Annex I

Terms of Reference

TERMS OF REFERENCE

FOR AN ENVIRONMENTAL IMPACT ASSESSMENT (EIA) TO BE PREPARED FOR PELICAN POINT RESORT AND MARINA, CAYE CAULKER BELIZE DISTRICT

BACKGROUND

This Terms of Reference (TOR) has been prepared following the scoping for the most critical issues that will need to be addressed for the proposed development which consists of the construction of a resort and marina in Caye Caulker by Pelican Point. In the preparation of the Environmental Impact Assessment (EIA), the EIA preparers will need to focus on addressing the main areas of concern, such as:

WATER RESOURCES, WASTE MANAGEMENT, ENERGY GENERATION, EXTRACTION OF MATERIALS, TRANSPORTATION, AND SOCIO-ECONOMIC FACTORS.

Scoping of these issues speeds up the EIA process, cuts down its cost, improves the quality of the development, and ensures that environmental concerns are clearly addressed. This Term of Reference is divided into three (4) sections:

A. PROJECT DESCRIPTION AND PHYSICAL ENVIRONMENT
B. ENVIRONMENTAL ISSUES
C. DEVELOPMENT COMPONENTS
D. CONCLUSIONS AND RECOMMENDATIONS

A. PROJECT DESCRIPTION AND PHYSICAL ENVIRONMENT

This section of the document deals primarily with information pertaining to the background of the project, and the physical environment within which it is proposed. The EIA will need to address:

1.0 THE PROJECT DESCRIPTION AND LAYOUT PLAN

Maps at appropriate scales (1:25,000) must be provided and with proper labels and legends to illustrate the general settings of project related development sites as well as surrounding areas likely to be environmentally affected. These maps shall include topographic contours, where available, as well as location of major surface waters, natural drainage, roads, parks or reserves, political boundaries including the projects relation to the Caye Caulker airstrip and existing adjacent land uses (tourism, agricultural, fishing, industrial) and a photo-geologic/geomorphic map of the project area showing geomorphic features (by use of aerial photographs, if available). Additionally the following should be provided:

1.01 Give the exact location of the project and provide proof of ownership of the parcel(s) of land comprising the project site. Include a copy of the land tenure

documents.

1.02 Provide the following plans:
The layout plan for the overall development, including siting of all facilities such as the utilities, water treatment facilities, sewage treatment facilities for both the resort/condo and the marina, storage facilities including boat storage, drainage facilities, administrative buildings, marina, channel network, condominiums, cabanas, restaurants, resort facilities, swimming pools, fuel storage facilities, fuel service station, recycling / composting facilities, garbage storage/treatment facilities, etc.;

1.03 Describe briefly the facilities provided in the plans above.

1.04 The physical plan for the development, including the justification for the siting and rationale of all facilities and infrastructure.

1.05 Provide specifications for the following:
a. Waste treatment facilities; (liquid, solid, international)
b. Recreational sites
c. Condominiums and resort sites
d. Piers & Marinas and docking facilities and any other related infrastructure
e. Channels or lagoon (locations, depths, widths and designs)
f. Potable water and source
g. Tourism facilities and amenities
h. Fuel storage facilities and fuelling station

1.06 Provide outline of the overall management structure anticipated for the proposed development.

1.07 Give detailed information about the Pelican Point Marina including any possible activities such as fuelling for boats, mechanic services, long term boat storage and waste disposal & management from docked vessels.(if applicable)

1.08 Describe the implementation of the project in phases (if applicable).

1.09 Provide a brief description of previous activities undertaken in regards to the project, including landing clearing, dredging / excavation etc and how they will impact any future development of the project (if any).

2.0 THE PHYSICAL ENVIRONMENT

2.01 Provide details of the basic physical environment of the project site and zone of influence. This should include:

- Topography: including degree of slopes, flood hazard, drainage patterns around project site and the effects of rainfall averages on these conditions

- Climate: hydrology and meteorology: including rainfall average per year, prevailing wind patterns,

- Geology: Provide a detailed description of the characteristics of landform, land surface including exposed rock types, types of unconsolidated materials exposed (sediments), tributaries, ridges, and geological structures — faults, folds, if they can be determined by field mapping.

