. The Act also outlines regulations with respect to water supplies, solid and liquid waste, beaches, seaports, harbours and marinas.

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

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

Environmental Impact Assessment Regulations 2020

These regulations govern the process for review of the environmental impacts and management for development projects in The Bahamas. The regulations outline the process for applying for a Certificate of Environmental Clearance (CEC), inclusive of the development of Environmental Impact Assessments (EIAs) and Environmental Management Plans (EMPs).

Environmental Planning and Protection Act 2019

This Act provides a legal framework for the protection, enhancement and conservation of the environment. It also provides for the prevention and mitigation of pollution in order to maintain the quality of the environment. It establishes the Department of Environmental Planning and Protection (DEPP) to regulate and oversee the review of Environmental Impact Assessments and Environmental Management Plans.

Forestry Act 2010

This Act provides for the protection of trees that are rare and of historical significance and imposes stiff penalties for violators of this law. Protected trees can only be removed with the permission of the Director of Forestry. The permit will outline conditions of removal inclusive of replacement ratio for protected trees.

Health and Safety At Work Act 2002

The Act provides for:

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

Marine Mammal Protection Act 2005

This Act provides for the protection of marine mammals belonging to the family Delphinidae and any other marine mammal designated by the Minister within the Exclusive Economic Zone (EEZ) of The Bahamas. The Act prohibits taking, harassment, hunting or killing of any marine mammal within The Bahamas. It also regulates facilities involved with marine mammals and requires the appointment of Marine Mammal Inspectors.

The Act is accompanied by the Marine Mammal Protection Regulations 2006. These regulations outline the application process for export, import, sale, transport and research on marine mammals. The regulations also establish the standards and guidelines for captive marine mammal facilities.

Planning and Subdivision Act 2010

This Act provides for:

- A land use planning based development control system led by policy, land use designations and zoning;
- Prevention of indiscriminate division and development of land;
- Efficient and orderly provision of infrastructure and services to the built environment;
- Planning processes that are fair by making them open, accessible, timely and efficient;
- Recognition of the decision-making authority and accountability of the Government in land use planning; and
- Planning for the development and maintenance of safe and viable communities.

The Act provides for regulating activities such as quarrying, mining, road construction and subdivision development.

Water and Sewerage Corporation Act 1976

This Act establishes the Corporation. Functions of this organization include the application of appropriate standards and techniques for investigation, use, control, protection,

management and administration of water. The Corporation is also mandated to oversee waste disposal, water treatment and water quality.

Wild Animals (Protection) Act 1968

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

Wild Birds Protection Act 1952

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

4.2 International Standards and Agreements

International Organization for Standardization (ISO)

ENKA is certified under the following international standards:

- ISO 14001:2015 (Environmental Management System Requirements);
- ISO 9001:2015 (Quality Management Systems - Requirements); and
- ISO 45001:2018 (Occupational Health & Safety Management Systems).

Copies of these certificates can be found in Appendix B of the EMP.

ENKA will adhere to these standards for construction of the NCP project.

MARPOL

With respect to operation of the Port, NCP will adhere to MARPOL – the International Convention for the Prevention of Pollution from Ships under the International Maritime Organization (IMO). This multilateral agreement, which The Bahamas became a signatory to in 1979, covers prevention of pollution to the marine environment by ships from routine operations and accidents. MARPOL has various annexes including Annex IV on Sewage Pollution and Prevention. The Bahamas Maritime Authority (BMA) also provides guidance on standards to ship owners with respect to sewage discharge including if, when and where it can be discharged. Other annexes are:

- Annex I – Prevention of Pollution by Oil;
- Annex II – Control of Pollution by Noxious Liquid Substances in Bulk;
- Annex III – Prevention of Pollution by Harmful Substances Carried at Sea in Packaged Form;
- Annex V – Prevention of Pollution by Garbage from Ships; and
- Annex VI – Prevention of Air Pollution from Ships.

Section 1 – Environmental Management for Construction

5.0 Environmental Policies for Construction

ENKA's environmental policy and goals are guided by its HSSE Policy and Green Port Policy. The HSSE Policy consists of eight (8) components:

1. Leadership and Commitment
2. Planning
3. Risk Management
4. Implementation
5. Competency
6. Objective and Key Performance Indicators
7. Monitoring and Review
8. Social Responsibility

These components and their associated objectives are shown in Figure 5-1.

The health, safety and welfare of all personnel involved in Nassau Cruise Port Project whether employed directly by ENKA or as subcontractors, the preservation of the environment, and the protection of the assets rank equally with ENKA's other business objectives. ENKA is totally committed to perform the construction works in a safe and efficient manner, and has set the following HSSE goals:

- No accidents;
- No harm to people; and
- No damage to the environment.

To achieve its commitment to the HSSE Policy and goals, ENKA will:

1. Comply with the requirements of ISO 14001 Environmental Management System, ISO 45001 Occupational Health and Safety Management Systems, and related legislation, regulations, Employer HSE Schedule, procedures, specifications and guidelines, codes of practice and standards;
2. Provide continuous leadership and demonstrate committed support by all levels of management in order to ensure the identification and the achievement of HSSE objectives and targets within the relevant aspects of the project;
3. Define responsibility and accountability for HSSE to all level of personnel involved in the project;
4. Minimize any significant adverse environmental impacts of activities, processes and services through the implementation of integrated environmental management plans and procedures;
5. Commit towards the sustainability of the project through environmental protection, pollution prevention, and recruitment of competent personnel with appropriate qualification, skills and experience;
6. Provide adequate resources and training to personnel involved in the project to enable them to fulfill their responsibilities and to achieve the Project HSSE objectives and targets;
7. Create positive perceptions of HSSE, raise HSSE awareness on the project and obtain feedback on related issues and concerns;

8. Control and mitigate actions arising from the hazard/risks and aspect/impact throughout the execution of the project;
9. Provide continuous monitoring of HSSE performance and associated indicators throughout the project;
10. Ensure the active participation of its subcontractors and suppliers to achieve the established HSSE objectives and targets; and
11. Provide facilities that are safe to operate.

ENKA's Green Port Policy serves as a guide for decision-making and establishing a framework for environment-friendly Port development and operation. The guiding principles of the Green Port Policy are:

1. To protect the community from harmful environmental impacts as a result of Port operations;
2. To maintain a balance between the environment, society and economy in any Port planning, development and operation;
3. To inculcate sustainability within the framework of the organization focusing on increasing awareness and the use of sustainable materials or technologies;
4. To provide principal direction within the Port towards environmental compliance and conservation;
5. To prevent pollution and improve personal, community and environmental health;
6. To encourage positive impacts beyond economic benefits to the surrounding community;
7. To engage and communicate with the community; and
8. To use energy, electricity and fuel saving initiatives.

The Project Manager (PM) has overall responsibility to ensure the HSSE and Green Port Policies are understood by and communicated to staff and subcontractors. The PM is also responsible for the review of the effectiveness of the HSSE Management system throughout the project.

Figure 5-1: ENKA HSSE Policy and Objectives

5.1 Eco-Management and Audit Scheme

The EU Eco-Management and Audit Scheme (EMAS) is a management instrument developed by the European Commission for companies and other organization to evaluate, report, and improve their environmental performance. EMAS is open to every type of organization desiring to improve its environmental performance. It spans all economic and service sectors and is applicable worldwide.

Since the revision of the annexes of the EMAS Regulation, it is easier for an organisation already complying to an environment management system, such as ISO 14001, to step up to EMAS.

EMAS components are:

- Performance: EMAS supports organizations in finding the right tools to improve their environmental performance. Participating organizations voluntarily commit to both evaluating and reducing their environmental impact.
- Credibility: Third party verifications guarantee the external and independent nature of the EMAS registration processes
- Transparency: Providing publicly available information on an organization's environmental performance is an important aspect of EMAS. Organizations achieve greater transparency both externally through the environmental statement and internally through employees' active involvement.

The relationship between EMAS and ISO 14001 is shown in Figure 5-2.

Figure 5-2: EMAS and ISO 14001

6.0 Construction Environmental Management Organizational Structure

The goals of the construction environmental management system for the Nassau Cruise Port Project are to:

- Comply with all environmental, legal and contractual requirements. In the absence of specific legal requirements, the Company will seek out and observe accepted best practices as appropriate;
- Achieve environmental objectives and targets through the implementation of the environmental management plan;
- Foster employees' awareness of their responsibilities to the environment;
- Strive to achieve continual improvement of its environmental performance and prevention of pollution through periodic management review; and
- Provide training to all staff including subcontractors' staff, on the environmental, legal and contractual requirements of the project and the EMP as well as the implications of non-compliance with these requirements.

6.1 Organization and responsibilities chart

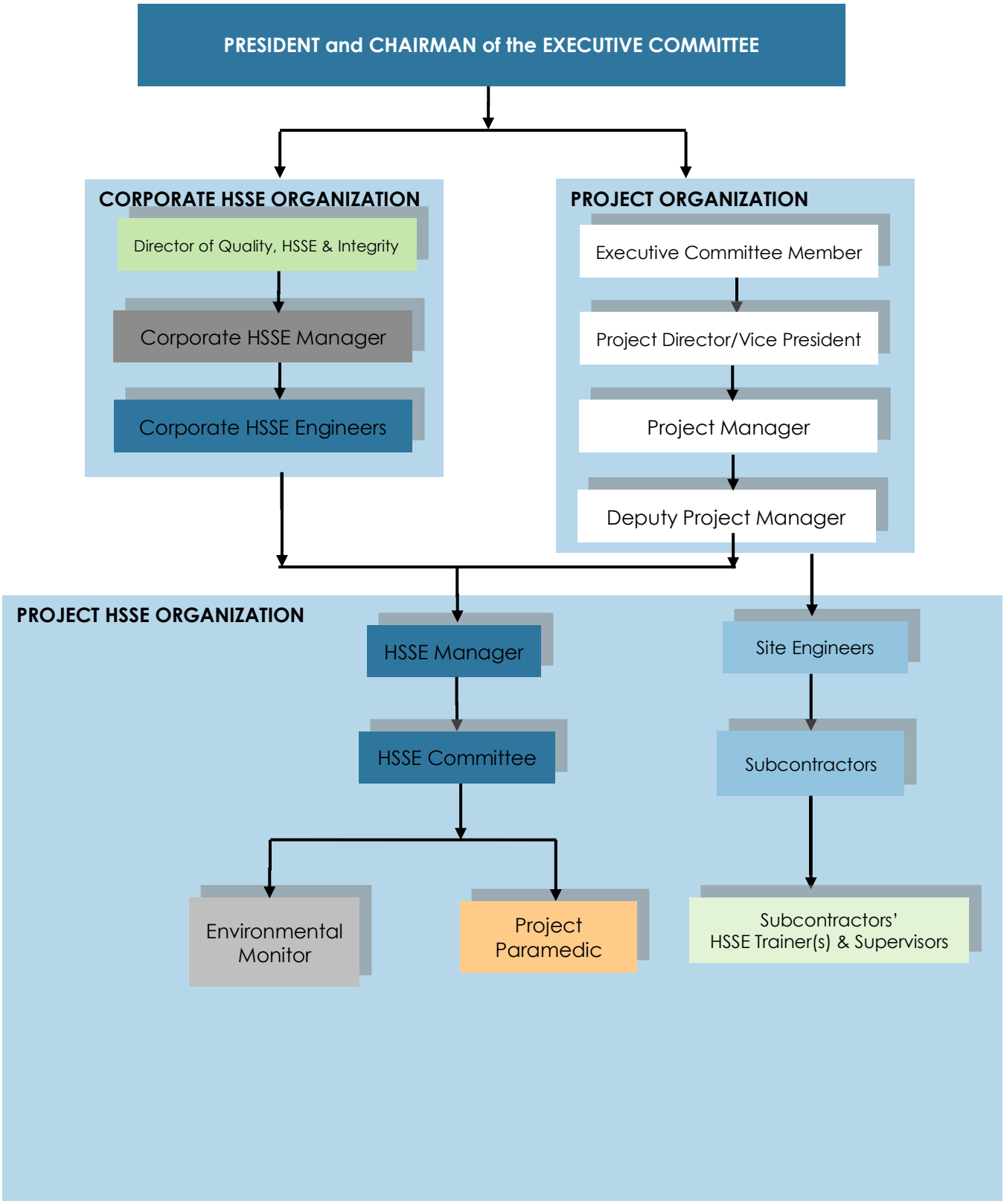
The environmental management organizational structure for ENKA inclusive of Health, Safety, Social and Environmental (HSSE) is outlined in Figure 6-1. It shows how the current project fits into the ENKA corporate structure.

The details on roles and responsibilities of positions directly related to the project HSSE organization are detailed in the following subsections.

6.1.1 Project Manager

The Project Manager (PM) is responsible for overall management of the project, in compliance with all applicable environmental commitments. The PM is ultimately responsible for overseeing implementation of the requirements set forth in this EMP. The PM may designate a qualified, senior-level alternate (e.g., HSSE Manager), to act on their behalf in implementing the environmental program for the project. The Project HSSE Manager is primarily responsible for the implementation of the EMP and reporting to the Department of Environmental Planning and Protection (DEPP) on environmental issues related to the project.

Figure 6-1: ENKA Environmental Management Organizational Structure



The Project Manager's specific duties include:

1. Enforce and promote ENKA's commitment to continuous improvement with regard to HSSE management;
2. Promote open communication, cooperation, and trust between the project management, project employees, subcontractors with regard to optimizing HSSE management;
3. Communicate to the project team that the emphasis on cost and schedule shall not override the importance of HSSE requirements;
4. Provide sufficient budget and required HSSE team for the effective implementation on Project;
5. Confirm the effective implementation of the HSSE Policy Statement and the EMP;
6. Confirm that the Project Environmental Policy Statement and Plan are reviewed on an annual basis and to chair HSSE Management Review meetings;
7. Provide clear and direct leadership and support for the project Health, Safety, Social and Environmental (HSSE) team;
8. Allocate appropriate resources to confirm the successful implementation and maintenance of the project HSSE commitments and requirements;
9. Establish clear responsibility and accountability for the implementation of the EMP;
10. Communicate with NCP regarding the status of HSSE compliance issues;
11. Promote support and participation in the project "Zero Accident" philosophy to pursue and maintain a safe environment; and
12. Actively participate in HSSE workshops and reviews, as necessary.

6.1.2 Deputy Project Manager

The Deputy Project Manager (DPM) works under the direction of the Project Manager. They shall oversee direct-hire labour and subcontractor work execution within their assigned areas. The DPM provides direct operational oversight of work performed and is responsible for ensuring full compliance with specifications and other contract documents, including environmental requirements.

The DPM's duties include:

1. Assisting PM will all tasks outlined above;
2. Overseeing work performed by direct-hire personnel;
3. Preparation of daily reports and giving direction to subcontractors regarding their activities and performance, including environmental compliance information provided by HSSE Manager and EM;
4. Preparation of Non-Conformance Reports for subcontractors & sources for construction and demolition activities.

5. Keeping a record of Environmental Non-Conformance Reports and Corrective Action Reports prepared by EM.
6. Facilitating site access and work by the HSSE Department; and
7. Working with HSSE Manager to track and identify any hazardous waste issues on the work site.

6.1.3 Health, Safety, Social and Environment (HSSE) Manager

The HSSE Manager is primarily responsible for the implementation of the EMP and ENKA's HSSE Policy Statement. They shall act as ENKA's Lead Environmental Representative, supported by the Environmental Monitor (EM) which will serve as Deputy Environmental Representative. This structure ensures that at any given time, there is always an Environmental Representative present on the site to deal with environmental issues as they arise. The HSSE Manager shall serve as the key point of contact for the Department of Environmental Planning and Protection (DEPP) and other Government agencies with respect to environmental compliance functions on the project including up-front planning, permitting, design, demolition and construction.

The specific duties of HSSE Manager include:

1. Provides environmental technical requirements and guidance to the PM, DPM and other project team members;
2. Coordinates environmental permitting requirements for the project with the Site Engineers and EM as required;
3. Identifies environmental issues that could become potential problems affecting constructability and provides cost effective solutions;
4. Identifies site-specific mitigation needs and construction and demolition environmental issues to limit impacts and help confirm environmental compliance;
5. Ensures that environmental controls and materials are on-site and properly installed and maintained;
6. Responsible for technical quality and completeness of project deliverables from an environmental perspective;
7. Coordinates environmental compliance issues and concerns with the Employer and keeps PM informed of any potential "hot issues";
8. Works with DPM to track and identify any hazardous waste issues on the work site;
9. In conjunction with EM, conduct environmental awareness training for construction, demolition and commissioning personnel and prepare training materials and guideline sheets;
10. Responsible for technical oversight of environmental subcontractors performing services for ENKA;
11. Responsible for the development and revisions of the Environmental Management Plan (EMP) and other site-specific plans as required for use during Project activities;

12. Provides technical support and assistance to the DPM and the EM assigned onsite during construction and demolition;
13. Responsible for the implementation of the ENKA's construction environmental monitoring program with assistance from the EM;
14. Conducts periodic inspections of construction and demolition activities to review compliance with environmental requirements, permits and this EMP; and
15. Serves as the primary site Emergency Controller (EC).

6.1.4 Environmental Monitor (EM)

The Environmental Monitor (EM), assigned for the project, shall have at least 2 years of experience and a graduate degree in environmental sciences or related area of study. The EM shall serve as ENKA's Deputy Environmental Representative with specific responsibility for environmental coordination within the project. They report to the HSSE Manager who will act as ENKA's Lead Environmental Representative. The EM, in collaboration with the HSSE Manager, shall also provide technical support to the project management, the construction engineering teams, as well as the field staff, so that the project proceeds in accordance with environmental commitments and requirements. The EM shall routinely communicate issues of environmental compliance to the HSSE Manager.

Other HSSE duties of the EM include:

1. Confirm that ENKA project management and other project personnel are informed of the potential environmental impacts of planned activities and the mitigation measures/actions necessary to maintain compliance with project permit and legislative requirements;
2. Assist the HSSE Manager with implementation of ENKA’s construction environmental monitoring program;
3. Be responsible for on-site environmental monitoring on a day-to-day basis;
4. In conjunction with HSSE Manager, conduct environmental awareness training for construction, demolition and commissioning personnel and prepare training materials and guideline sheets;
5. Review the project construction and demolition plan to advise and determine that proper and required environmental controls are incorporated;
6. Directly notify the PM, DPM and HSSE Manager of any circumstances that warrant regulatory notification or management action to confirm effective environmental compliance;
7. Help confirm that all field construction, demolition and commissioning activities are planned and conducted in accordance with applicable environmental regulations and site-specific requirements;
8. Participate in periodic meetings with regulatory agencies to review environmental requirements and compliance;

9. Conduct daily field inspections and regular audits of construction, demolition and commissioning activities for compliance with existing permits and approvals and all applicable environmental regulations;
10. Coordinate site inspections by regulatory agencies and agency interface during any problem resolution;
11. Prepare an environmental compliance summary on a monthly basis for distribution and review by the project management and the construction and demolition team;
12. Prepare Non-conformance and Corrective Action Reports on environmental issues;
13. Evaluate trends in environmental compliance among subcontractors and work sites and communicate to the project management;
14. Participate in the development and maintenance of project HSE plans and procedures;
15. In consultation with the business management department, ensure that appropriate environmental conditions and requirements are included in all sub-contract tender packages;
16. Maintain a record of field inspections of construction, demolition and commissioning activities for compliance with the existing permits and approvals, and other applicable environmental regulations;
17. Use "stop-work" authority with regards to construction and commissioning activities that could have, or are causing, adverse impacts to the environment;
18. Distribute appropriate environmental information to subcontractors and direct-hire personnel, and monitor their compliance; and
19. In consultation with the design department, to provide knowledge and/or approaches that environmental conditions and requirements are included in Bahamian laws, legislation and contractual requirements.

6.1.5 HSSE Committee

The HSSE Manager, or his delegate, shall chair the project HSSE committee meeting. Monthly project reviews shall be undertaken to assess the status of listed HSSE actions contained within the project's HSSE activity schedule.

The committee shall consist of the following representation:

- HSSE Manager
- Department Managers;
- Field Superintendents;
- ENKA management representatives;
- HSSE Manager;
- Nominated Field Engineers;
- Subcontractor management representatives;

- Subcontractor HSSE personnel where applicable;
- Environmental Monitor;
- Project Paramedic

The functions of the project HSSE committee are as follows:

1. Establish goals and initiatives for the enhancement of overall project HSSE performance.
2. Review key performance indicators for measurement of HSSE progress.
3. Review progress towards achieving key performance indicators.
4. Review significant incidents and/or incident trends and develop and implement appropriate controls/interventions.
5. Review and improve where required the levels of employee communication and participation in HSSE program.
6. Review and analyse future proposed work activities to determine potential hazards/areas of risk and advice on suitable corrective actions/interventions.
7. Review project health and hygiene requirements and standards and introduce appropriate controls where necessary.
8. Analyse effectiveness of reporting and recording systems and make recommendations for improvement where required.
9. Review effectiveness of training, education and orientation programs and devise appropriate actions for improvement.

Other project staff that will be involved in environmental management are Site Engineers, Subcontractors and the Project Paramedic.

6.1.6 Site Engineers

Site Engineers (SEs) are engineers from various disciplines and departments responsible for specific construction and demolition activities. Each of these engineers shall have responsibility for HSSE compliance and subcontract coordination within their assigned area of operation. The environmental duties of SEs include:

1. Implement and enforce HSSE commitments and mitigation within their area of responsibility.
2. Work with the EM to identify site specific mitigation needs and construction sequencing to reduce adverse environmental impacts and help confirm environmental compliance and continuous improvement;
3. Effectively manage corrective actions where HSSE non-compliances are observed;
4. Review of subcontractor performance and activities, and implement actions if noncompliance with permits or contract documents is observed;
5. Timely communicate HSSE compliance issues to Project Management, the Construction and demolition team and the HSSE Manager;

6. Explore the use of secondary and recycled materials where allowable in specifications and where they can meet appropriate performance criteria;
7. Ensure appropriate waste management facilities are available on-site;
8. Ensure appropriate handling and storage facilities exist on site prior to the delivery of materials such as fuel, oil, solvents and potential hazardous materials required for construction and demolition purposes;
9. Track and help identify any hazardous waste issues on the work site. Help confirm that all hazardous materials present on the site have been recorded in a Material Safety Data Sheet (MSDS) and that employees are aware of the hazards present in the workplace and have access to MSDS log;
10. Effectively manage and lead with the spill kit to the emergency actions shall be described in spill response plan and given training course, and report to the immediately to the EE.

6.1.7 Subcontractors

All subcontractors shall be subject to exactly the same requirements as ENKA and have to apply and comply with them. The liabilities of ENKA to the subcontractors shall be binding and shall be held accountable for any deviation from environmental standards. Copies of ENKA and subcontractors environmental-related documents (such as Environmental Management Plans, ISO 14001 Environmental Management System certifications, etc.) shall be provided to NCP.

All subcontractors shall read, understand, and adhere to the environmental requirements of their subcontract and perform all their work in an environmentally responsible manner. Environmental requirements will be reinforced through site inductions, specific method statements, trainings, toolbox talks and the like.

The Subcontracts Administrator shall:

1. Enforce language in the subcontractors' contracts with ENKA that clearly dictates that subcontractors are responsible for complying with all applicable Bahamian environmental legislation and ENKA site plans and procedures;
2. Require all subcontractors to submit information to ENKA's EM on their activities which involve the use or generation of hazardous substances and wastes, that can potentially affect provisions of existing permits, or that have the potential to affect the environment;
3. Verify that each subcontractor has provided all necessary submittals as required (e.g. Material Safety Data Sheets, etc.) for materials that they bring to the site;
4. Confirm that all subcontractors are provided with a copy of this EMP.

6.1.8 Project Paramedic

The Project Paramedic has two main responsibilities related to HSSE:

1. First aid on the project site; and
2. Providing the initial medical intervention in case of an occupational incident on site.

The Construction Project Schedule is provided at Appendix C. The preliminary site layout showing key areas, such as hazardous waste storage areas and muster points in the event of an evacuation is available at Appendix D.

7.0 Environmental Impacts - Construction

7.1 Environmental impact significance from construction

The NCP project's impact significance matrix from construction as identified in the Environmental Impact Assessment (July 2020) is provided in Table 7-1 below.

The impact significance ranking key provided in the July 2020 approved EIA for the project is:

Impact Significance	Color Code
Negligible/No Impact	
Minor Impact	
Moderate Impact	
Severe Impact	
Beneficial Impact	

Table 7-1: NCP Project Impact Significance Matrix for Construction

Project Component	Impacting Factor	Physical		Coastal Processes			Biological						Socio-Econ & Cultural			
	Project Activity	Hydrology & Hydrogeology	Air Quality	Noise	Erosion & Sedimentation	Beach	Terrestrial Habitats	Marine Habitats	Birds	Terrestrial Flora	Marine Mammals	Marine Resources	Neighboring Communities	Relocation	Traffic	Economic
Marina	Land Reclamation															
	Dredging															
	Tour boat expansion															
	Repair Pier 1															
	Pier 3 extensions															
	Spoil Stockpiling															
	Dock Piles Installation															
Upland Construction	Land Clearing & Demolition															
	Infrastructure Installation															
	Boat Traffic															
	Accidental															
	Fuel / Oil Spills															
	Sewage Discharge															
	Surface Runoff															

The impacts from construction as identified in the approved EIA for the project are detailed in the subsections that follow.

7.2 Impacts from demolition

The Port Warehouse has already been demolished according to the approved EMP for this activity prepared by the demolition contractor, Bahamas Marine Construction Co. Ltd. and approved by the BEST Commission (now DEPP). Festival Place will be demolished to facilitate the development of the new cruise terminal according to the approved EMP for this activity prepared by the demolition contractor, Bahamas Marine Construction Co. Ltd. and approved by DEPP. Both buildings are located on Prince George Wharf, near Woodes Rogers Walk and downtown Nassau.

Perceived potential impacts from the demolition of the both buildings could be debris and silt from the demolition falling in the Harbour, which will impact marine resources in the immediate vicinity or flush beyond the harbor boundary impacting marine resources found there. Silt may also impact the air quality in the surrounding marine and terrestrial areas during this demolition. The noise associated with the demolition process and the heavy machinery required for demolition may impact surrounding businesses and the horses used in surrey tours. Transporting heavy equipment may impact the traffic flow in the area. A traffic impact assessment for the project was conducted by Caribbean Civil Group (CCG).

Businesses displaced during the demolition such as the Festival Place vendors, vendors along Woodes Rogers Walk, tour boat operators using the western and eastern berths in the NCP boundary will be temporarily negatively impacted. A more detailed impact analysis for demolition can be found in Section 7, Appendix C of the July 2020 EIA.

7.3 Impacts from sheet piling and dredging

Dredging and land reclamation will remove the benthic habitat from the areas identified in the habitat map. The species that cannot move out of the dredged area and the land reclamation area will be negatively impacted. The proposed dredging is not expected to change the hydrodynamics of the harbour. As a result, the current and wave interaction on the shoreline is expected to remain the same as that of present-day conditions. Sediment does not currently shift around notably within the harbour under the existing conditions, i.e. formation/movement of sandbars etc. Therefore, it is not expected that sediment will shift notably under the proposed post-dredge conditions.

The existing basin is demarcated by a sheer vertical cut face, which implies that the basin was dredged into sound rock substrate. It is expected that the cut face from the proposed dredging will be very similar, which means that the walls of the dredged area will not be

vulnerable to erosion or collapse and that sediment from the surrounding shallower seabed will not slide or collapse into the proposed basin due to wall collapse, and so there is no change in bathymetry to surrounding areas expected. The location of the dredger during mobilization and dredging may negatively influence marine traffic in the navigation channel along the northern boundary of the Port. The pipe used to transfer dredge material to the land reclamation site may become a hindrance to smaller tour boat operators using the eastern and western portion of the Harbour since the Port will remain in operation during this process. The route of the dredge pipe was relocated to reduce the impact to marine traffic.

The noise associated with the heavy machinery required for dredging and land reclamation may impact surrounding businesses and cruise ship visitors.

Should any silt or sedimentation flush beyond the Harbour during the construction, the visibility and turbidity on adjacent beaches by the Pointe development and Junkanoo Beach may be negatively impacted. With appropriate turbidity mitigation in place, the project is not expected to have an impact on Junkanoo Beach.

In summary, the intended dredging is not expected to change the currents in the Harbour nor create rip currents or similar dangerous wave energy or activity to nearby beaches which may affect beach goers. The proposed dredging is also not expected to impact the tidal or current flows in any significant way to create erosional events to the area of coastline in the vicinity of the project. Nor should the proposed dredging result in any changes to the wave energy or wave forces effect any of the beaches which border the project to the west or the east.

7.4 Impacts from landside construction

The vehicular traffic will be slightly negatively influenced by heavy equipment travelling to and from the construction site. During landscaping, traffic may be negatively impacted. There should be limited noise impact and during the landscaping activities in the landside works.

Protected trees identified in the Protected Trees Assessment (see Appendix G) will be removed during landside construction.

Construction of the new cruise terminal will lead to increased noise, but this will be a temporary nuisance to surrounding business communities. Noisy operations are the hydraulic impact hammer, vibratory hammer and power packs that will be used for pile

driving activities. No restricted work times are foreseen at this time. Operations are expected to be carried out 6 days a week, 24 hours a day.

Businesses displaced during the landside works, such as the Festival Place vendors and the vendors along the northern boundary of Woodes Rogers Walk, may be temporarily negatively impacted because they will be displaced for a short period.

7.5 Potential positive impacts from construction

Potential positive impacts from construction include:

1. **Marine debris observed in the NCP project site will be removed prior to dredging and land reclamation** - Transport of the debris beyond the Harbor limits will likely be avoided because the debris will be removed prior to dredging and the land reclamation process. Plastic debris is generally not biodegradable and can be mistaken for prey by marine life or lead to entanglements. Plastic debris also breaks down into microplastics, small pieces of plastic less than 5 mm long, is dangerous to the marine life as well because it can be mistaken for food. Many tires were observed in the NCP site during the marine benthic survey. Tires are also not biodegradable and can destroy coral reefs when currents or storm surge moves them onto coral reefs.

2. **Regrading of the Festival Place site and the Woodes Rogers Walk and improving drainage on site will reduce flooding in both areas** - This will eliminate standing water which can act as a vector for mosquitoes and is an eye sore for both tourists and locals.

3. **Modifying horses watering station -** Modifying the watering station for the horses working in the horse and carriage tours will also reduce the amount of available standing water that may harbor mosquitoes. The existing watering station is a small container of open standing water. Relocating the horse and carriage area and separating it from the retail space will help improve the shopping experience for both locals and visitors because the nuisance odors will not occur in the same space.

7.6 Impacts from land reclamation

The impacts from land reclamation include:

- **Loss of natural resources due to land reclaimed** - Mangroves and other native forests were not observed in the project area of impact during the surveys. These habitats were also not identified in the environmental impact assessment report in 2008 for the Nassau Harbour Port Improvement Project (NHPIP). As a result, there

will be no negative impact in this regard. During the land reclamation activity, the benthic habitat will be negatively impacted. However, this impact will be temporary and not significant.

- **Displacement of other existing land uses** - The cruise terminal will remain in operation during construction which will not permanently displace vendors and tour operators. Vendors will be temporarily displaced during the Festival Place demolition, the schedule for the demolition of this building has been provided to DEPP in the approved Demolition EMP. This impact will be temporary and insignificant.
- **Soil erosion and siltation** – There is potential for significant impact related to soil erosion and siltation due to the location of the demolition sites, and the dredging and land reclamation sites. The potential impact is related to soil erosion entering the NCP marine environment because the demolition sites are in proximity to the Harbour
- **Land availability for planned facilities** – The land reclamation component of the project will create the necessary space for the new recreational marina located in the western harbour.

7.7 Impacts on flooding and surface water flow patterns

The July 2020 EIA indicated that flooding will impact the project site. The report noted that due to regrading of the surface early in construction as well as project design inclusive of increasing pervious surfaces and use of swales, the surface water should not settle on the project site.

8.0 Environmental Mitigation Strategies – Construction

A summary of the Nassau Cruise Port project's construction mitigation strategies related to its potential environmental impacts is provided in Table 8-1 below. It should be noted that specific job hazard analyses and risk assessments will be conducted based on specific project activities and necessary environmental mitigation measures will be taken.

Implementation of mitigation strategies will be overseen by the HSSE Manager in conjunction with the Environmental Monitor.

Table 8-1: Summary of NCP Project's Mitigation Strategies for Construction

Area of Project	Area of Impact	Mitigation Strategy
Marine side works	Marine habitat – Benthic	Marine debris will be removed prior to dredging and land reclamation. Coral will be relocated from the project site prior to commencement of land reclamation and dredging activities. The Coral Relocation Plan is provided at Appendix H. Any marine wildlife encountered during marine construction works will involve following the procedures related to wildlife discovery as outlined in subsection 8.15.
	Marine habitat – Geology	No mitigation measures required.
	Marine habitat – Water quality	Use of appropriate turbidity mitigation measures to prevent siltation or sedimentation (see Appendix I on turbidity control measures). These measures will prevent increased turbidity along Junkanoo Beach. Turbidity monitoring will occur during dredging and land reclamation to ensure turbidity levels do not exceed 29 NTU above baseline levels.

Area of Project	Area of Impact	Mitigation Strategy
		See the Appendix J Spill Response Plan and Appendix K Hazardous Waste Management Plan for mitigation measures for any potential spills in the marine environment.
	Marine traffic	The route of the dredge pipe was relocated to reduce the impact to marine traffic. Boaters will be given advanced notice prior to commencement of dredging to prevent traffic conflicts.
	Air quality	Dust control measures will be implemented. All engines on site are fully equipped with exhaust filters and undergo full maintenance regularly as well as third party inspections to ensure air quality is not impacted.
	Noise	Noise barriers will be utilized as necessary to minimize exposure of neighbouring communities to harmful noise levels. See more detail on proposed mitigation measures in subsection 8.3.
	Socioeconomics – Displaced vendor management	Over the life of the construction phase, an overall ratio of 80% Bahamian workers to 20% non-Bahamian workers will be maintained. Displacement of vendors will be temporary. Tour boat operators will only be displaced for expansion of the connecting bridge between Piers 1 and 2.
Land side works	Terrestrial resources	Protected trees will be replaced at a ratio of 2:1 on the project site. Native plants will be utilized in landscaping. 2003 National invasive Species Strategy Voluntary Code of Conduct will be utilized to guide landscaping activities.

Area of Project	Area of Impact	Mitigation Strategy
		Any terrestrial wildlife encountered during landside construction works will involve following the procedures related to wildlife discovery as outlined in subsection 8.15.
	Terrestrial – Geology	Regrading of the surface early in the construction phase along with project design to increase pervious surfaces and use of swales and drainage ponds will ensure that surface water will not settle on the project site not negatively impact neighbouring properties.
	Air quality	Dust control will include watering of the site and use of silt fencing around the site. All engines on site are fully equipped with exhaust filters and undergo full maintenance regularly as well as third party inspections to ensure air quality is not impacted.
	Noise	High-level noise operations will be scheduled simultaneously to reduce the duration of noise exposure for the surrounding community. Noisy operations will not be scheduled during main business hours and peak traffic times. Noise barriers will also be utilized (see subsection 8.3). Amphitheater design will include soundproofing of the building.
	Traffic	See subsection 8.12 for details on mitigation for traffic inclusive of designated haul routes, designated pedestrian routes and use of flagmen to aid in traffic management. More detailed information can be found in the Traffic Impact Assessment (Appendix A to the approved EIA). No mitigation measures were indicated specifically

Area of Project	Area of Impact	Mitigation Strategy
		for construction, but it was indicated that it would be important to enhance pedestrian access which will be the end of result of the construction of the project.
	Existing buildings	Mitigation for demolition of the warehouse was guided by a separate EMP for that activity. Mitigation for demolition of Festival Place was guided by the approved EMP for that activity. Mitigation for demolition of any additional buildings on the site will utilize the same mitigation measures detailed in the Festival Place EMP.
	Socioeconomics – Displaced vendor management	Over the life of the construction phase, an overall ratio of 80% Bahamian workers to 20% non-Bahamian workers will be maintained. Surrey drivers and Festival Place vendors temporarily displaced during construction will be given an alternate location to operate from. This alternate location will be identified in conjunction with the Ministry of Tourism.
	Socioeconomics – Public engagement	Signage will be installed around the site inclusive of construction firm contact information and safety signs, particularly those for public safety. A complaints mechanism will be developed inclusive of complaints phone contact or email and inventory of documented complaints (see Appendix O).

Mitigation strategies are further detailed in subsections 8.1 through 8.15.

8.1 Air quality

The main source of air pollution will be dust generated during construction. Dust will be kept down at all times, including during non-working hours. Soils at the site, haul roads and other areas disturbed by ENKA's construction activities and materials stockpiled for the project will be treated by water sprinkling or covered to control dust. Wet mopping or wet sweeping will be used instead of dry sweeping. The following measures will be taken to mitigate for any potential air pollution from dust during construction:

1. **Storage of cement** – Every stock of more than 20 bags of cement shall be covered entirely be impervious sheeting or properly stored.
2. **Stockpile of dusty materials** – Stockpiles of sand, rock and excavated material shall be covered entirely by impervious sheeting or sprayed with water or a dust suppression chemical to keep the surface wet.
3. **Loading, unloading or transfer of dusty material** – All dusty materials will be sprayed with water immediately prior to loading, unloading and transfer operation to prevent dust from becoming airborne. The exception is cases where the moisture content of dusty materials is a matter of concern.
4. **Excavation or earthmoving** – The working areas of any excavation or earthmoving operation shall be sprayed with water immediately before, during and immediately after the operation to keep the surface wet.
5. **Emission from construction plant drive by internal combustion engines** – All construction plants, inclusive of equipment, shall undergo regular maintenance so that any emissions due to malfunctioning or inefficiencies are minimized. All engines are fully equipped with exhaust filters and undergo full maintenance regularly as well as third part inspections to ensure air quality is not impacted.
6. **General site tidiness** – The site shall be cleaned and moistened frequently to minimize fugitive dust emissions.

8.2 Water quality and supply

Cutter suction dredge methodology will be used. The detailed methodology for the cutter section dredge and specifications for the proposed dredgers are provided at Appendix E. Sediment will be dredged from one area of the harbour and transferred to another via underwater pipe. This methodology will eliminate the need to load dredge material onto a barge for transport. This reduces the likelihood of dredge material falling into the ocean during transport. As the material is dredged, it will be piped to the land reclamation area.

Figure 8-1 shows the dredge and land reclamation plan for the site and the total dredge material. The purple line identifies the layout of the pipe from the dredge site to the land reclamation site. This configuration will reduce the impact to boaters using berths in the

eastern area of the Harbour. The pipes will be routed along the piers to avoid impacting marine traffic. The estimated total dredged material is 148,010 cubic yards (CY) and the estimated total overdredge is 24,389 CY. The estimated total fill area is 187,305 CY. The methodology for land reclamation is detailed at Appendix F.

The impact of the cutting will be minimal as the material will be cut and the seabed material will directly be pumped to the landfill via pipelines. The small-generated plume will stay at the bottom, sufficiently below the surface of the water; the material will not be discharged in barges, where you could have some excess/overflow water on the surface. As a mitigation, the speed (rpm) of the cutter head will be regulated and lowered to a minimum, leaving most of the material in front of the suction mouth of the dredger and reducing the plume to an absolute minimum.

To minimize impairment of water quality during dredging and excavation activities, the following mitigation measures will be implemented:

1. Sedimentation control methodologies will be employed around active dredging to contain suspended solids within the dredge area.
2. Sedimentation control equipment will be maintained during all activities causing turbidity. It should be noted that silt screens cannot be placed close to the cutter head as the dredger has to swing and needs space for its anchors.
3. During construction of the entrance channel, sedimentation control equipment will be installed at the disposal area to control turbidity.
4. Turbidity levels will be monitored on a daily basis during active dredging. If turbidity exceeds 29 NTU above natural levels, dredging will be stopped until sediments have settled before dredging can commence again.
5. Excess material will be cleaned from the decks and exposed rigging of barges or hoppers before the vessel is moved.
6. Adequate freeboard should be maintained on barges to reduce the likelihood of decks being washed by wave action.
7. All vessels will be sized such that adequate clearance is maintained between vessels and the seabed at all tidal levels to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash.
8. Spill kits will be kept on the barge for absorbing chemical spillage.
9. All chemical spills caused by maintenance work on the barge will be cleaned up immediately, properly and safely.

Water supply to the project site during construction must be discussed with the Water and Sewerage Corporation and the Department of Environmental Health Services prior to any water being utilized on the site for construction-related activities. Methodology for water

supply and disposal must be approved by these agencies prior to commencement of construction activities.

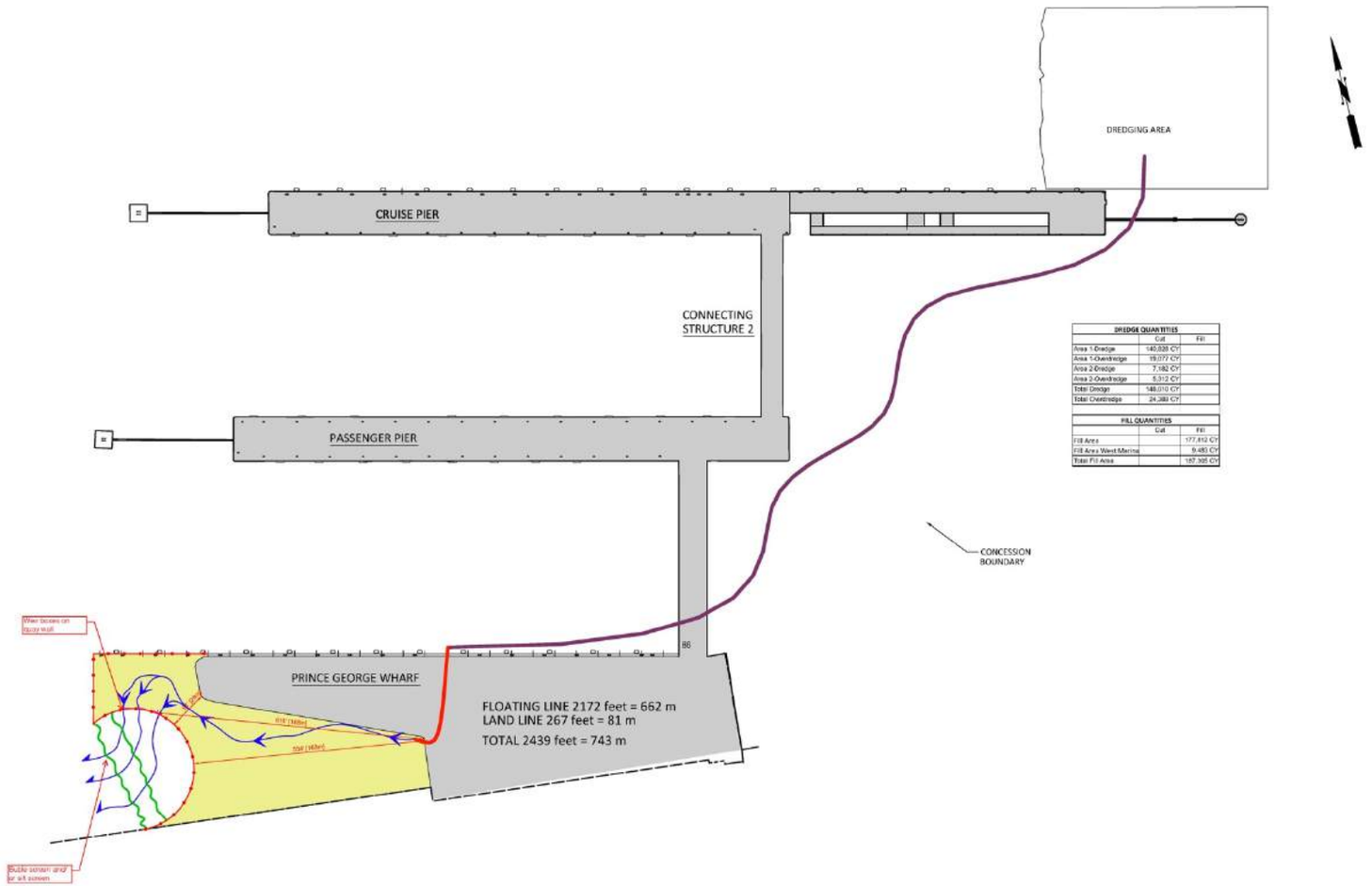


Figure 8-1: NCP dredge and land reclamation plan

8.3 Noise pollution

Noise pollution sources at the Port will include heavy equipment being used during construction and operation as well as increased traffic to and from the Port. Any noise generated is expected to be intermittent and temporary. The site is expected to be active 24 hours per day, so there will be potential for noise generation during night shifts as well as during the day. As work is occurring in a commercial zone, it is not expected that residents will be disturbed during the night or sleeping hours.

The following measures will be taken to mitigate for any potential noise pollution during construction:

1. Limit the amount of noise-generating equipment to be used.
2. Limit the amount of noise-generating equipment to be used simultaneously.
3. Use silenced or relative Quality Powered Mechanical Equipment (PME).
4. Cover noise-generating equipment with acoustic enclosures if necessary.
5. Erect temporary and movable noise barriers next to noise sources to shield down the noise emission if necessary (see Figure 8-2).
6. Position noise-generating equipment or activities away from sensitive receivers and at locations where existing structures on site can act as noise shields.
7. Switch off noise-generating equipment when not in use.
8. Ensure proper maintenance of noise-generating equipment.
9. Noise meters will be used for monitoring to ensure compliance with international standards as there are no published national noise standards for The Bahamas.

Prolonged exposure to noise levels above 70dB may cause hearing damage. Loud noises above 120 dB can cause immediate damage (CDC, 2019). Neighbouring communities are not expected to be exposed to noise exceeding safe levels for any prolonged period.

Figure 8-2: Examples of noise barriers

8.4 Habitat conservation -Terrestrial

Any invasive alien species (IAS) observed on the project site will be removed. The only invasive species identified in the July 2020 EIA were Hawaiian seagrape (*Scaevola taccada*). Other IAS common on New Providence include Australian pine (*Casuarina equisetifolia*) and Jumbey (*Leucaena glauca*), and Brazilian pepper (*Schinus terebinthifolius*).

Landscaping will be guided by the 2003 National Invasive Species Strategy Voluntary Code of Conduct (BEST Commission, 2003):

- Work with local plant ecologists, horticulturists, nurseries, botanic gardens, conservation organizations and others to determine which species either are currently highly invasive or show aggressive potential.
- Increase interaction with other professionals and non-professionals to identify alternative plant material and other solutions to problems caused by harmful invasive plants.

- Identify and specify non-invasive species that are aesthetically and horticulturally suitable alternatives to invasive species for use in Port landscaping.
- Eliminate specification of species in landscaping plans that are invasive in The Bahamas.
- Remove invasive plant species and replace them with non-invasive species.
- Be aware of potential environmental impacts beyond the designed and managed area of the landscape plan (for example, plants may spread to adjacent natural areas or cropland).
- Encourage suppliers to provide non-invasive plants.

Landscaping at the Port facility will be done with native and non-invasive vegetation, and no known or potential invasive plant species will be utilized. Native protected trees that may be used in landscaping include Mahogany (*Swietenia mahagoni*), Small leaved blolly (*Guapira discolor*), and Silver buttonwood (*Conocarpus erectus*).

A protected tree assessment was completed in August 2020 as a part of the development of the EMP. The assessment report can be found in Appendix G. A total of 34 protected trees were identified and marked. The protected species identified were as follows:

- 31 Mahogany (*Swietenia mahagoni*);
- 2 Lignum vitae (*Guaiacum sanctum*); and
- 1 Blolly (*Guapira discolor*).

The trees were all marked so they can be replaced at a ratio of 2:1 during construction of the Port. Action taken with respect to protected trees must be by permit issued by the Director of Forestry.

With landscaping, the project will seek to establish vegetated corridors. These areas would constitute vegetated corridors and would traverse the project site so that birds and other wildlife can move across the facility to access other natural areas. These corridors should only include native coastal or upland plant species and should be permanently maintained.

8.5 Habitat conservation -Marine

The EIA identified a few corals that need to be relocated so they are not destroyed during dredging activities. The coral relocation plan can be found in Appendix H. The plan indicates that 500 corals will be moved. The corals include scleractinian, reef-building stony corals – *Pseudodiploria* sp., *Orbicella* sp. and *Porites astreoides*. They range in size from 10 cm to 1 m. No fire coral, soft corals or spongy were observed. The relocation will be performed by scientists from the Perry Marine Institute. The proposal relocation site is the western tip of Paradise Island.

During dredging, appropriate sedimentation control equipment should be utilized (e.g. silt curtains) to minimize sedimentation of seagrass beds outside of the active construction zone.

8.6 Fueling

Fueling on site can result in spills of gasoline diesel and oil, which are common sources of marine pollution and are costly to clean up. Mitigation measures for fueling include:

1. Establishment of a designated fuel dispensation area on the project site away from water or at an alternate site.
2. Installation of floating docks or stationary skids to provide a more stable platform to prevent rocking during fueling in order to prevent spills.
3. Topping off practices when fueling will be discouraged. Tanks should not be filled beyond 95%. Impervious fire-proof containment trays should be used when filling small cans to contain any possible spills. Easy to read signs will be posted at the fueling station to explain proper fueling procedures.
4. To prevent overflow spills, automatic back pressure shut-off nozzles will be installed on the fuel pump discharge hoses. Fuel nozzle triggers that are used to hold the nozzle open without being held will be removed if automatic shut-offs are not available.
5. Secondary containment, such as drain pans, will always be used during fueling in the event of a fuel spill or leak.
6. The fueling system will be briefly inspected daily and thoroughly inspected once a week by fuel attendant(s) for leaks and overall soundness.
7. All spent fluids will be collected for either storage or recycling.
8. Absorbent materials, such as pads and booms, will be readily available at the fueling station in clearly identified containers in the event of a spill. Used absorbent materials will be disposed of off-site by a licensed company. The spill response container will also contain fire extinguishers, a copy of the Spill Response Plan, and the emergency contact list. This container will be clearly marked and easily accessible in order to quickly react to any potential spills. An inventory of equipment will be taken monthly or after use and a list of items needing replacement will be submitted for purchasing immediately.
9. The components of the spill response plan (see Appendix J) include who to notify when a spill occurs, immediate spill response actions, a contact list for response communications, a response chain-of-command in the Port, an inventory of spill response equipment and its location. Easy-to-read signs will be posted at the fueling station informing attendants and other users what to do to contain fuel and oil in the event of a spill. Signs will also include a “No Smoking” sign to avoid risk of explosion.
10. All appropriate construction staff should be trained at least bi-annually in proper fueling, proper maintenance techniques, and the implementation of the spill response plan.

