REPORT

Charles Kirkconnell International Airport - Runway Extension draft Terms of Reference

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Executive Summary

The Cayman Islands Aviation Authority (CIAA) is proposing to construct a Runway End Safety Area (RESA) at each end of the runway at CKIA. To achieve this the runway itself will be marginally shortened by relocating the Runway 09 threshold 75.6m (248ft) to the east to allow 90m (295ft) RESAs to be constructed at each end (at the western end the RESA would be constructed on what is currently the end of the runway and at the eastern end a new area will be used for construction of the RESA). Additionally, the runway strip width, to the south of the runway, is not within regulations and will be widened to 75m from the centreline of the runway.

The construction of RESAs at CKIA is primarily driven by the need to comply with Overseas Territories Aviation Regulations (OTARs), to meet the requirements of the International Civil Aviation Organisation (ICAO) and to enhance safety. The construction of RESAs and the widening of the runway strip, which will involve a small amount of pond filling, are required to accommodate the safe manoeuvring of aircraft; including the relocation of obstacles such as trees and power lines, and the improvement of bird management techniques to reduce hazards.

The Environmental Impact Assessment (EIA) process, voluntarily initiated by the CIAA in 2023, is underway to identify, assess and address the potential environmental impacts associated with the Project. In May 2023, the CIAA submitted a request for an EIA scoping opinion to the National Conservation Council (NCC). The NCC confirmed that the Project falls within Schedule 1 of the National Conservation Act, and therefore an EIA was required. On the 23rd August 2023, the NCC appointed the Environmental Advisory Board (EAB) to provide advice throughout the EIA process. The EAB comprises the Civil Aviation Authority (CAA), Department of Planning, Water Authority – Cayman and the Department of Environment. In 2024, the CIAA acquired the services of Royal HaskoningDHV to author a Terms of Reference (ToR) (this document) to define the assessments required to inform the EIA for the Project. The EIA will address the potential environmental impacts associated with the Project and respond to public consultation feedback.

This ToR identifies the scope of work required to inform the EIA, including the detail required for the construction activities and operational parameters for the Project, the surveys required to inform the environmental baseline and the EIA methodology to be used to assess the potential effects on the natural and human environment. The EIA will address the following topics:

- Terrestrial ecology and wildlife management,
- Marine ecology, and
- Hydrology, drainage and water quality.

The EIA will assess the potential impacts arising from the construction and operational activities for the Project. Should significant effects on environmental resources and existing communities be identified the EIA will propose measures to avoid or minimise those effects so those effects are no longer significant in EIA terms. The EAB, in accordance with Section 3(13) of the National Conservation Act of 2013, will oversee the preparation and implementation of the EIA.



Acronyms

Acronym	Acronym description
ATC	Air Traffic Control
вто	British Trust for Ornithology
CAA	Cayman Islands Civil Aviation Authority
CAL	Cayman Airways Ltd
CAP	Capital Action Plan
CEA	Cumulative Effects Assessment
CIAA	Cayman Islands Aviation Authority
CIEEM	Chartered Institute of Ecology and Environmental Management
CKIA	Charles Kirkconnell International Airport
COSSH	Control of Substances Hazardous to Health
СРА	Central Planning Authority
DoE	Department of Environment
EAB	Environmental Advisory Board
EcIA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ES	Environmental Statement
FAC	Florida Administrative Codes
GIS	Geographic Information System
ICAO	International Civil Aviation Organization
IEMA	Institute of Environmental Management and Assessment
IFC	International Finance Corporation
IUCN	International Union for the Conservation of Nature
NBAP	National Biodiversity Action Plan
NCA	National Conservation Act
NCC	National Conservation Council
NCL	National Conservation Law
NTCI	National Trust Cayman Islands
OTARs	Overseas Territories Aviation Requirements
PCSM	Preliminary Conceptual Site Model
PFCs	Perfluorinated chemicals
POP	Persistent Organic Pollutants
RESA	Runway End Safety Area



SAP	Species Action Plan
SCTLD	Stony Coral Tissue Loss Disease
ToR	Terms of Reference



1 INTRODUCTION

1.1 **Project background**

The Charles Kirkconnell International Airport (CKIA) is one of the three aerodromes in the Cayman Islands, located at the southwest corner of Cayman Brac (hereafter referred to as 'the Project'). The main access road providing access to the aerodrome is Gerrard Smith Avenue, which connects to West End Road along the southern coast of the island. The Cayman Islands Aviation Authority (CIAA) is proposing to construct a Runway End Safety Area (RESA) at each end of the runway at CKIA. To achieve this the runway itself will be marginally shortened by relocating the Runway 09 threshold 75.6m (248ft) to the east to allow 90m (295ft) RESAs to be constructed at each end (at the western end the RESA would be constructed on what is currently the end of the runway and at the eastern end a new area will be used for construction of the RESA). Additionally, the runway strip width, to the south of the runway is shown below in **Figure 1.1**.

The CKIA, owned and operated by the CIAA, is vital to the island's connectivity and development; processing over 59,000 passenger movements and more than 5,000 aircraft movements annually (CIAA, 2024). The airport, which features a 1,829m (6,000ft) runway, supports both commercial and private flights, contributing significantly to the local tourism and economy. The Cayman Islands rely on imported goods and CKIA handles around 132,000 pounds of cargo and 4,300 pounds of mail annually (CIAA, 2024). In the future, and outside of the scope of this EIA, the CKIA will undergo facility upgrades to enhance passenger experience and operational efficiency.

The construction of RESAs at CKIA is primarily driven by the need to comply with Overseas Territories Aviation Regulations (OTARs), to meet the requirements of the International Civil Aviation Organisation (ICAO) and to enhance safety. The construction of RESAs and the widening of the runway strip, which will involve a small amount of pond filling, are required to accommodate the safe manoeuvring of aircraft; including the relocation of obstacles such as trees and power lines, and the improvement of bird management techniques to reduce hazards. This Terms of Reference (ToR), and the subsequent Environmental Impact Assessment (EIA) process, represents positive action towards the safety and capacity of the aerodrome on Cayman Brac.

The Project is expected to begin the design stage in 2026. Once the design and the EIA process is completed, assuming the Project is approved, construction is anticipated to begin in 2027. Construction is expected to take 6 months to complete, and it is anticipated the Project would be operational in 2028. As the proposed works are part of a Civil Aviation Authority (CAA) Capital Action Plan (CAP), they are required to be completed as soon as possible.

In May 2023, the CIAA voluntarily decided to carry out an EIA for the Project and submitted a request for an EIA scoping opinion to the National Conservation Council (NCC). The NCC confirmed that the Project falls within Schedule 1 of the National Conservation Act, and therefore an EIA is required. On the 23rd August 2023, the NCC appointed the Environmental Advisory Board (EAB) to provide advice throughout the EIA process. The EAB comprises the Civil Aviation Authority (CAA), Department of Planning, Water Authority – Cayman and the Department of Environment.

Following the requirements of the EIA Directive a subsequent meeting was held on 27th September 2023, where the EAB met for an initial discussion regarding the EIA scoping and produced a scoping report. The EAB's Scoping Opinion was published on the 15 December 2023 (**Appendix A**). The purpose of this report is to provide the Terms of Reference (ToR) for the EIA.





1.2 The Project location

Cayman Brac has a permanent population of approximately 2,000 persons, or roughly 3% of the entire Cayman population (The Economics and Statistics Office, 2022). Cayman Brac's local economy is supported by tourism, fishing, and government services. Some of the main attractions are MV Captain Keith Tibbetts wreck, and the Brac Parrot Reserve, among numerous caves and hiking trails.

Cayman Brac supports a range of habitats including dry forests, wetlands and xerophytic shrubland. The Brac is also home to several important protected areas that play a crucial role in the island's ecosystem. This includes sites including the Brac Splits, which protects wetlands and Marine Protected Areas that support a diverse range of marine life, bird populations, and other wildlife. The island's marine parks are established to protect coral reefs, seagrass beds, and various marine species. These protected areas contribute to water filtration, storm protection, and serve as vital nurseries for marine life. The reserves are discussed in greater detail in **Section 4.2**.

The CKIA is located on the southwestern side of the island, near the main settlement of West End (**Figure 1.1**). The airport is accessible via Gerrard Smith Avenue, which connects to the island's main road network. The surrounding area is a mix of residential and commercial properties, with pockets of natural vegetation.

1.3 Need and alternatives for the Project

1.3.1 Need for the Project

This ToR specifically addresses the proposed runway strip widening and realignment at CKIA and the extension needed to the east to accommodate the RESAs at either end. These needs are discussed in detail in the Cayman Airports Master Plan (Stantec, 2023) and key points are summarised here.

1.3.1.1 Existing runway

The CKIA currently operates a single, lighted, non-instrument asphalt runway, Runway 09-27, which is 1,829m (6,000ft) long and 45m (150ft) wide, alongside a commercial aircraft apron for up to two Code C aircraft. The runway is grooved and structurally sound, although there is some surface deterioration; especially under the paint markings.

Runway 09-27 can handle short-haul aircraft operations ranging from Code A to Code C, with the largest being the Boeing 737 MAX 8 used by Cayman Airways. The most frequently seen aircraft at CKIA are those operated by Cayman Airways, including the Boeing 737 MAX 8, Saab 340, and DHC-6 Twin Otter.

CKIA lacks a parallel taxiway and has only one taxiway, Taxiway A, which connects Runway 09-27 to the terminal apron. This taxiway is currently 23m (75ft) wide and 135m (443ft) in length. Aircraft entering the apron from Taxiway A may experience delays due to the presence of a B737-MAX 8 operated by CAL, which cannot be safely passed whilst maintaining the minimum wingtip to object clearances required. Given this, although the CKIA is a certified international aerodrome, it currently does not comply with OTARs.

The runway system's capacity is constrained by several factors:

- The placement and number of taxiway entrances and exits
- The runway strip is not wide enough in certain areas
- The absence of a full parallel taxiway
- The mix of small to medium-sized aircraft



• The air traffic control (ATC) system relies on line-of-sight and visual monitoring of aircraft. The ATC tower lacks direct visibility of the Runway 09 and 27 thresholds, so a CCTV system on a tall pole east of the tower is used to enhance visibility.

Current peak hour aircraft movements at CKIA are reported to be an average of two to three movements per hour and these are not forecast to increase. However, the future replacement of the CAL Saab and DHC-6 Twin Otter will likely result in a larger turboprop aircraft (for example an ATR 42) with additional seats resulting in slightly increased passenger numbers, rather than additional aircraft movements.

1.3.1.2 Runway end safety areas

The existing RESAs for Runways 09 and 27, do not currently meet minimum standards for the runway length (1,800m+) (**Table 1.1**).

Table 1.1 ICAO Runway Standards

ICAO Annex 14 Standards and Recommended Practices (SARPs) for runways aim to enhance safety by providing adequate buffer zones at the ends of runways. They are categorised based on runway length into four codes:

Runway	Length	RESA length (beyond the runway strip)	
Code 1	< 800 meters	 Recommended 120 meters 	
Code 2	800-1199 meters		
Code 3	1200-1799 meters	Minimum 90 meters	
Code 4	1800 + meters	Recommended 240 meters	

At the west end of the runway, there is a beach and sea turtle habitat to the north. The east end has a sandy, grassy strip and RESA, beyond which lies a pond. The Westerly Ponds, located on the south side of the runway, attract significant bird populations, which can pose a hazard to aircraft. These ponds are not environmentally protected; however they do provide supporting habitat for protected species and feature public viewing areas for bird watching. However, the runway strip encroaches onto the northern edges of the Westerly Ponds, making it non-compliant with ICAO standards.

It was therefore determined that there is an immediate requirement to resolve these regulatory compliance issues. As such, the runway strip will be widened, and compliant RESAs should be constructed at each runway end.

Various options for developing RESAs at CKIA were evaluated. However, upon identifying that turtles nest on the beach to the northwest of the runway, the planning team determined the RESA shall avoid this area. Additionally, the considerable depth of the water off the west end of Runway 09-27 makes extending the RESA in that direction economically unfeasible. The planned RESA at the west end, pre-threshold Runway 09, has therefore been shifted to the east to avoid the possible turtle nesting sites. By shifting the runway landing threshold to the east, the runway length is marginally reduced while enabling take-off from the RESA utilizing approved starter strips.

1.4 Outline Project description

The option being taken forward in this ToR is outlined below (Figure 1.2):

A widening of the south side of the runway strip to 75m from the runway centreline, requiring;
 Realignment of South-Side Road out of the widened runway strip



- Removal of obstacles (trees and powerlines) from the widened runway strip.
- Shift Runway 09 76m to the east
- Construct a 90m x 90m RESA at the western end of the runway (Runway 09);
- Extend Runway 27 60m to the east
- Construct a 90m x 90m RESA at the end of Runway 27.

At this early stage in the process outline or detailed design of the potential modifications to the airfield is not yet known. At a worst case the construction will require some loss of habitat. Where possible, any measures to prevent, limit or mitigate this loss of habitat will be discussed in the EIA.

The airfield and runway modifications will allow CKIA to meet OTARs but is projected to support a similar frequency of flights as the current aerodrome. The safer nature of the aerodrome may, however, facilitate utilisation by larger planes which could bring increased numbers of visitors to Cayman Brac.

