

The Ministry of Transport and Aviation
and Department of Civil Aviation

Comprehensive Strategy for Optimization of the Family Islands Airports



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**Task 1 Report: Comprehensive
Strategy for Optimization of the
Bahamas Family Islands Airports**

FINAL REPORT

*Aerodrome Technical Assessment
and Economic Analysis*



Prepared for:
Ministry of Transport and Aviation
and
Department of Civil Aviation


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Sign-off Sheet


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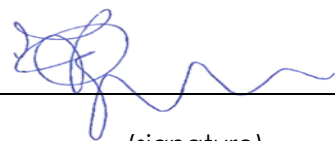
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COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

ABBREVIATIONS

SARPs	Standards and Recommended Practices
ICAO	International Civil Aviation Organization
IATA	International Air Transport Association
OAG	Official Airline Guide
GoB	The Government of the Bahamas
FIA	Family Islands Airports
ACI	Airport Council International
UNWTO	United Nations World Tourism Organization
GA	General Aviation
POE	Port of Entry
AOE	Airport of Entry
WTTC	World Travel & Tourism Council
EIU	Economist Intelligence Unit
CARICOM	Caribbean Community
BCAD	Bahamas Civil Aviation Department
IFR	Instrument Flight Rules
VFR	Visual Flight Rules
PAPI	Precision Approach Path Indicators
WDI	Wind Direction Indicators
BASR	Bahamas Civil Aviation Safety Regulations - Schedule 21
ARFF	Aircraft Rescue and Fire fighting
AOM	Airport Operations Manual
PCN	Pavement Classification Number referenced by ICAO

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

EXECUTIVE SUMMARY

The Bahamas Ministry of Transport and Aviation (MOTA) and Civil Aviation Department (CAD) retained Stantec Consulting International Ltd. to provide consulting services for air transport reform of the institutional framework for the Bahamas Family Islands Airports. The project is organized in four distinct tasks:

1. Comprehensive Strategy for Optimization of the Family Islands Airports
2. Institutional & Organizational Analysis/Development of Guidelines & Standards
3. Hazardous Cargo Management Procedures
4. Energy & Water Use Conservation Standards

The Task 1 Comprehensive Strategy for Optimization of the Bahamas Family Islands Airports has two substantial components:

- Aerodrome Technical Assessment ; and
- Economic Analysis

The Task 1 report addresses issues related to airport operating conditions for the 28 Family Islands Airports and considers the tourism market potential and economic perspectives in establishing investment priorities and recommendations. The report addresses each one of the Family Islands Airports and outlines their challenges in providing the safe, secure and welcoming 'front door' that can both facilitate and stimulate the regional economic development potential in the Family Islands Airports.

The tourism growth potential is aligned with air carriers and tourism integrators that need to establish strong links to the Bahamas. The airlines are seeing strict operating conditions dictate the locations and sites that they will entertain for travel. The key element in establishing the right climate and environment for airlines, and in turn the right integrators, is ensuring the airport environment is safe, well managed and welcoming.

The Family Islands Socio-Economic and Tourism Profiles

The population of the Family Islands is highly concentrated: four islands (namely Abaco, Andros, Eleuthera and Exuma) account for 74% of the population (totalling 34,856 inhabitants based on 2010 population figures). In 2000, these four islands accounted for only 61% of the Family Islands' population. This 13% increase in population density within the four most populated Islands is indicative of a densification of the more populated centres that is likely to continue.

Tourism as an industry not only accounts for over 60% of the GDP of The Bahamas, but provides jobs for more than half the country's workforce. After tourism, the next most important economic sector is financial services, accounting for some 15% of the GDP.

The Nation's tourism sector is the key driver of the economy; however, its overall performance has been stagnant over the past decade. Nevertheless, there are positive signs that things may



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be turning around. Despite a decline in tourist arrivals in 2011, it looks like this number may be increasing. Over the past five years, there has been a steady flow of foreign investment-led activity (e.g., new resort and marina developments).

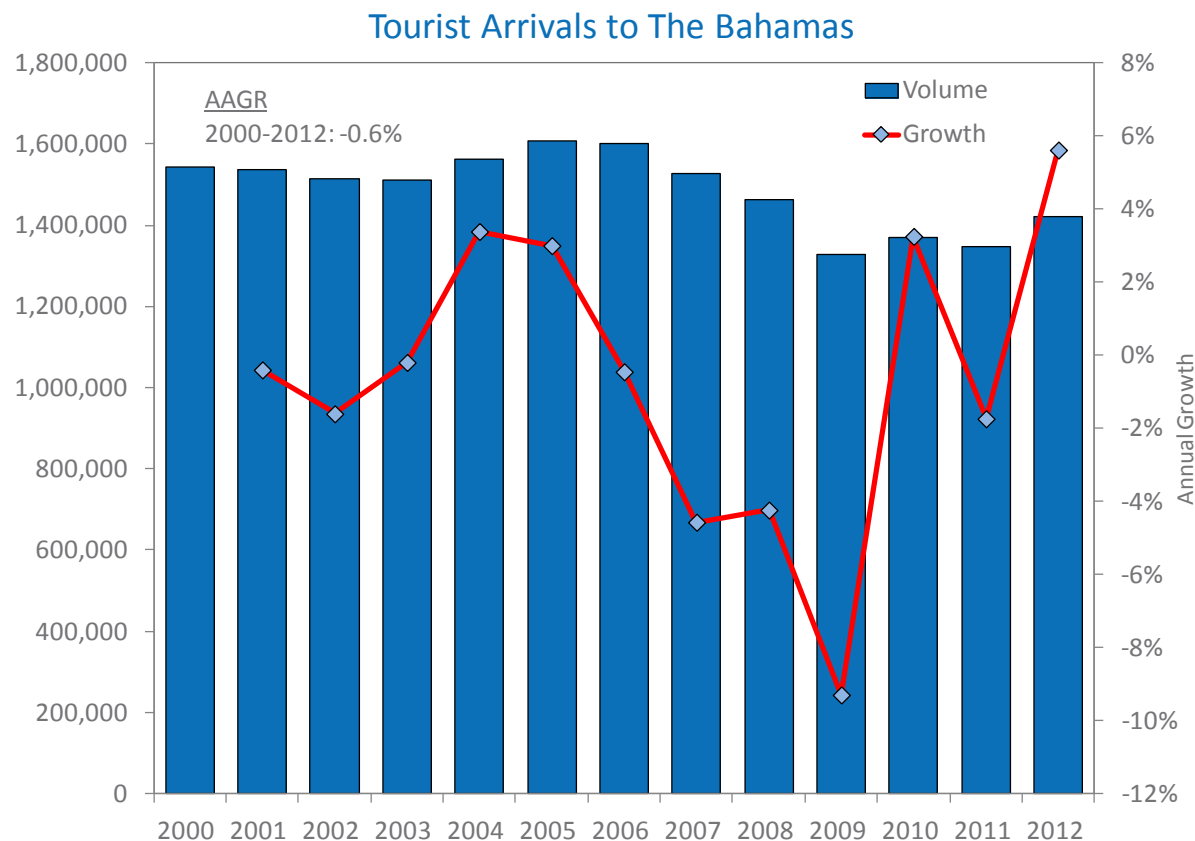


Figure E-1: Tourist Arrivals to The Bahamas

Despite indications of a return to growth in tourist arrivals to The Bahamas, this does not fare well in comparisons of growth for key competing jurisdictions across the Caribbean.

As illustrated in the chart below, both Nassau (which includes Paradise Island) and Grand Bahama have experienced a decline in the number of hotels, while the Family Islands have experienced an increase. Note that this comparison does not include Nassau's Baha Mar Complex (slated to be completed by December 2014).

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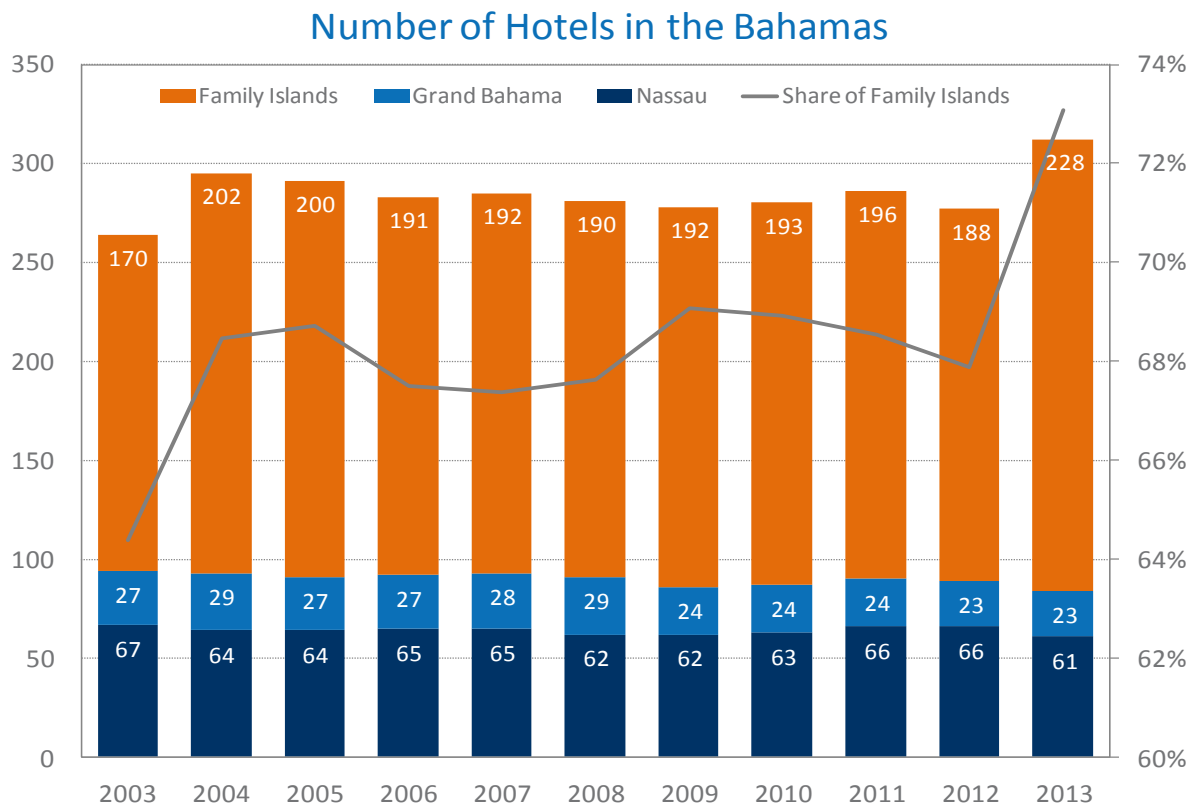


Figure E-2: Number of Hotels in The Bahamas

The majority of the hotels in The Bahamas are situated on the Family Islands, but these hotels tend to be small on average (19 rooms vs. 147 rooms in Nassau), meaning that in terms of overall hotel capacity, the Family Islands offered 29% of the total capacity of the Bahamas. Furthermore, over the last decade, capacity (measured in rooms) nearly doubled in the Family Islands.

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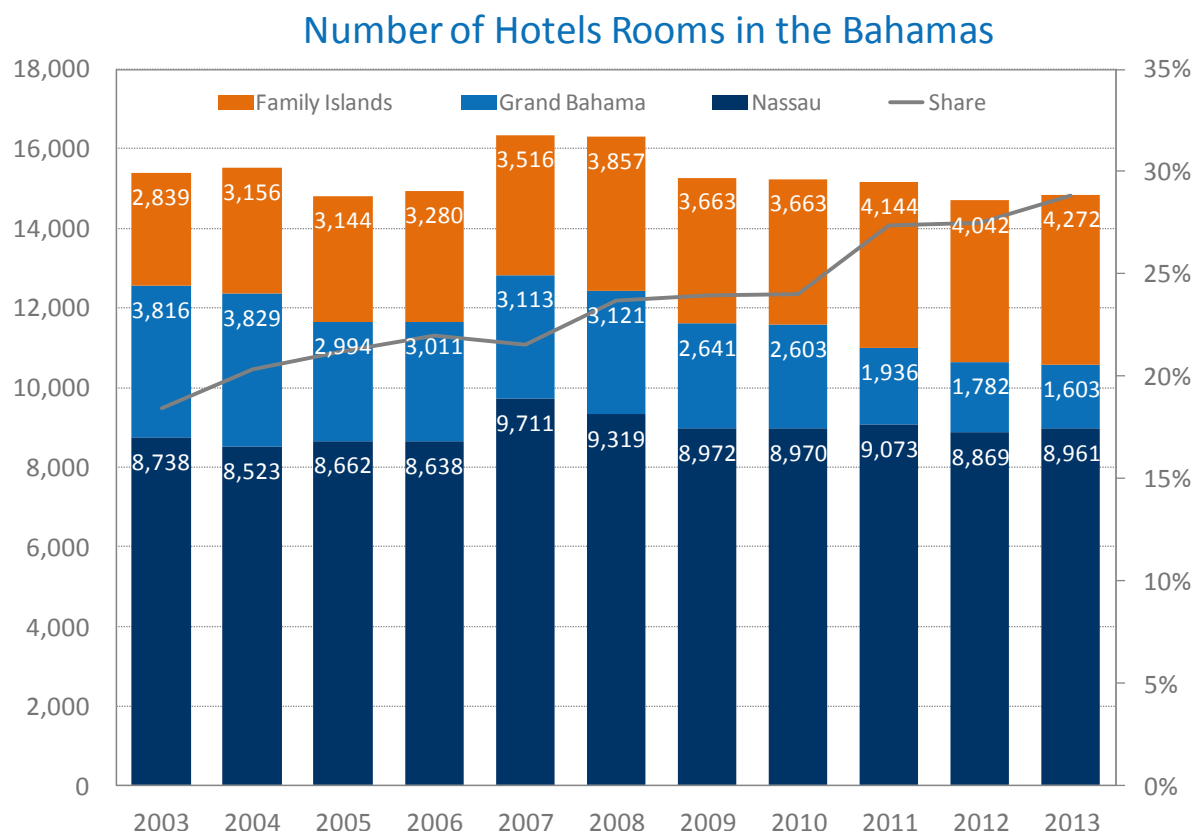


Figure E-3: Number of Hotel Rooms in The Bahamas

The small boutique properties and high-end service can be a key element in the tourism positioning and strategy for The Bahamas, and in particular, the Family Islands. The transition to the Family Islands can also be stimulated through an airport hotel at Lynden Pindling International Airport as an important transfer facility. Airport hotels at major international airports are significant revenue contributors but are unique properties and not destinations themselves but important connecting points for airline and travel connections.

Air Transport in Latin America and the Caribbean

Within Latin America/Caribbean, the region of the Caribbean accounts for 10% of passenger traffic and 0.7% of world traffic. The Caribbean is a collection of mostly small island-countries relying greatly on the tourism industry for their economic development. The Bahamas experienced negative growth in tourist arrivals over the past decade. As a result, the country's share of tourist arrivals to the Caribbean declined over the period 2002-2012. At the same time, key competing jurisdictions with higher tourist volumes experienced robust growth in tourist arrivals (e.g., Dominican Republic (5.0%), Cuba (5.5%), and Jamaica (4.6%)).

15 Largest Country Markets in the Caribbean (2013)

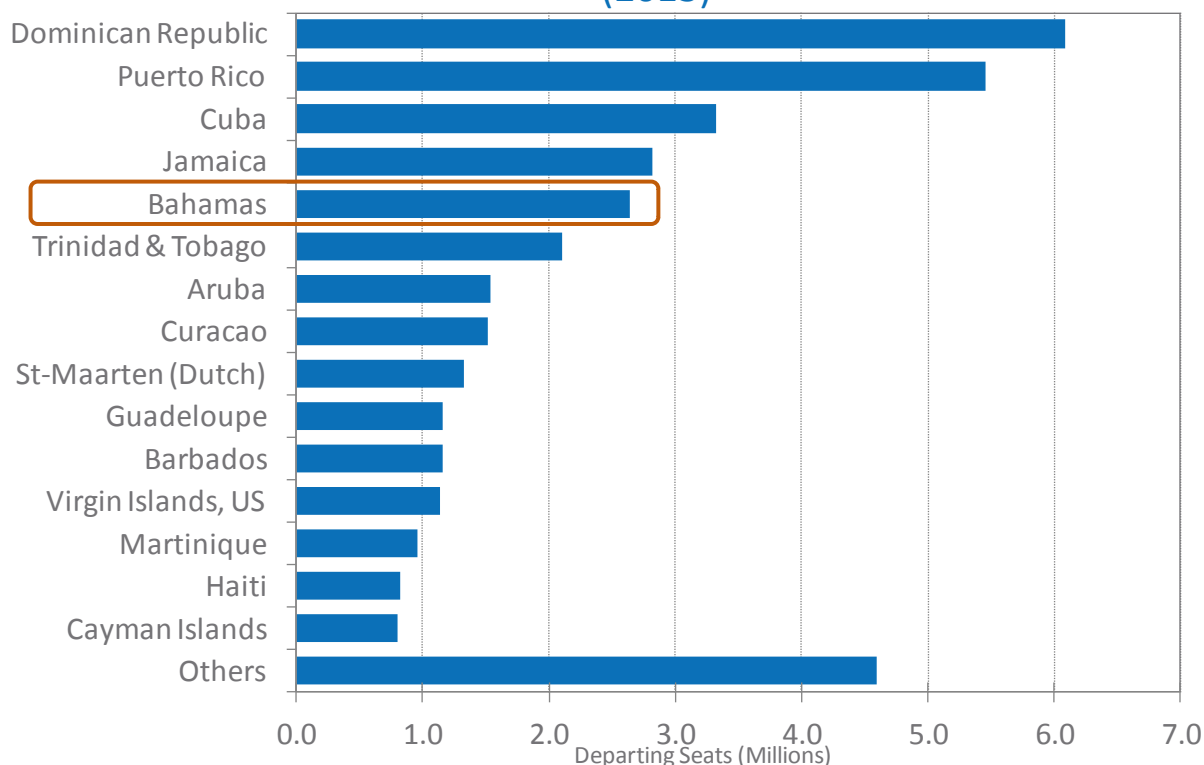


Figure E-4: 15 Largest Country Markets in the Caribbean

These trends and cross-country comparisons indicate that The Bahamas faces stiff competition with its neighbouring Caribbean countries and, in consequence, will have to focus on developing and implementing a focused marketing and investment strategy, including an emphasis on market diversification. The Dominican Republic has the Caribbean's largest and most well-developed tourism market, The Bahamas ranks 5th. More precisely the Bahamas accounts for 6% of air transport demand in the Caribbean.

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The Bahamas Air Traffic

Based on the Official Airline Guide (OAG) seating capacity, in 2013 the Bahamas offered 6.5 million seats, a decrease of 1.6% since 2004. The greatest decline was in Freeport (Grand Bahama) which has seen its market decrease by more than half (or -8.2% per annum). Most of these cuts were on the international routes (-10.9% p.a.) compared to a smaller reduction on the domestic market (-2.4% per annum). Nassau Airport is by far the largest airport in the country and, since 2004, it has seen a decline of 0.9%, including -6.0% in 2013. Here too, most of the cutbacks were on the international routes (-1.6% per annum), compared to an expansion of the domestic markets (+1.6% per annum).

The Family Islands Airports have seen their market marginally but steadily increase and by 2013, they accounted for 23% of the seating capacity in the Bahamas. Since 2003, this seating capacity has increased annually by 0.4%.