8.7 Sewage and wastewater management

Sewage generated by portable toilets during construction shall be pumped away and disposed of at DEHS-approved facility by a specialist subcontractor. The maximum number of employees will be 109 for all locations within the project, including Prince George Wharf, Stock Yard and barges. Of the 109 employees, 80 will be working day shifts and 29 will be working night shifts.

The following number of toilets will be stationed in the respective locations, which satisfy OSHA and ILO toilet per staff ratio:

- Main Office Building - 3
- Prince George Wharf - 5
- Stock Yard - 3
- Barges - 2 each
- Tug Boat - for own Crew

Waste oil shall be collected in a dedicated oil container then delivered offsite by a local waste management company for disposal and recycling.

There will be no drainage of sewage or wastewater to the sea or any natural waterbodies on or near the project site at any time. All activities related to sewage and wastewater management will be subject to approval of respective Government agencies, inclusive of the Water and Sewerage Corporation and the Department of Environmental Health Services. Additionally, any activities that are planned to be undertaken with respect to sewage and wastewater handling, treatment and/or disposal will be communicated to the Department of Environmental Planning and Protection (DEPP) for their review prior to activities being undertaken.

Handling of wastewater/sewage will be managed differently in 2 separate scenarios:

1. Marine
2. Land

Marine:

Marine operations include tug boat and barges.

- **Tug Boat:** Tug boat has its own fixed sewage tank; the sewage will be directly vacuumed from the tank to the certified project waste handler's vacuum truck at the stock yard.
- **Barges:** The wastewater that will be generated from the toilets will be pumped into a sewage tank that will be stationed on the barges. The sewage tanks on the barges

will be transferred onto the land when they are full and ready for emptying. Once the tank is transferred to land, the certified project waste handler will come to the project site with its vacuum truck and empty the tank. The empty tank will be transferred again and stationed on the barge. Both barges will be equipped with an additional backup sewage tank in case of emergencies or the initial tank not being able to be transferred onto the land (because of delays or malfunction of pumping equipment). These operations will be carried out at ENKA stock yard.

Land:
The wastewater that will be generated will be directly pumped into the existing city sewer system. A separate sewage tank will be in place as a backup in case of failure or emergency cases.

There will be no drainage of sewage or wastewater to the sea or any natural waterbodies on or near the project site at any time.

8.8 Solid waste management

For the construction phase of the project, all waste that will be generated in the project will be managed according to Project Waste Management Plan. Accordingly, all waste will be collected, segregated and temporarily stored until the certified project waste handler comes and collects for disposal. There will no waste disposal or incineration within the project premises.

On Land:
Non-hazardous waste will be transferred to designated waste area where it will be segregated according to local applications, into 2 categories:

- Domestic Waste
- Construction Waste

Hazardous waste, such as thinner, oil-based paints, waste batteries, flammable liquids and the like will be collected, transferred and stored in containers within the project hazardous waste storage area.

On Barges:
Only non-hazardous domestic waste will be generated on the barges. Accordingly, they will be stored in domestic waste containers that are fitted with tires and lifting points for easy transfer to land, where they will be emptied into the domestic waste containers.

A registry of all waste which is removed from the site will be kept on site and made available to Government officers when requested during inspections. Monthly monitoring reports submitted to DEPP will also contain a copy of the waste registry for that month.

8.9 Hazardous waste management

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

During construction, temporary storage facilities at the project site for hazardous waste will have disposal containers that are covered, made of inflammable material, sealed to prevent leaking, and positioned on an impervious surface as far from any water as possible. Secondary containment for all disposal containers should be 110 per cent of the maximum volume of the container. Temporary storage facilities will be inspected at least once a day by appropriate staff to check for leaky containers. Appropriate spill containment and clean-up equipment will be easily accessible near hazardous waste storage facilities.

Disposal of all hazardous waste utilized or generated during construction will occur offsite by a licensed contractor at a licensed facility as per DEHS requirements.

A Hazardous Material Management Plan is provided at Appendix K.

8.10 Erosion control

During construction, necessary mitigation measures will be implemented around the project site and near the shoreline to reduce sediment runoff and turbidity, particularly during rainy periods, into nearby waters. Some examples of possible mitigation measures are provided below in Figures 8-3 through 8-5. More detail on possible turbidity control methodologies is included in Appendix I.

Figure 8-3: Example of silt fence

Figure 8-4: Example of sand bag use

Baseline turbidity levels will be documented prior to the commencement of dredging in the marine environment. During active dredging, a number of methodologies are being considered to control turbidity. These methodologies include turbidity booms, weighted silt curtains, bubble screens and geotubes.

Turbidity levels will be monitored on a daily basis during active dredging. If turbidity exceeds 29 NTU above natural levels, dredging will be stopped until sediments have settled before dredging can commence again.

Figure 8-5: Example of silt curtain

8.11 Stormwater management

Port design should maximize pervious surfaces, such as vegetated areas, to reduce the quantity of stormwater runoff. Stormwater will be maintained on site during operation

through the use of swales and holding ponds prior to discharge into disposal wells, which will be cased to 40 – 50 feet.

Under no circumstances will stormwater runoff be routed directly to surface waters, including the Port basin or inland waterways.

8.12 Stockpile and traffic management

Soils at the site, haul roads and other areas disturbed by ENKA's construction and materials stockpiled for the project will be treated with water sprinkling or covered to control dust.

Dredged material and excavated spoils will be utilized on site for land reclamation and grading. The estimated total dredged material is 148,010 cubic yards (CY) and the estimated total overdredge is 24,389 CY. The estimated total fill area is 187,305 CY.

Expansion of the Port will result in an increase in commercial traffic (mainly large trucks) to and from the facility. Trucks hauling materials will be covered. ENKA will inspect all vehicles for dirt prior to their leaving the construction site. Dirt, soil and rubble likely to be dislodged during transit will be removed from trucks and other vehicles prior to leaving site either through construction of a wheel wash or vehicle wash down area near the site exit.

Traffic management on the site will include:

- Designated haul routes for commercial vehicles;
- Maintenance of low speeds for driving on site;
- Traffic control on site and on the road directly in front of the project site during times of heavy commercial vehicle and/or heavy equipment traffic to prevent accidents with private vehicles;
- Wheel wash or vehicle wash down are near/at site exit;
- Regular cleaning of roads;
- Securing the site (e.g. fencing) to prevent pedestrians, particularly children, from traversing the site;
- Ensuring all workers wear high visibility vests so that drivers of commercial vehicles and heavy equipment can see them; and
- Training all workers in traffic hazards on site in an effort to avoid injury and loss of life.

Pedestrian routes will be established on the site to provide safe access to and from the parking, lay down, and work areas for employees. Pedestrian-only areas – from which vehicles are completely excluded – will be established where necessary. These pedestrian routes will:

- Be located a reasonable distance away from areas of vehicle activity.
- Be clearly separated from vehicle routes with barricades, or other suitable means, excluding flagging.
- Be wide enough to safely accommodate the volume of employees likely to use them during peak times.
- Be free from obstructions and have safe and even footing.
- Be clearly signed.
- Provide safe crossings.

Additionally, green roads for tourists and any civil pedestrians that may need to use the piers and connecting structures will be established, depending on the ongoing work activities and their locations. Flagmen will be stationed to ensure no civil pedestrian enters the worksite. All vehicle routes will be designed to avoid pedestrian routes as possible. Vehicles routes that will be open for common use will be managed under controlled traffic, with the utilization of flagmen.

Primary vehicle routes will be set up to handle the most common vehicle movements, such as deliveries and the movement of heavy equipment to and from the work areas/site. Vehicle routes will:

- Provide separation from pedestrians
- Minimize the need for reversing operations through use of one-way systems and turning points;
- Have firm surfaces, adequate drainage, and appropriate profiles to allow for safe movement;
- Have an aptitude toward the task to be assigned;
- Avoid hazards such as excavations, edges of structures, and fuel and chemical storage areas;
- Be clearly signed with hazard warnings to pedestrians and drivers, reminders of safe work practices, and directions to secure routes;
- Indicate speed limits and speed control measures specific to site conditions.

Where vehicle routes cannot avoid proximity to hazardous conditions and construction vehicle operations, additional measures will be taken to reduce and control the risks. During construction operations, if any vehicle is required to collect any waste from the incoming cruise ships, they will be guided through the site by ENKA personnel and flagmen to reach their destination.

Mitigation for marine traffic impacts included relocation of the route of the dredge pipe so as not to impeded smaller tour boats. Cruise ships will be accommodated during the

dredging and land reclamation activities through strategic scheduling. They will dock at the remaining berths not impacted by the respective construction activity underway at the time of their scheduled arrival.

NCP is currently in negotiations with management of the Kelly Dock and adjacent properties to facilitate temporary relocation of the remaining ferry boat operators. It is not anticipated that these operators will be displaced for a long period during construction.

Boaters in neighbouring communities (e.g. Paradise Island) will be given advance notice prior to the commencement of dredging in order to prevent user conflicts.

8.13 Climate change adaptation

A vulnerability assessment was completed by Atametrics Ltd (see Figure 8-6). It identified flood-prone areas of the project site. Climate change adaptation will involve reducing the impact of flooding on the site due to heavy rainfall through stormwater management.

Port design will maximize pervious surfaces, such as vegetated areas, to reduce the quantity of stormwater runoff. Once the port is operational, stormwater will be maintained on site through the use of swales and holding ponds prior to discharge into disposal wells, which be cased to 40 – 50 feet.

Current methodology for the reclamation area will not cause any flooding. The elevation of Woodes Rodgers Walk from the mean sea level differs from 4’ to 5’ according to the tide. For the regrading activitiy, dredged material will be pushed into the reclamation area in a controlled manner to not cause any changes in water flow patterns. The material will then be compacted by vibro densification method up to an elevation of +3.5’ from the mean sea level. Therefore, no water runoff or flooding of the neighbouring areas will take place.

Figure 8-6: Flood-prone areas on current site

Source: Atametrics, 2019

8.14 Public awareness and communication

Prior to construction commencing, there will be a series of consultations through online discussions with neighbouring businesses. These consultations will provide an opportunity for these stakeholders to be informed about what is planned, to ask questions and to highlight issues that they may feel need to be addressed. Every effort will be made to engage those working in close proximity to the project site as they will be most impacted by project activities. Outreach will be through television, newspaper and radio announcements as well as the project's website to inform the public about the project and inform them of mechanisms by which they can participate in dialogue with project staff.

Once construction commences, the public will be advised of instances of inconvenience or disturbance, such as changes to traffic routes and times of excessive noise per the mechanisms described above. Signage will also be utilized on and near the site to advise of things, such as traffic diversions and active construction areas. At least one sign needs to include information about the onsite contractor inclusive of a telephone number and email address for contacting them. Contact information will also be provided for DEHS, DEPP and Ministry of Works. Examples of other signage on site are provided below in Figure 8-7.

Figure 8-7: Signage for Project Construction Site

The public, especially neighbouring businesses, must be informed of the mechanism for reporting concerns or problems and this mechanism must be easily accessible and responsive. Options for this mechanism include a telephone hotline, website or contact person. When concerns are communicated, they will be acknowledged within 24 hours and resolved within 48 hours, when feasible. If it is not feasible to resolve a matter within 48 hours, persons will be advised of this and regularly updated on progress in addressing their concerns.

The complaints form in Appendix O or a similar version will be used to record any complaints received about the project. All complaints will be recorded, including:

- Date of complaint;
- Complainant (name and contact information);
- Nature of problem including location;
- Time;
- Number, gender and age of people impacted; and
- Costs associated with the problem or incident, if possible (e.g. cost of doctor's visit and medication; cost of repair to vehicle or third-party property, etc.)

Completed complaint forms will be included in monthly reporting to DEPP.

8.15 Procedure for wildlife discovery

During construction, wildlife may be encountered during marine and landside works. Wildlife may include marine mammals (e.g. dolphins and manatees), marine turtles, sharks, snakes, lizards, frogs and birds. These procedures outline what steps should be taken by construction staff should they encounter any wildlife on site. It is important to note that the safest course of action when encountering wildlife is to do nothing and simply wait for the animal to move away. Most animals are not aggressive unless they feel threatened.

- **Feeding** – No animals should be fed under any circumstances. Providing animals with human food (e.g. chips, candy) can harm them. Food should not be left out in the open around the site where it might attract animals.

- **Disturbing nests** – Workers should not damage or attempt to move nests or eggs if they are found on site. If nests or eggs are found, the HSSE Manager or Environmental Monitor should be notified so that they can contact the Bahamas National Trust for guidance. The contact information for BNT is 393-1317.
- **Disturbing young or juveniles** – Workers should not interfere with or harm young or juvenile animals if they are encountered on site. If young animals are found on site, the HSSE Manager or Environmental Monitor should be notified so they can contact the relevant agency.

  With some young, the parents are usually close by and may attack if the young are threatened. A human approaching, touching or picking up young can be perceived as a threat. If a young animal is observed alone for more than two hours, the following agencies can be contacted:
  - Animal Control Unit 325-1173
  - Bahamas National Trust 393-1317
  - Department of Marine Resources 393-1777
- **Disturbing adult wildlife** – Workers should not interfere with or harm adult animals if they are encountered on site. Usually the animal will move away if it is left alone. If workers feel threatened by an animal, such as a snake, they should contact the HSSE Manager or Environmental Monitor who can contact the relevant agency for assistance. Agencies involved in safe wildlife removal include the Animal Control Unit and the Bahamas National Trust.
- **Entanglement** – Entanglement is a particular risk for marine animals (e.g. dolphins, manatees, marine turtles and sharks). If an animal becomes entangled in construction equipment in the marine environment, it is critical to free the animal as quickly as possible. In the event of a such an incident, the HSSE Manager or Environmental Monitor should be notified immediately so they can quickly make contact with the Department of Marine Resources for assistance. Some marine wildlife, such as dolphins, manatees and marine turtles, need to be able to surface periodically so that they can breathe and will actually drown if trapped underwater.
- **Hunting and fishing** – No hunting or fishing will be allowed on site whether landside or marine.
- **Injury or death** – If wildlife is injured on site, whether it is self-inflicted or by accident, the HSSE Manager or Environmental Monitor should be contacted immediately so they can quickly make contact with the relevant agency for assistance in treating the injured animal. If wildlife is killed on site, whether self-inflicted or by accident, the HSSE Manager or Environmental Monitor should be contacted immediately so they can document the incident for inclusion in their monthly environmental reports. If the wildlife is an endangered or threatened species, the

Bahamas National Trust should be contacted as they may want to collect and preserve the animal or document the death.

- **Human injury from wildlife encounter** – If a staff member or subcontractor is injured on site because of an encounter with wildlife, immediate first aid treatment should be sought as some scratches and bites can result in infection or disease transmission. Evaluation during first aid treatment will determine whether further medical treatment is necessary.

9.0 Health and Safety - Construction

ENKA's Health and Safety protocols focus on twelve life critical requirements for construction activities. These requirements are described in Table 9-1. Compliance with life critical requirements is mandatory.

Table 9-1: Life Critical Requirements for Construction Activities

	Life Critical Requirement	Actions
1	Simultaneous activities	• Prioritize the activities to ensure safe system of work. • If not practicable, ensure that required precautionary measures are put in place in order to manage dangerous intersections or unidentified risks which may arise afterwards.
2	Driving	• Consider applying safe driving practices as your responsibility. • Never drive or work under the influence of drugs and alcohol. • Never exceed speed limits both on site and off site.
3	Working height	• Never work at height without fall protection. • Use and install fall arrest systems as in compliance with manufacturer's instructions and recommendations. • Provide sufficient training, instruction, supervision and maintenance. • Only certified scaffolders shall be permitted to make modifications, erect and dismantle temporary elevated platforms. • Secure hand tools and remove all loose materials from edges to minimize risk of falling objects.
4	Elevated work platforms	• Operate only in accordance with the written instructions of the manufacturer. • Never operate elevated work platform if you are not authorized to. • Never use elevated work platforms without valid inspection.
5	Floor openings	• Prevent personnel from falling through unprotected openings such as grating holes, shafts and manholes. • Obtain permit to work (PTW) to open and close such openings in a controlled manner under the supervision of responsible persons. • Cover openings and/or install guardrails in the surrounding area.
6	Machine guarding	• Never remove guards of machinery and hand tools. • Follow manufacturer's instructions and recommendations without making any unauthorized modifications. • Provide adequate maintenance.

	Life Critical Requirement	Actions
7	Mobile Equipment & People Interface (MEPI)	• Provide accessible, well-lit and designated separate routes for pedestrians to prevent interface with mobile plant and equipment. • Maintain continuous monitoring, assign trained flagmen in the vicinity of mobile equipment and plants when required. • Never use any mobile equipment unless adequate maintenance is provided. • Assign only authorized persons to operate mobile plant and equipment. • Never use mobile plant and equipment if it is unsafe.
8	Excavation	• Prior to any excavation, always obtain PTW to proceed safely. • Ensure that buried services are identified and marked on the drawings included in the PTW. • Excavations and trenches shall be sloped, benched or supported with manufacture shoring systems, based on soil classifications.
9	Rigging, lifting operations & suspended platforms	• Never stand under a suspended load. • Consider all lifting operations critical if and when a person is lifted. • Permit only authorized people to carry out lifting operations under the conditions of issued PTW. • Take ground conditions, adjacent structures and simultaneous activities into account at all times. • Lifting accessories and appliances shall be used as per related standards and manufacturer's recommendations. • Never use equipment, such as scaffolding materials, pipes or objects with sharp edges, for lifting and rigging operations.
10	Lock-Out/Tag-Out (LOTO)	• Ensure that all energy sources are properly isolated prior to commencement of work. • Obtain PTW, follow LOTO procedures and conduct Safety Task Analysis and Risk Reduction Talk (STARRT) to safely complete task. • Do not remove and/or tamper with locks and tags if you are not authorized. • Eliminate all residual/stored energy prior to work.
11	Confined space	• Never initiate any work in the areas defined as confined space without relevant training and authorization. • Obtain PTW. • Test the atmosphere. • Assign watcher and provide effective communication methods with entrants.

	Life Critical Requirement	Actions
		• Provide continuous supervision. • Develop a rescue plan and ensure it is operational.
12	Barricades	• Obey all signs, barricades and other safety warnings. • Do not remove or override any existing guards and/or barricades without authorization.

Stop work authority

All ENKA personnel have the authority to and are encouraged to stop any work that they believe there is an imminent danger, and to intervene and stop others from working in an unsafe manner. No personnel shall be punished or retaliated for stopping work that is being carried out with an imminent danger. All stopped work activities shall be reported to the relevant Site Supervisor and HSSE team.

Job Hazard Analysis

A Job Hazard Analysis (JHA) is a written analysis of a work activity developed to determine how to perform the job safely. Supervisors must complete a JHA for each major scheduled work activity, before the work activity begins. The JHA shall list each step of the job and the hazards involved in each step. It must include safe procedures and appropriate preventive measures to prevent a fatality, injury, or other incident for each step/hazard identified.

If any scope in the JHA changes, work must stop and a new JHA shall be initiated. The JHA enables supervisors to give accurate instructions to first line supervisors for each job to be performed during a work shift.

Method Statements

Method Statements (MSs) are used on the project to:

- Outline a safe method of work for a specific job;
- Provide an induction document that workers must read and understand before starting a job;
- Document hazard identification and control measures;
- Program work, materials, time, staff, and to anticipate possible problems; and
- Use as a tool in quality assurance

Health, safety and environmental requirements will be described in MSs and JHAs will be attached. Project HSSE Manager shall check the defined requirements and approve MSs.

Safety Task Analysis Risk Reduction Talk

Supervisors will establish employee involvement in the Safety Task Analysis and Risk Reduction Talk (STARRT) daily before any work commences. STARRT process will be conducted where the works will progress and following the toolbox talk.

All craft are required to participate in an individual STARRT review prior to the start of each shift and for each new task. Daily toolbox topics will be conducted within the STARRT. The daily (pre-work) STARRT briefing is the final checkpoint for verifying the safety preparedness of the crew at the site. As such, the discussion must verify that:

- Tools and machinery brought to the work area are in good condition and, where necessary, properly equipped with safeguards;
- System configuration is safe to perform work scope;
- Atmospheric monitors, respiratory protection, and other personal protective equipment brought to the site is operable and in good condition; and
- The necessary first aid or medical provisions are available (e.g. emergency call numbers known to crew).

Permit to Work

A Permit to Work (PTW) shall provide information inclusive of precautions and site preparations to be taken, personal protective equipment to be used, scope of work to be performed, personnel to perform the work, and persons who will approve such scope of work to be performed.

Protective Personal Equipment (PPE)

Workers will be required to wear personal protective equipment (PPE) appropriate to each task. Workers shall be provided (at no cost to them) with the appropriate PPE for their job. All PPE purchased shall be 'CE' (Conformity of Europe) marked and comply with the requirements of international regulations.

The minimum PPE to be provided shall include:

- Hard hat compliant with EN 397 (impact protection)
- Safety glasses (EN 166)
- Safety shoes with steel toe-caps (EN 20345)
- Long-sleeved coveralls (EN 340) or 100% cotton with reflective strips
- Ear plugs
- Gloves (specification depending on the tasks to be performed)
- Life jackets (EN 12402) when working offshore or near water and during vessel.
- Additional PPE requirements, e.g., fall protection, respiratory protection, face shields, shall be determined by the nature of the individual work activities and as specified on the MSs and JHAs.

Smoking policy

Smoking is only allowed in the designated areas on site, outside offices and outdoors in the camp area. Smoking in rooms, offices, vehicles and similarly confined areas is strictly prohibited. To smoke in non-smoking areas and to put smoke detectors out of operation (e.g. by covering or taking the batteries out) is strictly prohibited.

Due to the nature of work on this project, two other areas are important to note – fatigue and working on night shifts:

1. Fatigue - The major factors contributing to and increasing the risk of fatigue involve:

- Work schedules (shift work, night work, and hours of work, breaks which limit the time workers can physically and mentally recover from work)
- Job demands (concentrating for extended periods of time, performing repetitious or monotonous work and performing work requiring continued physical effort)
- Sleep – length of sleep time, quality of sleep and time since sleep
- Environmental conditions (heat, cold, vibration or noisy workplaces)
- Non-work factors (lifestyle, family responsibilities and health; examples of health factors include insomnia, sleep apnea, some medication)

Determining measures to address worker fatigue involve assessing cause of fatigue and then selecting appropriate control measure. Measures may include changing shift times and rotation to allow longer periods for recovery or sleep and workers seeking medical treatment if fatigue is health-related.

2. Working on night shifts – Working at night requires additional measures not necessarily required for working during the day. Such measures may include:

- Preparing risk assessments for the tasks to be performed in hours of darkness.
- Construction team ensuring that the adequate level of supervision is arranged for the task.
- Notifying necessary departments, such as HSSE, transportation, Medical Team and Canteen, in advance to ensure preparations are completed for the task.
- Project HSSE Manager ensuring that adequate level of HSSE supervision is arranged for the task.
- Adequate level of lighting is arranged for the task to prevent shadows and dark spots.

9.1 Health and safety training

The HSSE Manager will establish a training plan describing the health and safety specific training and education requirements relevant for personnel on the project. The plan will include a training matrix identifying the required minimum training by position to support the implementation of the project health and safety program and procedures. Training will be delivered by an appropriately qualified trainer. Modules will include, but not be limited to:

- General health and safety orientation
- Risk assessment and hazard identification
- First aid
- Wearing and using PPE
- Hazardous chemicals communication
- Working at heights
- Confined space entry
- Fall prevention and protection
- Emergency response
- COVID-19 Emergency Orders and associated work requirements

Personnel shall receive the necessary training regarding JHA and STARRT during the new employee orientation. Supervisors shall receive more in-depth training during the Supervisors' Induction regarding the JHA and STARRT processes.

All new staff will participate in site-specific induction training delivered by the HSSE Manager or Environmental Monitor. The training should cover issues inclusive of legislation, regulations, environmental management, staff duties and responsibilities, mitigation measures and the EMP. Training will culminate in testing of staff's knowledge on HSSE issues.

There will also be daily staff talks (also referred to as Toolbox talks). All staff should be required to attend. Topics will include, but not be limited to:

- Proposed work activities
- Activities required for the safe completion of work
- PPE requirements
- Incidents or hazards that have occurred on or off the project site, including near misses
- Individual concerns of employees

The monthly monitoring report to DEPP needs to include a record of staff who have undergone orientation training (see form below to be completed).

Site induction form			
Employee name:		Position/job title:	
Employment start date:		Supervisor/manager:	

Health and safety

I have been shown:

☐ How to do my job safely, including the use of guards and other safety equipment
☐ The safety signs and what they mean
☐ How to safely use, store and maintain safety equipment
☐ How to safely use, store and maintain equipment, machinery, tools and hazardous substances

I know:

☐ My responsibilities as an employee
☐ Where EMP and HSE information is kept

Hazards

I know:

☐ The hazards in my workplace
☐ The controls for these hazards
☐ How to report hazards
☐ Where records of hazards are kept
☐ The procedures for working safely

Emergencies

I am familiar with:

☐ The location to assemble at in the event of an emergency
☐ The location of the fire extinguishers
☐ The evacuation procedure
☐ The first-aid kit and its location
☐ Who can provide first-aid (if applicable)

Incidents and injuries

I know:

☐ To report injuries, near hits and misses and early signs of discomfort and how to report them
☐ Where incident/injury forms are kept

☐ Who I report to
☐ Reports will be investigated and I will be informed of the results

Accidents and Spills

I know:

☐ To report accidents and spills and how to report them
☐ The petroleum spill kit and its location
☐ Where accident/spill forms are kept
☐ Who I report to
☐ Reports will be investigated and I will be informed of the results

Signed by employee:		Date:	
Signed by trainer:		Date:	

The project site will be equipped to respond to sea-based emergencies, such as lifesaving. There will be adequate and well-displayed signs posted about lifesaving equipment at the site. The following water safety guidelines will be followed:

a) A person who falls in the water will be able to get up and out of the water (e.g., via rope or ladder).
b) The required lifesaving equipment on the project site must at least include the presence of lifebuoys and ladders.
c) Lifesaving equipment must be available 24 hours a day on the site and their location will be clearly indicated with signage on the site.

There will be adequate and visible signage posted about first aid and fire-fighting equipment on the project site. Safety precautions and information must also be posted at both areas. The following first aid and fire safety guidelines will be followed:

a) The fire-fighting equipment on the site must at least include the presence of fire extinguishers, but could also include water hoses and fire carpets.
b) The fire-fighting equipment must be easily identified and accessible 24 hours a day throughout the operational season and indicated with signage on the site.
c) Fire extinguishers must be present at the fueling stations, near hazardous waste storage facilities and at locations where high temperature work is going on.
d) First aid equipment must be present on the site.
e) Public or emergency telephones at or very near the site must also be available 24 hours a day.

9.2 Security

The construction site will have at least one security guard posted at the main entrance to ensure site protocols are followed with respect to safe access, appropriate PPE and COVID-19 screening.

The site will be fenced off to prevent unauthorized persons from accessing or traversing the site.

9.3 Hurricane preparedness plan for construction

The purpose of the construction Hurricane Preparedness and Response Plan is to identify the actions that will be taken to reduce or eliminate long-term risk to people and property and respond to natural disasters in the form of tropical storms, hurricanes, and coastal flooding. Project management should ensure that all staff are knowledgeable and equipped to execute the Hurricane Preparedness and Response Plan when necessary. Preparation for hurricanes and tropical storms must be an ongoing activity at the project site during the hurricane season which occurs annually from June 1 to November 30. Staff and subcontractors should be informed well in advance of their responsibility during a storm.

Key preparation activities are outlined below.

1. **GENERATORS:** Check all generators for proper operation (change oil, test batteries, start and run, run under load, ensure plug-in receptacles in good working order).

2. **EMPLOYEE CONTACT:** Update Employee Contact List. Ensure all staff members have a copy and understand the procedures for calling in or reporting to work post-hurricane.

3. **SITE INSPECTION:** The designated Manager conducts complete site inspection no less than weekly to ensure site is free from clutter. The designated Manager should initiate and direct the removal of all excess supplies and equipment from the site.

4. **HURRICANE PLAN:** The plan should be printed and/or emailed to all staff. The designated Manager will ensure that all staff are familiar with the plan and its preparation and response procedures as well as the location of equipment and supplies necessary for preparation and response.

5. **SUPPLIES:** The designated Manager should ensure adequate supplies of tools and any equipment needed to deal with preparation and recovery are on-hand at the site (batteries/radios, gas/diesel, rain gear, bottled water).

6. **VEHICLES & HEAVY EQUIPMENT:** All vehicles (including trucks and cars) and heavy equipment should be in good working order and have fuel topped off and/or batteries charged. Staff should understand the procedures for relocating/securing any portable equipment to designated safe areas.

GENERAL

A. Objective:

To provide clear and concise procedures for staff to follow in the event of a hurricane or tropical storm. To manage, maintain security, and control the operation of site during an announced emergency situation.

B. Background:

The project site may not be a safe location during a hurricane or tropical storm, depending on the direction and strength of the storm. It is highly recommended that vehicles, heavy equipment, portable equipment and supplies be relocated well in advance to safer locations in order to protect them and neighbouring residents from damage of flying debris from construction activities at the project site. The following procedures will enhance the project's ability to protect the lives and property of staff and neighbouring businesses and homes, and safeguard facilities.

C. Preparation:

Every designated manager should have an individual Hurricane Plan, designed specifically for their area of responsibility. This Plan should include the location of alternate storage for their vehicles and equipment; a checklist of key procedures to be followed to prepare for a storm; and necessary gear and supplies to help secure their area of responsibility on short notice.

The management team should designate an Operating Post for the coordination of operations, communication, and emergency response. All staff shall be familiar with the emergency procedures.

HURRICANE ACTION PLAN

D. Hurricane Watch

1) All staff are required to know by definition the status of a weather emergency as differentiated between a Hurricane Advisory, Watch, Warning, etc.

2) All staff will be prepared to respond when called upon to report to work. Proper planning will ensure that personnel needs are met, while still meeting the need to respond to an emergency situation at the project site.

3) At designated staging areas, all emergency equipment and supplies (i.e. pumps, generators, vehicles, etc.) are to be at full operational capacity and ready to move. Batteries are fully charged; rain gear and other safety equipment stocked and in full working order.

4) At the Operating Post, the information cycle is started – the designated Manager shall contact the relevant local hurricane preparedness agencies (i.e. NEMA) and verify contact information. The Operating Post will communicate with staff – directly, by voice announcement, by posted notice, by phone, and/or by passing the word - the proposed order of an evacuation plan.

5) All trash and debris will be removed from containers to prepare those containers for receiving additional trash. Parking and common areas should be checked for removal of unnecessary equipment and materials.

6) Notification is made to other personnel/subcontractors if there is need to relocate any vehicles, equipment (including dredger), or property. Staff are designated at the facility to handle the safeguarding, evacuation, or relocation of the above.

7) Commence securing buildings, trailers, vehicles, heavy equipment and other property. Barges and dredging equipment may need to be relocated to a safer port. Only basic site accesses are left open.

8) Staff should report essential information to the designated Manager and receive instruction as to communications, controls, phone numbers, etc.

9) The designated Manager should rotate staff home to address personal needs. Some staff members will be required to report back to work, scheduled in selected groups at selected locations, for continuing emergency operations. It is imperative that staff report to work as instructed.

E. Hurricane Warning

1) All off-duty staff must respond immediately and report to work if requested to do so. Personal needs should now have been met and all available personnel will be meeting the need for necessary emergency work at the site.

2) Emergency equipment and supplies are positioned to be mobilized for fast use. Access roads are cleared of movable objects, garbage, and debris. Loose items that cannot be removed are secured, tied down, etc.

3) Keep vehicle traffic flowing in a smooth and orderly fashion.

4) Complete securing site and equipment. Finish safeguarding property from flood areas and secure areas once completed.

F. Site Evacuation

1) Upon local directive, site is secured and evacuated. Off-duty staff are dismissed, with instruction to establish contact with the designated Manager as soon as possible after the storm for instruction. The site will be shut down for the duration of the emergency. Begin planning for "after the storm" action.

9.4 Emergency preparedness

Emergencies associated with the project may include fires, explosions, storms, accidents and malfunctions. The Emergency Response Plan is detailed in Appendix L.

9.5 COVID-19

The guidance provided under the Bahamas Emergency Powers (COVID-19 Pandemic) Order 2020 and from the Ministry of Health will be adhered to as follows:

1. Construction companies are allowed to operate between the hours of 7 am to 5 pm (Monday to Friday) and 7 am to 1 pm (Saturday). ENKA will seek an exemption to these time restrictions as their schedule requires shifts spanning 24 hours per day.
2. A distance of six (6) feet between individuals will be maintained.
3. Each individual will wear a mask covering their nose and mouth.
4. Hands will be washed frequently with soap and water. If running water and soap are not available, an alcohol-based hand sanitizer will be applied regularly.
5. If you have to sneeze or cough, do so into your elbow or a tissue. If you use a tissue, discard the tissue into a closed bin and immediately clean your hands with soap and water or an alcohol-based hand sanitizer.
6. Disinfect equipment or surfaces that are touched frequently.
7. If an individual experiences the following symptoms, he/she will stay home from work and contact the Ministry of Health or a medical doctor for guidance on medical treatment and testing:
    a. Fever (temperature of 100.4°F or higher)
    b. Chills
    c. Cough
    d. Shortness of breath or difficulty breathing

e. Fatigue
f. Muscle or body aches
g. Headache
h. Loss of taste or smell
i. Sore throat
j. Congestion or runny nose
k. Nausea or vomiting
l. Diarrhea

Body temperatures of all persons (employees, suppliers, visitors, etc.) who wish to enter the project site will be measured prior to entry. Those with a body temperature exceeding 37.5 °C (99.5 °F) shall be recorded and not be allowed to enter the project site.

A copy of the current Emergency Orders can be found at in Appendix M.

10.0 Environmental Education and Outreach

Environmental education and outreach should increase sensitivity and concern about environmental issues and stimulate environmentally responsible behaviours. Environmental education and outreach programs will introduce staff, customers and the local community to the value of adjacent ecological communities as well as the challenges they face in small island environments. These programs will also introduce persons to the role these ecological communities play in sustaining fragile island ecosystems. Proper training of staff in employing best management practices will also be an important component of environmental education and outreach.

Staff training will include the information provided in Appendix N on Education and Outreach Material as well as health and safety training per Chapter 9.0.

All construction staff will be sufficiently trained so that they can execute best management practices. Environmental stewardship concepts should be routinely reinforced through regularly scheduled practice exercises, such as spill response and first aid drills.

Environmental outreach materials about Bahamian ecosystems, namely coppice, mangrove wetlands, beaches, rocky shore, seagrass beds and coral reefs will be made available in the during staff training. Materials may include PowerPoint presentations and factsheets. Key features of these ecosystems and how to avoid negatively impacting them should be highlighted. Examples of content for environmental outreach materials are attached at Appendix N.

All new staff will participate in the environmental site-specific induction training delivered by the HSSE Manager and/or Environmental Monitor. There will be refresher training for all staff every 6 months. The training will cover a number of issues related to environmental management, including legislation, regulations, ENKA's HSSE and Green Port Policies, environmental management organizational structure, staff duties and responsibilities, mitigation measures and the Environmental Management Plan. Training will culminate in testing of staff members' knowledge on environmental management issues.

There will also be weekly employee environmental talks regarding environmental nuisance abatement and waste management. All staff will be required to attend. Topics will include, but not be limited to:

- Air pollution control;
- Water pollution;
- Wastewater treatment;
- Noise control;

- Waste reduction;
- Waste management;
- Good housekeeping practices;
- Handling of chemical waste; and
- Environmental emergency preparedness.

11.0 Monitoring and Reporting

The monitoring and reporting regime for the project will be the responsibility of the HSSE Manager in conjunction with the Environmental Monitor. Weekly environmental site inspection which will be conducted by the Environmental Monitor. These inspections will provide a means to enforce specific environmental management and pollution control measures. Site inspection observations and results will be documented in site inspection forms, which will be submitted to the Project Manager, Deputy Project Manager and HSSE Manager. A possible template for the inspection form is provided in Appendix O.

The weekly site inspection forms and other environmental issues will be compiled into a monthly report to be submitted to DEPP. It should be noted that DEPP may also conduct unannounced site inspections to ensure compliance with the EMP. The 2019 Environmental Planning and Protection Act gives DEPP the power to issue a cease and desist order for non-compliance with the conditions of the Certificate of Environmental Clearance (CEC).

If non-compliance is found during the inspection, appropriate action as per the EMP will be implemented. The inspection will not be limited to the project site, but also observations of environmental management issues and pollution control measures in areas adjacent to the project site, which are likely to be impacted, directly or indirectly, by site activities during construction.

Section 2 – Environmental Management for Operation

12.0 Environmental Policies for Operation

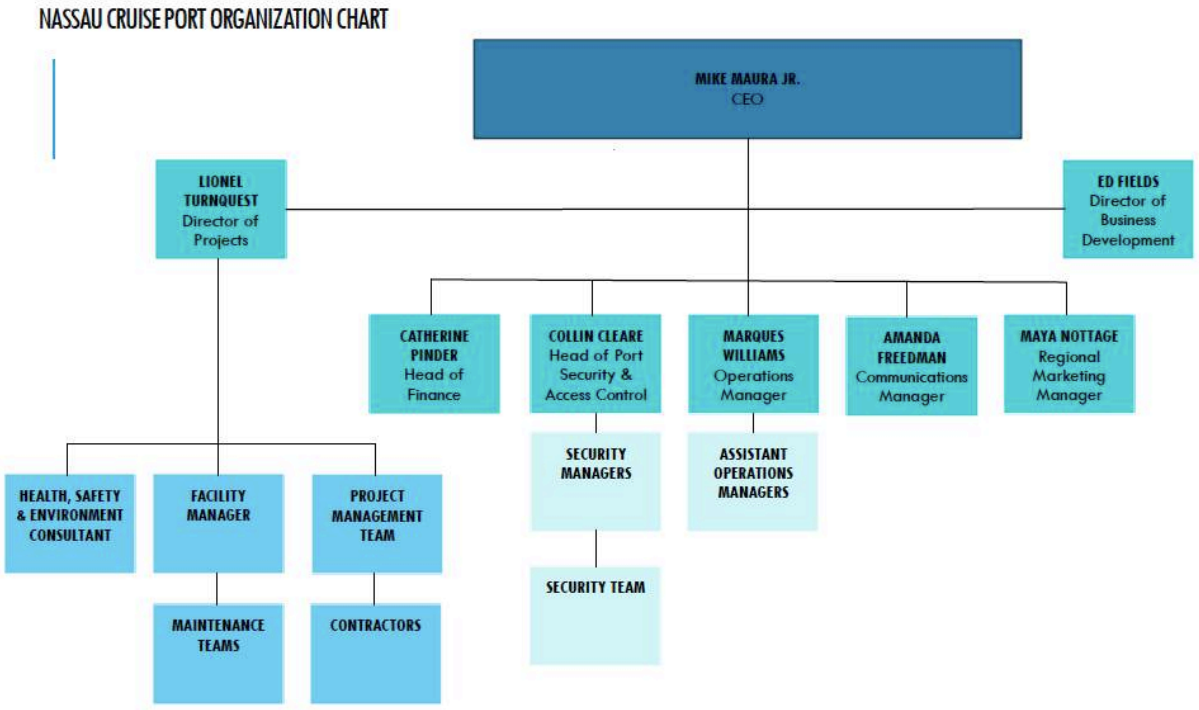
The responsibilities and duties of NCP as Port operator with respect to Health, Safety and Environment (HSE) include:

1. Taking reasonable care for staff's safety and health at work;
2. Performing all work and associated functions in a safe and environmentally responsible manner;
3. Complying with all national requirements;
4. Following all of Nassau Cruise Port Limited policies, procedures and practices;
5. Obtaining and correctly using all necessary personal protective equipment;
6. Acting to eliminate risks within the workplace and/or to report those risks that the individual cannot correct;
7. Establishing and maintaining the highest possible standards of housekeeping and cleanliness in individual work areas;
8. Reporting all incidents, complaints and improvements no matter how small;
9. Assisting with the investigation of incidents as required;
10. Strictly following all procedures for the task being performed;
11. Being familiar with emergency and evacuation procedures and the location of first aid points and equipment and fire protection facilities;
12. Using the correct tools and equipment for the job and using them safely;
13. Only using, altering or repairing tools or equipment when authorised and trained to; and
14. Ensuring that no task is performed if considered unsafe.

13.0 Operation Environmental Management Organizational Structure

The organizational structure for NCP inclusive of HSE is outlined in Figure 13-1.

Figure 13-1: NCP Organizational Structure



The details on roles and responsibilities of the HSE Consultant are provided below. The HSE Consultant will be initially engaged on a one-year contract with the option to renew for two-year terms subsequently.

13.1 HSE Consultant

The HSE Consultant is primarily responsible for the implementation of the EMP and NCP's HSE Manual. They shall act as NCP's Lead Environmental Representative. The Operations Manager (OM) which will serve as Deputy Environmental Representative. This structure ensures that at any given time, there is always an Environmental Representative present on the site to deal with environmental issues as they arise. The HSE Consultant shall serve as the key point of contact for the Department of Environmental Planning and Protection (DEPP) and other Government agencies with respect to environmental compliance functions at the Port.

The specific duties of HSE Consultant include:

1. Provides environmental technical requirements and guidance to the Director of Projects (DP), Operations Manager (OM) and other Port team members;

2. Coordinates environmental permitting requirements for the Port with the OM as required;
3. Identifies environmental issues that could become potential problems affecting operations and provides cost effective solutions;
4. Identifies mitigation needs and environmental issues to limit impacts and help confirm environmental compliance;
5. Ensures that environmental controls and materials are on-site and properly installed and maintained;
6. Coordinates environmental compliance issues and concerns with the Port management team and keeps DP and OM informed of any potential "hot issues";
7. Works with OM to track and identify any hazardous waste issues on the work site;
8. Conducts environmental awareness training for operations staff and subcontractors, and prepares training materials and guideline sheets;
9. Participate in periodic meetings with regulatory agencies to review environmental requirements and compliance;
10. Responsible for the development and revisions of the Environmental Management Plan (EMP) and other site-specific plans as required for use during operations;
11. Responsible for the implementation of NCP's operation environmental monitoring program in collaboration with the OM; and
12. Conducts monthly inspections of operation activities to review compliance with environmental requirements, permits and this EMP.

14.0 Environmental Impacts – Operation

14.1 Environmental impact significance from operation

The NCP project's impact significance matrix from construction as identified in the Environmental Impact Assessment (July 2020) is provided in Table 14-1.

The impact significance ranking key provided in the July 2020 approved EIA for the project was:

Impact Significance	Color Code
Negligible/No Impact	
Minor Impact	
Moderate Impact	
Severe Impact	
Beneficial Impact	

Table 14-1: NCP Project Impact Significance Matrix for Operation

Project Component	Impacting Factor	Physical		Coastal Processes			Biological						Socio-Econ & Cultural			
	Project Activity	Hydrology & Hydrogeology	Air Quality	Noise	Erosion & Sedimentation	Beach	Terrestrial Habitats	Marine Habitats	Birds	Terrestrial Flora	Marine Mammals	Marine Resources	Neighboring Communities	Relocation	Traffic	Economic
Operations	Amphitheatre															
	Emissions															
	Retail, Resort, Restaurants															

The impacts from operation as identified in the approved EIA for the project are detailed in the subsections that follow.

14.2 Potential positive impacts from operation

Potential positive impacts from operation include:

1. **Terrestrial invasive species will be removed during the operation phase of the project** – Through continued monitoring and maintenance by the NCP's landscaping team, the return of invasive Hawaiian Sea Lettuce will be prevented. Native plants will replace the invasive Hawaiian Sea Lettuce in the landscaping. A benefit of using native species in landscaping is it will reduce irrigation demand during operation and reduce the consumption of potable water. Native species are adapted to growing in dry arid conditions in The Bahamas. Since NCP will be connected to the Water and Sewerage Corporation, this will reduce demand on the Corporation. Another benefit of using native flora is that native flora typically attracts native fauna, which should be aesthetically pleasing for both locals and tourists using the area.
   Invasive *Rattus* sp. were abundant in the Woodes Rogers Walk, Rawson Square, and Festival Place areas. These are highly visible areas for locals and cruise ship visitors. Through consistent landscaping and waste removal, the population of rats is expected to reduce. Rats will not have large amount of debris to hide under or a significant food source to attract them. Another measure to reduce the number of rats in the area is to strategically position rat traps and remove them regularly as a part of the NCP maintenance program. This is beneficial because rats can potentially impact public heath as they can transmit diseases.
2. **Economic impact** - The project will generate wide-spread economic growth and a more competitive tourism sector through the transformation of the Port and the downtown area. The project would transform the Nassau Cruise Port into a world-class facility in a cost-effective manner, while creating jobs and driving increased economic opportunity into the community. The project structure is tailored to accommodate Bahamian interests and create an opportunity for thousands of Bahamians to be vested in the Project through BIF, an investment fund designed for Bahamians.
   The YES Foundation would support essential social programs including educational events and sports designed to assist deserving youth. According to KPMG analysis, the project would have a cumulative impact of US $15.7B from 2019 to 2049 on the Bahamian economy. It is estimated that approximately 70 permanent jobs will be created for Bahamians post-construction.

14.3 Impacts on physical resources

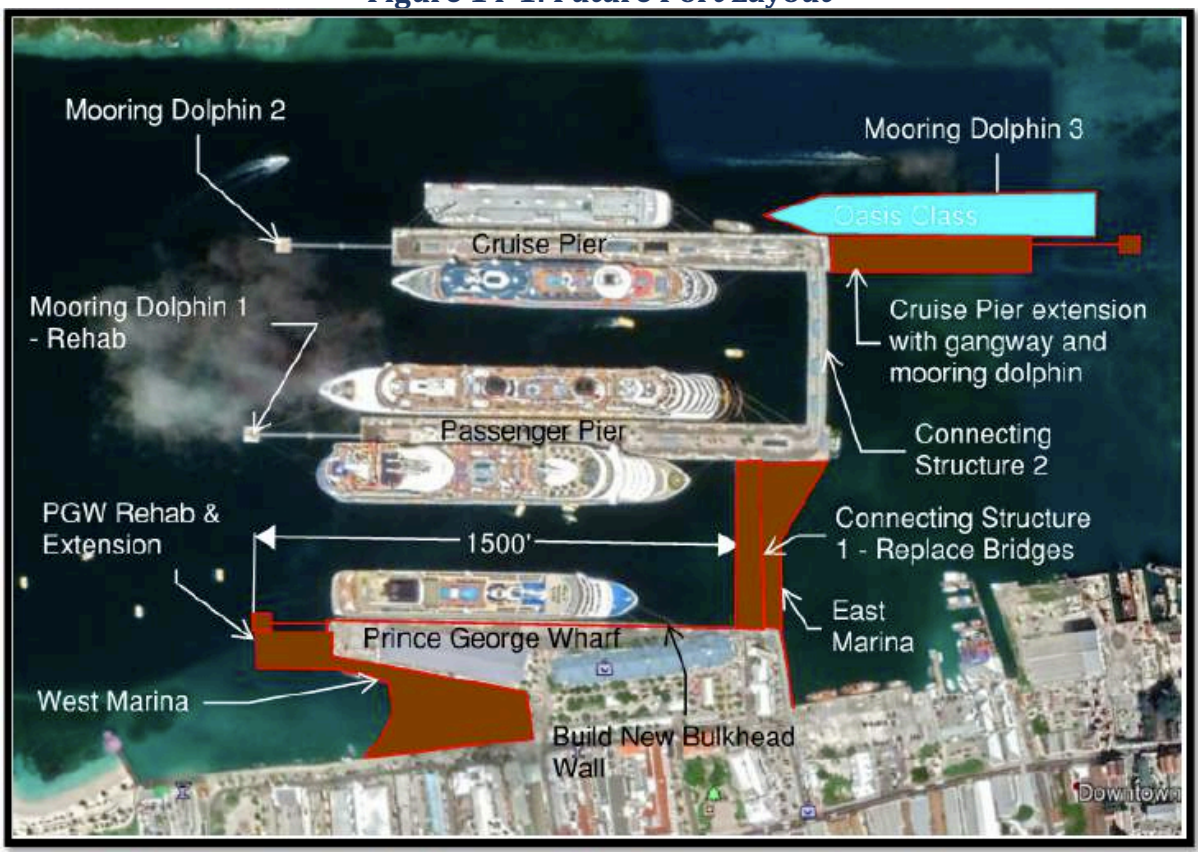
Impacts on physical resources due to operation include:

- **Deterioration of water quality due to flushing capacity** – Preliminary water quality analysis suggests the NCP site has flushing capacity. The flushing analysis results indicate that the main cruise berths will all still flush effectively and in accordance with DEPP's requirements of 90% in 24 hrs., after the Port expansion has been completed.

  The two areas of concern identified by the flushing analysis are the East and West Marinas. The flushing of these areas did not meet DEPP's requirements of 90% in 24 hrs. However, the report recommended the incorporation of culverts (connecting the East Marina to the berth to the west and connecting the West Marina to the berth to the north) into the final design of these areas will ensure that flushing will occur in accordance with DEPP's requirements. The flushing study report is provided in Appendix P of the approved EIA for the project.

  The East Marina design has been updated to an open pile structure which will have no impact on water circulation. Additionally, connecting structure 1 will remain as is dimensionally/geometrically, but the existing structures will be replaced with new structures where needed, based on the as-built survey (see Figure 14-1). The new structure will function exactly as the existing structure does presently. Culverts similar to those at connecting structure 1 will be implemented for the west marina to improve flushing times.
- **Deterioration of water and soil quality associated with oil spills and hazardous materials** - Ship repair facilities are not a component of the proposed project. A strategy to address oil spills from onshore and offshore operations are provided in Appendix J of this EMP (Spill Response Plan). While NCP does not anticipate receiving any hazardous materials at the Port, a hazardous waste management strategy is provided in this EMP as a precaution (see Appendix K).