- Subsurface geology; detailed description of the stratigraphy of the rocks or unconsolidated materials, within the project site *(including proposed areas for feeder roads)*, to depths allowing for maintenance of suitable impermeable layer for the protection of the water table. This must be done by core sampling (mechanical or manual) using a pre-determined borehole grid. Cross sections of the rock types or unconsolidated materials should also be presented. The engineering properties of the rocks and/or unconsolidated materials must be tested (including permeability) to determine the suitability for the proposed development.

- Soils: soil profile, permeability, classification, fertility, value;

- Current land use of project site and adjacent properties;

- Physical description of surrounding receiving water bodies including creeks, lagoons and sea front, sea grass beds, reef systems (if any) and mangroves etc.

2.02 Determine the projected number of buildings to be constructed, including condominiums, fuel storage facilities, fuelling stations, resort facilities, commercial facilities or other similar complexes. A layout of all complexes, including marinas and other infrastructure to be built and the proximity to each other should be shown.

2.03 Provide technical justification for the number of buildings, number of marinas, number of expected vessels and number of persons residing and visiting the project site/resort. This should be described in such a way as to determine the physical carrying capacity of the area.

3.0 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

3.01 Describe the pertinent regulations, standards and policies, at the local, national and international levels governing environmental quality, health and safety, protection of sensitive areas, including cultural resources, protection of endangered or threatened species, infrastructure development, land use control, full service marinas and tourism that may have an impact on the proposed development. Provide and discuss policy, legal or administrative issues as they relate to this proposed development.

B ENVIRONMENTAL ISSUES

This section of the document primarily targets the environmental issues of critical concerns based on information provided in section A.

The following are the critical issues a high quality EIA will need to address for this development. The EIA will need to address:

1.0 FLORA AND FAUNA

For the project site and the zone of influence:

1.01 Collect baseline data (field study) on the terrestrial and aquatic fauna and flora; rare or endangered species or commercially valuable species within or in areas adjacent to the project site with special emphasis on wetland species and marine life, effluent receiving water bodies, source(s) of potable water supply and immediate areas to be used for recreational activities including the marina and channel use. This should provide a baseline from which to detect any changes in the abundance and/or health status of the species due to this development.

1.02 Provide a general description of the methodology used to collect baseline data including date, time, area surveyed and method used.

1.03 Estimate the acreage and type of vegetation to be cleared (if applicable)

1.04 Identify any species (flora and fauna) of conservative significance, and specify measures for their protection.

1.05 Highlight, where appropriate, measures that could be taken to enhance the habitat value of the project area.

2.0 WATER RESOURCES

2.01 Establish a base line on the water resources of the project area. This base line should include water quality assessment of the ground water and surface waters of the project site and zone of influence. This data should be collected at appropriate intervals to establish any seasonal variation in the water quality between dry and rainy seasons. The base line should include, at a minimum, the following parameters:

i	Temperature	viii	Dissolved Oxygen (surface & below surface, a.m. & p.m)
ii	Conductivity	ix	Total Nitrate (as $N0_3$- N);
iii	Hardness	x	Total Phosphate (PO_4^-)
iv	Salinity	xi	Sulphates (SO_4^{2-})

v	Total Suspended Solids (TSS)	xii	Biological Oxygen Demand (BOD)
vi	Total Dissolved Solids (TDS)	xiii	Microbiological Parameters
vii	pH		

Assays i, vii & viii, will be conducted in the field and the remainder by an independent water quality consultant.

2.02 Determine the projected water needs for the entire development (including drinking water supply, potable water for construction and operation of the resort and marina and vessels, irrigation of lawns, and other non potable uses.)

2.03 Assess all sources of water supply, quality and quantity, paying special attention to determining the safe maximum sustainable yield the sources can provide.

2.04 Given the results from above, evaluate alternatives for the provision of water supply for the entire development including construction and servicing of the marina and vessels.

