

STRATEGIC MASTER PLAN FOR THE TCIAA

A.4. Environmental analysis of the airport infrastructure

October 2024





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Objectives

The objective of this report is to perform a comprehensive environmental analysis of the TCIAA airport infrastructure, which is to be performed in 2 blocks

- <u>General environmental considerations for the TCIAA</u>: A preliminary assessment of the TCIAA's current environmental & sustainability practices, concluding with a set of recommendations and considerations that should position the TCIAA as a leading entity in terms of environmental practices in the future
- 2. <u>Airport environmental assessment</u>: An individual assessment for each airport, analyzing the socioeconomic environment of each and its surroundings, their current infrastructure, environmental assessment and analysis, and environmental action plan for compliance with international and regional E&S standards

This initial environmental assessment lays out the foundations for the development of a common environmental strategy for all the TCIAA network (Task B.4)



Content

General environmental considerations for the TCIAA

Providenciales

Grand Turk

South Caicos

Salt Cay

North Caicos

Middle Caicos

ALG

In the short-term, the challenge of the aviation sector in Turks and Caicos is the transformation towards a sustainable airport system

Sustainable airport system



The ultimate target for an Airport Authority should be developing a sustainable airport system that is economically viable, socially responsible, and environmentally respectful

All international E&S standards are a mandatory requirement for the international financial institutions in new investment projects

E&S aviation framework

The Equator Principles, the IFC Performance Standards and the IDB Environmental and Social Policy Framework are the most relevant references for the TCIAA, both for future investment projects and for the access to green funds





Developing a comprehensive E&S policy, as well as an integrated management system covering all airports in TCI, is a challenge that must be approached through the implementation of int'l best practices (to be developed in Task B.4)

Two different management systems, both aligned with int'l bestpractices, are proposed for TCIAA airports (PLS and remaining network)

E&S Management Systems proposed for the TCI



Sustainable airport

Compliance with international standards

PLS GDT XSC SLX NCA MDS

Green airports

TCIAA Model – E&S

Integrated Management

System

PLS

GDT XSC SLX NCA MDS

- Environmental management in all phases of the infrastructure life cycle, probably with phase overlap
- Environmental & Social Department with full time staff
- Specialized staff with detailed E&S regulatory knowledge
- E&S budget (CapEx and OpEx)
- To be developed by the **private operator** (PPP), and **supervised by the TCIAA**





•	Environmental cooperative managemen			
	in all phases of infrastructure life cycle			

- Minimal intervention in the terminals to become more efficient
- Multifunctional staff of the TCIAA (E&S aspects included), to work in all the airports (staff with part-time E&S responsibilities)
- Staff with general knowledge of E&S aspects and minimal regulatory knowledge
- Minimum E&S budget (OpEx)



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It is imperative that PLS complies with int'l standards for sustainable airports (IFC Performance Standards, MPAS, EP) after the PPP process

E&S Management System – PLS



Environmental and Social Management System

- The airport must have an Environmental and Social Management System (ESMS), or an Integrated Management System (Quality, Safety and Environment) implemented
- The environmental team should have capacity and competence for performing the management in all phases of the airport life cycle
- The environmental team must have technological tools to monitor programs and established procedures
- The ESMS needs to have **properly defined KPIs** that allow taking management decisions
- All environmental aspects should be considered (energy, water, waste, hazardous materials, emissions, climate change, etc.)
- **Social aspects** shall also be included (workers, land acquisition, cultural aspects) within the management
- Main environmental and social international best-practices should be implemented
- The airport should become a reference in the country with regards to environmental management

For the rest of TCIAA network, a Management Model based on an E&S Integrated Management System needs to be developed

E&S Management System – Rest of TCIAA network



All environmental and social aspects to be considered (for environment, workers and community)

Reduction of operating costs

Lower energy and water costs Greater durability and fewer repairs Minimal maintenance required

Environmental benefits

Reduced contributions to local/regional air pollution Reduced local water pollution Protection of biodiversity and natural vegetation Increased environmental awareness

Comprehensive approach to E&S management

- **Design aspects:** Building orientation and façade design to reduce solar gain; Protection from both the rain and sun; Natural ventilation promotion (openings on the façades, ventilation and light shafts to generate thermal drafts)
- **Materials:** Local materials selection according to their durability and resistance to weathering
- Efficiency systems: Achieving enhanced energy efficiency and minimizing use of artificial lighting system by creating the optimum conditions for the use of passive and active solar strategies (LEDs, photovoltaic cells....); Water efficiency within the buildings to provide fresh water; Using LED technology for airfield lighting
- **Maintenance:** Regulatory compliance in pollution prevention of waste and FOD, hazardous materials, water, green areas
- **Biodiversity and natural resources management:** Management of wildlife and bird strike; Identification and natural resources
- **Staff:** Multifunctional staff to work in all the airports (staff with parttime E&S responsibilities), and with general knowledge of E&S aspects and minimal regulatory knowledge