Figure 14-1: Future Port Layout



Source: WSP, 2020.

14.4 Traffic impacts

Traffic impacts on land were assessed in the Traffic Impact Assessment (TIA) completed by Caribbean Civil Group (CCG). Traffic impacts in the marine environment were assessed in the approved 2020 EIA completed by Caribbean Coastal Services (CCS).

The CCG TIA indicated the following as localized traffic impacts of the Port operation as well as existing projects in the area and new projects planned for the area:

- Pedestrian conflicts;
- Bay and Charlotte intersection delay and conflicts increasing;
- Bay and Parliament intersection delay and conflicts increasing; and
- Bay and Elizabeth intersection delay and conflicts increasing.

Specific mitigation measures recommended for the Port are described in subsection 15.10. The TIA identified other impacts from the existing and projected uses of the Downtown area, but these require mitigation measures by other projects or the Government (in terms of policy and regulatory changes, transportation planning and traffic management changes).

With respect to marine traffic, the Port will be primarily designed for cruise ships. The largest cruise ship class to be accommodated is Oasis class (i.e. up to 1,180 ft). Secondary marine vessels which will also be serviced include yachts, service boats, tour boats, private boats and tugboats. Yachts up to 250 ft in length will be accommodated at the Yacht Berth. The marinas will accommodate vessels up to 150 ft in length.

The vessel schedule varies throughout the year for the cruise port, with the highest traffic times seen from September through May (WSP, 2020). Once the Port is operational, no marine traffic impacts are expected. Cruise ships will have scheduled berths at the renovated piers and tour boat operators will be permitted to berth at the new tour boat operator station, i.e. bridge connection between Piers 1 and 2.

14.5 Impacts on socioeconomic and cultural resources

The surrey drivers and marina operators that will be relocated may face business interruption, a negative socioeconomic impact. Business interruption refers to the loss of income due to the suspension of the business operation.

NCP is working with these stakeholders to ensure a smooth transition of operations from their current location to their permanent location within the site plan. Once in operation, vendors and other tour operators will be relocated to the designated retail, taxi and surrey location. There will be little to no long-term impact to these operators.

The cultural resources identified in Rawson Square will not be impacted by the redevelopment of the Nassau Harbour. A portion of the Woodes Rogers Walk will be transformed into a waterfront park that will attract both locals and visitors to the area.

15.0 Environmental Mitigation Strategies – Operation

A summary of the NCP's operation mitigation strategies related to its potential environmental impacts is provided in Table 15-1 below.

Implementation of mitigation strategies will be overseen by the HSE Consultant with support of the Operations Manager.

Table 15-1: Summary of NCP Project's Mitigation Strategies for Operation

Area of Project	Area of Impact	Mitigation Strategy
Marine side works	Marine habitat – Benthic and water quality	Dumping of any waste, including untreated sewage and ballast water, will be prohibited in the Port and any associated marina. Solid waste collection and waste treatment services will be provided for vessels using the Port. Any marine wildlife encountered during marine operation will involve following the procedures related to wildlife discovery as outlined in subsection 15.13. See the Appendix J Spill Response Plan and Appendix K Hazardous Waste Management Plan for mitigation measures for any potential spills in the marine environment.
	Marine habitat - Geology	No mitigation measures required.
	Marine traffic	Once the Port is operational, cruise ships will have scheduled berths at the renovated piers and tour boat operators will be permitted to berth at the new tour boat operator station, i.e. bridge connection between Piers 1 and 2.

Area of Project	Area of Impact	Mitigation Strategy
		Traffic will be managed by the Port Comptroller or Harbour Master in accordance with international safety standards.
	Air quality	All engines and equipment on site will be fully equipped with exhaust filters and undergo full maintenance regularly as well as third party inspections to ensure air quality is not impacted.
	Noise	No noise levels that are harmful are expected to be generated during operation in the marine environment.
	Socioeconomics	Approximately 70 permanent jobs will be created for Bahamians post-construction across both marine- and land-side aspects of the Port. Tour boat operators will be permitted to berth at the new tour boat operator station.
Land side works	Terrestrial resources	Protected trees will be replaced at a ratio of 2:1 at the Port. Native plants will be utilized in landscaping. 2003 National invasive Species Strategy Voluntary Code of Conduct will be utilized to guide landscaping activities. Landscaping teams will continue to monitor and prevent return of Hawaiian scaevola (*Scaevola taccada*). NCP maintenance program will include consistent waste removal to reduce invasive, vector species, such as rats. These animals will also be trapped to aid in reducing their numbers. Any terrestrial wildlife encountered during terrestrial operation will involve following the procedures related to wildlife discovery as outlined in subsection 15.13.

Area of Project	Area of Impact	Mitigation Strategy
	Terrestrial – Geology	Landscaping will commence as soon as feasible to aid in soil erosion prevention and soil runoff into the marine environment when it rains. Regrading of the surface early in the construction phase along with project design to increase pervious surfaces and use of swales and drainage ponds will ensure that surface water will not settle on the project site nor negatively impact neighbouring properties.
	Air quality	No air quality mitigation should be necessary during operation once landscaping is complete. All engines and equipment on site will be fully equipped with exhaust filters and undergo full maintenance regularly as well as third party inspections to ensure air quality is not impacted. Renewable energy components will be installed.
	Noise	Advance notice will be given of events at the amphitheater, so neighbouring communities are aware of potential elevated sounds. Amphitheater will be soundproofed.
	Traffic	The Traffic Impact Assessment recommended mitigation by pedestrianizing a portion of Woodes Rogers Walk and installing pedestrian barriers. The Port project will enhance pedestrian access to this area. Other mitigation measures will require Government approval (see subsection 15.10). Landscaping activities will not be scheduled during peak traffic times.

Area of Project	Area of Impact	Mitigation Strategy
		More detailed information can be found in the Traffic Impact Assessment (Appendix A to the approved EIA). Additional mitigation measures recommended for Downtown will need to be implemented by other developers in the area and the Government of The Bahamas.
	Energy	A mix of power supply from BPL and photovoltaic systems will reduce the Port's energy consumption during operation. NCP intends to source 30% of its electricity from renewable resources in alignment with the The Bahamas' National Energy Policy 2013 – 2030.
	Socioeconomics	Approximately 70 permanent jobs will be created for Bahamians post-construction across both marine- and land-side aspects of the Port. Retail space in NCP will be rented at current rental rates for a year from the completion of the project in an effort to retain existing Bahamian small businesses and entrepreneurs.

Mitigation strategies are further detailed in subsections 15.1 through 15.13.

15.1 Air quality

No air quality impairment is expected during operation of the Port facility. To ensure this, all engines and equipment on site will be fully equipped with exhaust filters and undergo full maintenance regularly as well as third party inspections to ensure air quality is not impacted.

Use of renewable energy for a portion of power generation should reduce the greenhouse gas (GHG) emissions for the Port.

15.2 Water quality and supply

Water quality should not be impaired if mitigation measures as outlined in the Spill Response Plan (Appendix J) and Hazardous Material Management Plan (Appendix K) as well as those measures outlined in subsections on waste management are implemented.

Water supply to the project site will be provided by the Water and Sewerage Corporation (WSC). Water supply standards will be maintained in accordance with requirements of WSC and the Department of Environmental Health Services. Methods for water supply and disposal must be approved by these agencies prior to commencement of operation activities.

15.3 Noise pollution

No noise pollution is expected from operation of the Port. Advance notice will be given of events at the amphitheater, so neighbouring communities are aware of potential elevated sounds. The amphitheater will be soundproofed to reduce any noise disturbances.

15.4 Habitat conservation – Terrestrial

Any invasive alien species (IAS) observed on the project site will be removed. The only invasive species identified in the July 2020 EIA were Hawaiian seagrape (*Scaevola taccada*). Other IAS common on New Providence include Australian pine (*Casuarina equisetifolia*) and Jumbey (*Leucaena glauca*), and Brazilian pepper (*Schinus terebinthifolius*).

Landscaping will be guided by the 2003 National Invasive Species Strategy Voluntary Code of Conduct (BEST Commission, 2003):

- Work with local plant ecologists, horticulturists, nurseries, botanic gardens, conservation organizations and others to determine which species either are currently highly invasive or show aggressive potential.

- Increase interaction with other professionals and non-professionals to identify alternative plant material and other solutions to problems caused by harmful invasive plants.
- Identify and specify non-invasive species that are aesthetically and horticulturally suitable alternatives to invasive species for use in Port landscaping.
- Eliminate specification of species in landscaping plans that are invasive in The Bahamas.
- Remove invasive plant species and replace them with non-invasive species.
- Be aware of potential environmental impacts beyond the designed and managed area of the landscape plan (for example, plants may spread to adjacent natural areas or cropland).
- Encourage suppliers to provide non-invasive plants.

Landscaping at the Port facility will be done with native and non-invasive vegetation, and no known or potential invasive plant species will be utilized. Native protected trees that may be used in landscaping include Mahogany (*Swietenia mahagoni*), Small leaved blolly (*Guapira discolor*), and Silver buttonwood (*Conocarpus erectus*). All protected trees removed will be replaced at a ratio of 2:1 at the Port (see Figure 15-2).

With landscaping, the project will seek to establish vegetated corridors. These areas will constitute vegetated corridors which will traverse the Port so that birds and other wildlife can move across the facility to access other natural areas. These corridors should only include native coastal or upland plant species and will be permanently maintained.; these corridors are also visible in Figure 15-2.

Invasive species control will also involve maintenance at the site to reduce rats at the Port. Maintenance will involve (WHO, 2016):

- Regular inspection of areas where infestation is likely to occur, e.g. food storage, food handling and solid waste disposal.
- Inspection of incoming materials and goods where rodents can hide. Reject any that may be contaminated with rodent faeces or urine.
- Elimination of hiding places and point of accumulation in which trash, food particles or dirt may accumulate.
- Frequent cleaning of Port facilities, especially spaces where is food is stored, prepared or served or where dishes and utensils are washed and stored.
- Ensuring proper storage and disposal of food waste.
- Installation and regular removal of traps by a licensed pest control company.
- Use of rodenticide will be course of action of last resort as these chemicals are toxic to humans, dogs, cats and other animals as well. If rat populations are not being

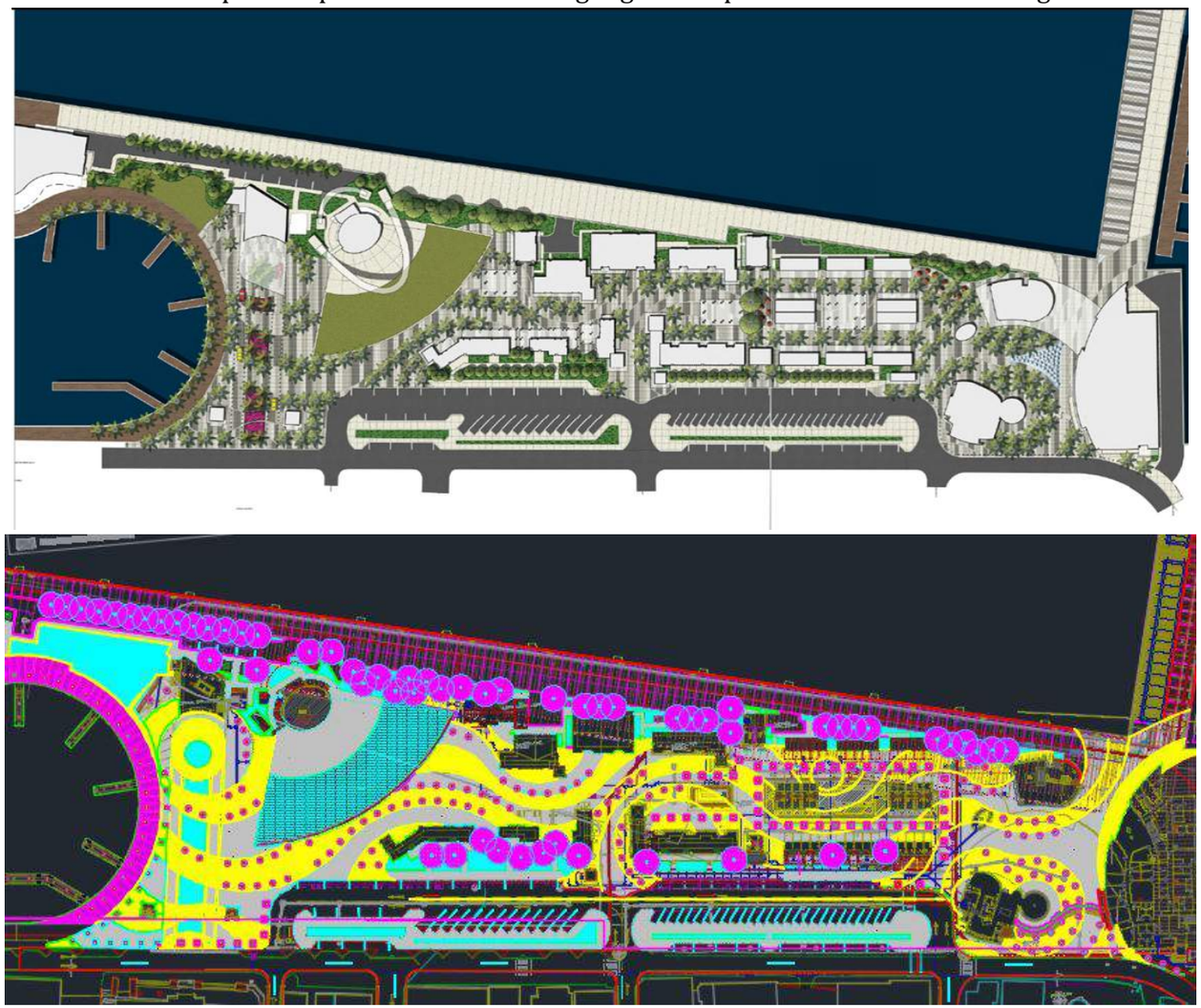
successfully managed through the use of traps, a licensed pest control company will be engaged to ensure that rodenticides are placed in areas where they will not pose a risk to humans (especially small children) and pets. Areas that have been baited should be checked regularly and any poisoned vermin removed.

Ships can be a pathway for rats to enter the Port. Preventative requirements for ships will include installation of rat-proofing collars along mooring lines at suitable distances from the ship. To enable the collars to withstand wind action, they should be fitted with hawsers that connect the ship to the shore. An example of this configuration is shown in Figure 15-1 below.

Figure 15-1: Rat-proofing collars and hawsers

Figure 15-2: Landscaping Plan for the Port

The replanted protected trees are highlighted in pink in the bottom drawing.



15.5 Habitat conservation – Marine

Coral relocation will be completed during the construction phase.

Dumping of any waste, including solid waste, untreated sewage and ballast water, will be prohibited in the Port and any associated marina. Solid waste collection and waste treatment services will be provided for vessels using the Port.

Any marine wildlife encountered during marine operation will involve following the procedures related to wildlife discovery as outlined in subsection 15.13.

Appendix J Spill Response Plan and Appendix K Hazardous Waste Management Plan detail mitigation measures for any potential spills in the marine environment that could negatively impact marine habitat and organisms.

15.6 Fueling

Fueling on site can result in spills of gasoline diesel and oil, which are common sources of marine pollution and are costly to clean up. Mitigation measures for fueling include:

1. Establishment of a designated fuel dispensation area outside of the Port perimeter, i.e. away from water.
2. Installation of floating docks or stationary skids to provide a more stable platform to prevent rocking during fueling in order to prevent spills.
3. Ensuring a fuel attendant is on hand to dispense fuel at all times. Unattended fueling by customers will be prohibited.
4. Topping off practices when fueling will be discouraged. Tanks should not be filled beyond 95%. Impervious fire-proof containment trays should be used when filling small cans to contain any possible spills. Easy to read signs will be posted at the fueling station to explain proper fueling procedures.
5. To prevent overflow spills, automatic back pressure shut-off nozzles will be installed on the fuel pump discharge hoses. Fuel nozzle triggers that are used to hold the nozzle open without being held will be removed if automatic shut-offs are not available.
6. Secondary containment, such as drain pans, will always be used during fueling in the event of a fuel spill or leak.
7. The fueling system will be briefly inspected daily and thoroughly inspected once a week by fuel attendant(s) for leaks and overall soundness.
8. All spent fluids will be collected for either storage or recycling.
9. Absorbent materials, such as pads and booms, will be readily available at the fueling station in clearly identified containers in the event of a spill. Used absorbent materials will be disposed of off-site by a licensed company. The spill response container will also contain fire extinguishers, a copy of the Spill Response Plan, and the emergency

contact list. This container will be clearly marked and easily accessible in order to quickly react to any potential spills. An inventory of equipment will be taken monthly or after use and a list of items needing replacement will be submitted for purchasing immediately.

10. The components of the spill response plan (see Appendix J) include who to notify when a spill occurs, immediate spill response actions, a contact list for response communications, a response chain-of-command in the Port, an inventory of spill response equipment and its location. Easy-to-read signs will be posted at the fueling station informing attendants and other users what to do to contain fuel and oil in the event of a spill. Signs should also include a "No Smoking" sign to avoid risk of explosion.
11. All appropriate operation staff should be trained at least bi-annually in proper fueling, proper maintenance techniques, and the implementation of the spill response plan.

15.7 Sewage and wastewater management

Sewage generated during operation will be treated to the tertiary level and the remainder going to a deep disposal well. Wastewater will be treated in a system connected to the pump-out facility.

Sewer facilities shall be provided at the marinas and yacht berthing areas to transport waste material from vessels to shore. Each marina shall be provided with sanitary waste extraction (pump-out) system designed to pull gray and/or black water waste from the moored boats and discharge the waste to the public sanitary sewerage system. Each system shall be pre-engineered and consist of suction hydrants located in proximity of moored boats, suction collection piping system, a peristaltic (positive displacement) pump and discharge (pressure) piping. The suction piping system shall be installed exposed under the marinas dock or along the sea wall for ease of maintenance and repairs.

In order to ensure proper use of pump-out equipment, Port staff will monitor their use at all times. Regular inspection and maintenance of pump-out facilities will be conducted by designated staff members. Visible signs will be posted around the Port that identify the location of pump-out station(s) and hours of use. Dye tablets will be placed into the holding tanks of all vessels upon docking within the Port by attendants to easily identify pump-out violators.

Vessel operators will be encouraged to use non-toxic biodegradable cleansers and deodorants for treating holding tanks. Use of formaldehyde will be prohibited. Vessel operators will also be encouraged to use phosphate-free or low phosphorous biodegradable soaps and low nitrogen detergents on board. Vessel crew and passengers will be urged to

utilize the Port's sanitary facilities when at dock or staying overnight. These facilities will be properly constructed to house disabled patrons/clients.

No wastewater on site (neither surface run-off nor construction wastewater) shall be discharged directly or indirectly into any public sewer, stormwater drain, or channel without prior consent of the Department of Environmental Health Services (DEHS) and the Water and Sewerage Corporation (WSC).

There will be no drainage of sewage or wastewater to the sea or any natural waterbodies on or near the project site at any time. All activities related to sewage and wastewater management will be subject to approval of respective Government agencies, inclusive of the WSC and DEHS. Additionally, any activities that are planned to be undertaken with respect to sewage and wastewater handling, treatment and/or disposal will be communicated to the Department of Environmental Planning and Protection (DEPP) for their review prior to activities being undertaken.

15.8 Solid waste management

Covered trash receptacles will be positioned in lighted areas and in locations that are convenient for patrons. As much as possible, these trash containers will be tied down to stationary fixtures. Placing trash containers on docks where trash can inadvertently blow into surface waters must be avoided. At these receptacles, signs should be posted listing or showing symbols of items that can be disposed of. Prohibited solid waste includes recyclables and hazardous waste materials, such as waste oil, and used absorbent materials. It is recommended that contents of all trash receptacles are disposed of at least once a day, or as frequently as possible. In order to maintain clean grounds, there should be morning and afternoon "walk-throughs" of the Port by custodial attendants to pick up stray litter.

Regular removal of trash will aid in reduction of vector species, such as rats, which feed on and shelter in trash.

A licensed subcontractor will dispose of solid waste from the Port in accordance with DEHS standards and only with their approval.

Disposal of solid waste from operation of the Port facility will be done at the New Providence Ecology Park in compliance with DEHS requirements.

The Port will comply with the single-use plastics and styrofoam ban instituted by the Government of The Bahamas under the Environmental Protection (Control of Plastic Pollution) Act 2019. The following products will not be utilized or allowed at the Port:

- Single-use plastic bags;
- Styrofoam containers and cups;
- Plastic utensils; and
- Plastic straws.

Ship waste reception will be initiated by a request from the ship agent to dispose/discharge of waste. The request must be sent to the Port operations team. The request must include the following information:

- Type of waste
- Volume of each type of waste
- Third party company that will collect the waste
- Driver and vehicle information (if necessary)
- Time of disposal/discharge
- Where the waste will be disposed of or discharged

The Operations Team will review the request and determine if the risk of this disposal/discharge is reasonable, and if so when and how it will happen.

If the disposal/discharge is provisionally approved, an email will be sent to the ship agent indicating the details of the activity. Bahamas Customs will be copied on this email. With the approval from Bahamas Customs for disposal/discharge, the ship agent can confirm arrangements with the waste reception company.

When the ship begins the disposal/discharge process, all ship safety protocols and the waste reception company protocols must be in place.

All third-party waste reception companies must provide approval from the Department of Environmental Health Services that they are permitted to receive and dispose of any type waste. Table 15-1 describes types of solid waste from ships and allowed disposal/discharge methods.

Table 15-1: Ship Waste

GARBAGE TYPE	Regulation 6 Within Special Areas (The Bahamas)
Food Waste comminuted or ground	≥ 12 nm, en route and as far as practicable
Food Waste not comminuted or ground	Discharge prohibited
Cargo residues not contained in wash water	Discharge prohibited
Cargo residues contained in wash water	≥ 12 nm, en route and as far as practicable (subject conditions in regulation 6.1.2 and paragraph 5.2.1.5)

GARBAGE TYPE	Regulation 6 Within Special Areas (The Bahamas)
Cleaning agents and additives contained in cargo hold wash water	≥ 12 nm, en route and as far as practicable (subject conditions in regulation 6.1.2 and paragraph 5.2.1.5)
Cleaning agents and additives in deck and external surfaces wash water	Discharge permitted
Animal Carcasses (Should be split or otherwise treated to ensure the carcasses will sink immediately)	Discharge prohibited

15.9 Hazardous waste management

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

Storage facilities at the Port for hazardous waste will have disposal containers that are covered, made of inflammable material, sealed to prevent leaking, and positioned on an impervious surface as far from any water as possible. These containers will be located in the same area as designated for solid waste containers, but with clear separation and signage to ensure proper containers are used for hazardous waste. Secondary containment for all disposal containers should be 110 per cent of the maximum volume of the container. Storage facilities will be inspected at least once a day by appropriate staff to check for leaky containers. Appropriate spill containment and clean-up equipment will be easily accessible near hazardous waste storage facilities. Signs directing patrons to hazardous waste storage facilities will be posted around the Port facility. These signs should state a list of hazardous materials that are being collected. Port operation staff should be trained regarding proper handling, storage, transfer, and disposal procedures for hazardous waste materials.

Standard ship works at the Port will include:

- Washing the Ship: Once approved, the crew can wash the hull and windows with fresh water. They can also use cleaning solutions approved by the Bahamas Department of Environmental Health Services (DEHS).
- Safety Drills and Exercises: Once approved, the crew can perform these functions with constant communication with NCP Security. These drills may include dropping of anchors, launching lifeboats or life rafts and blasts from the ship horn. Details of the exercise must be provided to the Operations team.
- Maintenance Hot Works: Once approved, minor welding and repairs may be conducted in the ship, open decks and balconies.

- Greasing Moving Parts: Once approved, the application of grease to anchors and lifeboat launching mechanism can be conducted.

Special ship works are activities that may adversely disrupt the environment, safety or security at the Port. These activities typically occur on the exterior of the ship. These activities must adhere to the NCP HSE and the Department of Environmental Planning and Protection protocols. If approved, they are subject to an hourly rate. These activities include:

- Ship Hull Work: Any major work to the exterior of a ship's hull.
- Underwater Work: Any underwater work that is conducted including surveys, cleaning, and welding.
- Chipping: The removal of paint from the exterior (usually from the hull or anchor).
- Painting: Paints approved by the DEHS must be applied using the Port guidelines.
- Crane Work: Utilizing a crane by land or sea will require a safety plan.

Disposal of all hazardous waste generated by the Port will occur offsite by a licensed contractor at a licensed facility as per DEHS requirements. Hazardous wastes can be generated during a number of activities during operation at the Port facility. These are described below:

1. **Hull maintenance and cleaning** can release pollutants that can result in toxicity of the water column; metals, such as tin, copper and arsenic, found in paint and paint scrapings are all toxic to marine organisms if ingested and can also lead to habitat degradation if dispersed by wind, rain or runoff into coastal waters. Concentrated release of harmful vapours, such as volatile organic compounds (VOCs) from paint and lacquers can also have adverse health effects on humans if inhaled. Mitigation measures for hull maintenance and cleaning include preventing and reducing the release of contaminants and harmful vapours into sediments, air and surface waters, and ensuring proper management and disposal of all hazardous waste offsite by a licensed contractor at a licensed facility.

2. **Engine maintenance** requires use of hazardous materials, such as oil and solvents. Improperly maintained engines can also emit high levels of hydrocarbons, carbon monoxide, nitrous oxides and particulate matter into the air and aquatic environments, negatively affecting air quality. Mitigation measures for engine maintenance include establishment of a designated maintenance area with:

    a. Absorbent materials available to immediately soak up any possible spills; and
    b. Properly labeled and separated containers for used oil, oil filters, batteries and other hazardous waste.

Hazardous waste will be disposed of offsite by a licensed company.

3. **Bilge water**, which can contain hazardous chemicals, is a common source of marine pollution if discharged into marine or surface waters. Mitigation measures include provision of bilge water pumping facilities at the Port capable of separating oily bilge water or water extraction from oily residues. Absorbent materials should be widely available during bilge water pumpout. Biodegradable and environmentally friendly bilge cleaning products, such as Heller Ganz Bilge Cleaner, should be used at the Port.

A Hazardous Material Management Plan is provided at Appendix K.

15.10 Traffic management

The Traffic Impact Assessment completed by CCG recommended the following mitigation measures for the Port operation:

- Pedestrianize a portion of Woodes Rogers Walk and installing pedestrian barriers. The Port project will enhance pedestrian access to this area.
- Seek Government approval for pedestrianizing of Charlotte Street between the limits of Bay Street and Woodes Rogers Walk, allowing solely service/delivery vehicles over a specified time off-hour. This traffic change would also involve not allowing pedestrians to cross at Charlotte Street through use of a pedestrian barrier. The nearest crossing would then be the traffic signal at Frederick Street.
- Seek Government approval for Parliament Street to be a staging area for jitneys and utilized by the buses and shuttle only. All other vehicles would be prohibited. Pedestrians would not be allowed to cross at Parliament Street with the installation of a pedestrian barrier, and would cross at the traffic signal at East Street instead.
- Seek Government approval to install a traffic signal at Bay and Elizabeth intersection.

Additional traffic mitigation will include not scheduling landscaping and other maintenance activities during peak traffic times.

More detailed information can be found in the Traffic Impact Assessment (Appendix A to the approved EIA). Additional mitigation measures recommended for the area will need to be implemented by the other developers in the Downtown area and the Government of The Bahamas.

Once the Port is operational, cruise ships will have scheduled berths at the renovated piers and tour boat operators will be permitted to berth at the new tour boat operator station, i.e. bridge connection between Piers 1 and 2.

15.11 Climate change mitigation and adaptation

Climate change adaptation will involve reducing the impact of flooding on the site due to heavy rainfall through stormwater management.

Port design will maximize pervious surfaces, such as vegetated areas, to reduce the quantity of stormwater runoff. Stormwater will be maintained on site during operation through the use of swales and holding ponds prior to discharge into disposal wells, which will be cased to 40 – 50 feet.

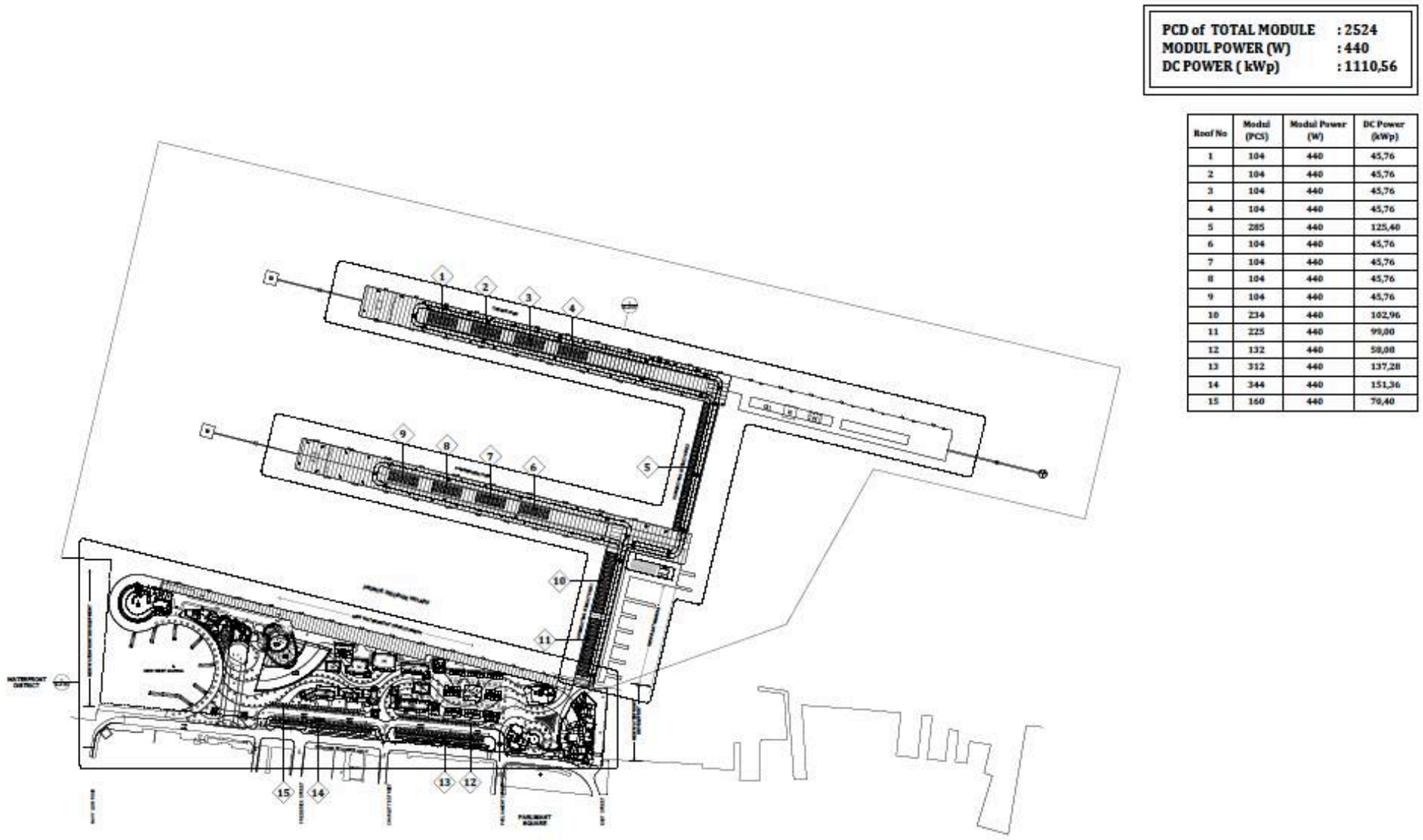
Climate change mitigation for the NCP project will focus on reducing greenhouse gas (GHG) emission through use of cleaner energy sources. NCP has a vision of reducing harmful effects of the cruise industry by improving clean energy usage and raising awareness on resource utilization. This project is committed to high environmental standards and aims to achieve the same through its Green Port Policy. For such purposes, NCP intends to appoint a qualified consultant to advise on environmental matters. While promoting sustainability, the best available technology will be used to avoid or reduce environmental impacts.

Renewable energy technologies, other self-generation systems, controls, and energy storage will be installed to the extent possible to allow the Port to run in an energy efficient and environmentally conscious way. NCP will endeavour to source 30% of its electricity from renewable resources in alignment with the Government of The Bahamas' National Energy Policy 2013-2030. Accordingly, the project will work to create a strategy for sustainable energy modernization which will ensure reliability of the energy systems and conduct activities to reduce energy use and increase energy efficiency in all stages of its operations.

Renewable energy usage in the Port will consist of solar-power plants on rooftops of buildings with diversified capacities limited to 100 kW per plant with a total installed capacity of approximately 1.5 MW. The intent is to seek approval from BPL to connect the Port photovoltaic system to the New Providence electricity distribution network. The preliminary design layout for the photovoltaic (solar) system is provided below in Figure 15-2.

Once the NCP renewable energy system is operational, a computer software system will be used to integrate BPL and NCP, the two energy supply streams, with a user-friendly interface so that supply and consumption can be tracked and monitored efficiently.

Figure 15-2: Preliminary Layout for Photovoltaic System



Roof No	Modul (PCS)	Modul Power (W)	DC Power (kWp)
1	104	440	45,76
2	104	440	45,76
3	104	440	45,76
4	104	440	45,76
5	285	440	125,40
6	104	440	45,76
7	104	440	45,76
8	104	440	45,76
9	104	440	45,76
10	234	440	102,96
11	225	440	99,00
12	132	440	58,08
13	312	440	137,28
14	344	440	151,36
15	160	440	70,40

15.12 Public awareness and communication

Once operation begins, any outreach about the Port will be through television, newspaper and radio announcements as well as the project's website.

The public, especially neighbouring businesses, must be informed of the mechanism for reporting concerns or problems and this mechanism must be easily accessible and responsive. Options for this mechanism include a telephone hotline, website or contact person. When concerns are communicated, they will be acknowledged within 24 hours and resolved within 48 hours, when feasible. If it is not feasible to resolve a matter within 48 hours, persons will be advised of this and regularly updated on progress in addressing their concerns.

The complaints form in Appendix O or a similar version will be used to record any complaints received about the project. All complaints will be recorded, including:

- Date of complaint;
- Complainant (name and contact information);
- Nature of problem including location;
- Time;
- Number, gender and age of people impacted; and
- Costs associated with the problem or incident, if possible (e.g. cost of doctor's visit and medication; cost of repair to vehicle or third-party property, etc.)

Completed complaint forms will be included in regular reporting to DEPP.

15.13 Procedure for wildlife discovery

During operation, wildlife may be encountered during terrestrial and marine activities. Wildlife may include marine mammals (e.g. dolphins and manatees), marine turtles, sharks, snakes, lizards, frogs and birds. These procedures outline what steps should be taken by staff should they encounter any wildlife on site. It is important to note that the safest course of action when encountering wildlife is to do nothing and simply wait for the animal to move away. Most animals are not aggressive unless they feel threatened.

- **Feeding** – No animals should be fed under any circumstances. Providing animals with human food (e.g. chips, candy) can harm them. Food should not be left out in the open around the Port where it might attract animals.
- **Disturbing nests** – Staff should not damage or attempt to move nests or eggs if they are found at the Port. If nests or eggs are found, the Operations Manager or HSE Consultant should be notified so that they can contact the Bahamas National Trust for guidance. The contact information for BNT is 393-1317.

- **Disturbing young or juveniles** – Staff should not interfere with or harm young or juvenile animals if they are encountered at the Port. If young animals are found on site, the Operations Manager or HSE Consultant should be notified so they can contact the relevant agency.

  With some young, the parents are usually close by and may attack if the young are threatened. A human approaching, touching or picking up young can be perceived as a threat. If a young animal is observed alone for more than two hours, the following agencies can be contacted:
  - Animal Control Unit 325-1173
  - Bahamas National Trust 393-1317
  - Department of Marine Resources 393-1777
- **Disturbing adult wildlife** – Staff should not interfere with or harm adult animals if they are encountered at the Port. Usually the animal will move away if it is left alone. If staff feel threatened by an animal, such as a snake, they should contact the Operations Manager or HSE Consultant who can contact the relevant agency for assistance. Agencies involved in safe wildlife removal include the Animal Control Unit and the Bahamas National Trust.
- **Entanglement** – Entanglement is a particular risk for marine animals (e.g. dolphins, manatees, marine turtles and sharks). If an animal becomes entangled in equipment in the marine environment, it is critical to free the animal as quickly as possible. In the event of a such an incident, the Operations Manager or HSE Consultant should be notified immediately so they can quickly make contact with the Department of Marine Resources for assistance. Some marine wildlife, such as dolphins, manatees and marine turtles, need to be able to surface periodically so that they can breathe and will actually drown if trapped underwater.
- **Hunting and fishing** – No hunting or fishing will be allowed at Nassau Cruise Port whether in the terrestrial or marine environment.
- **Injury or death** – If wildlife is injured at the Port, whether it is self-inflicted or by accident, the Operations Manager or HSE Consultant should be contacted immediately so they can quickly make contact with the relevant agency for assistance in treating the injured animal. If wildlife is killed at the Port, whether self-inflicted or by accident, the Operations Manager or HSE Consultant should be contacted immediately so they can document the incident for inclusion in their environmental reports. If the wildlife is an endangered or threatened species, the Bahamas National Trust should be contacted as they may want to collect and preserve the animal or document the death.
- **Human injury from wildlife encounter** – If a staff member or subcontractor is injured on site because of an encounter with wildlife, immediate first aid treatment

should be sought as some scratches and bites can result in infection or disease transmission. Evaluation during first aid treatment will determine whether further medical treatment is necessary.

16.0 Health and Safety – Operation

NCP will provide a safe facility for all visitors and employees. It will adhere to the following standards for management:

- ISO 9001 Standard for its quality management system,
- ISO 14001 Standard for its environmental management system, and
- ISO 45001 Standard for its occupational health and safety management system.

Health and safety procedures will be guided by the Port Health Safety and Environmental Manual (NCP, 2019); the manual can be found in Appendix O to the approved EIA.

Stop work authority

It is an employee's and contractor's responsibility to stop work if individuals see an unsafe act or believe:

- Task will endanger you or anybody else
- Task you are performing is unsafe
- Conditions in which you are working are unsafe.
- Unauthorized discharge of any material or substance will occur.

Potentially hazardous activities

Before starting any potentially hazardous activity, staff must ensure:

1. A job hazard analysis has been completed.
2. All applicable statutory certificates and licences for workers, vehicles and equipment have been obtained and are up-to-date.
3. All persons involved in the activity are appropriately trained and have participated in the NCP HSE orientation program.
4. All necessary permits to work have been issued by NCP.
5. All personal protective equipment is provided and is in sound condition.
6. The activity is conducted in accordance with all statutory requirements, sound industry practice, and equipment/vehicle manufacturers' instructions.
7. All unfinished work must be tagged, closed off from the public and a hazardous sign erected.
8. All tools and equipment must be secured away from public view when the worksite is inactive.

A list of potentially hazardous activities is provided below; it is not exhaustive, and all tasks should be evaluated for hazards prior to commencing:

- Using hand tools
- Using power tools
- Using machinery

- Using welding equipment
- Using compressed air
- Using electrical equipment
- Erecting and using scaffolding
- Using cranes

Details on safely engaging in these activities are provided in the NCP HSE Manual.

Permit to Work

NCP has a permit to work system that operates across the facility. This is a formal written system to control certain types of work identified as potentially hazardous. Workers can inquire about a work permit through the NCP Operations team. The system ensures that personnel have completed the following tasks before starting work:

1. planned the work;
2. inspected the work site;
3. identified the hazards;
4. implemented control measures;
5. gained operational approval or release of the plant to be worked on;
6. participated in the NCP HSE orientation program; and
7. confirmed that safety perimeter and privacy fencing is secure.

Protective Personal Equipment

Employees and visitors will be provided with all necessary personal protective equipment (PPE) as required for a task. Contractors, tenants, consultants and all other Port users must ensure that their employer provides the necessary PPE. Examples of PPE that will be utilized at the Port, depending on tasks, include:

- Ear plugs
- Hard hat
- Safety goggles
- Steel-toed boots
- Gloves
- High-visibility jackets
- Life jackets when working on or near water
- Safety harnesses for working at heights

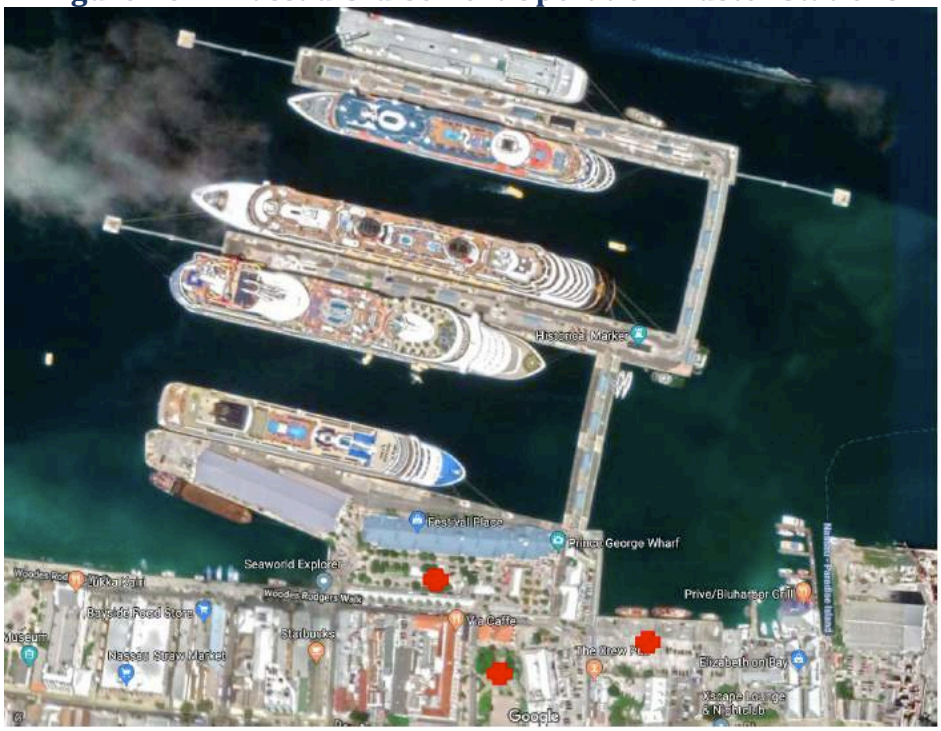
Muster stations

Muster stations in the event of an emergency are:

- Muster Station 1 – In the taxi call-up area within Prince George Wharf
- Muster Station 2 – Rawson Square, south of Prince George Wharf
- Muster Station 3 – Kelly Dock, east of Prince George Wharf

These stations are shown in Figure 16-1 below.

Figure 16-1: Nassau Cruise Port Operation Muster Stations



16.1 Health and safety training

As a part of the Port's induction training, all staff and subcontractors will undergo health and safety training to ensure their safety at the facility. Health and safety training will include best practices for working:

- With hazardous materials
- At heights
- In confined spaces
- With heavy equipment

Staff will be required to wear appropriate personal protective equipment (PPE) and be trained in how to properly wear and/or use this equipment. Staff will also be trained in incident or accident response, including first aid.

Emergencies

Adequate means of escape in case of fire is provided from all places in the Port and lead to safe places outside buildings. Suitable access routes for emergency services are also provided at:

- Port Administration Building

- Festival Place Building
- Customs Warehouse
- Muster stations (see Figure 16-1)

The Port will be equipped to respond to sea-based emergencies, such as lifesaving. There will be adequate and well-displayed signs posted about lifesaving equipment at the Port. The following water safety guidelines will be followed:

a) A person who falls in the water will be able to get up and out of the water (e.g., via rope or ladder).
b) Port staff must be able to help or rescue a distressed person in the water without risking his or her own life.
c) The required lifesaving equipment in the Port must at least include the presence of lifebuoys and ladders. Other types of lifesaving equipment could include boathooks, rescue boats, and rescue stations.
d) Lifesaving equipment must be available 24 hours a day throughout the operational season and their location will be clearly indicated on the Port map.

The presence of chemicals and fuels, and the sheer number of patrons place Ports at high risk for potential fire-related accidents. Such situations may require an immediate response, whereby waiting for emergency personnel can lead to dire circumstances. There will be adequate and visible signage posted about first aid and fire-fighting equipment at the Port. Safety precautions and information must also be posted at both areas. The following first aid and fire safety guidelines will be followed:

a) The fire-fighting equipment in the Port must at least include the presence of fire extinguishers, but could also include water hoses and fire carpets.
b) The fire-fighting equipment must be easily identified and accessible 24 hours a day throughout the operational season and indicated on the Port map.
c) Fire extinguishers must be present at the fueling stations, near hazardous waste storage facilities and at locations where high temperature work is going on.
d) First aid equipment must be present at the Port or at other facilities at the Port.
e) Public or emergency telephones at or very near the Port must also be available 24 hours a day, and clearly indicated on the Port map.

16.2 Security

The security management for the Port aims to prevent anything that may directly or indirectly affect daily operational activities. NCP acknowledges and agrees that it will maintain the security at the Nassau Harbour. Also, that it will ensure all procured personnel and contractors affiliated with the Project will comply with the International Ship and Port

Facility Security (ISPS) Code. Additional European Union (EU) implementation directives to ISPS Code and NCP-PTFS code are given below:

- Maritime Security Regulation 725 / 2004
- Port Security Directive 2005 / 65
- AEO Regulations 648 / 2005

Security procedures shall be prepared based on NCP–PTFS Code as well as relevant international and national legislation by taking into consideration the particular circumstances of each port and terminal; and they shall be updated periodically. All ports/terminals shall have an updated and approved Security Assessment and Security Plan in accordance with the ISPS Code. Particular care shall be given to ensure that security measures and implementations are of deterrent and preventive quality. Operating in coordination and cooperation with local security forces shall be of essence. Necessary information exchange, coordination and cooperation on matters of security shall be ensured with other elements of ports and terminals as well as with ships. When required in the local legislation, Protection and Security Plans shall be prepared consistent with the principles of relevant legislation. Practices required as well as all security equipment, gears, materials and instruments to be procured to ensure integration and standardization among NCP facilities shall be submitted to NCP and terminal security committee.

NCP security rules regarding construction related commitments, states that each of the Parties will be responsible for the adequacy, stability and safety of any site construction operations and methods of construction for works carried out by such Party (including any dredging by or on behalf of the Government of The Bahamas). Each Party will in respect of any works carried out by or on behalf of such Party:

- take care for the safety of all persons entitled to be on the relevant construction sites in line with the Good Industry Practice and in compliance with Bahamian standards under the applicable Laws;
- provide fencing, lighting, guarding and watching of their respective sites and works that is compliant with applicable Laws and the relevant requirements hereunder for the respective sites; and
- be responsible for keeping unauthorized persons off its respective sites.

The Table of Contents for the Port Security Management Plan is provided in Appendix P.

16.3 Hurricane preparedness

The Hurricane Preparedness Plan for the operation phase of the project can be found in Appendix Q.

16.4 Emergency preparedness

Emergencies associated with the project may include fires, explosions, storms, accidents and malfunctions. The Emergency Response Plan is detailed in Appendix L.

16.5 COVID-19

The guidance provided under the Bahamas Emergency Powers (COVID-19 Pandemic) Order 2020 and from the Ministry of Health will be adhered to as follows:

1. Construction companies are allowed to operate between the hours of 7 am to 5 pm (Monday to Friday) and 7 am to 1 pm (Saturday). ENKA will seek an exemption to these time restrictions as their schedule requires shifts spanning 24 hours per day.
2. A distance of six (6) feet between individuals will be maintained.
3. Each individual will wear a mask covering their nose and mouth.
4. Hands will be washed frequently with soap and water. If running water and soap are not available, an alcohol-based hand sanitizer will be applied regularly.
5. If you have to sneeze or cough, do so into your elbow or a tissue. If you use a tissue, discard the tissue into a closed bin and immediately clean your hands with soap and water or an alcohol-based hand sanitizer.
6. Disinfect equipment or surfaces that are touched frequently.
7. If an individual experiences the following symptoms, he/she will stay home from work and contact the Ministry of Health or a medical doctor for guidance on medical treatment and testing:
    a. Fever (temperature of 100.4°F or higher)
    b. Chills
    c. Cough
    d. Shortness of breath or difficulty breathing
    e. Fatigue
    f. Muscle or body aches
    g. Headache
    h. Loss of taste or smell
    i. Sore throat
    j. Congestion or runny nose
    k. Nausea or vomiting
    l. Diarrhea

Body temperatures of all persons (employees, suppliers, visitors, etc.) who wish to enter the Port will be measured prior to entry. Those with a body temperature exceeding 37.5 °C (99.5 °F) shall be recorded and not be allowed to enter the Port.

A copy of the current Emergency Orders can be found at in Appendix M.

17.0 Post EIA-Public Consultation

The post-EIA public consultation was held on October 5th, 2020. Due to COVID-19 restrictions, the consultation was held virtually on the Google Meet platform.

Questions/issues raised during the consultation are listed below along with the responses provided:

1. Status of approval from the Department of Environmental Planning and Protection – At the time of the consultation, the project EMP was under review. Upon completion of satisfactory review of the EMP, the Certificate of Environmental Clearance will be issued, and project proponents can then seek the necessary permits for the project.
2. Use of solar energy in the project – Solar energy use in the project is detailed in the EMP.
3. Whether a a bathymetric assessment was done for the project and the quantity of the dredging that has to be done – Bathymetric surveys have been completed. While a figure was provided during the consultation, please see subsection 8.2 of the EMP for more accurate estimates.
4. Whether there has been discussion with the Docks Committee on the matters relating to the berths – There has been discussion at the Docks Committee.
5. Whether the June 2022 deadline is still practicable for NCPL to complete the project – There have been delays due to COVID-19 and delays with approvals. Continued delays in approvals may have a major effect on the project.
6. Whether there have been provisions for contingencies which consider the future of rising tides [sea level] – Sea level rise has been considered and piers are to be raised to just under a foot. Elevating the piers is limited by accommodation of the cruis ship doors. Upland works will also entail raising the present elevation.
7. Architecture in the project and the issue of The Bahamas' architecture style versus super modern architecture style with steel buildings in the Arrivals Building and Plaza - Colonial architectural features in the interior of the port, with more Bahamian-style buildings in the middle. NCP has tried to modernize the architecture a little, without taking away from the style of the region. The more modern style of the Arrivals Building and Plaza were selected to make the Port iconic.
8. Whether the art gallery would contain permanent displays or revolving exhibits - art exhibitions will showcase Bahamian artists.