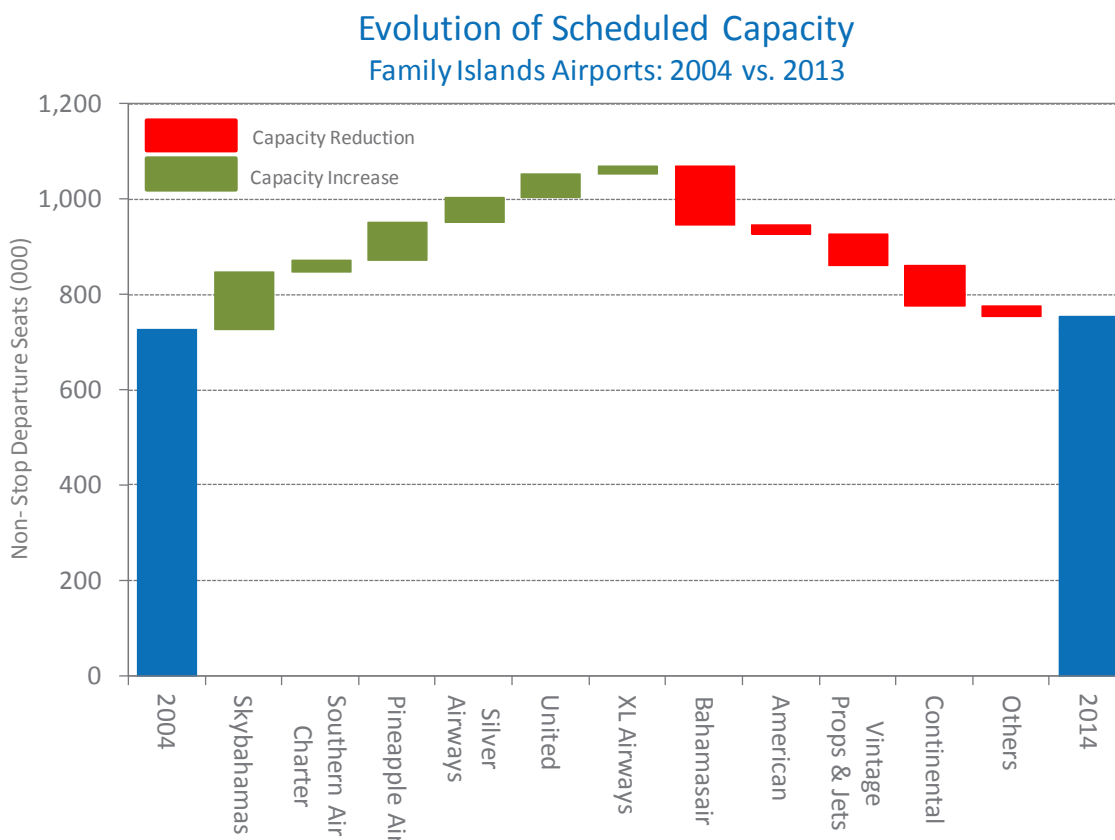


Figure E-5: Evolution of Scheduled Capacity: 2004 vs 2013

In 2013, the Family Islands Airports handled 1, 055, 052 passengers, 63% of whom were domestic passengers. Comparatively, in 2008, passengers were estimated at 1, 006, 496, representing an increase of 0.9% per annum. The Bahama's six (6) Tier 1 airports account for the largest share of passenger activities. In 2013, these airports handled an estimated 722,155 passengers, including

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326,062 international passengers. The six (6) Tier 1 airports account for 84% of international passenger activity at the Family Islands Airports.

Global Travel Trends

In coming years, some of the key trends impacting the global demand for air travel will include:

- Slowing economic growth in mature economies;
- Relatively rapid growth in emerging economies such as Brazil;
- Population and demographic trends including: continued growth, aging demographic profile, increasing incomes and on-going dispersion of families (i.e., relocation within a country and abroad);
- Continued globalization and liberalization of markets (this holds true for the economy as a whole and the air transportation in particular); and
- Rise in international tourism, particularly to/from previously less-developed countries.

These factors suggest that trends which are already evident, namely growth rates below 4% in the mature markets and higher than 4% in the less mature markets, are likely to continue for at least the next decade. In the longer term, even emerging markets, which are currently nascent, will eventually mature.. And as Bahamas was negatively impacted by the global financial crisis, its economy is expected to expand at a slightly slower rate than in the past.

Based on World Travel and Tourism Council (WTTC) forecasts, The Bahamas is expected to attract 1,469,000 international tourist arrivals in 2014 and 2,138,000 by 2024, an increase of 3.5% per annum. While there is a growing demand for international tourism travel, there is also a growing portfolio of tourist destinations, which will create additional competition for the maturing Bahamas market and will dampen growth in tourist arrivals. In addition, the Bahamas is targeting “high-end” tourists and, while this will increase revenues derived per tourist, it will tend to subdue the overall growth in tourist arrivals.

As the only airport in the Family Islands to offer international service outside of the Americans, San Salvador Airport is an exception to the country's trends.

During the next two decades, Family Islands' passenger demand is projected to increase annually by 2.4% to reach 1.7 million passengers by 2033, where most of the growth will be driven by Tier 1 airports.

The Technical Analysis

The Aerodrome technical assessments involved the project team conducting a technical analysis of each of the 28 government-owned Family Islands Airports. These airside and landside assessments were conducted from February 19th to March 6th, 2014. The technical assessments provided a high-level overview of compliance gaps with the following reference standards and recommended practices. Specifically, all assessments, analyses and documentation have been prepared on the basis of compliance with ICAO Annex 14, wherever reasonable and practical.



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In the case of the ICAO Annexes, it should be noted that all stated recommendations are indeed recommendations and as stated in the annexes are “recognized as desirable in the interest of safety, regularity or efficiency of international air navigation, and which Contracting States will endeavour to conform in accordance with the Convention”. It is at the discretion of the individual Member States whether to adopt these recommendations as a standard to be met by aerodromes. It is also understood that the Bahamas Civil Aviation Safety Regulations – Schedule 21 – Aerodrome Standards and Certification has been prepared in final form but, to date, has not been enacted and the recommendations in the Stantec Reports can further refine and re-shape the Schedule (a separate Memorandum was submitted to the Department of Civil Aviation outlining recommendations for inclusion in Schedule 21).

The aerodrome technical assessments also provided an accurate snapshot of the operating environment to assess future opportunities and areas for improvement through the preparation of the site specific development plans. The preliminary aerodrome technical assessments were presented to the government's aviation officials and key stakeholders on April 30, 2014 with the following strong message.

The existing operating environment cannot continue in its present state. The airports require significant attention and resources (human and capital) to close the gap to an acceptable operating state.

An Operational Focus Needed

The overall interest level and support provided to the project team has been very good. The points of contacts were generally security-related and several Island Administrators also met the team. The level of awareness of the airport operating environment and its ongoing requirements was low, although most of the contacts expressed interest and desire to receive airport training for their sites. The Family Islands Airports are presently managed from a security-centric perspective. The airport environment for the Family Islands Airports requires an operational shift in focus and, while security is a critical element, other essential operational requirements are urgently needed at the majority of the Family Islands Airports. The culture shift requires a move to a safety culture with a strong maintenance and life cycle awareness of the airport assets.

The Airport Tier Approach

The combination of airport activity and capacity for individual Family Islands Airports provided the project team with a methodology to create categories/tiers of airport operations and response as follows:

- **Tier 1** – Airports are significant Port of Entry gateways for the Family Islands and have economic opportunities to be operationally sustainable.
- **Tier 2** – Airports have Port of Entry status and provide Customs and Immigration services to Family Islands where there is existing international traffic and/or economic development to support limited or shared services.



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- **Tier 3** – Domestic services only and limited traffic (or transitional airport) that requires local coordination with island administrators for daily inspections and maintenance.

The 28 Family Islands Airports have a wide range of aviation activity and infrastructure requirements that are not homogenous in terms of level of compliance of facilities and equipment. The tier system shapes and designs an appropriate level of infrastructure, roles and oversight for the airports in the respective tiers.

Key Criteria for Physical Design and Oversight

Our criteria are based on the standards and recommended practices stated in this Final Report. The initial aerodrome standards and physical design criteria include the following:

- Precision Approach Path Indicators (PAPIs);
- Wind Direction Indicators (WDIs);
- Runway Pavement Markings ;
- Apron Safety Lines; and
- Safety Security Fencing.

Note: The above noted criteria cover only a fraction of the standards and recommended practices in Annex 14 but they are considered as the essential initial criteria to be applied to the Family Islands Airports.

Capital Spending Priorities

The criteria for capital spending at an airport is centred on the airfield and ripples outward to address the other deficiencies identified in the technical assessments. The criteria established for The Bahamas and its future prioritization of capital spending at the Family Islands Airports is as follows:

1. Obstacle Clearance and Aircraft Rescue & Firefighting equipment;
2. Visual Aids to support pilots;
3. Pavements inside the strip; and
4. Items outside the strip (including the landside items).

Added to this is the second tranche of priority associated with the level of activity and tier of airport as recommended by the consulting team. This would establish that Tier 1 items would get completed before Tier 2 items, and Tier 2 items before Tier 3 items.

Establishing a Maintenance Culture

The parallel track to bringing the government-operated Family Islands Airports into a state of compliance as quickly as possible will require a new discipline on the maintenance of airport assets and a program to ensure that ongoing maintenance and repairs are made promptly. This will require a change of approach to the airports and a need to transition skills and



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maintenance responsibilities to the islands through an implementation strategy that will require operational staff at all Tier 1 and Tier 2 airports and maintenance programs at all airports.

Landside Investments

The landside for the airports is an aspect of each airport's capacity to process passengers and handle goods. It is a processor and an important link to the airport's airside. The facilities at each site have been assessed based on:

- The overall condition and state of repair;
- The activity level and category of airport (i.e., POE) that will determine the programming space needed;
- Health and Safety issues for both staff and the travelling public;
- Accessibility of the facilities;
- Energy programming modifications for improved operating performance; and
- Parking and landside facilities that are not part of the passenger facility.

Addressing the Family Islands Airports Compliance Gap

To bring the 28 Family Islands Airports into compliance with appropriate Standards and Recommended Practices (SARPs) that would serve The Bahamas aviation environment will cost over \$160 million US. This can be summarized both by the respective tier, and by airside, landside and mobile equipment programme costs.

The landside recommendations also provide a suggested passenger processing model for each tier with minimum and maximum area requirements based on individual programming requirements. These are intended as guides and can reduce the future facility design costs; however, each site is encouraged to integrate the aesthetics of the local environment into its facility within reason.

The mobile equipment category is intended to identify and address the site equipment required to support the airport operations related to its recommended and forecasted activity levels.

Tier 1 Airports

Airside Compliance Capital Costs: **\$32.93 million US**

Landside Capital Costs (including ARFF facilities): **\$ 10.50 million US**

Mobile Equipment: **\$ 5.47 million US**

Sub-total for Tier 1 Airports: **\$48.90 million US**

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Tier 2 Airports

Airside Compliance Capital Costs: **\$42.40 million US**

Landside Capital Costs (including ARFF facilities): **\$ 8.50 million US**

Mobile Equipment: **\$ 0.99 million US**

Sub-total for Tier 2 Airports: **\$51.92 million US**

Tier 3 Airports

Airside Compliance Capital Costs: **\$57.68 million US***

Landside Capital Costs (including ARFF facilities): **\$ 0.75 million US**

Mobile Equipment: **\$ 0.40 million US**

Sub-total for Tier 3 Airports: **\$58.82 million US**

Total Compliance Costs for Family Islands Airports: **\$159.64 million US***

**The Tier 3 airside costs are \$76.58 million (or \$18.9 million greater) if five Tier 3 sites have runway rehabilitation done by full excavation and asphalt rather than sand and seal approach. These five airports include 3 sites addressed in the rationalization recommendations, This would bring the overall compliance costs to \$178.54 million.*

The gap analysis and the capital programming for compliance is integrated with the level of activity at each of the airports with consideration for the forecasted growth and investment opportunities associated with the airport catchment areas. Investment in the airport environment will not only address current gaps but also allow the Family Islands Airports to run safely, securely and efficiently in the future.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

Community Investment – more than Capital

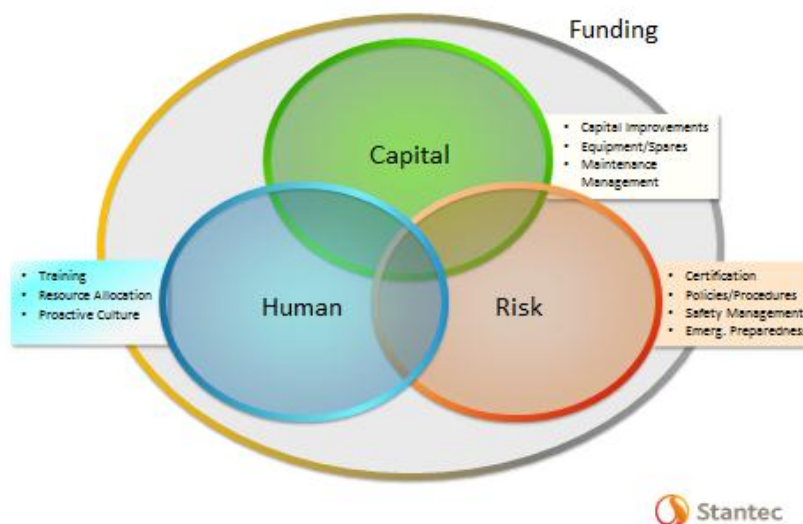


Figure E-6: Investment Relationships with Outcomes

The Economic Analysis

This analysis incorporates the investment ranking and priorities for capital spending and programming to optimize the government's investment in the valuable assets at its Family Islands Airports. The economic analysis also considers the ability of each airport (or group of airports) to attain a level of sustainability.

Accordingly, we employed the following assumptions:

- ✓ Seasonal residents and timeshare visitors are repeat customers for the airport and will tend to fly to and from the island on multiple trips per annum due to fixed accommodations.
- ✓ Hotel visitors and hotel rooms will take the next highest relative share. This is due to the absolute volume of flights that are generated by these categories though lower numbers of seasonal and timeshare visitors.
- ✓ Local population, although important economically, is not as highly weighted as other categories related to airport investment due to the small proportion of local residents that will fly annually.
- ✓ Finally, tourism-related investments (approved over the past five years) was given the most weight due to these investments being very good barometers of investors' perceptions of areas of the Family Islands where they are most likely to receive the best return on their investment and, by extension, these are strong indicators of future air traffic demand.

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The analysis generated a set of impacts where Marsh Harbour and Treasure Cay are excluded from the analysis. This was done for two key reasons:

- 1) We expect Treasure Cay's traffic demand to be shifted to Marsh Harbour; and
- 2) Marsh Harbour's recent development and investments are already sufficiently developed to accommodate the traffic volumes that are forecast for the airport over the next twenty years.

Table E-1: Economic Impact Analysis by Airport Level

EIA - Airport Level (Excluding Marsh Harbour and Treasure Cay)						
Tier	Airport	Island/ Archipelago	Rank	Score	Adjusted Score	Post Adjustment Rank
1	Governor's Harbour	Eleuthera	1	22.41	9.36	5
2	New Bight	Cat Island	2	13.89	14.29	3
1	North Eleuthera	Eleuthera	3	13.69	18.59	1
1	George Town	Exuma	4	13.14	14.76	2
3	Sandy Point	Abaco	5	6.18	6.18	6
1	South Bimini	Bimini	6	5.93	5.93	7
1	San Salvador	San Salvador	7	5.80	5.80	8
2	Great Harbour Cay	Berry Islands	8	5.29	5.29	9
2	Rock Sound	Eleuthera	9	2.42	10.57	4
3	Congo Town	Andros	10	2.18	0.86	14
3	Stella Maris	Long Island	11	1.79	1.17	13
2	Deadman's Cay	Long Island	12	1.32	1.94	11
2	Andros Town (Fresh Creek)	Andros	13	1.30	1.79	12
3	Staniel Cay	Exuma	14	1.16	0.00	23
2	San Andros	Andros	15	0.92	2.28	10
3	Mangrove Cay	Andros	16	0.54	0.00	24
3	Crooked Island	Crooked Island	17	0.52	0.52	15
3	Blackpoint	Exuma	18	0.44	0.00	25
C	Arthur's Town	Cat Island	19	0.41	0.00	26
3	Spring Point	Acklins Island	20	0.20	0.20	16
2	Matthew Town	Inagua	21	0.19	0.19	17
3	Mayaguana	Mayaguana	22	0.09	0.09	18
3	More's Island	Abaco	23	0.09	0.09	19
3	Rum Cay	Rum Cay	24	0.04	0.04	20
3	Ragged Island	Ragged Island	25	0.03	0.03	21
3	Farmer's Cay	Exuma	26	0.01	0.00	22
			Total	100.00	100.00	

New Bight Airport (on Cat Island), which ranked third on the adjusted scoring, is the noted outlier in this analysis. The region around the airport ranks behind most of the other airport on the basis of most metrics covered in the model (e.g., population, hotel rooms, hotel visitors, etc.).



COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

However, the region around the airport has received a disproportionate share (\$1.2 billion) of approved investments over the past five years. The investment being made on Cat Island will have a strong connection to the airport (i.e., the investment project is contingent upon the existence of an airport that can transport tourists to/from the island, and the airport will require adequate facilities/capacity to support the project).

Sandy Point, a tier 3 airport, received a relatively high ranking (sixth place) as, relative to many other airports included in the analysis, a significant amount of investment is coming to the southern part of Abaco Island, where the airport is located.

Strategy for Optimization

The airports require a substantial level of maintenance and improved operational awareness through a much more vigilant level of attention to protection of the airside and its operating protection zones. The airports require immediate capital programming for the first two levels of priority and all mobile and aircraft rescue/firefighting equipment in place at all sites with an implementation schedule for the next 2 years to become fully compliant on these identified items. Many of these are not the most significant costs for the government to consider. This will also require staff designated at sites with operational responsibilities and operational and safety training.

The airside pavement requirements are very costly and need to be carefully implemented, consistent with their ability to provide a safe flying environment and provide capacity to meet the forecasted demand in passengers and tourism for the respective island region. This investment will require a phased approach and the larger design projects will require geotechnical, legal survey, engineering design and tendering activity prior to construction. Therefore, there is a lag effect in the cash flow of much of the investment. The Tier 1 pavement projects are included for design work to commence in the first two years to move toward full compliance of all Tier 1 sites as soon as possible.

The stimulation of the tourism opportunity for Tier 1 and 2 airports will benefit from attractive and fully-functional terminal facilities. Although the landside investments are not as high an item for compliance, they do support the economic development of the island economy by providing travellers with an inviting and welcoming processing area.

The overall investment in the Family Islands Airports is a very positive one for the government. Studies of tourism economic impacts in The Bahamas have yielded GDP multipliers ranging from .87 to 1.25. Applying these multipliers to the direct tourist expenditures figure (\$339,366,403 for 2011) yields total economic impacts (direct, indirect and induced) accounted for by the Family Islands airports, ranging from \$634,615,174 to \$763,574,407: this translates to average per tourist economic impacts ranging from \$3,272 to \$3,937. Spending on the tourism gateways for the Family Islands will lead to increased tourism activity and this will lead to direct impacts and jobs in The Bahamas.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

A significant factor in the overall cost to the government that requires policy agreement and then action toward implementation is this report's recommendations toward transfers of airports to private interests, airport closures and airport leases for ongoing operational responsibilities. The deferral of Tier 3 Airports major runway rehabilitation also is to be considered with a program of patching and maintenance. These sites will require the priorities of obstacles clear zones and visual aids to be implemented at all sites. The implementation of the full recommendations put forward in this Final Report would reduce the capital costs for the government by over \$49 million US (this would include looking to establish an MOU with the US Coast Guard for cost sharing of infrastructure improvements at Matthew Town Airport). This would reduce the costs of compliance to \$110 million US with implementation achieved over the next 5–7 years. Other key elements of the strategy are:

- Turning the Tier 1 airports from cost centres to profit centres through commercial development/revenue enhancement and cost efficiencies;
- Committing to an initial investment strategy for \$35 million to complete initial activities related to compliance of the critical infrastructure for all sites (including Tier 3) related to obstacles, visual aids, all mobile equipment and aircraft rescue firefighting equipment (ARFF) and pavement engineering design work for the Tier 1 sites;
- Implementing revenue generation strategies (airport improvement fees, leases, concession agreements, airline charges, etc.) estimated to generate \$5 million per year;
- Implementing an organizational change to devolve responsibilities, including budgeting, from a centralized to airport site-level operating model;
- Budgeting and looking at capacity building and training;
- Rationalizing of tier recommendations to achieve ICAO compliance on Tier 1 and Tier 2 (with certification), while Tier 3 assets will be registered (not certified sites) and see top priority safety issues addressed and lower priority for pavements; and
- Alternative service delivery options are limited today due to the high level of subsidization required and the huge capital deficit that has built up at the airports.

There are three options for the government to consider that are being put forward:

- 1) Address 100% of the ICAO gaps for compliance and safe operations at a cost of over \$160 million US (\$178.9 million with full pavement rehabilitation at 5 tier 3 sites) for all 28 airports;
- 2) Implement the strategy outlined in this Final Report, including airport transfers, leases and closures, and phase in the capital spending at a cost of approx. \$110 million US (and a priority of \$35 million US to aggressively invest in the airports and tourism strategy); or
- 3) Address the top two levels of priority for all sites, including fire-fighting and additional mobile equipment, and defer capital spending on pavements and facilities while looking to secure additional contracting options for specific airports.

Option 2, with its policy implications, is the preferred option recommended in this Final Report. The compliance also requires an investment in the people and operational support, training and plan development for all sites (Airport Operations Manuals, Maintenance Management Systems,

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and commercial development workshops and program training) would require an investment of approximately \$150,000 US to support the first 2 years implementation strategy. Additionally, and once the first wave of initiatives is addressed, The Bahamas would be well served to undertake Air Service development activity to stimulate the market and attract new carriers and tour operators to The Bahamas.

Lastly, it should be recognized that the investment in new infrastructure will require an annual commitment to preserve and provide regular maintenance on the infrastructure and on a life cycle basis, this is estimated to be an incremental and additional \$4.6 million per annum for the Family Islands Airports.