2.05 Identify the preferred option for water supply required for project development, based on environmental grounds. Where the recommended water supply source is ground water, a proper pump test on the aquifer must be conducted. Specify any residual impacts of meeting water needs through this option, their significance, and any mitigation measures to be undertaken.

2.06 Provide an inventory of other users in the zone of influence with respect to the selected water supply source and identify any impacts thereon and mitigation measures to be undertaken.

2.07 Identify and develop a water quality monitoring program able to detect any change in groundwater or surface water quality that will be of significant detriment to:

i. Public health;
ii. Recreational activities and
iii. Forest, and adjacent habitats, including water bodies

3.0 LIQUID WASTE

3.01 Determine the nature and volume of liquid waste to be generated by the entire project including vessels utilizing the marina, including sewage, bilge and grey water, and discharge from the pools, etc .

3.02 Evaluate a minimum of three alternative options for the collection, treatment, recycling (if appropriate), and disposal of these liquid wastes. Be sure to identify

any chemicals planned for use in the treatment or management of these wastes, including wastes from vessels.

3.03 Identify the preferred option(s) for liquid waste management, based on environmental grounds, including necessary infrastructure and land requirements. Specify any residual impacts of liquid waste management, their significance, and any mitigation measures to be undertaken.

4.0 SOLID WASTE GENERATION

4.01 Determine the projected types and volumes of solid waste to be produced by the entire development. This should include organic, inorganic and construction waste. It will also need to include solid wastes (international waste) coming from boats and other transportation vehicles. If composting of organic wastes is to be conducted, provide specifications on the location of the site and procedures to be followed for the composting.

4.02 Evaluate at least two alternative options for the collection, treatment, transportation and disposal of these wastes.

4.03 Select the preferred option(s) for disposal of these materials. Again, this should be based on environmental grounds, and should specify any residual impacts, their significance and the mitigation measures, which are to be undertaken.

4.04 Assess the ability of the community or local government to provide the necessary infrastructure, resources and management for the collection, storage, treatment and final disposal of solid waste generated by the project should the EIA recommend the use of an existing landfill and provide appropriate recommendations for these, in the event that they are inadequate.

4.05 Should the EIA determine that the construction of an on-site landfill is to the preferred option, the EIA should include a study to determine the most suitable site for the construction along with detailed designs of the landfill.

5.0 GEOLOGY AND EXTRACTION OF MATERIALS

5.01 Provide information on the specific soil type and submit results of analysis carried out to determine soil permeability/profile in the proposed project area.

5.02 Conduct at least three bores of a diagonal transect of the tourism area for the reconfirmation of bedrock for structural support.

5.03 Determine the type and volume of landfill materials and construction materials required for the entire development.

5.04 Consult with the Geology and Petroleum Department over fulfilling requirements

for a quarry/mining license, which will be required before any dredging/mining commences.

5.05 In light of this consultation, evaluate options for meeting these needs, reviewing their sources, volume, extraction methods and transportation and identifying;

a. direct and indirect biological impacts on flora and fauna, marine and terrestrial with emphasis on the seagrass beds, corals (if any) and mangroves;
b. direct and indirect physical impacts;
c. impact on water resources, receiving water bodies, Caribbean Sea, lagoons and mangrove wetlands;
d. impact if any on fishing grounds (if any);
e. specific mitigation measures for the above mentioned.

5.06 Evaluate the potential impacts of excavation/dredging on flora, fauna and human beings including information on sub-tidal habitat such as sea grass beds, macro-algal beds, and beach or near-shore environment.

5.07 Identify the preferred option for the extraction methods, source, and transportation of materials, specifying the necessary mitigation measures, their residual impacts and significance.