18.0 Environmental Education and Outreach

Environmental education and outreach should increase sensitivity and concern about environmental issues and stimulate environmentally responsible behaviours. Environmental education and outreach programs will introduce staff, customers and the local community to the value of adjacent ecological communities as well as the challenges they face in small island environments. These programs will also introduce persons to the role these ecological communities play in sustaining fragile island ecosystems. Program tools will include adequate and visible signage within the Port, availability of educational fact sheets, and tips for environmentally responsible behaviour within the Port. Proper training of staff in employing best management practices will also be an important component of environmental education and outreach.

Staff training will include the information provided in Appendix N on Education and Outreach Material as well as health and safety training per Chapter 16.0.

All Port staff will be sufficiently trained so that they can effortlessly convey environmental education and related stewardship concepts to customers and visitors to the facilities and execute best management practices. Environmental stewardship concepts should be routinely reinforced through regularly scheduled practice exercises, such as proper boat maintenance and cleaning procedures, spill response, and lifesaving and first aid drills.

Environmental outreach materials about Bahamian ecosystems, namely coppice, mangrove wetlands, beaches, rocky shore, seagrass beds and coral reefs will be made available in the Port. Materials may include signage, posters and factsheets. Key features of these ecosystems and how to avoid negatively impacting them should be highlighted. Examples of content for environmental outreach materials are attached at Appendix N.

Environmental education activities can include slideshows or Powerpoint presentations during staff orientation and regular training sessions, guided tours of the Port facilities and adjacent environs for local community members (e.g. school children and civic groups). All new staff will participate in the environmental site-specific induction training delivered by the HSE Consultant. There will be refresher training for all staff every 6 months. The training will cover a number of issues related to environmental management, including legislation, regulations, NCP HSE Policy, environmental management organizational structure, staff duties and responsibilities, mitigation measures and the Environmental Management Plan. Training will culminate in testing of staff members' knowledge on environmental management issues.

There will also be monthly employee environmental talks regarding environmental nuisance abatement and waste management. All staff will be required to attend. Topics will include, but not be limited to:

- Water pollution;
- Wastewater treatment;
- Waste reduction;
- Waste management;
- Good housekeeping practices;
- Handling of chemical waste; and
- Environmental emergency preparedness.

19.0 Monitoring and Reporting

The monitoring and reporting regime for the project will be the responsibility of the HSE Consultant in conjunction with the Operations Manager. Monthly environmental site inspection which will be conducted by the HSE Consultant. These inspections will provide a means to enforce specific environmental management and pollution control measures. Site inspection observations and results will be documented in site inspection forms, which will be submitted to the Director of Projects and Operations Manager. A possible template for the inspection form is provided in Appendix O.

The monthly site inspection forms and other environmental issues will be compiled into a monthly report to be submitted to DEPP. It should be noted that DEPP may also conduct unannounced site inspections to ensure compliance with the EMP. The 2019 Environmental Planning and Protection Act gives DEPP the power to issue a cease and desist order for non-compliance with the conditions of the Certificate of Environmental Clearance (CEC).

If non-compliance is found during the inspection, appropriate action as per the EMP will be implemented. The inspection will not be limited to the Port, but also observations of environmental management issues and pollution control measures in areas adjacent to the Port, which are likely to be impacted, directly or indirectly, by activities during operation.

References

BEST Commission. (2003). *The National Invasive Species Strategy for The Bahamas*. Nassau, The Bahamas: BEST Commission.

Caribbean Civil Group. (2019). *Appendix A: Nassau Cruise Port Traffic Impact Assessment*. In Environmental Impact Assessment (Revision V): Nassau Cruise Port – New Providence, Bahamas.

Caribbean Coastal Services. (2020). *Environmental Impact Assessment (Revision V): Nassau Cruise Port - New Providence, Bahamas*.

Centers for Disease Control and Prevention. (2020). *Symptoms of Coronavirus*. Retrieved from https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html

Centers for Disease Control and Prevention. 2019. *What noises cause hearing loss?* Retrieved from https://www.cdc.gov/nceh/hearing_loss/what_noises_cause_hearing_loss.html

Correll DS, Correll HB. (1982). *Flora of the Bahama Archipelago*. Hirschbergi, Germany: Strauss and Cramer.

ENKA. (2020). *Project HSE Plan*. Nassau, The Bahamas: ENKA.

Government of The Bahamas. (2019). *Environmental Planning and Protection Act*. Nassau: Bahamas Government Publications.

Ministry of Environment & Housing. (2020). Towards a Plastic-Free Bahamas website. https://www.plasticfree242.com

Ministry of Health. (2020). Novel Coronavirus (2019-nCoV) website - http://www.bahamas.gov.bs/wps/portal/public/novel%20coronavirus%20(2019-ncov)/

Nassau Cruise Port Limited. (2020). *Appendix O: Health, Safety and Environmental Manual, Edition 5*. In Environmental Impact Assessment (Revision V): Nassau Cruise Port – New Providence, Bahamas.

Ottawa Planning and Growth Management. (2015). *Protocol for Wildlife Protection during Construction*. Ottawa: City of Ottawa.

PBS&J. (2008). *Best Management Practices (BMPs) for Construction, Dredge and Fill and Other Activities Adjacent to Coral Reefs*. Miami, Florida: SEFCRI and FDEP.

World Health Organization. (2016). Handbook on Vector Surveillance and Control at Ports, Airports, and Ground Crossings. Geneva: World Health Organization.

WSP USA. (2020). *Appendix N: Basis of Design: Nassau Cruise Port – Marine Works*. In Environmental Impact Assessment (Revision V): Nassau Cruise Port – New Providence, Bahamas.

Appendices

Appendix A: Nassau Cruise Port Site Plan

Appendix B: ENKA International Certifications

bsi.

By Royal Charter

Certificate of Registration

ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2015

This is to certify that:

Enka Insaat ve Sanayi A.S.
Balmumcu Mah.Zincirlikuyu Yolu No:10
Besiktas
Istanbul
34349
Turkey

Holds Certificate No: **EMS 71388**

and operates an Environmental Management System which complies with the requirements of ISO 14001:2015 for the following scope:

The project management, engineering, procurement, construction, and commissioning of civil engineering, building, infrastructure, rail, aviation, power plants, nuclear power plants and industrial plants projects worldwide both alone and in joint venture.

For and on behalf of BSI:

Andrew Launn, EMEA Systems Certification Director

Original Registration Date: 2002-12-04
Latest Revision Date: 2018-11-12

Effective Date: 2018-11-16
Expiry Date: 2021-11-15

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By Royal Charter

Certificate of Registration

OCCUPATIONAL HEALTH & SAFETY MANAGEMENT SYSTEM - ISO 45001:2018

This is to certify that:

Enka Insaat ve Sanayi A.S.
Zincirlikuyu Yolu No:10 Besiktas
Balmumcu Mah.
Istanbul
Istanbul (Euro Side)
34349
Turkey

Holds Certificate No: **OHS 71389**

and operates an Occupational Health and Safety Management System which complies with the requirements of ISO 45001:2018 for the following scope:

The project management, engineering, procurement, construction, and commissioning of civil engineering, building, infrastructure, rail, aviation, power plants, nuclear power plants and industrial plants projects worldwide both alone and in joint venture.

For and on behalf of BSI:

Andrew Launn, EMEA Systems Certification Director

Original Registration Date: 2002-12-04
Latest Revision Date: 2019-11-21

Effective Date: 2018-11-16
Expiry Date: 2021-11-15

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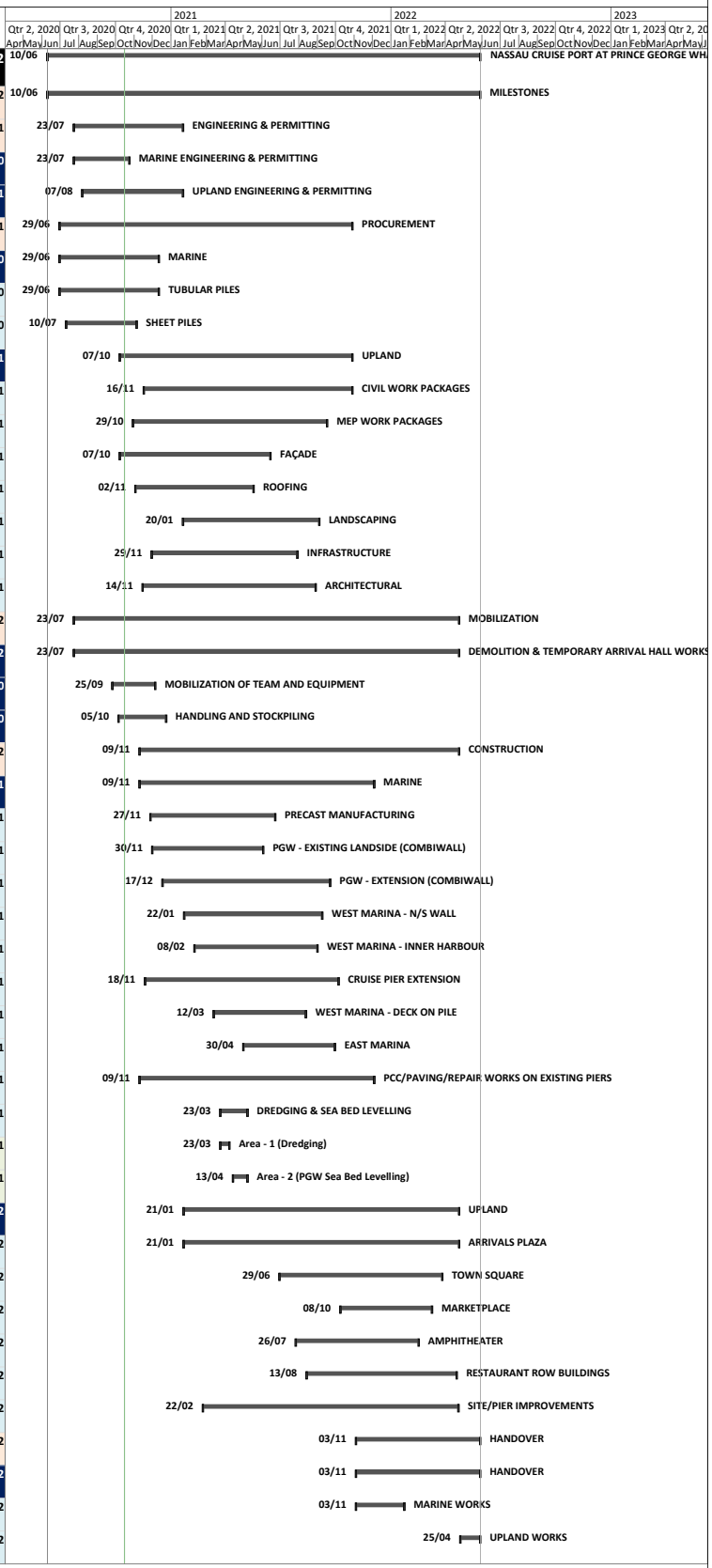
Appendix C: Construction Project Schedule (Draft)

ID	Task Name	Duration	Start	Finish
1	**NASSAU CRUISE PORT AT PRINCE GEORGE WHARF**	**581 days**	**10/06/2020**	**28/05/2022**
2	**MILESTONES**	**581 days**	**10/06/2020**	**28/05/2022**
17	**ENGINEERING & PERMITTING**	**141 days**	**23/07/2020**	**20/01/2021**
18	**MARINE ENGINEERING & PERMITTING**	**79 days**	**23/07/2020**	**23/10/2020**
26	**UPLAND ENGINEERING & PERMITTING**	**128 days**	**07/08/2020**	**20/01/2021**
34	**PROCUREMENT**	**395 days**	**29/06/2020**	**28/10/2021**
35	**MARINE**	**142 days**	**29/06/2020**	**11/12/2020**
36	**TUBULAR PILES**	**142 days**	**29/06/2020**	**11/12/2020**
40	**SHEET PILES**	**100 days**	**10/07/2020**	**04/11/2020**
43	**UPLAND**	**309 days**	**07/10/2020**	**28/10/2021**
44	**CIVIL WORK PACKAGES**	**346 days**	**16/11/2020**	**28/10/2021**
63	**MEP WORK PACKAGES**	**322 days**	**29/10/2020**	**16/09/2021**
106	**FAÇADE**	**250 days**	**07/10/2020**	**14/06/2021**
112	**ROOFING**	**196 days**	**02/11/2020**	**17/05/2021**
118	**LANDSCAPING**	**226 days**	**20/01/2021**	**03/09/2021**
124	**INFRASTRUCTURE**	**242 days**	**29/11/2020**	**29/07/2021**
130	**ARCHITECTURAL**	**287 days**	**14/11/2020**	**28/08/2021**
149	**MOBILIZATION**	**514 days**	**23/07/2020**	**23/04/2022**
150	**DEMOLITION & TEMPORARY ARRIVAL HALL WORKS**	**514 days**	**23/07/2020**	**23/04/2022**
158	**MOBILIZATION OF TEAM AND EQUIPMENT**	**61 days**	**25/09/2020**	**05/12/2020**
169	**HANDLING AND STOCKPILING**	**68 days**	**05/10/2020**	**23/12/2020**
175	**CONSTRUCTION**	**422 days**	**09/11/2020**	**23/04/2022**
176	**MARINE**	**314 days**	**09/11/2020**	**03/12/2021**
177	**PRECAST MANUFACTURING**	**160 days**	**27/11/2020**	**22/06/2021**
189	**PGW - EXISTING LANDSIDE (COMBIWALL)**	**142 days**	**30/11/2020**	**02/06/2021**
234	**PGW - EXTENSION (COMBIWALL)**	**219 days**	**17/12/2020**	**21/09/2021**
252	**WEST MARINA - N/S WALL**	**191 days**	**22/01/2021**	**08/09/2021**
264	**WEST MARINA - INNER HARBOUR**	**170 days**	**08/02/2021**	**31/08/2021**
295	**CRUISE PIER EXTENSION**	**256 days**	**18/11/2020**	**05/10/2021**
375	**WEST MARINA - DECK ON PILE**	**126 days**	**12/03/2021**	**12/08/2021**
426	**EAST MARINA**	**127 days**	**30/04/2021**	**29/09/2021**
453	**PCC/PAVING/REPAIR WORKS ON EXISTING PIERS**	**314 days**	**09/11/2020**	**03/12/2021**
482	**DREDGING & SEA BED LEVELLING**	**38 days**	**23/03/2021**	**07/05/2021**
483	**Area - 1 (Dredging)**	**12 days**	**23/03/2021**	**07/04/2021**
485	**Area - 2 (PGW Sea Bed Levelling)**	**22 days**	**13/04/2021**	**07/05/2021**
487	**UPLAND**	**373 days**	**21/01/2021**	**23/04/2022**
488	**ARRIVALS PLAZA**	**373 days**	**21/01/2021**	**23/04/2022**
800	**TOWN SQUARE**	**217 days**	**29/06/2021**	**26/03/2022**
1422	**MARKETPLACE**	**117 days**	**08/10/2021**	**09/03/2022**
1696	**AMPHITHEATER**	**161 days**	**26/07/2021**	**15/02/2022**
1733	**RESTAURANT ROW BUILDINGS**	**200 days**	**13/08/2021**	**19/04/2022**
1934	**SITE/PIER IMPROVEMENTS**	**345 days**	**22/02/2021**	**22/04/2022**
1959	**HANDOVER**	**165 days**	**03/11/2021**	**28/05/2022**
1960	**HANDOVER**	**165 days**	**03/11/2021**	**28/05/2022**
1961	**MARINE WORKS**	**57 days**	**03/11/2021**	**22/01/2022**
1964	**UPLAND WORKS**	**30 days**	**25/04/2022**	**28/05/2022**



Date: 16/10/2020

Task	Project Summary	Inactive Milestone	Manual Summary Rollup	Deadline			
Split	External Tasks	Inactive Summary	Manual Summary	Critical			
Milestone	External Milestone	Manual Task	Start-only	Critical Split			
Summary	Inactive Task	Duration-only	Finish-only	Progress			

Appendix D: Preliminary Site Layout

Appendix E: Cutter Suction Dredge Methodology

INTRODUCTION

A Cutter Suction Dredger (CSD) is classified as a hydraulic dredger and is one of the most common used type of dredging equipment. A CSD can dredge nearly all kinds of soils and is used where the ground is too hard, or the seabed too shallow, for trailing suction hopper dredgers.

There are non-propelled CSD's, which have a pontoon hull without the means of propulsion, and self- propelled CSD's that are shaped like a ship and are sea-going.

The dredging operation takes place with the CSD in a stationary position, thus even a self-propelled CSD will be anchored to the seabed with spuds or anchors while at work. It needs to lift all dredging gear from the seabed before they can navigate freely to other sections of the project or to a next project.

The following chapters show the layout of a CSD and explain the functions of each part within the dredging process:

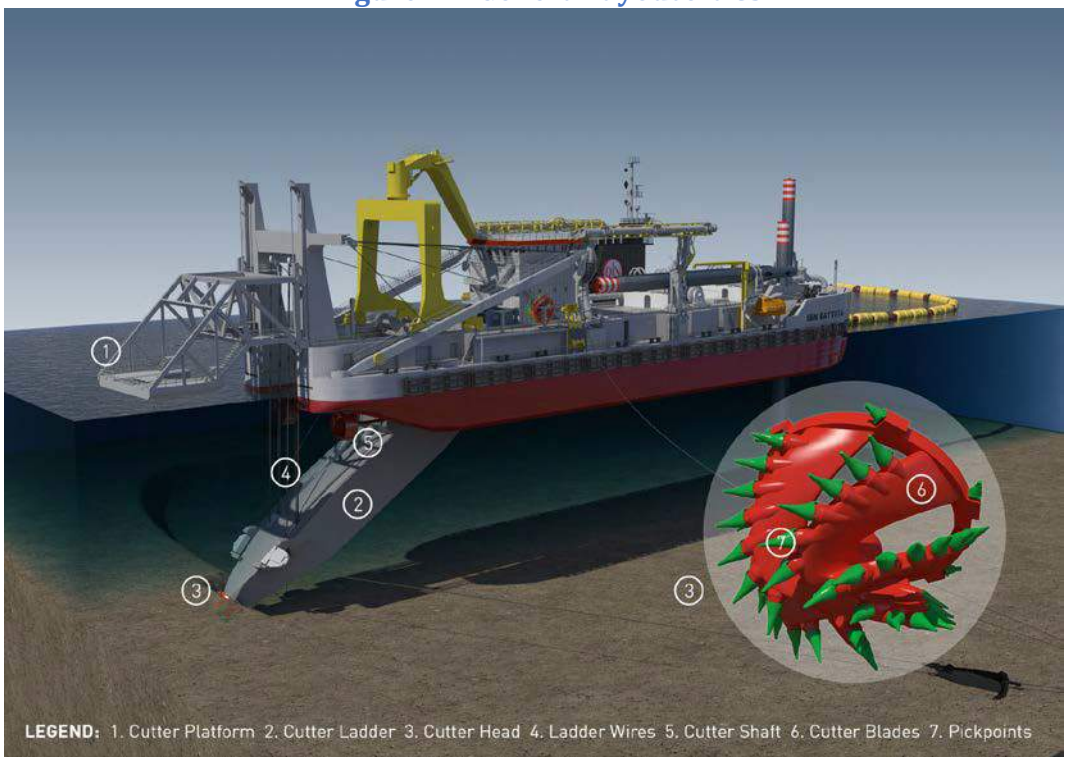
- Cutting
- Swinging
- Stepping and shifting spud
- Anchoring
- Pumping
- Discharging

CUTTING PROCESS

A CSD has a rotating cutter head, which is a mechanical device mounted at the end of the cutter shaft, in front of the suction mouth. The cutter head is able to cut hard soil or rock into fragments and rotates along the axis of the suction pipe.

The dredge pump sucks the cut soil inside suction pipe via the suction mouth, which is located inside the perimeter of the cutter head. Figure E-1 shows the general layout of a CSD.

Figure E-1: General layout of a CSD



Key - cutter platform (1), cutter ladder (2), cutter head (3), ladder wires (4), cutter shaft (5) and cutter head with cutter blades (6) and pick points (7).

CUTTER HEAD

The cutter head is the rotating cutting tool mounted on the end of the cutter shaft. The rotating motion of the cutter head creates a soil-water mixture that can then be transported hydraulically. The cutter head consists of a set of five or six blades with a half-sphere-shaped form. The cutter head design is different for different types of soil material. The number of blades and thus the opening between the blades varies depending on the type of dredged soil.

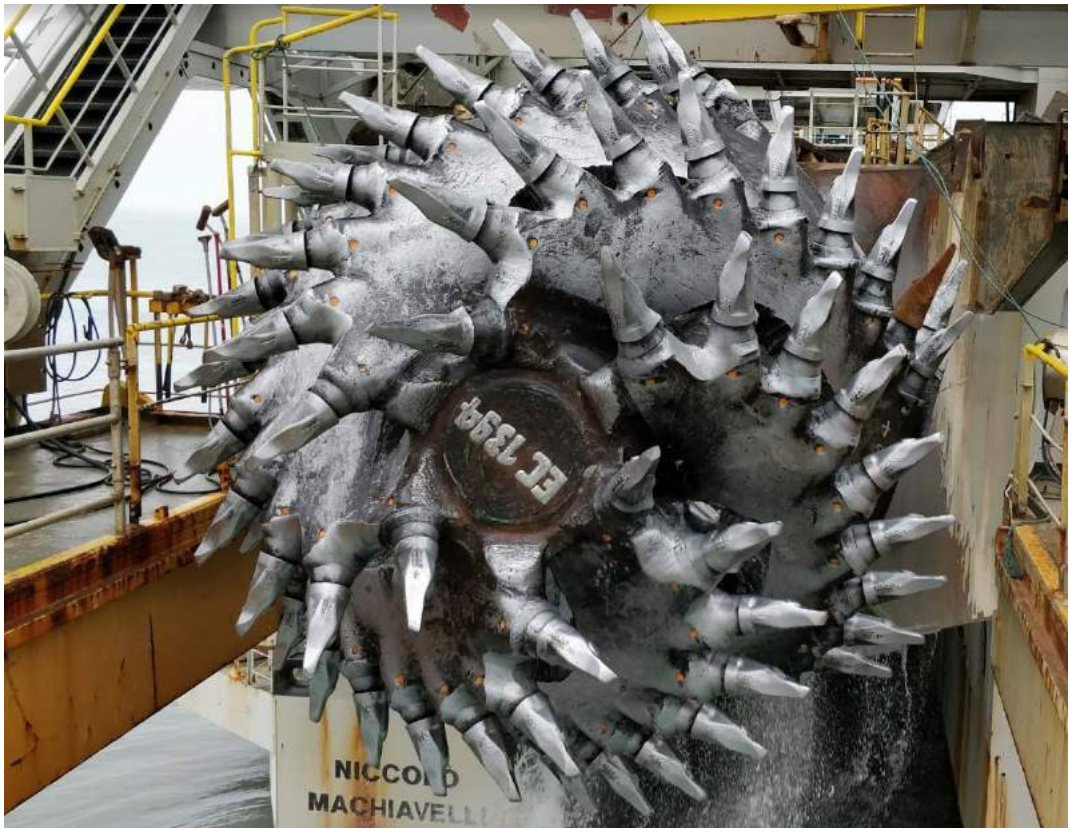
For hard soils, the cutter head has to withstand the impact forces on the teeth. The cutter head design is thus heavy with a small contour and replaceable teeth to withstand the extreme wear on both the cutter head and the teeth. The teeth used are of the type pick point.

For non-cohesive soils, high production rates can be achieved through optimal mixture formation in a wide and open cutter head. Replaceable teeth such as chisels will be able to withstand the wear with lower impact forces.

For cohesive soils, the primary concern is to avoid blocking of the cutter head during dredging. The cutter head in this case should have a large and round contour with fewer blades to reduce clogging. Chisels or flared points can be used as replaceable teeth to cope with the wear.

The cutter heads are interchangeable between similar CSD's and can easily and fast be replaced during dredging if required to cope with changed soil material or for an overhaul due to wear and tear.

Figure E-2: Cutter Head
with six blades and pick points to the blades attached with adapters



Each blade of the cutter head has a set of adapters installed to hold the cutter teeth in position. The cutter teeth break the soil material loose from the seabed and the shape of the cutter head blades ensures that the cut soil material moves to the suction mouth. There the vacuum created by the dredge pump ensure that the soil material enters the suction mouth and the suction pipe. The crew of the CSD inspects and replaces the cutter teeth when worn to maintain a good cutting efficiency. The cutter head is raised above the water line for inspection from the cutter platform.

CUTTER LADDER

The cutter ladder is attached to the hull of the CSD via a pin that allows the cutter ladder to pivot vertically with the help of the cutter ladder hoisting wire. This wire is connected to the ladder wire winch via the ladder gantry on both sides of the vessel. A swell compensator incorporated in the ladder wire helps to reduce the impact of waves on the position of the ladder

and cutter head. The swell compensator allows the CSD to maintain a continuous cutting depth even in less favourable weather conditions.
The cutter engine and underwater pump are inside the cutter ladder. The cutter engine drives the cutter head via the gearbox and cutter shaft. Thanks to its weight, the cutter ladder aids the cutter head to force into the seabed and cutting face. The length of the ladder determines the maximum cutting depth of the CSD. Some CSD's have an extra pivot point to increase their maximum range.

SWINGING PROCESS

The cutter head, the side wire anchors and the spud at the rear are the parts that connect the CSD with the seabed. During dredging, the CSD uses the spud as a pivot point to swing left to right and right to left around her centreline, called the swinging process. At the most right or left corner of the swing, the CSD either makes a step forward to advance the cutting face or lowers the cutter head to increase the dredge depth before she starts the next swing. Figure E-3 shows the CSD swinging left to right during dredging with help of side wire (2) and side wire anchor (3) that connect to the cutter ladder via the tumbling sheave (1).

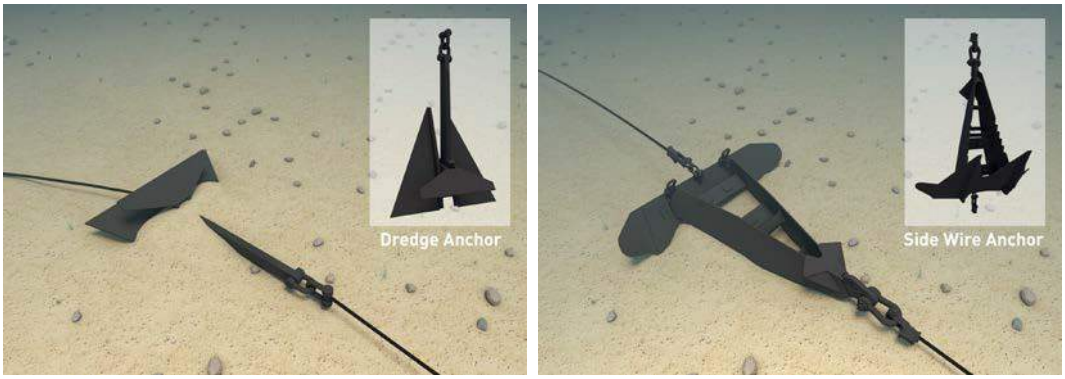
Figure E-3: CSD swinging

ANCHORS

The CSD swings left to right and vice versa by pulling the side wire on one side and by veering it on the other side. The side wire anchors are the fixed points used to exert the pulling force on.

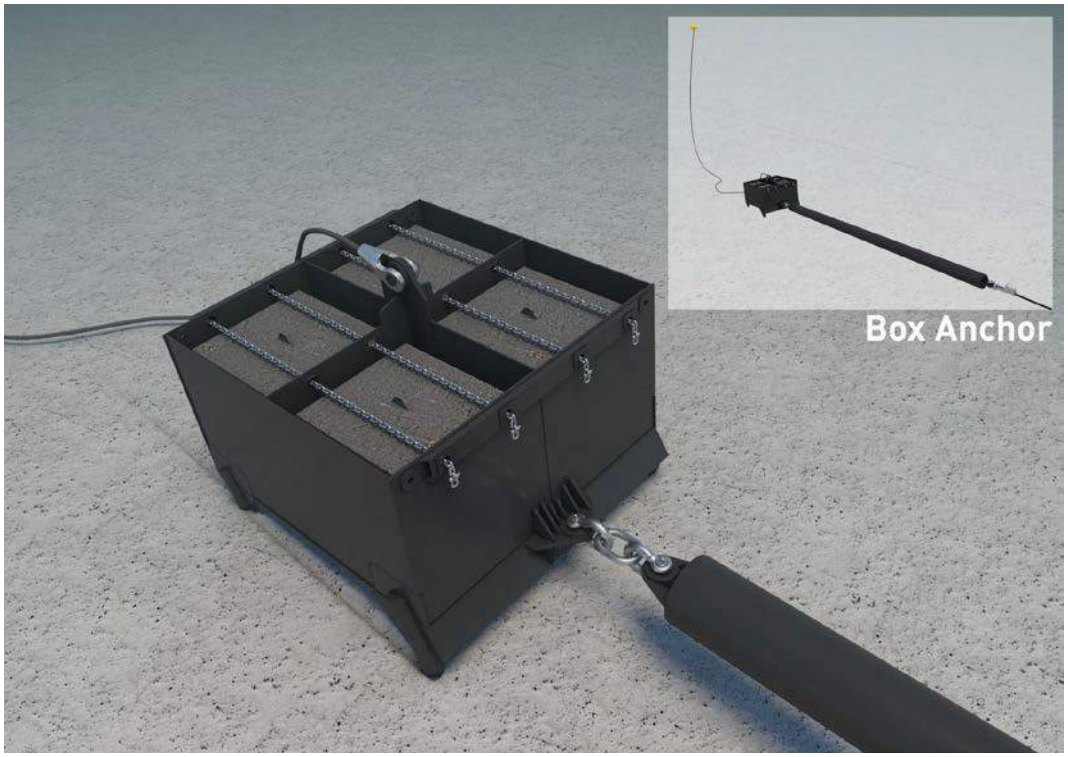
When the CSD has made sufficient progress on her centreline, she repositions her anchors to maintain their optimal effectiveness. A CSD uses one of two types of drag embedment anchors, depending on the working conditions and type of the soil material:

1. Dredge anchor (weight up to 20 ton) and
2. Side wire anchor (weight up to 30 tons, but extra weights can be added if required)



Drag embedment anchors can be repositioned by the anchor booms onboard the CSD or by an auxiliary anchor handling vessel. Gravity anchors need to be handled and positioned by an auxiliaryvessel and weight 120 to 180 tons).

Figure E-4: Gravity or box anchor



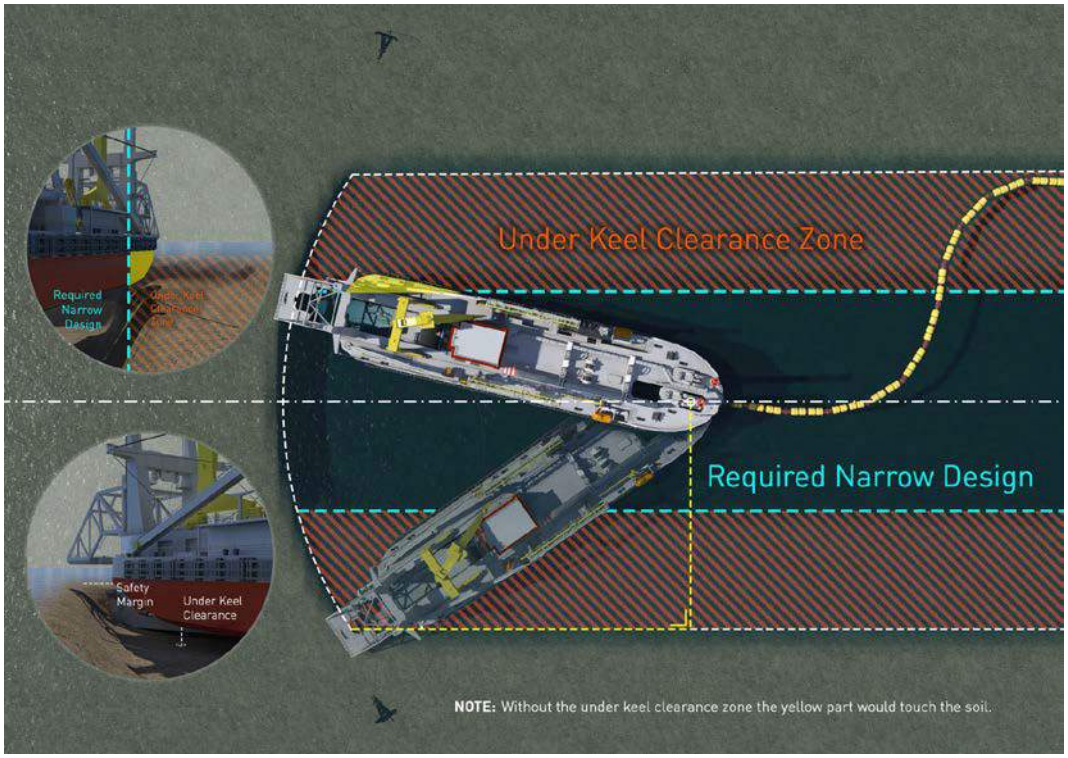
SIDE WIRES

Two side wires (left and right) swing the CSD around the main spud, which act as a pivot point. The end of the side wires is attached to the side wire anchor on one end and to the side wire winch on the other end. The side wire winches are located on the cutter ladder or on the bridge of the CSD. The tumbling sheaves shown in Figure E-3 guide the side wire from the winch to the end of the cutter ladder, where the cutter head is, to the side wire anchors placed on both sides of the CSD, outside the dredge area. The combined force of the side wire and the weight of the ladder forces the cutter head in the seabed.

FLOATATION CHANNEL

The CSD may need to create a floatation channel in areas where the water depth is less than the draught of the CSD. The geometry of the CSD and barges, if the CSD is barge loading, determines the dimensions of this floatation channel. The floatation channel is the volume dredged outside the design volume to create the necessary space for the CSD to work. The CSD requires a minimum channel width while swinging to avoid the hull making contact with the sea bed.

Figure E-5: CSD Floatation Channel



STEPPING AND SHIFTING SPUD PROCESS

At the end of the swing when the CSD is in the right or left side of the dredge cut, she needs to move forward to advance in the uncut seabed in front of the vessel. By pushing forward on the main

spud via the spud carrier, the CSD can move forward in horizontal direction. Each step can have a variable length, but is limited to the maximum reach of the spud carrier. The size of the step forward is chosen as a logic fraction of the maximum step length, typically between 0.5 and 2 meter, and depending on the type of soil material. Figure E-6 shows the stepping process of the CSD.

Figure E-6: CSD Stepping Process

The CSD moves forward by pushing via the spud carrier (1) on the main spud (2), while the auxiliary spud (3) is used to hold the CSD in position while the main spud is repositioned

When the spud carrier reaches the end of its range, the CSD retracts the spud carrier to its initial position. To hold the CSD in position during the retraction of the spud carrier, the CSD drops the auxiliary spud in the seabed. The vessel is then anchored stable on her auxiliary spud and cutter head. The CSD raises its main spud from the seabed and the spud carrier shifts back to the start position. After the spud carrier has finished moving, the CSD drops its main spud and raises its auxiliary spud from the seabed. Figure E-7 shows this spud shifting process.

Figure E-7: CSD Spud Shifting Process

The CSD retracts the spud carrier (1) by dropping the auxiliary spud (3) and raising the main spud (2).

SPUD POLES

The CSD has three spud poles:

1. Main spud
2. Auxiliary spud
3. Spare spud, not always present and not necessary for the dredge operations

The main spud at the bow of the vessel (the rear during dredging) serves two functions:
To provide a fixed pivot point around which the CSD swings from side to side to provide sufficient resistance to allow the cutter head to push into the cutting face. Without enough counterforce, the cutter head will not cut sufficient material thus decreasing the production of the CSD especially in harder strata. The CSD only deploys its auxiliary spud during the retraction of the main spud carrier to help maintain the vessel in its stationary position.

SPUD CARRIER

The spud carrier is the connection between the CSD and the main spud. It provides the forward motion to the CSD during stepping. When the CSD is at the end of her swing, it will be pushed forward by a hydraulic ram with a maximum stroke of 6 to 9 meters, depending on the type of CSD. Discrete steps of between 0.5 to 2 meters are taken when pushing the vessel forwards. The size of the step is determined by the soil resistance and the number of cut layers.

When the spud carrier is at the end of its stroke, the main spud is shift to a new forward position. Consequently, the following steps are made while maintaining the CSD in position by the auxiliary spud throughout the operation:

- Stop the swing with the cutter head on the centre line
- Drop the auxiliary spud in the seabed
- Raise the main spud from the seabed
- Retract the spud carrier back to the start position (minimum stroke)
- Drop the main spud in the seabed (position now 6 to 9 meters forward on the centreline)
- Raise the auxiliary spud and resuming the swinging process

When dredging in waves and at large water depths, the forces on the spud become increasingly higher. The latest generation of CSD's have a flexible spud carrier that allows limiting the forces on the spud, thus protecting the spud from damage while increasing the workability of the CSD.

This spud carrier acts like a gimbal when the overload on the spud exceeds a certain predetermined value, by allowing rotation and hence limiting the overload on the spud. This gimbal is realized by allowing the spud carrier with spud to pitch and roll via mechanical joints. It connects to large hydraulic cylinders and a nitrogen buffer system in order to set the overload force.

To help reduce the forces on the spud, some CSD's have a roll damping system installed. The roll damping system consists of a U-shape tank filled with water. Energised by the roll movement of the ship, the water is oscillating in the U-shape tank, which is counteracting the roll and stabilising the vessel.

ANCHORING PROCESS

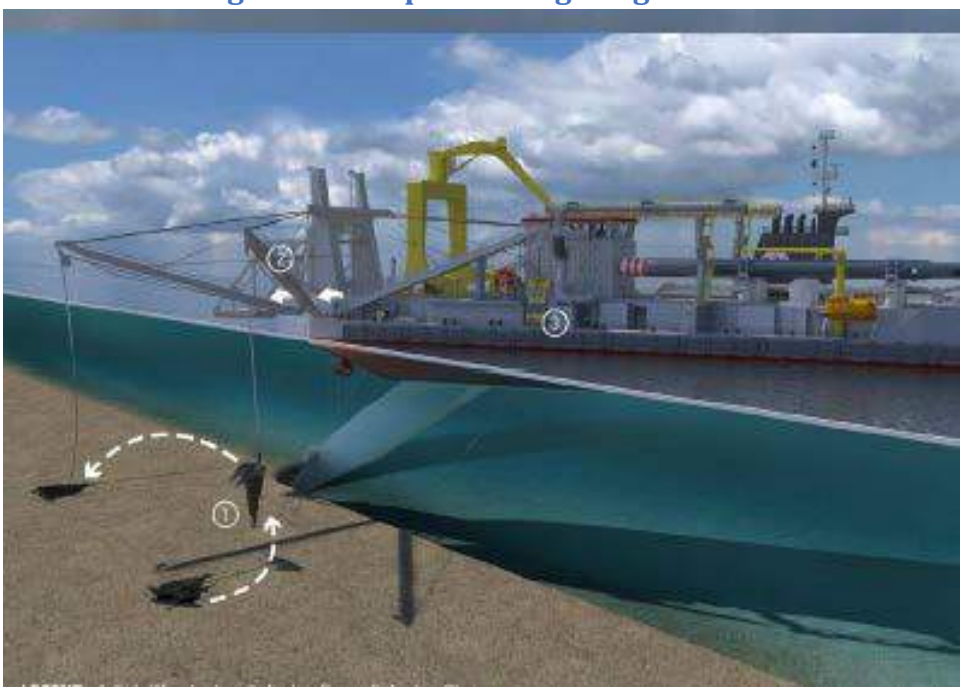
DRAG EMBEDMENT ANCHORS AND ANCHOR BOOM

CSD are equipped with anchor booms for lifting and repositioning of the drag embedment anchors without any externalassistance. Typically, the CSD repositions her side wire anchors after a few spud carrier shifts. To shift a side wire anchor, the CSD leaves the cutter head on the seabed and executes the following steps as shown in Figure E-8:

1. Swing the anchor boom outboard
2. Lift the side wire anchor with the pennant wire while the anchor boom is automatically guided above the previous position of the anchor
3. Rotate the anchor boom with the side wire anchor above water to the forward end position
4. Lower the anchor to the seabed on the new position and fix the anchor in position through pulling of the side wire
5. Retract the anchor boom back inboard and while releasing tension from the pennant wire

The CSD repositions the drag embedment anchor (1) with its anchor boom (2). The anchor sits in the anchor chair (3) when it is not being used.

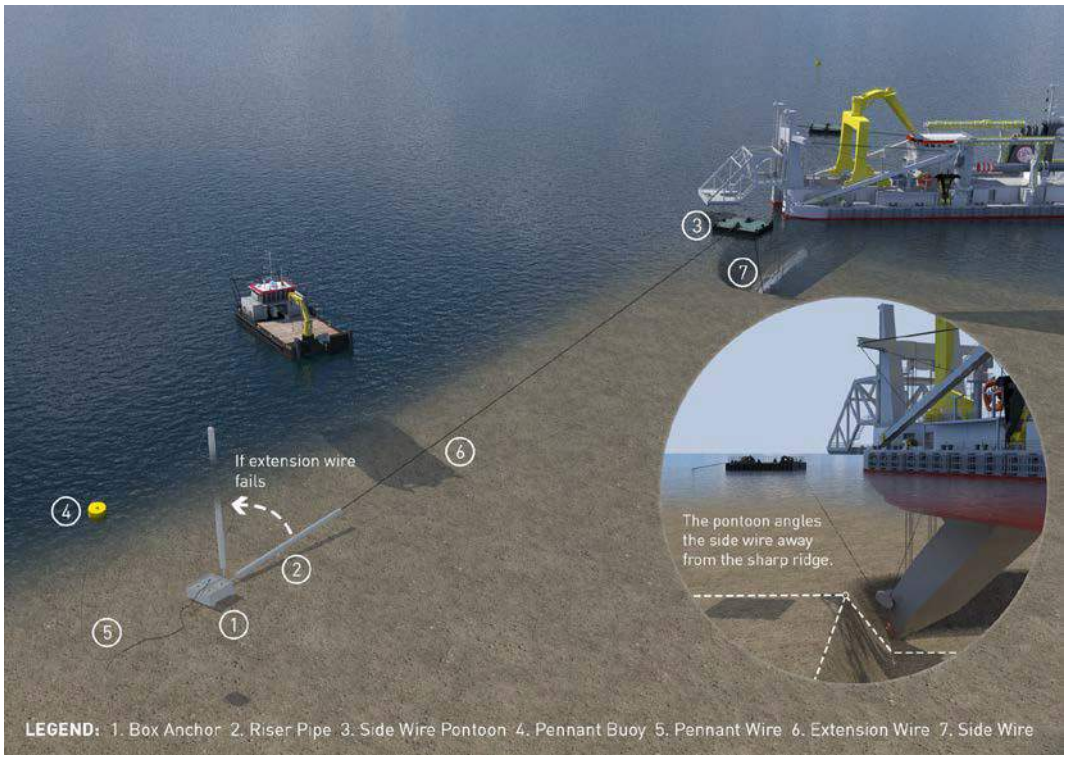
Figure E-8: Repositioning Drag Anchor



GRAVITY ANCHORS AND ANCHOR HANDLING VESSEL

When the seabed consists of hard rock stratum, a drag embedment anchor may not be able to penetrate sufficiently to provide the necessary reaction force. To counter this issue, a gravity or box anchor is used. This anchor has a rectangular box shape and contains up to eight modules of 15 to 20 ton each. The anchor has protruding pins at the bottom that combined with the weight of the anchor generates sufficient friction to provide the holding force for the swinging CSD. In Figure E-9, The setup of a gravity or box anchor (1) that connects to the side wire (7) via a riser pipe (2), an extension wire (6) and side wire pontoon (3). The pennant wire (5) which is accessible via the pennant buoy (4) allows lifting the anchor from the seabed.

Figure E-9: Complete setup of the gravity anchor



A riser pipe placed between the box anchor and the extension wire ensures that the connection can be easily repaired in case of wire failure. This pipe remains under water during operation, but rises to the surface when there is no tension on the extension wire. The extension wire connects to the side wire of the CSD via the side wire pontoon. This pontoon allows for an above water connection between the side wire and extension wire that is easily accessible. It also ensures that the side wire makes less contact with the seabed and dredged slopes. This reduces the wear and damage to the wires.

The side wire pontoon has quick release hooks that allow making a fast disconnection when the CSD has to take shelter in case of deteriorating sea state conditions. The box anchor and side wire pontoon remain in position. The CSD cannot lift the box anchor from the seabed due to its weight. Therefore, an auxiliary anchor handling vessel or pontoon is required to lift the box anchor via the pennant wire and bring it to a new position.

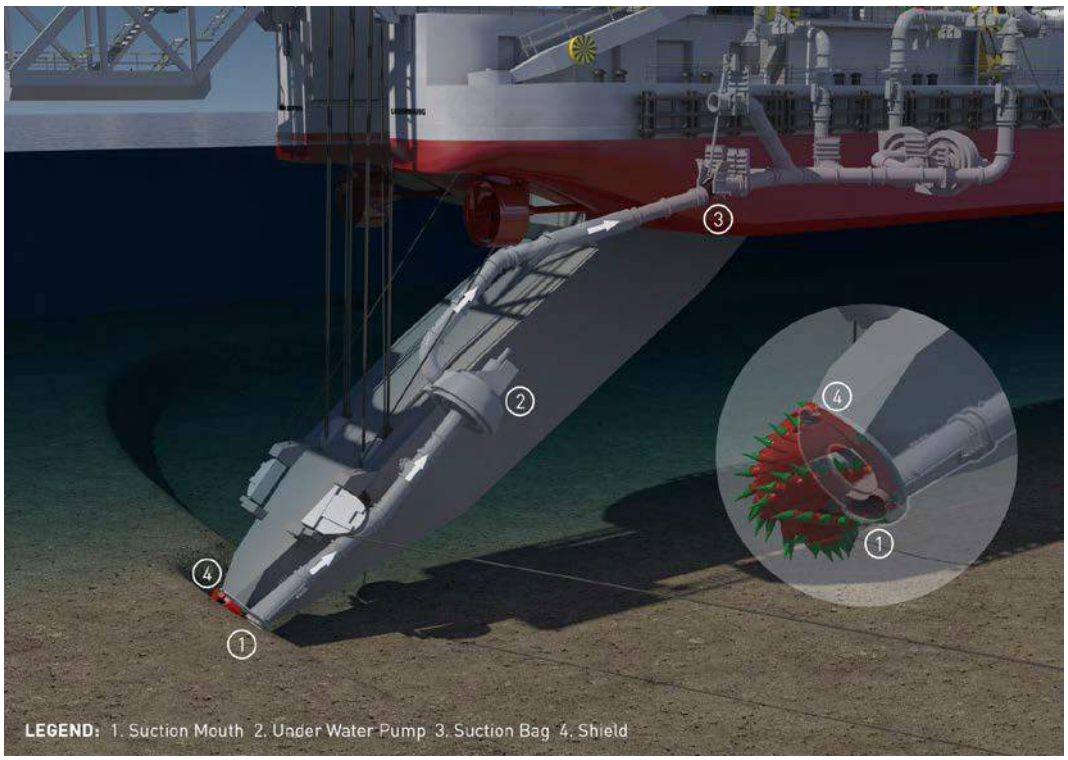
PUMPING PROCESS

SUCTION MOUTH

The rotating cutter head mechanically loosens the soil material. Inside the cutter head, the cut soil mixes with seawater and the dredge pump sucks the soil-water mixture in the suction

mouth. The suction mouth, located at the lower end of the cutter ladder, has a kidney shape and its optimal position allows the maximum amount of soil-water mixture to enter.
Behind the suction mouth is the suction pipeline and dredge pump located. Figure E-10 shows the setup of the parts of the pump process - the setup of the suction pipeline with suction mouth (1), inspection piece (2), underwater pump (3) and cutter shield (4)

Figure E-10: Pump Process



DREDGE PUMP CONFIGURATION

Most CSDs have one underwater pump and two inboard pumps. The configuration of the dredge pumps depends on several factors:

- Type of soil material
- Method of discharging, via barges or via pipeline
- Distance to discharge area

When placed in a serial configuration, the dredge pumps can boost the pressure of the soil-water mixture to allow for a long pump distance.

DISCHARGING PROCESS

The dredge pumps connect to the discharge pipeline. There are different types of discharge method possible:

- Onshore discharge
- Discharge via spray pontoon
- Barge loading

- Pre-cutting

ONSHORE DISCHARGE

For onshore discharge, the CSD places two or three dredge pumps in a serial configuration. The discharge pipeline that connects to the CSD at its bow consists of:

- Floating pipeline: steel pipes fitted with buoyancy pieces or rubber hoses that are self-floating
- Submerged pipeline: steel pipes welded to a single pipe that is resting on the seabed during operation to reduce hindrance to other shipping
- Onshore pipelines: steel pipes connected with bolts and flanges

Figure E-11 shows discharge onshore - the CSD (1) connects to a discharge pipeline that consists of floating, submerged and onshore pipes (2)

Figure E-11: Onshore Discharge

SPRAY PONTOON

When the discharge area is under water or when the discharge material needs to be spread out evenly, for example for a sand blanket, a spray pontoon can be used for discharge as shown in Figure E-12. Similar to the onshore discharge, two or three dredge pumps are placed in a serial configuration. Figure E-12 shows the setup of a spray pontoon (2) which connects to the CSD via the floating pipeline (1).

Figure E-12: Spray Pontoon

BARGE LOADING

When the distance to the discharge area is too great, barges may be more cost-efficient than pipelines to transport the dredged material. The CSD uses a special loading system typically located on both sides of the vessel. This allows two barges to be alongside the CSD simultaneously and reduce delay when switching the loading from one barge to the other. The barge remains alongside the CSD during swinging with the aid of a swell- compensated barge mooringsystem.