1.5 Scope of works for EIA project introductory sections

The EIA will include a full description of the Project including figures showing the boundary of the proposed works, with all facilities shown and all associated works and infrastructure. How the plans fit with existing and proposed planning requirements will be discussed. The EIA consultant will collaborate with the design consultants to finalise the project description and will confirm the impacts to be assessed within the EIA with the EAB prior to the commencement of the process.

The justification for the Project shall be discussed in detail. This section shall take account of the responses to public consultation as summarised in **Section 3.2.2**.

The alternatives considered will be fully discussed together with the process followed for justification of the preferred option. The results of any public consultation, either directly for the Airport Master Plan, the Draft Planning Statement for the islands and the results of the public consultation for this ToR shall be incorporated into the EIA.

The study area for each parameter will be determined by the findings of the baseline characteristics and the potential for effect that could arise from the proposed construction and operation of the Project once the design and construction activities are established. The study area for each topic will be confirmed with the EAB prior to any surveys or modelling being undertaken.

The construction methodology shall be detailed together with a proposed time plan for any works showing any seasonal restrictions that are identified during the assessment process. If there is uncertainty over any methodologies, the precautionary principle will apply, the assumptions shall be detailed, and worst-case scenarios used for the assessment process.

Any sources of material that are taken from outside of the red line boundary, for example fill material, if needed, shall be identified in terms of volumes required and sources and the transportation routes identified and assessed.

The requirement for construction materials will need to be assessed. The Central Planning Authority (CPA) has also noted that the policy on aggregate reserves may be outdated and needs revisiting (Cayman News Service, 2023). Cayman Brac has several quarries, with West End Quarry being one of the most notable. If material is to be taken from or deposited in sites that are not currently licensed or if aggregates are imported, then the potential effects shall be included in the EIA.



Any changes to the operation of the airport as a result of the Project shall be detailed and assessed including management of drainage water from the runway (and associated pollutants) alongside general drainage design to avoid storm water run-off. Maintenance requirements and activities at the Project site shall be provided to inform the assessments in the EIA.



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2 LEGISLATION AND PLANNING REQUIREMENTS

This section outlines the legislative and policy framework that is relevant to the EIA procedure. The requirements of the legislation shall be applied to the relevant sections of the EIA to ensure full compliance.

2.1 Legislative framework

2.1.1 National Conservation Act (2013)

The requirement for an Environmental Impact Assessment (EIA) in the Cayman Islands is determined by the National Conservation Act (2013) (NCA). Specifically, Section 43 of this law outlines the legal framework for EIAs. The process is further detailed in the National Conservation Council's Directive for Environmental Impact Assessments, which was gazetted on 29 June 2016.

The NCA 2013 is aimed at protecting and conserving the natural environment. The Act is designed to protect and conserve endangered, threatened, and endemic plants and wildlife, as well as their habitats. It provides a legal framework for the conservation of biodiversity in the Cayman Islands. The Act established the National Conservation Council. Section 6(1)(a) of the NCA places responsibility for the administration and enforcement of the law with the DoE. This includes overseeing the EIA process for projects that may impact the environment. Other aspects of the Act which may be relevant to the EIA process include:

- Legal Framework: The Act provides the legal basis for conducting EIAs in the Cayman Islands. Section 43 of the Act outlines the requirements and procedures for EIAs.
- The EIA Directive: The National Conservation Council issued a directive for conducting EIAs under the NCA legal framework, ensuring that all potential environmental impacts are thoroughly assessed and mitigated.
- Stakeholder Involvement: The Act mandates the involvement of various stakeholders, including government agencies, environmental organizations, and the public, in the EIA process. This ensures a comprehensive and transparent assessment.
- Sustainable Development: The law promotes sustainable development by ensuring that all government entities are required to consult with the NCC on the likely effects of their projects, plans and actions before taking any decisions or giving any undertakings.

As per section 43 (2), an EIA shall:

- (a) assess the proposed action having regard to its direct, indirect and cumulative impact and the need to
 - (i) protect and improve public health and social and living conditions;
 - (ii) preserve natural resources, ecological functions and biological diversity;
 - (iii) protect and conserve protected areas and conservation areas;
 - (iv) protect and conserve protected, endemic and migratory species and their habitats; and
 - (v) avoid any adverse effects of climate change on the quality of the environment; be carried out by a person approved by the Council; and
- (b) comply with any directives of the Council and regulations made under the Law.

Part 3 addressed the conservation of land, and Section 7 described the designation process of protected areas. Similarly, Part 4 addressed the conservation of Wildlife, and Section 16 covers the listing procedures for protected species.

Section 11 (2), prohibits and regulates any activity that is likely, individually, or cumulatively, to harm or adversely affect a protected area or that is otherwise not compatible with the purposes for which a protected



area was established. To obtain an exemption to Section 11 (2), the proponent must submit an application to the Council to obtain a permit under Section 20 (2)(a). Section 11 (2)(d) prohibits or regulates the dumping of discharge of water or other substances.

2.1.2 Directive for Environmental Impact Assessments, 2016

The Directive for Environmental Impact Assessments (EIA), 2016, issued by the National Conservation Council of the Cayman Islands, provides a structured framework for conducting EIAs. The directive is issued under Section 43 of the National Conservation Law ("the EIA Directive"), and in conjunction with Sections 3(12)(j) and 43(2)(c) of the National Conservation Act. The Directive outlines the procedures and requirements for EIAs (**Figure 2.1**).

2.1.3 National Trust Act, 2010

The purpose of the Trust is to preserve the historic, natural, and maritime heritage of the islands through the preservation of areas, sites, buildings, etc.; maintain conservation; and protect flora and fauna. Of relevance to this project are the environmental sites maintained by the Trust (of which there are six historic sites and eight nature reserves). The closest in proximity to the Project is the Brac Splits.

2.1.4 Cayman Islands Constitution Order, 2009

The Cayman Islands Constitution Order, 2009 establishes the constitutional framework for the Cayman Islands and replaced the previous constitution from 1972. Various aspects of the Constitution Order are relevant to the EIA process, for example:

- Environmental Protection Mandate: The Constitution mandates that the government must consider the need to foster and protect an environment that is not harmful to the health or well-being of present and future generations. This principle underpins the EIA process, ensuring that environmental sustainability is a core consideration in development projects.
- Legal Framework: The Constitution provides the legal foundation for the National Conservation Act (2013), which directly governs the EIA process. This ensures that EIAs are conducted within a robust legal framework that aligns with constitutional principles.
- Public Participation: The Constitution emphasises the importance of public participation in environmental decision-making. This is reflected in the EIA process, which includes public consultation phases to gather input from the community and stakeholders.
- Sustainable Development: The Constitution supports sustainable development by balancing economic growth with environmental protection. This balance is a key objective of the EIA process, ensuring that development projects do not compromise the environment or social well-being.

Schedule 2, Part I (18) states that:

- (1) Government shall, in all its decisions, have due regard to the need to foster and protect an environment that is not harmful to the health or well-being of present and future generations, while promoting justifiable economic and social development.
- (2) To this end government should adopt reasonable legislative and other measures to protect the heritage and wildlife and the land and sea biodiversity of the Cayman Islands that—
 - (a) limit pollution and ecological degradation;
 - (b) promote conservation and biodiversity; and
 - (c) secure ecologically sustainable development and use of natural resources.





Figure 2.1 EIA Process as outlined in the EIA Directive.



2.1.5 Environment Charter, 2001

The Environment Charter, 2001 is an agreement between the Cayman Islands and the United Kingdom, aimed at promoting sustainable development and environmental protection. It outlines commitments by both the Cayman Islands and the UK to protect and conserve the environment. For the EIA process, it may provide:

- Framework for Action: It provides a framework for environmental management, including the development of policies and strategies to address environmental issues.
- Legal and Policy Foundation: The Charter serves as a foundational document that influences environmental legislation and policies in the Cayman Islands. It supports the implementation of the National Conservation Act (2013), which governs the EIA process.
- General EIA Guidance: The principles outlined in the Charter guide the EIA process, ensuring that environmental assessments are conducted to high standards. This includes thorough evaluation of potential impacts and the incorporation of sustainable practices.
- International Standards: By aligning with the Charter, the EIA process in the Cayman Islands adheres to international best practices and standards for environmental protection and sustainability.

2.1.6 Airports Authority Law, 2005 revision

The Airports Authority Law is relevant to the EIA process as it provides guidance on:

- Establishment of the Authority: The law establishes the CIAA, which is responsible for the management and operation of airports in the Cayman Islands.
- Environmental Compliance: The CIAA is mandated to ensure that airport operations comply with environmental standards and regulations. This is crucial during the EIA process, where potential environmental impacts of airport projects are assessed.
- Long-Range Planning: The law requires the CIAA to develop long-range plans for airport development, which includes considering environmental impacts and sustainability.
- Stakeholder Coordination: The CIAA coordinates with various stakeholders, including government agencies, environmental bodies, and the public, to ensure comprehensive environmental assessments.
- ICAO Standards: The law ensures that airport operations conform to the standards and recommended practices of the ICAO, which are integral to the EIA process.

Specifically, the Airports Authority Law states:

" (3) In giving effect to subsections (1) and (2) the Authority shall – (b) in accordance with section 5(1)(g), take adequate measures for the protection and preservation of the environment, and to prevent or deal with noise, vibration, pollution or any other disturbance attributable to aircraft used for the purpose of civil aviation."

2.2 Planning framework

2.2.1 The Planning Statement, 1997

The 1997 Development Plan Statement for the Cayman Islands aims to maintain and enhance the quality of life by effectively directing development to safeguard the economic, cultural, social, and general welfare of the people; while also protecting the environment Specifically, Appendix 1 provides guidelines for



development control on Cayman Brac and Appendix 3 provides provisions for an Environmental Impact Statement.

2.2.2 Planning Statement for the Cayman Islands (1997), Development and Planning Act (2021)

From the Development and Planning Act (2021 Revision), Section 25 (1) regulates the removal or destruction of trees (including individual trees, groups of trees, or woodlands), and includes conditions for replanting woodland habitat.

The Planning Statement for the Cayman Islands (1997), Appendix 1 - guidelines for development control in Cayman Brac states that the:

" (m) The lagoon adjacent to the airport should be landscaped. "

2.2.3 Cayman Islands Development Plan Planning Statement (Draft)

The Draft Planning Statement is a high-level document that defines the various Zones, Overlays and Other Policy Considerations that will guide development in the Cayman Islands. The primary objective of the Plan is to maintain and enhance the economy, society and environment of the Cayman Islands. The Planning Statement is drafted to incorporate all three islands whilst factoring in flexibility, acknowledging that each island will have unique needs. The document outlines a strategic vision for land use and development, focusing on sustainable growth, efficient land use management, infrastructure improvements, community engagement, and environmental protection. It emphasises sustainable development, mixed-use development, infrastructure improvement, community engagement, and preserving natural habitats and biodiversity. Specifically, the draft document calls for the "Support the long-range needs and alternatives for all types of airport facilities throughout the Cayman Islands". It has relevance to the EIA as it:

- Provides detailed strategies and policies that address the objectives outlined in the ToR that shall be addressed as part of the EIA.
- Operationalises vision, translating broad goals into actionable policies.
- Ensures compliance with regulatory framework and standards.
- Facilitates monitoring and evaluation, establishing benchmarks for assessing progress and impact.



3 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

3.1 Overview

This ToR has been developed with reference to the Scoping Opinion prepared by the EAB and following guidance from the International Finance Corporation (IFC) of World Bank Group's Performance Standards on Environmental and Social Sustainability. These IFC standards play a significant role in shaping the Environmental Impact Assessment (EIA) process in many countries, including the Cayman Islands as they provide standards to follow on various subjects including:

- Risk management.
- Stakeholder engagement.
- Compliance and best practices and,
- Monitoring and reporting.

Although not a requirement, by incorporating these IFC standards into the EIA process, this project, and the Cayman Islands overall can achieve higher levels of transparency, accountability, and sustainability, aligning with global best practices.

3.2 Terms of Reference

In an EIA process, the first step is screening, to determine if a project needs an EIA based on its potential environmental impacts. This is followed by a scoping stage, which identifies the key issues to be addressed in the EIA through stakeholder consultation. Screening decides the necessity, and scoping defines the focus of the assessment. These stages have already been completed for the CKIA as it is a major development and so a full EIA is required under Schedule 1. The EAB have provided a scoping opinion that defines the potential impacts that require investigation during the EIA (**Appendix A**)

Through additional research and public engagement, the Terms of Reference (ToR) refines the existing EIA's scope established in the Scoping Opinion. The EIA provides a systematic process for assessing the likelihood that a project may have a detrimental effect on the economy, society, and the environment. The ToR identifies the applicable environmental laws and regulations, establishes effective methods of evaluation, and directs the project to fulfil its ultimate needs efficiently and effectively.

The purpose of the ToR in the EIA Process is:

- **Defining Scope and Objectives:** ToR reports outline the scope and objectives of the EIA, specifying environmental aspects, methodologies, and key issues to be addressed.
- **Guided Assessment:** ToR provides a structured framework for conducting the EIA, detailing specific tasks and studies.
- **Stakeholder Engagement**: ToR reports include provisions for stakeholder engagement, ensuring the views and concerns of various stakeholders are considered.
- **Regulatory Compliance:** ToR ensures the EIA complies with environmental regulations and standards, aligning the assessment with legal requirements.
- **Quality Control:** ToR provides detailed guidelines and criteria for the EIA, maintaining the quality and consistency of the assessment.
- **Decision-Making:** ToR informs decision-making by providing a clear plan for the EIA, enabling informed decisions about the project.