6.0 WATER TRANSPORTATION / MARINA

6.01 Determine the projected number and types of boats likely to be associated with the entire development.

6.02 Evaluate options for storage and docking of water borne vessels. This will require examination of:

i. Benthic substrate;
ii. Design of marina facility, including access channel;
iii. Shoreline protection;
iv. Near shore and off shore currents;
v. Near shore and off shore sedimentation patterns;
vi. Wind conditions;
vii. Wave conditions;
viii. Construction methods;
ix. Methods of controlling sedimentation of marina;
x. Requirement for maintenance dredging (frequency and volume) ***(if applicable***);
xi. Transportation of construction materials ***(if applicable***);
xii. Disposal/use of dredged materials***(if applicable)***;
xiii. Dredging requirements/volume of materials to be dredged ***(if applicable)***;
xiv. Physical character of materials to be dredged***(if applicable);***
xv. Type of dredging equipment/Method of dredging***(if applicable)***;

6.03 Provide bathymetry of the area to be dredged in particular the access channel and the marina area.

6.04 Provide an analysis or modelling to estimate the expected rate of flushing of the interior waterways.

6.05 Evaluate options for the construction of beach protection structures/devices and identify the preferred option.

6.06 Evaluate options for the supply, transportation and storage of fuel to boats and identify the best method for eliminating potential spillages and maximizing health and safety. This should include options for the proper storage of the fuels.

6.07 Provide information on alternative sites considered and the rational for the selection of the proposed site and design of the preferred choice for both the pier(s) and the marina.

6.08 Provide specifications (dimensions) of the proposed pier, indicating the type(s) of construction materials that will be used.

6.09 Identify the preferred option for the extraction methods, the source, and transportation of materials for the construction of the pier and marina, specifying the necessary mitigation measures to be used, their residual impacts and significance.

6.10 The plan of the marina must include dimensions to scale (e.g. length, height, width) for all related structures both, land and water based, berthing and mooring arrangements as well as the specific siting for the various facilities such as fuel dispensing and boat storage off-land. Text must be submitted (accompanying the plan) justifying the size and scope of the marina and details on the type, size and number of vessels to be involved with this undertaken.

6.11 Evaluate and identify options for waste (liquid and solid) disposal from boats docked at the marina, including mitigation measures (if applicable).

7.0 ROAD AND AIR TRANSPORTATION

7.01 Provide a layout of the existing access road(s)/walkways to the development site. Identify whether any new roads/walkways will be required for the development.

7.02 Identify any changes in drainage patterns, if applicable

7.03 Evaluate options for the provision of suitable roads/walkways for the development, taking into account proper access to proposed facilities, etc.

7.04 Select preferred option for the provision of suitable roads/walkways for the development. This will need to examine construction materials (types, sources, volumes, transportation) and methods in relation to their environmental impacts.

7.05 Identify the preferred option for surface drainage system for the project area, including drains, and sedimentation structures.

7.06 Recommend mitigation measures, based on the specific option selected, for the proper management of the vehicular/boat traffic close to and within the project area. These mitigation measures must include recommendations for protection features against siltation, erosion, and other potential pollution to the environment.

7.07 Select the preferred option for the resort to capitalize on the near by airstrip.

7.08 Provide a layout of the air strip and what impacts it might receive from the operation of the marina.

8.0 ENERGY GENERATION

8.01 Determine the projected energy requirements for the entire development.

8.02 Evaluate alternatives for meeting these needs, using fossil fuel, solar, wind resources (and others if appropriate). For each of these options, it will be necessary to investigate:

1) fuel storage (where relevant);
2) transportation (where relevant);
3) health and safety;
4) pollution sources, volumes, and types;
5) significance of any pollution that may result from energy generation; and
6) mitigatory measures

It will be necessary to divide examination of energy provision into construction, operation, and maintenance phases.

8.03 Select the preferred option for energy generation. Again, this should be based on environmental grounds, and should specify the residual impacts of generation of the preferred option, their significance and the mitigatory measures, which will be undertaken.

9.0 DISASTER MANAGEMENT AND CONTINGENCY PLANS

9.01 Identify the potential disasters and their respective response and contingency management measures or plans for the proposed development (e.g. accidents, hurricane, floods, fires, tidal rise, biosecurity, spills, health and safety etc.) This should include the implementation of an Emergency Committee and their role in carrying out the respective response and contingency measures or plans.