The management of natural aspects linked to climate change will be key for the viability of TCIAA airports in the long-term

Main E&S impacts of the airport network

The development of a **shared model** with an **integrated management approach**, focused on energy efficiency and consumption minimization, should allow defining a strategy for operational management at the TCIAA, both at **the organizational level and at the airport level** (to be developed in Task B.4)





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Providenciales is the most developed island in the TCI, with most of its economy dedicated to serving its growing tourism industry

Economic dynamics

Socioeconomic & environmental analysis – Providenciales

Providenciales				
			Providenciales is the most developed island of the TCI, with most of its economy dedicated to serving its growing tourism. The island also has emerging financial services and manufacturing sectors	
		Tourism	The conventional tourism sector of Providenciales revolves around resorts and vacation villas, with over 300 hotels and 4,100 rooms that are busy during most of the year	
 Hotels Condo Hotels Nature Reserves and National Parks 	Providenciales Int'l Airport	Niche Tourism	There is an increasing offer of niche tourism, including watersports, golf, hiking and similar, which is both complementing the existing offer and growing on its own	
Quick facts		Financial Services (*)	Providenciales is also a hub for financial services, which, through the strong legal and regulatory system of the TCI, has developed a substantial offshore finance operation	
Population	~35k (2023 estimated)			
Area	98 km ² (pop. density ~360 inhab/km ²)		There is a growing manufacturing industry (plastic	
Hotel rooms	Hotel rooms 4,114 (318 hotels)		construction materials, etc.) fueled by demand from the	
Average Temperature 26 °C				
Average Temperature	26 °C		hospitality sector and the proximity to major markets	
Average Temperature Annual rainfall	26 °C 763 mm		hospitality sector and the proximity to major markets	
Average Temperature Annual rainfall Highest point	26 °C 763 mm 48m – Blue Mountain	Fishina	 hospitality sector and the proximity to major markets Over 10% of the TCI's fishermen are based in Providenciales which has fish processing facilities and a 	

PLS is the TCI's largest and busiest airport, with multiple facilities designed to handle commercial, private and cargo flights

Providenciales Airport – Airport Overview



Providenciales Airport has multiple sites with abandoned equipment and poor waste management practices; this could represent hazards

Providenciales Airport – Environmental assessment (1/2)



A general environmental review should be performed given that current practices pose threats to aircraft safety and workers/pax health

Providenciales Airport – Environmental assessment (2/2)



The waste disposal containers are uncovered, posing FOD risk; additionally, the septic tank below is not properly sealed



Several abandoned aircraft and containers sit on the Provo Air Center G.A. apron; these should be properly disposed of



Another waste disposal area next to the commercial apron



Several offices throughout the terminal proper waste disposal practices have humidity and mold problems



The septic tank/drainage below immigration offices is not properly sealed

- Generally. there are poor waste disposal practices throughout the airport, along with septic tanks that are not properly sealed, causing serious hygiene hazards for workers and pax
- Areas designated for waste disposal should be properly covered in order to avoid possible FOD entering the runway/taxiway/apron areas, generating points of attraction for fauna and diseases
- The terminal building has areas with humidity and ventilation issues, resulting in problems with mold that affect the health of airport workers

The execution of the E&S-related proposed developments would align Providenciales Airport to international standards for E&S management

Providenciales Airport – Environmental development plan



Main environmental-related proposed developments

- 1 Implementation of renewable energy infrastructure (ex. photovoltaic plant for self-consumption in the terminal roof/car park)
- 2 Construction of a waste and hazardous materials management center, including incinerator/autoclave
- 3 Improvement of the water cycle from supply to water recirculation, taking into consideration the drains in the recirculation system
- 4 Aeronautical reserve zone for noise impacts due to increased aircraft traffic (also compliant with SLOs)
- 5 Recovery of degraded spaces within or adjacent to the airport perimeter



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General environmental considerations for the TCIAA

Providenciales

Grand Turk

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Middle Caicos



As the historical & Govt. center of the TCI, Grand Turk's economy is supported by Govt. offices, historic tourism, and the Cruise Port