This document forms the ToR for the Project and covers Steps 4 and 5 out of the 12 Step process as outlined in the EIA Directive¹ which are shown in **Figure 2.1**.

3.2.1 Requirements of the EIA

The EIA shall undertake the following tasks which will be presented in an Environmental Statement (ES):

- Describe the need for the project.
- Justify the selection of the preferred option for the project detailing the reasons why all alternatives were not selected.
- Compare the preferred option against the "Do Nothing" Option.
- Describe in detail the construction methodology including the sources and delivery of all material and the proposed duration for works with any seasonal restrictions on activities.
- Describe in detail the proposed operational activities for the project.
- Undertake consultation with stakeholders (consultation is addressed in **Section 3.2.2 and 3.2.4** and will continue throughout the EIA phase).
- Identify the baseline conditions for each of the topics covered in **Section 4** including their sensitivity and vulnerability to the construction and operation of the proposed airport.
- Assess the potential impacts on the receptors.
- Determine the potential for mitigation of any significant effects.
- Assess the residual impacts on the receptors and determine next steps for any effects that are still significant (consider alternatives, importance and potential for offsets).
- Determine any monitoring requirements for each receptor where mitigation is required.
- Undertake a cumulative effects assessment.

Following completion of the ES, an Environmental Management Plan (EMP) shall be prepared outlining the requirements to be implemented during the construction phase and the roles and responsibilities of all those involved together with review and reporting requirements for the monitoring results. It is recommended that adaptive monitoring and management strategies are developed for any monitoring required.

Additional plans shall be produced at this stage that are needed to address specific activities, for example pollution contingency planning and waste management during both construction and operation.

3.2.2 Public consultation

Public consultation throughout the EIA process is essential given the nature and scale of Project. The potential impact on both the environmental features and the residents of Cayman Brac, could be considerable without mitigation. The National Conservation Act's EIA Directive mandates the public consultation requirements during the ToR and EIA process:

- During draft ToR development:
 - The draft ToR document (this report) will be available on the Department of Environment's (DoE) website for a period of 21 consecutive days.
 - The availability of the ToR will be advertised at least twice in the local press within the 10day period immediately preceding the start of the 21-day review period.
 - As part of the public consultation process, a public meeting must be held to seek feedback on the draft ToR. Draft ToR will be presented / discussed at public meetings. The public meetings will provide an opportunity for stakeholders and community members to review

¹ https://conservation.ky/eia-process/



and comment on the draft ToR, ensuring that their input is considered in the finalisation of the document.

- All comments and feedback received during the public consultation period will be reviewed. Relevant issues raised by the public will be integrated into the final ToR to ensure that the EIA addresses all key concerns. All comments will be anonymised and responses will be appended to the ToR (see Appendix B).
- During ES development:
 - The draft ES document (once produced) will also be available on the DoE's website for 21 consecutive days.
 - Similar to the ToR, the publication of the ES will be advertised at least twice in the local press within the 10-day period prior to the commencement of the 21-day review period.
 - Draft ES results, along with the Non-Technical Summary report, will be presented at public meeting(s) to receive comments and feedback.
 - The public can submit comments directly to the EAB via the DoE, either by email, direct mail, or hand delivery to the DoE offices. These comments will be jointly assessed by the EIA consultants and the EAB, and relevant changes will be incorporated into the final documents. Responses to all comments received will be appended to the ES.

3.2.3 Stakeholder engagement

Stakeholder engagement will be an integral part of the EIA process, extending beyond public meetings and document publication. The stakeholder engagement will draw upon the consultation already undertaken as part of the public outreach for the planning stages, including that undertaken for the draft planning statement and the Airport Masterplan. The comments made during the public consultation for the CIAA's Master Plans for the Future Development of Cayman Islands Airports (Stantec, 2023) will be reviewed and the concerns raised will be incorporated into the EIA process.

A Stakeholder Management Plan (SMP) shall be developed as one of the first activities in the EIA process to outline the consultation stages to be followed and shall be a 'live document' which will record the outcomes at each stage. Any comments received throughout the EIA process shall be documented and responded to and included in the ES.

Various outreach and communication methods will be employed to continue the consultation, including stakeholder meetings, adverts in the Caymanian Times and Cayman Compass, press releases, radio, project newsletters, community outreach sessions, pull-up banners and regular CIAA website and social media updates. In addition to this, stakeholder organisations will be contacted directly to invite them to contribute to the EIA process in two consultation phases.

The first consultation phase, which will happen at an early stage in the EIA, will present the proposed approach to the EIA and will collate feedback from the stakeholders on specific topics/issues that will be covered in the ES. The second consultation phase, to provide a forum for discussion of the draft report, will advise attendees of the outcomes. In between these two stages there will be informal consultation with those stakeholders that either request further consultation at the initial stage, are identified for further consultation as they hold relevant information or have concerns over the project or are identified during the EIA process.

Stakeholders will be involved at critical decision-making stages, such as evaluating project alternatives, assessing impacts, developing mitigation strategies, and reviewing findings to determine the preferred solutions. This proactive engagement will ensure that the feedback and insights gathered from stakeholders



are incorporated into the project planning and decision-making processes, thereby enhancing the project's overall effectiveness and community acceptance.

Stakeholders include representatives from:

- Local business owners.
- Local residents.
- EAB members.
- Appropriate government bodies.
- National Trust for the Cayman Islands (NTCI).
- CAL.
- Cayman Islands National Museum
- CIAA.

Engaging both public and private stakeholders at an early stage is crucial. Throughout the EIA process it will be essential to thoroughly research and address environmental concerns and ensure all voices are heard. The stakeholder process will be flexible enough to incorporate new consultees as the project progresses as it is recognised that additional stakeholders are likely to be identified throughout the EIA.

3.2.4 Summary of consultation on this ToR

Following completion of a draft version of this ToR a public outreach event was held on Cayman Brac. The meeting was held at least seven days before the end of the public consultation review period. A full record of [anonymised] consultation responses is provided in **Appendix B**. The below summarises the main discussion areas raised during the meeting and signposts where in this ToR the comments have been taken into account.

To be completed following public outreach sessions for this ToR.

3.2.5 Assessment methodology

It is proposed that the ES evaluates the potential direct and indirect effects of a project using the following methodology.

All receptors will exhibit a greater or lesser degree of sensitivity to the changes brought about by the proposed scheme and defining receptor 'sensitivity' as part of the definition of the baseline environment helps to ensure that the subsequent assessment is transparent and robust. The sensitivity of a receptor is a function of its capacity to accommodate change and reflects its ability to recover if it is affected, and is defined by the following factors:

- Adaptability the degree to which a receptor can avoid, adapt to or recover from an effect.
- Tolerance the ability of a receptor to accommodate temporary or permanent change.
- Recoverability the temporal scale over and extent to which a receptor will recover following an effect.

In order to define the sensitivity of a receptor, the guidelines presented in **Table 3.1** will be used to determine the level of effect that could occur on each receptor during the EIA process. Receptor specific definitions will be applied where appropriate.



Sensitivity / value	Description
Very high	Receptor has very limited or no capacity to accommodate physical or chemical changes or influences. Receptor possesses fundamental characteristics which contribute significantly to the distinctiveness, rarity and character of the resource, is of very high importance and rarity that is international in scale (e.g. designated sites such as Ramsar Sites, World Heritage Sites, Important Bird and Biodiversity Areas, Alliance for Zero Extinction Sites and Key Biodiversity Area) incl. water abstractions for public use, and has very limited potential for substitution / replacement.
High	Receptor has a limited capacity to accommodate physical or chemical changes or influences. Receptor possesses key characteristics which contribute significantly to the distinctiveness, rarity and character of the resource, is of high importance and rarity that is national in scale (e.g. designated sites such as Nationally Protected Areas, Marine Parks and Reserves, Biodiversity Action Plan (BAP) habitats and species, Heritage Coasts, Scheduled Monuments, (Major) Features listed on the National Heritage Register, National Trust Properties, etc.), and has limited potential for substitution / replacement.
Medium	Receptor has a limited capacity to accommodate physical or chemical changes or influences. Receptor possesses key characteristics which contribute to the distinctiveness and character of the resource, is of medium importance and rarity that is regional in scale (e.g. Regionally Important Geological Sites, (Minor) Features listed on the National Heritage Register), and has limited potential for substitution / replacement.
Low	Receptor has a low - moderate capacity to accommodate physical or chemical changes or influences. Receptor characteristics make a small contribution to local character or distinctiveness, and are of low importance and rarity, are not designated, and could be substituted / replaced.
Very low	Receptor is generally tolerant of and can accommodate physical or chemical changes or influences. Receptor characteristics do not make a significant contribution to local character or distinctiveness, and are of very low importance and rarity, are not designated, and are easily substituted / replaced.

Table 3.1 Generic guidelines used in the determination of receptor sensitivity and value

It should be noted that the sensitivity criterion is a composite one; combining value (a measure of the receptor's importance, rarity and worth) with tolerance to a change. In some instances, the inherent value of a receptor is recognised by means of designation (see below), and the 'value' element of the composite criterion recognises and gives weight in the assessment to that designation.

The magnitude of an effect is typically defined by four factors:

- Extent the area over which an effect occurs.
- Duration the time for which the effect occurs.
- Frequency how often the effect occurs.
- Severity the degree of change relative to existing environmental conditions.

To help define impact magnitude, the criteria presented in **Table 3.1** and **Table 3.2** are proposed to be adopted for the purposes of the EIA. While this table provides guidelines of a generic nature, more specific guidelines in relation to impact magnitude can be adopted for the topics assessed, where considered necessary.

able 3.2 Generic guidelines used in the determination of magnitude of effect			
Magnitude	Description		
Very high	Adverse: Loss of resource and/or quality of the resource; severe damage to key characteristics, features or elements. Permanent / irreplaceable change, which is certain to occur. Beneficial: Large scale improvement of resource or attribute quality; extensive restoration or enhancement.		
High	Adverse: Loss of resource, but not affecting quality of the resource; partial loss of or damage to key characteristics, features or elements. Permanent / irreplaceable change, which is likely to occur.		

Table 3.2 Generic guidelines used in the determination of magnitude of effect



Magnitude	Description
	Beneficial: Improvement to, or addition of, key characteristics, features or elements of the resource; improvement of attribute quality.
Medium	Adverse: Minor loss of, or alteration to, one (maybe more) key characteristics, features or elements; measurable change in attributes, quality or vulnerability. Long-term though reversible change, which is likely to occur. Beneficial: Minor improvement to, or addition of, one (maybe more) key characteristics, features or elements of the resource; minor improvement to attribute quality.
Low	Adverse: Very minor loss of, or alteration to, one (maybe more) key characteristics, features or elements; noticeable change in attributes, quality or vulnerability. Short- to medium-term though reversible change, which could possibly occur. Beneficial: Very minor improvement to, or addition of, one (maybe more) key characteristic, feature or element; very minor improvement to attribute quality.
Very low	Adverse: Temporary or intermittent very minor loss of, or alteration to, one (maybe more) characteristic, feature or element; possible change in attributes, quality or vulnerability. Short-term, intermittent and reversible change, which is unlikely to occur. Beneficial: Possible very minor improvement to, or addition of, one (maybe more) characteristic, feature or element; possible improvement to attribute quality.

The significance of an impact is determined by combining the predicted magnitude of the effect with the sensitivity of the receptor, as defined in **Table 3.3**. Impact assessments carry a degree of subjectivity, as they are based on expert judgement regarding the effect-receptor interaction that occurs and on available data. As such, each impact assessments will be qualified appropriately, and all assumptions made shall be discussed in the relevant section.

For the purposes of the EIA assessment, any effect that is of major or moderate significance is considered to be significant in EIA terms, whether this be adverse or beneficial. In addition, whilst minor impacts are not significant in their own right, it is important to distinguish these from other non-significant impacts as they may contribute to significant impacts cumulatively or through interactions.

Receptor sensitivity (inclusive of value)	Magnitude of effect					
	Very high	High	Medium	Low	Very low	
Very high	Major	Major	Moderate	Moderate	Minor	
High	Major	Moderate	Moderate	Minor	Negligible	
Medium	Moderate	Moderate	Minor	Minor	Negligible	
Low	Minor	Minor	Minor	Negligible	Negligible	
Very low	Minor	Negligible	Negligible	Negligible	Negligible	

Table 3.3 Impact assessment matrix

The probability of an effect occurring (i.e. an effect-receptor interaction) shall also be considered in the assessment process; capturing the probability that the effect will occur and also the probability that the receptor will be present. For example, the magnitude of the effect and the sensitivity of the receptor may have been established, and it may be highly probable that the effect will occur; however, the probability that the receptor will be present at the same time will also be considered.

The level of confidence in the assessment of each receptor to each potential change will be detailed and shall be based on the level of confidence in the baseline situation and the ability to predict the change that could occur.