Night Operations

The Consultant Team would recommend that the airport best suited for night operations is at Marsh Harbour and it requires staffing the Air Traffic Control Tower. The second site to move to night operations would be Exuma International Airport and it has a Flight Services Station/Tower at the site with some visual obstruction due to trees. The obstacle clear zones are required and this facility could likely be functional for staffing of Air Traffic Control Services with limited start-up or transition costs for facilities. The other Tier 1 sites could potentially all be capable of night operations in the future but there is significant terminal work required at San Salvador and runway work at North Eleuthera that would be required to be in place first. The South Bimini site would require a tower as would Governor's Harbour.

The Risk of not Investing in the Family Islands

the Tourism growth has been stagnant for the past 12 years and this could actually see a decline of the product, and that includes the Family Islands Airports, is not invested in to provide the aviation community with a safe and well managed airport environment. Additionally, it only takes one incident to create an international reaction and impose tremendous liability on The Bahamas as well as reputational damage.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

1.0 INTRODUCTION

1.1 PROJECT OVERVIEW

The Government of The Bahamas has recently embarked on a series of institutional, legal and policy initiatives as part of an overhaul of existing air sector policy. These changes reflect the need to modernize sector policies and institutional arrangements. Part of this modernization is the establishment of Airport Standards and Recommended Practices (SARPs) for the Commonwealth of the Bahamas, which is in development through the establishment of Schedule 21, Aerodrome Standards and Certification.

The Commonwealth of the Bahamas and its Ministry of Transport and Aviation and Department of Civil Aviation has initiated a major assessment and review of the 28 government-owned and operated Family Islands Airports as part of the significant Air Transport Institutional Reform that is currently underway. The project, contracted to Stantec Consulting International Ltd. (Stantec), is organized in four distinct tasks (Figure 1 - Organization Chart and Workplan):

1. Comprehensive Strategy for Optimization of the Family Islands Airports
2. Institutional & Organizational Analysis/Development of Guidelines & Standards
3. Hazardous Cargo Management Procedures
4. Energy & Water Use Conservation Standards

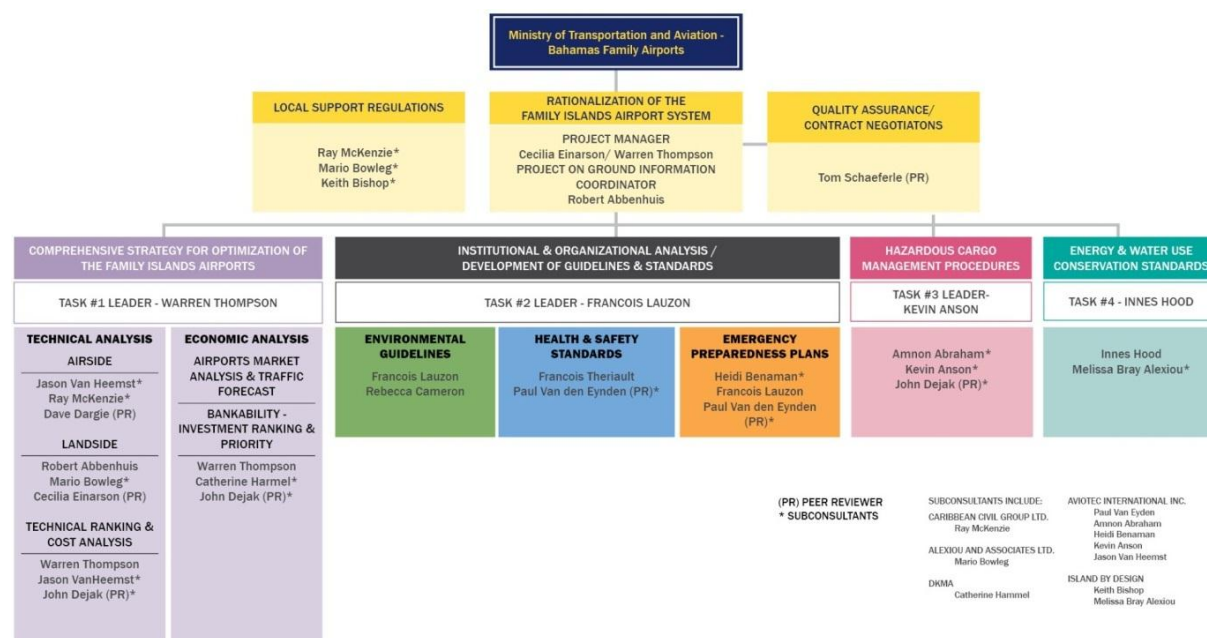


Figure 1: Organization Chart and Work plan

1.2 BACKGROUND

The Task 1 programme has two substantial components:

1. Aerodrome Technical Assessment; and
2. Economic Analysis

1.2.1 Aerodrome Technical Assessment

The Aerodrome Technical Assessments involved the project team conducting a technical analysis of each of the 28 government-owned Family Islands Airports. These airside and landside assessments were conducted from February 19th to March 6th, 2014. The technical assessments provided a high-level overview of compliance gaps with the following reference standards and recommended practices:

- International Civil Aviation Organization (ICAO) - Annex 14 - Aerodromes, Volume 1 – Aerodrome Design and Operations, 6th Edition (July 2013);
- International Civil Aviation Organization (ICAO) - Annex 19 – Safety Management, 1st Edition (November 2013);
- International Air Transport Association (IATA) – Airport Development Reference Manual, 10th Edition (2014); and
- Bahamas Civil Aviation Safety Regulation - Schedule 21 - Aerodrome Standards and Certification (in final form but not yet enacted).

Specifically, all assessments, analyses and documentation have been prepared on the basis of compliance with ICAO Annexes 14, wherever reasonable and practical. In the case of the ICAO Annexes, it should be noted that all recommendations stated in these documents are indeed recommendations and as stated in the annexes are “recognized as desirable in the interest of safety, regularity or efficiency of international air navigation, and which Contracting States will endeavour to conform in accordance with the Convention”. It is at the discretion of the individual Member States whether to adopt these recommendations as a standard to be met by aerodromes.

The aerodrome technical assessments also provided an accurate snapshot of the operating environment to assess future opportunities and areas for improvement through the preparation of site-specific development plans. The preliminary aerodrome technical assessments were presented to the government's aviation officials and key stakeholders on April 30, 2014.

1.2.2 Economic Analysis

The economic analysis includes the development of a long-term airport forecast and an economic impact study for the Region, the Family Islands and each airport. This analysis also incorporates the investment ranking and priorities for capital spending and programming to optimize the government's investment in the valuable assets at its Family Islands Airports. The

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

economic analysis also considered the ability of each airport (or group of airports) to attain a level of sustainability.

The gap analysis and the capital programming for compliance are integrated with the level of activity at each of the airports with consideration for the forecasted growth and investment opportunities associated with the airport catchment areas.

This Task 1 Final Report builds on the economic analysis and the site assessments conducted at all 28 Family Islands Airports (see Figure 2) to identify aerodrome development plans and recommended optimization strategies for the Family Islands Airports.



Figure 2: Government-Owned Family Islands Airports

Table 1 below lists which of the Family Islands Airports are currently Ports of Entry (POE) where Customs and Immigration Officers are normally present.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

Table 1: Ports of Entry Airports

Airport Name, location	Port of Entry (POE) Status
Marsh Harbour International Airport, Abaco	POE
Treasure Cay International Airport, Abaco	POE
Sandy Point Airport, Abaco	
Moore's Island Airport, The Abaco Cay's	
Andros Town Airport, Central Andros	POE
San Andros International Airport, North Andros	POE
Congo Town Airport, South Andros	POE
Clarence A. Bain Airport, Mangrove Cay, Andros	
South Bimini Airport, Bimini	POE
New Bight Airport, Cat Island	POE
Arthur's Town Airport, Cat Island	
Governor's Harbour International Airport, Central Eleuthera	POE
North Eleuthera International Airport, North Eleuthera	POE
Rock Sound International Airport, South Eleuthera	POE
Exuma International Airport, Exuma	POE
Staniel Cay Airport, The Exuma Cays	
Farmers Cay Airport, The Exuma Cays	
Black Point Airport, The Exuma Cays	
Matthew Town Airport, Inagua	POE
San Salvador International Airport, San Salvador	POE
Great Harbour Cay Airport, The Berry Islands	POE
Stella Maris Airport, Long Island	POE
Deadman's Cay Airport, Long Island	
Spring Point Airport, Acklins	
Crooked Island Airport, Crooked Island	
Mayaguana Airport – (Suffrage – Administrator functions as Customs and Immigration)	POE
Ragged Island Airport, Ragged Island	
Port Nelson Airport, Rum Cay	

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

The 28 Family Islands Airports have a wide range of aviation activity and infrastructure requirements that are not homogenous in terms of level of compliance of facilities and equipment. The tier system shapes and designs an appropriate level of infrastructure, roles and oversight for the airports in the respective tiers. The team designed a three (3) tier system that will be referenced in the report and fully explained in the technical assessment section. Investment in the airport environment will not only address current gaps but also allow the Family Islands Airports to run safely, securely and efficiently in the future (see Figure 3 below).



Figure 3: Family Islands Airports Investment

2.0 THE ECONOMIC PROFILE

The Final Report will lead in with the economic analysis of the Family Islands Airports to provide the context for the technical assessments and the aligned recommendations and strategy for investment and policies that will shape the airport environment for years to come.

The team has undertaken:

- 1) An evaluation of the current profile of traffic at the Family Islands Airports (FIA) and the likely future evolution of traffic at these airports; and
- 2) An economic impact study that has the objective of facilitating efforts to determine the appropriate relative level of funding warranted for each airport covered in the Final Report.

For the purposes of this Task 1 Final Report, the team has been asked to provide an independent view, based on:

- Discussions with experts;
- Experience and knowledge gained over the years from undertaking similar studies; and
- Knowledge of travel market trends, airline strategies, and the degree of flexibility airlines have to adapt to the changing environment.

2.1 KEY OBJECTIVES OF THE ECONOMIC ANALYSIS

The main objectives of the Report are:

- Analyse past and recent trends in air transport activity at the Family Islands Airports;
- Analyse the main socioeconomic, tourism and demographic factors that influence the evolution of traffic in the Family Islands Airports;
- Project annual passenger and aircraft movement for the Family Islands Airports; and
- Develop an economic impact model (score card system) that provides guidelines for the allocation of funding that will be made available for the development of the Family Islands airports covered in this study.

2.1.1 Main Sources of Data

- Bahamas Ministry of Tourism;
- Tourism Today (Bahamas);
- Bahamas Statistics Department;
- Bahamas Investment Authority;
- ACI traffic statistics;
- OAG; and
- EIU

2.2 THE SOCIOECONOMIC AND TOURISM PROFILES IN THE BAHAMAS

2.2.1 Overview of the National Economy

According to the World Bank, The Bahamas is the most economically prosperous Caribbean Community (CARICOM) country and is one of the richest countries in the Americas.

The nation's economy is heavily dependent on tourism and this sector, combined with tourism-driven construction and tourism-related manufacturing, accounts for approximately 60% of GDP and directly or indirectly employs half of the Bahamian labour force.¹

The World Travel & Tourism Council (WTTC) estimates that in 2013 the direct contribution of Travel and Tourism to GDP was BSD 1,729 million (20.4% of GDP) and is projected to rise by 3.2% per annum between 2014 and 2024.

When only considering the contribution linked to the spending of foreign visitors arriving by air, Oxford Economics estimates that in 2009, the travel and tourism industry contributed approximately \$590 million to the economy of the Bahamas (8.2% of total GDP) and supported around 15,600 jobs. Figures for the Family Islands are not available; however, the relative scale of impact is expected to be similar.

After tourism, the most important economic sector is financial services, which accounts for approximately 15% of the nation's GDP. In addition, "other business services" account for approximately 20% of GDP, while manufacturing and agriculture combined account for less than 10% of GDP.²

Despite its success in previous decades, over the past ten years, the Bahamian economy has been anaemic, growing at an average per annum rate of 0.8% between 2003 and 2013. Similar to other countries around the world, the global financial crisis had a marked adverse impact on the economy of The Bahamas. However, the crisis does not account for the fact that growth of the Bahamian economy was lacklustre in the years leading up to the crisis - a time when the world economy was growing at a relatively robust pace.

As demonstrated further on in this section, tourist arrivals to The Bahamas declined by -0.7% per annum over the period 2000-2012 and, given that tourism is the mainstay of the economy, this is the most plausible explanation as to why the country's economic performance was slowed over the past ten years. More fundamentally, it is contended that international tourism has become increasingly competitive over the years and, in keeping with this trend, The Bahamas' tourism sector faces stiff and growing competition, particularly with its Latin American/Caribbean neighbours, for attracting international tourists.

¹ World Bank Development Indicators database.

² World Bank Development Indicators database and CIA World Factbook.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

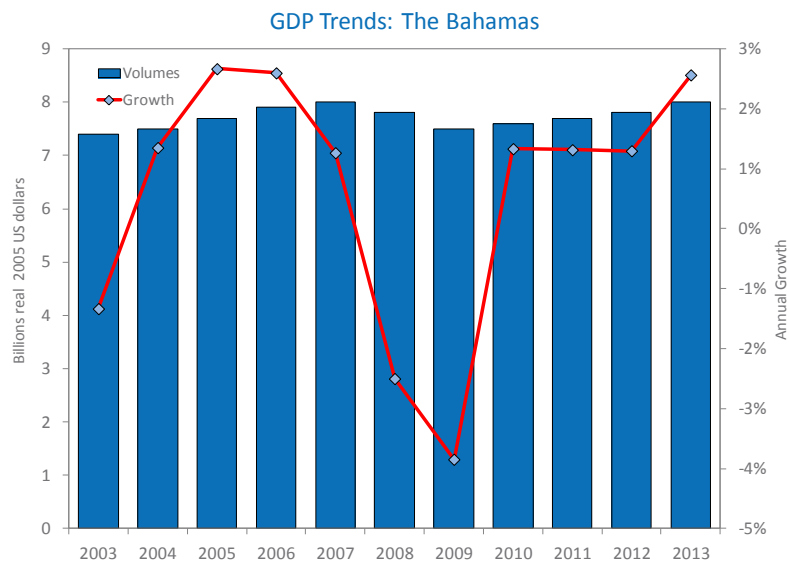


Figure 4: GDP Trends: The Bahamas

(Source: EIU)

The Nation's per capita income declined by -0.1% per annum over the period 2003-2013 and the principal reason why there was negative growth in this metric, despite some minimal growth in GDP for the same period of time, is that the rate of growth in population (see below) was slightly faster than that of the rate of growth in GDP.

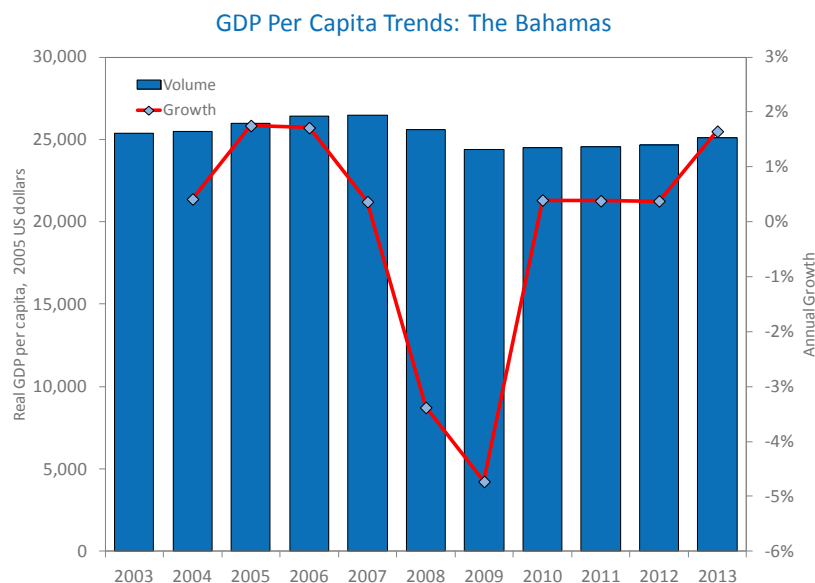


Figure 5: GDP Per Capita Trends: The Bahamas

(Source: EIU)

2.3 DEMOGRAPHIC TRENDS

To make population comparisons between the national and sub-national levels, The Bahamas' latest Census data (2010) was analysed. It is observed that the Family Islands had a population of 52,954 in 2010, which represented 15.0% of the total population in the Bahamas. A decade earlier the population in the Family Islands was 45,785, representing an annual growth of 1.5% and 15.1% of the population in the country.

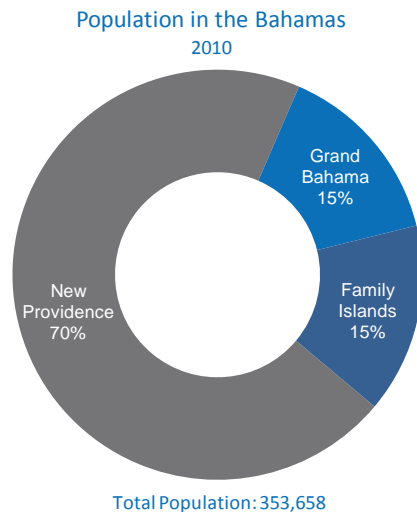


Figure 6: Population of The Bahamas

Source: Department of Statistics of the Bahamas

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

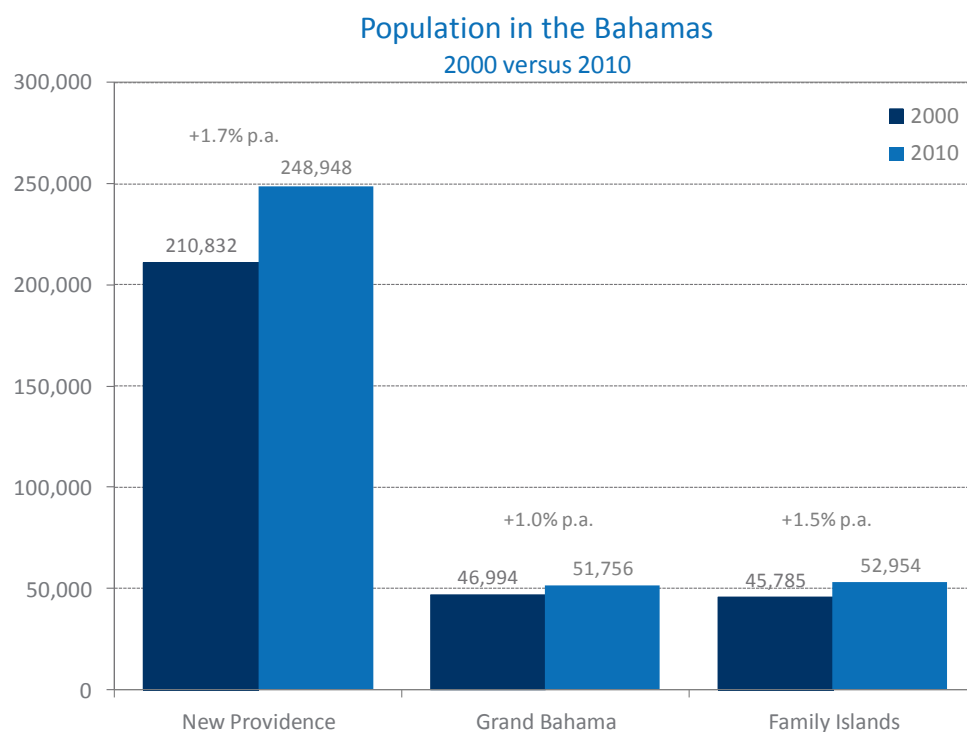


Figure 7: Population in The Bahamas: 2000 vs 2010

Source: Department of Statistics of the Bahamas

The population of the Family Islands is highly concentrated: four islands (namely Abaco, Andros, Eleuthera, and Exuma) account for 74% of the population (totalling 34,856 in-habitants). In 2000, these four islands accounted for 61% of the Family Islands' population. Since 2010, seven islands have seen their population decrease. The decrease has centred mostly on small islands but has also affect Andros, the country's 3rd largest Island.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