The CSD lowers the barge loading pipeline above the barge before start of the loading and has several openings regulated by valves allowing the dredged material to spread inside the barge hopper as shown in FigureE-13. Once the barge is fully loaded, it sails to an underwater discharge area and dumps to load on the seabed. Figure E-13 shows the CSD has a barge on either side during barge loading while the other barge sails to the discharge area.

Figure E-13: Barge Loading

PRE-CUTTING

During pre-cutting, the CSD discharges the dredged material directly back to the seabed via a pipeline attached to the submerged dredge pump. This bypass pipeline ends at the bottom of the cutter ladder and allows for an even spread of the dredged material behind the cutter head. Since the dredged material practically remains in place, it has to be removed by other means such as by trailing suction hopper dredger or backhoe dredger. Figure E-14 illustrates how pre-cutting works.

Figure E-14: Pre-cutting

The CSD discharges the dredged material via a pipeline (1) attached to the underwater pump back to the seabed (2).

In certain soil materials, the CSD can pre-cut without the use of the underwater pump. Then the cutter head only loosens the soil material without suction and deposition behind the cutter head. This can have a beneficial impact on the water quality inside the dredge area. However, there is a negative impact on the efficiency of the cutting process and the productivity of the CSD.

Mitigation measures in the event of a blow-out along the dredge piping system:
For pumping the material with floating pipeline: state-of-the-art floating pipe with ball joints will be utilized. Floating pipe of 900 mm diameter will be used (subject to change) and the pressure for these ball joints is designed up to 30 bar. Before the dredging process is started, as a control measurement, water will be pumped into the floating pipeline. Possible leaks in the floating pipeline will be noticed immediately (pressure loss on the measurements on-board and visually).

The specifications for two cutter suction dredger options being considered are provided in the tables below:

Proposed CSD-1

Length o.a.	138.5 m
Breadth	26 m
Draught	5.5 m
Dredging depth	35 m
Suction pipe diameter	900 mm
Discharge pipe diameter	900 mm
Barge loading pipe diameter	900 mm
Submerged pump power	4,250 kW
Inboard pump power	2 x 5,000 kW
Cutter power	7,000 kW
Propulsion power	2 x 3,500 kW
Total installed diesel power	23,520 kW
Speed	13 kn
Accommodation	46

Proposed CSD-2

Length o.a.	116.5 m
Breadth	19 m
Draught	4.85 m
Dredging depth	32 m
Suction pipe diameter	900 mm
Discharge pipe diameter	900 mm
Barge loading pipe diameter	000 mm
Submerged pump power	2,740 kW
Inboard pump power	2 x 3,530 kW
Cutter power	2,945 kW
Propulsion power	2 x 2,280 kW
Total installed diesel power	16,115 kW
Speed	11 kn
Accommodation	45

Appendix F: Land Reclamation Methodology

Prior to dredging the reclamation area will be confined with combiwall system consisting of tubular and sheet piles. There will be weir boxes at three locations (number may vary as per actual site conditions). There will be silt curtains installed at the outside of these weir boxes for turbidity control.

The pumping of dredged material will not start until all mitigation measures are in place. Mitigation measures will be determined upon the completion of the work specific risk assessment. The existing bulkhead which lies along middle axis of the reclamation area will be used to absorb the initial kinetic energy of the pumped slurry. The pumpline will be located in such a way that the slurry will first impact on the RC wall and then flow along the reclamation site.

Figure F-1: Route of slurry from pipe to basin

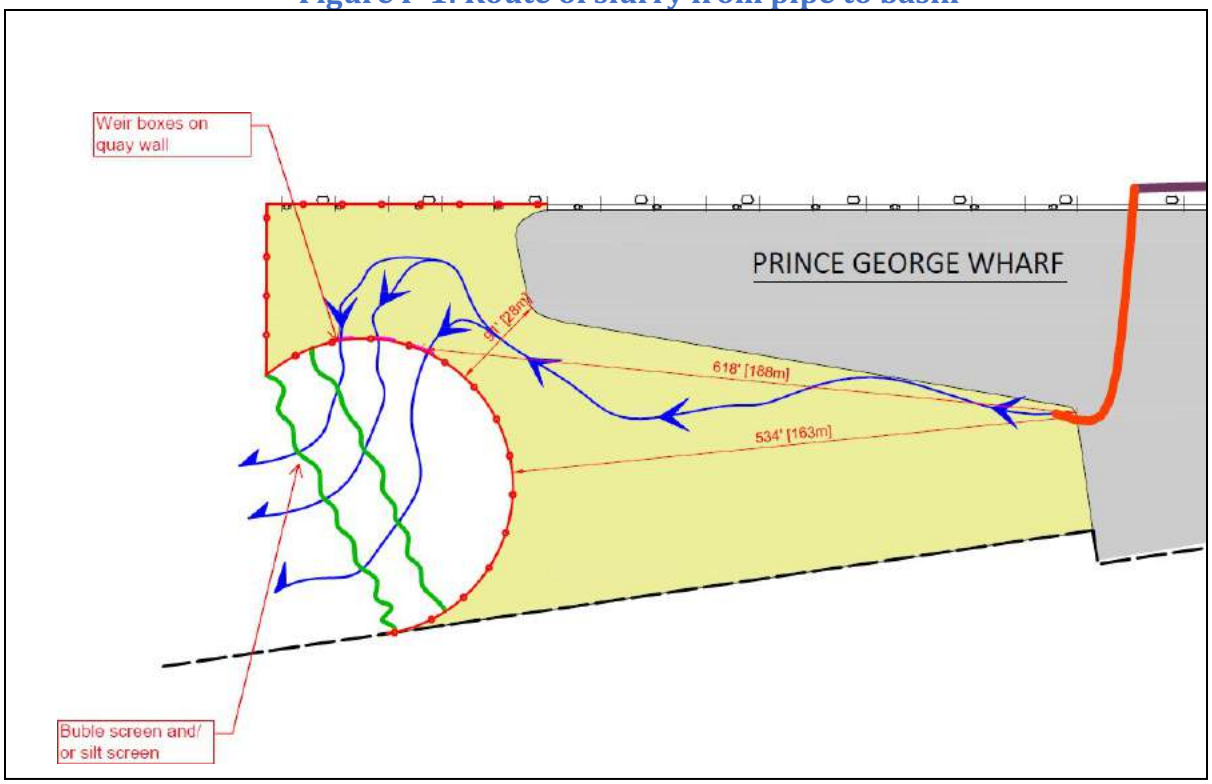
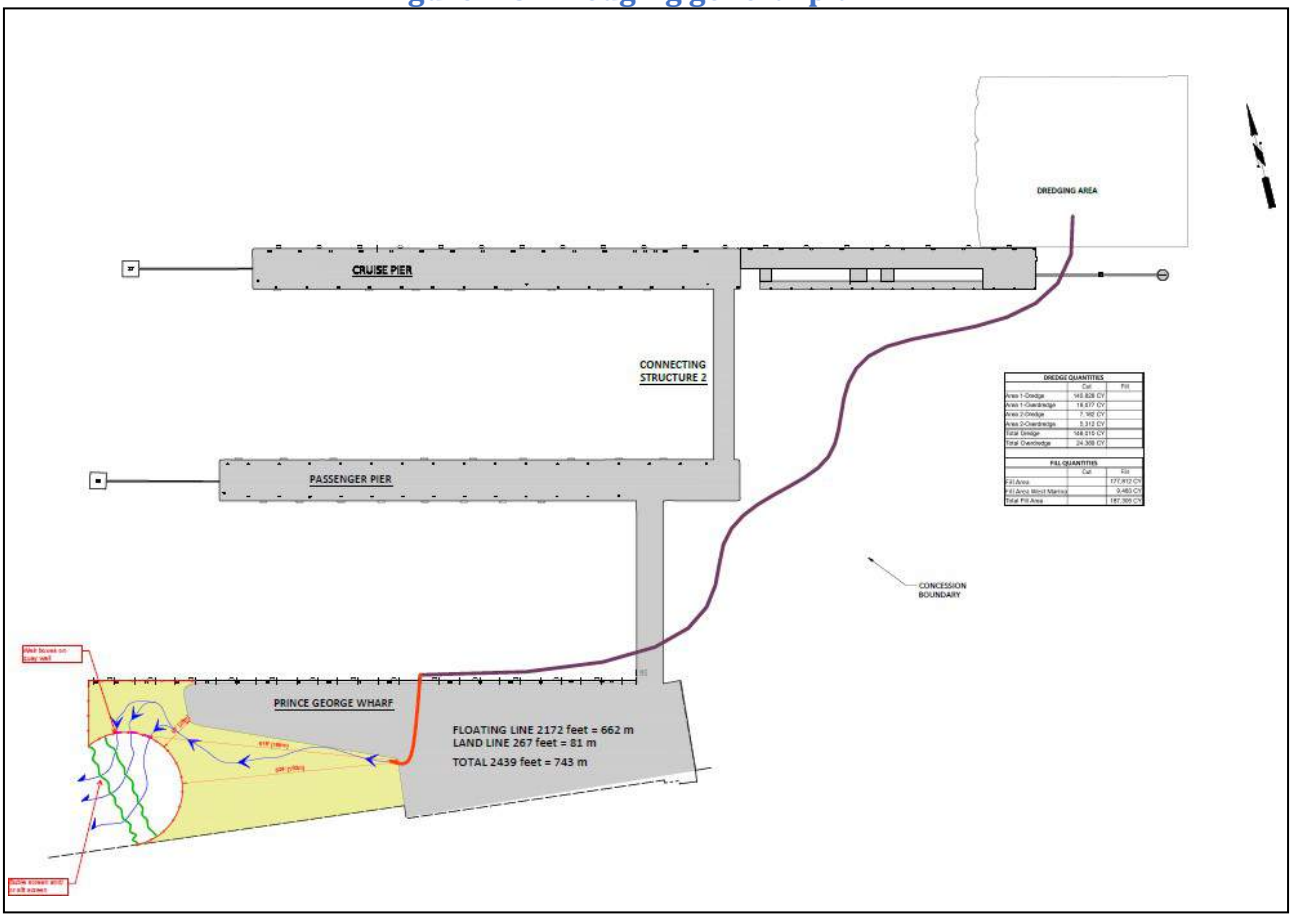


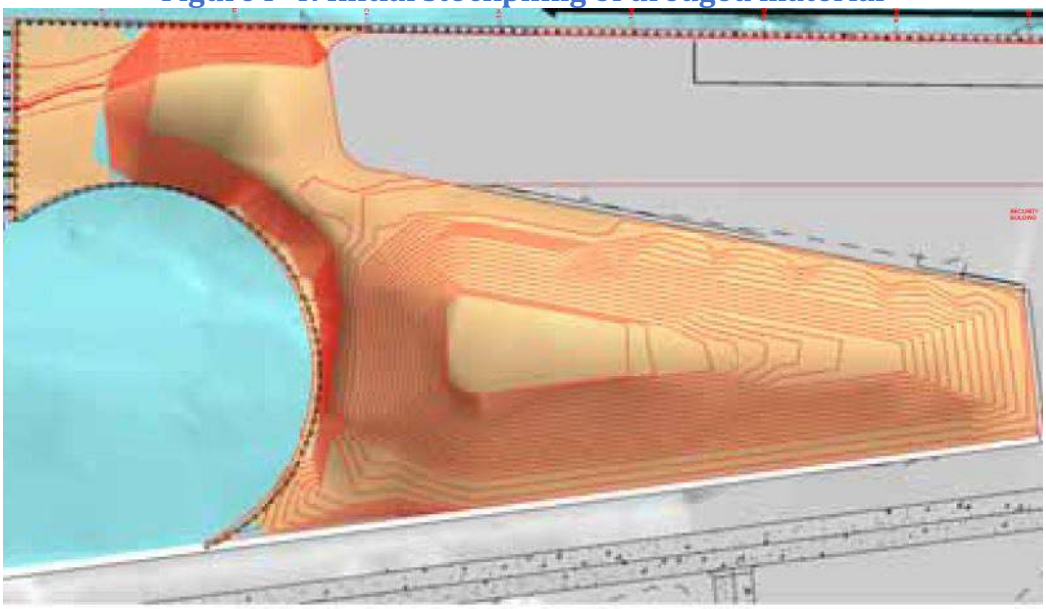
Figure F-2: Reclamation area view from pumping location

Figure F-3: Dredging general plan



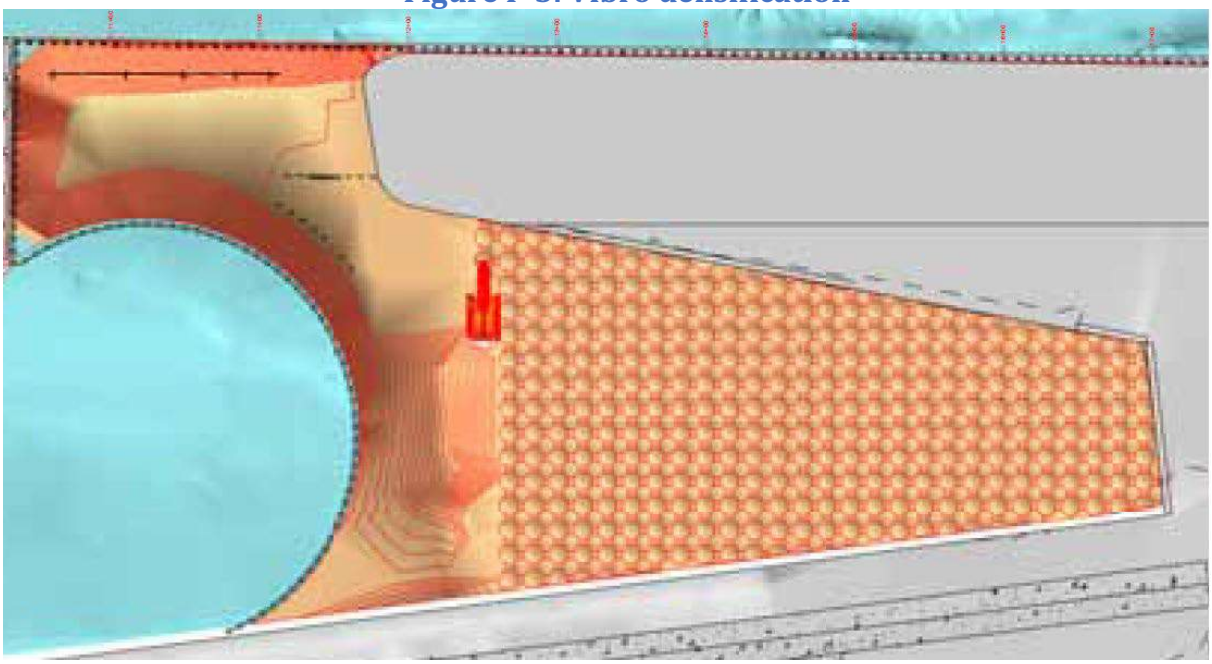
In order to avoid excessive load on the combiwall, the dredged material will be stockpiled close to landside and material will be pushed towards the bulkhead with dozers in a controlled manner.

Figure F-4: Initial stockpiling of dredged material



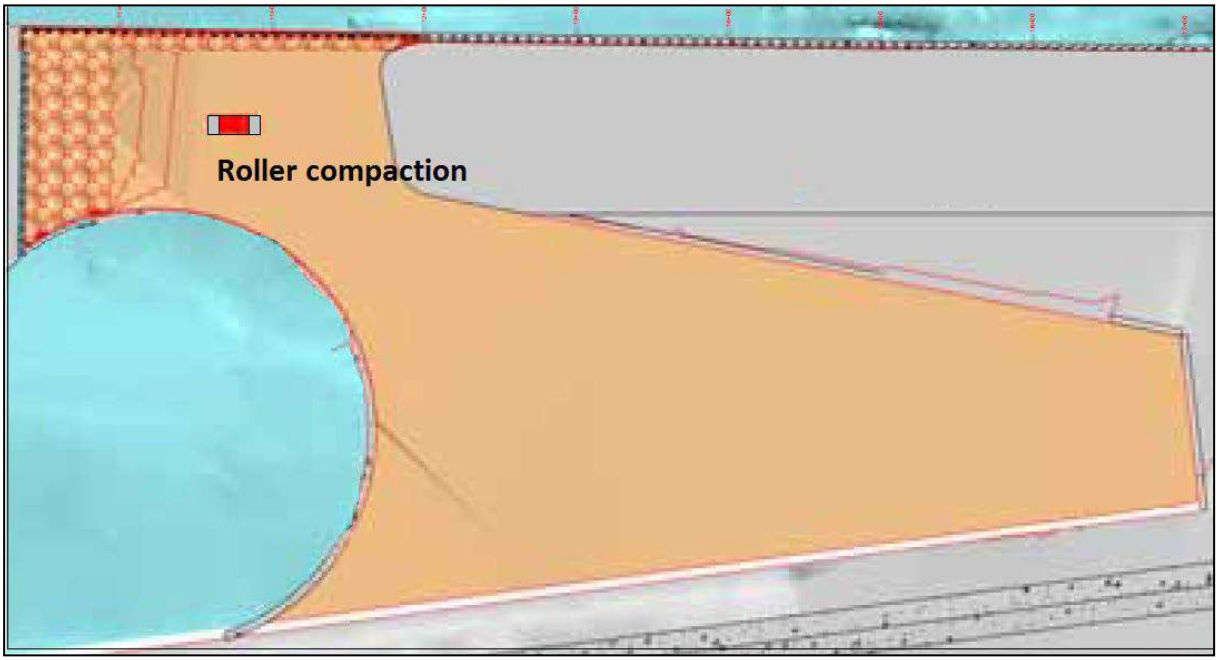
Reclaimed material will be compacted by vibro densification method up to msl +3.5' level to achieve 65% relative density.

Figure F-5: Vibro densification



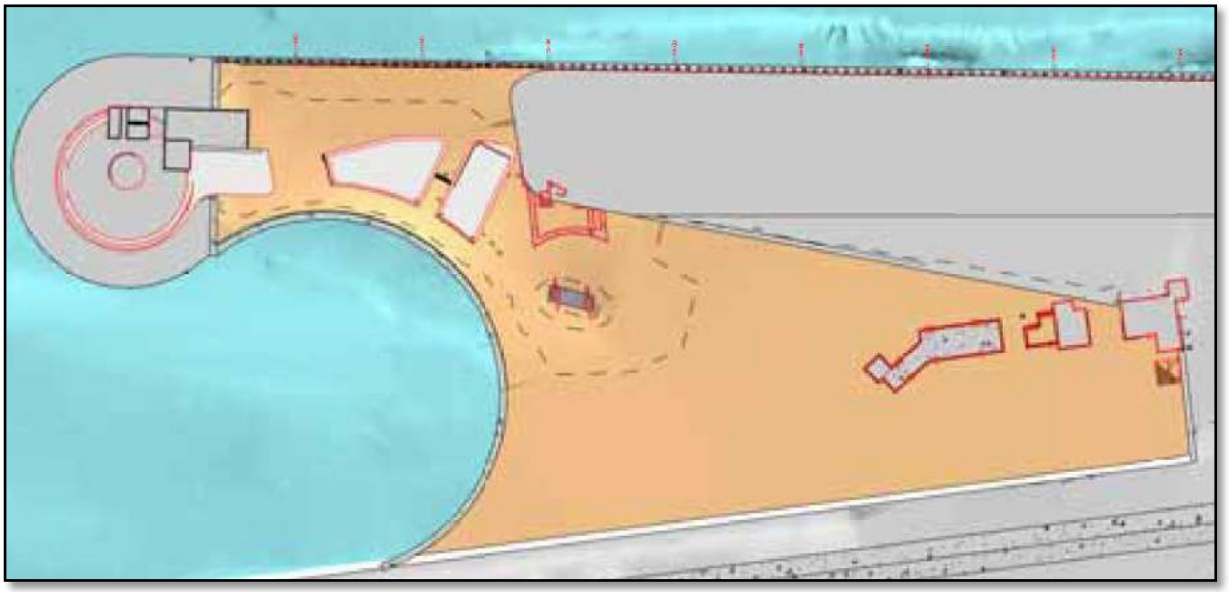
After elevation 3.5 is reached and tie-rod connections are completed the area will be reclaimed to final level of msl +8.00 level with roller compacted level of 2' max to achieve 95% relative density.

Figure F-6: Roller compaction



Once the compaction is finished the area will be ready to host superstructure of the Nassau Cruise Port Project.

Figure F-7: Super structure on reclaimed area



Appendix G: Protected Trees Assessment

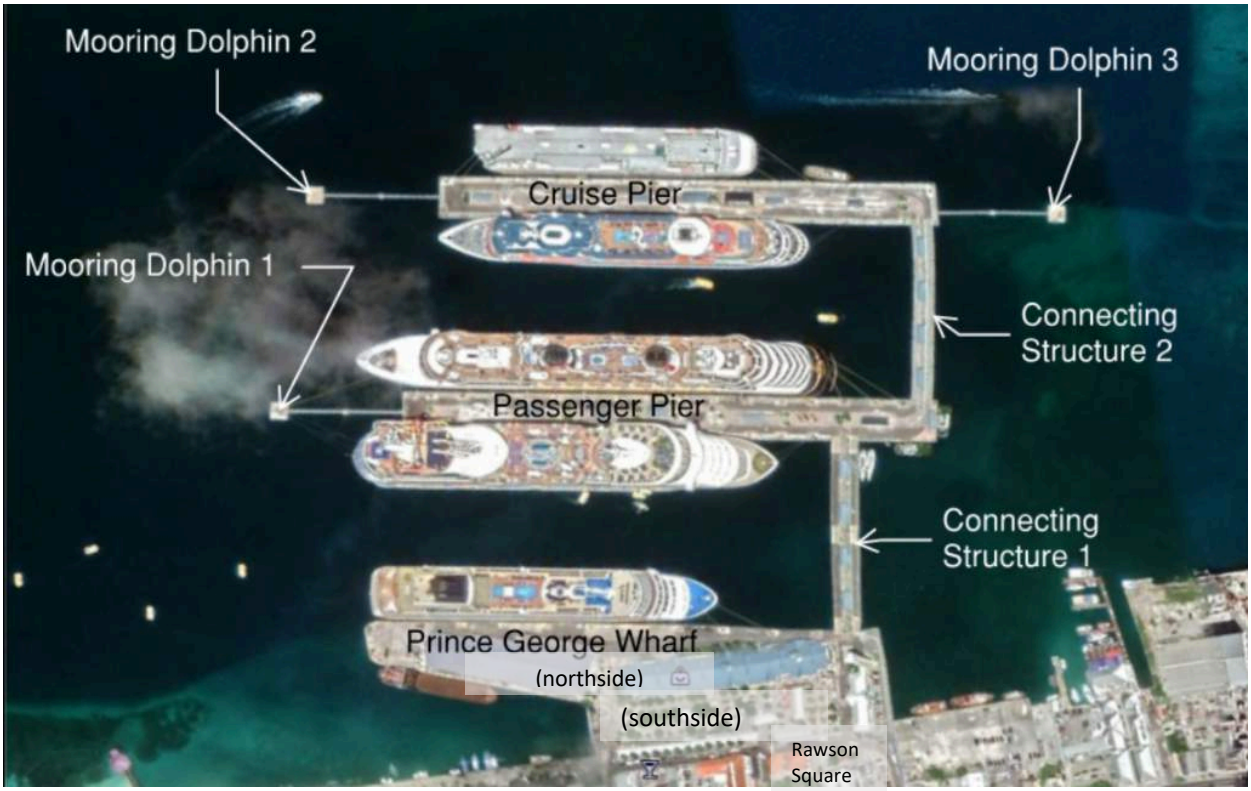
Project Site Description

The Nassau Cruise Port is located in the downtown area of Nassau, with entrances at Charlotte Street and Woodes Rogers Wharf (western entrance) and Parliament Street and Woodes Rogers Wharf (eastern entrance). It is an official Port of entry accessed near the western entrance of Nassau Harbour (the Harbour), between New Providence and Paradise Island (see Figure 1). The latitude and longitude at a central location in the Harbour is 25°4'55"N and 77°20'40"W.

Figure G-1: Project Location on New Providence

The current Nassau Cruise Port Project is focused on expanding the capacity of the Harbour to make way for an expanded cruise Port terminal able to accommodate larger ships. Nassau Cruise Port Limited (NCP) will transform the terminal to accommodate the increased arrivals, enhance the Woodes Rodgers Walk by constructing a state-of-the-art retail space, and landscape the streets running north to south from Woodes Rodgers Walk to Bay Street from Navy Lion Road to North East Street.

Figure G-2: Project Site - Prince George Wharf



The project site consists of approximately 13 acres (estimated in ArcMap) including;

1. Cruise Pier – northernmost pier (120,000 square feet).
2. Connecting Structure 2 – connects cruise and passenger pier (25,200 square feet).
3. Passenger Pier – longest pier, located between cruise pier and Wharf (132,000 square feet).
4. Connecting Structure 1 – connects passenger pier and Wharf (25,200 square feet).
5. Prince George Wharf 1 of 2 – northside, pier and welcome building (121,000 square feet).
6. Prince George Wharf 2 of 2 – southside, vendor area/adjacent to street (72,000 square feet).
7. Rawson Square – located opposite eastern gate and home to bust of Sir Milo Butler and Cabinet Office (90,000 square feet).

Vegetation throughout the site grows in constructed pot or planter structures located in the middle of each of the concrete piers and connecting structures. Structures vary in size and composition, with primarily landscape or decorative plant species. Prince George Wharf (southside) has the majority of the vegetation on site, specifically mature trees.

Methodology

SEV Consulting Group conducted a field survey at the Nassau Cruise Port on August 13, 2020 to identify protected tree species. The methodology for the fieldwork involved walking the entire 14-acre site. Access to the Port was provided by the Port Department via the eastern gate.

Field reconnaissance was guided by site maps provided by the NCP and ground-truthing was completed to determine where vegetative communities existed and to identify protected tree species, if present. Observations of protected tree species were recorded throughout the site and flagged upon identification.

Table G-1: Areas surveyed

Areas on Site	Acreage (estimated)
Cruise Pier	2.75
Connecting Structure 2	0.57
Passenger Pier	3.03
Connecting Structure 1	0.57
Prince George Wharf (1 of 2 – northside, pier and welcome building)	2.78
Prince George Wharf (2 of 2 – southside, vendor area adjacent to street)	1.65
Rawson Square	2.06
Total	**13.41**

Results

There are 1,371 plant species recorded for The Bahamas (Correll and Correll, 1982) and twenty of those recorded are endemic. Part IV of the 2010 Forestry Act ensures the protection of several species. Table 2 lists all eleven protected species under the Protected Tree Order[1] and on-site presence or absence at the site.

[1] This references the Conservation and Protection of the Physical Landscape of The Bahamas (Declaration of Protected Trees) Order, 1997. While the 2010 Forestry Act was supposed to result in a repeal of this Order, the Forestry Unit nor the responsible Minister has issued a new Order, so the 1997 list of species is the only known list for The Bahamas.

Table G-2: Protected Tree List and Occurrence at Nassau Cruise Port

Scientific name	**Common Name**	**On-Site**
Guapira discolor	Beefwood (Blolly)	Observed, Rawson Square
Pera bumeliifolia	Black ebony	Not observed
Caesalpinia vesicaria	Brasiletto	Not observed
Gochnatia ilicifolia	Candlewood	Not observed
Pinus caribea var. bahamensis	Caribbean Pine	Not observed
Lysiloma sabicu	Horseflesh	Not observed
Guaiacum sanctum	Lignum vitae	Observed, Rawson Square
Swietenia mahogoni	Mahogany	Observed, Prince George Wharf
Rauvolfia nitida	Rauwolfia	Not observed
Juniperus bermudiana	Red cedar	Not observed
Ceiba pentandra	Silk Cotton	Not observed

Thirty-one (31) Mahogany (*Swietenia mahogoni*) trees were observed and flagged in the Prince George Wharf (southside) area. Two (2) Lignum vitae (*Guaiacum sanctum*) trees were observed and flagged at Rawson Square (both adjacent to the bust of Sir Milo Butler). One (1) mature Blolly (*Guapira discolor*) tree was also observed at Rawson Square. See photos in Table 3.

Table G-3: Protected trees observed and photos

Scientific name	**Common Name**	**Location**	**Photos**		
			Tree/Trunk/Branches	**Leaves**	**Flower/Fruit/Seed**
Guaiacum sanctum	Lignum vitae	Rawson Square			
Swietenia mahogoni	Mahogany	Prince George Wharf			

Guapira discolor	Beefwood (Blolly)	Rawson Square			No fruit/flower/seed observed

Table G-4: Site Photos

	Photos		
Areas on Site	**West**	**North**	**East**
Cruise Pier			
Connecting Structure 2			

Passenger Pier			
Connecting Structure 1			
Prince George Wharf 1 of 2 (northside, pier and welcome building)			

Prince George Wharf 2 of 2 (southside, vendor area adjacent to street)			
Rawson Square			

Appendix H: Coral Relocation Plan

Prepared by Craig Dahlgren, PhD
Perry Institute for Marine Science (PIMS)

Overview

Corals are critical components to tropical marine ecosystems. As ecosystem engineers, they build reef structure that supports high biodiversity and provides invaluable ecosystem services. Nevertheless, corals are among the most endangered species in tropical marine ecosystems, suffering from various natural and human threats that not only jeopardize coral species, but threaten the structure, function and integrity of an entire ecosystem and puts species that depend on this ecosystem at risk. As such, there is a need to reduce loss of corals in areas impacted by coastal development and other human activities. Here we describe a specific plan of action and timeline for removing corals from the Nassau Cruise Port area prior to construction activities and relocating them to an area where they will have a chance to grow and survive.

500 corals will be moved. The corals are scleractinian, reef-building stony corals, including *Pseudodiploria* sp., *Orbicella* sp. and *Porites astreoides*. They range in size from 10 cm to 1 m. No fire coral, soft corals or spongy were observed.

Coral Removal and Translocation

All reef-building stony corals larger than 10 cm will be removed from the seafloor and man-made structures in the Nassau Cruise Port area (diagram outlining exact area to be provided by the Nassau Cruise Port or designee based on EIA and government requirements). Removal will be conducted by 2 to 4 PIMS staff members.

Individual corals will be removed by hammer and chisel to effectively remove the limestone coral skeleton from its point of attachment and leaving the living tissue of the coral unharmed. Corals removed will be collected and kept underwater in mesh bags, basket or other containers that allow water to flow through until the time that they will be relocated. At that time all corals collected will be brought to the surface and put in coolers on a surface support vessel for immediate transport to a nearby area where they will be outplanted.

The proposed site for translocation is the western tip of Paradise Island. The site was selected based on:
(1) environmental requirements of the coral,
(2) ensuring they are outside of any impact from construction activities at the Port, and
(3) condition of corals at outplant site.

For this last point, we are particularly concerned with disease transmission to and/or from translocated corals We will avoid moving corals to areas infected by disease or otherwise unsuitable, and we will avoid risking spread of disease from translocated corals to natural populations. Final site selection will be confirmed with the relevant government oversight agents.

Translocation will consist of removing vegetation (i.e., algae) and sediment from hard ground at the translocation site to allow for the outplanting of corals removed from the Port. Corals will be outplanted using Portland Type 2 cement and/or 2-part underwater epoxy, depending on the size of the coral. To minimize stress to corals, corals will be removed and outplanted daily without the need for holding them extensively.

Photographs will be taken of outplanted corals to determine number and species of corals outplanted as well as to provide a baseline for monitoring the success of the translocation efforts by fate tracking individual corals.

Timeline

Coral removal and translocation can begin as early as allowed (based on construction timeline, permitting considerations and/or COVID 19 restrictions). Because of the need to minimize holding time of corals plus the potential for limited working time every day at the Port due to tidal currents and diver safety considerations, it is expected that the work will be completed over a 2-week window where daily time on site at the Port is determined by the timing of tidal flow.

Monitoring & Reporting

Coral monitoring of relocated area will occur at the time intervals – 1 month, 3 months, 6 months, 9 months, and 12 months. In Year 2 post-relocation, monitoring will be done every quarter. Assessment will include – health observation of reattached coral colonies, colonization of relocation site, reef fish associated with relocation site, number of surviving colonies, difference in live tissue cover, rate of disease, number of recruitments, bleaching, and boring sponges or other invading organisms. If algae or other fouling organisms (e.g. tunicates, sponges and hyrdoids) are found invading the coral, these organisms will be removed. Wire brushes and hand tools will be used to clean areas surrounding the corals so that algae do not outcompete them.

A Coral Relocation Monitoring Report will be submitted to DEPP upon completion of the exercise. Reports will also be submitted to DEPP after each monitoring exercise.

Appendix I: Turbidity Control Methodologies

A **silt fence** is a temporary sediment barrier consisting of filter fabric entrenched into the soil and attached to supporting posts. It is a sedimentation control device. This device is intended to be installed where sediment-laden water can pond, thus allowing the sediment to fall out of suspension and separate from runoff. Silt fences keep soil on a construction site rather than letting it be washed away into nearby water bodies (which can degrade aquatic habitats), roadways or storm drains (which can become blocked with sediment).

Silt fences are most effective under the flowing conditions:

- The size of the drainage area is no more than 0.25 acres per 100 linear feet of silt fence. Water flowing over the top of the fence during normal rainfall indicates that the drainage area is too large.
- The maximum flow path length above the fence is 100 feet.
- The maximum slope gradient above the fence is 2:1.
- Small swales are carrying silts, the slope is less than 2% and the drainage area is less than 2 acres.

Gravel/Sand Bag Barriers intercept and slow the flow of sediment laden runoff. They serve as a filter to slowly release filtered water. The bags can be used along the perimeter of a construction site or parallel to roadways to keep sediment off of paved areas. Stacked gravel or sand bags placed along a level contour to detain runoff from disturbed areas retain sediment suspended in the runoff and release water as sheet flow. They also can be used to divert runoff flow, create a temporary sediment basin or as a check dam. They can be more practical than silt fences or fiber rolls for prolonged construction projects because they are more durable.

Gravel bags are preferred over sand bags near storm drain inlets because they filter water without preventing it from entering the storm drain. Sand bags can act as a complete water barrier after being inundated with water. Gravel and sand bags need to be inspected after significant storm events. When sediment reaches one-third barrier height, accumulated silt must be removed. All washouts and other damages to barriers need to be repaired as needed.

Limitations of gravel/sand bags include:

- Installation of sand or gravel bags can be labor intensive.
- They should not be used to detain runoff flows with a high concentration of sediment.
- Do not completely surround drain inlets with gravel or sand bags. Use sand bags to create an L or J shape from the curb pointing up slope or away from the drain to cause a ponding effect.

- Never stack sand bags above the level of a curb.

During dredging, best management practices to reduce sediment resuspension and contaminant loss when using a cutter suction dredge[2] include:

- **Reduce cutterhead rotation speed.** Reducing cutterhead rotation speed reduces the potential for side casting the excavated sediment away from the suction entrance and resuspending sediment. This measure is typically effective only on maintenance or relatively loose, fine grain sediment.
- **Reduce swing speed.** Reducing the swing speed ensures that the dredge head does not move through the cut faster than it can hydraulically pump the sediment. Reducing swing speed reduces the volume of resuspended sediment. The goal is to swing the dredge head at a speed that allows as much of the disturbed sediment as possible to be removed with the hydraulic flow. Typical swing speeds are 5-30 feet/minute.
- **Eliminate bank undercutting.** Dredgers should remove the sediment in maximum lifts equal to 80% or less of the cutterhead diameter.
- **Use experienced operator**. Experienced operators can better reduce sediment resuspension while maintaining production.
- **Avoid tidal extremes**. Tidal extremes may limit the distance that suspended sediments travel.
- **Avoid adverse weather**. Avoiding adverse weather will reduce spillage during sediment offloading/transport.

Specific site containment BMPs to use if operational measures prove inadequate include:

- **Silt curtains or turbidity booms** are deployed in water to control suspended solids or turbidity resulting from dredging operations.
- **Bubble screens** are created by placing a weighted, perforated tube on the seabed and pumping compressed air through it. The bubbles rise up through the water column, trapping sediment and preventing the spread of silt.
- **Geotubes** are high-strength, woven geotextiles designed to resist pressures from dredge pumping operations while fully containing the sediments. The bags are connected to the discharge end of a hydraulic dredge and filled with the sediment or water slurry. The geotextiles contain special filtering properties that provide for the rapid dewatering of the material.

Important points to note regarding selection, design and deployment of silt curtains or turbidity booms are:

[2] PBS&J. (2008). *Best Management Practices (BMPs) for Construction, Dredge and Fill and Other Activities Adjacent to Coral Reefs*. Miami, Florida: SEFCRI and FEDP.

1. The device should be used in slow to moderate currents, stable water levels and relatively shallow water depths.
2. The device should be designed to pass water either under or through it.
3. In applications where the device will be extended to the bottom of the water body, in tidal or moving water conditions, a heavy woven pervious filter fabric or tide flaps should be designed into the device to create a permeable design and to relieve pressure on the device wall.
4. Silt curtains should not be used in current velocities higher than 3 – 5 knots unless special designs are developed to adapt to higher velocities.
5. Extra length (up to 10 – 20%) and depth (slack) of curtains should be included in designs to allow for tidal fluctuations and exchanges of water within the device.
6. Special designs may be required for applications of curtains at depths greater than 10- 15 feet and/or currents exceeding 1.5 knots.
7. A minimum continuous span of 50 feet between joints is a good 'rule of thumb'. An excessive amount of joints can prove problematic.
8. The curtain should be a bright color (e.g. yellow or bright orange) to attract attention of nearby boaters so they do not run into the curtain.
9. In tidal situations, where currents move in both directions, it is important to attach anchors to both sides of the device to hold the curtain in place and to not allow it to overrun the anchors and pull them out when the tide reverses.
10. Anchor lines should be attached to the flotation device, not to the bottom of the device.
11. Removal of curtains and screens should be in a manner to avoid or minimize resuspension of settled solids.

Appendix J: Spill Response Plan and Reporting

This spill response plan applies to activities during construction and operation. The most likely spill during both phases are oil spills in the marine environment

SPILL PREVENTATIVE and CONTROL MEASURES

Fueling on site can result in spills of gasoline diesel and oil, which are common sources of marine pollution and are costly to clean up. Preventative measures for fueling will include:

1. Establishment of a designated fuel dispensation area outside of the Port perimeter, i.e. away from water.
2. Installation of floating docks or stationary skids to provide a more stable platform to prevent rocking during fueling in order to prevent spills.
3. Ensuring a fuel attendant is on hand to dispense fuel at all times. During operation, unattended fueling by customers will be prohibited.
4. Topping off practices when fueling will be discouraged. Tanks should not be filled beyond 95%. Impervious fire-proof containment trays should be used when filling small cans to contain any possible spills. Easy to read signs will be posted at the fueling station to explain proper fueling procedures.
5. To prevent overflow spills, automatic back pressure shut-off nozzles will be installed on the fuel pump discharge hoses. Fuel nozzle triggers that are used to hold the nozzle open without being held will be removed if automatic shut-offs are not available.
6. Secondary containment, such as drain pans, will always be used during fueling in the event of a fuel spill or leak.
7. The fueling system will be briefly inspected daily and thoroughly inspected once a week by fuel attendant(s) for leaks and overall soundness.
8. All spent fluids will be collected for either storage or recycling.
9. Absorbent materials, such as pads and booms, will be readily available at the fueling station in clearly identified containers in the event of a spill. Used absorbent materials will be disposed of off-site by a licensed company. The spill response container will also contain fire extinguishers, a copy of the Spill Response Plan, and the emergency contact list. This container will be clearly marked and easily accessible in order to quickly react to any potential spills. An inventory of equipment will be taken monthly or after use and a list of items needing replacement will be submitted for purchasing immediately.
10. The components of the spill response plan include who to notify when a spill occurs, immediate spill response actions, a contact list for response communications, a response chain-of-command in the Port, an inventory of spill response equipment and its location. Easy-to-read signs will be posted at the fueling station informing attendants and other users what to do to contain fuel and oil in the event of a spill. Signs will also include a “No Smoking” sign to avoid risk of explosion.

11. All appropriate construction and operation staff should be trained at least bi-annually in proper fueling, proper maintenance techniques, and the implementation of the spill response plan.

In addition to the good housekeeping and material management practices discussed in the previous sections of this EMP, the following practices will be followed for oil spill prevention and cleanup:

1. Manufacturer's recommended methods for spill cleanup will be clearly posted and staff will be made aware of the procedures and the location of the information and clean-up supplies.
2. Materials and equipment necessary for spill cleanup will be kept in the designated storage area onsite.
3. All spills will be cleaned up immediately after discovery.
4. Staff will wear appropriate protective gear to prevent injury from contact with petroleum products.
5. Spills will be reported to the Incident Commander and relevant Government agencies, regardless of the size.
6. The spill prevention plan will be adjusted to include measures to prevent spills from reoccurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included. This information is usually documented in a spill incident report form, which is provided.
7. The Project Manager will be the Incident Commander and responsible for spill prevention and cleanup coordination for the construction. The Operations Manager will fulfill this role for operation. Alternate ICs will receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of responsible staff members will be posted at the project site during construction and at the Port during operation as well as in the administrative offices.
8. A stockpile of spill cleanup materials will be stored where it will be readily accessible.

In the event of either type of spill, the agencies that should be contacted include:

Emergency Agencies

Fire Department	**911**
First Aid Responder	**919**
Police Department	**911**
Royal Bahamas Defence Force	**325-8663**

Port Department **302-0200**

Administrative Agencies

Department of Environmental Planning and Protection **322-4546**
Department of Environmental Health Services **322-8037** or **322-2295**

The spill response team for construction will be comprised of the following staff members:

- Incident Commander (IC): Project Manager – Levent Ustaoglu 818-5559
- Alternate IC: Deputy Project Manager – Bora Aydın 817-5162
- Alternate IC: Construction Manager – Berk Seki 829-3479
- HSE Manager – Doga Arslan 828-0742

The spill response team for operation will be comprised of the following staff members:

- Incident Commander (IC): Operations Manager – Marques Williams 826-7164
- Alternate IC: Head of Security – Collin Cleare 829-3187

The 2011 National Oil Spill Contingency Plan will also be followed. A digital copy of the plan can be found at: http://www.racrempeitc.org/sites/default/files/Attachments/Bahamas%20national%20plan-%20bahamas.pdf.

A hard copy of the Plan will be kept on site during construction and at the administrative offices of the Port during operation. The Plan categorizes oil spills and responses as follows:

TIER	SPILL		RESPONSE TIME	DESCRIPTION & RESPONSE REQUIRED
	BARRELS (BBLS)	GALLONS (GALS)		
I	0 – 50	<2,000	<4 hours	A small spill from oil-related activity requiring local (usually onboard a ship or at a storage site)
II	>50 to <150	>2,000 to <6,000	<24 hours	A larger spill which should be contained by concentrating all government and industry resources ***within*** The Bahamas (government and local contractors)
III	>150	>6,000	<48 hours	A major spill which overwhelms all local resources and calls for international assistance (by contract or cooperation)

Source: OSCAC, 2011

The contact protocol under this Plan is provided below:

LEAD AGENCY (Competent National Authority)

National Emergency Management Agency (NEMA) Captain Stephen Russell National Disaster Coordinator Cabinet Office, P.O. Box N-7145 Nassau, N.P., The Bahamas	Tel: (242) 322-2805 Fax: (242) 326-5456 Office Email: nema@bahamas.gov.bs POC: Mrs. Gayle Moncur-Outten Assistant Secretary

SPILL NOTIFICATION POINT

Port Department Commander Berne Wright Port Controller P.O. Box N-8175 Prince George Wharf Nassau, N.P., The Bahamas	Tel: (242) 302-0200 or (242) 326-7354 Fax: (242) 322-5545 Email: bernewright@rbdf.gov.bs POC: Commander Berne Wright Port Controller

RESPONSE AGENCY

Port Department Commander Berne Wright Port Controller P.O. Box N-8175 Prince George Wharf Nassau, N.P., The Bahamas	Tel: (242) 302-0200 or (242) 326-7354 Fax: (242) 322-5545 Email: bernewright@rbdf.gov.bs POC: Commander Berne Wright Port Controller

NATIONAL OPERATIONAL CONTACT (under MARPOL)

The Bahamas Maritime Authority Commodore Davy Rolle Managing Director and CEO 120 Broad Street London EC2N 1AR United Kingdom	TEL: +44 (20) 7 977-471220 (24 hrs) FAX: +44 (20) 7 614-1300 Email: tech@bahamasmaritime.com POC: Mr. Dwain Hutchinson Deputy Director Email: dhutchinson@bahamasmaritime.com

The Port will have adequate manpower available or on call to respond to a Tier I or II oil spill, whatever time of day.

Tier II or Tier III oil spills activate the National Disaster Plan (NDP) by the Bahamas National Emergency Management Agency (NEMA). An oil spill from a passing oil tank, or as a result of grounding, has the potential of seriously impacting the coastline and the beaches (OSCAC, 2011).

Spill Report Form

Reporting Party's Name:			
Address/City/State:			
Phone:			
Responsible Party's Name (if known):			
Address/City/State:			
Phone:			
Date of Spill:		Time:	
Location:		Product spilled:	
Estimated quantity:		Discharge stopped or contained?	
Source or cause of spill (if known):			
Actions taken:			
Injuries/fatalities/evacuations?			
Environmental damage:			
List of equipment used:			
Disposal site/facility for used absorbents:			
Oil Spill Notifications			
Organization	**Phone**	**Time Contacted**	**Case Number**
Fire Department			
Port Comptroller			
Spill response contractor			
Department of Environmental Planning and Protection			
Department of Environmental Health Services			
Preventative actions taken			

IMPORTANT - Attach site map indicating location of the spill along with completed form.

Appendix K: Hazardous Material Management Plan

This plan outlines best management practices for hazardous materials that may be found or generated on site.

Good Housekeeping

- An effort will be made to store only enough product required to do the job.
- All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
- Products will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product will be used before disposing of the container.
- Manufacturers' recommendations for proper use and disposal will be followed.
- The Site Superintendent will inspect the site daily to ensure proper use and disposal of materials onsite.

Hazardous Products

If hazardous materials are required, then the guidelines below will be followed:

- Products will be kept in original containers unless they are not resealable.
- Original labels and material safety data sheets will be retained for important product information.
- If surplus product must be disposed of, the manufacturer or local recommended methods for proper disposal will be followed.

Petroleum Products

All on site vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chances of leakage. Petroleum products will be stored in tightly sealed containers which are clearly labeled. Any asphalt substances used onsite will be applied according to the manufacturer's recommendations.

Fertilizers

Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to stormwater. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.

Paints

All containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm sewer system, the sea, the ground or any natural water body, but will be properly disposed of according to manufacturer's instructions or local regulations.

Concrete Trucks

Concrete trucks will be required to wash out or discharge surplus concrete or drum wash water into a wash out pit with construction of the pit overseen by the Site Superintendent. The wash out pit will be designated in an area that does not receive significant runoff and does not drain directly into a storm network. Upon the completion of the project, this area will be cleared of the concrete and the site restored.

Asphalt Substances

Any asphalt substances used onsite will be applied according to the regulatory standards and Contract specifications.

PREVENTION OF POLLUTION OF GROUNDWATER

To ensure that all efforts are undertaken to ensure that the groundwater is not impacted during construction the following actions will be taken:

- All diesels, fuel and other toxic materials shall be securely bounded in welded steel trays whose capacity is at least 110% of the maximum stored volume of the fuel. Bunds shall be inspected and cleaned out at regular intervals.

- Any bulk tank with an integral delivery hose and nozzle shall have a means of securing and padlocking at the nozzle above the maximum fill level and the nozzle shall be locked in this position when not in use.

- A fueling area shall be designated adjacent to the storage tanks and this shall be comprised of a concrete apron laid to falls, draining into the steel tray or leak proof sump.

- Generator and other static plants shall be of a type supplied with integral bunds or shall be located within a welded steel tray of appropriate volume.

- All mobile plants such as vehicles, pumps and excavators used on site shall be in good condition and free from engine, lubrication and hydraulic oil leaks and shall have steel dip trays placed beneath them when not in use.

- All containers for chemicals and lubricants used on site shall be stored in trays of steel or other approved materials of appropriate volume.

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

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

Hazardous Material Reporting Form

Reporting Party's Name:	
Position:	
Address/City/State:	
Phone:	
Description of hazardous material (including name and any unique formula identifiers (UFIs) for the containers):	
Weight or volume of material disposed of:	
Location where material was collected:	
Location where material was disposed of:	
Summary of disposal method:	
Name and position of licensed contractor disposing of material:	
Signature of licensed contractor:	
Date of disposal:	

A copy of the signed receipt from the licensed facility where the hazardous material was disposed of should be attached to this form.

Appendix L: Emergency Response Plan

This Plan is designed to address the most likely emergencies which will occur on site due to activities and material utilization associated with construction and operation.

1.0 Purpose and Applicability

1.1 The purpose of this Plan is to coordinate the response of the workers to a situation that may jeopardize the safety or wellbeing of the workers, the general public, the community and the environment. Types of disasters include: fires, bomb, threats, chemical releases, loss of utilities, and natural disasters (floods, wind, etc.). It should be noted that, where applicable, any national Emergency Response Plan will supersede this plan.

2.0 Roles and Responsibilities

2.1 **Command Center** will be the general office location of the Company or the area identified by the health and safety team, if this is not acceptable.

2.2 **Disaster Team** will respond to all emergency, contingency and disaster situations. This will comprise:

- For construction - the Project Manager, HSSE Manager, Environmental Monitor and, where applicable due to the extent of the emergency, relevant Government agencies' representatives.
- For operation – the Operations Manager, HSE Consultant and, where applicable due to the extent of the emergency, relevant Government agencies' representatives.

2.3 **Incident Commander** or highest-level administrator who is present at an incident will report to the Command Center as soon as possible. The Incident Commander is authorized to declare an evacuated area safe for re-occupancy. In the event of an emergency requiring the assistance of Government agencies, the Government representatives will assume the responsibility of the Incident Commander. For localized situations which do not require Government agency involvement, the Incident Commander will be the Company's representative for the project. The Incident Commander is also responsible for ensuring that an incident reporting form is completed for every incident on site as described by the Emergency Response Plan. Copies of completed incident reporting forms should be kept on site and made available to Government officers if requested during an inspection. Any incident reporting forms should be submitted along with monthly environmental monitoring reports submitted to DEPP.