Significant impacts in EIA terms are taken to be those of moderate or major significance (as defined above); albeit that appropriate mitigation, where available, shall be sought for all impacts. Impacts will be assessed both prior to the application of mitigation and as a residual impact, assuming successful implementation of the mitigation. The mitigation hierarchy shall be followed for assigning measures to reduce or offset potential effects. The Institute of Environmental Management and Assessment (IEMA) provides detailed guidance on implementing the mitigation hierarchy. According to IEMA, the hierarchy involves the steps illustrated in Figure 3.1. IEMA emphasises the importance of integrating these steps from the earliest stages of project planning and maintaining them throughout the project's lifecycle. Monitoring shall be recommended to ensure successful implementation of each mitigation measure.



Figure 3.1 Mitigation hierarchy

3.2.6 EIA study area

The initial study area for the EIA is based on a 1km buffer, presented in **Figure 3.2**, to ensure that all potential receptors would be included at an early stage. The EIA shall refine this where needed and include details on the study area for each receptor and provide a justification for the assigned study area. The study area will differ for each receptor depending on the sensitivity of the receptor, its functional area (i.e. migratory pathways) and the vulnerability of the receptor associated with the potential changes that could occur due to the construction and/or operation of the proposed airport. The study area for each receptor will include the footprint of the project, surrounded by an area that takes account of the direct and indirect effects that could occur. A zone around the impact zones will be examined to determine whether the resources in the impact zones are unique or typical to the area. In addition to this, any areas linked to the site, for example, the seagrass and mangrove areas in the surrounding area, will also be included. Direct impacts will be evaluated on a quantitative basis where data permits and holistically to account for indirect impacts also. The study area for each receptor will be confirmed with the EAB before the commencement of surveys.

3.3 Cumulative Effects Assessment

A Cumulative Effects Assessment (CEA) will be undertaken to ensure that any impacts are considered cumulatively with others that are predicted for the same project but also for other projects or plans that could interact both temporally and spatially. At an early stage in the EIA process, a list of other projects shall be derived through investigation of planning proposals and discussion with the relevant government bodies.

The CKIA is undergoing development due to facility upgrades, maintenance needs, safety and efficiency improvements to meet OTARs, and runway and apron improvements. The potential cumulative effects of undertaking these works at the same time as the Project will be considered in the CEA. A full description of existing infrastructure and operations, some of which has already been implemented, can be found in the CIAA Master Plan (Stantec, 2023).





4 CONSIDERATION OF POTENTIAL EFFECTS

4.1 Terrestrial ecology and wildlife management

4.1.1 Baseline conditions

4.1.1.1 Overview

The habitats of Cayman Brac include dry forests, wetlands and xerophytic shrubland. Additional habitat types that are present within the island include: coastal mahogany forest, coastal shrubland, dry shrubland, seasonally flooded mangrove forest, woodland, and shrubland, semi-permanently flooded grasslands, tidal tropical or subtropical annual forb vegetation, and beach sand communities. The local climate is influenced by the location of the Islands and can be described as a tropical marine climate with two distinct seasons: a wet season from May through November and a relatively dry season from December through April (see discussion of climate trends in Section 4.8.1.3).

Throughout the EIA process, a comprehensive review of technical reports, publications, government documents, websites, and the Geographic Information System (GIS) datasets provided by the DoE will be conducted to gain an in-depth understanding of the baseline existing conditions within, adjacent to, and in the vicinity of the proposed CKIA runway strip widening, road realignment and RESA construction. This will include review of the following:

- Cayman Brac Landcover and Habitat (2018);
- Cayman Brac National Trust Sites (2022);
- Cayman Brac National Conservation Act (NCA) Sites (2022).

4.1.1.2 Protected areas

The nationally important terrestrial ecological resources identified within 1km of the Project is limited to one National Trust site (**Table 4.1** and **Figure 4.1**). There are no internationally recognised areas, NCL protected land, or NCA protected sites within a 5 km radius of the Project.

Table 4.1 Nationally protected areas within a	a 1 km terrestrial buffer, Cayman Brac.
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Protected Area	Location	Designation	IUCN Management Category	Area
Brac Splits	Within 1 km buffer	Terrestrial and Inland Waters Protected Areas	II - National Park	0.11 km ²

4.1.1.3 Habitats

The Cayman Islands, including Cayman Brac, are situated on the Cayman Ridge, which forms the southern margin of the North American Plate. This tectonically active area is near the Oriente Transform Fault and the Mid-Cayman Rise, contributing to the unique geological features of the islands. The island is primarily composed of calcareous rock formations; sedimentary rocks formed from the accumulation of coral, shells, and other organic materials over millions of years that support a variety of habitats.

Habitats that have developed on the island include wetland, shrubland and forest with some areas that have been modified by man. Around half of the island is considered unmodified (natural) habitat with the percentages shown below in **Table 4.2**.



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Land cover category	Total area (acre)	Protected (acre)	Protected (%)
Wetland	131	15	11.5
Xerophytic shrubland	649	16	2.5
Dry forest	4,559	262	5.7
Man-modified areas	3,998	28	0.7
Total	9,337	321	2.4
Total area (km ²)	37.8	1.3	0.4

Table 4.2 Land cover on Cayman Brac. Source: Ministry Of Finance and Economic Development, 2014

The runway strip widening, road realignment and RESA extension works would occur primarily within existing man-made habitat but will also result in the loss of a small area of ponds, seasonally flooded woodland and dry lakebed (**Figure 4.2**). Mangroves occur along the south and east boundaries of the CKIA. This swamp area provides a vital resource for many species of coastal and terrestrial fauna and flora. There is potential for indirect water quality issues to occur in the coastal habitats, particularly during construction activities and during periods of high run off, where finer sediments and contaminants may be mobilised. Potential areas of habitats lost within the footprint of the scheme, calculated from the mapping data in **Figure 4.2** are presented in **Table 4.3**.

Table 4.3 Potential habitat loss resulting from the runway strip widening and RESA extension at CKIA, Cayman Brac.

Land cover category	Habitat	Potential area lost km² Acres 0.005 1.2 0.0016 0.4 0.0047 1.16 0.0008 0.2	
		km ²	Acres
Wetland	Ponds, pools and mangrove lagoons	0.005	1.2
Welland	Seasonally flooded mangrove forest and woodland	0.0016	0.4
Varaphytic chrubland/dry foract	Dry lakebed	0.0047	1.16
Aerophytic shrubianu/ury forest	Coastal shrubland	0.0008	0.2
Man-modified areas	Man-modified or urban	0.28	69
Total		0.29	71.96

4.1.1.4 Species

Cayman Brac boasts a rich and diverse biodiversity and support numerous species of animals and plants, many of which are endangered and unique to the region. Species of particular interest include:

- Sister Islands Rock Iguana Cyclura nubila ssp. caymanensis: an endemic and critically endangered reptile species (Goetz & Burton, 2012) only found on Little Cayman and Cayman Brac (Figure 4.3). It is suggested that populations are steadily declining due to development, increased tourism, road mortality (roadkill) and predation by pets such as cats and dogs (Echternacht et al., 2011). This species is a Part 1 Schedule 1 Protected Species under the National Conservation Act.
- **Terrestrial crabs**: All four species of terrestrial crabs found in the Cayman Islands which include the black land crab *Gecarcinus ruricola*, red land crab *Gecarcinus lateralis*, soldier or hermit crab *Coenobita clypeatus* and the blue land crab *Cardisoma guanhumi* are protected to maintain their populations
- Sea turtles: species such as green turtles (*Chelonia mydas*), hawksbill (*Eretmolchelys imbricata*) and loggerhead turtle (*Caretta caretta*) are known to nest around the coastline close to the western end of the Project. Sea turtles are discussed in detail in **Section 4.2.1.1** and therefore not discussed further in this section.



Cayman Brac West End DeenStreetMap: Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esr					
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- **Sybil's crownbeard** *Verbesina caymanensis:* a rare flowering shrub found exclusively in Cayman Brac that has received protections under the NCA and has a Species Conservation Plan. This plant is typically found in dry, rocky areas and coastal regions of Cayman Brac and plays a crucial role in its native ecosystem by providing food and habitat for various insects and birds.
- West Indian whistling duck (*Dendrocygna arborea*): a protected species often found in freshwater ponds, mangroves, and coastal lagoons. According to BirdLife International (2025), it is estimated that a small population of approximately 30 individuals is present on Cayman Brac and associated with the ponds at the eastern end of the existing runway. It is classified as Near Threatened by the IUCN due to habitat loss and hunting pressures. Local conservation efforts have been successful in stabilising and increasing their population in some areas.
- White-crowned pigeon (*Patagioenas leucocephala*): a notable bird species found on Cayman Brac coastal woodlands, mangroves, and dry forests. This species is protected under local conservation laws due to habitat loss and hunting pressures. It is listed as Near Threatened by the IUCN.
- **Cayman Brac parrot** *Amazona leucocephala hesterna*: This parrot is endemic to Cayman Brac and protected under the National Conservation Law. Their main habitats include dry forests and mangrove areas, which provide essential nesting and feeding grounds.
- **Red-legged thrush** *Turdus plumbeus*: another endemic bird species that prefers coastal woodlands, shrublands, and bluff-top woodlands. It is protected under local conservation laws to ensure its survival and the preservation of its habitat
- Vitelline Warbler Setophaga vitellina: this species is restricted to the Cayman and Swan Islands, and the subspecies *S.v.crawfordi* is endemic to Cayman Brac and Little Cayman. It is listed as a 'near threatened' Red-list species under IUCN criteria. The species nests in dry shrubland habitats between April and August and will also forage in edge wetland habitats. It was a SAP species under the National Biodiversity Action Plan (NBAP), and is legally protected under Schedule 1 Part 1 of the NCA.
- White-billed tropicbird Phaethon lepturus: these birds nest on both the north and south Bluff cliff faces, toward the northern end of Cayman Brac. This species has seen substantial declines in the Cayman Islands over the last century (National Conservation Council, 2022a), and are declining globally (IUCN, 2025). Nesting pairs on Cayman Brac have declined from 208 in 1985 to 30 in 2021 (NCC, 2022b). This species may be susceptible to increase disturbance effects relating to increases in tourism. It was a 'species action plan' (SAP) species under the NBAP and is included in the draft Species Conservation Plan for colonial nesting seabirds (NCC, 2022a).
- **Magnificent frigatebird** *Fregata magnificens*: known for its large size, long wingspan (up to 2.3m), and distinctive forked tail, this species is more commonly associated with Little Cayman, where they breed in large colonies. However, they can also be seen around Cayman Brac, especially near coastal areas and cliffs.
- Red-footed booby Sula sula: although considered an unusual visitor to Cayman Brac as it is a common breeding resident on Little Cayman where numbers are expected to be around 3500 pairs as reported by the Cayman Islands Department of Environment (2025). Red-footed boobies nest between November and July. It was a 'species action plan' (SAP) species under the NBAP and is included in the draft Species Conservation Plan for colonial nesting seabirds (National Conservation Council, 2022a).
- Brown booby Sula leucogaster: a breeding bird on Cayman Brac, this ground-nesting seabird is susceptible to disturbance from humans, recreational activity and feral animals. Increased tourism could increase anthropogenic disturbance The global population is flagged as declining by the IUCN (IUCN, 2025). Numbers declined by >80% on Cayman Brac in the 1980-90s (DoE, 2009), and 46 pairs were recorded nesting in 2019 (NCC, 2022a), with 70% of eggs / fledglings lost in 2022 (NCC, 2025). Historically the species nested around most of the Cayman Brac coastline but is now restricted to Northern end. It was a 'species action plan' (SAP) species under the NBAP and is included in the draft Species Conservation Plan for colonial nesting seabirds (NCC, 2022a).



- **Migratory birds**. The Cayman Islands are of importance to migratory bird species, particularly between October and March. Some birds remain on the islands for the winter, while others use the islands as a stopover during migration between North and South America. Dry shrubland, mangrove habitats and associated wetland habitats are likely to be of particular importance for a range of migratory passerine bird species.
- **Protected Plants.** Cayman Brac supports several protected plant species, many of which are unique to the region. Species include *Evolvulus squamosus*, *Consolea millspaughii*, Cayman Ironwood *Chionanthus caymanensis*, Cayman Sage *Salvia caymanensis*.

4.1.2 Potential effects

Any potential effects from the construction and operation of the Project on terrestrial ecology will be determined during the EIA study using existing data, results from the walkover survey and consultation with relevant stakeholders, including the DoE and NTCI. Additionally, potential secondary effects on surrounding ecological receptors, such as the disturbance to ponds, pools, and mangrove lagoons adjacent to the proposed runway adjustments and road alignment, will be evaluated.

4.1.2.1 Matters scoped in

The potential effects to be scoped into the terrestrial ecology assessment are displayed in Table 4.4.