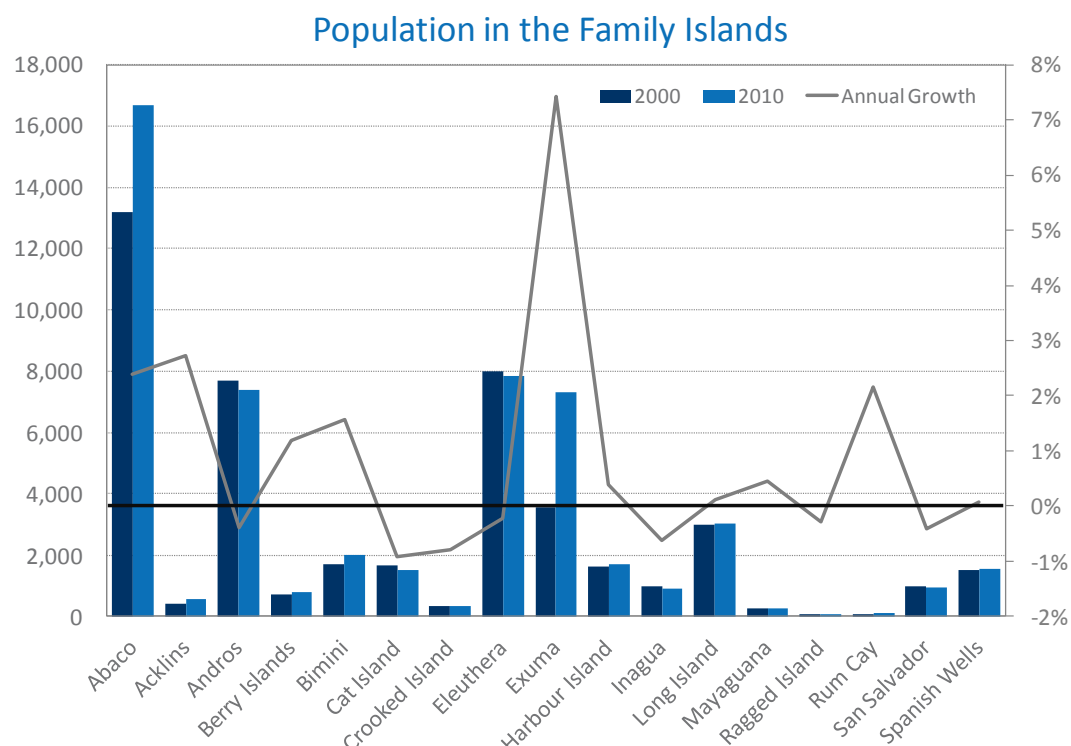


Figure 8: Population in the Family Islands

Source: Department of Statistics of the Bahamas

2.4 TOURISM PERFORMANCE

The nation's tourism sector is the key driver of the economy and its overall performance has been stagnant over the past decade. Nevertheless, a steady flow of foreign investment-led activity indicates that The Bahamas' economic outlook may be shifting.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

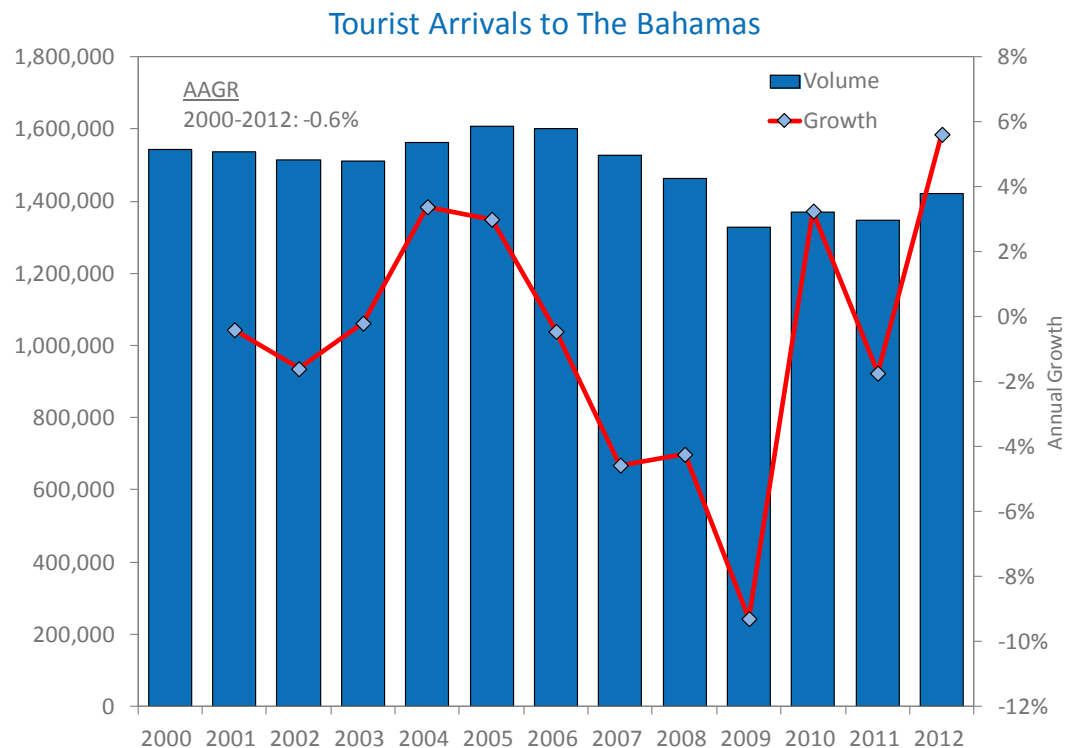


Figure 9: Tourist Arrivals to The Bahamas

Source: Tourism Today and World Bank

Despite indications of a return to growth in tourist arrivals to The Bahamas, the country as a whole does not fare well in comparisons of growth in this metric for key competing jurisdictions across the Caribbean. As indicated in the chart above and in the table below, The Bahamas has experienced negative growth in tourist arrivals over the past decade. As a result, the country's share of tourist arrivals to the Caribbean declined over the period 2002-2012. At the same time, key competing jurisdictions with higher tourist volumes experienced robust growth in tourist arrivals (e.g., Dominican Republic (5.0%), Cuba (5.5%) and Jamaica (4.6%)).

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

Table 2: International Tourist Arrivals, Caribbean

International Tourist Arrivals, Caribbean (000)							
	Arrivals			Rank		Share	
	2002	2012	Growth	2002	2012	2002	2012
Dominican Rp.	2,810	4,563	5.0%	2	1	16.0%	21.8%
Puerto Rico	3,087	3,069	-0.1%	1	2	17.6%	14.7%
Cuba*	1,657	2,688	5.5%	3	3	9.4%	12.9%
Jamaica	1,266	1,986	4.6%	5	4	7.2%	9.5%
Bahamas	1,513	1,419	-0.6%	4	5	8.6%	6.8%
Aruba	643	904	3.5%	6	6	3.7%	4.3%
Barbados	498	536	0.7%	7	7	2.8%	2.6%
Martinique	447	487	0.9%	8	8	2.6%	2.3%
St. Maarten	381	457	1.8%	9	9	2.2%	2.2%
Cayman Islands	303	322	0.6%	10	10	1.7%	1.5%
Others	4,929	4,456	-1.0%			28.1%	21.3%
Total	17,534	20,887	1.8%				

* 2011

Source: UNWTO

In examining the origin of tourist arrivals for The Bahamas as compared to other Caribbean nations, it is not surprising to see that tourism in the Caribbean region as a whole has a strong dependence on tourists originating in North America, and the USA in particular. What is striking, however, is that The Bahamas seems to have a disproportionately high dependence on tourist arrivals from the US and, given that the US economy has been struggling for several years to recover from the global financial crisis, the decline in The Bahamas' tourism industry has not been unexpected. It should also be noted that tourist arrivals to the Bahamas declined prior to the most recent global recession

These trends and cross-country comparisons indicate that The Bahamas faces stiff competition from other Caribbean countries and, in consequence, will have to focus on developing and implementing a focused marketing and investment strategy, including an emphasis on market diversification.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

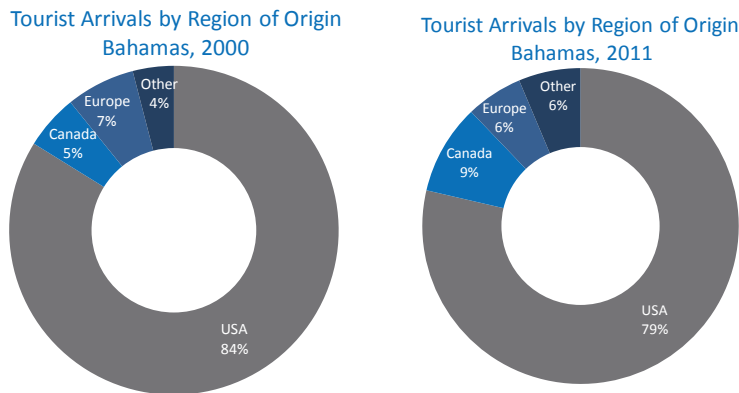
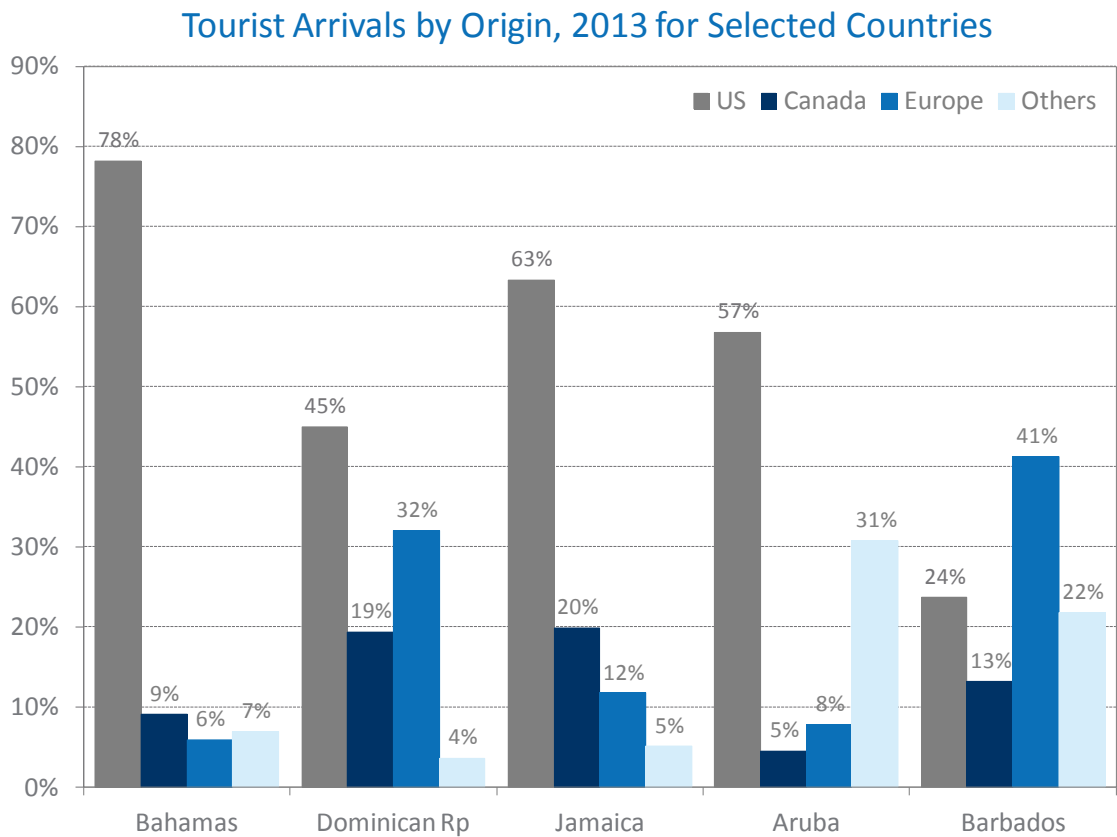


Figure 10: Tourist Arrivals by Region of Origin – 2000 vs 2011
Source: Tourism Today



Source: UNWTO



COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

The chart below compares numbers of hotels in The Bahamas as a whole to percentage share in the Family Islands. While both Nassau (which includes Paradise Island) and Grand Bahama have seen their number of hotels decline, the Family Islands have experienced an increase.

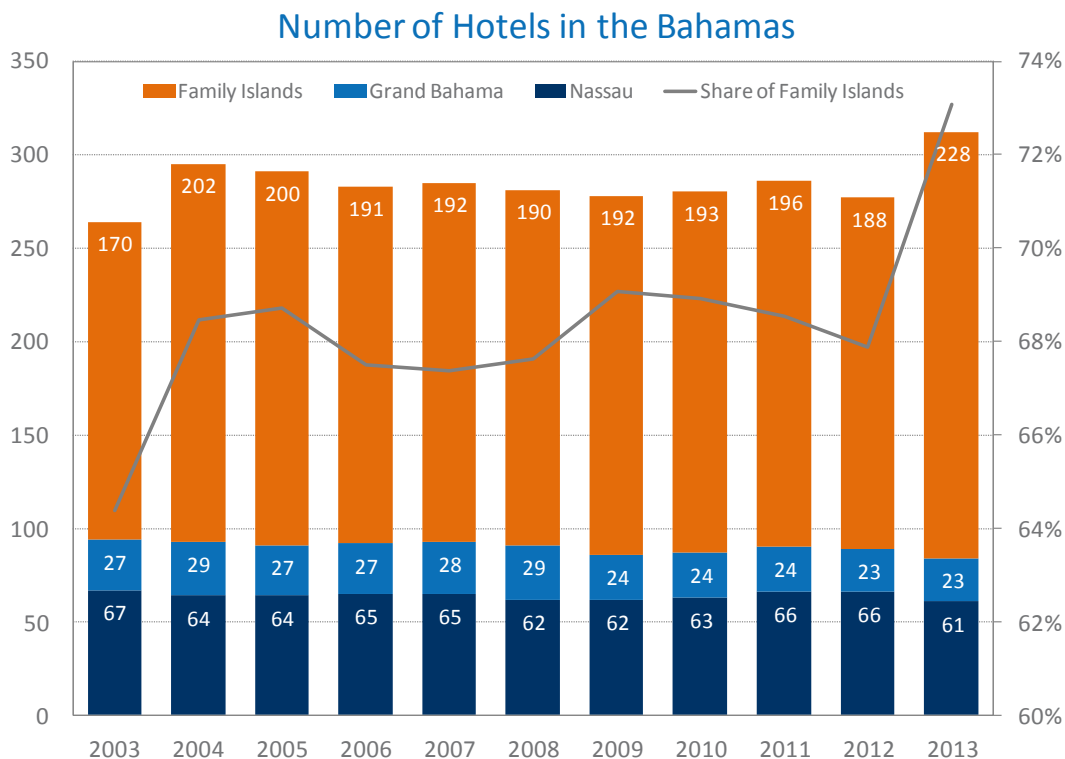


Figure 11: Number of Hotels in The Bahamas

Source: Bahamas Ministry of Tourism

Though the majority of the hotels in The Bahamas are situated on the Family Islands, these hotels tend to be small (average size of 19 rooms vs. 147 rooms in Nassau), meaning that in terms of overall hotel capacity, the Family Islands offered 29% of the total capacity of the Bahamas. However, over the last decade, capacity in the Family Islands' hotels has nearly doubled.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

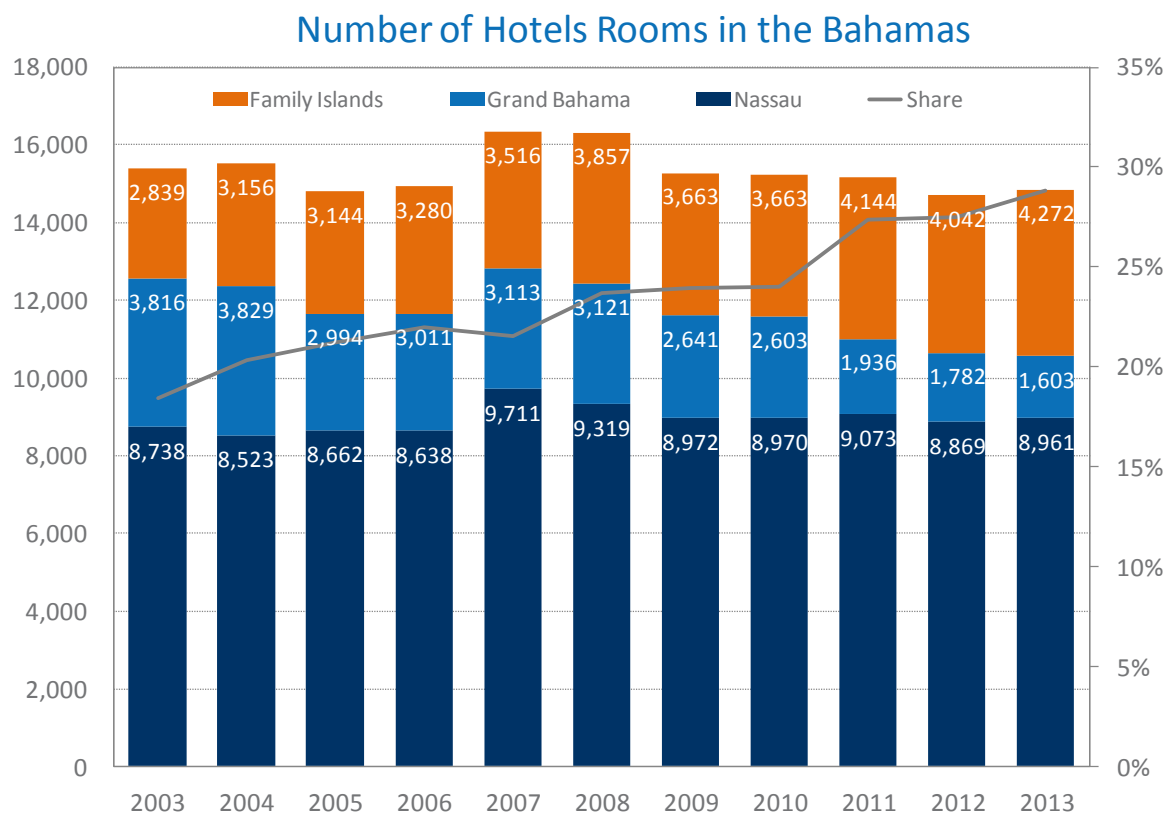


Figure 12: Number of Hotel Rooms in The Bahamas

Source: Bahamas Ministry of Tourism

2.5 ISLAND PROFILES

2.5.1 Abaco

Overview: The Abacos are a group of islands and cays in the northern Bahamas that form a 120-mile-long chain stretching over 650 square miles. The main islands (the mainland) comprise Great Abaco and Little Abaco.. The coastlines are dotted with bays, coves and protected harbours that feature full-service marinas and resorts. Marsh Harbour, the principal settlement and capital, has a lively downtown area with all city amenities.

Airport Coverage: Treasure Cay, Marsh Harbour, Moore's Island and Sandy Point.



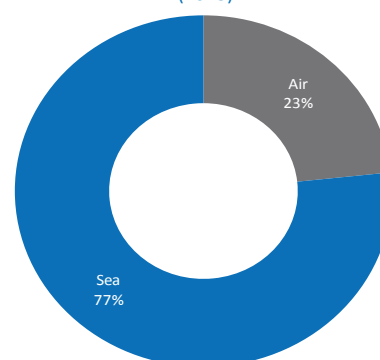
Key points of distinction:

- ✓ Abaco Islands are known as one of the world's top boating and sailing destinations;
- ✓ Diving and snorkelling is excellent, with several protected underwater areas (e.g., Fowl Cay National Reserve and Pelican Cays National Park);
- ✓ Boat building by hand (without plans) is a tradition still practiced by some residents of Man-O-War Cay who are renowned for their superior workmanship; and
- ✓ The Bahamas National Trust maintains six national parks in the Abaco Islands.

Abaco: Facts & Figures

Population (2010)	16,692
Seasonal residents (2011)	7,910
Timeshare visitors (2011)	1,246
Hotel visitors (2011)	23,267
Number of hotel rooms (2012)	964
Tourism-related investments (approved/in progress - past 5 years)	4.5 bn

Visitor Arrivals to Abaco: Air vs. Sea (2013)



Key Activities:

Boating/sailing

Diving/snorkeling

Bonefishing and deep sea fishing

Culture/history (colonial towns)

Golfing (two golf courses)

Beach activities

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

2.5.2 Andros

Overview: At 2,300 square miles, Andros is the largest island of The Bahamas and the fifth-largest island in the Caribbean.

Airport Coverage: San Andros Airport at Nicholls Town, Andros Town International Airport located at Fresh Creek, the Clarence A. Bain Airport at Mangrove Cay and Congo Town Airport in South Andros.

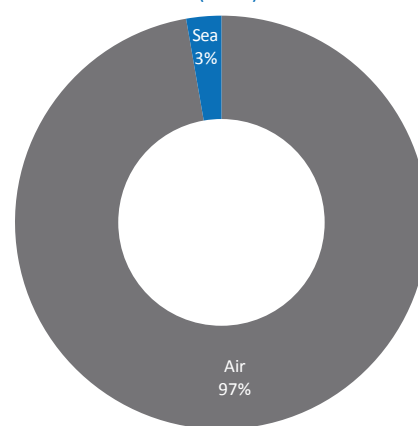


Key points of distinction:

- ✓ The earth's third-largest barrier reef (after Australia's Great Barrier and Central America's Belize Barrier Reef) lies adjacent to its shores.
- ✓ Tongue of the Ocean — A mile-deep abyss walled with coral and filled with whales, dolphin, marlin and a myriad of reef animals –runs along Andros' east coast.
- ✓ The University of Miami has a campus here.