2.4 **Managers/ Supervisors** shall maintain a current list of workers including their home phone numbers, pager numbers, and mobile phone numbers, if applicable. Managers are also

responsible for evacuating staff of affected areas as necessary and as instructed and to account for all staff.

2.5 **Security** will respond under the direction of the Security Supervisor. Security personnel will take immediate steps to prevent the entrance of all non-essential traffic at the incident. The Highest-Ranking Officer on duty will be responsible for traffic control. Security personnel will ask employees not authorized to be at the incident scene to leave the area.

3.0 Disaster Declaration Procedures

3.1 A **Phase A (Alert) Disaster** is the initial response to the report of a potential disaster or an actual disaster when the impact on the construction site is uncertain. For example, a Phase A disaster might involve an equipment system failure that may extend for a few hours. Limited on-site personnel can handle a Phase A disaster. Advancement to a Phase B is unnecessary unless the incident cannot be handled by those already involved or the nearby residents must be notified.

Phase A alerts and disasters will be included in monthly reporting to DEPP. Notification to DEPP, other Government and emergency management agencies will be triggered by Phase B and Phase C disasters.

3.2 A **Phase B Disaster** will be declared in response to an actual event that stresses on site operations, but can be managed by on-duty personnel or requires outside assistance. The purpose of Phase B is to quickly mobilize on-duty personnel and resources in support of event management. For example, a Phase B disaster might involve extended or widespread power failures due to downed lines, a significant fire, or a significant hazardous material release on site. Notification for a Phase B disaster will be accomplished by mega-phone and other available PA systems. Each supervisor with specific roles in a disaster is responsible for notifying their own staff. Upon notification of a Phase B disaster, personnel will remain on duty, report immediately to their assigned areas, and proceed as directed. In the event of upgrade or termination of Phase B, all personnel who have been contacted will be informed by supervisors.

3.3 A **Phase C Disaster** is the site response to a major disaster in which on-site personnel cannot effectively manage the event. The purpose of a Phase C is to quickly mobilize necessary Public Emergency Responders. A Phase C disaster involves the evacuation of staff from the site. In an evacuation, construction staff will disperse to agreed muster points – one for the stockyard, one for the office and three for the project site (see Appendix D). In an evacuation, operation staff will disperse to agreed muster points – one at taxi call-up area, one at Rawson Square and one at Kelly Dock (see Figure 16.1). Notification for a Phase C disaster will be accomplished via mega-phone and other available PA systems, and each

supervisor with specific roles in a disaster is responsible for notifying their own staff. A Phase C may be terminated at the discretion of the Incident Commander. Upon notification of a Phase C disaster, personnel will remain on duty and report immediately to supervisor for direction.

4.0 Disaster Procedures

4.1 Each department shall maintain a current list of personnel including their home phone numbers, pager numbers and mobile phone numbers, if applicable. This list will be made available to the Incident Commander upon request.

4.2 The following terms and corresponding emergency contact numbers must be used to report or declare an internal disaster.

Emergency Agencies

Fire Department **911**
Ambulance Department **919**
Police Department **911**
NCP Emergency hotline **818-7678**
Princess Margaret Hospital **322-2861**
Doctor's Hospital **302-4600**

Administrative Agencies

Port Security Office **829-3187**
Bahamas Power and Light **302-1000 or 323-5561 thru 4**
Department of Environmental Planning & Protection **322-4546**
Department of Environmental Health Services **322-8037 or 322-2295**
Department of Meteorology **356-3734 or 356-3736**
Hurricane Forecast Section **377-7178 or 377-7040**
Royal Bahamas Police Force **919 or 911**
Water and Sewerage Corporation **302-5599**
Ministry of Works, Director **322-4830/1**
Ministry of Health (COVID-19 Surveillance Unit) **502-7382**

4.3 The **Disaster Team for construction** will be comprised of the following staff:

- Incident Commander (IC): Project Manager – Levent Ustaoglu 818-5559
- Alternate IC: Deputy Project Manager – Bora Aydın 817-5162
- Alternate IC: Construction Manager – Berk Seki 829-3479
- HSE Manager – Doga Arslan 828-0742

The **Disaster Team for operation** will be comprised of the following staff:

- Incident Commander (IC): Operations Manager – Marques Williams 826-7164
- Alternate IC: Head of Security – Collin Cleare 829-3187

4.4 The Incident Commander will perform the initial investigation of a potential disaster. As the investigation progresses, the Command Center will be updated. If a significant threat exists, the Command Center will notify the Incident Commander. It is the responsibility of the Incident Commander to assess the situation and issue the announcement specifying the level of the disaster and the location of the Command Center.

Hurricanes

Please follow the Hurricane Preparedness and Response Plan in Appendix IV.

Environmental Emergencies

Environmental drills, including drills for spill response, will be planned and conducted with construction staff on site.

Fuel Spills

Spills and leaks that occur during vehicle and equipment fueling can contribute hydrocarbons, oil and grease, as well as heavy metals to stormwater runoff. The following management practices will be implemented to help prevent fuel spills and leaks. A reduction in the potential for pollutant discharge will be done through source control pollution prevention and best management practices (BMP) implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

SPILL CONTROL PRACTICES

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup:

- Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.

- Employees will be educated about spill prevention measures.

- Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite. Equipment and materials will include but not be limited to brooms, dustpans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.

- All spills will be cleaned up immediately after discovery. Spills are not cleaned up until all materials used in the clean up are picked up and properly disposed of.

- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.

- Spills of toxic or hazardous material will be reported to the HSSE Manager and appropriate Government agency, regardless of the size.

- The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures employed will also be included in the spill incident report.

- The Site Superintendent responsible for the day-to-day site operations will be the spill prevention and cleanup coordinator. He will designate at least three other site personnel who will receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of responsible spill personnel will be posted in the material storage area and in the office trailer onsite.

- A stockpile of spill cleanup materials (spill kits) will be stored where it will be readily accessible.

FIRE CONTROL MEASURES

There will be no burning on the construction site and fire extinguishers will be kept at the fueling location and in the managers' trailer. Signs will be posted identifying the location of all extinguishers. There will be no smoking on the construction site, particularly in or near the designated fueling area.

All employees will immediately report any fires occurring in or near the site. A phone will be available to all employees for emergencies which might occur on site. All emergency numbers will be posted in the office and near the fueling areas or other hazardous areas.

If there is a fire, call the **Fire Department at 911.**

MUNICIPAL ELECTRICAL POWER LOSS OR DAMAGE

All issues relating to loss or damage to power lines, poles or junction boxes whether in the ground or overhead must be deferred to BPL. The Project Manager will ensure that all staff

is removed from the area and that the area is secured. BPL will be notified and the site will await the arrival of the BPL technicians (Telephone **302-1000 or 323-5561 thru 4**).

MUNICIPAL WATER LINES DAMAGE

All issues relating to loss or damage to water lines or junction boxes will be the responsibility of the Contractor. The Project Manager will ensure that all staff is removed from the area, that the area is secured and that the Water and Sewerage Corporation is notified (Telephone **302-5599**).

ACCIDENTS INVOLVING THE PUBLIC

In the event of an accident involving members of the public, whether by vehicle or pedestrian, the Police, Fire Department and/or Ambulance will be notified as required. The Project Manager will ensure, as much as is possible, that the area is secured and that the accident site poses no additional safety risk to the public or staff. Once the Government agents have arrived on the scene, these agents will assume responsibility of the site of the accident.

ENKA	Attachment 1 – Initial Incident Notification Form		
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NOTIFICATION FORM

(Filled and dispatched to the related units as soon as possible after the accident.)

Project Name			
Accident / Incident No			
Date / Time			
Place of Incident			
Severity		*Type of Incident / Accident*	
Type of Injury / Injury Body Part			
Activity Progress At Time Of Incident			
Employer Name and Duty			
Involved Equipment / Machinery			
Type of Pollution or Environmental Incident			
Preventative actions taken			

INCIDENT DESCRIPTION

Reported by:
Date:

Appendix M: COVID-19 Emergency Orders 2020

EMERGENCY POWERS (COVID 19 PANDEMIC) (NO.8) ORDER, 2020

Arrangement of Orders

Order

EMERGENCY POWERS (COVID 19 PANDEMIC) REGULATIONS, 2020

EMERGENCY POWERS (COVID 19 PANDEMIC)(NO.8) ORDER, 2020

In exercise of the powers conferred on me by the Emergency Powers (Covid 19 Pandemic) Regulations, 2020, I HEREBY make the following Order —

PART I - PRELIMINARY

1. Citation and commencement.

(1) This Order may be cited as the Emergency Powers (Covid 19 Pandemic) (No. 8) Order, 2020.

(2) This Order shall come into force on Friday the 9th day of October, 2020 at 7:00 pm.

PART II – GENERAL PROVISIONS

2. Application of Part.

Unless otherwise stated, this Part shall apply to the islands specified in the *First Schedule* and the *Second Schedule.*

COVID 19 PROTOCOLS

3. Physical distancing protocols.

(1) Every person shall practice physical distancing between himself and others who are not of the same household of no less than six feet whenever he is away from his residence.

(2) Every business establishment must —

(a) ensure that all customers and staff maintain physical distancing between themselves and others of no less than six feet in or outside the business;

(b) determine the number of persons that may be permitted in the establishment at any one time by permitting one person for every thirty square feet of store space;

(c) have distance markers six feet apart, indicating where each customer must stand on a line at a check out point;

(d) have distance markers six feet apart on the outside of the establishment, indicating where customers must stand while waiting to enter the establishment.

4. Requirement to wear face mask.

(1) Every person who leaves his residence shall, while away from his residence, wear a face mask, which fits securely to his face, covering his nose and mouth.

(2) Any person who is found not wearing a face mask in accordance with this order commits an offence and is liable on summary conviction to a fine of two hundred and fifty dollars or to a term of one month imprisonment or to both such fine and imprisonment.

(3) Every establishment or business shall —

(a) deny entry to any person not wearing a face mask described in paragraph (1);

(b) ensure that its employees are fitted with face masks described in paragraph (1) at all times when in the presence of other employees or customers;

(c) ensure that its employees are allowed regular breaks outside of the presence of other employees or customers to permit the employee access to fresh air without wearing a face mask.

(4) A person is not required to wear a face mask while —

(a) exercising but is required to have a face mask visibly in his possession and easily accessible;

(b) on a beach but must wear a face mask when approaching and after exiting the beach.

(5) The requirement to wear a face mask is not satisfied by the wearing of a face shield in place of a face mask.

5. Requirement to sanitise.

Every establishment shall —

(a) provide a hand sanitising station at every entry to that establishment;

(b) ensure that every person who enters sanitises his hands;

(c) regularly sanitise the premises provided that such sanitisation is done no less than twice a day; and

(d) sanitise the premises, equipment and furniture in accordance with applicable protocols approved by the Ministry of Health.

6. Requirement to carry government issued identification.

Every person who leaves his residence in accordance with the provisions of this Order, shall carry with him a government issued identification and shall produce the same for inspection when required to do so by a peace officer.

7. Closure of business, office or construction site.

Where ten per centum of the employees of any business or branch thereof, office or construction site have tested positive for Covid 19 —

(a) that business or branch thereof, office or construction site shall be required to close;

(b) all employees shall be required to quarantine for a period of fourteen days.

BUSINESS AND OFFICE OPERATIONS

8. Work remotely from home.

(1) This order shall apply to the islands specified in the *Second Schedule.*

(2) All businesses and offices may continue their business operations by allowing their employees to work remotely from home utilising virtual means, unless those employees are permitted to work under Part IV.

(3) Where a business is unable to have employees work remotely from home, or operate in accordance with the provisions of this Order, that business shall cease its operations.

9. Public Service.

(1) This order shall apply to the islands specified in the *Second Schedule.*

(2) All persons employed within the public service, unless specifically designated as essential workers in Part IV or designated by the permanent secretary of any Ministry as essential workers, shall work remotely from home.

(3) All persons employed within the public service who are so designated as essential workers by the permanent secretary of the respective Ministry shall report to their place of work.

(4) For the purposes of this order —

"public service" includes a government agency or department; and

"permanent secretary" includes any director or head of a government agency or department.

10. Curbside and delivery service.

A business, establishment or institution permitted to operate utilising curbside or delivery service shall do so in accordance with the protocol set forth in the *Third Schedule*.

11. Diplomatic and consular offices.

Notwithstanding any curfew imposed by this Order, a diplomatic or consular office inclusive of Operation Bahamas and Turks and Caicos (OPBAT) and Atlantic Undersea Test and Evaluation Center (AUTEC) shall be permitted to operate.

12. Food distribution.

(1) The National Food Distribution Task Force shall be permitted to carry out the national food distribution programme.

(2) A non governmental organisation or religious organisation shall —

(a) be permitted to distribute food; and

(b) provide the Commissioner of Police with a list of employees engaged in the distribution of food.

(3) Notwithstanding the curfew imposed under order 37(2)(b), the National Food Task Force may operate for the packaging of food on Saturday and Sunday between the hours of 7:00 am and 1:00 pm.

13. Provision of care in homes and residential care facilities.

(1) Any person desirous of —

(a) conducting home visits for the purpose of providing medical, therapeutic or other patient care;

(b) providing care in a residential care establishment or facility,

must submit to the Chief Medical Officer —

(i) a valid government issued identification;

(ii) a current residential address, telephone number and other contact information;

(iii) evidence of training and certification to provide medical or therapeutic care;

(iv) details regarding the care to be provided and contact information for current patients or clients, and undergo infection control protocol training provided by the Ministry of Health prior to providing any care.

(2) A person referred to in paragraph (1), may be required by the Chief Medical Officer to undergo a RTPCR COVID 19 diagnostic test from time to time.

(3) Upon satisfaction of meeting the requirements of paragraph (1), the Chief Medical Officer may issue a letter authorising a person referred to in paragraph (1), to provide medical, therapeutic or other patient care by home visit or in a residential care establishment or facility.

(4) No person shall permit a healthcare worker or caregiver to enter his home or a residential care establishment facility unless that healthcare worker or caregiver produces a letter of authorisation issued by the Chief Medical Officer in accordance with paragraph (3).

14. Restriction on visitation.

No person shall visit or be permitted to visit —

(a) any place of quarantine or isolation station which includes a government identified quarantine facility;

(b) a patient in a hospital or residential care establishment or facility; or

(c) a detainee in a correctional facility.

DOMESTIC AND INTERNATIONAL TRAVEL

15. Approval of voyage by sea or travel by air.

(1) The —

(a) Director-General of the Bahamas Civil Aviation Authority may permit a private or commercial flight; and

(b) Chairman of the Bahamas Maritime Authority may permit a commercial vessel,

for the purpose of any travel into, within and out of The Bahamas.

(2) For the avoidance of doubt —

(a) an approval granted under paragraph (1) —

(i) is made in respect of an aircraft or vessel; and

(ii) is not an approval for entry of a person into The Bahamas or approval for a person to travel inter-island; and

(b) the provisions of order 22 shall apply in respect of the approval of a person to enter The Bahamas and orders 20 and 21 shall apply in respect of the approval of a person travelling inter island.

16. Travel health visa.

(1) Except as otherwise provided in this Part, every person travelling into and within The Bahamas shall be required to obtain a travel health visa.

(2) An applicant for a travel health visa shall be required prior to arrival in The Bahamas or embarking upon inter island travel —

(a) to undergo a RTPCR COVID 19 molecular diagnostic test administered by an accredited lab; and

(b) if result of the test is negative, submit or cause to be submitted to the Chief Medical Officer at the Ministry of Health, the results of the test together with his contact information.

(3) Notwithstanding paragraph (2), a person ten years old or younger shall not be required to undergo a RTPCR COVID 19 molecular diagnostic test in order to obtain a travel health visa.

(4) For the purposes of this Order, the results of a RTPCR COVID 19 molecular diagnostic test shall be valid for a period of five days from the date on which the test was taken and any visa issued in reliance of those results is only valid for that time.

17. Negative RTPCR COVID 19 molecular diagnostic test result.

A reference to a negative test result means a result of a RTPCR COVID 19 molecular diagnostic test result indicating that a person is COVID 19 negative or COVID 19 is not detected.

18. Exemption from the requirement to undergo RTPCR COVID 19 test.

Any senior government official who is travelling for immediate government business may be exempted by the Competent Authority in writing, from the requirement to —

(a) obtain a travel health visa in accordance with order 16; and

(b) undergo the RTPCR COVID 19 molecular diagnostic test under order 20.

19. Responsibility of airline and vessel operators.

(1) This order shall apply to travel into and within The Bahamas.

(2) The operator of any aircraft or vessel shall —

(a) not permit any person to board that aircraft or vessel without the passenger first presenting —

(i) a travel health visa in accordance with order 16; or

(ii) written confirmation that the person has to travel for emergency purposes in accordance with order 20 (2)(a); or

(iii) written confirmation that the person is exempted by the Competent Authority from the requirement to obtain a travel health visa and undergo testing in accordance with order 18;

(b) ensure that travellers continue to wear their face mask throughout the journey.

(3) The operator of any aircraft or vessel transporting persons in accordance with this Order shall be obligated to report to the Chief Medical Officer as soon as practicable but no later than upon arrival in The Bahamas, the details of any passenger exhibiting apparent symptoms of Covid 19.

20. Inter island travel.

(1) Subject to paragraphs (2) and (3), every person desirous of inter island travel shall prior to travelling, apply for and obtain a travel health visa that shall be presented to the operator at the point of embarkation.

(2) A person travelling from New Providence shall —

(a) be required to undergo a RTPCR COVID 19 molecular diagnostic test and obtain a negative result prior to applying for the travel health visa referred to in paragraph (1); and

(b) upon arrival on the other island, submit to mandatory quarantine at a government identified facility or any other appropriate facility as determined by the Ministry of Health, at his own expense, for a period of fourteen days or for the duration of stay, if for a lesser period.

(3) A person travelling from Abaco to Elbow Cay, Grand Cay, Green Turtle Cay or Man-or-Way Cay shall, upon arrival in one of the cays, submit to mandatory quarantine at a government identified facility or any other appropriate facility as determined by the Ministry of Health, at his own expense, for a period of fourteen days.

(4) A person travelling inter island —

(a) in respect of an emergency which is evidenced by written confirmation from a health officer or the Royal Bahamas Police Force stating that the person has an emergency that requires inter island travel; or

(b) as the employee of an operator of an aircraft or a vessel transporting freight and passengers;

shall not be required to comply with paragraph (1) and (2).

(5) For the avoidance of doubt, notwithstanding that a person travelling from an island listed in the *First Schedule* or *Second Schedule* is not required to obtain a COVID 19 RTPCR test result prior to travel to New Providence, such person shall be required to obtain a negative result when departing from New Providence to return to a Family Island.

(6) For the purposes of this order, a hotel is an appropriate facility for quarantine under paragraph (1)(b).

(7) All passengers travelling inter island shall be required to wear face masks in accordance with order 4.

(8) The operator of any aircraft, passenger ferry or mailboat carrying persons inter island shall deny the boarding of any person who —

(a) is not wearing a face mask;

(b) has not presented to the carrier agent at the point of embarkation —

(i) a travel health visa; or

(ii) in the case of an emergency, a written confirmation from a health officer or the Royal Bahamas Police Force stating that the person has an emergency and is required to travel inter island.

(9) An operator who permits a person to travel contrary to paragraph (5) commits an offence and is liable upon summary conviction to a fine of one thousand dollars in respect of each passenger in violation.

(10) Inter island commercial flights shall be permitted to operate throughout The Bahamas.

21. Restriction of travellers from island under lockdown.

A person shall not be permitted to travel from an island for which notice has been given of an impending lockdown order or for which additional measures and restrictions have been imposed.

22. Entry requirements for citizens, legal residents and visitors.

(1) A —

(a) citizen or legal resident of The Bahamas who has obtained a travel health visa issued by the Government;

(b) visitor who has —

(i) obtained a travel health visa issued by the Government; and

(ii) complied with all other legal requirements for entry,

shall be permitted to enter The Bahamas.

(2) A person to whom a travel health visa has been issued shall, upon arrival in The Bahamas submit to quarantine in accordance with order 23.

(3) For the purposes of this order, a "legal resident" includes a non-Bahamian who is a owner of a home in The Bahamas.

23. Quarantine.

(1) A person who arrives in The Bahamas shall —

(a) submit to mandatory quarantine at a government identified facility or any other appropriate facility as determined by the Ministry of Health, at his own expense, for a period of fourteen days or for the duration of stay, if for a lesser period.

(b) undergo a RTPCR COVID 19 molecular diagnostic test at the end of the period specified in subparagraph (a).

(2) Notwithstanding paragraph (1), a visitor under mandatory quarantine, may, subject to protocols established by the Ministry of Health, and at his own expense, travel outside of the jurisdiction.

(3) For the purposes of this Order, a hotel is an appropriate facility for quarantine.

24. Exemption from quarantine.

(1) Diplomatic personnel shall be exempt from mandatory quarantine upon arrival in The Bahamas and monitoring under order 25.

(2) After consultation with the Ministry of Health, the Competent Authority may in writing, exempt any person or any class of persons whose arrival in The Bahamas is necessary to perform an essential service or is in the national interest, from the requirement to quarantine under order 23 provided such person has a RTPCR COVID 19 negative test and will be residing in a hotel or resort.

(3) A public officer travelling for government business who has written confirmation that he or she is travelling for immediate government business from the Permanent Secretary of the respective Ministry or the head of the respective agency, shall be exempt from the requirement to undergo quarantine.

(4) The exemption from quarantine under paragraph (3) does not affect the requirement for a public officer to undergo a RTPCR COVID 19 molecular diagnostic test.

(5) Any senior government official who is travelling for immediate government business may be exempted, in writing, from the requirement to undergo quarantine, by the Competent Authority.

25. Condition of entry - monitoring.

(1) As a condition of entry into The Bahamas, a person referred to in order 22 agrees to monitoring which includes monitoring —

(a) by way of the HubbCat Monitoring Platform;

(b) by the Ministry of Health;

(c) by members of the COVID 19 Enforcement Unit which is comprised of health officers and officers of the Royal Bahamas Police Force as authorised by the Competent Authority; and

(d) by unscheduled visits by the Royal Bahamas Police Force.

(2) A —

(a) citizen or legal resident who refuses to be monitored in accordance with paragraph (1)(a), shall be required to submit to mandatory quarantine, at his own expense, at a government identified facility as appointed by the Competent Authority;

(b) visitor who refuses to be monitored shall be deported at the earliest opportunity and until such deportation, be placed in mandatory quarantine at a government identified facility.

26. Travel by sea.

(1) Every port of entry in every Family Island shall be closed with the exception of any port of entry which is a public dock.

(2) A person entering The Bahamas by sea must —

(a) comply with the requirements of order 22 and submit prior to arrival in The Bahamas, valid negative results from a RTPCR COVID 19 molecular diagnostic test;

(b) stop at the port of entry at the intended destination pursuant to paragraph (1) and deliver to the local authority, a copy of the negative RTPCR COVID 19 molecular diagnostic test and a valid travel health visa;

(c) not travel to any other island before or during the commencement of his quarantine in accordance with paragraph (d);

(d) at his own expense, quarantine on his vessel or other appropriate location for a period of fourteen days of for the duration of stay, if for a lesser period, and undergo a RTPCR COVID 19 molecular diagnostic test at the end of the quarantine period.

PART III – MEASURES RELATING TO FIRST SCHEDULE ISLANDS

27. Application of Part.

This Part shall apply to the islands specified in the *First Schedule.*

28. Curfew for Grand Bahama.

A curfew is hereby imposed for the island of Grand Bahama, extending from 10:00 pm to 5:00 am daily with such exceptions as are permitted herein or as may be approved by the Commissioner of Police.

29. Businesses and institutions.

A business, agency, establishment or institution shall be permitted to operate subject to the adherence to the Covid 19 protocols of orders 3, 4, 5 and 6.

30. Religious and educational instruction.

(1) A church or place of religious instruction may conduct services in accordance with the protocols established by The Bahamas Christian Council and approved by the Ministry of Health.

(2) A school is permitted to open provided that —

(a) all persons in attendance at that school wear face masks in accordance with order 4;

(b) the premises are sanitised; and

(c) the physical distancing protocols under order 3, 4, 5 and 6, and any guidelines or notices issued by the Competent Authority or the Ministry of Education are adhered to.

(3) A person is permitted to operate a home school programme provided that no more than five students are in attendance unless permission for the attendance of more than five students has been granted by the Ministry of Education.

(4) Preschools and infant daycare centres are permitted to open provided that —

(a) all employees wear face masks;

(b) the premises are sanitised; and

(c) the preschool or infant daycare centre adheres to any guidelines or notices issued by the Competent Authority or the Ministry of Education.

31. Salons, barbershops, and spas.

(1) A hair stylist, barber or other cosmetologist may operate subject to being certified by the Ministry of Health to resume work.

(2) The operator of a salon, barbershop or spa shall ensure that —

(a) orders 3, 4 and 5 are strictly adhered to by employees and patrons; and

(b) at any time, the occupancy of the salon, barbershop or spa shall not exceed one patron per service provider.

32. Restaurants.

(1) A restaurant shall be permitted to operate utilising inside and outside dining provided that —

(a) the maximum seating of a restaurant shall be fifty percent of the maximum occupancy of that restaurant with a minimum of thirty square feet per person;

(b) seating shall be arranged in accordance with physical distancing protocols in accordance with order 3;

(c) staff shall wear masks in accordance with order 4;

(d) patrons shall be required to wear masks upon entry and exit;

(e) staff shall sanitise tables, chairs and other implements used by patrons after each use.

(2) For the avoidance of doubt, "restaurant" includes a mobile takeaway restaurant —

(a) that has a valid business licence issued under the Business Licence Act, 2010 *(No. 25 of 2010)*;

(b) that meets aesthetic standards as approved by the Ministry of Works;

(c) that has been granted written approval by the Commissioner of Police to occupy a location;

(d) whose employees have valid food handlers certifications; and

(e) that has been certified by the Ministry of Health.

33. Social gathering.

A person may host or attend a social gathering of not more than twenty persons at a private residence or facility.

34. Weddings, receptions, funerals, burials and repasts.

(1) A wedding may be held in a church, a facility, or outdoors provided that the number of attendees inclusive of officiants is limited in accordance with the physical distancing protocols provided in order 3.

(2) A person may host or attend a wedding reception provided that all attendees adhere to the physical distancing protocols in accordance with orders 3 and 32(1)(a) and the requirement to wear masks in accordance with order 4, respectively.

(3) A funeral may —

(a) be held in a church or other religious facility provided that the number of attendees is limited in accordance with the physical distancing protocol under order 3 and other protocols issued by the Bahamas Christian Council and approved by the Ministry of Health;

(b) include a burial at a graveside, held with no more than thirty persons exclusive of officiants and funeral service workers and shall be subject to physical distancing in accordance with order 3; and

(c) include a repast of not more than twenty persons at a private residence or facility,

(4) All attendees of a wedding, reception, funeral, graveside burial or repast held in accordance with this order shall be required to wear a mask in accordance with order 4.

35. Beaches and parks.

(1) Subject to paragraph (2), all public and private beaches and parks shall be open.

(2) A beach or park situate in Grand Bahama shall be open daily between the hours of 5:00 am to 12:00 pm.

PART IV – MEASURES RELATING TO SECOND SCHEDULE ISLANDS

36. Application of Part and commencement.

This Part shall apply to the islands specified in the *Second Schedule*.

37. Curfew.

(1) Effective 7:00 pm on Friday the 9th day of October, 2020 until 5:00 am on Tuesday the 13th day of October, 2020, a twenty-four hour curfew is hereby imposed for the islands to which this Part applies.

(2) Effective 5:00 am on Tuesday the 13th day of October, 2020 a curfew is hereby imposed for the islands to which this Part applies, extending —

(a) on Monday through Thursday, between the hours of 7:00 pm and 5:00 am; and

(b) from 7:00 pm every Friday until 5:00 am every Monday for a period of twenty-four hours.

38. Essential services and activities.

Notwithstanding a curfew imposed under order 37, the following agencies, businesses, establishments, undertakings or activities shall be permitted to operate during the hours of curfew —

(a) a public health medical facility including a hospital or clinic;
(b) the Public Hospital Authority and its agencies;
(c) a quarantine centre or facility;
(d) the National Food Distribution Task Force or any food distribution centre, for the packaging of food only;
(e) the National Emergency Management Agency;
(f) a hotel with guests subject to order 44;
(g) The Royal Bahamas Police Force;
(h) The Royal Bahamas Defence Force;
(i) Fire Services;
(j) Operation Bahamas Turks and Caicos (OPBAT);
(k) the Department of Correctional Services;
(l) the Department of Immigration;
(m) the Customs Department;
(n) the Judiciary (essential workers only);
(o) the Bahamas Civil Aviation Authority (air traffic controllers);
(p) a humane society;
(q) waste disposal and sanitation services;
(r) a business licensed to provide security guard services;
(s) a business that provides veterinarian emergency services;
(t) essential workers, including contractors or subcontractors, in any public or privately owned utility provider of water, electricity or electronic communications, including the print and electronic news media;
(u) ports of entry, container ports, freight forwarders and private terminals for the conduct, where applicable, of basic port maintenance services (inclusive of garbage removal), domestic trade, imports and exports of containerised freight, and the import, treatment, bunkering and export of oil products;
(v) any public or privately owned terminal and ancillary or support services for the receipt of imported wholesale petroleum products for domestic consumption, for the purpose of the storage and onward delivery of the same to any public or private entity for utility or retail distribution throughout The Bahamas over land or by barges;

(w) a business engaged in inter-island transportation of freight; and

(x) home visits conducted by a healthcare worker to members of the general public for the purpose of providing medical or therapeutic care;

(y) a farmer or caretaker shall be permitted to maintain crops and animals —

(i) on Monday through Friday between the hours of 5:00 am and 6:00 pm;

(ii) on Saturday and Sunday between the hours of 7:00 am and 1:00 pm; and

(z) a retail or wholesale grocer or manufacturer for the restocking of goods and cleaning of premises on Saturday and Sunday between the hours of 7:00 am and 1:00 pm.

39. Permitted activities during curfew for Abaco.

Notwithstanding the curfew imposed by order 37, a takeaway restaurant and a gas station situate in Abaco shall be permitted to operate —

(a) on Saturday and Sunday between the hours of 6:00 am and 6:00 pm; and

(b) on Monday the 12th day of October, 2020 between the hours of 6:00 am and 6:00 pm.

40. Permitted activities.

(1) The following businesses may operate on the islands specified in the *Second Schedule* on Monday to Friday between the hours of 6:00 am and 6:00 pm —

(a) a grocery store;

(b) a pharmacy utilising curbside and delivery service only;

(c) a gas station, providing external services for refuelling only and excluding food takeaway;

(d) a water depot utilising curbside and delivery service only;

(e) a dental practice;

(f) the Central Bank, with essential employees only;

(g) a commercial bank or credit union, provided that all non-client facing operations are conducted remotely, unless such operations cannot be conducted remotely;

(h) an international bank, trust company or financial institutions may operate provided that the office is not permitted to open for more than eight hours in any working day, with ten essential staff

members or more as may be approved in writing by the Competent Authority;

(i) financial services shall be permitted to operate for the purposes of a transaction that cannot be carried out remotely and limited to only Senior Officer 1 and Senior Officer 2, together with not more than ten employees;

(j) insurance agents, brokers and companies shall be permitted to operate, with no more than ten essential employees;

(k) a law firm shall be permitted to operate with no more than ten persons inclusive of partner and associate attorneys in attendance;

(l) a real estate agent or broker, shall be permitted to operate with no more than five persons in attendance;

(m) an architect, engineer or surveyor shall be permitted to operate with no more than five persons in attendance;

(n) money transmission services shall be permitted to operate, provided that all non-client facing operations are conducted remotely, unless such operations cannot be conducted remotely;

(o) the essential workers of a pool maintenance or landscape service provider may operate;

(p) a retail bakery, water and ice production company shall be permitted to operate utilising takeaway, curbside and drive thru service only;

(q) a news vendor provided that the vendor remains stationary;

(r) a laundromat shall be permitted to operate subject to protocols approved by the Ministry of Health including —

(i) fifty percent occupancy;

(ii) a control person at each entrance ensuring sanitisation as persons enter;

(iii) no congregating of persons inside or outside of the laundromat;

(s) a dry cleaning or laundry service;

(t) a retail business utilising curbside or delivery service;

(u) a beauty salon or barbershop shall be permitted to operate in accordance with paragraph (2);

(v) a gaming house operator, utilising curbside or delivery services;

(w) a wholesaler or manufacturer.

(2) A salon or barbershop permitted to operate under paragraph (1)(u) shall do so subject to —

(a) being certified by the Ministry of Health to resume work; and

(b) the operator of a salon or barbershop shall ensure that —

(i) orders 3, 4 and 5 are strictly adhered to by employees and patrons; and

(ii) at any time, the occupancy of the salon or barbershop shall not exceed one patron per service provider.

(3) A private medical facility, may operate daily —

(i) between the hours of 6:00 am and 6:00 pm;

(ii) between the hours of 7:00 pm and 5:00 am for the provision of emergency care only.

(4) Every business permitted to operate under paragraphs (1) shall, unless otherwise specified, operate in store or with client-facing services.

(5) Each household shall designate one person to carry out shopping for essential item or seeking essential services as specified in this Part.

41. Prohibited businesses and activities.

For the avoidance of doubt, the following are not permitted to operate or be held —

(a) a casino, bar, discotheque, cinema, museum, historical society and other cultural or entertainment facility;

(b) a regatta, festival, fair, play, performance art and other cultural or entertainment event;

(c) the occasional sale of prepared meals commonly known as a cook out, steak out or souse out;

(d) a spa or gym; and

(e) a craft or straw market vendor, and a jet ski operator.

42. Religious and educational instruction.

(1) Notwithstanding order 37(2)(b), a worship service may be conducted on Saturday and Sunday between the hours of 7:00 am and 1:00 pm, in accordance with the protocols established by The Bahamas Christian Council and approved by the Ministry of Health.

(2) A school shall be permitted to operate virtually provided that a teacher shall be permitted to attend the premises for the purposes of performing tasks necessary for the conduct of virtual learning.

(3) Every religious organisation, school or preschool permitted to operate in accordance with this order may do so provided that —

(a) the physical distancing protocols under order 3 are adhered to;

(b) all persons in attendance wear face masks in accordance with order 4;

(c) the premises are sanitised in accordance with order 5; and

(d) any guidelines, notices or protocols issued or approved by the Competent Authority, the Ministry of Education or the Ministry of Health are adhered to.

(4) Notwithstanding the operation of a school or preschool in accordance with this Order, the principal or other person responsible for the management of the school may, in writing, exempt a teacher from attendance at a school in accordance with health protocols established by the Ministry of Health.

(5) For the avoidance of doubt, a "religious organisation" —

(a) includes a church, synagogue, mosque, sanctuary or other premises which is utilised for the purpose of communal worship; and

(b) shall only operate as permitted in paragraph (1), subject to the conditions of paragraph (3).

43. Weddings and funerals.

(1) A —

(a) wedding may be held with no more than ten persons, exclusive of the officiant, in attendance, in a religious facility in accordance with the protocols established by The Bahamas Christian Council and approved by the Ministry of Health;

(b) graveside service or internment may be held with a maximum of ten persons exclusive of the officiant and mortuary workers.

(2) For the avoidance of doubt, no person shall host or attend a wedding reception or a funeral repast.

44. Tourism facilities, attractions, excursions, etc.

(1) A hotel permitted to open under order 38(1)(g) shall operate subject to —

(a) adherence to orders 3, 4 and 5; and

(b) the following conditions —

(i) a guest under quarantine shall not be permitted to leave the premises except as permitted by this Order;

(ii) indoor dining, casinos, discos and spas are prohibited.

(2) Subject to order 41, a business or commercial activity in a hotel or resort shall be permitted to operate and shall not be restricted to the hours of operation specified in order 40.

(3) Charters, including inter-island charters, provided the provisions of orders 15, 19 and 20 are complied with, are permitted to operate.

(4) For the avoidance of doubt —

(a) guests of a hotel shall remain on the premises of that hotel during the curfew imposed in order 37;

(b) a restaurant in a hotel permitted to open under order 38(1)(g) —

(i) shall not offer buffet style service; and

(ii) may only operate utilising outdoor dining or room service; and

(c) any other touristic facility, attraction or excursion is prohibited from operation.

(5) A person who is not a current guest at a hotel or other commercial accommodation situate in an island specified in the *Second Schedule* shall be required to submit a negative COVID 19 RTPCR test result in order to check in as a guest.

(6) For the avoidance of doubt, "other commercial accommodation" includes accommodation offered for let on platforms including AirBnb, Homeaway or VRBO.

45. Restaurants.

(1) A restaurant may, in accordance with this order, operate between the hours of 6:00 am and 6:00 pm daily —

(a) utilising —

(i) curbside pickup or delivery;

(ii) drive thru; or

(iii) take away; and

(b) ensuring that —

(i) its employees wear masks in accordance with order 4;

(ii) all patrons adhere to physical distancing protocols and wear masks in accordance with orders 3 and 4, respectively.

(2) For the avoidance of doubt, "restaurant" includes a mobile takeaway restaurant —

(a) that has a valid business licence issued under the Business Licence Act, 2010 *(No. 25 of 2010)*;

(b) that meets aesthetic standards as approved by the Ministry of Works;

(c) that has been granted written approval by the Commissioner of Police to occupy a location;

(d) whose employees have valid food handlers certifications; and

(e) that has been certified by the Ministry of Health.

(3) Restaurants located at the Fish Fry at Arawak Cay and Potters Cay shall be permitted to operate in accordance with paragraph (1) only.

46. Fishing hunting and harvesting of crabs.

The following activities shall be permitted —

(a) fishing with no more than two persons in the vessel between the hours of 5:00 am and 6:00pm;

(b) commercial fishing including trap setting and fishing for crawfish beyond the curfew hours set in order 37;

(c) harvesting of crabs beyond the hours of curfew set out in order 37; and

(d) wild bird hunting.

47. Social gatherings.

No person shall host or attend a gathering in a private residence or facility except for —

(a) a wedding in accordance with order 43; or

(b) as otherwise permitted under this Part.

48. Beaches and parks.

(1) All public and private beaches and parks shall be closed.

(2) Law enforcement shall be empowered to monitor beaches and parks to ensure the adherence to this Order.

49. Exercise.

A person is permitted to exercise —

(a) in his immediate neighbourhood Monday through Friday between the hours of 5:00 am and 7:00 pm; or

(b) at any time in his own residence inclusive of his yard.

50. Construction.

Construction shall be permitted on Monday to Friday between the hours of 6:00 am and 6:00 pm subject to the Covid 19 protocols in orders 3 to 5 and protocols established by the Bahamas Construction Association as approved by the Ministry of Health.

51. Exemptions.

The Competent Authority, may by letter, in exceptional circumstances and in consultation with public health professionals, exempt a business or class of business to which this Part applies from any restriction imposed by this Part.

PART V – MISCELLANEOUS

52. Application of Part.

This Part shall apply to the islands specified in *First Schedule* and the *Second Schedule.*

53. Event of emergency.

In the event of an emergency, a person shall seek the permission of the Commissioner of Police to leave his place of residence by calling 311 or the nearest police station.

54. Anonymous report of violations.

Anonymous reports of persons violating order 47 regarding no social gatherings are to be made to the Royal Bahamas Police Force at the following numbers —

(a) 702-9967;
(b) 702-9968;
(c) 702-9969;
(d) 702-9970;
(e) 702-9971;
(f) 702-9972.

55. Public transportation.

A —

(a) taxi service; or
(b) private and public bus service may operate, provided that such service shall be operated at fifty percent occupancy,

subject to guidelines issued by the Ministry of Tourism and approved by the Ministry of Health.

56. Power to stop vehicles.

(1) The Royal Bahamas Police Force shall have powers to stop any vehicle and inquire as to the purposes for which that vehicle is being utilized and to arrest anyone found in violation of this Order.

(2) For the purposes of this Order, "vehicle" includes a motor vehicle or motor bike.

57. Littering.

(1) No person shall dump on or otherwise deposit or leave any litter in any public place or open space.

(2) For the purposes of this order, "litter" means anything whatsoever, including dust, dirt, oddments, leavings, waste paper, cigarette ends, bottles (whether empty or not), derelict vehicles, derelict vessels and any dead animal or carrion.

58. Failure to enforce requirements.

(1) Any owner, manager or operator of any establishment or business who —

(a) allows the entry of any person not wearing a mask; or

(b) fails to ensure that —

(i) all persons within the establishment or business wears a mask while within the establishment or business; or

(ii) the number of persons in the establishment or business is limited in accordance with this Order;

(iii) sanitisation measures in accordance with order 5 are carried out;

(iv) persons within the establishment comply with physical distancing under order 3;

commits an offence and is liable upon summary conviction to a fine of one thousand dollars.

(2) Any owner, manager or operator or supervisor of a construction site who fails to ensure the compliance of the protocols established by the Bahamas Construction Association and approved by the Ministry of Health commits an offence and is liable upon summary conviction to a fine of one thousand dollars.

(3) Where a person referred to in paragraph (1) or (2) commits —

(a) a second offence, that person shall be liable upon summary conviction to a fine of two thousand dollars or the closure of a business for a period of fourteen day or to such fine and closure of the business;

(b) a third or subsequent offence —

(i) that person shall be liable upon summary conviction to a fine of ten thousand dollars; or

(ii) the establishment or business may be ordered to close temporarily; or

(iii) the person shall be liable upon summary conviction to a fine of ten thousand dollars and the establishment, business or construction site may be ordered to close temporarily.

(4) For the purposes of this order, "establishment or business" includes public or private transportation for hire.

59. Falsified results.

Any person who —

(a) submits a falsified result of a Covid 19 diagnostic test; or

(b) undergoes a RTPCR COVID 19 molecular diagnostic test prior to his departure from The Bahamas and presents the results of that test on his return to The Bahamas as though the test had been carried out in another jurisdiction,

commits an offence and upon summary conviction is liable to a fine not exceeding four thousand dollars or to two years imprisonment or to both such fine and imprisonment.

60. General offence and penalty.

(1) Any person company or organization who contravenes any order herein commits an offence.

(2) Any offence for which no penalty is provided, is liable upon summary conviction to a fine not exceeding twenty thousand dollars or to a term of imprisonment not exceeding eighteen months or to both.

61. Issue of notice.

(1) Notwithstanding anything to the contrary in this or any other Order where a peace officer finds any person or has reason to believe that any person ("the alleged offender") is committing or has committed an offence under this Order he may then and there serve upon the alleged offender the prescribed notice in writing charging him with the commission of the offence.

(2) The peace officer shall at the time of such service notify the alleged offender —

(a) of his requirement to appear before a magistrate on the day specified in connection with the charge; and

(b) that he has the opportunity of having his appearance before a magistrate waived and of having no conviction recorded against him should he, the alleged offender, sign the notice in the appropriate place in acknowledgement of his guilt and return it to the magistrate's clerk specified in the notice together with the sum mentioned in the notice in payment of the fixed penalty.

(3) Notwithstanding anything to the contrary in any law, the alleged offender who signs the notice and pays the fixed penalty before the expiration of fourteen days following the date of the notice shall be treated for all purposes in law as a person who has not committed or been charged with or prosecuted for or convicted of or sentenced for the offence in respect of which payment was made.

(4) Subject to paragraph (7), where a person is served a notice under paragraph (1) in respect of an offence no proceedings shall he taken against the alleged offender for that offence until the end of fourteen days following the date of the notice.

(5) Payment of the fixed penalty shall be made to the clerk of the Magistrate's Court specified in the notice and the admission of guilt and the sum paid shall, subject to paragraph (3), be dealt with by the magistrate of that court in the same manner as an adjudication by him in court upon the admission of an offence punishable on summary conviction and for which no conviction is recorded.

(6) In any proceedings, a certificate that payment of the fixed penalty was or was not paid to the relevant magistrate's clerk by the date specified in the certificate shall, if the certificate purports to be signed by the magistrate's clerk be sufficient evidence of the facts stated therein, unless the contrary is proved.

(7) For the purposes of this section, the fixed penalty shall be —

(a) for the offence of not wearing a mask in accordance with order 4, two hundred and fifty dollars; and

(b) for all other offences, five hundred dollars.

(8) In any proceedings for an offence to which paragraph (1) applies, no reference shall be made about the conviction of the alleged offender to the giving of any notice under this section or to the payment or non-payment of the fixed penalty unless in the course of the proceedings or in some document which is before the Court in connection with the proceedings reference has been made by or on behalf of the alleged offender to the giving of such a notice or as the case may be to such a payment or non-payment.

(9) A notice issued to a person under paragraph (1), shall for the purposes of this Order or any other law, be deemed to be a summons issued to that person by the magistrate or the Magistrate's court specified in the notice for the appearance of that person in the event where he does not sign the notice in acknowledgement of his guilt and make payment of the fixed penalty.

(10) For the purposes of this section the notice shall be in the form in the *Fourth Schedule*.

62. Guidelines.

The Competent Authority may issue guidelines to provide for further clarification on these Orders.

63. Revocation.

The Emergency Powers (Covid 19 Pandemic) (No. 7) Order, 2020 is hereby revoked.

FIRST SCHEDULE

(Order 2, 20, 27, and 52)

Acklins
Andros
Berry Islands
Bimini
Cat Island
Chub Cay
Crooked Island
Elbow Cay
Eleuthera
Exuma
Inagua
Mayaguana
Grand Bahama
Grand Cay
Green Turtle Cay
Harbour Island
Long Cay
Long Island
Man-O-War Cay
Ragged Island
Rum Cay
San Salvador
Spanish Wells

For the avoidance of doubt, a reference to an island above includes the reference to a surrounding island or cay unless otherwise specified.

SECOND SCHEDULE

(Order 2, 8, 20, 36, and 52)

Abaco

(excluding Green Turtle Cay, Grand Cay, Man-O-War Cay and Elbow Cay)

New Providence (including Rose Island)

Paradise Island

For the avoidance of doubt, a reference to an island above includes the reference to a surrounding island or cay unless otherwise specified.

THIRD SCHEDULE

(Orders 10, 37, 39 and 45)

DELIVERY AND CURBSIDE CRITERIA AND PROTOCOLS

DELIVERY

A business resuming operations via delivery should meet the following criteria and protocols at a minimum —

(a) utilize gloves and other protocols in handling and delivery of goods;

(b) upon arrival at the customer's destination, the delivery person shall call, text or email the customer to announce delivery of the goods;

(c) ensure that there is no person-to-person contact utilising practices such as —

(i) leaving the delivery outside the door with the driver waiting an effective distance away from the door;

(ii) waiting at an effective distance away from the door to make a visual confirmation that the parcel has been received; and

(iii) taking an image of the customer collecting the package, as an additional precaution and to confirm receipt.

CURBSIDE PICKUP

A business resuming operations via curbside pick-up should meet the following criteria —

(a) the customer shall place an order remotely, either through an online store, social media page, app or telephone;

(b) the business shall issue an invoice to the customer and the customer shall pay by electronic or digital platform, or in cash at the time of pick up via placing the cash in an envelope in a secure bin provided by the business which must be sanitized after every use;

(c) the business shall schedule a same day or other day pick up;

(d) all orders shall be filled in store by essential staff, who must practise Covid 19 safety and physical distancing protocols;

(e) staff must wear personal protection equipment while filling orders;

(f) the customer will call the store when they are outside;

(g) a member of staff of the business shall place the goods in the trunk of the customer's vehicle, if possible, while continuing to practice physical distancing at all times;

(h) all customers are encouraged to remain in their vehicles.

FOURTH SCHEDULE

(order 61)

Form
Royal Bahamas Police Force
NOTICE OFFERING WAIVER OF APPEARANCE BEFORE MAGISTRATE AVAILABLE

TO: (Offender)
.....of.....
.....
.....
Driver's Licence No .....

National Insurance No .....
(or)

Passport No.....Country of Issue .....
Take Notice that

I, ...
(number, rank and name of police officer) have reason to believe that the offence of (name offence and give particulars) has been committed by you .....

You may waive your obligation to appear before the Magistrate and have no conviction for the offence recorded if you sign this notice in the appropriate place below admitting guilt of the offence and returning the signed notice together with the fixed penalty of $..... before the ..... day of ..... 20 ..... to the clerk of the Magistrate's Court # ..... situated at .....

Failure to return the signed notice together with the above sum in payment of the fixed penalty in the manner and within the time specified above will result in your trial for the above offence before the Magistrate of the aforementioned Magistrate's Court at ..... o 'clock in the morning/afternoon of .. .. 20 ..... and for which trial you are hereby requested to attend before the Magistrate at that time.

Signature of Officer .....
I admit to the above offence and make the payment of the sum of $ .....

Signature of Offender .....

Date:.....20.....

Made this 9th **day of** October **, 2020**

PRIME MINISTER

Appendix N: Education and Outreach Material

Critical terrestrial wildlife found on the project site may include:

- Land crabs and invertebrates
- Birds (resident as well as migrants)
- Lizards, iguanas and snakes

Wildlife is threatened by habitat loss and degradation that can be a result of development. They are also impacted by invasive feral animals, which include cats and rats.

Land Crabs

Land crabs play an important ecological role in The Bahamas as critical foragers on the coppice floor, recycling plant and animal matter. Land crabs require high quality habitat, especially clean ground water. "Land crabs" as an ecological group includes the "soldier crab" or land hermit crab (*Coenobita clypeatus*), black crabs (*Gercarcinus lateralis*) and white crabs (*Cardisoma guanhumi*).

The small land hermit crab is very abundant and an important detritivore. Hermit crabs live near water only returning to sea to lay their eggs. Black land crabs are found in coppice areas. The white land cab is a large burrowing crab usually found within 5 km of the ocean. Large individuals can grow to over 11 cm and weigh over 500 grams.

Land crabs have their season from May to October each year. They mostly frequent coppice land near to the sea and make their homes in burrows, the entrance to which they block throughout the winter months while they hibernate. During the summer months they feed on buttonwood, tallyberries, sea grapes, mangroves, coco plums and other fruits and leaves. Land crabs perform the important organic recycling tasks in the ecosystem by feeding on carrion (dead animals) when available.

Land crabs can serve as critical indicators of environmental quality throughout the project site.

Birds

A list of birds that were identified during the EIA are provided in Table K-1 below. All vegetation communities contain important plant species for food or create critical habitat for birds. Bird life will benefit from plant conservation areas and maintenance of corridors of native vegetation throughout the property.