Activity	Effect	Receptor
Construction		
	Direct loss, degradation and fragmentation of habitats within the Project footprint.	Terrestrial, aquatic and coastal habitats and associated species within and in the vicinity of the footprint of the Project.
	Loss of species through direct impacts during site clearance and construction disturbance.	All species within the footprint of the Project and surrounding area.
Construction of the Project	Disturbance to species during construction activities including light pollution, noise and vibration	All species within the footprint of the Project and surrounding area.
	Construction and roadway runoff (sedimentation and/or contamination) affecting habitats and associated species.	Terrestrial, aquatic and coastal habitats and associated species within the footprint of the Project and surrounding area.
	Changes to air quality such as fugitive dust and fumes arising from construction machinery and operations.	Terrestrial, aquatic and coastal habitats and associated species within the footprint of the Project and surrounding area.
Operation		
	Disturbance to species from light pollution into surrounding natural areas (this includes for any potential for impact on turtle nesting areas due to light affecting the nesting and hatching behaviour of turtles	All species within the footprint of the Project and surrounding area.
Presence of the	Potential for an increase in numbers of visitors to Cayman Brac resulting in increased disturbance to species and habitats.	All habitats and species Cayman Brac.
Project	Potential for increased wildlife management as a result of the greater encroachment of the runway and associated infrastructure into surrounding habitats.	All species within the footprint of the Project and surrounding area.
	Disruption to hydrology and its impact on surrounding habitats and associated species	Terrestrial, aquatic and coastal habitats and associated species within the footprint of the Project and surrounding area.

Table 4.4 Potential effects on terrestrial and coastal habitats and species



Activity Effect		Receptor
	Disturbance to species from noise and vibration.	All species within the footprint of the Project and surrounding area.

4.1.2.2 Matters scoped out

Based on the nature of the works and existing information on species, the following items have been scoped out but will be reconsidered if field surveys indicate a need:

• Direct impact on terrestrial animal species including bats, amphibians and reptiles excluding Sister Island rock iguana.

4.1.3 Assessment methodology

4.1.3.1 Further baseline surveys recommendations

Existing data for the habitats and species outlined in **Section 4.1.1** will be reviewed to provide a detailed account of the baseline ecology of the coastal and terrestrial habitats around and on Cayman Brac. In order to update and complement the existing baseline data, further field surveys are required to provide a sufficient baseline characterisation of the habitats and species such that the potential effects of the Project are accurately assessed.

It is important to bear in mind that some wildlife surveys may require licences or permits from the DoE. Prior to the surveys being confirmed, discussions with the DoE and the NTCI shall be undertaken to ensure that all available data has been considered and that the survey methodologies cover all species and habitats that could be of concern and require assessment as part of the EIA. The surveys will include but may not be limited to the following.

4.1.3.1.1 Terrestrial habitat and species surveys

- Habitat and botanical surveys to include distribution of any protected species of plants e.g. *Evolvulus squamosus*:
 - A desk study using existing datasets and latest satellite imagery shall be carried out, in order to divide the survey area into homogeneous stands of vegetation/ land cover.
 - Habitat surveys shall be undertaken to characterise broad habitat types within a minimum 50 metres of the Project order limits.
 - Surveys shall be undertaken between April and June when the majority of plants are in bloom.
 - Methodology for vegetation surveys such as those provided for the National Vegetation Classification (Rodwell and JNCC, 2006). Representative sites within the area to be surveyed shall be selected and a suitable number of quadrats will be selected and all plant species within each quadrat recorded. A floristic table summarising the species frequency and abundance values characteristic of the vegetation will be produced.
 - Additional habitat features such as soil type, slope, aspect, and any signs of disturbance or management will be recorded.
 - The survey data will be presented as a comprehensive report, including maps, species lists, and descriptions of the vegetation communities listing details of endemic, notable and/ or protected species.
 - The potential of the habitats within the footprint of the Project to support protected and/ or notable species of animals such as roosting, nesting or resting sites will be recorded and further surveys recommended where appropriate.
- Sister Islands rock iguana Cyclura nubila ssp. caymanensis:



- The surveys shall ideally be timed during the iguanas' active periods and when they are most visible basking, typically early morning or late afternoon.
- Seven visits shall be undertaken, spaced at two-week intervals.
- The survey area shall encompass known habitats, such as rock outcrops, clearings and dry forest. The species are also known to use roads for thermoregulation and often attracted to residential areas to forage.
- Visual counts can be undertaken systematically through transects or grids, recording, where possible, age class, sex and any notable behaviours. Any road kills and dead specimens shall also be recorded.
- A threat assessment recording immediate threats to iguanas, such as predation by feral and domestic species, road kills and habitat loss/ degradation shall be undertaken.
- Terrestrial crabs
 - Review any existing distribution records and identify suitable habitats based on desk surveys.
 - The surveys shall be undertaken during the crabs' active periods, typically during the rainy season from May to August when breeding occurs taking into any species variation into account.
 - The survey area shall encompass known habitats and should identify any main migratory routes from their terrestrial habitat to the sea.
 - Visual counts can be undertaken systematically through transects or grids, recording, where possible, age class, sex and any notable behaviours. Any road kills and dead specimens shall also be recorded.
 - A threat assessment recording immediate threats to crabs, such as predation by feral and domestic species, road kills and habitat loss/ degradation shall be undertaken.

4.1.3.1.2 Breeding and non-breeding bird surveys

Surveys shall encompass the Project site and surrounding areas, including all known areas to support bird populations such as surrounding ponds and wetlands, to include targeting the key species identified above.

The surveys shall be undertaken using a method adapted from the UK Bird Survey Guidelines², comprising, as a minimum, once a month early morning visits over a 12-month period. The length of each monthly survey will be determined by the length of time it takes to cover the survey area. The surveys shall be undertaken by a suitably experienced field ornithologist, familiar with visual identification and calls/songs of the expected species.

Each survey will comprise a walked transect that encompasses all areas (observed to a maximum distance of approximately 50m, depending on accessibility) within the application site. The transect route(s) will be determined through a pre-survey reconnaissance visit. Species recorded shall be mapped and activities noted using a code such as the British Trust for Ornithology (BTO) activity codes³. Bespoke species codes shall be generated for those species recorded during the surveys.

Because of the overlapping breeding and non-breeding/migratory periods, a single survey methodology is proposed (rather than breeding and non-breeding surveys); however, analysis of the results shall address breeding and non-breeding/migratory species separately, in order than the relative importance of the survey area for each group can be considered.

² https://birdsurveyguidelines.org/methods/survey-method/

³ https://www.bto.org/sites/default/files/efws_instructions.pdf



4.1.3.2 Approach to assessment

The proposed ecological evaluation and impact assessment approach will be based on Guidelines for Ecological Impact Assessment (EcIA) in the United Kingdom and Ireland (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018). These guidelines aim to predict the residual impacts on important ecological features affected, either directly or indirectly by a development, once all the appropriate mitigation has been implemented.

The approach to determining the significance of an effect will follow a systematic process for all impacts as discussed in **Section 3.2.5**. This involves identifying, qualifying and, where possible, quantifying the sensitivity, value and magnitude of all ecological receptors which have been scoped into the assessment. Using this information, a significance of each potential impact shall be determined.

The criteria for defining the sensitivity/value of a receptor will follow that set out in **Section 3.2.5** and may be refined for each receptor in the ES. This EIA Chapter will use professional judgement to ensure the assessed significance level is appropriate for each individual receptor, taking account of local values for biodiversity, to avoid a subjective assessment wherever possible.

4.1.4 Mitigation measures

All significant effects will be investigated in terms of the potential to mitigate the effect according to the mitigation hierarchy set out in **Section 3.2.5**.

Specific mitigation measures would need to be tailored according to the potentially affected habitats or species but may include:

- Ecological supervision with interaction if needed;
- Controls on the timing, duration and location of works;
- Habitat and species translocation;
- Habitat enhancement, management or establishment;
- Protection and management of hydrological features;
- Wildlife tunnels and safe crossings;
- Wildlife fences; and
- Environmental awareness campaigns.

Depending on the significance of residual impacts there may be a need for offsetting if the Project is deemed to be essential should significant effects remain. The measures to be applied to reduce the significance of effects will be detailed within the EMP for the Project and within any feature, or activity, specific management plans required.



4.2 Marine ecology

4.2.1 Baseline Conditions

The nationally important marine resources identified within 1km of the Project include five sites managed by the DoE (**Table 4.5** and **Figure 4.4**). There are no internationally recognised marine areas within a 5 km radius of the Project.

Protected Area	Location	Designation	IUCN Management Category	Area
Cayman Brac East Grouper Hole	Within 1 km	Spawning Aggregation Overlay Zone	IV - Habitat/Species Management Area	1.15 km ²
Dick Sessingers Bay - Beach Point Marine Park		fithin 1 km uffer Marine Reserve		2.18 km ²
White Bay Marine Park	buffer		II -National Park	0.38 km ²
West End				1.34 km ²
Channel Bay				0.61 km ²

Table 4.5 Nationally protected areas within a 1km buffer, Cayman Brac.

The proposed works are located in close proximity to a sea turtle nesting beach and proposed critical habitat ⁴ (**Figure 4.5**) and, as identified in the Scoping Opinion (**Appendix A**), the Project could adversely affect nesting sea turtles. All sea turtle species in the Cayman Islands are protected under Part 1 Schedule 1 of the NCA, ensuring their protection at all times. Project is adjacent to the West End Marine Reserve, and approximately 300m from the Channel Bay Marine Reserve, which contain coral reefs and nearshore seagrass beds. All coral species are also protected under Part 1 Schedule 1 of the NCA and seagrass under Part 2 Schedule 1. The spawning area is located approximately 500m offshore from the Project. Groupers are not allowed to be fished within designated spawning areas, a measure which ensures the continuation of these fish populations in the Cayman Islands and surrounds.

4.2.1.1 Sea turtles

Since 1998, the DoE has monitored sea turtle nests in the Cayman Islands (**Figure 4.6**). The data shows increasing nest numbers and population recovery for green and loggerhead turtles, while hawksbill turtle nests remain critically low, and leatherback turtles are likely extirpated, with no nests recorded in 26 years (Department of Environment, 2024). Additionally, Blumenthal, et al. (2021) have suggested that the western tip of Cayman Brac, has potential nesting habitat for all sea turtle species and is critical habitat for both green and loggerhead turtles (**Figure 4.7**).

In 2013 the NCA was passed listing all sea turtle species as protected at all times. The DoE drafted a Sea Turtle Conservation Plan to prevent local extinction and aid recovery, but it has been pending Cabinet approval since late 2019. Due to increasing beach developments, the NCC issued an Interim Directive in August 2020 to protect Critical Sea Turtle Habitat for various species, including green turtles (*Chelonia mydas*), loggerhead turtles (*Caretta caretta*), hawksbill turtles (*Eretmochelys imbricata*), leatherback turtles (*Demochelys coriacea*) and all other species that may occur in Cayman waters including Kemp's ridley turtles (*Lepidochelys kempii*) and hybrids in accordance with Section 17(7) of the NCA 2013.

⁴ The National Conservation Law defines "critical habitat" as the specific areas of land containing the physical, biological and ecological features needed for the conservation of a species as specified in the Conservation Plan for the species. In this Conservation Plan critical habitat for sea turtles is identified as beaches which have had the highest density of turtle nesting over the monitoring period (1998 - 2018).



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Figure 4.6 Recorded sea turtle nests in the Cayman Islands (1998-2023). It should be noted that data was not recorded on the Sister Islands for a number of years in the first decade of the Turtle Monitoring Programme. (Source: (Department of Environment, 2024)



Figure 4.7 Proposed critical habitat for green and loggerhead turtles in Cayman Brac (C). Source: (Blumenthal, et al., 2021)



4.2.1.2 Benthic habitats

Cayman Brac is distinguished by its vibrant marine ecosystems, particularly at its west point, where coral reefs and seagrass meadows coexist, enhancing biodiversity. The coral reefs at the west point host diverse coral species and marine life, offering habitats for fish, sea turtles, and invertebrates. These reefs, known for their structural complexity, face threats from climate change, ocean acidification, and human activities. It is important to note that the coral reefs surrounding Cayman Brac were noted to be in good health and condition in 2021, as Stony Coral Tissue Loss Disease (SCTLD) had not yet affected the sister islands (DoE, 2021).

Adjacent to the reefs, seagrass meadows act as filters to improve water quality, provide good feeding habitats for many species (including the turtles), play a role in coastal protection and serve as nurseries for various fish species. The interaction between coral reefs and seagrass meadows creates a more resilient ecosystem. Seagrass meadows stabilise the seabed and reduce sedimentation on reefs, while reefs buffer against strong waves, protecting the meadows.

Additionally, these habitats contain and support various other protected marine species, and so a detrimental impact on the habitats may cause a cascade through the ecosystem.

4.2.2 Potential effects

4.2.2.1 Matters scoped in

4.2.2.1.1 During Construction

As discussed in the EAB Scoping Opinion (**Appendix A**); to minimise impacts of the CKIA airport, construction is often undertaken at night. However, in addition to being affected by construction noise, this is when turtles can be impacted by the presence of artificial lights. Artificial lighting on sea turtle nesting beaches is considered a form of habitat loss and it poses significant threats to nesting sea turtles and their hatchlings. It can deter females from nesting, reducing the area for suitable nesting sites and disrupt their ability to return to the sea. Hatchlings, which instinctively move toward the brightest horizon to find the ocean, can become disorientated by artificial lights, leading them away from the sea. This disorientation increases their risk of predation, dehydration, and death.

Run-off associated with construction activities may increase turbidity, particularly affecting coral reefs and causing stress to marine organisms through smothering. Turbidity, caused by suspended particles, reduces light penetration in water, decreasing primary production by phytoplankton and aquatic vegetation, which impacts the entire food web. It can also interfere with the foraging abilities of visual predators and disrupt marine organism behaviour. Run-off during construction could also potentially include contaminants and debris. The assessment of effects will draw upon the findings of the hydrology, drainage, and water quality baseline studies and surveys, as mentioned in **Section 4.3.4**.