Socioeconomic & environmental analysis – Grand Turk



27m – Colonel Murray's Hill

Salt ponds are common throughout

the island; donkeys wander freely

Economic dynamics

The economy of Grand Turk is mainly supported by the Govt. offices (it is the territory's capital), as well as the tourism brought by the Cruise Center that resides on the southern portion of the island

> As the official capital of the Turks and Caicos since 1766, many of the main government offices, such as the Supreme Court or the Governor's Residence, are located here

> The Grand Turk Cruise Center serves as the launch point

for cruise ship and as many as three ocean liners are



As one of the historically significant touristic destination of TCI, a key issue is the lack of hotel capacity and major hotels, but there are projections for hotel development



Sea salt production peaked at the start of the 1900s, but due to the inefficiencies of the small scale of production, the local industry ceased in the 1950s



welcomed there each day

Source: Google Earth, TCIAA, Visit TCI, ALG Analysis

Highest point

Fauna/flora

GDT is the country's 2nd largest and busiest airport; it handles regular domestic flights, while being conditioned to handle international flights

Grand Turk Airport – Airport overview



Multiple areas with abandoned machinery & equipment are observed at the Grand Turk Airport; these present risks such as fire and FOD

Grand Turk Airport – Environmental assessment (1/2)

Equipment disposal area, with disabled machinery exposed under the sun, presenting fire risks

The storage hangar, with exposed machinery

An abandoned fire truck parked next to the ARFF station with potential oil spills

An abandoned car sits next to the Police hangar

Abandoned fire trucks within the airport perimeter

- Poor equipment disposal and waste management practices are observed throughout the airport
- Unusable machinery is left exposed under the sun, presenting fire risk in areas next to the terminal
- Several fire trucks are abandoned in areas close to the aprons and runway; these should be removed and properly disposed of
- Uncovered construction equipment storage sites may result in FOD invading the runway and presenting safety risks to flights and generate points of attraction for fauna and diseases

Half-demolished structures and abandoned buildings are also present within the airport, resulting in potential wildlife and fire hazards

Grand Turk Airport – Environmental assessment (2/2)

Materials of demolished buildings exposed

Abandoned building within the airport's perimeter generate points of attraction for fauna and diseases

Remnants of the old fence laid on the floor permanently

Remnants of old buildings left exposed

Different floor materials spread throughout the areas within the airport's perimeter

Construction pillars of new ARFF facilities (works now halted)

Multiple sites have remnants of demolished buildings, with exposed materials such as floors and torn walls; these present an environmental risk

- There are also several abandoned buildings, which should be either refurbished or fully demolished to avoid issues with wildlife and pests
- Proper environmental practices should be implemented to dispose of old buildings

The key for a successful environmental development of Grand Turk is considering external factors beyond the airport perimeter

Grand Turk Airport – Environmental development plan

Main environmental-related proposed developments

- **1** Improvement of the water cycle from supply to water recirculation
- 2 Implementation of renewable energy infrastructure (ex. photovoltaic plant for self-consumption in the terminal roof/car park)
- **3** Designation of a waste and hazardous materials management center
- 4 Create and incentivize coastal conservation projects with other Government departments
- 5 Incorporate materials resistant to salt erosion in existing infrastructure refurbishments and new developments to improve the sustainability of buildings

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General environmental considerations for the TCIAA

ALG

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The South Caicos' economy is primarily supported by the fishing industry, but tourism is currently emerging due to luxury development

Socioeconomic & environmental analysis – South Caicos

		Economic dynamics		
		Currently, South Caicos is mainly economically supported by small- scale commercial fishing and some tourism		
Norman B. Saunders Sr Int'l Airport	ders Sr.	Tourism South Caicos is currently a rising tourism destination and conscious of its tourism potential, there are on-going hotel developments to increase visitor capacity		
Hotels Nature Reserves and National Parks		Luxury Tourism The island is home of two luxury low-density accommodation resorts and, by 2025, it is expected that a new luxury hotel development with around 100 rooms starts operations		
		The main economic income for South Caicos comes from		
Quick facts		Fishing the fishing industry , producing majority of conch, lobster and fish packaged for domestic and international shipping		
Population	~2k (2023 estimated)			
Area	21 km ² (pop. density ~95 inhab/km ²)	and the second		
Hotel rooms	87 (2 hotels)			
Average Temperature27.4 °CAnnual rainfall736 mmHighest point46m – Valley Bay HillFauna/floraSeveral marine banks; donkeys wander freely				

South Caicos Airport was fully refurbished throughout the last 6-7 years, with an airfield and terminal able to handle international flights

South Caicos Airport – Airport overview

The airport fencing at XSC is currently unfinished, leaving over 700 m of the perimeter exposed; this causes serious operational threats