Andros: Facts & Figures	
Population (2010)	7,386
Seasonal residents (2011)	398
Timeshare visitors (2011)	3
Hotel visitors (2011)	3,974
Number of hotel rooms (2012)	393
Tourism-related investments (approved/in progress - past 5 years)	\$59.8 mn

Visitor Arrivals to Andros: Air vs. Sea (2013)



Key Activities:

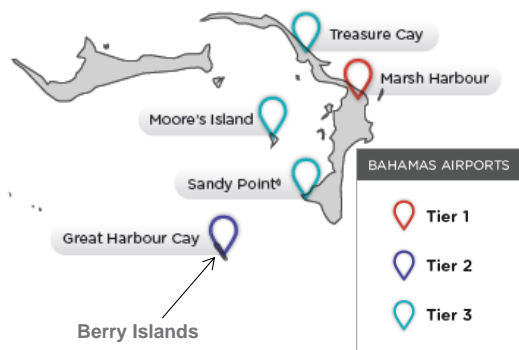
Eco travel
 Kayaking
 Diving/snorkeling
 Bird watching
 Bonefishing and deep sea fishing

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS –
AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

2.5.3 Acklins Island

Overview: Acklins is a lesser known island that is remote and not well-known as a tourist destination. The island is 92 square miles and is four miles across at its widest point. It hugs the Bight of Acklins, a small but famous lagoon.

Airport Coverage: Spring Point.



Key points of distinction:

- ✓ Breathtakingly beautiful beaches, unusual rock formations and scenic plant and animal life make Acklins Island a nature lover's dream.

Acklins: Facts & Figures

Population (2010) (Spring Point)	36
Seasonal residents (2011)	-
Timeshare visitors (2011)	
Hotel visitors (2011)	-
Number of hotel rooms (2012)	47
Tourism-related investments (approved/in progress - past 5 years)	-

Key Activities:

Bonefishing and deep sea fishing

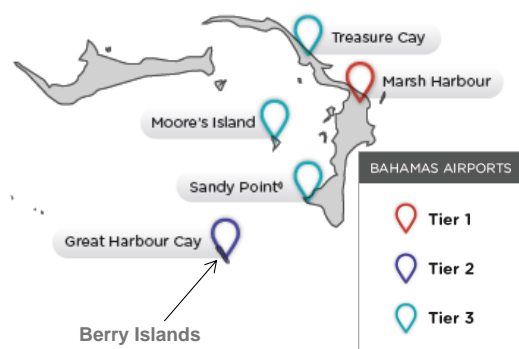
Diving/snorkeling

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

2.5.4 Berry Islands

Overview: The Berry Islands are a cluster of 30 cays, comprising a land mass that totals just over twelve square miles, and has a population of about eight hundred people. Most residents live at Bullock's Harbour, which is only a short distance from Great Harbour Cay.

Airport Coverage: Great Harbour Cay.



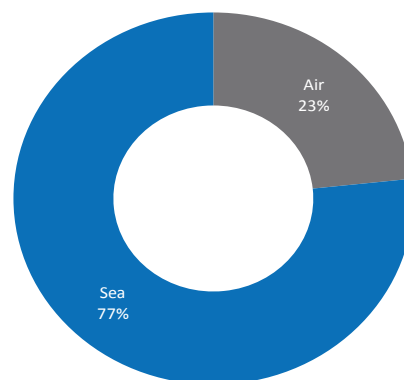
Key points of distinction:

- ✓ Berry Islands is home to Chub Cay, often referred to as "The Fish Bowl of the Bahamas," which borders a deep-sea gully known as the Tongue of the Ocean. Bait fish are drawn into the submarine gardens off its coast and larger fish follow, making it a fisherman's paradise, famous for its record-breaking catches.
- ✓ In May, Great Harbour Cay's annual fishing tournament attracts hordes of visitors and fishing captains.
- ✓ Many of the cays, suitable for stock raising and agriculture, are privately owned.
- ✓ Little Stirrup Cay is a private island that's used by Royal Caribbean Cruise Lines as a one-day stopover.

Berry Islands: Facts & Figures

Population (2010)	798
Seasonal residents (2011)	-
Timeshare visitors (2011)	-
Hotel visitors (2011)	-
Number of hotel rooms (2012)	40
Tourism-related investments (approved/in progress - past 5 years)	\$470 mn

Visitor Arrivals to Berry Islands: Air vs. Sea (2013)



Key Activities:

Diving/snorkeling

Hiking

Deep sea fishing

Fishing tournament

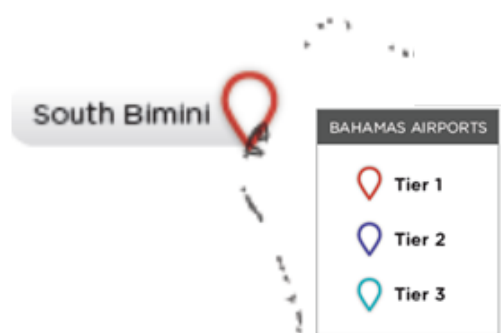
Golfing

Culture/history

2.5.5 Bimini Island

Overview: Bimini is the closest Bahamian island to the United States, located just 50 miles off Florida's coast. It consists of two main islands—North Bimini Island and South Bimini Island—and numerous cays.

Airport Coverage: South Bimini



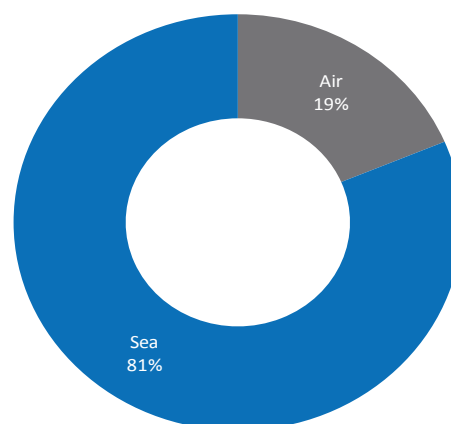
Key points of distinction:

- ✓ It is known as Ernest Hemingway's favourite escape. Hemingway popularised big game fishing in the waters around Bimini, leading the way for many fishermen to pilot their own boats across the Gulf Stream from Florida to seek out what is regarded as some of the world's feistiest game fish.
- ✓ Scuba diving on wrecks, reefs, or atop the mysterious Bimini Road that some believe is the remnants of a man-made causeway of the legendary Lost City of Atlantis.
- ✓ Kayaking to the legendary "Fountain of Youth", a natural spring amid the mangrove mud that pumps lithium and sulphur.

Bimini: Facts & Figures

Population (2010)	2,008
Seasonal residents (2011)	2,999
Timeshare visitors (2011)	28
Hotel visitors (2011)	35,977
Number of hotel rooms (2012)	830
Tourism-related investments (approved/in progress - past 5 years)	\$174.2 mn

Visitor Arrivals to Bimini: Air vs. Sea (2013)



Key Activities:

Diving/snorkeling

sailing

Fishing (bonefish and big game)

history/culture

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

2.5.6 Cat Island

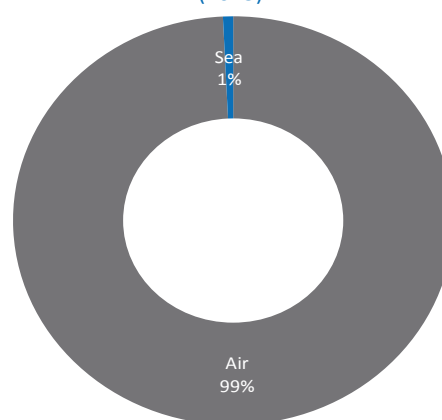
Overview: About 130 miles southeast of Nassau and Paradise Island, near the Tropic of Cancer, lies Cat Island. The fishhook-shaped island is only 48 miles long and at its widest is only four miles across. Much of the island has not been developed, which provides a unique vacation for those who want to get away in a private, relaxing and laid-back environment.

Airport Coverage: Arthur's Town and New Bight.



Cat Island: Facts & Figures	
Population (2010)	1,503
Seasonal residents (2011)	-
Timeshare visitors (2011)	-
Hotel visitors (2011)	-
Number of hotel rooms (2012)	181
Tourism-related investments (approved/in progress - past 5 years)	\$1.2 bn

Visitor Arrivals to Cat Island: Air vs. Sea
(2013)



Key points of distinction:

- ✓ The island runs deep with history and culture. Visitors can wander around the ruins of cotton plantations and slave huts or explore the interior of ancient Arawak Indian caves.
- ✓ Annual Rake & Scrape Festival. Music is made using recycled objects (e.g., saw, pieces of wood, fishing line, tin washtubs, and goatskin drums).
- ✓ Up the steps of Mt. Alvernia sits The Hermitage, a medieval monastery hand carved from rock by Father Jerome

Key Activities:

Diving/snorkeling

Hiking

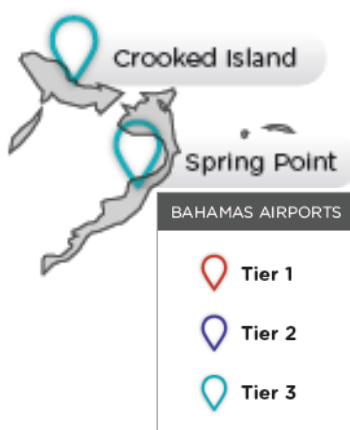
Fishing (bonefish and big game)

history/culture

2.5.7 Crooked Island

Overview: Crooked Island is one of the four islands forming an atoll which hugs the beautiful shallow waters of the Bight of Acklins. It is extremely remote and not well known as a tourist destination.

Airport Coverage: Crooked Island and Spring Point.



Key points of distinction:

- ✓ Historical points of interest include: remnants of slave and cotton plantations, ancient churches, remains of a British fort that was constructed to protect the Crooked Island Passage from the area's many pirates and buccaneers.

Crooked Island: Facts & Figures

Population (2010)	323
Seasonal residents (2011)	
Timeshare visitors (2011)	
Hotel visitors (2011)	
Number of hotel rooms (2012)	33
Tourism-related investments (approved/in progress - past 5 years)	\$31 mn

Key Activities:

Diving/snorkeling

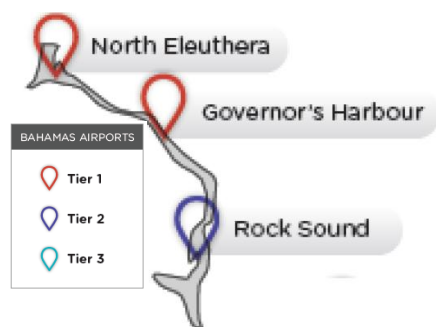
Fishing

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

2.5.8 Eleuthera & Harbour Island

Overview: Eleuthera Island is approximately two miles wide and 110 miles long. It is divided between North Eleuthera and South Eleuthera. There are more natural wrecks here than off any other island in the Bahamas. This is especially true along The Devil's Backbone, a shallow and jagged reef extending across the northern edge of Eleuthera.

Airport Coverage: North Eleuthera, Governor's Harbour and Rock Sound.



Key points of distinction - Eleuthera:

- ✓ Home of the first republic in the "New World". Many historical landmarks remain from the British Loyalists who settled here in the 1700s.
- ✓ Secluded villas and upscale resorts attract the rich and famous, including members of the British royal family.

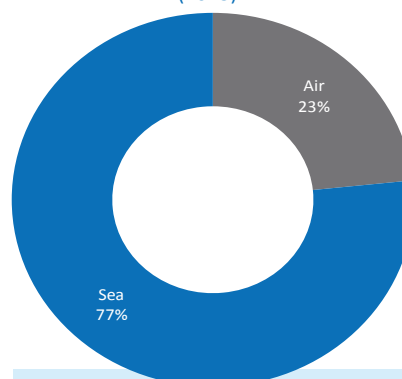
Key points of distinction - Harbour Island:

- ✓ Approximately 3.5 miles long and only 1.5 miles wide, Harbour Island is located just off the tip of Eleuthera, separated by a narrow channel. Regular ferry service shuttles resort and hotels guests as well as daily visitors from North Eleuthera for a day of exploring and shopping in Dunmore Town.
- ✓ This tiny island is a vacation magnet for the rich and famous, savvy travellers and beach vacationers.
- ✓ Harbour Island, Bahamas, is famous for the pink beach that runs the entire length of its eastern shore.
- ✓ Current Cut offers one of the most thrilling high-current dives in the Caribbean.
- ✓ Note: Harbour Island, Bahamas, was ranked "The Best Island in the Caribbean" by Travel Leisure magazine.

Eleuthera: Facts & Figures

Population (2010)	11,515
Seasonal residents (2011)	2,954
Timeshare visitors (2011)	55
Hotel visitors (2011)	23,943
Number of hotel rooms (2012)	568
Tourism-related investments (approved/in progress - past 5 years)	\$2.2 bn

Visitor Arrivals to Eleuthera: Air vs. Sea (2013)



Key Activities:

Diving/snorkeling

Fishing

History/Culture

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

2.5.9 Exuma

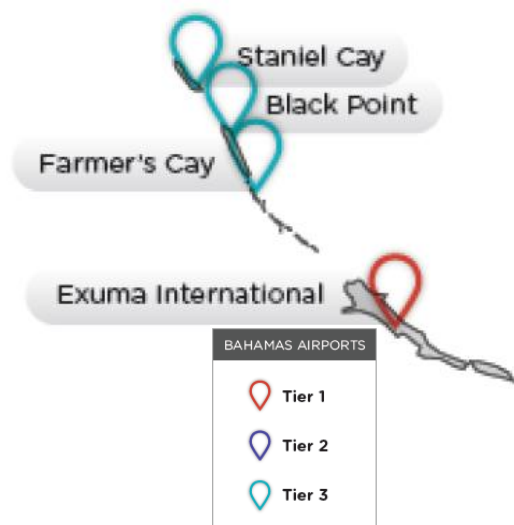
Overview: The Exumas are a 120-mile-long island chain-within-the-chain of the Out Islands, with the Exuma Cays scattered in a long line extending north toward New Providence from Great Exuma. The anchor of the Exumas archipelago is Great Exuma, where the capital of Georgetown is situated.

Staniel Cay is a hub of activity in the Exuma Cays. Boaters gather at the Staniel Cay Yacht Club's bar and restaurant, and a landing strip serves as the gateway to the northern stretch of Cays.

Hotels here range from five-star resorts such as the Grand Isle Resort & Spa or luxury-inclusive like Sandals Resort, which houses a world-class golf course built by Greg Norman, to condo-resorts and locally-owned fishing lodges.

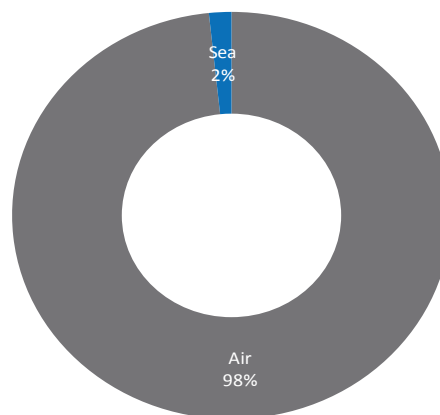
In addition to tourism-related investment projects on the island (see accompanying 'Exuma: Facts & Figures' chart), the Georgetown area has a mini hospital that is expected to open by year-end.

Airport Coverage: Staniel Cay, Black Point, Farmer's Cay, and Exuma International.



Exuma: Facts & Figures	
Population (2010)	7,314
Seasonal residents (2011)	1,140
Timeshare visitors (2011)	17
Hotel visitors (2011)	20,593
Number of hotel rooms (2012)	755
Tourism-related investments (approved/in progress - past 5 years)	\$790.2 mn

Visitor Arrivals to Exuma: Air vs. Sea (2013)



COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

Key points of distinction:

- ✓ Many of the Exuma Cays are private, some operated as luxuriously exclusive private-island resorts and others as the ultra-exclusive homes of the rich and famous.
- ✓ The area is considered to be so precious — it's reefs and island environments so pristine — that the Bahamian government set aside a 176-square-mile section as the Exuma Cays Land and Sea Park, one of the world's most successful marine parks.

Key Activities:

Boating

Fishing (bonefish and big game)

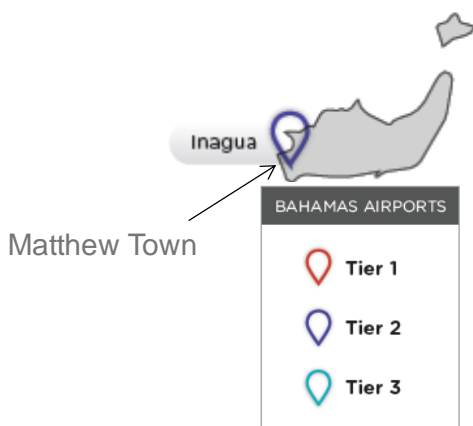
Kayaking

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

2.5.10 Inagua

Overview: Inagua consists of two separate islands, Great Inagua Island and Little Inagua Island. Both are known for their natural surroundings and act as great destinations for Eco tourists.

Airport Coverage: Matthew Town.



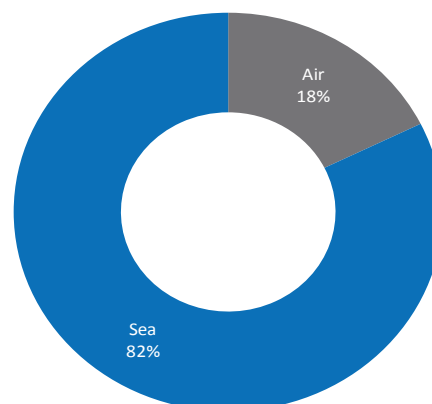
Key points of distinction:

- ✓ The island has three national parks and preserves, as well as one of three remaining kerosene-burning, hand-cranked lighthouses in The Bahamas.
- ✓ Inagua National Land & Sea Park covers 45% of Great Inagua Island and is home to over 80,000 West Indian Flamingos and other birds unique to The Bahamas. Consequently, Inagua is considered a haven for birdwatchers and marketed as the Bird watching Capital of The Bahamas.
- ✓ Little Inagua Island is a protected habitat for endangered sea turtles, and features a vast reef that prevents boaters and sailors from getting too close to its shores.

Inagua: Facts & Figures

Population (2010)	911
Seasonal residents (2011)	-
Timeshare visitors (2011)	-
Hotel visitors (2011)	-
Number of hotel rooms (2012)	27
Tourism-related investments (approved/in progress - past 5 years)	-

Visitor Arrivals to Inagua: Air vs. Sea (2013)



Key Activities:

Eco tourism

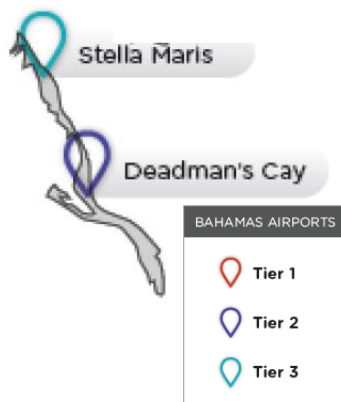
Bird watching

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

2.5.11 Long Island

Overview: Long Island is 80 miles long and at its widest is four miles wide. The Tropic of Cancer runs directly through the island, giving it two very different coastlines—dramatic cliffs and caves on the east coast, and a sandy-edged lee side which slopes into the Bahamas Bank.

Airport Coverage: Stella Maris and Deadman's Cay.



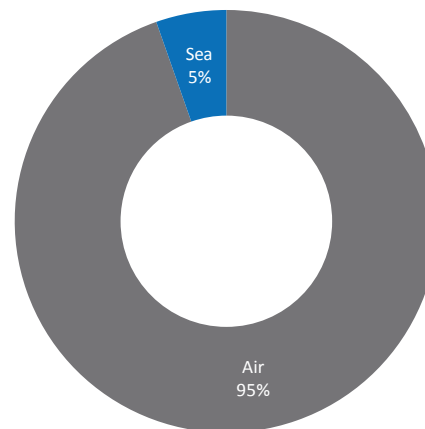
Key points of distinction:

- ✓ To divers, the Island is best known for Dean's Blue Hole, the deepest recorded blue hole in the Bahamas (more than 600 feet).
- ✓ Scuba divers are drawn to the area's sharks, vast schools of fish, towering corals, and the spectacular wall of nearby Conception Island (a national park).
- ✓ Cape Santa Maria Beach has been recognized by beach lovers and travel writers as one of the most beautiful beaches in the world.
- ✓ Hamilton's Cave - One of the largest caves in The Bahamas, is an ancient cave system that has passages 50 feet wide and a ceiling over 10 feet high. Artefacts and cave drawings from the Lucayan Indian tribe were discovered here in 1935.

Long Island: Facts & Figures

Population (2010)	3,024
Seasonal residents (2011)	-
Timeshare visitors (2011)	-
Hotel visitors (2011)	-
Number of hotel rooms (2012)	201
Tourism-related investments (approved/in progress - past 5 years)	\$170.7 mn

Visitor Arrivals to Long Island: Air vs. Sea (2013)



Key Activities:

Bonefishing

Diving/snorkeling

Sailing/yachting

Beach activities

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

2.5.12 Mayaguana

Overview: More isolated and less developed than any other island in The Bahamas, Mayaguana is one of the least visited by tourists in the Bahamas and is noted as a destination for travellers seeking a secluded escape.