The sourcing and delivery of materials shall also be assessed. This will include whether delivery by vessel will be required to the island. The route for navigation and method of drop off will need to be assessed both in terms of the potential for physical impacts to the seabed during delivery but also to the route used and the potential for disturbance to ecological features and risk of pollution events occurring. New sources of material for the reclamation and potential impacts of extraction shall be included in the assessment process, unless the source is an already licensed provider of aggregate.

4.2.2.1.2 During Operation

As the operation of the CKIA shall not be altered as a result of the proposed works, the majority of potential effects will be from the construction phase. Therefore, these operational impacts will not be novel to the surrounding area. Nonetheless, with the runway extending further into the ponds, there is an increased risk



of run-off including debris and pollutants, namely persistent organic pollutants (POPs) such as aviation fuel and perfluorinated chemicals (PFCs) (see **Section 4.3**). Such chemicals can have an adverse effect on the aquatic species and habitats through accidental run-off. This run-off, flowing into adjacent ponds may then reach the marine environment and has the potential to harm marine life. The increased surface area of hardstanding and the loss of capacity within the ponds due to runway widening and realignment has the potential to increase flows into the marine environment and exacerbate these impacts. During storms these impacts may be further exacerbated through the implementation of stormwater management measures increasing flows to the marine environment to prevent the runway from flooding.

If existing runway and facility lighting shall be altered to account for RESA lighting regulations or guidelines, then a full assessment of potential impacts on turtles should be undertaken. As the runway end shall be shifted further eastward, this impact could be positive.

4.2.2.2 Matters scoped out

Although there is a spawning area within 2km of the works, the protected area is of sufficient distance to be unlikely to be adversely impacted by a potential increase in turbidity or release of pollutants. Ample water circulation along the periphery of the island would facilitate the dispersal of any accidentally released materials in addition to the mitigation measures that could be put in place (**Section 4.2.4**).

There is the potential for airborne dust and particulate matter to settle on the water surface, affecting water quality and light penetration. However, given the distance, this is more likely to impact terrestrial water bodies, rather than marine. Measures to reduce the potential for such effects in the terrestrial environment will provide suitable mitigation for this and further consideration is scoped out.

The planning team at CKIA evaluated various options for developing RESAs and selected an option that avoided moving closer to the turtle nesting sites on the beach to the north of the runway. Additionally, due to the economic infeasibility of extending the RESA westward into the ocean because of deep water, the planned RESA was shifted eastwards at the west end of Runway 09-27. Although this slightly reduces the runway length, it still allows take-off from the RESA using approved starter strips, balancing environmental protection, economic feasibility, and operational efficiency. No habitat loss shall be experienced in the coastal, intertidal or subtidal environments and as such an assessment of habitat loss is scoped out of the EIA. Instead, it shall be limited to the areas of grassy dune at the ends of the existing runway, as discussed in **Section 4.1.2**.

The potential significant impacts to be scoped into the marine ecology assessment are displayed in **Table 4.6.**

Activity	Impact	Receptor				
Construction						
Delivery of materials (potential)	Disturbance to species in the transit area and the delivery zone.	Benthic and pelagic habitats and species				
	Direct and indirect effects at an extraction site if marine based sources are to be used as fill material for the ponds.	Benthic and pelagic habitats and species				
Construction activities	Indirect effects on habitats and species through increased turbidity and sediment deposition.	Benthic and pelagic habitats and species				
	Changes to water quality from construction activities introducing chemicals/pollution to the water column.	Benthic and coastal habitat and species				
Night working with additional artificial lighting	Displacement and behavioural disturbance of nesting sea turtles and hatchlings.	Nesting turtles and hatchlings				

Table 4.6. Potential marine ecology impacts



Activity	Impact	Receptor				
Operation						
Operational activities	Changes to water quality and turbidity as a result of altered runway drainage and run-off patterns, including effects from increased water volumes during storm events.	Benthic and coastal habitat and species				
	Effects on turtle nesting sites through alterations in lighting requirements at the western end of the runway.	Nesting female turtles and hatchlings				

4.2.3 Assessment methodology

4.2.3.1 Data collation

Throughout the EIA process, a comprehensive review of technical reports, publications, government documents, websites, and the GIS datasets provided by the DoE will be conducted to gain an in-depth understanding of the baseline existing conditions within, adjacent to, and in the vicinity of the proposed Project. This will include review of the following:

- Cayman Brac Landcover and Habitat (2018);
- Cayman Islands National Trust Sites (2022);
- Cayman Islands NCA Sites (2022);
- Available data for species from various stakeholders, including the DoE and consultation with tour operators;
- Previous information collated for projects on Cayman Brac, including results from surveys of habitats and species in the area, water quality monitoring and any EIAs that have an area of influence overlapping that of this project; and
- Results of the drainage assessment undertaken as part of the EIA.

4.2.3.2 Surveys

A benthic study is essential for understanding the health of benthic ecosystems, which include organisms living on or in the seabed. It is essential to first understand the condition, location and extent of valuable benthic habitats, such as coral reef and seagrass meadows, in order to reasonably quantify the potential effects of the proposed works. Additionally, once the project design is finalised, alterations to drainage patterns must be fully understood to ensure that pollutants and particulate matter do not drain into sensitive marine habitats during either the construction or operational phase. The survey shall comprise habitat mapping for the main habitat types including intertidal habitats, seagrass and corals based on aerial photography and existing survey data. An intertidal walkover survey shall be undertaken to confirm the presence of habitats and the condition of those habitats and species. Subtidal transects shall be surveyed using diving to record percentage cover and condition of habitats and key species. Video recordings along the transects shall be made and records of mobile species observed along the transect within a buffer zone of approximately 5m, depending on visibility. The transects shall be approximately 100m in length from the shallow subtidal out to sea. There shall be a minimum of ten transects within the subtidal area spaced at 50m intervals around the western coastline of Cayman Brac. The exact locations shall be defined based on the potential for drainage impacts to ensure that the area of greatest potential effect is covered by the survey area.

Conducting a comprehensive lighting study for the proposed runway widening and RESA construction is essential to mitigate or avoid impacts on nesting turtles and their hatchlings. The first step involves identifying the nesting sites of sea turtles in the vicinity of the proposed construction area. This shall include mapping nesting sites and measuring the baseline light levels, encompassing both direct and ambient light.



Establishing this baseline is crucial for understanding the current lighting conditions and their potential impact on the turtles. Following the initial assessment, lighting scenario simulation and modelling shall be conducted. This process utilises advanced software to model potential light pollution resulting from the proposed construction and subsequent operation (if there are alterations to existing runway lighting). The simulation will predict how light will spread and its potential effect on the identified nesting sites. This predictive modelling is vital for designing lighting solutions that minimise disruption to the turtles.

4.2.4 Mitigation measures

Following the assessment of potential effects, the EIA shall recommend measures where it is necessary to mitigate any significant effects. These could include consideration of the following.

4.2.4.1 Water quality (contamination and turbidity)

To mitigate turbidity impacts and potential pollution events, several measures can be implemented: scheduling construction during low biological activity periods, retention ponds for run-off, implementing pollution control measures or spill procedures and establishing vegetative buffers along shorelines.

4.2.4.2 Artificial lighting

From May to November (Cayman Islands Department of Environment, 2013), during turtle nesting season, it's important to:

- **Reduce beach lighting:** Turn off, redirect, or shield lights visible from the beach to prevent disorienting baby turtles and deterring nesting females.
- **Stay quiet and distant**: Avoid using flashlights, making loud noises, or getting too close to nesting turtles to prevent them from abandoning their nests.
- **Remove obstacles:** Clear beach chairs and recreational equipment from the beach at night to ensure a safe nesting environment.

Consultation with the design consultants and the DoE will be essential for developing adequate measures to avoid or minimise any adverse effects on turtles, following the guidelines outlined in (DoE, 2024).



4.3 Hydrology, drainage, water quality

4.3.1 Overview

The Project has the potential to cause alterations to the baseline hydrology, local drainage networks and water quality receptors within Cayman Brac during the construction and operational phases of the Project. Therefore, an assessment is required to characterise the baseline environment, identify potential impacts that could occur as a result of the Project and discuss potential mitigation measures to reduce the significance of effect on identified receptors.

The study area for the assessment of impacts on hydrology, drainage, and water quality will include the land within the redline boundary for the Project and a 250m buffer. The buffer zone will be extended to 1 km for assessing the presence of groundwater abstraction wells due to the higher sensitivity of the receptor.

4.3.2 Baseline conditions

An initial review of published and publicly available information will be used to develop the existing baseline conditions for the Project site's hydrology, drainage, water quality, geology and hydrogeology receptors.

4.3.2.1 Geology and hydrogeology

A review of published geological mapping by Jones (1994) indicates that the project site (located on the western part of Cayman Brac) is underlain by the Ironshore Formation while the Pedro Castle Formation (part of the Bluff Group) lies to the east of the site.

The Ironshore Formation is formed of friable, poorly consolidated reef limestones, calcarenites, and oolitic limestone that are cemented by calcite. Dolomite has not yet been found in these rocks. The presence of dolomite in the Pedro Castle Formations but not in the Ironshore Formation suggests that dolomitization postdated deposition of the Pedro Castle Formation but predated deposition of the Ironshore Formation Jones (1994). From a mineralogical perspective, dolomitic limestones contain calcium magnesium carbonate, while other limestone is predominantly calcium carbonate. Due to the magnesium content, dolomites are less soluble in water than limestones. The absence of dolomites in the Ironshore Formation suggests that the rocks can dissolve and leave voids that may be important as aquifers.

On Cayman Brac, the Pedro Castle Formation is formed of limestone, dolomitic limestone, and dolostone. The basal part of the formation is dolostone which is overlain by dolomitic limestone and then by limestone that displays little or no dolomitization. Wackestone, a carbonate mud with abundant skeletal foraminifera and rare corals, is the principal facies in this formation outcropping on Cayman Brac (Jones, 1994).

Analysis of the hydrogeological map of Cayman Brac indicates that most parts of the Island are classified as strata with limited fresh groundwater resources. Towards the east, a zone of moderately productive aquifer is present. The strata on the southern tip of the island, including the project site and the whole area under the airport, have no fresh ground water resource but support ponds with mineralised water.

The geology of the Cayman Islands does not provide confined or semi-confined aquifer zones, which would preclude migration of the shallow fresh groundwater to the deeper wells or migration of brine to shallower depths. A freshwater lens is located within the Ironshore Formation and the underlying transition zone is located within the Pedro Castle Formation. The low porosity cap rock of the Cayman Formation (part of the Bluff Group) effectively isolates the freshwater lens from water circulation in the deeper part of the succession (Jones et al, 2001).



4.3.2.2 Topography

The topography of the island rises from about 3m (10ft) in the west to about 46 m in the east. At the project site, topography ranges from approximately 4 to 7m (13-23ft) above sea level (<u>https://en-gb.topographic-map.com/</u>).

4.3.2.3 Rainfall

The Cayman Islands National Weather Service provides rainfall statistics for Grand Cayman and Cayman Brac. A 30-year average rainfall record from Owen Roberts International Airport on Grand Cayman shows an annual average rainfall of approximately 1400mm (Cayman Islands National Weather Service, 2024). The 30-year record shows strong seasonality, with a drier period between December and April and a wetter season from May to November (Cayman Islands National Weather Service, 2024). Peak rainfall is recorded in September and October.

4.3.2.4 Surface hydrology and drainage

Analysis of aerial photography of Cayman Brac suggests the surface drainage network is extremely limited (and potentially ephemeral). While no linear drainage features (i.e. streams) are apparent, Cayman Brac contains ponds and areas of wetland. The project will require partial filling of the West Westerly and East Westerly Ponds (see **Figure 4.2**). As noted in **Section 4.1.1**, the Westerly Ponds are home to various migratory and indigenous bird species and filling the ponds would have environmental impacts. Another pond is located to the east of the project, but no partial filling is anticipated for this pond.

The origins of the Westerly ponds and their water supply mechanisms are unknown, apart from rainwater. However, ponds on the Cayman Islands could be natural or man-made. There are saltwater and underground seep-influenced ponds on the islands. In addition to the ponds, seasonally flooded mangrove forest and woodland, dry lakebed and urban landcover types are located close to the site. The wider island is surrounded by the Caribbean Sea in all directions.

4.3.2.5 Water quality

Hydrogeology mapping of the island suggests that the southern strata of the island does not have fresh ground water resources but support ponds and mineralised water on the surface. The hydrogeological strata in the centre of the island support "limited fresh groundwater resources".

There are no specific data on the quality of the surface water features in the vicinity of the proposed Project. Collection of water quality data, especially, in the ponds within the vicinity of the project, is recommended for the EIA (Section 4.3.4).

4.3.2.6 Water resources

The 2021 Cayman Islands Census Report (Cayman Islands Government, 2022) indicates that the main source of drinking water on the Islands was bottled water. The main source of household water was reported to be cisterns (filled with rain or trucked water) followed by mains supply (city water or desalinated).

4.3.2.7 Designated sites

The nationally important ecological resources identified within 2 km of the Project are limited to one National Trust site (Brac Splits – designated as Terrestrial and Inland Waters Protected Area). See **Section 4.1.1.1** for further details.