South Caicos Airport – Environmental assessment (1/2)

The fence adjacent to the terminal building is in an acceptable state, although it does not cover the entire perimeter

The lack of proper fencing presents an operational risk linked to wildlife, which often penetrates the perimeter

Example of wildlife: a donkey grasses next to the runway

- The airport fencing at XSC is currently unfinished, with over 700 m of the airport's perimeter exposed. This presents high operational risks, which are currently affecting operations given the high amount of wildlife that penetrates the airport
- In addition, this also allows any person into the airport, creating potential safety threats for aircraft and passengers
- The TCIAA is in process to complete the airport fencing (expected 2024-Q4)

Several areas present poor waste disposal practices following the construction, in addition to dangerous materials not properly stored

South Caicos Airport – Environmental assessment (2/2)

Cleaning practices are performed in a non-standard manner, which present hygiene risks

Construction materials are laid out throughout several areas, presenting threats to airport workers

Spilled oil and other materials from brand new buildings

General waste and old equipment is left on the airport's perimeter without proper disposal practices

- Poor waste disposal practices are observed at the airport following the construction of the new terminal building, with construction material remaining in several areas
- Multiple cases of dangerous material not properly stored are observed, posing risk for airport workers and passengers
- Non-standard cleaning practices are also observed, such as exposed cleaning material, which could present hygiene risks

The environmental development plan of South Caicos relies on improving the operational safety of the airport and its community

South Caicos Airport – Environmental development plan

Main environmental-related proposed developments

- 1 Improvement of the water cycle from supply to water recirculation
- 2 Implementation of renewable energy infrastructure (ex. photovoltaic plant for self-consumption in the terminal roof/car park)
- **3** Designation of a waste and hazardous materials management center
- 4 Incorporate materials resistant to salt erosion in existing infrastructure refurbishments and new developments to improve the sustainability of buildings

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Salt Cay's proximity to Grand Turk, its calm beaches and closeness to whale migration paths, make its economy largely dependent on tourism

Socioeconomic & environmental analysis – Salt Cay

migration happens along its coast

	CALL THE CALL OF THE SECOND	Economic dynamics		
Leon Wilson Domestic Airpo	prt		Salt Cay is a community with less than 100 residents, albeit its proximity to Grand Turk, its calm beaches and closeness to whale migration waters, make its economy largely dependent on niche tourism activities	
Salt Cay		Tourism	Although there are no hotels in the island, Salt Cay is home to several vacation villas usually booked by tourists that wish to relax in a place with little rain and warm weather	
Nature Reserves and National Parks		Niche tourism	The proximity of Salt Cay to whale migration paths, and the nearby coral reefs makes it a well-known destination for scuba-divers, who usually arrive in groups of >10 people	
	Quick facts	Salt industrv	The salt industry in the island boomed early in the XX th century, but large-scale production ended in the 1950s;	
Population	<100 (2023 estimated)		nevermeless, mere is a local small-scale sait production	
Area	6.7 km ² (pop. density ~10 inhab/km ²)	- Contraction		
Hotel rooms	- (only vacation villas)	and the second		
Average Temperature	26.5 °C			
Annual rainfall	723 mm			
Highest point	17m – Taylor Hill	2		
Fauna/flora	Salt ponds are predominant; whale	- Maria		

Salt Cay Airport was entirely refurbished in 2020, with a new airfield and terminal designed to handle light aircraft performing domestic flights

Salt Cay Airport – Airport overview

Buildings such as the ARFF and the terminal have defects which pose serious environmental threats, as does the septic tank and pipe system

Salt Cay Airport – Environmental assessment

The ARFF facility outworn condition poses a serios environmental and health threat

The interior of the ARFF does not have working air conditioning

The septic tank and draining system are lacking proper maintenance

Waste accumulation within the generator container creates fire risk and diseases

One of the terminal's bathrooms is unusable

Areas around the terminal are used for waste disposal, with poor environmental practices

The airport is adjacent to saline ponds, which may flood the airport

- The most critical building is the ARFF station, whose outworn state presents a hazard for the firemen (no air conditioning, leaks, etc.)
- The terminal building also has numerous defects, particularly regarding one of its bathrooms, which is currently unusable
- The septic tank lacks proper maintenance, posing an environmental hazard
- SLX has surrounding saline ponds, which may flood the airport during heavy rains

The environmental management of Salt Cay Airport should consider the salt ponds surrounding the airport to minimize the risk of floods