Today, it's home to just 300 locals who live in three main settlements—Abraham's Bay, Pirate's Well, and Betsy Bay. Most residents make a living by fishing for conch and farming the land.

Airport Coverage: Mayaguana.



Mayaguana: Facts & Figures

Population (2010)	271
Seasonal residents (2011)	-
Timeshare visitors (2011)	-
Hotel visitors (2011)	-
Number of hotel rooms (2012)	13
Tourism-related investments (approved/in progress - past 5 years)	-

Key Activities:

Bonefishing

Diving

Guided tours of main settlements

2.5.13 Ragged Island

Overview: This hilly, croissant-shaped chain of islands is part of the Jumento Cays. The islets, cays and rocks stretch over 110 miles and comprise Great and Little Ragged Island, Raccoon Cay, Hog Cay, Nurse Cay, Flamingo Cay and Double-Breasted Cay, among others.

Until recently Ragged Island had an active salt industry. The salt ponds were developed in the 19th Century by Duncan Taylor, after whom Duncan Town, the only settlement, is named. Due to the decline of the salt industry and the lack of adequate educational facilities on the island there has been a gradual emigration to more prosperous islands such as New Providence, Grand Bahama Island, Abaco Island, The Exumas and Eleuthera.

No major economic or tourism growth is planned for Ragged Island.

Airport Coverage: Ragged Island Airport

Key points of distinction:

- ✓ The island is a haven for avid fishermen, with its unparalleled flats ideal for bone fishing.
- ✓ The island has a salt industry.

Ragged Island: Facts & Figures

Population (2010)	70
Seasonal residents (2011)	-
Timeshare visitors (2011)	-
Hotel visitors (2011)	-
Number of hotel rooms (2012)	5
Tourism-related investments (approved/in progress - past 5 years)	-

Key Activities:

Bonefishing

History/culture

2.5.14 Rum Cay

Overview: Rum Cay measures 30 square miles in area and is a small settlement. Today, Port Nelson is the only inhabited village remaining on the island. Tourism plays a significant role to island residents, as many of them are employed by the marinas and restaurants that attract seafarers and other visitors.

Airport Coverage: Rum Cay.

Key points of distinction:

- ✓ Known as a "sleeping beauty" because it's considered one of the best-kept secrets in The Bahamas southern region, Rum Cay is recognized for its historical ruins, vivid coral reefs, miles of pure sand beaches and thrilling surf.
- ✓ Just offshore is an abundance of vibrant marine life that attracts fishermen, divers and snorkelers from all around.

Rum Cay: Facts & Figures

Population (2010)	99
Seasonal residents (2011)	-
Timeshare visitors (2011)	-
Hotel visitors (2011)	-
Number of hotel rooms (2012)	6
Tourism-related investments (approved/in progress - past 5 years)	-

Key Activities:

Fishing

Diving/snorkeling

2.5.15 San Salvador

Overview: Only 12 miles long and 5 miles wide, San Salvador is one of the most south-eastern islands of The Bahamas and set on the Atlantic side of the archipelago of The Bahamas, the island of San Salvador is about 200 miles southeast of Nassau, about a 1-hour flight from Florida.

Airport Coverage: San Salvador

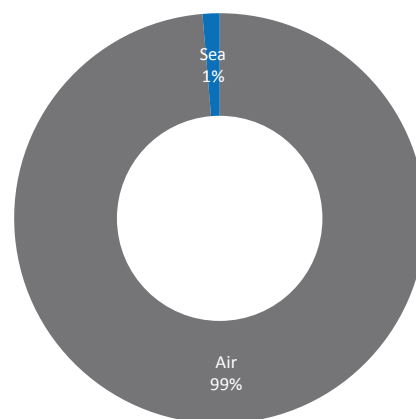
Key points of distinction:

- ✓ San Salvador is home to many shipwrecks, ruins and monuments, including four memorials that purportedly mark the exact spot Christopher Columbus came ashore in 1492.
- ✓ San Salvador is renowned for great diving, with more than 50 dive sites on the island's lee side, including ruins and shipwrecks.
- ✓ Gerace Research Centre, located on an old US Navy base has been studying the island's Archaeology, Biology, Geology, and Marine Science for over 30 years
- ✓ Great Lake Preserve - This lake in the middle of San Salvador has been designated a protected area to preserve its natural pristine wonder. The lake stretches the entire length of the island at 10 miles long and 2 miles wide and connects all of the island's major settlements.
- ✓ Much of San Salvador's tourism activity is focused around the island's Club Med and a distinguishing feature of the island is that a large proportion of its tourists come from Europe — a contrast from most of the other Family Islands, whose tourists principally arrive from the Americas.

San Salvador: Facts & Figures

Population (2010)	930
Seasonal residents (2011)	57
Timeshare visitors (2011)	
Hotel visitors (2011)	14,456
Number of hotel rooms (2012)	278
Tourism-related investments (approved/in progress - past 5 years)	\$122.5 mn

Visitor Arrivals to San Salvador: Air vs. Sea (2013)



Key Activities:

Fishing

Diving

Sailing

Guided tours

3.0 OVERVIEW OF AIR TRANSPORT IN LATIN AMERICA, THE CARIBBEAN AND THE BAHAMAS

3.1 LATIN AMERICA AND THE CARIBBEAN

Table 3: Economic and Population Data

Population: 524 million (2013)	ACI World Ranking (2013) 4/6
8.8% of World Population	Total Passengers (million, 2013): 461
GDP (US\$, 2013): 3,457 bn	7.5% Share of World Traffic
6.4% of World GDP	Annual Growth 2000-2013: 6.0%
GDP per Capita (2013): 6,532 US\$	Share of international passengers (2013): 28.9%
Ratio: Passengers /Population (2013): 0.7	

Over the last decade, Latin American and Caribbean governments have worked to improve their economies and reduce poverty. Today, it seems those efforts have paid off. Growth across the region has averaged 3.5% per annum and, in consequence, the region's air traffic has surged by 6.0%, led by countries such as Brazil, Peru and Chile. Although today, Latin America represents less than 10% of worldwide passengers; its recent traffic growth has been impressive. Moreover, being one of the success stories in aviation in recent years, the need for airport infrastructure developments could potentially become a constraint to future growth in the region. Investment in airport infrastructure, runways and other airport facilities, will be key to ensure the expansion of the sector.

Tourism has been and will continue to be a major driver of air transport in the region, outperforming the world tourism developments. Exemplifying this, as reported by the UNWTO (United Nations World Tourism Organisation), international tourist arrivals in Latin America have increased 4.6% per annum since 1990, above the 4% increase at a world level over the same period. Tourism will continue to stimulate air transport growth.

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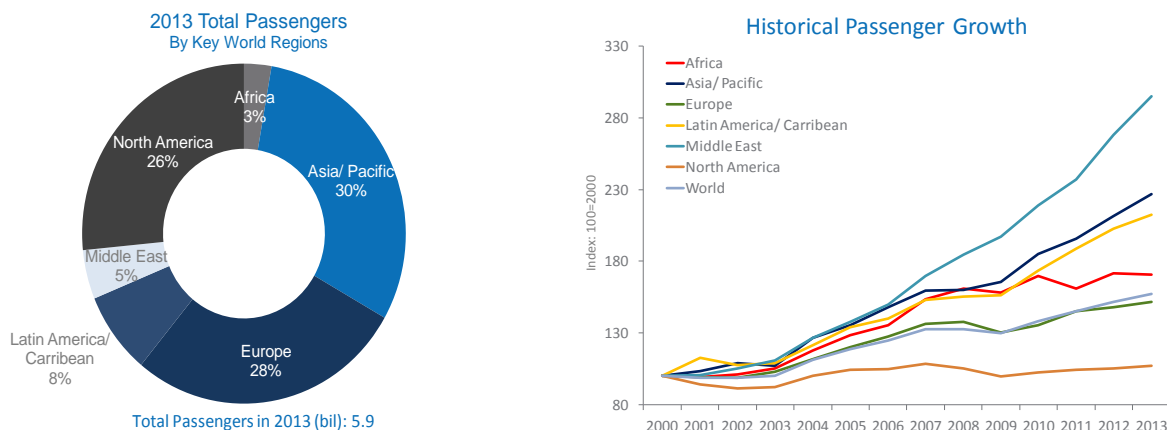


Figure 13: Total Passengers by Region with Growth

Source: ACI Statistics

Within Latin America/Caribbean, the region of the Caribbean accounts for 10% of passenger traffic and 0.7% of world traffic. The Caribbean is a collection of mostly small island-countries relying greatly on the tourism industry for their economic development.

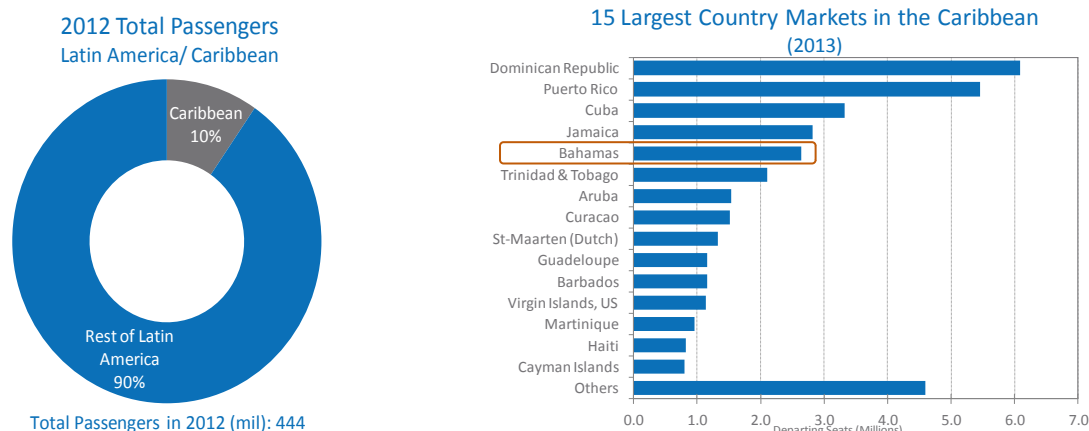


Figure 14: Total Passengers (2012) Data – Latin America/Caribbean

Source: ACI and OAG Statistics

In terms of the air transport market, the Dominican Republic, which has a large and well developed tourism market, ranks as the largest in the Caribbean, while the Bahamas, ranks 5th. More precisely the Bahamas accounts for 6% of air transport demand in the Caribbean.

3.2 TRAFFIC CAPACITY DEVELOPMENT IN THE BAHAMAS

The Bahamas is an island country consisting of more than 700 islands, cays, and islets in the Atlantic Ocean; north of Cuba and Hispaniola (the Dominican Republic and Haiti); northwest of the Turks and Caicos Islands; southeast of the U.S. state of Florida; and east of the Florida Keys. Its capital, Nassau, is on the Island of New Providence and, as one of the most prosperous countries

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in the West Indies; the Bahamas relies on tourism to generate most of its economic activity. Tourism as an industry not only accounts for over 60% of the Bahamian GDP, but provides jobs for more than half the country's workforce. After tourism, the most important economic sector is financial services, accounting for some 15 % of GDP. As an island country, The Bahamas relies greatly on the sea and the air for its transportation of goods and citizens.

Based on OAG seating capacity, in 2013 the Bahamas offered 6.5 million seats, which is a decrease of 1.6% since 2004. The greatest decline was in Freeport (Grand Bahama) which has seen its market decrease by more than half (or -8.2% per annum). Most of the cuts were on the international routes (-10.9% per annum) compared to a smaller reduction on the domestic market (-2.4% per annum). Nassau (Lynden Pindling International Airport) is by far the largest airport in the country and, since 2004; it has seen a decline of 0.9%, including 6.0% in 2013. Here too, most of the cutbacks were on the international routes (-1.6% per annum), compared to an expansion of the domestic markets (+1.6% per annum). On the contrary, the Family Islands Airports have seen their market, marginally, but steadily increase and by 2013 they accounted for 23% of seating capacity in The Bahamas. Since 2003, capacity has increased annually by 0.4%.

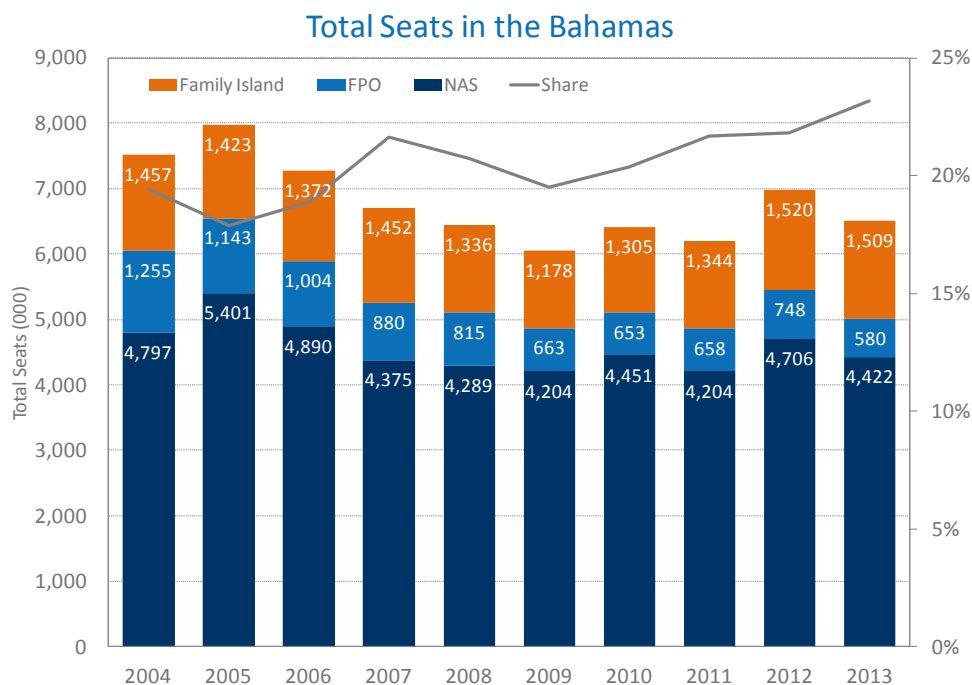


Figure 15: Total Seats in The Bahamas

Source: OAG Statistics

The Family Islands Airports is a collection of airports that vary in size and in the nature of the services offered to their local community. In 2013, 17 airports offered commercial service while the others only offered non-commercial service (i.e., General Aviation). In 2003, 21 airports received commercial service. Since 2003, the international markets have decreased annually by

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1.4% per annum while the domestic markets have grown by 1.2%. This translates to an increase of the share of the domestic activities: In 2003 domestic represented 67% and by 2013 72%. In 2013, 81% of the domestic seats were to/ from Nassau and in comparison, in 2003 this figure was 69%. There is no domestic commercial service to Freeport (FPO) and the remainder of the domestic commercial service is intra-Family Islands service.

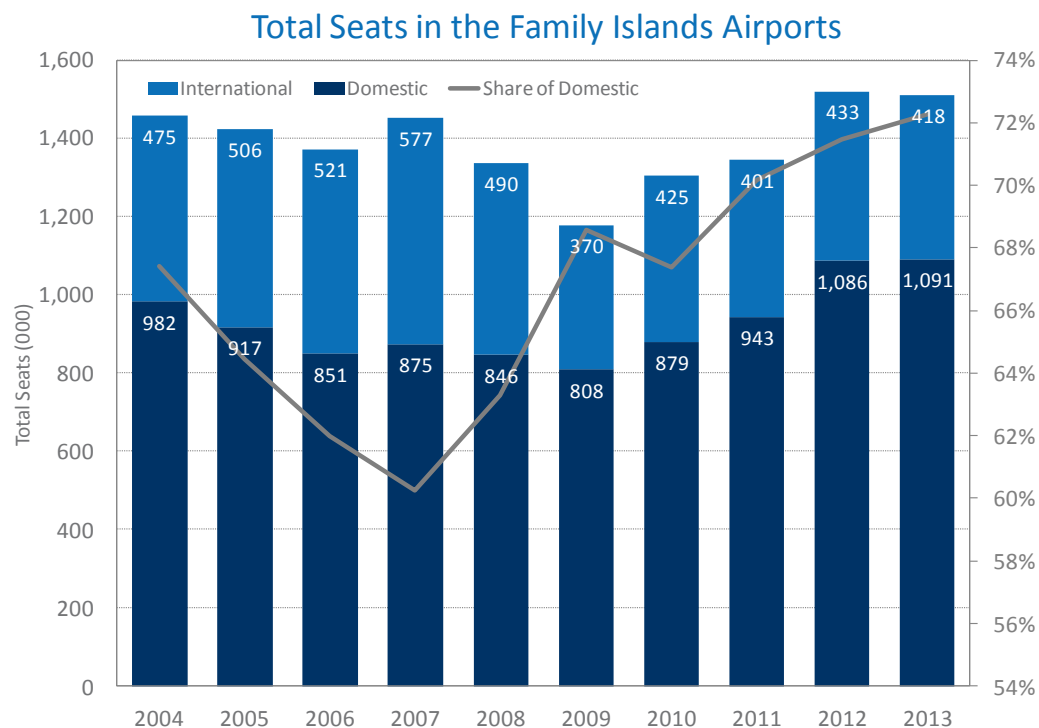


Figure 16: Total Seats in the Family Islands Airports

Source: OAG Statistics

Since 2004, the carriers that operate commercial scheduled flights in the Family Islands have greatly evolved. Today, Bahamasair is the largest domestic carrier. However, during the last decade the carrier has reduced capacity. Meanwhile, other carriers, namely SkyBahamas and Pineapple Air, have expanded. In 2008, Vintage Props & Jets declared bankruptcy and the void has enabled the expansion of SkyBahamas and Pineapple Air. The largest international carrier is American, followed by United. Most of the domestic routes to/from the Family Islands are to/from Nassau. No commercial service to Freeport is offered and intra Family Islands flights are rare. Internationally, most service is to/from the USA (more specifically Florida). Many domestic and international routes are multi-stops.

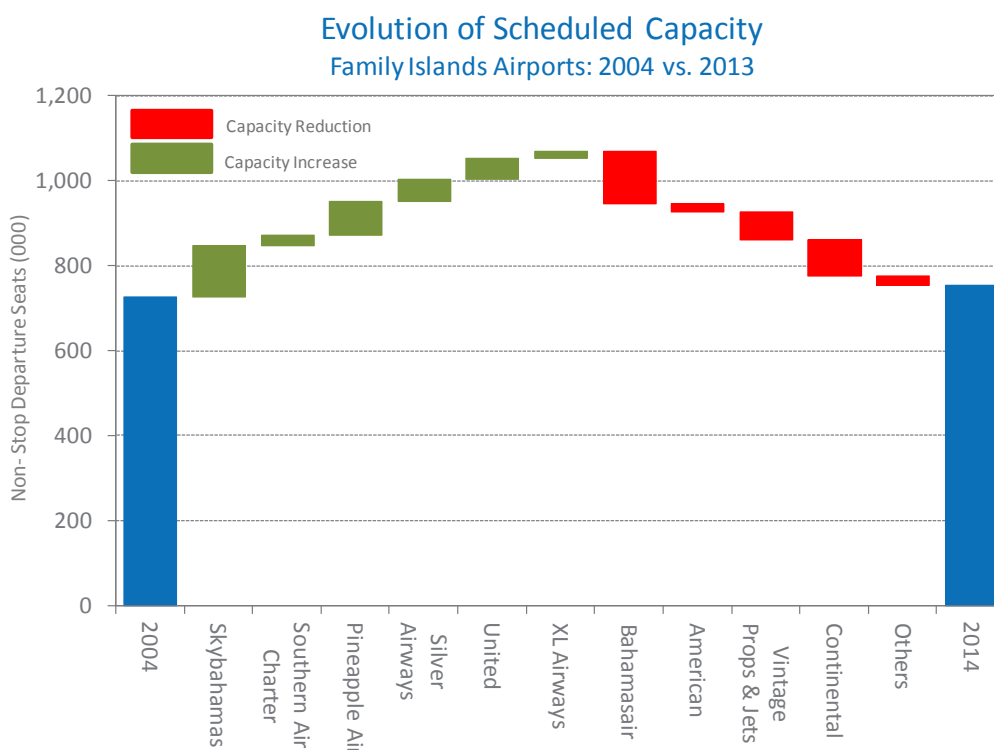


Figure 17: Evolution of Scheduled Capacity (2004 vs 2013)

Source: OAG Statistics

3.3 ESTIMATION OF SCHEDULED PASSENGER AND COMMERCIAL AIRCRAFT MOVEMENTS IN THE FAMILY ISLANDS

The Stantec team, led by DKMA, prepared projected passenger and aircraft movements for the Family Islands Airports. By definition, to prepare a forecast it is necessary to have historical traffic statistics and for this study only partial data was provided to the team. More precisely the forecast team had:

- A data set from 2008 to 2011 for international passenger arrivals by Family Islands Airports (though no domestic passenger information;
- For commercial aircraft movements we relied on the OAG; and
- For non-commercial aircraft movements (GA), the client provided movements for February and March, 2014 for arrival flights from Nassau Airport (NAS) only.