4.3.2.8 Land uses

Urban land use, ponds and forests are the dominant land uses in the vicinity of the project site with the South Side Road running south of the project site. Review of the landcover map within the EAB's Scoping Opinion indicates that there are areas of previous development (recorded as 'man-modified' on the



landcover map) located within the boundary of the proposed Project. There is the potential for these areas to represent potential sources of contamination, however further information will be sought as part of the EIA process.

4.3.3 Potential effects

The potentially significant effects to be scoped into the hydrology, drainage and water quality assessment are displayed in **Table 4.7**.

Activity	Effect	Receptor				
Construction						
Earthworks – cut and fill activities, site grading and compaction	Expanding the runway would require removal of vegetation cover, expansion into existing ponds, site filling and compaction. This would potentially reduce infiltration and increase the volume of surface run-off flow and flooding. Runway expansion into existing ponds would also result in direct loss of surface water and any habitats supported by the ponds. As noted in Section 4.1.1 , any filling within the ponds would have impacts on the wildlife. There is also the risk of increased susceptibility to erosion due to higher surface run-off flow. Earthworks can also alter the natural flow of surface and ground water.	Nearby properties, infrastructure and adjacent lands Ponds, pond-dependent habitats and groundwater				
Contamination of surface water and groundwater	Surface run-off from construction site could transfer contaminants into nearby ponds, thereby polluting the surface water body. Pollutants from site could infiltrate into groundwater thus resulting in pollution.	Nearby ponds and water-dependent habitat Groundwater				
Sediment mobilisation	During construction, there could be sediment mobilisation from site and subsequent transportation into nearby ponds and mangrove lagoons. This can smother invertebrates and impact affected habitat.	Nearby ponds and water-dependent habitat				
Operation						
Contamination of surface water and groundwater	Pollutants, fuel and oil can be washed into surface water and groundwater sources, thus resulting in pollution.	Nearby ponds and water-dependent habitat Groundwater				
Permanent loss of ponds	Runway expansion would result in permanent loss of areas of the ponds and any habitats supported in the ponds. As noted in Section 4.1.1 , any filling within the ponds would have impacts on the wildlife.	Ponds and water-dependent habitat				
Increased volume of surface run-off	Runway expansion will involve an increase in paved surfaces and reduction in infiltration. If not properly managed, increased surface run-off can overwhelm drainage facilities and enhance erosion and flooding.	Adjacent lands and properties.				
Sediment mobilisation during routine maintenance	Excavations associated with routine maintenance could lead to the introduction of sediments into nearby surface waterbodies.	Nearby ponds and water-dependent habitat				

Table 4.7 Potential hydrology and water resources effects



4.3.4 Assessment methodology

4.3.4.1 Approach

As part of the EIA process, the existing environment with respect to hydrology, drainage and water quality will be described, including, but not limited to, the following:

- Hydrology and surface water features;
- Geology and natural resources;
- Hydrogeology, aquifer designations and groundwater resources;
- Historical land use and potential contamination sources; and
- Sensitive land uses (including designated sites).

The baseline for hydrology, drainage, water quality and hydrogeology will be established in general accordance with the Environment Agency 'Land Contamination Risk Management Framework' (2023), which advocates a phased risk-based approach. In the absence of local guidance in relation to hydrology, drainage, water quality and hydrogeology, it is deemed appropriate to utilise the Environment Agency guidance due to the Cayman Islands being a British Overseas Territory.

A Preliminary Conceptual Site Model (PCSM) will be developed as part of the establishment of baseline conditions. The PCSM will aid in the identification of potential sources of contamination within the site boundary (inclusive of buffer zones discussed in **Section 4.3.1** above). The PCSM will also aid in identifying the potential risks posed to sensitive receptors. Sensitive receptors include both those that currently exist and those that could be introduced as a result of the Project, e.g. construction workers, water consumers, and ecological communities in water-dependent habitats.

The hydrology, drainage, and water quality chapter will consider the likely significant effects during the construction and operation of the Project. It will be undertaken in accordance with the IFC Performance Standard 1 (Assessment and Management of Environmental and Social Risks and Impacts), Performance Standard 3 (Resource Efficiency and Pollution Prevention) and Performance Standard 6 (Biodiversity Conservation and Sustainable Management of Living Natural Resources) (IFC, 2012c).

The assessment will also be undertaken in accordance with the following:

- The Cayman Islands Constitution Order 2009 (His Majesty's Government, 2009);
- Guidance Note 3, Resource Efficiency and Pollution Prevention (IFC, 2012d);
- Environmental, Health and Safety (EHS) Guidelines (IFC, 2012e);
- Development and Planning Regulations (2024 Revision) (Cayman Islands Government, 2023); and
- Water Authority Act (2022 Revision) (Cayman Islands Government, 2022).

As there are no specific requirements for water quality in the Cayman Islands, the British and international standards will be evaluated, such as the Florida Administrative Codes (FAC) 62-777 which advises on concentrations of contaminants in soil, groundwater, and surface water that are considered safe for different uses and FAC 62-302.500 and 62-302.530 which establish minimum and general criteria for surface water quality, including specific limits for various pollutants. Use of the appropriate standard(s) shall be agreed in consultation with the EAB.

4.3.4.2 Surveys

It is recommended that the following further investigations are undertaken to inform the assessment of impacts on hydrology, drainage, and water quality and, where appropriate, inform the development of suitable mitigation measures:



- Surface water investigation: monitoring may be required to improve the understanding of the nature, quality and ecological value of surface water features and water-dependent habitats in the study area. This shall include:
 - Installation of water level loggers to monitor water levels in water-dependent habitats (e.g., ponds and wetlands with standing water) and inform the evaluation of the relationship between groundwaters and surface water features. If possible, an automatic logger will be installed in each surface water feature within the development site and in the area of potential influence identified during the PCSM to collect, as a minimum, daily water level readings.
 - Periodic collection of surface water samples to characterise the quality of surface water features that could potentially be affected by the Project. Samples will be taken on at least a monthly basis and submitted to an accredited laboratory for measurement of key water quality parameters. In the absence of detailed archive data, it is recommended that a broad suite of determinands are considered for at least three monthly sampling rounds at the outset of the monitoring period, considering basic water chemistry (e.g., pH, electrical conductivity, salinity, dissolved oxygen, biochemical oxygen demand) and any potential contaminants identified following completion of a detailed PCSM (e.g., a subset of relevant nutrients, metals, hydrocarbons, herbicides and pesticides, as included in Schedule 3, Parts 2 and 3 of the Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015. This will allow a determination of any contaminants of concern that may already be present to be identified and enable a more robust assessment of potential effects and subsequent monitoring to be targeted at those substances.

4.3.5 Mitigation measures

Should any adverse effects on hydrological setting, local drainage networks and water quality be identified in the EIA during the construction or operational phase of the proposed Project, the EIA will identify appropriate mitigation measures for any effects on known receptors following the mitigation hierarchy.

Specific measures to prevent adverse impacts during construction could include:

- Development of a construction-stage drainage and water management strategy to control the management of surface run-off and groundwater. This would include measures to control the rate at which water is discharged, where it is discharged to, a method for dewatering of subsurface excavations.
- The temporary construction stage drainage strategy would also incorporate measures to reduce/remove risk of sediment entrainment, potentially including: i) storing and capping topsoil to minimise wind/water erosion; ii) minimising subsoil exposure and retention of strips of undisturbed vegetation on edge of working areas; iii) where practicable, water entering construction areas would be pumped via settling tanks/filtration ponds before being discharged via interceptor drains to remove sediment in line with any permits required; iv) where vegetation has been removed, reseed to limit future run-off.
- To mitigate the effects of permanent loss of areas of the ponds, two measures could be adopted (see **Section 4.1.4**):
 - 1. Creation of wetlands at another location on the island.
 - 2. Enhancing the existing ponds by increasing the area and/or improving quality and diversity.
- A range of measures would be incorporated to manage potential contamination risks, potentially including:
 - 1. Fuels, oils lubricants and other chemicals to be clearly labelled and the site shall retain an up-to date Control of Substances Hazardous to Health (COSHH) inventory.



- 2. Fuels, oils lubricants and other chemicals to be stored in bunded compound (volume of which shall be at least equivalent to the capacity of the tank or tanks plus 10%), located in designated areas taking into account security, location of sensitive receptors, and inspected at least weekly for signs of spillage, leaks and damage.
- 3. Portable bowsers with built-in bunds shall be used for any refuelling activities required in working area, with the bowsers returned to the construction compound overnight.
- 4. Small plant to be provided with drip trays.
- 5. All construction plant shall be inspected for fuel leaks before being delivered to working areas.
- 6. Biodegradable oils to be used where possible.
- 7. Concrete/cement mixing and washing areas shall be located at least 10m away from nearest water body, and washing areas shall incorporate settlement and recirculation systems to allow water to be reused and all washing out of equipment would take place in a contained area and the water collected for disposal offsite.
- 8. A Pollution Prevention Management Plan shall be prepared by the contractor for pollution events will provide detail as to how to report and deal with environmental incidents including measures to manage spills (e.g. through use of spill kits), or the release of hazardous substances, and to clean up following an incident and ix) consideration of collection and/or treatment of any wastewater from welfare facilities.

Specific measures to prevent adverse impacts during operation could potentially include:

- A permanent operational drainage strategy shall be developed to control the quantity and quality of run-off and offsite flood risk from permanent above ground infrastructure.
- The operational drainage strategy shall include measures to control the supply of contaminants from the Project, including fuel.



5 APPROACH TO EIA

5.1 Summary of approach to collation of baseline information required to inform the EIA

Table 5.1 summarises the baseline information required for the EIA of the Project so that the assessments can be carried out as described in **Section 3** and outlined in **Section 4**. As set out in **Section 1.5** the EIA consultant will collaborate with the design consultants to finalise the project description and confirm the impacts to be assessed (and therefore study area for each topic) within the EIA with the EAB prior to any surveys or modelling being undertaken.

Торіс	Approach
Terrestrial and coastal ecology	Baseline surveys of terrestrial habitats and species, breeding and non-breeding birds are required to inform the EIA. Habitat and species-specific surveys shall be conducted if they are found present during the initial walkover survey.
Marine ecology	Baseline benthic surveys of marine habitats and species (namely coral reef, algae, seagrass beds and macroinvertebrates), as well as a lighting study are required to inform the EIA.
Hydrology, drainage and water quality, contaminated land and natural resources	A PCSM will be developed as part of the establishment of baseline conditions. The PCSM will aid in the identification of potential sources of contamination within the site boundary as well as identifying the potential risks to sensitive receptors. A water features survey to verify the presence and type of water-related habitats in the area surrounding the Project shall be undertaken to inform the assessment.

Table 5.1 Summary of the approach to provide baseline information for the EIA

5.2 Outline EIA programme

An outline programme for the production of the EIA is provided in **Table 5.2**, below, which provides a guide for effective forward planning.

Following the appointment of a suitably qualified EIA specialist consultancy, the detailed scope of the surveys required to inform the baseline of the EIA shall be developed and confirmed with the EAB. Consequently, a clear survey scope can be produced to commission specialist survey companies. Once commissioned, the surveys can commence. The timings provided in the programme are based on those recommended in each topic section in this ToR.

While the surveys are ongoing it is important that the design of the airport (the Project description) is developed, and the construction methods and operational activities are developed so that the potential impacts on identified receptors can be accurately assessed.

At the same time, the initial sections of the EIA and all topic sections can be progressed, and the impact assessment sections commenced as far as possible while waiting for the survey data and/or modelling results to be finalised for those topics which require surveys to inform the baseline.

Sufficient time must be allowed for the provision of the survey reports and then for the EIA itself to be finalised. Following this a review of the draft report by the proponent shall be allowed for and updates to be made prior to submitting the final report to the EAB for review and consideration.

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Table 5.2 Outline EIA programme

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Review, refine and agree survey scope with EAB																								
Commission and undertake surveys:																								
Terrestrial ecology and wildlife management																								
Marine ecology																								
Hydrology, drainage, water quality																								
Finalisation of survey reporting																								
Undertake modelling:																								
Marine ecology (lighting)																								
Preliminary Conceptual Site Model																								
Development and provision of CKIA project description, construction methodology and operational requirements																								
Production of EIA																								
Client review of EIA																								
Finalisation of EIA																								
Submission of EIA to Cayman authorities																								



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Appendix A – EAB Scoping Opinion



Environmental Impact Assessment Scoping Opinion for the Proposed Cayman Brac Charles Kirkconnell International Airport Runway Extension and Widening Prepared by the Environmental Assessment Board Subcommittee of the National Conservation Council

> 25 October 2023 Finalised 15 December 2023

1. Introduction

At its meeting on 28 August 2023, the National Conservation Council (NCC) agreed to appoint an Environmental Assessment Board (EAB) comprising members of the Department of Environment (DoE), Planning Department, Civil Aviation Authority, and Water Authority. The EAB has been appointed to guide the Environmental Impact Assessment (EIA) for the design, construction and operation of the Charles Kirkconnell International Airport Runway Extension and Widening proposed by Cayman Islands Airports Authority ('the proponent') as shown in Figures 1 & 2. Two separate EABs have been convened for EIAs for the Cayman Islands Airports Authority projects on Little Cayman and Grand Cayman, and members from those EABs, including the Cayman Islands Coast Guard and Cayman Islands Fire Department contributed to the EIA scoping exercise. For clarity, a full summary of the NCC appointments for each EAB is presented below in Table 1:

Access/	Relevant EIA									
Agency	Grand Cayman	Cayman Brac	Little Cayman							
Civil Aviation Authority	Yes	Yes	Yes							
Cayman Islands Fire Service	Yes	No	Yes							
Coast Guard	Yes	No	No							
HMCI	Yes	No	No							
NRA	Yes	No	No							
Department of Planning	Yes	Yes	Yes							
Water Authority	Yes	Yes	Yes							

Table 1. NCC appointments of EABs for CIAA projects on all three islands.