10.0 SOCIAL FACTORS

10.01 Conduct an investigation to determine the potential social impacts of the proposed development taking into account factors such as:

a) Labour; - employment opportunities for skilled and unskilled workers and provision of basic health care and hygiene, the provision of recreational spaces, sanitary facilities for all workers, during construction and operation of the project.

10.1.2 An analysis of the requirements of areas for public services should be incorporated into this study. Issues such as the following should be addressed;

i. Fire protection
ii. Police/Security services
iii. Recreational centers
iv. Medical emergency evacuations

10.02 Identify emergency preparation and applicable management measures for the proposed development (e.g. hurricane, floods, fires etc.). This should include evacuation and hazard management plans inclusive of climate change adaptation measures.

11.0 NGO AND PUBLIC INTEREST

11.1 The EIA team will consult with and report on the views and concerns of local/nearby communities, local NGO's, public interest groups and relevant government departments/agencies, especially the local fisheries cooperatives, Caye Caulker Village Council, local government agencies, Fisheries Department and the Civil Aviation Department regarding the development of the project.

11.2 Consult with the Institute of Archaeology on the need for an archaeological assessment for the proposed project site. Include a copy of the approval/recommendations from the Institute of Archaeology and integrate them into the overall development plan.

11.3 Provide a copy of the questions/answers used for the report including the name and organization of the interviewees and the date of interview

12.0 <u>POTENTIAL CUMULATIVE IMPACTS</u>

12.1 Identify potential negative impacts and possible changes that may result from the implementation of this project on its surrounding environment,

taking each component into consideration. This should include, but not be limited to, changes in the following:

i. Water Quality of the area (Caribbean Sea, and other tributaries);
ii. Possible effects on the Belize Barrier Reef (Mesoamerican Barrier Reef)
iii. Land Use pattern;
iv. Traffic (land and water);
v. Infrastructure;
vi. Employment opportunities;
vii. Socio-cultural environment; and
viii. Abundance of flora and fauna.

12.2 The above analysis may distinguish between significant positive and negative impacts; direct and indirect impacts; immediate, medium and long-term impacts, irreversible or unavoidable impacts and identify impacts that may result from accidental events (i.e. oil/fuel spills, accidental release of untreated wastewater/ effluent, etc.). This analysis may be divided into construction, operational and maintenance activities / phases.

12.3 Characterize the extent and quality of available data, explaining significant information deficiencies (gaps) and uncertainties associated with the prediction of such potential negative impacts.

C. CONCLUSIONS / RECOMMENDATIONS

This section proposes alternatives to the execution of the project based on the information generated by Section B.

1.0 ALTERNATIVES FOR DEVELOPMENT

1.01 Present at least three alternatives for development including the no action alternative in comparative form, exploring each alternative. Include the no-action alternative, and the reason why certain alternatives were recommended or eliminated. These alternatives should address the following components:

1.01.1 Siting of the necessary support infrastructure and all facilities;
1.01.2 Water supply alternatives (examine the different abstraction points investigated, if applicable).
1.01.3 Liquid and solid waste treatment, including wastewater reclamation system and disposal options (evaluate the different treatment technologies and methodologies).
1.01.4 Boat Storage and docking facilities.

2.0. MITIGATION AND MONITORING PLAN

2.01 Based on the investigations, develop a mitigation matrix outlining mitigation measures for all potential negative environmental impacts including, but not

limited to: construction and operation activities, water abstraction, waste water treatment and disposal, waste treatment and disposal, habitat alteration, erosion and sedimentation.

2.02 Provide a monitoring plan to be implemented for the entire operation. This should include monitoring of waste water discharge characteristics (if any), waste from vessels, solid waste (in all its forms), water abstraction levels, and transportation activities, changes in ecological species (including endangered species) and health and safety.

2.03 Characterize the extent and quality of available data, explaining significant information deficiencies and any uncertainties associated with the prediction of such impacts.

Annex II

EIA Preparers

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