In spite of the missing data, armed with partial information, the team has been able to construct a historical time series by airport. The time series estimates:

- International passengers (2008-2013);
- Scheduled domestic passengers (2008-2013);
- Domestic commercial aircraft movements (2008-2013);

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- International commercial aircraft movements (2008-2013); and
- Non-commercial movements (2013-2014).

Estimating International Passengers: the team had access to international arrivals by airport for 2008 to 2013. To obtain total international passengers, data was multiplied by 2. The international arrivals data is an excellent proxy for estimating total international passengers but nevertheless has some weaknesses. Arriving and departing passengers may not do so at the same airport due to domestic travel, making multiplying by two slightly inaccurate.

Estimating Scheduled Domestic Passengers: The methodology developed by DKMA to estimate domestic passengers by airport is completely different than the one developed to estimate international passengers. The team obtained historical domestic passenger data for Nassau (Lynden Pindling International Airport) for 2008 and 2013, which was used as our starting point. The Bahamas scheduled domestic routes can be regrouped under three main route areas:

- Nassau to/from Freeport (NAS-FPO);
- Nassau to/from Family Islands Airports; and
- Intra-Family Islands Airports.

Note: The OAG indicates there is no commercial scheduled service between FPO and the Family Islands.

From the OAG we know the capacity/seats offered by individual carriers for each domestic route. Therefore, we can group capacity/seats for the 3 main domestic route areas mentioned above. Since we have actual domestic passengers in Nassau, and we have the corresponding scheduled seats capacity, we can derive an estimated load factor by year for domestic service from Nassau. From this we assumed that the load factors for the intra-island routes are the same as the one to/from Nassau. Since we have capacity for each intra-Island route, we can estimate passengers by multiplying the estimated load factor to the capacity. The diagram in the next slide illustrates the process.

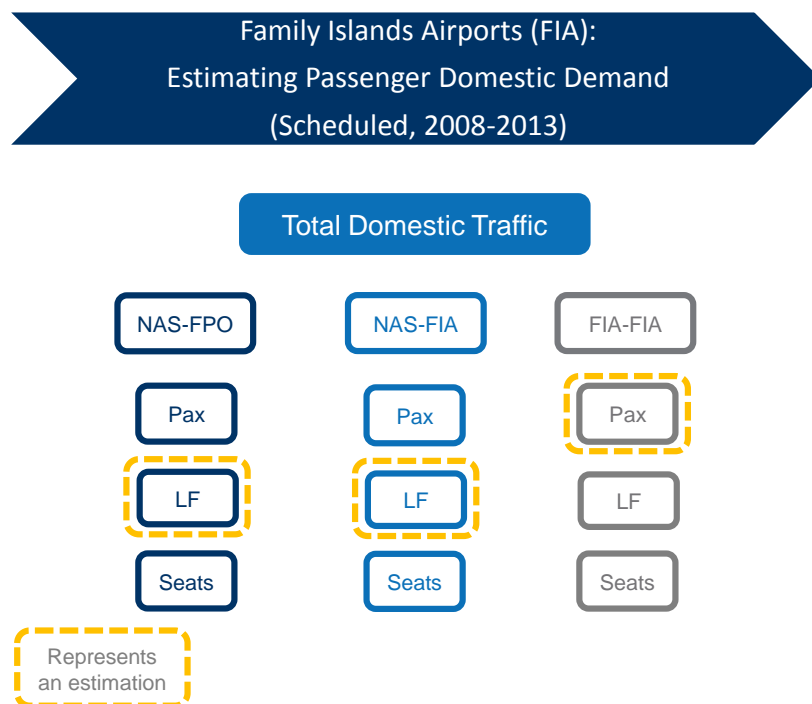


Figure 18: Estimating Passenger Demand (FIA), 2008-2013

Aside from the information found in the OAG, we know that some carriers in the Bahamas offer scheduled flights but that the information is not reported to the OAG. Western Air and LeAir are examples of this. From the web pages of these carriers, the forecast team was able to establish their flight schedule and estimate their annual passengers and movements. These carriers operate at several airports in the Family Islands including San Andros, South Andros/Congo Town, Mangrove Cay and Fresh Creek/Andros Town.

Estimating Commercial Movements: For commercial movements by airport, the team relied on the OAG flight schedule. This schedule provides us with a historical time series split by airport and between domestic and international operations. However, the OAG is based on 'planned' flights, which differ from 'actual' flights. Planned flights may be cancelled for reasons including mechanical and weather events. Though the difference between 'planned' and 'actual' is marginal, it is important to recognize that it exists.

Estimating Non-Commercial Movements: For non-commercial movements, the team had aircraft arrivals for February and March 2014, between Nassau and 26 airports in the Family Islands, except for Farmer's Cay and Crooked Island, for which we had no relevant data.

Since the data cover only arrivals from Nassau (Lynden Pindling International Airport), it does not represent total non-commercial activities in the Family Islands. Unfortunately, we have no information to estimate non-commercial activities outside of flights involving Nassau and thus, the non-commercial information is incomplete.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

To convert these two months of non-commercial arrivals movements, the team did the following: analysed the seasonality of non-commercial movements for a series of 10 Caribbean airports. For this list of airports, on average, non-commercial movements in February represented 10.1% of the annual activity and March 10.3%. For the Family Islands, the same percentage distribution was assumed and from there, converted the February and March arrivals into calendar year arrivals. To estimate total calendar year non-commercial movements we then multiplied by 2.

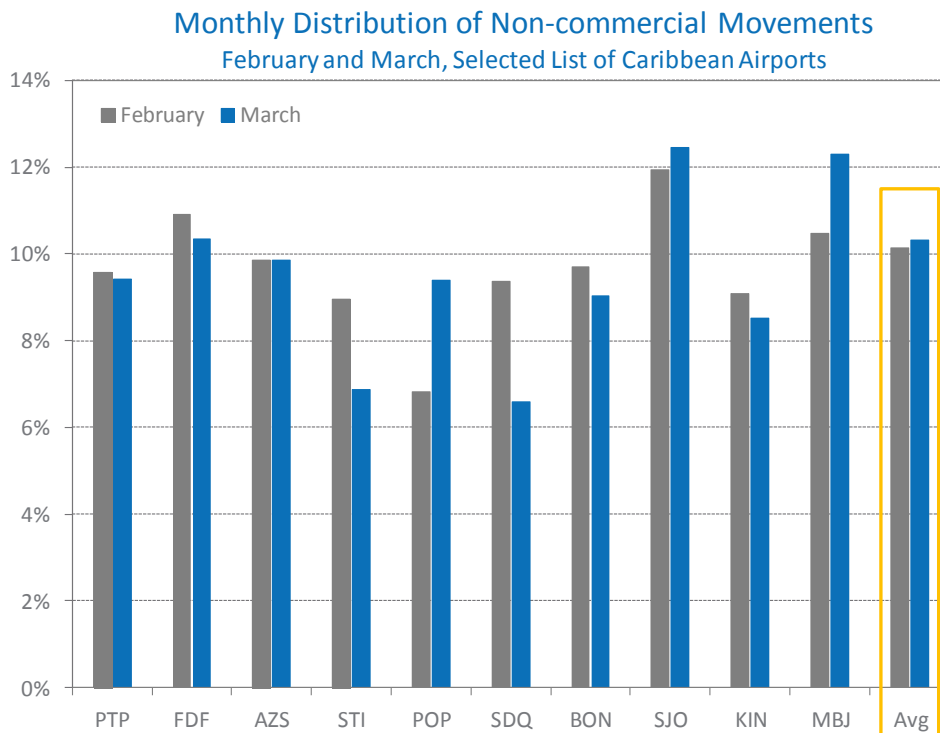


Figure 19: Monthly Distribution of Non-Commercial Movements

Source: ACI Statistics

For the two missing airports, non-commercial movements were estimated the following way:

- For Crooked Island it was assumed that the profile of activity was similar to Spring Point, where both airports have non-commercial and commercial activities. In Spring Point, the ratio of non-commercial to commercial movements was 0.0188 and since we have commercial movements in Crooked Islands, we applied this ratio to estimate non-commercial movements in Crooked Island.

Farmer's Cay has no commercial activities and therefore, to estimate non-commercial movements, the methodology used for Crooked Island could not be applied. Instead, it was assumed that Farmer's Cay has a comparable level of activities as Black Point, another airport with no commercial operations. However, an adjustment was made for the "26th Annual Farmer's Cay Festival & Regatta" held in February which could impact non-commercial activities during that period.



COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

These assumptions enabled us to estimate non-commercial movements in 2014. However, since part of our work includes understanding the Family Islands Airport activity from a historical perspective, we also estimated non-commercial movements in 2013. This enabled us to understand, for example, the importance of non-commercial activities versus commercial movements, passengers, etc.

3.3.1 Summary of Scheduled Passenger and Commercial Aircraft Movements in the Family Islands

This study focuses on 28 airports situated in the Family Islands. Of these 28 airports, 22 had scheduled commercial service in 2013, meaning that the remaining six only offered non-commercial operations. From the estimations described above, the team estimates that in 2013, the Family Islands Airports handled 1,055,052 passengers, of which 63% were domestic passengers. To compare, in 2008, passengers were estimated at 1,006,496 representing an increase of 0.9% per annum.

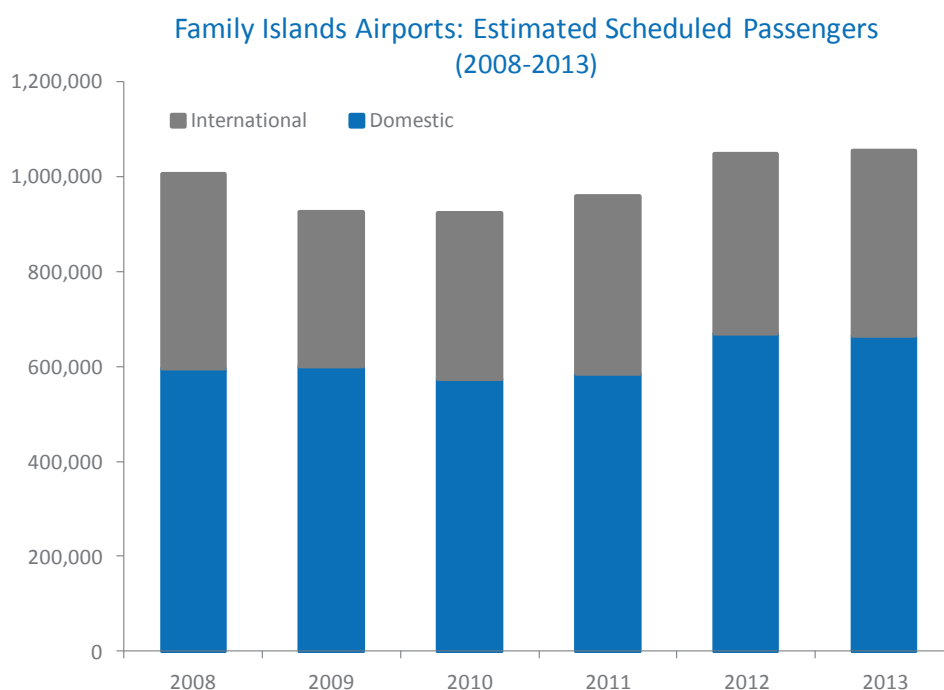


Figure 20: FIA Estimated Scheduled Passengers (2008-2013)

Source: DKMA estimates

In 2013, total aircraft movements were estimated at 86,837, of which non-commercial movements were estimated at 28,458, representing 33% of all movements. Non-commercial activities comprise a wide range of activities (e.g., sightseeing, search and rescue, training, recreational, survey, aerial ambulance etc.). Ranging in size from small to large aircraft, these operations contribute significantly to the local economies, to which they fly and, given that the

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

Family Islands is a collection of islands - by definition fairly remote and isolated - it does not come as a surprise that non-commercial activities represent nearly one third of all movements.

In parallel, commercial movements were estimated at 58,379 and of these, 46,908 were domestic movements (representing 80.4% of activity) and 11,471 international movements. Since 2008, commercial movements have declined annually by 1.2%, where most of the decline was on international routes (-16.9% per annum). Most of the international cutback was on the Fort Lauderdale route, where airline mergers led to frequency being scaled back. In 2013, the average passenger per flight was 14 for domestic flights, 34 for international flights and 18 for all route areas combined.

For the purpose of this study, the Family Islands airports are grouped into three tiers based on their future operational potential. Tier 1 airports hold the greatest potential, while Tier 3 hold the least potential. Additionally, one airport is not ranked by tier since it is slated as possible closure (Arthur's Town).

Despite consisting of only six airports, Tier 1 accounts for the largest share of passenger activities (these are identified below). In 2013, they are estimated to have handled 722,155 passengers including 326,062 international passengers. Alone these six airports account for 84% of international passenger activity at the Family Islands Airports.

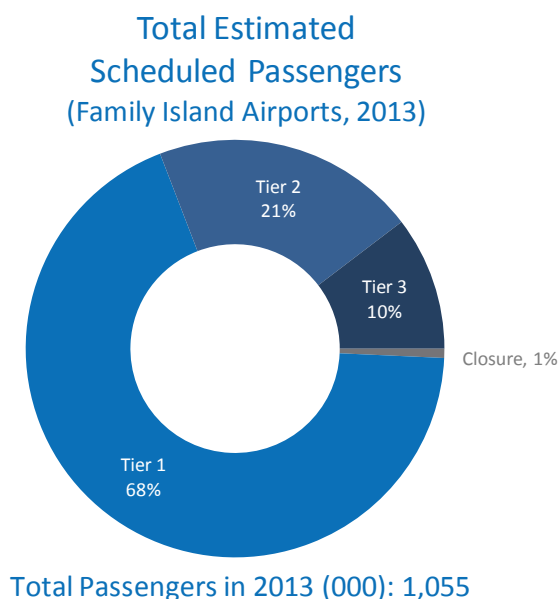


Figure 21: Total Estimated Scheduled Passengers (FIA, 2013)

Source: DKMA estimates

Within the 28 airports that comprise the Family Islands, Marsh Harbour is the single largest airport, with an estimated 216,643 passengers in 2013. It is estimated that, in 2013, the airport handled 120,324 international passengers, representing 56% of its passenger activities. Marsh Harbour,

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along with San Salvador and South Bimini, are the only three airports in the group for which international passenger activities were more important than domestic ones. In terms of domestic activities, North Eleuthera is the largest domestic airport with an estimated 102,433 passengers in 2013, while Marsh Harbour ranks second with 96,319 and Exuma/Georgetown ranked third with 90,422 domestic passengers.

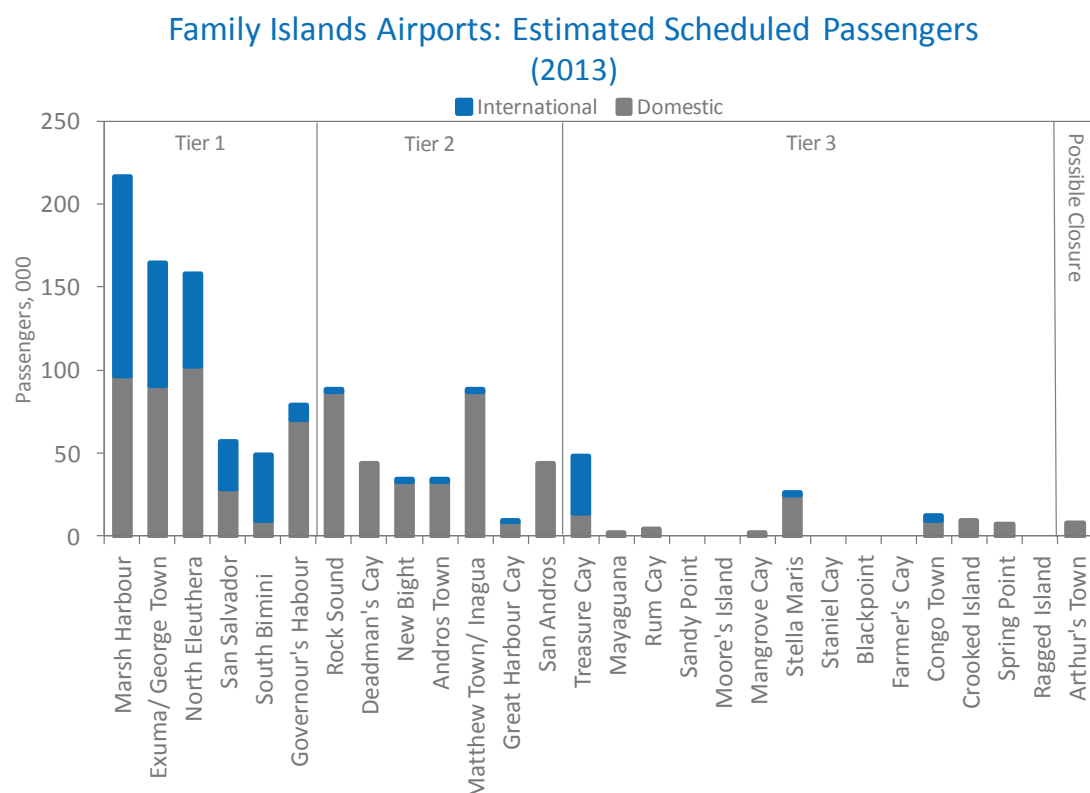


Figure 22: FIA Estimated Scheduled Passengers (2013)

Source: DKMA estimates

The next two tables show the estimated passengers and aircraft movements for each airport.

It should be noted that in the first table, which highlights passenger development between 2008 and 2013, that a figure of zero (0) indicates that the airport in question has no scheduled commercial passenger activity.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

Table 4: Estimated Scheduled Passengers, FIA

Estimated Scheduled Passengers (000), Family Islands Airports												
Tier	3-Letter Code	4-Letter Code	Airport Name	Domestic			Int'l			Total		
				2008	2013	%	2008	2013	%	2008	2013	%
1	MHH	MYAM	Marsh Harbour	109.0	96.3	-2.4%	135.3	120.3	-2.3%	244.3	216.6	-2.4%
1	GGT	MYEF	Exuma/ George Town	81.5	90.4	2.1%	59.0	73.9	4.6%	140.5	164.3	3.2%
1	ELH	MYEH	North Eleuthera	93.4	102.4	1.9%	51.3	55.4	1.6%	144.7	157.8	1.8%
1	ZSA	MYSM	San Salvador	30.7	27.8	-2.0%	32.9	28.6	-2.7%	63.5	56.4	-2.4%
1	BIM	MYSB	South Bimini	0.0	9.4	-	32.4	39.0	3.8%	32.4	48.3	8.3%
1	GHB	MYEM	Governour's Habour	69.2	69.8	0.2%	14.4	8.9	-9.2%	83.6	78.7	-1.2%
2	RSD	MYER	Rock Sound	48.8	86.7	12.2%	4.1	1.7	-16%	52.9	88.4	10.8%
2	LGI	MYLD	Deadman's Cay	32.0	43.5	6.3%	0.0	0.0	-	32.0	43.5	6.3%
2	TBI	MYCB	New Bight	6.9	32.5	36.2%	6.1	1.6	-23.5%	13.0	34.1	21.2%
2	ASD	MYAF	Andros Town	0.0	10.7	-	8.0	5.8	-6%	8.0	16.6	15.7%
2	IGA	MYIG	Matthew Town/ Inagua	12.9	8.2	-8.6%	0.3	0.4	5%	13.2	8.6	-8.1%
2	GHC	MYBG	Great Harbour Cay	0.0	0.2	-	9.9	7.6	-5%	9.9	7.9	-4.5%
2	SAQ	MYAN	San Andros	9.2	9.1	-0.3%	4.1	7.7	14%	13.3	16.8	4.8%
3	TCB	MYAT	Treasure Cay	43.4	13.5	-20.8%	43.6	34.5	-5%	86.9	48.0	-11.2%
3	MYG	MYMM	Mayaguana	12.5	1.8	-32.0%	0.0	0.0	-	12.5	1.8	-32.0%
3	RCY	MYRP	Rum Cay	0.0	3.7	-	0.0	0.0	-	0.0	3.7	-
3		MYAS	Sandy Point	0.0	0.0	-	0.0	0.0	-	0.0	0.0	-
3		MYAO	Moore's Island	0.0	0.0	-	0.0	0.0	-	0.0	0.0	-
3		MYAB	Mangrove Cay	0.0	1.6	-	0.0	0.0	-	0.0	1.6	-
3	SML	MYLS	Stella Maris	17.4	24.4	7.0%	1.8	1.8	-0.8%	19.2	26.2	6.4%
3	TYM	MYES	Staniel Cay	0.0	0.0	-	0.0	0.0	-	0.0	0.0	-
3		MYEB	Blackpoint	0.0	0.0	-	0.0	0.0	-	0.0	0.0	-
3	MYE3		Farmer's Cay	0.0	0.0	-	0.0	0.0	-	0.0	0.0	-
3	TZN	MYAK	Congo Town	9.2	9.1	-0.3%	7.0	2.9	-16.0%	16.2	12.0	-5.8%
3	CRI	MYCI	Crooked Island	8.8	9.1	0.8%	0.0	0.0	-	8.8	9.1	0.8%
3	AXP	MYAP	Spring Point	8.5	7.1	-3.7%	0.0	0.0	-	8.5	7.1	-3.7%
3	DCT	MYRD	Ragged Island	0.0	0.0	-	0.0	0.0	-	0.0	0.0	-
C	ATC	MYCA	Arthur's Town	2.9	7.6	21.1%	0.0	0.0	-	2.9	7.6	21.1%
	Total			596.5	665.0	2.2%	410.0	390.1	-1.0%	1,006.5	1,055.1	0.9%

Source: DKMA estimates

Domestic passenger traffic has seen an annual growth of 2.2% since 2008 in the Family Islands Airports while the international passenger activity has declined by 1.0% over this same time frame.