Seabirds need large areas of coastal oceans to forage and isolated rocky islands to nest.

Seabirds are suspected of undergoing a serious decline in populations in The Bahamas. Humans have impacted seabird nesting islands with boat traffic close to nesting islands, walking on the islands during nesting, and removing eggs from the nests. All efforts are needed to protect existing nesting sites through education and closure of the nesting environs during the nesting months of May through early July.

Table K-1: List of Birds found in NCP Project Site

Common Name	Scientific Name
Laughing Gull	*Larus atricilla*
Eurasian Collared Dove	*Streptopelia decaocto*
House Sparrow	*Passer domesticus*
Bahama Parrot	*Amazona leucocephala*
White-crowned Pigeon	*Patagioenas leucocephala*

Reptiles

All native reptiles (snakes and lizards) and amphibians (frogs) are at risk from loss of habitat or competition and predation threats from introduced species. Common lizards in New Providence include the Bahamian brown anole (*Anolis sagrei*) and curly-tailed lizard (*Leiocephalus carinatus*). A snake native to The Bahamas is the Bahamian boa (*Epicrates striatus*). This snake is harmless, but many Bahamians will kill it on site. These snakes play an important role that benefits ecosystems and humans by controlling rats and mice which they feed on.

Sea Turtles

Species of sea turtle that occur in The Bahamas include Green, Loggerhead, Hawksbill, Kemp's Ridley and Leatherback. These turtles use beaches as nesting areas. It is believed that seagrass beds serve as important feeding or foraging habitat for juvenile Loggerhead and Green turtles. These turtles need to be protected from degradation of water quality, boat traffic and loss of seagrass habitat.

Marine Mammals

A surprising number of marine mammals are known to occur in The Bahamas, but little is known about population structure or abundance. Some species of whales are only seasonal residents of Bahamian waters. All coastal development poses a potential threat to whales and dolphins. Increased boat traffic, from recreation boats to barge and cargo ships, can threaten marine mammals. Humans also compete with some species (e.g. spotted and bottlenose dolphins) for fisheries resources.

There are 11 species of whales and dolphins that can occur seasonally in The Bahamas (these are listed in Table K-2). Whales, especially slower-moving species, are at risk of being hit by fast, large ships.

The protection of marine mammals will require a long-term monitoring and observation program that can help identify migratory routes or foraging areas. The Bahamas Marine Mammal Survey project operates in Abaco, and can provide a protocol for initiating long-term observations at the Nassau Cruise Port.

Table K-2: Marine Mammals that can occur in The Bahamas

Common Name	Scientific Name
Right Whale	*Eubalaena Glacialis*
Minke Whale	*Balaenoptera acutorostrata*
Humpback Whale	*Megaptera novaeangliae*
Pygmy Sperm Whale	*Kogia breviceps*
Cuvier's Beaked Whale	*Ziphius cavirostris*
True's Beaked Whale	*Mesoplodon mirus*
Gervais' Beaked Whale	*Mesoplodon europaeus*
Blainville's Beaked Whale	*Mesoplodon densirostris*
Short-finned Pilot Whale	*Globicephala macrorhynchus*
Bottlenose Dolphin	*Tursiops truncatus*
Atlantic Spotted Dolphin	*Stenella frontalis*
Manatee (Rare)	*Trichechus manatus*

Flora

Bahamian flora are described below in Table K-3.

Table K-3: Terrestrial and Coastal Vegetation Classification for The Bahamas

Designation	Description
Coppice or "Bush"	Coppice, (Dry Broad-leaved Evergreen Formations, DBEF) in The Bahamas, are areas that contain the highest plant diversity of any natural community. Coppices are usually found well back from the shoreline, behind coastal dune and/or coastal shrubland communities. These areas contain a mixed humic soil-leaf-litter layer. The substrate in these areas may consist primarily of sandy substrate or a rocky limestone substrate with scattered solution holes.
Coastal Mangroves	Mangroves are characteristic of low-energy, soft-sediment coastal environments. All mangroves are generally found in areas sheltered from high-energy waves. Coastal mangrove areas can be divided into two subclasses based upon their hydrology and geomorphology: • **Overwash and Creek Systems**: Water flow and nutrient input is high and interstitial salinities are variable with evaporation and rainfall,

	which mean that these areas have the highest degree of structural development • **Fringe**: Fringe mangroves occur along the seaward edges of protected shorelines or around overwash islands Fringe areas are characterized by salinity levels similar to seawater and lower nutrient input.
Coastal Strand	Coastal Strand Communities consist of vegetation on sandy or rocky substrate with direct exposure to coastal wind and wave energies. These communities include the pioneer zone, fore-dune, back-dune, and associated coastal wetlands and inter-dunal communities.

Mangrove communities can serve many functions:

- Removal of excess nutrients from runoff
- Buffers against storms
- Fish nursery habitat
- Fish feeding grounds
- Bird sanctuaries
- Honey bee havens
- Homes for orchids and bromeliads

Marine vegetation includes seagrasses and algae, A common seagrass found around Abaco is turtle grass (*Thalassia testidium*). Seagrass beds provide critical habitat for fish and invertebrates (like conch) as well as food for juvenile sea turtles.

Reef habitats found in The Bahamas include hardbar, patch reefs, fringing reefs and deep reef. Reefs provide critical habitat for important fisheries species, such as Nassau grouper (*Epinephelus striatus*) and crawfish (Spiny Lobster, *Paniluris argus*).

Protected Trees in The Bahamas

The Forestry Act 2010 enables the protection of trees in The Bahamas. While the Forestry Act does not provide a list of species of trees, the 1997 Order under the Conservation and Protection of the Physical Landscape Act indicated which trees are protected in The Bahamas (Table K-4). These trees should be:

- Protected whenever possible, especially large trees and a surrounding buffer area, and preserved in the landscape,
- Transplanted or removed to a nursery area for relocation, or
- Replaced in the final landscape with two or more trees of the same species.

Table K-4: List of Protected Species of Trees in The Bahamas

Common Name	Scientific Name
Beefwood/Blolly	*Guapira discolor*

Black Ebony/Bullwood	*Pera bumeliifolia*
Brasiletto	*Caesalpinia vesicaria*
Candlewood	*Gochnatia ilicifolia*
Caribbean Pine	*Pinus caribaea var. bahamensis*
Horseflesh	*Lysiloma sabiau var. bahamensis*
Lignum vitae	*Guaiacau sanctum*
Mahogany*	***Swietenia mahogani***
Rawolfia	*Rauwolfia nitida*
Red Cedar	*Juniperus bermudiana*
Silk Cotton	*Ceiba pentandra*

Bolded species occur on the project site.

Appendix O: Template for Environmental Reporting

All reports of environmental site inspections and environmental incidences and accidents shall be kept on file at the project administrative office as well as be submitted on a regular basis to the Department of Environmental Planning and Protection and Department of Environmental Health Services. Information in the environmental reports shall include but not be limited to:

- Environmental site inspections by Environmental Engineer
- Environmental site inspection by external enforcement authorities
- Weekly environmental walks
- Inventory of complaints from the public
- Records of non-compliance with environmental, legal and contractual requirements
- Records of any pollution or spill incidents
- Records of solid and hazardous waste disposal
- Records of environmental training
- Minutes of SEC meetings

An example of an environmental site inspection form is provided below and can be amended as needed based on project activities.

An example of a complaints form is provided below and can be amended as needed based on project activities.

Example of an Environmental Site Inspection Form

Types of Construction Activities

- ☐ Excavation
- ☐ Fill Import
- ☐ Land clearing/Grading
- ☐ Fueling
- ☐ Erosion and Sediment Control
- ☐ Waste /Hazardous Material
- ☐ Noise Pollution
- ☐ Building construction
- ☐ Air Pollution/Dust control
- ☐ Water/Drains/Wetland issues
- ☐ Other

Excavation Operations

Components	*Compliance w/ EMP*	*Maintenance required*	*Comments/Recommendations*
Control of dewatering discharge.	☐	☐	
Dredge pipeline placement and containment	☐	☐	
Land creation containment	☐	☐	
Turbidity monitoring records maintained	☐	☐	

Erosion and Sedimentation Control

Components	*Compliance w/ EMP*	*Maintenance required*	*Comments/Recommendations*
Adequate installation and maintenance of perimeter controls and silt fence.	☐	☐	
Use of diversion swales and basins.	☐	☐	

Groundwater Management

Components	*Compliance w/ EMP*	*Maintenance required*	*Comments/Recommendations*
Deep wells functional	☐	☐	
Adequate secondary containment for fuel and oil tanks.	☐	☐	
Oil spills identified	☐	☐	
Hazardous/contaminated material disposal and containment.	☐	☐	
Fueling sites maintained	☐	☐	
Spill kits on site	☐	☐	

Air Quality Management

Components	*Compliance w/ EMP*	*Maintenance required*	*Comments/Recommendations*
Watering of construction sites to minimize dust generated.	☐	☐	
Equipment properly maintained to reduce emissions.	☐	☐	

Waste Management

Components	*Compliance w/ EMP*	*Maintenance required*	*Comments/Recommendations*
Good housekeeping practices on site.	☐	☐	
Temporary on-site sanitary facilities.	☐	☐	
Vehicle wash down / Contractors Yard	☐	☐	
Concrete washout area	☐	☐	
Trucks hauling materials covered	☐	☐	
Waste ticket documentation maintained	☐	☐	

Landscape Management

Components	*Compliance w/ EMP*	*Maintenance required*	*Comments/Recommendations*
Minimization of disturbance to terrestrial vegetation (e.g. plants to be preserved).	☐	☐	
Maintenance of setbacks from wetlands or open water bodies	☐	☐	

Other

Components	*Compliance w/ EMP*	*Maintenance required*	*Comments/Recommendations*
Exit and entrance clearly marked.	☐	☐	
Appropriate wildlife discovery actions taken	☐	☐	

Other Corrective Actions Needed:

Inspector(s): _____

Example of Contractor's Report of Complaints Received

Date of complaint:	
Time of complaint:	
Name of person recording complaint:	
Name of person making complaint:	
Telephone number:	
Address:	
Nature of complaint:	
Results of investigation:	
Action taken:	
Date complainant contacted with results of the investigation and action taken:	
Name and signature of person investigating the complaint:	

Appendix P: Port Security Management Plan

Included is the Table of Contents as provided by NCP in the EIA. DEPP to confirm receipt of the full confidential document during the EIA review process.

GLOBAL PORTS HOLDING
PORT AND TERMINAL FACILITIES
SECURITY CODE
(GPH – PTFS CODE)

FEB 2018
VER 2-1

REVIEW/UPDATE PAGE

No	Date	Chapter No	Content	Name Surname	Signature
1	01.18.2018	Pro.44	CCTV Monitoring		
		Pro.45	Shopping Mall Security		
		Annex-36	Vehicle Control Log Form		
		Annex-37	Ship Log Form		
		Annex - 38	Cyber Attack Report Form		
		Annex - 39	Man Over Board Report Form		
		A-3.5.6	CCTV, Underwater, Cyber Security		
		A-3.5.7	UAV(Drone) Security		

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Appendix Q: Hurricane Preparedness and Response Plan for Port Operations

The purpose of the Hurricane Preparedness and Response Plan is to identify the actions that will be taken to reduce or eliminate long-term risk to people and property, and respond to natural disasters in the form of tropical storms, hurricanes, and coastal flooding. Port management should ensure that all staff are knowledgeable and equipped to execute the Hurricane Preparedness and Response Plan when necessary. Preparation for hurricanes and tropical storms must be an ongoing activity at the Port, and employees and patrons should be informed well in advance of their responsibility during a storm.

Key preparation activities are outlined below.

1. **OWNER CONTACT:** Ensure that all vessel owners emergency contact information is up-to-date and entered into the Port's database and placed on file at the Port office. Where possible, e-mail contact information should be collected.

2. **GENERATORS:** Check all generators for proper operation (change oil, test batteries, start and run, run under load, ensure plug-in receptacles in good working order).

3. **EMPLOYEE CONTACT:** Update Employee Contact List. Ensure all staff members have a copy and understand the procedures for calling in or reporting to work post-hurricane.

4. **FACILITY INSPECTION:** Operations Manager conducts complete Port inspection no less than weekly to ensure piers and docks are free from clutter. The Operations Manager should initiate and direct the removal of all excess gear and equipment from docks.

5. **HURRICANE PLAN:** The plan should be printed and/or emailed to all Port staff. The Operations Manager and HSE Consultant will ensure that all Port staff are familiar with the plan and its preparation and response procedures as well as the location of equipment and supplies necessary for preparation and response.

6. **SUPPLIES:** The Operations Manager should ensure adequate supplies of tools and any equipment needed to deal with preparation and recovery are on-hand at the Port (dock lines, batteries/radios, gas/diesel, rain gear, bottled water).

7. **WORK VESSELS:** All Port work vessels should be in good working order. Dock lines and safety equipment should be on-board. Bilge pumps and generators should be operational. The Operations Manager and HSE Consultant should ensure that Port staff members understand the evacuation plan and their individual responsibilities.

8. **VEHICLES:** All Port vehicles (including trucks and cars) should be in good working order and have fuel topped off and/or batteries charged. Port staff should understand the procedures for relocating/securing any portable equipment to designated safe areas.

GENERAL

A. Objective:

To provide clear and concise procedures for staff to follow in the event of a hurricane or tropical storm. To manage, maintain security, and control the operation of Port facilities during an announced emergency situation.

B. Background:

A port may not be a safe location for vessels during a hurricane or tropical storm – their proximity to the water and coastal regions generally place these facilities either close to or directly in the path of these storms. It is highly recommended that vessels be relocated well in advance to safer locations in order to protect both the vessel and the Port. The following procedures will enhance NCP's ability to protect the lives and property of Port customers, and safeguard the Port facilities.

C. Preparation:

Every vessel owner should have an individual Hurricane Plan, designed specifically for their vessel. This Plan should include the location of alternate berthing /storage for their vessel; a checklist of key procedures to be followed to ready the vessel for a storm; necessary gear and supplies on board to help secure the vessel on short notice; and the name and phone number of a designated person who will act on behalf of the vessel owner should they be unable to reach the vessel. Port customers should regularly provide their facilities with current contact information, including emergency telephone numbers. Vessel insurance should be a mandatory requirement for berthing / storing a vessel at the Nassau Cruise Port. Port users should make sure that their vessel insurance is current and that coverage is sufficient protection for vessel liability, damage, or loss.

The Port office (unless otherwise designated) will serve as the Operating Post for the coordination of operations, communication, and emergency response. Port staff shall be familiar with the emergency procedures.

HURRICANE ACTION PLAN

D. Hurricane Watch

1) All staff are required to know by definition the status of a weather emergency as differentiated between a Hurricane Advisory, Watch, Warning, etc.

2) All staff will be prepared to respond when called upon to report to work. Proper planning will ensure that personnel needs are met, while still meeting the need to respond to an emergency situation at the Port.

3) At designated staging areas, all emergency equipment and supplies (i.e. pumps, generators, vehicles, etc.) are to be at full operational capacity and ready to move. Batteries are fully charged; life jackets, rings, lines, and other safety equipment stocked and in full working order.

4) At the Operating Post, the information cycle is started – the Operations Manager shall contact the relevant local hurricane preparedness agencies (e.g. NEMA) and verify contact information. The Operating Post will communicate with:
    a. Port Patrons – directly, by voice announcement, by posted notice, by phone, and/or by passing the word, the proposed order of an evacuation plan will be announced.
    b. Vessel owners/operators will be instructed to monitor VHF Channel 16, the marine working channel, and weather station for information updates and emergency instructions.
    c. All trash and debris will be removed from containers to prepare those containers for receiving additional trash. Parking areas, common areas, and docks should be checked for removal of unnecessary equipment and materials.
    d. Staff shall ascertain that vessel owners are prepared for an emergency evacuation.
    e. Notification is made to other Port personnel/contractors if there is need to relocate any vehicles, equipment, or property. Port employees are designated at the facility to handle the safeguarding, evacuation, or relocation of the above, as well as files and irreplaceable data.

5) Commence securing buildings, docks, vessels, and upland property. Only basic facility accesses are left open.

6) Wet slips are to be kept open for a smooth flow of vessels from their slips and any additional haul out vessels to the upland. Direct trailerable vessels are moved out of the area.

7) Staff should report essential information to the Operations Manager and receive instruction as to communications, controls, phone numbers, radio channels, etc.

8) The Operations Manager should rotate facility staff home to address personal needs. All staff will be required to report back to work, scheduled in selected groups at selected locations, for continuing emergency operations. It is imperative that all staff report to work as instructed.

E. Hurricane Warning

1) All staff on duty shall alert the boating public of any Hurricane Advisory Update and Warning information.

2) All off-duty staff must respond immediately and report to work if requested to do so. Personal needs should now have been met and all available personnel will be meeting the need for necessary emergency work at the Port.

3) Emergency equipment and supplies are positioned to be mobilized for fast use. Piers and bulkheads are cleared of movable objects, garbage, and debris. Loose items that cannot be removed are secured, tied down, etc.

4) Keep vessel and customer traffic flowing in a smooth and orderly fashion. Be prepared to assist vessel owners with untying lines, securing equipment, etc.

5) Complete securing buildings, piers, and docks; finish safeguarding property from flood areas; secure areas once completed.

F. Facility Evacuation

1) Upon local directive, Port facilities are secured and evacuated. Vessel owners have been directed to hurricane shelters. All staff are dismissed, with instruction to establish contact with the Operations Manager as soon as possible after the storm for instruction. The Port will be shut down for the duration of the emergency. Begin planning for “after the storm” action.

Appendix R: Curriculum Vitae for EMP Consultants

The curriculum vitae for the consultants that worked on preparation of the EMP and will also work on its implementation are provided. The team includes:

- Stacey Helena Moultrie, SEV Consulting Group – Lead Environmental Consultant; Environmental Monitoring Supervisor
- Hayley-Jo Carr, Perry Institute for Marine Science (PIMS) – Coral relocation team
- Krista Sherman, PIMS – Coral relocation team
- Valeria Pizarro, PIMS – Coral relocation team

The Environmental Monitor (EM) will be engaged prior to construction commencing. The curriculum vitae for that individual will be provided to DEPP once they are engaged.

Stacey Helena Moultrie

Position:	Lead Environmental Consultant
Date of Birth:	1 September 1971
Nationality:	Bahamian
Certifications and Membership in Professional Societies:	GHG Inventory Expert, UNFCCC Roster of Experts Chartered Institution of Water and Environmental Management (CIWEM), United Kingdom Chartered Scientist, Science Council, United Kingdom Member, American Planning Association (APA) Lifetime Member, Delta Epsilon Iota Academic Honor Society

Education

2019	University College London, Bartlett School of Environment, Energy & Resources, Institute of Sustainable Resources – Graduate research student (planned graduation in 2023)
2016	University of Florida (USA), Master of Urban Planning – Sustainability
2007	Conservation Strategy Fund, Stanford University (United States), Economic Tools for Conservation
1998	Dalhousie University (Canada), Master of Marine Management
1995	University of the West Indies (Mona Campus, Jamaica), B.Sc. (*Upper Second Class Honours*) Zoology – Marine Science & Fisheries

Countries of Work Experience

The Bahamas
Regional projects involving Antigua and Barbuda, Bahamas, Barbados, Belize, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Saint Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, and Venezuela.

Languages

	Speaking	*Reading*	*Writing*
English	Excellent	Excellent	Excellent

Key Qualifications

Mrs. Moultrie is an environmental planner. Her employment history in the environmental arena spans more than 24 years, including 18 months with the Department of Environmental Health Services and 7 years with the BEST Commission. Her experience involves work in project management, international negotiations, tourism, development of environmental education materials, environmental policy development, project proposal development for international funding, assessing environmental impacts of development projects, and environmental management and planning. Her role at the BEST Commission included advising the Government of The Bahamas on the environmental impacts of large private development projects, Government-led development projects, and policy decisions. She negotiated on behalf of the Bahamas Government in the following fora – Convention on Biological Diversity, Cartagena Protocol on Biosafety, Stockholm Convention on Persistent Organic Pollutants, United Nations Framework Convention on Climate Change, Rotterdam Convention on Prior Informed Consent and United Nations Convention on Desertification and Drought. She also provided policy guidance to the Ministry of Foreign Affairs on the Law of the Sea Convention and its various protocols.

Born and raised in The Bahamas with considerable work experience in the environmental sector, Mrs. Moultrie is well versed in the regulatory and policy aspects of natural resource management.

Employment Record

From 2007	**To Present**
Employer	SEV Consulting Group (Nassau, The Bahamas)
Position Held and Description of Duties	Environmental Planner Mrs. Moultrie is responsible for business development, project management, staff management, and client service delivery in the areas of environmental policy, planning and management as well as EIA and EMP development, coordination of internationally funded projects and development of environmental education, awareness and training materials.
From 2019	**To Present**
Employer	The Islands Laboratory, University College London (London, United Kingdom)
Position Held and Description of Duties	Researcher Mrs. Moultrie is a researcher with the Islands Laboratory which focuses on innovative solutions to tackle climate change and assess scenarios for disaster risk reduction and resilience for islands globally. Her research focuses on sustainability indicators, resilience, resource nexus and energy reform.
From 2011	**To Present**
Employer	University of The Bahamas (Nassau, The Bahamas)

Position Held and Description of Duties	Part-time Lecturer, School of Chemistry, Environmental and Life Studies. Mrs. Moultrie is responsible for development of course materials (lecture, handouts, class assignments, field trips and exams) and teaching of courses in Local and Global Issues in Sustainability (SIS 202), Conservation Studies (SIS 130), Marine Biology (MARI 231) and Environmental Impact Assessment (SIS 401). Mrs. Moultrie also served as part-time Grant Writer for the University from 2018 to 2019, securing funding for the University from the Inter-American Development Bank and Global Environment Facility Small Grants Programme.

From 2007	**October 2010**
Employer	The Nature Conservancy (Northern Caribbean Program, Nassau, The Bahamas)
Position Held and Description of Duties	Senior Policy Advisor Mrs. Moultrie was responsible for government relations for the Conservancy on issues related to expansion of protected area systems, sustainable financing, management effectiveness monitoring tools, and ecosystem-based adaptation to climate change. Her work involved review of proposed legislation and policy, proposal development and project management for internationally-funded projects, technical advice to Ministers and senior Government officials on various environmental issues, including renewable energy and means for conservation and sustainable use of natural resources of The Bahamas and other countries in the Caribbean region.

From 2000	**To 2007**
Employer	Bahamas Environment, Science and Technology (BEST) Commission (Nassau, The Bahamas)
Position Held and Description of Duties	Senior Environmental Officer Mrs. Moultrie was responsible for project management, staff management and advice to the Government of The Bahamas in the areas of biodiversity conservation, environmental impacts from development, mitigation for development activities, policy development, international negotiations, drafting environmental legislation, developing national strategies for environmental issues (included development of National Environmental Policy and National Environmental Management and Action Plan) and securing international funding for environmental projects. She was also responsible for management of environmental aspects of development of the islands of New Providence, Exuma, Eleuthera, Abaco, Long Island and Paradise Island.

From 1998	**To 1999**
Employer	Department of Environmental Health Services (Nassau, The Bahamas)
Position Held and Description of Duties	Health Inspector Mrs. Moultrie was responsible for ensuring that public entities and private businesses complied with regulations under the Environmental Health Act and aspects of the Public Health Act as an agent of the Government of The Bahamas in the areas of potable water provision, disposal of solid waste and wastewater, food safety, pollution prevention, vector control and control of animal diseases.

Work Experience in Community Capacity-Building

- **Caribbean Community Climate Change Centre, Capacity Building of National Designated Authority (NDA) and Preparation of Country Strategic Framework – The Bahamas,** February 2018 – December 2018 (National Consultant, team member with Acclimatise)
  Funded by the Green Climate Fund (GCF), Caribbean Community Climate Change Centre (CCCCC) and the Bahamas Government, the project seeks to strengthen the capacities of the Ministry of Environment and Housing as the National Designated Authority for the GCF, develop operational guidelines for engagement of the NDA with the GCF, and prepare a Country Strategic Framework for The Bahamas (including a portfolio of climate change projects). Mrs. Moultrie is responsible for stakeholder engagement and assisting with development of project reports and the Country Strategic Framework along with communication materials about the GCF.

- **Inter-American Development Bank, Ecosystem-based Development for Andros Island, The Bahamas – Outreach and Capacity-Building,** July 2015 – March 2017 (Team Leader)
  Funded by the Inter-American Development Bank, the project seeks to complete an analysis of ecosystem services and future development scenarios as well as development of a master plan for the island of Andros. SEV was selected to support the project through development of outreach and capacity building activities including development of a communications strategy, facilitation of public consultations, assessment of technical capacity of decision-making agencies and delivery of a training workshop on several topics including ecosystem services and economic valuation. Mrs. Moultrie is responsible for ensuring all team members complete their tasks in a timely manner and serves as liaison with other consulting teams on the project as well as the IDB staff. She leads the tasks on stakeholder consultations and training workshop.

- **IICA Smallholder Rural Producers and Climate-Smart Agricultural Production and Marketing in English Caribbean**, January 2014 – November 2014 (Consultant)
  Funded by the Inter-American Institution for Cooperation in Agriculture (IICA) and International Fund for Agricultural Development (IFAD), the project sought to collate and analyze information on smallholder production within the context of climate change responses. Mrs. Moultrie

responsibilities included review and collation of country-specific information on the state of rural and agriculture smallholder producers as it related to climate smart agriculture and rural entrepreneurship in The Bahamas. Her work involved conducting stakeholder consultations and leading a national workshop with stakeholders to validate her findings and discuss recommendations for implementing climate smart agricultural practices. Outputs of the project included a country report, an inventory of policies, projects and programs on climate change and the agricultural sector, and case studies of smallholder farms.

- **Department of Marine Resources, GEF Full-Sized Project Lionfish Demonstration, South Berry Islands Marine Reserve – Experiment Coordination,** 2011 — 2014 (Project Lead)
  Mrs. Moultrie was responsible for coordinating all activities related to the lionfish demonstration project which involved lionfish removals in the South Berry Islands Marine Reserve (SBIMR) and research on lionfish invasion pathways into The Bahamas. Key components of the project include ensuring participation of Bahamian students in research and local residents in the removal exercises. Outputs of the project included research papers and strategies for management of lionfish as a major biodiversity threat to the Bahamian marine environment.

Work Experience in Environmental Planning and Management

- **Bahamas Power and Light, Environmental Impact Assessment and Environmental Management Plan – New Providence, The Bahamas,** March 2020 – Present (Consultant)
  Project involves construction of a power plant in New Providence. Mrs. Moultrie is responsible for development of an EIA and EMP for the project inclusive of coordinating all field teams, data collection, preparation of reports and liaising with BEST Commission and other Government agencies as necessary prior to construction works commencing.

- **Central Bank of The Bahamas, Environmental Impact Assessment and Environmental Management Plan – New Providence, The Bahamas,** February 2020 – Present (Consultant)
  Project involves demolition of several buildings in New Providence. Mrs. Moultrie is responsible for development of an EIA and EMP for the project inclusive of coordinating all field teams, data collection, preparation of reports and liaising with BEST Commission and other Government agencies as necessary prior to construction works commencing.

- **Nassau Cruise Port, Environmental Management Plan – New Providence, The Bahamas,** January 2020 – Present (Consultant)
  Project involves construction of cruise port facilities in New Providence. Mrs. Moultrie is responsible for development of an EMP for the project inclusive of development of detailed mitigation measures, a hurricane preparedness plan and an environmental, health and safety training manual for construction staff.

- **Bill Simmons Construction, Environmental Monitor – New Providence, The Bahamas,** December 2018 – June 2019 (Consultant)
  Project involved provision of potable water infrastructure and road reinstatement for western New Providence. Mrs. Moultrie was responsible for development of environmental checklist and biweekly environmental inspections to ensure compliance with Ministry of Works and Water and Sewerage Corporation standards. She also provided environmental, health and safety training for all construction staff prior to construction works commencing.

- **Shell Bahamas LNG Project, Environmental Permitting and Environmental Impact Assessment – New Providence, The Bahamas,** December 2018 – Present (Consultant)
  Project involves development of an LNG pipeline and power plant by Shell in cooperation with Bahamas Power and Light (BPL). Mrs. Moultrie is responsible for providing guidance on environmental, health and safety legislation, regulations and standards the project will need to adhere to as well as assisting with liaising with the Bahamas Environment, Science and Technology (BEST) Commission. Mrs. Moultrie's responsibilities also involve developing an EIA for the project.

- **By The Ocean Development, Environmental Impact Assessment – Eleuthera, The Bahamas,** April 2018 – December 2018 (Team Leader)
  Project involved development of an EIA hotel and luxury home development with an organic farm component. Preparing the EIA involved terrestrial and hydrological surveys to assess the impacts of the development. The EIA also recommends mitigation measures to be undertaken to eliminate or minimize negative environmental impacts. Mrs. Moultrie was responsible for preparing of the EIA, coordinating the team of consultants, and liaising with Government agencies during the EIA review to obtain no-objection for the development to proceed.

- **Caribbean Development Bank, Water Supply Improvement Project – The Bahamas,** December 2016 – April 2018 (Socio-Environmental and Climate Specialist)
  Funded by the Caribbean Development Bank (CDB) and the Bahamas Government, the project sought to improve existing and develop new infrastructure for water supply on six islands in The Bahamas. Mrs. Moultrie was responsible for developing ESMPs for five of the islands and monitoring compliance with the ESMPs during construction. A key component of the project was ensuring infrastructure is resilient to climate change.

- **Inter-American Development Bank, Environmental and Social Analysis and Management Plan – The Bahamas,** July 2016 – September 2016 (Socio-Environmental and Climate Specialist)
  Funded by the Inter-American Development Bank (IDB) and the Bahamas Government, the Skills for Current and Future Jobs in The Bahamas project involved finding a location for the Department of Labour. Mrs. Moultrie was responsible for advising on the environmental and social impacts of three scenarios – repair of Clarence A. Bain building, demolition of the building and construction of a new building at the same site, and rental of space in an existing building. She developed an Environmental and Social Analysis (ESA) of related demolition, construction and operation activities for the various scenarios. She also developed an Environmental and Social Management Plan (ESMP) to guide demolition, construction and operation, depending on the scenario selected.

- **Inter-American Development Bank, Feasibility Studies for a Climate Risk-resilient Coastal Zone Management Investment Program in The Bahamas – Preparation of a National ICZM Policy Framework,** February 2016 – October 2016 (SEV Team Leader)
  Funded by the Inter-American Development Bank, the project sought to prepare a national integrated coastal zone management (ICZM) policy framework for The Bahamas, support the Government of The Bahamas in communicating with the public on relevant issues and enhance knowledge and capacities in innovative aspects of ICZM for the Government and other key stakeholders. SEV Consulting Group, along with Caribbean Coastal Services, was selected to support the project through development of technical briefs on thematic areas including policy, governance and planning, environment and climate change adaptation as well as develop a draft ICZM National Policy Framework. Mrs. Moultrie was responsible for ensuring all SEV team members completed their tasks in a timely manner and served as liaison with other consulting teams on the project as well as Government and IDB staff. She led all tasks related to policy development, including drafting of the ICZM Policy Framework and participation as a presenter in the training workshop, and assisted with other tasks.

- **Cotton Bay Development Golf Course, Eleuthera – Environmental Impact Assessment Addendum and Environmental Management Plan**, July 2015 – September 2016 (Project Lead)
  Project involved development of an EIA Addendum for the golf course component under Phase 2. Preparing the Addendum involved terrestrial and hydrological surveys to assess the impacts of the golf course construction. The Addendum also recommends mitigation measures to be undertaken to eliminate or minimize negative environmental impacts. Subsequent to the approval of the EIA Addendum, an EMP was developed to guide construction and operation.

- **Commercial Port Development, Great Exuma – Feasibility Study**, February 2015 – December 2016 (Team Member)
  Project involved development of a feasibility study, including potential environmental impacts, for a commercial port development on the island of Great Exuma. Mrs. Moultrie was responsible for environmental evaluation of the proposed project site, data collection, developing the methodology for the EIA to be completed as the next phase of the project and participation in stakeholder consultations in Exuma. She also supported other team members by reviewing their deliverables to ensure local context was accurately reflected.

- **FAO Strengthening Fisheries and Aquaculture Governance in The Bahamas**, November 2014 – November 2016 (National Consultant)
  Funded by the United Nations Food and Agriculture Organization (FAO), the project involved development of a sector review study for fisheries and aquaculture in The Bahamas as well as consultations for the development of the national fisheries and aquaculture policy and strategy. Mrs. Moultrie's responsibilities included coordinating with FAO offices, Department of Marine Resources and other key Government agencies as well as sector stakeholders including fishing communities. Her outputs included a report of the current status of fisheries and aquaculture in The Bahamas, an updated version of the FAO country profile for fisheries and aquaculture, and the draft National Policy and Strategic Plan for Fisheries and Aquaculture in The Bahamas.

- **North Abaco Port, Cooper's Town, Abaco – Development of Supplemental Environmental Impact Assessment and Environmental Management Plan; Environmental Monitoring,** July 2014 — July 2016 (Project Lead)
  Project involved development of a Supplemental Environmental Impact Assessment (SEIA) and an Environmental Management Plan (EMP). The SEIA involved terrestrial and marine surveys inclusive of wetland surveys and hydrogeological modeling to assess the impacts of the Port's construction. The EMP was developed to guide construction activities, such as dredging and land clearing. On completion of the EMP, SEV was engaged as Environmental Monitor for the project and served in this capacity for 2 years. Mrs. Moultrie was the technical lead and provided guidance to SEV's on-site environmental monitor as well as firms involved in port construction, including CHEC, CCG and CCS.

- **Yamacraw Marina, New Providence – Environmental Impact Assessment,** September 2014 — December 2014 (Project Lead)
  Project involved assessment of the environmental impacts from a small marina development. Tasks involved assessment of terrestrial and marine impacts to develop the EIA. The EIA also included recommendations for mitigation methodologies to minimize any negative environmental impacts. Mrs. Moultrie was the Project Lead and responsible for coordinating all fieldwork as well as completing some of the fieldwork, liaising with Government agencies and preparing the EIA document in compliance with Bahamian policies and legislation for submission to the Docks Committee and Bahamas Environment, Science and Technology (BEST) Commission.

- **Blue Hole Marina, Fresh Creek, Andros – Environmental Impact Assessment,** May 2014 — August 2014 (Project Lead)
  Project involved assessment of the environmental impacts from a commercial marina development. Tasks involved assessment of terrestrial and marine impacts to develop the EIA. The EIA also included recommendations for mitigation methodologies to minimize any negative environmental impacts. Mrs. Moultrie was the Project Lead and responsible for coordinating all fieldwork as well as completing some of the fieldwork, liaising with Government agencies and preparing the EIA document in compliance with Bahamian policies and legislation for submission to the Docks Committee and Bahamas Environment, Science and Technology (BEST) Commission.

- **Royal Bahamas Defence Force, New Providence and Inagua – Baseline Assessment and Environmental Management Plan for Coral Harbour Base Improvement and Environmental Monitoring of Improvements to Coral Harbour Base,** 2014 — 2016 (Project Lead)
  Project involved development of a baseline assessment of the environmental conditions at the Coral Harbour base and an Environmental Management Plan (EMP) to guide construction improvements. The project also involved environmental monitoring during construction at Coral Harbour, New Providence base as per the EMP.

- **Ecological Gap Analysis for the Bahamas National Protected Area System,** 2013 – 2015 (Lead Consultant)
  Project was one of the components under the GEF Full-Sized Project on sustainability of marine protected areas in The Bahamas. This component resulted in revision of the 2003 Ecological Gap Analysis and identification of priority areas for conservation using the GIS analysis tool, MARXAN as well as development of management plans for some of the priority areas. Mrs. Moultrie's responsibilities included organizing all expert consultations as well as stakeholder workshops, finalization of Gap Analysis reports, and development of protected area management plans.

- **Inter-American Development Bank, Feasibility Studies for Natural Gas in the Caribbean – Socio-Environmental Impact and Risk Assessment, 2013 – 2014 (Team Member)**
  Funded by the Inter-American Development Bank, the project sought to determine the feasibility of natural gas as an energy source for the Caribbean. Mrs. Moultrie was responsible for preparation of a socio-environmental impact and risk assessment for the project as well as assisting with data collection for Caribbean nations including The Bahamas. She was also tasked to assist with developing a strategy to implement the selected scenario for introduction of natural gas in the Caribbean Region inclusive of mitigation measures for any negative socio-environmental impacts.

- **CARICOM-CIDA Diagnostic and Analytical Review of National Environmental Governance Systems in The Bahamas,** February 2013 – December 2013 (Lead Consultant)
  Project was one of the components under the CARICOM-CIDA Trade and Competitiveness Project. This review looked at the readiness of the legal and institutional frameworks governing environment and natural resource management in The Bahamas for participation in the Caribbean Single Market Economy (CSME). It also involved identification of priority environmental issues and respective policy responses as well as existing gaps and recommendations for addressing them.

- **Development of Management, Communication and Zoning Plans for the South Berry Islands Marine Reserve**, June 2012 – March 2013 – (Lead Consultant)
  Project resulted in development of management, communication and zoning plans for a marine reserve in the South Berry Islands in The Bahamas. Development of the various plans involved Mrs. Moultrie organizing and leading numerous stakeholder consultations in the form of town meetings and workshops in several Family Island communities as well as New Providence. Other team members developed GIS maps and zoning for the marine reserve.

- **ECLAC Project on Development of Economic Frameworks in support of an Assessment of the Economic and Social Impacts of Climate Change in the Caribbean,** 2012 (National Data Collector)
  Under guidance from the Economic Commission for Latin America and the Caribbean (ECLAC), Mrs. Moultrie served as the National Data Collector for The Bahamas. She was tasked to collect historical and current statistical data for the following sectors – agriculture, energy, health, marine and coastal resources, tourism, and water resources. The data was utilized for input into the regional project.

- **Baker's Bay Club, Abaco – Review of Environmental Management Plan and Environmental Monitor,** 2012 — September 2018 (Project Lead)
  Project involved review of the Environmental Management Plan for the Baker's Bay Club (BBC) development and recommendations for changes to improve the environmental management regime for the Club. Monitoring was focused on the marina and golf course components of the project to ensure they were having no detrimental environmental impacts on sensitive habitats inclusive of coral reefs and wetlands. The project also involved development of environmental education materials for BBC staff and residents as well as assisting the Club with obtaining Blue Flag certification for its marina and developing an Environmental Report Card for BBC.

- **Inter-American Development Bank and Bahamas Electricity Corporation, New Providence – Impact Methodologies for Alternative Energy Sources**, 2012 (Team Member)
  Project was funded by the Inter-American Development Bank and was focused on strengthening the energy sector in The Bahamas. Mrs. Moultrie was responsible for assisting with the development of an impact methodology for a pilot project for the installation of photovoltaic (PV) systems inclusive of monitoring and evaluation indicators. She performed the same task for a compact fluorescent lamps (CFLs) pilot project and a solar water heater (SWH) pilot project.

- **Bahamas Petroleum Company – Environmental Impact Assessment,** 2011 - 2012 (Team Member)
  Mrs. Moultrie was responsible for development of the baseline environmental assessment for the areas of The Bahamas to potentially be impacted by development of a deepsea exploratory oil drilling platform and support facilities. She also assessed the environmental impacts of this activity and assisted in development of mitigation measures to eliminate or minimize any negative impacts identified.

- **Statoil – Environmental Feasibility Study, Cay Sal Bank,** 2011 - 2012 (Team Member)
  Mrs. Moultrie was responsible for development of the baseline environmental component of the study for the areas of The Bahamas, Florida and Cuba to potentially be impacted by development of an oil exploration and production program. She also identified potential environmental impacts of the proposed program and assisted in development of mitigation measures to eliminate or minimize any negative impacts identified.

- **Bond's Cay, Berry Islands – Environmental Feasibility Study, Environmental Impact Assessment and Permitting Assistance,** 2011 (Project Lead)
  Project involved assessment of the environmental impacts from a luxury home development. The project is on a 680-acre cay. Tasks involved development of an Environmental Feasibility Study to determine potential environmental impacts and assessment of terrestrial and marine impacts to develop the EIA. The EIA also included recommendations for changes in design to minimize footprint and negative environmental impacts and for mitigation methodologies. Mrs. Moultrie was the Project Lead and responsible for coordinating all fieldwork as well as completing some of the fieldwork, liaising with Government agencies and preparing the EIA document in compliance with Bahamian policies and legislation for submission to the Bahamas Investment Authority and the Bahamas Environment, Science and Technology (BEST) Commission.

- **Inter-American Development Bank Water & Sewerage Support Program, New Providence – Development of Environmental and Social Impact Analysis**, 2011 (Project Lead)
  Mrs. Moultrie was responsible for an environmental and social analysis (ESA) of the sewage treatment operations of the Water and Sewerage Corporation as a requirement of their loan application to the Inter-American Development Bank (IDB). The analysis involved assessing current status of the sector (physical assets, human resources, legislative framework and operational processes), review of proposed upgrades to the sector and their potential impacts as well as recommendations on environmental mitigation measures for the proposed construction upgrades. Mrs. Moultrie was also tasked to participate in any public consultation activities organized to discuss the ESA and respond to questions.

- **Lukku Cairi, Eleuthera – Development of Environmental Feasibility Study and Environmental Impact Assessment**, 2011 (Project Lead)
  Project involved development of a cruise ship terminal and resort which extends over 1,000+ acres. SEV developed an Environmental Feasibility Study to determine potential environmental impacts of the project, particularly related to the marine environment and freshwater resources, and advising on the environmental feasibility of the project. Mrs. Moultrie was project lead and responsible for coordinating all fieldwork as well as completing some of the fieldwork, liaising with Government agencies and ensuring preparation of the study in compliance with policies and legislation of the Government of The Bahamas for submission to the Office of the Prime Minister and the BEST Commission.

- **GEF National Portfolio Formulation Exercise,** 2010 (National Project Consultant)
  Project involved development of project concepts in the Global Environment Facility (GEF) focal areas of biodiversity, chemicals, climate change, international waters, land degradation and sustainable forestry management. The project concepts were those that are of priority for The Bahamas for the Fifth Replenishment of the GEF. As the project lead, Mrs. Moultrie was responsible for coordinating all public consultations and expert thematic groups and writing of the National Portfolio Formulation document for submission to the GEF Secretariat. Her tasks also involved review of all national plans, policies and programs related to GEF focal areas towards a goal of building on their recommendations in development of project concepts. She also provided guidance to the stakeholders on project concept content to ensure compatibility with GEF focal area strategy objectives.

- **NAD, New Providence – Review of Environmental Management Plan and Environmental Construction Monitor for Lynden Pindling International Airport (LPIA) Expansion Project (All Phases)**, 2009 – 2013 (Project Lead)
  Project involved review of the Environmental Management Plan for the LPIA Expansion Project, a $400 Million project spanning five and a half years, and recommendations for changes to improve the environmental management regime for the project. SEV also monitored the construction activities of the project, inclusive of terminal building construction, infrastructure installation, construction of parking for vehicles and aircraft, disposal of construction waste, and health and safety of construction workers, to ensure compliance with the EMP and international and Bahamian

legislation, regulations and guidelines. The monitoring occurred on a weekly basis and involved site inspections, completion of environmental checklists, submission of weekly reports and monthly reports. Mrs. Moultrie was project lead and responsible for coordinating all SEV staff involved in completing tasks as well as completing site inspections, checklists and reports and ensuring deliverables were made in a timely manner.

- **Inter-American Development Bank Water and Sewerage Support Program, New Providence – Legal and Regulatory Update for the Water and Sanitation Sector of The Bahamas,** 2009 — 2010 (Team Member)
  The project involved a review of the water and sanitation sector in The Bahamas, particularly the status of the legal, operational and environmental framework for the Water and Sewerage Corporation. Mrs. Moultrie was a team member for the environmental framework review which entailed review of existing environmental legislation, proposed legislation, institutional structure for the sector, human resources and environmental management processes. The project also involved recommendations on how to improve any deficiencies identified through the review.

- **Bahamas Protected Area Fund Proposed Structure and Legislation,** 2008 – 2010 (Project Lead)
  Project involved development of the proposed structure and draft legislation as well as bye-laws for the operation of The Bahamas Protected Area Fund (BPAF) as a sustainable financing mechanism for the Bahamas National Protected Area System (BNPAS). As the project lead, Mrs. Moultrie was responsible for coordinating all experts involved in completing tasks under this project as well as executing aspects of the project. The project involved review of similar mechanisms regionally and globally, review of national legislation to determine any existing vehicles for creation of the Fund, and stakeholder consultations to create a mechanism that would work within the legal and institutional framework for protected area management in The Bahamas.

- **Master Plan for the Bahamas National Protected Area System,** 2007 – 2010 (Project Lead)
  Project involved completion of all components of the master planning process – Ecological Gap Analysis, Assessment of Protected Area Management Effectiveness, Sustainable Finance Plan, Capacity Action Plan and Master Plan along with 10-year Action Plan. Mrs. Moultrie was project lead and responsible for coordinating all activities and consultants involved in completing each component as well as assisting with and editing all components and leading some of the components. Mrs. Moultrie authored the Master Plan which was published in 2012.

- **Albany, New Providence – EIA Addendum for Road Corridor Extension, Environmental Management Plan, training of construction staff and coral reef monitoring,** 2007- 2010 (Project Lead)
  Project involved assessment of the environmental impacts from a change in road configuration and design for the project which extends over 500+ acres. The $1.5 billion project is a luxury mixed-use resort development inclusive of an 18-hole golf course, 70-slip large-vessel marina, 100 residences in a marina village, and 300+ residential units. Tasks for EIA Addendum involved assessing environmental impacts of change in road corridor configuration and design and recommended mitigation for these impacts. Tasks for Environmental Management Plan involved ensuring all mitigation measures developed through the EIA for the project were included and

presented with clarity for management and construction staff to utilize during construction and operation, developing training materials and conducting training sessions with management and construction staff on the EMP and environmental issues related to the project, and developing monitoring program for key environmental factors such as biodiversity, marina water quality and groundwater quality. Tasks for coral reef monitoring involved regular environmental assessment of corals that were relocated for construction of the marina channel which extends one mile from shore. Parameters measured include fish diversity and abundance and reef health. Monitoring started in 2008 and was completed in 2010. Mrs. Moultrie was the project lead and responsible for coordinating all experts involved in completing tasks as well as completing all marine-related fieldwork, liaising with Government agencies and ensuring deliverables were made in a timely manner.

- **DevCon Limited, New Providence – Coral reef assessment and cleaning,** 2009 (Project Lead)
  The project involved assessment of 2 patch reefs that had been impacted by dredging activities as well as manually cleaning the corals in an effort to remove sediments. Tasks related to the assessment involved visual assessment of impacts and coral health and recommendations for reducing impacts on the corals. Mrs. Moultrie was the project lead and responsible for coordinating all experts involved in completing tasks as well as completing some of the marine-related fieldwork and ensuring deliverables were made in a timely manner.

- **Road 3B, Corridor 2, New Providence – Environmental Management Plan and environmental oversight as per EMP requirements,** 2007 - 2008 (Project Lead)
  The project involved development of an Environmental Management Plan (EMP) for the road construction; EMP included overview of environmental impacts, mitigation methodologies to be utilized, training materials for construction staff, design of organizational structure for EMP implementation, development of environmental method statements and monitoring schedule. Tasks also involved weekly monitoring for environmental impacts based on EMP requirements. Mrs. Moultrie was the project lead and responsible for coordinating all fieldwork as well as completing some of the assessment and monitoring fieldwork, liaising with Government agencies and ensuring deliverables were made in a timely manner, including monitoring reports.

- **Children's Bay Cay, Exuma – Environmental Impact Assessment and Environmental Management Plan and environmental oversight as per EMP requirements,** 2007 - 2008 (Project Lead)
  Project involved assessment of the environmental impacts from a luxury home development. The project occurred on a 176-acre cay and consisted of 11 residential lots and a small marina of about 20 slips. Tasks involved assessment of terrestrial and marine impacts to develop the EIA, recommendations for changes in design to minimize footprint and negative environmental impacts, and development of an EMP based on project impacts and recommended mitigation methodologies. Mrs. Moultrie was the Project Lead and responsible for coordinating all fieldwork as well as completing some of the fieldwork, liaising with Government agencies and ensuring deliverables were made in a timely manner.

Other Work Experience

- Development of The Bahamas Policy Framework and Strategy for Access and Benefit-sharing of Genetic Resources under the Nagoya Protocol (July 2019 – Present) – Consultant, BEST Commission, Ministry of Environment & Housing
- Development of The Bahamas National Biodiversity Strategy and Action Plan (NBSAP) 2020 – 2030 (May 2019 – Present) - Consultant, BEST Commission, Ministry of Environment & Housing
- Feasibility Study Development of a Business Plan for the Exuma Cays Land and Sea Park under the GEF FSP on Developing a Sustainable Network of Marine Reserves in The Bahamas (December 2010 – January 2012) – Consultant, Bahamas National Trust
- Model Policy and Strategy for Water Use Efficiency in the Caribbean for 13 Caribbean countries (2008) – Consultant, Water & Sewerage Corporation
- Drafting of The Bahamas' Second National Communication on Climate Change (2007 – 2011) - National Project Coordinator, BEST Commission, Ministry of Environment & Housing
- Development of Draft National Biosafety Framework and Draft National Biosecurity Strategy (2005 – 2007) - National Project Coordinator, BEST Commission, Ministry of Agriculture & Fisheries
- Conducting a Review of Policy, Legislation & Institutional Structures related to Integrated Watershed and Coastal Area Management (IWCAM) in countries participating in the IWCAM Regional Project – review for The Bahamas (2007) – National Consultant, Water & Sewerage Corporation

Publications

- Wells-Moultrie, S. (2020). Assessing sustainability in small island developing states: A comparative analysis of sustainability assessment tools and their applicability to small island developing states. Chapter 10. In *Tourism Development, Governance and Sustainability in The Bahamas*. Abingdon, Oxon; New York, N.Y: Routledge.
- Silver, J.M. et al. (2019). Advancing Coastal Risk Reduction Science and Implementation by Accounting for Climate, Ecosystems, and People. In *Frontiers in Marine Science*, 6(556).
- Arkema, K. et al. (2019). Integrating fisheries management into sustainable development planning. In *Ecology and Society*, 24(2):1.
- Wells-Moultrie, S. (2016). *Assessing Sustainability in Small Island Developing States" A comparative analysis of sustainability assessment tools and their applicability to Small Island Developing States*. Gainesville: University of Florida.
- Moultrie, Stacey. (2013). *Bahamas Invasive Species Field Guide: Identification of Plant and Animal Invasives.* Nassau: Department of Marine Resources.
- Moultrie, Stacey. (2013). *The Bahamas National Invasive Species Strategy 2013.* Nassau: Department of Marine Resources.
- Sherman, K., Dahlgren, C., Moultrie, S., and Arnett, F. (2013). *Building a Sustainable National Marine Protected Area Network: Controlling Lionfish Populations in Marine Protected Areas*. PSBP Conference Paper.
- Moultrie, Stacey. (2012). *Everyman's Guide to Protected Areas.* Nassau: HD Wells.