Salt Cay Airport – Environmental development plan

Main environmental-related proposed developments

- **1** Improvement of the water cycle from supply to water recirculation, specifically drainage and sewage management
- 2 Implementation of renewable energy infrastructure (ex. photovoltaic plant for self-consumption in the terminal roof/car park)
- **3** Designation of a waste and hazardous materials management center
- 4 Incorporate materials resistant to salt erosion when refurbishing existing infrastructure to improve the sustainability of buildings

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Middle Caicos

The economy of North Caicos is mainly supported by its crop plantations and its niche tourism industry, with growing hotel development plans

Socioeconomic & environmental analysis – North Caicos

NCA currently handles occasional domestic and GA flights; its runway sits in a much wider paved area and has an unused 40,000-sqm apron

North Caicos Airport – Airport overview

The airport currently does not have perimeter fencing; additionally, vegetation control must be implemented around the terminal building

North Caicos Airport – Environmental assessment

The main entrance of the 100m² terminal building, which was recently refurbished

The entire facility covers an area of around 355,000 m², including all paved surfaces and adjacent clear areas

The airport currently does not have perimeter fencing

The vegetation growing around the building attracts mosquitoes, which may pose hazards to passengers

The north apron area as seen from one of the taxiways that connects it to the runway

- The airport currently has no perimeter fencing, which poses a safety and environmental threat to the airport
- The old immigration building was refurbished into a 100m² terminal, which was completed in 2023
- The main entrance of the building does not have a paved walkway, and the facility's surroundings have growing vegetation that attracts mosquitoes, posing a potential threat to passengers eventually using the terminal
- The airport is **surrounded by woodlands** and one of its edges is **adjacent to the sea**

The environmental development plan at North Caicos shall focus on defining the airport perimeter and guaranteeing surrounding land uses

North Caicos Airport – Environmental development plan

Main environmental-related proposed developments

- 1 Improvement of the water cycle from supply to water recirculation
- 2 Implementation of renewable energy infrastructure (ex. photovoltaic plant for self-consumption in the terminal roof/car park)
- **3** Designation of a waste and hazardous materials management center
- 4 Implementation of a perimeter fence throughout the airport's operational area (priority action, already included in the previous slide)
- **5** Guarantee land uses around the airport through an aeronautical SLO, mainly in the residential development area

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Middle Caicos is known for its niche tourism activities for tourists that spend the day; it largely functions as a single island with North Caicos

Socioeconomic & environmental analysis – Middle Caicos

Economic dynamics

Middle Caicos **is connected by a causeway to North Caicos**, so both largely function as one. It has **very limited infrastructure and services**, and thus residents drive to North Caicos for food, fuel, and supplies

Tourism

Middle Caicos sees a fraction of the tourists that visit Provo and the majority come on a day trip. Dragon Cay Resort is the main hotel, and there are several vacation villas

Many of the tourists visiting Middle Caicos on day trips to explore the multiple activities that the island has to offer, such as **hiking, trekking, and visiting the old plantations**

Quick facts

Population	<100 (2023 estimated)
Area	144 km ² (pop. density <1 inhab/km ²)
Hotel rooms	13 (3 hotels)
Average Temperature	26.2 °C
Annual rainfall	771 mm
Highest point	40m – Ferguson Hill
Fauna/flora	Caribbean flamingos & Caicos Pine

Middle Caicos has been non-operational for the past 15 years; as of today, the 669m runway and 2,200m² apron are in an abandoned state

Middle Caicos Airport – Airport overview and compliance

The airfield at MDS is in an abandoned state with no perimeter fencing; there is invading vegetation on all areas, including around the terminal

Middle Caicos Airport – Environmental Assessment

The airport has no fencing at all, and the terminal building sits on the road opposite to the apron

The terminal building was recently refurbished, and is in an overall good state both inside and outside

The runway pavement is in an

abandoned state, with animals

roaming freely on it

Runway edge lights are still present, although not operational

The entry point to the runway from the apron, with visible vegetation growing along and on the runway itself

The lateral area of the building has a water tank and utilities infrastructure; this area shows signs of invasive vegetation that could become a problem

- The location of the terminal building may represent an issue in terms of re-opening the airport, given that pax would have to cross a public road to arrive at the apron; this, in addition to the lack of perimeter fencing, is an operational & safety problem
- The building is in good condition, although it still fully lacks interior fittings
- The lateral areas of the building show signs of invasive vegetation, which could become a problem due to mosquitoes and other animals
- Runway and apron are in an abandoned state, with growing vegetation and animals roaming freely

MDS requires an initial refurbishment for the airport to become operational again, to meet the community's emergency and occasional needs

Middle Caicos Airport – Environmental development plan

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