Figure 1. Proposed west end of runway strip widening works and additional RESA (Runway End Safety Area) (CIAA, 2023)



Figure 2. Proposed east end of runway strip widening works and additional RESA (Runway End Safety Area) (CIAA, 2023)

In accordance with the EIA Directive (2016), the following EIA Scoping Opinion outlines the likely significant effects of the project which will need to be assessed as part of the EIA process.

2. Background

2.1 May 2023 – Request for EIA Screening

The proponent submitted a request for EIA screening for the proposed runway strip widening and RESA additions on 5 May 2023. A Screening Opinion was prepared by the DoE and endorsed by the NCC at their meeting on 28 August 2023. At the same meeting, as outlined above, the NCC appointed the EAB to guide the EIA process.

2.2 September 2023 – EIA Scoping of Project Proposal

On 27 September 2023, the EAB met for an initial discussion on the scoping of the EIA. The result of this meeting is the EIA Scoping Report herein.

3. Proposed Project

Cayman Islands Airport Authority, as project proponent, is proposing the extension and widening of the airport runway at Charles Kirkconnell International Airport on Cayman Brac. The site has an approximate area of 145 acres and is mostly man-modified. The site is bordered to the south by the Westerly Ponds.

The proposed development includes a number of clearing and filling works associated with Charles Kirkconnell International Airport. As per the above mentioned request for screening, the proposed works will include:

- Widening the runway strip to 150m to meet the requirements of International Civil Aviation Organization (ICAO). This will require the partial filling of the Westerly Ponds,
- The construction of a 240m Runway End Safety Area (RESA), at the western end of the runway, in close proximity to proposed sea turtle critical habitat, and
- The construction of a 20m RESA at the eastern end of the runway, adjacent to a pond, although no filling of the pond is anticipated.

As per the proponent, the proposed works are a regulatory requirement and are part of a critical Civil Aviation Authority (CAA) capital action plan (CAP), meaning that the proponent is required to complete the works as soon as possible.

4. Consultation

Prior to the EIA process, the CIAA conducted a number of public consultation sessions, which informed and guided the direction of the preferred project proposal.

No other government entities outside of the members of the EAB have been consulted on the project to date.

5. Scope of the EIA

5.1 General EIA Methodology

The EIA methodology shall follow the requirements of the NCA and the EIA Directive (2016). Particular reference should be made to Schedule 2 of the EIA Directive which contains the information for inclusion in Environmental Statements (ES). The methodology to be employed to assess the effects for each topic shall be agreed as part of the Terms of Reference.

Generally and briefly, the ES shall:

- Describe and state the need for the project,
- Consider alternatives and justify why it was decided to choose the proposed runway layout/design,
- Identify and assess the baseline conditions for each topic identified below,
- Identify the potential environmental receptors (especially sensitive receptors) which may be impacted by the proposed runway expansion and may need to be considered as part of the assessment,
- Identify mitigation measures for each topic identified below and identify any residual effects,
- Undertake a Demolition and Construction Impact Assessment including a prediction of impacts for each topic identified below,
- Undertake a Completed Development Impact Assessment, including a prediction of impacts for each topic identified below, and
- Undertake a Cumulative Effects Assessment.

As per the EIA Directive (in particular Schedule 3), each ES shall include an Environmental Management Plan which shall include the mitigation measures recommended, any required post-project monitoring and present procedures and reporting relationships. A Non-Technical Summary is also required as part of the EIA process. Further detail will be agreed as part of the Terms of Reference.

5.2 Topics with Significant Effects

There is the potential for likely significant effects, during both the construction works associated with the proposed runway expansion and once the expanded runway is complete and operational, for the below topic areas:

- Terrestrial Ecology & Wildlife Management,
- Marine Ecology, and
- Hydrology, Drainage and Water Quality.

These topics shall be included as chapters within the ES.



Figure 3: Aerial imagery showing the western end of the proposed runway expansion site (outlined in light blue) with DoE-recorded turtle nests (shown in orange and green circles), DoE -recorded Sister Island Rock Iguana nest sites (green squares), proposed sea turtle nesting critical habitat (red lines) and the Marine Reserve MPAs adjacent to the runway expansion (hatched in pink) (Aerial Imagery Source: UKHO, 2021).

5.3 Terrestrial Ecology and Wildlife Management

Affected Resources

The proposed runway expansion and filling of the ponds has the potential to affect terrestrial ecology, particularly with respect to birds. Although the adjacent ponds are no longer animal sanctuaries protected under the Animal (Sanctuaries) Regulations, they remain as habitat frequently used by birds. The site also contains habitat used by Sister Islands Rock Iguanas (*Cyclura nubila caymanensis*) which are a Part 1 Schedule 1 Protected Species. These Iguanas are critically endangered and found nowhere else in the world but Cayman Brac and Little Cayman, and may be impacted by the construction and operation of the runway.

Potential Impacts

The proposed runway extension, as well as the filling of the ponds will permanently alter habitat frequently used by both birds and rock iguanas. Impact to this habitat will occur both during the filling of the ponds and construction of the RESAs, and the day to day operation of the airport.

Management of terrestrial ecology during operation of the airport is already a concern, with bird control measures (including lethal methods) regularly employed. Many bird species rely on ponds and wetlands as stopover points during migration. Eliminating these resting and foraging areas can disrupt migration patterns, leading to exhaustion and decreased survival rates, eventually leading to a decline in biodiversity. The filling of the ponds, combined with the very limited extent of remaining wetland habitat on Cayman Brac has the potential to amplify these impacts.

Expansion of the runway and construction of the RESAs, including the use of heavy machinery can also disturb ground-nesting iguanas. Clearing of vegetation and site preparation for the RESAs has the potential to disrupt existing iguana nests or interfere with nesting behaviours. Pollution and runoff due to airport activities can also affect soil and water quality in the surrounding area.

Therefore, the EIA shall include an Ecological Impact Assessment which assesses:

- Direct impacts on terrestrial ecology during construction and operation; and
- Indirect impacts on terrestrial ecology during construction and operation including wildlife hazard management.

5.4 Marine Ecology

Affected Resources

The proposed western end RESA is located in close proximity to a sea turtle nesting beach and proposed sea turtle critical nesting habitat and has the potential to have an adverse effect on nesting sea turtles. All species of sea turtles found in Cayman are Part 1 Schedule 1 protected species under the National Conservation Act and are protected at all times.

The site of the proposed runway expansion is also located adjacent to two Marine Reserves (Channel Bay and West End). These reserves contain areas of coral reef, as well as nearshore seagrass beds, all of which are ecologically valuable. All corals are Part 1 Schedule 1 Protected Species, which are protected at all times under the National Conservation Act (2013) (NCA). Seagrasses are Part 2 Schedule 1 Protected Species under the NCA. There are also likely to be other protected species such as fish, sea urchins, lobsters, and sponges which would be impacted by the works.

Potential Impacts

Construction activities, including the operation of heavy equipment have the potential to affect the nesting behaviour of nearby sea turtles and affect the success rate of any existing nests. To minimise impact on daily airport operations, airport construction often takes place at night. Artificial lighting on and around turtle nesting beaches is one of the greatest threats to the survival of sea turtles worldwide. Bright lights on or near the beach can deter female turtles from nesting, as well as cause baby turtles to crawl away from the sea, where they die from dehydration, exhaustion, predators or vehicle impacts. Run-off from an airport can potentially hold contaminants and debris from the airport, including fuel residues, oils, heavy metals and other substances that accumulate on the airport surfaces. Surface water run-off flowing into the adjacent ponds will then enter the marine reserve and can be harmful to marine life. The increased amount of hardstanding as a result of the expansion of the runways and RESAs is likely to exacerbate the impacts of this. Run-off associated with construction activities has the potential to impact the marine environment through turbidity effects. Turbidity impacts marine ecosystems, particularly coral reefs, causing stress to organisms through smothering. Immobile marine organisms such as coral can potentially be fatally smothered if turbidity reaches and is sustained at high levels for a significant period.

Therefore, the EIA shall include an Ecological Impact Assessment which assesses:

- Direct impacts on marine ecology during construction and operation; and
- Indirect impacts on marine ecology during construction and operation.

A benthic study will be required as part of the assessment of the baseline conditions. The Terms of Reference will identify the scope and extent of the benthic study.

5.5 Hydrology, Drainage and Water Quality

Affected Resources

The site of the proposed runway expansion is adjacent to several ponds that could be affected by changes in quantity and make-up of run-off. There are also a number of residential and commercial properties in the immediate vicinity for which water quality is likely to be a concern.

Potential Impacts

Construction of the runway expansion and RESAs will involve earthwork and grading, and the installation of drainage systems. These alterations can change the natural drainage patterns of the area. If not properly managed, these changes in drainage patterns have the potential to result in increased stormwater run-off, leading to erosion, flooding and sedimentation of nearby water bodies.

The increase in impervious site surfaces will lead to increased surface water run-off that will also need to be adequately managed. This increased run-off has the potential to overwhelm the current drainage system, which includes run-off into the nearby ponds. Inadequate stormwater management can lead to pollutants, such as oil, grease, chemicals and heavy metals being washed into nearby water bodies and causing pollution.

If not managed adequately, poor water quality has the potential to cause pollution and odour issues for the nearby properties.

Therefore, the EIA shall consider:

• Impacts on surface water management during construction and operation; and

• Impacts on water quality in the ponds during construction and operation.

6. Next Steps

The next stage of the process is for the proponent to provide the EAB with details of up to three suitably qualified consultancy firms to carry out the EIA based upon the requirements outlined in the EIA Scoping Opinion. The Consultant's proposals shall provide details of the professional team composition, including Curricula Vitae for all team members who should have at least five years professional experience of similar projects. Consultants should include:

- (i) A qualified and experienced EIA Coordinator with experience of coordinating EIAs for similar aviation projects,
- (ii) A qualified marine biologist with experience in tropical marine environments similar to the proposal site and capable of assessing the marine ecosystems in the area of the site and assessing the potential for mitigation measures to be carried out effectively,
- (iii) A qualified (external) terrestrial biologist with experience in wildlife hazard management in aerodromes and with a sound knowledge of Best Practices and Best Available Technologies, preferably in tropical, small island environments, and
- (iv) A qualified water resources engineer or hydrologist/hydrogeologist capable of assessing (and modelling, as necessary) the stormwater drainage patterns and flows, flood risks, and risks to nearby water quality.

The Consultant may propose suitable Sub-Consultants in specific areas of expertise as applicable. Credentials of such Sub-Consultants should be submitted as part of the Submission. The EAB will review the submissions from each consultancy team in order to confirm that the teams have the required experience and expertise to address the issues outlined in this EIA Scoping Opinion. Upon completion of the EAB's vetting process, the proponent is free to select consultant(s) from those which have been deemed competent by the EAB.

Upon appointment of the EIA consultants the EAB will make itself available to meet with the proponent and its EIA consultancy team to discuss the development of the draft Terms of Reference for the EIA, based on this EIA Scoping Opinion. Once agreed, the draft Terms of Reference will need to go out for public consultation (including discussion in at least one public meeting) for a period of 21 consecutive days and then finalised, taking into account the public's input all in accordance with the EIA Directive.

We trust that this information is of assistance. Please do not hesitate to get in touch should you have any questions.

Gina Ebanks-Petrie Director, Department of Environment & EAB Chair



Appendix B – Record of public consultation



Royal HaskoningDHV is an independent consultancy which integrates 140 years of engineering expertise with digital technologies and software solutions. As consulting engineers, we care deeply about our people, our clients and society at large. Through our mission Enhancing Society Together, we take responsibility for having a positive impact on the world. We constantly challenge ourselves and others to develop sustainable solutions to local and global issues related to the built environment and the industry.

Change is happening. And it's happening fast – from climate and digital transformation to customer demands and hybrid working. The speed and extent of these changes create complex challenges which cannot be addressed in isolation. New perspectives are needed to accommodate the broader societal and technological picture and meet the needs of our ever-changing world.

Backed by the expertise of over 6,000 colleagues working from offices in more than 20 countries across the world, we are helping organisations to turn these challenges into opportunities and make the transition to smart and sustainable operations. We do this by seamlessly integrating engineering and design knowledge, consulting skills, software and technology to deliver more added value for our clients and their asset lifecycle.

We act with integrity and transparency, holding ourselves to the highest standards of environmental and social governance. We are diverse and inclusive. We will not compromise the safety or well-being of our team or communities – no matter the circumstances.

We actively collaborate with clients from public and private sectors, partners and stakeholders in projects and initiatives. Our actions, big and small, are driving the positive change the world needs, and are enhancing society now and for the future.

Our head office is in the Netherlands, and we have offices across Europe, Asia, Africa, Australia and the Americas.