- Moultrie, Stacey. (2012). *Master Plan for The Bahamas National Protected Area System*. Nassau: The Nature Conservancy.
- The Nature Conservancy (2010). *Land and Sea Use Plan for the island of Andros.* Nassau: The Nature Conservancy.
- The Nature Conservancy (2009). *Master Plan Summary for The Bahamas National Protected Area System*. Nassau: The Nature Conservancy.
- Moultrie, S. (2009). *Sustainable Financing for Protected Areas*. In The Bahamas Investor, Nassau, The Bahamas.
- The BEST Commission. (2007). *National Environmental Policy* and *National Environmental Management and Action Plan.* Nassau, The Bahamas: The BEST Commission.
- Wells-Moultrie, Stacey. (2006). *The Evolution of Environmental Management in The Bahamas - 1994-2005.* In The Bahamas Journal of Science, Nassau, The Bahamas.
- The BEST Commission. (2003). *National Invasive Species Strategy for The Bahamas*, Nassau: The BEST Commission.
- The BEST Commission. (2002). *Bahamas Environmental Handbook.* Nassau, The Bahamas: Media Enterprises.
- Wells, Stacey. (1998). *A Marine Environmental Policy Proposal for The Bahamas*, Halifax, Canada: Dalhousie University.

HAYLEY-JO CARR

EDUCATION

Plymouth Marjon & Exeter University
Bachelor of Arts Degree with Honours
Sports and Recreation Studies with Community Studies
Current – MSc Biodiversity, Wildlife and Ecosystem Health – University of Edinburgh.

EMPLOYMENT HISTORY

Training Director, The Perry Institute for Marine Science, Nassau, Bahamas
Dec 2017 – Present

- Reef Rescue Network Coordinator – Coral nursery establishment, maintenance, management, outplanting and monitoring. Coordinator of coral nurseries throughout The Bahamas and Caribbean with a variety of partners including schools, private businesses, resorts, dive centers and other marine conservation groups.
- Highly experienced in the translocation of coral fragments to restore habitat and improve ecosystem health. Outplanted over 3000 coral fragments to 7 locations within the network.
- Coordinator of 29 coral nurseries, 18 of these personally established.
- Creation and implementation of a coral restoration training program, the PADI Reef Rescue Diver Specialty Course. Trained and certified 48 Reef Rescue Diver Instructors and 45 Reef Rescue Divers.
- Communicate the status, progress and achievements of the Reef Rescue Network through – websites, blog posts, social media, reports – to a diverse audience including the general public, funders, partners, stakeholders and government.
- Manage a large network of volunteers who assist in various marine conservation activities.
- Community events planner.
- Assist with marine research, education, outreach and policy initiatives.
- Participate in Atlantic Gulf Rapid Reef Assessments of coral reefs throughout The Bahamas, trained to conduct Fish, Coral & Benthic surveys.
- Plan and participate in beach and underwater marine debris removal events.
- PADI Course Director conducting Instructor Development Courses to train new Scuba Diving Instructors with an emphasis on marine conservation programs.

Training Director, Stuart Cove's Dive Bahamas, Nassau, Bahamas
Mar 2013 – Dec 2017
May 2010 – Apr 2012

- PADI Course Director teaching all courses up to Instructor levels.
- Emergency First Response Instructor Trainer.
- Manage 30+ Instructors and assisted with daily operations at a fast paced and extremely busy dive center.
- Social Media Manager.
- Marine Conservation Manager – In particular Marine Debris, Sharks, Sea Turtles and Coral Restoration.
- Coral restoration practitioner managing two coral nurseries and outplanting activities.
- Outplanted over 1000 coral fragments back onto coral reefs to restore reefs damaged by hurricanes.
- Authored a Shark Conservation Specialty program – PADI Shark Awareness Specialty Course.
- Kids Summer Scuba Camp Coordinator.
- Liaison between local schools, local dive club, NGO's and government.
- Marketing of all courses, projects and events.

Master Instructor, Aqaunauts Dive Center, Plymouth, UK
May 2012 – Dec 2012

- Teaching all course from Open Water to Assistant Instructor
- Marine Conservation Coordinator including: Marine Debris removal events and teaching Shark Conservation programs.
- Seasearch Coordinator – mapping and identifying species and habitats around the UK coastline.
- Social Media and website updates and articles.
- Adhering to strict Health & Safety regulations and conducting risk assessments.
- Marketing and advertising campaigns.

Watersports & Dive Center Manager, Reef Safari, Intercontinental Hotel, Fiji
Nov 2009 – May 2010

- Managing a variety of activities including surfing, kayaking, wakeboarding and scuba diving.

- Staff management & training.
- Marine Conservation Coordinator.
- Plan and participate in marine debris removal events.

Marine Conservation Coordinator, Asia Divers, Koh Tao, Thailand
Sept 2007 – Sept 2009

- Marine conservation project manager; monthly underwater marine debris removal, beach clean ups, mooring buoy placement, fundraising events, Reef Watch surveys, created eco-friendly underwater training sites.
- Coral restoration practitioner using Bio Rock technology. Growing corals and outplanting them onto degraded coral reefs to assist in recovery. Outplanted over 1000 corals back onto local coral reefs.
- Assisted in the creation of an alternative dive site for diver training to ease the pressure on local coral reefs.
- Established and monitored eco-friendly scuba diving protocols for the instructional team.
- Taught all courses from Open Water to Divemaster.

Cover Supervisor, Looe School, Cornwall, UK
Sept 2006 – Sept 2007

- Supervised classes in the absence of their teacher, including instructing students and providing them with the necessary resources for their learning, followed school systems and procedures on behavior management, rewards and sanctions.
- Curriculum support work including contributing to the planning and preparation of resources; assisting students in their learning; supporting teachers in the monitoring and assessment of student progress including collation of reports.

Retail Manager, Rhubarb, Plymouth, Devon
1998 – 2006

- Staff Management & Training. Merchandising, marketing and advertising.
- My employment here was both full and part time to allow me to fulfill and finance my university degree. This taught me the importance of being able to prioritize between different demands and the ability to meet deadlines.

Assistant Outdoor Pursuits Instructor, Delaware Center, Cornwall, UK
1996 – 1998

- Teaching rock climbing, abseiling, kayaking, canoeing, orienteering and problem solving to a variety of groups such as schools, colleges and disabled groups.
- Effective teamwork was essential particularly in terms of Health & Safety.

EXPERIENCE/QUALIFICATIONS

- Bahamas CITES Board Member. (The Convention on International Trade in
- Endangered Species of Wild Fauna and Flora).
- Bahamas National Wildlife & Conservation Committee member.
- Award Winning PADI Course Director.
- Project AWARE Dive Against Debris Hero Award.
- PADI Freediving Instructor.
- REEF Check Eco-Diver Instructor.
- AGRRA Fish, Benthic and Coral Surveyor.
- Specialty Instructor Trainer in a variety of courses including Shark Conservation, Lionfish removal, Naturalist, Wreck diving and Enriched Air Nitrox.
- Writer for Scuba Diver Life https://scubadiverlife.com/author/hayley/

DR. KRISTA D. SHERMAN

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Telephone: (242) 437-8576 (BAH)

EDUCATION

2014-2018 **University of Exeter (UK),** PhD Biological Sciences
Thesis: Integrative Approaches for Conservation Management of Critically Endangered Nassau Grouper in The Bahamas.
Thesis Examiner: Prof. Nicholas Polunin (Newcastle University)
Supervisors: Prof. Charles Tyler, Dr. Jamie Stevens & Dr. Stephen Simpson
Laboratory demonstrator for Animal Ecophysiology, Animals and Ecology. Graduate Teaching Assistant for Marine Biology.

2007-2008 **University of Southampton, National Oceanography Centre Southampton (UK),** MRes Ocean Science
Thesis: Stable Carbon and Nitrogen Isotope Analysis of the Invasive Lionfish (*Pterois volitans*) from Bahamian Waters.
Supervisor: Dr. Clive Trueman

2001-2005 **Jacksonville University (USA),** BSc Marine Science & minor in Spanish (*Magna cum laude*)
- Teaching and laboratory assistant for Introduction to Biology and Introduction to Marine Science.
- Conducted independent research examining "The Effects of salinity on regeneration of the brittle star *Ophiophragmus filograneus*".

AWARDS & SCHOLARSHIPS

- Moore Bahamas Foundation ($37,900) – 2020
- Blue Lagoon Island Research & Conservation Fund ($2,800) – 2019
- Private Donor ($25,000) – 2016-2017
- Save Our Seas Foundation Small Grant ($10,000) – 2016-2017
- Ministry of Agriculture and Marine Resources Marine Scientist Award – 2016
- Santander Postgraduate Research Award (£500) – 2016
- Shirley Oakes Butler (Overseas) Charitable & Shirley Oakes Butler (Bahamian) Trust via the Lyford Cay Foundation ($7,500 per year: 3 yr. total = $22,500) – 2014-2017
- Rotary Club of East Nassau $3,000 per year: 3 yr. total = $9,000) – 2014-2017
- Organization of American States Scholarship Recipient 2004-2005
- Jacksonville University President's Honour Roll – F'01, F'04, S'05
- Jacksonville University Dean's List – S'02-S'04, F'02-F'03
- Most Outstanding Marine Science Student Award – 2005
- Jacksonville University ($2,000 per year: 4 yr. total = $8,000) – 2001-2005
- Outstanding Students in Bahamian High Schools Academic Award – 2000

EXPERIENCE RELVANT TO PROJECT

- Atlantic and Gulf Rapid Reef Assessment (AGRRA) Trainer
- 10 years of conducting and/or leading coral and benthic surveys
- Assisted with the installation of coral nurseries (block, tree and line nurseries) in New Providence and the Exuma Cays Land and Sea Park (ECLSP)
- Coral outplanting and relocation around New Providence
- Coral nursery maintenance in New Providence, Andros, ECLSP and Abaco

WORK EXPERIENCE

2018-Present **Senior Scientist**, *Perry Institute for Marine Science (The Bahamas)*

- Lead the creation and implementation of a *Fisheries Research and Conservation Program* that contributes to the Reversing The Decline of Bahamian Coral Reefs initiative and other PIMS programs
- Collaborate with local government and NGO partners to refine and implement conservation and management strategies for key fisheries species, particularly Nassau grouper and other finfish
- Build capacity for fisheries research, conservation and management throughout The Bahamas
- Participate in AGRRA assessments of reefs and train partners to conduct AGRRA surveys
- Communicate the status, progress and achievements of the *Fisheries Research and Conservation Program* through electronic media and presentations, to diverse audiences including the general public, funders, researchers, conservationists, fishers, and government
- Raise funds in support of fisheries research and implementation of fisheries conservation management plans
- Assist with other research, education, outreach and policy initiatives as part of the Reversing The Decline of Coral Reefs program and related initiatives.

2010-2014 **Global Environment Facility (GEF) Full Size Project (FSP) Coordinator for pilot demonstration 3 – "Sustainable Tourism and Coral Reef Health in the Exuma Cays Land and Sea Park" & Science Officer,** *Bahamas National Trust, BNT (Nassau, Bahamas).*

- Organized and conducted research evaluating the health of coral reefs, seagrasses and mangroves in the Exuma Cays Land and Sea Park (ECLSP)
- Assisted in development of monitoring programme for the Bahamas National Protected Area System (BNPAS)
- Hired, managed and assisted consultants to develop sustainable business plan and tourism model for ECLSP
- Developed Bahamas Nature Tour Guide Certification Manual and organized and led tour guide workshops in conjunction with the Ministry of Tourism in the Exuma Cays
- Prepared technical reports and budgets and collated consultant reports for submission to BNT and the Bahamas Environment Science and Technology Commission
- Liaised with government agencies and other NGOs for meetings, trainings and workshops to execute all GEF FSP objectives
- Coordinated implementation of sustainable financing mechanisms for ECLSP
- Reviewed and evaluated scientific permit applications for research activities in marine parks

- Conducted research on lionfish ecology in ECLSP, New Providence and the Berry Islands, Nassau grouper spawning aggregation research (http://youtu.be/xhLOIyF1CzI) in Long Island, Andros & the Berry Islands and Eleuthera, rapid ecological assessments of reefs, mangroves and seagrasses for potential marine protected areas throughout The Bahamas, and coral reef ecology and restoration in New Providence & ECLSP
- Conducted coral reef assessments during the Living Ocean's Foundation Global Coral Reef Expedition to the Inaguas, Hogsty Reef, Andros and the Berry Islands and narrated documentary (http://www.livingoceansfoundation.org/updates-media/#media-video).

2008-2010 **Research Associate and Assistant Visiting Programs Manager for CEI, Research Teacher & Advisor for the Island School, BESS Programme Coordinator,** *Cape Eleuthera Institute, CEI and Island School (Eleuthera, Bahamas).*

- Developed and taught short-term research projects on lionfish and patch reef ecology for Island School students while providing technical assistance to researchers for other research programs (Shark Conservation Biology, Aquaculture, Flats Ecology and Aquaponics)
- Planned, coordinated and led educational programs for visiting primary through university level students
- Managed the Bahamas Environmental Steward Scholars (BESS) Programme in conjunction with the Bahamas Reef Environment Educational Foundation (BREEF) and mentored BESS scholars
- Supervised and advised a group of four students through their Island School experience each semester.

2006-2007 **Aquarist,** *Atlantis — Marine Aquarium Operations Dept. (PI, Bahamas),*

- Extensive animal husbandry and exhibit maintenance experience
- Specimen collection and quarantine procedures
- Public education and outreach on marine conservation and general husbandry practices.

PUBLICATIONS

Sherman, K.D., Paris, J.R., King, R.A., Moore, K.A., Dahlgren, C.P., Knowles, L.C., Stump, K., Tyler, C.R., Stevens, J.R. (2020) RAD-seq analysis and *in situ* monitoring of Nassau grouper reveal fine-scale population structure and origins of aggregating fish. Frontiers in Marine Science 7:157, DOI:10.3389/fmars.2020.00157

Sherman, K.D., Shultz, A.D., Dahlgren, C.P., Thomas, C., Brooks, E., Brooks, A., Brumbaugh D.R., Gittens, L., Murchie K.J. (2018) Contemporary and emerging fisheries in The Bahamas – conservation and management challenges, achievements and future directions. Fisheries Management and Ecology DOI: 10.1111/fme.12299

Sherman, K.D., (2018) Integrative Approaches for Conservation Management of Critically Endangered Nassau grouper (*Epinephelus striatus*) in The Bahamas. PhD Thesis – University of Exeter. https://ore.exeter.ac.uk/repository/handle/10871/33061

Paris, J.R., **Sherman, K.D.**, Bell, E., Boulenger, C., Delord, C., El-Mahadi, M.B.M., Fairfield, E.A., Griffiths, A.M., Gutmann Roberts, C., Hedger, R.D., Holman, L.E., Hooper, L.H., Humphries, N.E., Katsiadaki, I., King, R.A., Lemopoulos, A., Payne, C.J., Peirson, G., Richter, K.K., Taylor, M.I., Trueman, C.N., Hayden, B., Stevens, J.R. (2018) Understanding and managing fish populations: keeping the toolbox fit for purpose. Journal of Fish Biology 92:727-

751

Sherman, K.D., King, R.A., Dahlgren, C.P., Simpson, S.D., Stevens, J.R., Tyler, C.R. (2017) Historical processes and contemporary anthropogenic activities influence genetic population dynamics of Nassau grouper (*Epinephelus striatus*) within The Bahamas. Frontiers in Marine Science 4:393, DOI:10.3389/fmars.2017.00393

Stump, K., Dahlgren, C., **Sherman, K.**, Knapp, C.R. (2017) Nassau grouper migration patterns during full moon suggest collapsed historic fish spawning aggregation and evidence of an undocumented aggregation. Bulletin of Marine Science 93:375-389, DOI:10.5343/bms.2016.1042

Sherman, K.D., Dahlgren, C.P., Stevens, J.R., Tyler, C.R. (2016) Integrating Population Biology into Conservation Management for Endangered Nassau Grouper (*Epinephelus striatus*). Marine Ecology Progress Series 554:263-280

Sherman, K.D., Dahlgren, C.P., Brumbaugh, D.R., Knowles, L.C. (2013) Tourism and Coral Reef Health in the Exuma Cays Land and Sea Park. Proceedings of the 65th Gulf and Caribbean Fisheries Institute. GCFI 65:234-242

Barbour, A., Allen, M., Frazer, T., **Sherman, K.** (2011) Evaluating the potential efficacy of invasive lionfish (*Pterois volitans*) removals. PLoS One 6(5):1-7

Sherman, K. (2008) Stable Carbon and Nitrogen isotope analysis of the invasive lionfish, *Pterois volitans* from Bahamian Waters. MRes Thesis - National Oceanography Centre Southampton Library.

SELECTED TECHNICAL REPORTS

Sherman, K., Dahlgren, C. (2020 in prep) Marine biophysical monitoring plan for The Bahamas National Protected Area System (BNPAS). Submitted to the Bahamas National Trust, Nassau, Bahamas.

Dahlgren, C., **Sherman, K.**, Knowles, L., Haines E., Callwood, K. (2020) Bahamas coral reef report card volume 2: 2015-2020.

Sherman, K. (2020) New Providence Stony Coral Tissue Loss Disease Preliminary Assessment. Nassau, Bahamas. Report submitted to the Department of Marine Resources. 9pp

Dahlgren, C., **Sherman, K.** (2020) Preliminary assessment of Hurricane Dorian's impacts on coral reefs of Abaco and Grand Bahama. Report submitted to the Government of The Bahamas. 28pp.

Sherman, K., Dahlgren, C. (2019) Fish spawning aggregation research and monitoring protocols for The Bahamas. Nassau, The Bahamas. 38pp.

Dahlgren, C., **Sherman, K.** (2019) An assessment of the Queen Conch Resources of the East Grand Bahama National Park. Nassau, Bahamas 9pp.

Patterson-Maura, O. **Sherman, K.** (2018) Nassau Grouper Policy Brief. Nassau, The Bahamas 7pp.

Sherman, K.D., Dahlgren, C.P., Knowles, L.R. (2018) Nassau Grouper (*Epinephelus striatus*) Conservation Management Plan for The Commonwealth of The Bahamas. Prepared for the Department of Marine Resources, Nassau, Bahamas.

Dahlgren, C., **Sherman, K.,** Lang, J., Kramer, P.R., Marks, K. (2016) Bahamas Coral Reef Report Card Volume 1: 2011-2013.

Dahlgren, C., Kramer, P.R., Lang, J. and **Sherman, K.** (2014) New Providence and Rose Island, Bahamas Coral Reef Report Card.

Sherman, K. D., Knowles, L. C. and Anderson, L. S. (2014) Rapid Ecological Assessment for the Expansion of Lucayan National Park. July 2014. Bahamas National Trust. Nassau, Bahamas.

Sherman, K. (2014) GEF FSP Pilot Demonstration 3 Project: "Tourism and Coral Reef Health in the Exuma Cays Land and Sea Park" – 2014 Final Technical Report. *Report to the BEST Commission.* 71pp.

Sherman, K. (2013) GEF FSP Pilot Demonstration 3 Project: "Tourism and Coral Reef Health in the Exuma Cays Land and Sea Park" – 2012 Annual Progress Report. *Report to the BEST Commission.* 75pp.

Sherman, K. (2012) GEF FSP Pilot Demonstration 3 Project: "Tourism and Coral Reef Health in the Exuma Cays Land and Sea Park" – Final Report for Training Workshops to the Nature Conservancy. 10pp.

Sherman, K. (2012) GEF FSP Pilot Demonstration 3 Project: "Tourism and Coral Reef Health in the Exuma Cays Land and Sea Park" – 2011 Annual Progress Report. *Report to the BEST Commission.* 31pp.

Sherman, K. (2011) GEF FSP Pilot Demonstration 3 Project: "Tourism and Coral Reef Health in the Exuma Cays Land and Sea Park" – 2010 Annual Progress Report. *Report to the BEST Commission.* 23pp.

SELECTED POPULAR PRESS ARTICLES

Sherman, K. (2017) Under the full moon: Tracking Nassau grouper with acoustic telemetry. National Geographic Wildlife Blog Post. https://blog.nationalgeographic.org/2017/09/12/under-the-full-moon-tracking-nassau-grouper-with-acoustic-telemetry/

Sherman, K. (2016-2017) Blog posts under "The Grouper Family" via the Save Our Seas Foundation. https://saveourseas.com/project/the-grouper-family/

Sherman, K. (2017) Nassau Grouper 242 Project Update. Bahamas Coastal Angler Magazine. https://coastalanglermag.com/nassau-grouper-242-project-update/

Sherman, K (2015) Assessing Nassau Grouper Spawning Aggregations in The Bahamas: A Multi-Year Research Project to Strengthen Sustainable Management. Bahamas Coastal Angler Magazine. http://coastalanglermag.com/bahamas/nassau-grouper-spawning-project-designed-to-strengthen-sustainable-management/

Sherman, K (2015) Mining pollution alters fish genetics in south west England. University of Exeter Research News. http://biosciences.exeter.ac.uk/news/research/title_451730_en.html

Sherman, K. (2015) Scientists describe a new alga that may help corals adapt to climate change. University of Exeter Research News.
http://biosciences.exeter.ac.uk/news/research/title_444937_en.html

Sherman, K. (2012) The Bahamas Expands Its Reef Check EcoDiver Network to the Exumas. Reef Check Newsletter http://reefcheck.org/news/news_detail.php?id=894

Sherman, K. (2012) Shark Conservation in The Bahamas. Reef Check Newsletter http://www.reefcheck.org/news/news_detail.php?id=831

POSTER PRESENTATIONS

Anderson, L., **Sherman, K.,** Knowles, L., Dahlgren, C. (2014) The Role of Rapid Ecological Assessments and Participatory Planning to Design New Marine Protected Areas in The Bahamas. 67th Gulf and Caribbean Fisheries Institute Proceedings – Barbados.
http://www.gcfi.org/Conferences/67th/GCFI_67th_Book_of_Abtracts_Final_Eng.pdf

Moultrie, S., **Sherman, K.** Hall, A. (2012) Sustainable Finance for the Exuma Cays Land and Sea Park.

Miller, S., Akins, L., Green, S., **Sherman, K.** (2011) A Model for Collaborative Conservation: The Lionfish Research and Education Program at the Cape Eleuthera Institute, Eleuthera Bahamas.
http://www.gcfi.org/Conferences/64th/BooksOfAbstracts/Eng/fscommand/GCFI64thBookOfAbstractsEng.pdf

Soligo, T., Stephen C., **Sherman K.,** Neves F., Oronti, A., Danlychuk A. (2011) Changes in Fish Aggregations Around an Offshore Submerged Aquaculture Cage. World Aquaculture Society (WAS) Conference, Brazil.
(https://www.was.org/WasMeetings/meetings/pdf/WA2011Posters.pdf).

Sherman, K., Anderson M., Bordeaux H., Grune S., Henderson A., Maloberti M., Parizeau M., Sands-Berking J., Shaw T. (2010) The Effect of Lionfish (*Pterois volitans)* on Biodiversity of Patch Reefs in Southern Eleuthera, Bahamas. Research Symposium, The Cape Eleuthera Island School and Research Institute. (http://www.fishconserve.org/IS)

Sherman, K., Anderson M., Brown M., Cowhey J., Dawson S., Farrington M., Nash M., Shi J., Young S. (2009) Lionfish *Pterois volitans* Affecting Patch Reef Biodiversity. Research Symposium, The Cape Eleuthera Island School and Research Institute. (http://www.fishconserve.org/IS)

Sherman, K., Elmore C., Aikens C., Frost C., Henderson M., Kreisler S., Lopez E., Maynard N., White D. (2009). The Critical Thermal Maximum of Lionfish (*Pterois volitans*). Research Symposium, The Cape Eleuthera Island School and Research Institute. (http://www.fishconserve.org/IS)

ORAL PRESENTATIONS

**Invited presentations are denoted with an asterisk.*

2020	*Nassau Grouper Research and Conservation in The Bahamas (plenary for virtual Global Coral Reef Week Conference)
2020	Population Genomics: A tool for Nassau grouper conservation. Virtual Bahamas Natural History Conference (Nassau, Bahamas)
2020	*Coral Reef Health in The Bahamas (virtual lecture for University of Exeter, UK)
2020	*Bahamian Fisheries (virtual webinar for Scientist in Every Florida School and ANGARI Foundation)
2019	Ensuring a Sustainable Future for Nassau Grouper in The Bahamas and Caribbean (Nassau, **Bahamas**)
2019	Reversing the Decline of Bahamian Coral Reefs: Assessing Reef Health for Effective Management and Restoration (39th Association of Marine Laboratories of the Caribbean Conference, Punta Cana, **Dominican Republic**)
2019	*Getting Fishy: Population Dynamics and Conservation of Nassau grouper (Hopkins Marine Station of Stanford University, **California**)
2018	Genetic Population Dynamics and Management of Nassau Grouper within The Bahamas (71st GCFI Conference, **San Andres, Colombia**)
2018	Genetic Population Dynamics of Bahamian Nassau Grouper 4th Bahamas Natural History Conference (BNHC) (Nassau, **Bahamas**)
2018	Population Genetics of Nassau Grouper within The Bahamas. 2018 Abaco Science Alliance Conference (Abaco, **Bahamas**)
2017	Understanding Genetic Population Structure of Nassau Grouper in The Bahamas to Support their Conservation Management. 50th Anniversary Symposium of the Fishery Society of the British Isles (FSBI) Conference (Exeter, **UK**)
2017	*Status and Population Dynamics of Nassau Grouper in The Bahamas. Shedd Aquarium (Chicago, **IL**)
2016	Genetic Population Structure, Diversity & Connectivity of Endangered Nassau Grouper (*Epinephelus striatus*) in The Bahamas (69th GCFI Conference, **Grand Cayman**)
2016	Understanding Population Structure of Endangered Nassau Grouper (*Epinephelus striatus*) for Supporting their Conservation in The Bahamas (3rd BNHC Conference, **Bahamas**)
2015	*Investigating Nassau Grouper Spawning Aggregations in The Bahamas. Jacksonville University Marine Science Seminar Series (**USA**)
2014	MTIASIC Bahamas Lionfish Control Pilot Project: Findings and Management Implications (Policies, Strategies and Best Practices for Managing Invasive Alien Species (IAS) in the Insular Caribbean, **Trinidad & Tobago**)
2014	Building a Sustainable National Marine Protected Area Network: Controlling lionfish populations in the Marine Protected Areas (Policies, Strategies and Best Practices for Managing Invasive Alien Species (IAS) in the Insular Caribbean, **Trinidad & Tobago**)
2014	MTIASIC Bahamas Lionfish Control Pilot Project: Findings and Management Implications (2nd BNHC Conference, **Bahamas**)

2014	The Role of Rapid Ecological Assessments in Designating Marine Protected Areas (2nd BNHC Conference, **Bahamas**)
2014	Establishing Critical Resource Thresholds for Marine Habitats in the Exuma Cays Land and Sea Park (2nd BNHC Conference, **Bahamas**)
2014	*Introducing a sustainable tourism model for the Exuma Cays: (Small Island Developing States "Tourism as a Key Sector for Development in Island States Conference, **Bahamas**)
2014	*Introducing a sustainable tourism model for the Exuma Cays: Outputs from the Global Environment Facility (GEF) Full-Sized pilot demonstration 3 project (College of The Bahamas, **Bahamas**)
2013	Introducing a sustainable tourism model for the Exuma Cays. (Review Meeting Programme for A Sustainable Future for the Exumas: Environmental Management, Design and Planning, **Bahamas**)
2013	Advancing towards sustainability in the Exuma Cays Land and Sea Park: Implementation status of the Global Environment Facility (GEF) Full-Sized pilot demonstration 3 project. (1st BNNHC, **Bahamas**)
2012	Tourism and coral reef health in the Exuma Cays Land and Sea Park. (65th GCFI Conference, Santa Marta, **Colombia**)
2008	Stable Carbon and Nitrogen isotope analysis of the invasive red lionfish, *Pterois volitans* from Bahamian waters. **(UK)**
2008	The effects of pressure on the embryonic development of the blue mussel, *Mytilus edulis*. **(UK)**
2008	The impacts of fisheries of marine ecosystems. **(UK)**
2007	The diversity and function of sharks in marine systems. **(UK)**
2007	Harmful algal blooms. **(UK)**
2006	The Function of MPAs and Marine Reserves. **(Bahamas)**
2004	The effects of salinity on regeneration of the brittle star *Ophiophragmus filograneus*. **(USA)**

RESEARCH EXEPERIENCE

2014-present	Molecular biology (UK) and acoustic telemetry of Nassau grouper (The Bahamas)
2013-2014	GEF FSP pilot 1 (South Berry Islands Marine Reserve & Exuma Cays Land & Sea Park, Bahamas)
2013	Rapid Ecological Assessment of reefs, mangroves and seagrasses of the Joulter Cays, Andros (Bahamas)
2013	Rapid Ecological Assessment of offshore reefs and mangroves in East Grand Bahama (Bahamas)
2013	Rapid Ecological Assessment of offshore reefs and mangroves of Cross Harbour and the Marls (Abaco, Bahamas)
2013	AGRRA coral surveys of the offshore reefs of Bonefish Pond National Park (New Providence, Bahamas)
2010-Present	Nassau grouper spawning aggregation assessments (Abaco, Andros, Berry Islands, Eleuthera, Long Island, San Salvador, Cay Verde, Bahamas)
2011-Present	Atlantis Blue Project Foundation/AGRRA Surveys – Coral reef assessments and establishing coral nurseries (The Bahamas)
2010-2013	GEF FSP pilot 3 (Exuma Cays Land and Sea Park, Bahamas)
2010-2013	Mitigating the Threats of Invasive Alien Species in the Insular Caribbean (MTIASIC Project, Bahamas)

2012-2013	Rapid Ecological Assessment of the offshore reefs and mangroves around Lucayan National Park (Grand Bahama, Bahamas)
2011	GEF FSP pilot 2 (Exuma Cays Land and Sea Park, Bahamas)
2011	Living Ocean's Foundation Global Coral Reef Expedition (Inaguas, Andros and the Berry Islands, Bahamas)
2010	Rapid Ecological Assessment of coral reefs in the North and South Marine Parks (Andros, Bahamas)
2008-2010	Lionfish physiology and ecology (Eleuthera and Nassau, Bahamas)
2008-2009	Diversity and relative abundance of sharks (Eleuthera, Bahamas)
2007-2008	MRes thesis project (University of Southampton, UK)
2003-2004	The effects of salinity on regeneration of the brittle star *Ophiophragmus filograneus* (Jacksonville University, Fl.).

PROFESSIONAL MEETINGS

2019	Third Western Central Atlantic Fishery Commission (WECAFC) Spawning Aggregations Working Group (SAWG) (San Juan, Puerto Rico)
2019	39th Association of Marine Laboratories of the Caribbean (AMLC) Meeting (Punta Cana, Dominican Republic)
2018	Second Western Central Atlantic Fishery Commission (WECAFC) Spawning Aggregations Working Group (SAWG) Meeting (Miami, USA)
2018	Nassau Grouper Fishery Management Workshop, BNHC 2018 (Nassau, Bahamas)
2017	Tools for Understanding Fish Populations 50th FSBI Conference (Exeter, UK)
2016	69th Gulf and Caribbean Fisheries Institute (GCFI) Conference (Grand Cayman, Cayman Islands)
2016	Ecological Gap Analysis Workshop (Nassau, Bahamas)
2016	Developing Practical Guidance for Small Scale Fisheries Sustainability Workshop. (Monterey, California, USA)
2016	3rd Bahamas Natural History Conference (BNHC) (Nassau, Bahamas)
2014	Policies, Strategies and Best Practices for Managing Invasive Alien Species (IAS) in the Insular Caribbean (Trinidad & Tobago)
2014	2nd Bahamas Natural History Conference (BNHC) (Nassau, Bahamas)
2014	Small Island Developing States Conference "Tourism as a Key Factor for Development in Island States" (Nassau, Bahamas)
2013	Review Meeting Programme for A Sustainable Future for the Exumas: Environmental Management, Design and Planning (Nassau, Bahamas)
2013	1st Bahamas National Natural History (BNNHC) Conference (Nassau, Bahamas)
2012	65th Gulf and Caribbean Fisheries Institute (GCFI) Conference (Santa Marta, Colombia)
2012	Sustainable Financing for Protected Areas (Nassau, Bahamas)
2012	Bahamian Fisheries Regulations Workshop (Nassau, Bahamas)
2011	BTT International and Tarpon Symposium (Fort Lauderdale, Fl.)
2011	Adapting to Climate Change Workshop (Nassau, Bahamas)
2011	A Sustainable Future for the Exumas: Environmental Management, Design and Planning Conference (Nassau, Bahamas)

2010	63rd Gulf and Caribbean Fisheries Institute Conference (San Juan, Puerto Rico)
2010	Bahamas Protected Areas & Biodiversity Database Workshop (Nassau, Bahamas)
2010	Bahamas Bonefish Conference (Nassau, Bahamas)
2010	Bahamas Biocomplexity Workshop (Nassau, Bahamas)
2008-2013	The Island School Research Symposium (Eleuthera, Bahamas)
2007	Regional Aquatic Workshop (Pittsburgh, PA)
2004	Undergraduate Research Symposium (Jacksonville University, Fl.)

DOCUMENTARY CONTRIBUTIONS

2017	"Bahamas: Tracking Nassau Groupers". Shedd Aquarium https://www.youtube.com/watch?v=Wcl1LQCihs8&t=41s
2015	"Protecting the Nassau Grouper". Bahamas National Trust https://www.youtube.com/watch?v=KISSamuyztY
2014	"Lionfish in The Bahamas". World Fishing Network http://www.worldfishingnetwork.com/world-fishing-journal/video/wfj-episode-4-part-3-lionfish-bahamas
2012	"Global Reef Expedition: Mission Bahamas". Living Oceans Foundation http://www.livingoceansfoundation.org/updates-media/#media-video
2009	"Lionfish". World Fishing Network http://www.youtube.com/watch?v=y91bzCn41rY

TECHNICAL SKILLS

Molecular Biology
DNA extractions, PCR, gel electrophoresis, Beckman Coulter CEQ™ sequencing

Data Analysis & Management
Microsoft Office Suite, Microsoft Access, STRUCTURE, GenAlex, HP-Rare, GENEPOP, R, Stacks, Unix, VEMCO VUE software, Onset HOBO data logger software

Fieldwork
Small boat handling, water quality monitoring, VEMCO acoustic receiver preparation, deployment and transmitter surgeries, coral nursery installation, maintenance, and outplanting, coral relocation

QUALIFICATIONS

2019	PADI Divemaster
2016	American Red Cross First Aid Certificate
2015	Learning & Teaching in Higher Education Stage 2 Certificate
2014	Scottish Accreditation Board Certificate
2014	Learning & Teaching in Higher Education Stage 1 Certificate
2012	BahamaHost Certification
2012	Reef Check Eco-Diver Trainer
2011	Atlantic Gulf Rapid Reef Assessment (AGRRA) Trainer
2011	REEF Level 5 Fish ID Certification (Advanced Assessment Team for the Tropical Western Atlantic)
2010	REEF Level 3 Fish ID Certification

2010	Reef Check Eco-Diver Certification
2010	Solo Wilderness First Responder & CPR Certification
2009	PADI Rescue Diver
2009	PADI Advanced
2007	Sea Survival Training, CPR and First Aid Certification
2005	American Red Cross First Aid Certificate
2002	PADI Open Water Certification

COMMITTEES

- Stony coral tissue loss disease (SCTLD) task force (2020)
- Lyford Cay Foundation Academic Selection Committee (2019-present)
- WECAFC SAWG Communication Sub-Committee (2018-present)
- Cape Eleuthera Institute Advisory Board (2013-2015)
- National Steering Committee for the Mitigating the Threats of Invasive Alien Species in the Insular Caribbean (MTIASIC) Project (2010-2014)
- National Oil Spill Advisory Committee (2012-2013)

PROFESSIONAL ACTIVITIES

Reviewer: BMC Evolutionary Biology, Mangroves as Fish Habitat
Memberships: Gulf and Caribbean Fisheries Institute, Journal of Fish Biology, Bahamas National Trust, Bahamas Marine Mammal Stranding Network

REFERENCES

Dr. Craig Dahlgren – Executive Director, Perry Institute of Marine Science **(USA),** Email: *cdahlgren@perryinstitute.org*

Professor Charles Tyler – Professor of Environmental Biology & Academic Lead, University of Exeter **(UK)**, Email: C.R.Tyler@exeter.ac.uk

Dr. Jamie Stevens – Associate Professor of Molecular Ecology, University of Exeter **(UK)**, Email: J.R.Stevens@exeter.ac.uk

Dr. Clive Trueman – Associate Professor in Marine Ecology, University of Southampton **(UK)** Email: *trueman@noc.soton.ac.uk*

Dr. Daniel McCarthy – Professor and Director of Marine Science, Jacksonville University **(USA)** Email: *dmccart1@ju.edu*

Mr. Eric Carey – Executive Director, The Bahamas National Trust **(Bahamas)**, Email: *ecarey@bnt.bs*

Mr. Michael Braynen – Former Director of the Department of Marine Resources **(Bahamas)** Email: *michaelbraynen@gamil.com*

Mr. Chris Maxey – Director and Founder of The Island School and Cape Eleuthera Institute **(Bahamas)**, Email: *chrismaxey@islandschool.org*

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a. Professional Preparation

Universidad de Los Andes	Biology	B.Sc., 1999
Universidad Nacional de Colombia	Biology with marine emphasis	M.Sc., 2002
Newcastle University	Biology	Ph.D., 2007

b. Appointments

Senior Researcher, Perry Institute for Marine Science, Sep 2020 – currently
The Bahamas Coral Manager, The Nature Conservancy, Feb – Jul 2020
Senior Research Associate, Cape Eleuthera Institute, 2019
Director-CEO, Fundación Ecomares (NGO), 2015-2019
Consultant, Independent, 2013-2019
Professor, Universidad Jorge Tadeo Lozano - Colombia, 2007-2013
Marine biologist, CORALINA – Colombia, 2001-2003
Research Assistant, Universidad de Los Andes, 1998-1999

c. Awards and Fellowships

2018. Scholarship. Restoring reefs: advanced training in larval propagation. Secore International - Curazao
2011. Scholarship. CEMarin. Giessen University – Germany
2010. Scholarship. Pan-Caribbean Reef Restoration Workshop. Israel Oceanography and Limnological Research, National Institute of Oceanography, Israel and The University of the West Indies – Jamaica
2009. Scholarchip. NOAA and the National Coral Reef Institute. Coral genomics for the nongenomic scientist – USA
2007. Scholarship. NOAA. Coral restoration workshop – Puerto Rico
2006. Student travel award. European coral reef meeting – Germany
2004. Student travel award. X International Coral Reef Symposium – Japan
2003-2006. Graduate Fellowship. European Commission (EC): Programme Alban

d. Relevant projects

2019 – 2020: The Bahamas Coral Innovation Hub
2016 – 2018: Coral robustness - lessons from an "improbable " reef
2015 – 2019: First approaches for reef restoration at the Gorgona National Natural Park
2010 – 2013: Applying the coral gardening concept for shallow coral reefs at Tayrona National Natural Park
2012 – 2013: Rearing *Montastraea faveolata* embryos, larvae and recruits: a restoration strategy
2011 – 2013: Design of a tool to catalogue bacterial populations associated with coral disease
2011 – 2013: Search of microbiological and immunological signatures of White plague disease in reef-building corals in the Colombian Caribbean
2009 – 2011: *Acropora cervicornis* y *A. palmata*: initial experiments for their restoration at Cristal Beach, Tayrona National Natural Park
2009 – 2011: Mid-water nurseries at Gayraca Bay (Tayrona National Natural Park)

2007 – 2011: Demographic patters in endangered coral species - Acroporidae, Mussidae y Faviidae – at Corales del Rosario and San Bernardo National Natural PArk
2003-2006: Coral larvae dispersal and reef connectivity in the Western CAribbean
2002-2003: Desing of a Marine Protected Areas system at the Archipelago of San Andres, Providencia y Santa Catalina
2002-2003: Reef biodiversity and status at the Archipelago of San Andres, Providencia y Santa Catalina
2001-2002: Coral reef restoration at the Archipelago of San Andres, Providencia y Santa Catalina

e. Relevant Scientific Publications

Guerrero-Ramírez NR, **Pizarro V**, Turner BL (In Press) Soil and microbial nutrient status are heterogeneous within an elevational belt on a neotropical mountain. Pedobiologia - Journal of Soil Ecology.

Alvarado-Chacón EM, Gómez-Lemos LA, Sierra-Sabalza NP, Hernández-Chamorro AM, Lozano-Peña JP, Valcárcel-Castellanos CA, **Pizarro V**, García-Ureña R, Zárate-Arévalo JC, Rojas JA (2020) Early life history of the Caribbean coral Orbicella faveolata (Scleractinia: Merulinidae). Revista de Biología Tropical, 68(4): 1262-1274.

Roitman S, Lopez-Londono T, Pollock FJ, Ritchie KB, Galindo-Martínez CT, Gómez-Campo K, González-Guerrero LA, **Pizarro V**, López-Victoria M, Iglesias-Prieto R, Medina M. (2020) Surviving marginalized reefs: assessing the implications of the microbiome on coral physiology and survivorship. Coral Reefs, 39 (3):795-807.

Bayraktarov E, Banaszak AT, Montoya-Maya P, Kleypas J, Arias-González JE, Blanco M, Calle-Triviño J, Charuvi N, Cortés-Useche C, Galván V, García-Salgado MA, Gnecco M, Guendulain-García SD, Hernández-Delgado EA, Marín-Moraga JA, Maya MF, Mendoza-Quiroz S, Mercado-Cervantes S, Morikawa, Nava G, **Pizarro V**, Sellares-Blasco RI, Suleimán-Ramos SE, Villalobos-Cubero T, Villalpando M, Frías-Torres S. (2020) Coral reef restoration efforts in Latin American countries and territories. bioRxiv, 2020.02.16.950998; doi: https://doi.org/10.1101/2020.02.16.950998.

Ishida-Castañera J, **Pizarro V**, López-Victoria M, Zapata AF. (2020) Coral reef restoration in the Eastern Tropical Pacific: feasibility of the coral nursery approach. The Journal of the Society for Ecological Restoration, 28(1): 22-28.

Pizarro V, Vanegas MJ. (2018) Preliminary studies of sperm traits and cryopreservation of the Caribbean reef building coral *Orbicella faveolata*. Boletín de Investigaciones Marinas y Costeras, 467(2): 25-36.

Pizarro V, Rodríguez SC, López-Victoria M, Zapata FA, Zea S, Galindo-Martínez CT, IglesiasPrieto R, Pollock J, Medina M. (2017) Unraveling the structure and composition of Varadero Reef, an improbable and imperiled coral reef in the Colombian Caribbean. PeerJ 5:e4119 https://doi.org/10.7717/peerj.4119.

Acosta A, Cedeño-Posso C, Montenegro J, Navas-Camacho R, **Pizarro** V, Sánchez JA, Zapata F. 2016. Cnidarios de la Reserva de la Biósfera Seaflower. *In*: Vides M, Alonso D, Castro E, Bolaños N (eds.). Biodiversidad del mar de los siete colores. Instituto de Investigaciones Marinas y Costeras – INVEMAR y Corporación para el Desarrollo Sostenible del Archipiélago de San Andrés, Providencia y Santa Catalina – CORALINA. Serie de Publicaciones Generales del INVEMAR No. 84, pp. 84-95.

Ocampo ID, Zárate-Potes A, **Pizarro V**, Rojas CA, Vera NE, Cadavid LF. 2015. The immunotranscriptome of the Caribbean reef-building coral *Pseudodiploria strigosa*. Immunogentics. 67: 515-530.

Pizarro V, Carrillo V, García-Rueda A. 2014. Revisión y estado del arte de la restauración ecológica de arrecifes coralinos. Biota Colombiana, 15 (Supl. 2): 132-149.

Bayraktarov E, Lazarus JF, Alarcón-Moscoso J, **Pizarro V**, Carillo-Pacheco LV, Eidens C, Wild C. 2014. Spatiotemporal monitoring of water quality in coral reefs of Tayrona National Natural Park, Colombian Caribbean, 2011-2013. doi:10.1594/PANGAEA.836720.

Eidens C, Bayraktarov E, **Pizarro V**, Wilke T, Wild C. 2014. Spatial and temporal variability of benthic primary production in upwelling-influenced Colombian Caribbean coral reefs. PeerJ PrePrints, DOI 10.7287/peerj.preprints.258v1.

Bayraktarov E, **Pizarro V**, Wild C. 2014. Spatial and temporal variability of water quality in the coral reefs of Tayrona National Natural Park, Colombian Caribbean. Environmental Monitoring Assessment, DOI 10.1007/s10661-014-3647-3.

Bayraktarov E, **Pizarro V**, Eidens C, Wilke T, Wild C. 2013. Bleaching Susceptibility and recovery of Colombian Caribbean corals in response to water current exposure and seasonal upwelling. PLoS ONE, 8(11): e80536. Doi:10.1371/Journal.pone.008036.

Carrillo V, **Pizarro V**, Castaño C, García C. 2012. Aplicando el concepto de jardinería de coral para la restauración de los arrecifes coralinos someros del Parque Nacional Natural Tayrona. En: Domínguez H, C Boom, L Lamadrid (Eds.). Simposio Internacional de Restauración Ecológica: Retos y Estrategias de Restauración en el Caribe Colombiano. Universidad del Atlántico. Barranquilla, 55 p.

Carrillo V, **Pizarro V**. 2012. Cría de embriones, larvas y reclutas de coral: estrategia de restauración arrecifal. En: Domínguez H, C Boom, L Lamadrid (Eds.). Simposio Internacional de Restauración Ecológica: Retos y Estrategias de Restauración en el Caribe Colombiano. Universidad del Atlántico. Barranquilla, 55 p.

Cárdenas A, Rodríguez-R L, **Pizarro V**, Cadavid LF, Avérvalo-Ferro C. 2011. Shifts in bacterial communities of two Caribbean reef-building species affected by White plague disease. The ISME Journal, 1-11. doi:10.1038/ismej.2011.123.

Acosta A, Dueñas LF, **Pizarro V**. 2011. Review on hard coral recruitment (Cnidaria: Scleractinia) in Colombia. Universitas Scientiarum, 16(3): 200-218.

Carrillo V, **Pizarro V**. 2011. De gametos a juveniles: cría de corales para la restauración coralina. Boletín Red Colombia de Restauración Ecológica, 5(4): 7-8.

Pizarro V, Alvarado EM, Carrillo V. 2011. Corales y otros Cnidarios arrecifales. En: ZarzaGonzález E. (Ed.) El entorno ambiental del Parque Nacional Natural Corales del Rosario y de San Bernardo. Parques Nacionales Naturales de Colombia, 167-180.

Pizarro V, Alvarado E, Carrillo V. 2010. Reproducción sexual en corales: un posible método de restauración. Boletín Red Colombiana de Restauración Ecológica, 4(2): 7.

Sánchez JA, Herrera S, Navas-Camacho R, Rodríguez-Ramírez A, Herrón P, **Pizarro V**, Acosta AR, Castillo PA, Montoya P, Orozco C. 2010. White plague-like coral disease in remote reefs of the Western Caribbean. Revista de Biología Tropical, 58: 145-154.

Pizarro V, Thomason JC. 2008. The swimming ability and behaviour of coral larval: how do these affect retention and dispersion? Proceedings of the 11th International Coral Reef Symposium, 454-458.

Rodríguez-Ramírez A, Bastidas C, Cortés J, Guzmán H, Leão Z, Garzón-Ferreira J, Kikuchi R, Ferreira BP, Alvarado JJ, Jiménez C, Fonseca AC, Salas E, Nivia J, Fernández C, Rodríguez S, Debrot D, Cróquer A, Gil D, Gómez DI, Navas-Camacho R, Reyes-Nivia MC, Acosta A, Alvarado E, **Pizarro V**, Sanjuan A, Herrón P, Zapata FA, Zea S, LópezVictoria M, Sánchez JA. 2008. Status of coral reefs and associated ecosystems in

Southern Tropical America: Brazil, Colombia, Costa Rica, Panamá and Venezuela. En: Wilkinson, C (Ed.) Status of Coral Reefs of the World: 2008. Australian Institute of Marine Science, Townsville, 304 pp.

Pizarro V, Polania J, Thomason JC. 2007. Recruitment and juvenile survivorship of brain corals at San Andres Island, Western Caribbean Sea. Cahiers de Biologie Marine, 48: 113-119.

Pizarro V, Herrón P, Thomason JC. 2006. An improved technique for rearing *Montastraea faveolata* embryos and larvae. Coral Reefs, 25: 360.

Sánchez JA, **Pizarro V**, Acosta-de-Sánchez AR, Castillo PA, Herrón P, Martínez JC, Montoya P, Orozco C. 2005. Evaluating Coral Reef benthic Communities from remote Caribbean Atolls (Quitasueño, Serrana, and Roncador Banks, Colombia): multivariate approaches to recommend Marine Protected Areas for the SeaFlower Biosphere Reserve (Archipelago of San Andres and Providencia). Atoll Research Bulletin, 531: 1-66.

e. Synergistic Activities

Organizer of an annual workshop on coral reef ecology and biology for non-scientists, 2009 present

Training undergraduates and graduates in marine science and coral reef ecology, 2007-present

Reviewer for multiple journals and editor for Bulletin of Marine and Coastal Research (2010-2013), Acta Biológica Colombiana (2018-currently)

f. Languages

Spanish – mother language

English – fluent speaking, reading and writing

French – fluent reading