Regarding aircraft movements, a figure of zero (0) in the commercial columns indicates that the airport has no commercial activities.

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Table 5: Estimated Aircraft Movements, FIA

Estimated Aircraft Movements (000), Family Islands Airports															
Tier	3-Letter Code	4-Letter Code	Airport Name	Scheduled - Dom			Scheduled - Int'l			Non-Commercial			Total		
				2008	2013	%	2008	2013	%	2008	2013	%	2008	2013	%
1	MHH	MYAM	Marsh Harbour	7.4	4.5	-9.4%	11.1	4.1	-18.0%	n/a	1.1	n/a	18.6	9.8	n/a
1	GGT	MYEF	Exuma/ George Town	3.0	4.4	7.8%	3.0	2.2	-6.0%	n/a	0.8	n/a	6.0	7.4	n/a
1	ELH	MYEH	North Eleuthera	5.9	9.3	9.4%	3.4	1.8	-12.4%	n/a	3.8	n/a	9.3	14.9	n/a
1	ZSA	MYSM	San Salvador	1.0	1.5	7.6%	0.1	0.3	21.7%	n/a	0.3	n/a	1.1	2.0	n/a
1	BIM	MYSB	South Bimini	0.0	0.5	-	1.6	0.7	-14.9%	n/a	0.6	n/a	1.6	1.8	n/a
1	GHB	MYEM	Governour's Harbour	3.8	5.4	6.9%	1.3	0.5	-19.1%	n/a	1.6	n/a	5.1	7.4	n/a
2	RSD	MYER	Rock Sound	1.6	6.1	31.2%	0.5	0.1	-23%	n/a	0.8	n/a	2.1	7.0	n/a
2	LGI	MYLD	Deadman's Cay	1.3	3.5	22%	0.0	0.0	-	n/a	0.3	n/a	1.3	3.9	n/a
2	TBI	MYCB	New Bight	0.6	2.1	27.2%	0.6	0.1	-39%	n/a	0.1	n/a	1.3	2.3	n/a
2	ASD	MYAF	Andros Town	0.0	1.3	-	0.3	0.1	-19%	n/a	4.6	n/a	0.3	6.0	n/a
2	IGA	MYIG	Matthew Town/ Inagua	0.5	0.3	-8.3%	0.02	0.03	5.0%	n/a	0.03	n/a	0.5	0.4	n/a
2	GHC	MYBG	Great Harbour Cay	0.0	0.1	-	0.0	0.4	-	n/a	0.85	n/a	0.0	1.3	n/a
2	SAQ	MYAN	San Andros	0.7	1.3	13.9%	0.0	0.2	26.8%	n/a	5.1	n/a	0.7	6.5	n/a
3	TCB	MYAT	Treasure Cay	4.3	0.6	-32.9%	6.5	0.8	-34.4%	n/a	0.2	n/a	10.8	1.6	n/a
3	MYG	MYMM	Mayaguana	0.5	0.2	-13.2%	0.0	0.0	-	n/a	0.05	n/a	0.5	0.3	n/a
3	RCY	MYRP	Rum Cay	0.0	0.4	-	0.0	0.0	-	n/a	0.05	n/a	0.0	0.4	n/a
3		MYAS	Sandy Point	0.0	0.0	-	0.0	0.0	-	n/a	0.3	n/a	0.0	0.3	n/a
3		MYAO	Moore's Island	0.0	0.0	-	0.0	0.0	-	n/a	0.09	n/a	0.0	0.1	n/a
3		MYAB	Mangrove Cay	0.0	0.7	-	0.0	0.0	-	n/a	1.4	n/a	0.0	2.1	n/a
3	SML	MYLS	Stella Maris	0.7	2.5	30.6%	0.2	0.2	-0.8%	n/a	1.0	n/a	0.9	3.7	n/a
3	TYM	MYES	Staniel Cay	0.0	0.0	-	0.0	0.0	-	n/a	4.8	n/a	0.0	4.8	n/a
3		MYEB	Blackpoint	0.0	0.0	-	0.0	0.0	-	n/a	0.07	n/a	0.0	0.1	n/a
3	MYE3		Farmer's Cay	0.0	0.0	-	0.0	0.0	-	n/a	0.09	n/a	0.0	0.1	n/a
3	TZN	MYAK	Congo Town	0.8	0.9	3%	0.1	0.1	-2%	n/a	0.4	n/a	0.9	1.4	n/a
3	CRI	MYCI	Crooked Island	0.3	0.5	10.0%	0.0	0.0	-	n/a	0.01	n/a	0.3	0.5	n/a
3	AXP	MYAP	Spring Point	0.31	0.32	0.5%	0.0	0.0	-	n/a	0.06	n/a	0.3	0.38	n/a
3	DCT	MYRD	Ragged Island	0.0	0.0	-	0.0	0.0	-	n/a	0.06	n/a	0.0	0.1	n/a
C	ATC	MYCA	Arthur's Town	0.2	0.4	11.9%	0.0	0.0	-	n/a	0.02	n/a	0.2	0.4	n/a
	Total			33.0	46.9	7.3%	28.9	11.5	-16.9%	n/a	28.5	n/a	61.9	86.8	n/a

Source: DKMA estimates

There has been a significant shift in aircraft movements in the past five (5) years in the Family Islands Airports and the frequency of domestic flights has risen by 7.3%, with several air carriers serving multiple destinations. In contrast, the frequency of international flights has declined by close to 17% in the past 5 years. Passenger activity is only down by 1.0% during this time which indicates that carriers are using larger gauge equipment on the international flights. A reduction in flight numbers can also be attributed to the decrease of tourism activity. These aspects of the market will be addressed later in the report.

4.0 FORECAST METHODOLOGY AND FORECAST ASSUMPTIONS

4.1 TRAFFIC FORECAST METHODOLOGY & ASSUMPTIONS

4.1.1 Traffic Forecast Methodology

The objective is to deliver a 20 year passenger and aircraft movement forecast for each of the airports that comprise the Family Island Airports. Furthermore, passengers and aircraft movements will be further split between domestic and international and for each airport, non-commercial movements must also be projected.

In the field of air traffic forecasting, the strong correlation between growth in a region's income and demand for air travel to/from that region is both intuitive and borne out by experience. Put simply, at an economy's micro level: an individual's demand for air transport will increase in some proportion to an increase in that individual's income.

Based on this premise, the classic long term forecast methodology is to develop a top down model based on a regression/ econometric analysis. An econometric analysis postulates a relationship between a dependant variable and one or more independent/ explanatory variables. The dependant variable is the historical traffic development, while the explanatory variables are those variables that have an influence on the demand for air travel. The most common and reliable explanatory variable is GDP. The econometric model attempts to explain the demand for air travel as being caused by the changes in the explanatory variables (in other words, how economic growth influences air travel demand).

In many cases, a simple linear regression, in which the number of passengers forecasted is dependent on the level of the GDP, will yield satisfactory results. In this basic approach, GDP is the independent/ explanatory variable, whereas passenger traffic is the dependant variable. To develop a credible forecast model, the forecaster must have a long term historical time series which is stable and not affected by 'extraordinary' events.

In the context of this study, we had a medium term historical passenger series but no GDP on an island basis. This meant that it was impossible to rely on a classic regression model to project demand in the Family Islands. Instead, to project demand at a Family Islands airport level the team developed a bottom up forecast that projects demand at an airport level, splitting between domestic and international activities. In the end, these results had to be benchmarked against the country level and be credible.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

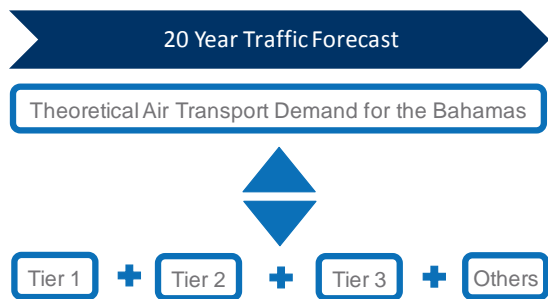


Figure 23: Traffic Forecast Model

For each airport which has commercial services, we developed a bottom up forecast to project demand. As mentioned earlier, we estimated historical domestic and international passengers from 2008 to 2013. Further, for each airport and for the same years, using the OAG we estimated the frequency and the average aircraft size, which by definition provides us with seats (i.e., capacity). With estimated passengers and capacity we can estimate load factors between 2008 and 2013 by airport and by route (split between domestic and international).

For the forecast, by airport, a series of assumptions were made covering the average daily frequencies, the average aircraft size and the load factors. Based on these three variables we can project passenger demand and aircraft movements. It is also important to note that assumptions concerning demand-side variables (i.e., economic and tourism activity) were factored into these estimates (more on this in the next section). For non-commercial activities, the forecast was judgmental based on the Island's economic activity.

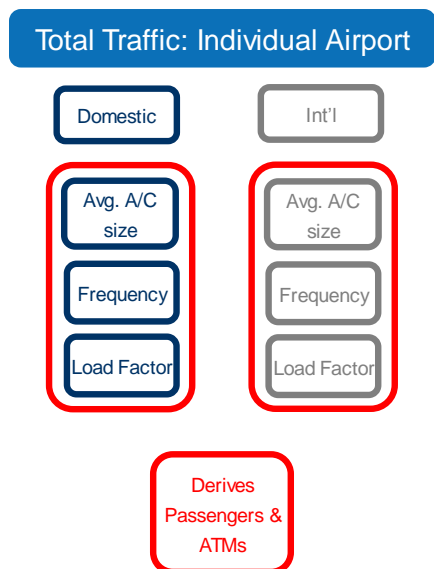


Figure 24: Total Traffic by Individual Airport Model

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

For our benchmark, we relied on the latest ACI 20 year passenger forecast. ACI's forecast projects demand on a global, regional and country level where The Bahamas is one of the countries covered by this study. According to this forecast, **total passenger demand in The Bahamas will grow by 3.1% annually making it one of the faster growing markets in the Caribbean.** The ACI forecast also projects domestic and international demand separately and, without surprise, **the international market holds more long-term potential compared to the domestic market.**

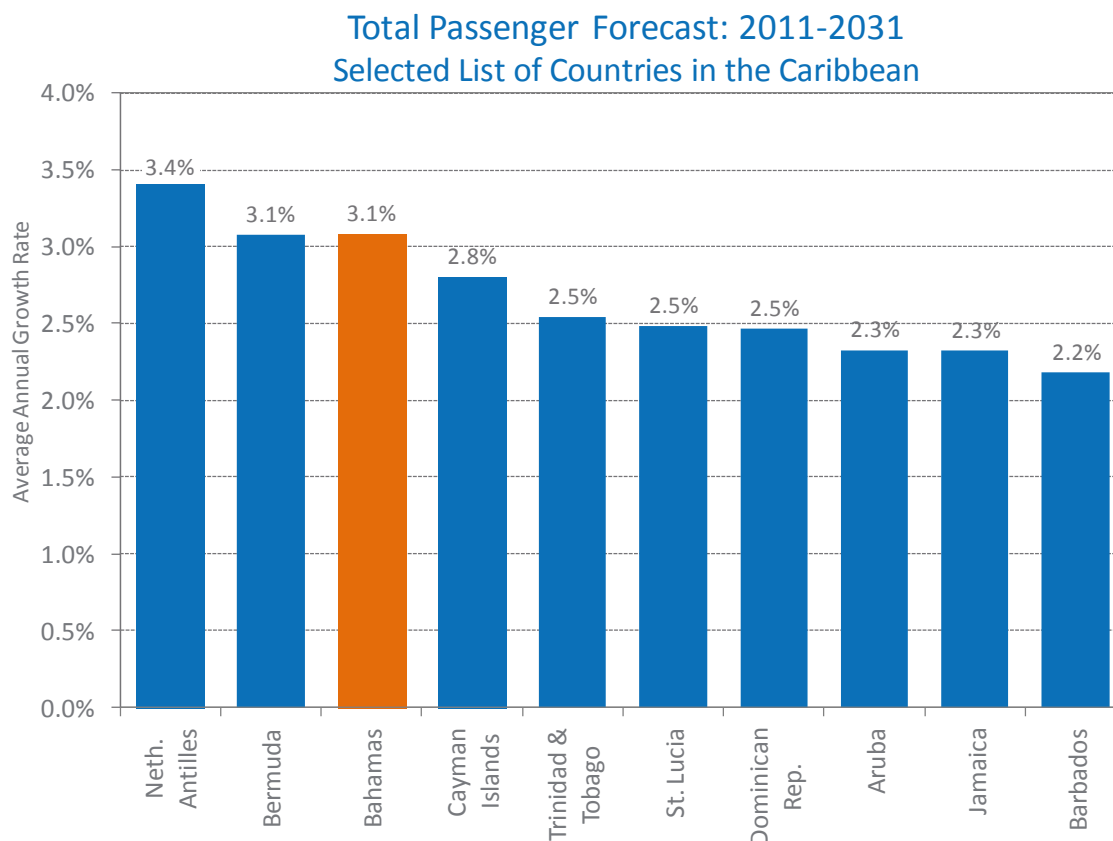


Figure 25: Total Passenger Forecast: 2011-2031

Source: DKMA estimates

4.1.2 Traffic Forecast Assumptions

Airport forecast assumptions can be grouped by demand-side and supply-side drivers. Demand side drivers covered typically include: the economy of the Bahamas, demographic profile of the Bahamas/ Family Islands and Tourism/ visitor arrivals in the Bahamas/ Family Islands. Supply-side drivers covered include: carrier development and airport development. While both demand-side and supply-side assumptions are important it is generally accepted that the former are the main forecast drivers.

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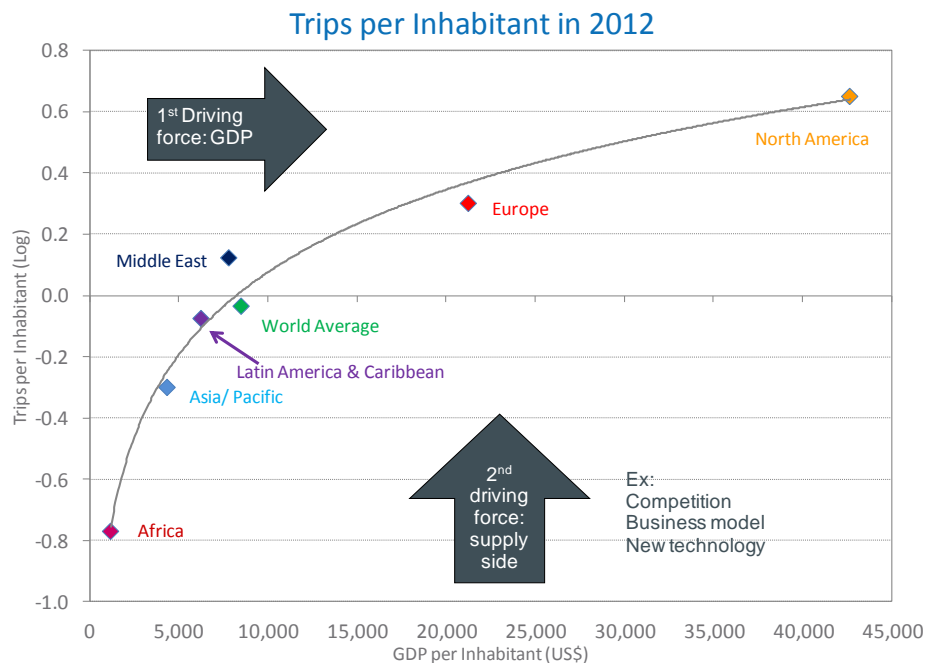


Figure 26: Trips per Inhabitant in 2012

Source: DKMA analysis based on ACI and EIU statistics

4.1.2.1 Demand-side Assumptions

In coming years, some of the key trends impacting the global demand for air travel will include:

- Slowing economic growth in mature economies;
- Relatively rapid growth in emerging economies such as Brazil;
- Population and demographic trends: continued growth, aging demographic profiles, increasing incomes and on-going dispersion of families (i.e. relocation within a country and abroad);
- Continued globalisation and liberalisation of markets (this holds true for the economy as a whole and the air transportation industry in particular); and
- Rise in international tourism, particularly to/ from the previously less-developed countries and this translates to increased competition between tourism destinations.

These factors mean that trends which are already evident, namely growth rates below 4% in mature markets and rates higher than 4% in less mature markets, are likely to continue at least during the next decade. For the longer term, even emerging markets which are currently nascent will eventually mature. The Bahamas is a small and maturing economy that is principally driven by a well-established tourism industry. Also, similar to most countries around the world, the Bahamas was negatively impacted by the global financial recession and, moving forward, its economy is expected to expand at a slightly slower rate than in the past. Based on World Travel and Tourism Council (WTTTC) forecasts, the Bahamas is expected to attract 1,469,000

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international tourist arrivals in 2014 and 2,138,000 by 2024, an increase of 3.5% per annum. While there is a growing demand for international tourism travel, there is also a growing number of tourist destinations and this will create additional competition for the maturing Bahamas market, and will have the effect of somewhat dampening growth in tourist arrivals. In addition, the Bahamas is targeting wealthier tourists and, while this will increase revenues derived per tourist, it will subdue the overall growth in tourist arrivals.

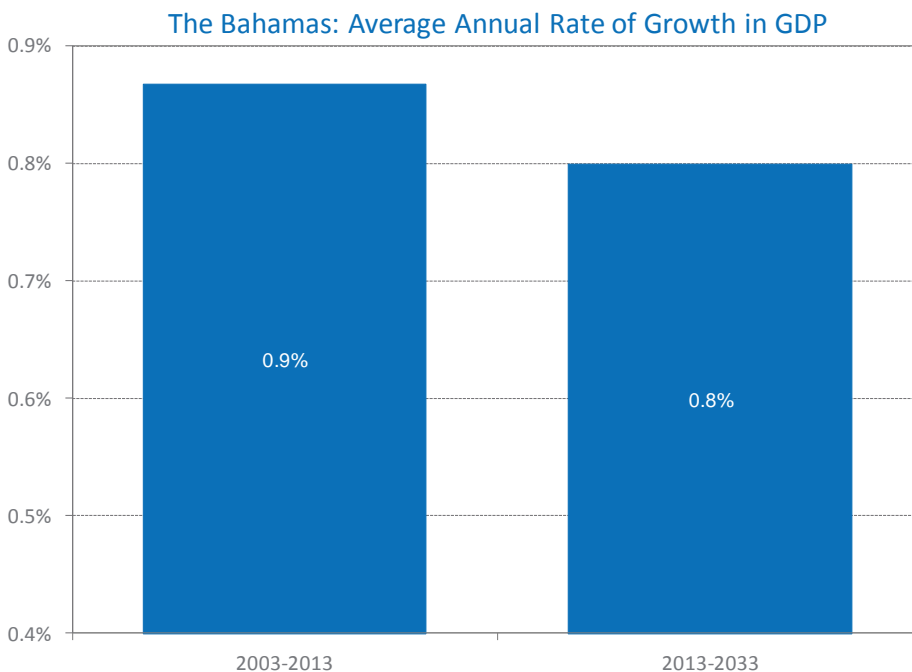


Figure 27: Annual Rate of Growth in GDP, The Bahamas

Source: EIU and International Futures of the University of Denver

According to the latest projections released by the Government of the Bahamas, by 2030 the population will reach 426,300. The government doesn't prepare projections by Island but, based on the past trends, where the Family Islands population share within the Bahamas has marginally decreased. The team assumes that by 2030 the Family Islands population will be 64,322. To compare, in 2000, the Family Islands represented 15.1% of the total population in the Bahamas, 15.0% by 2010 and by 2030 we project this share to decline marginally to 14.8%. There is insufficient information to prepare projections by individual Family Island.

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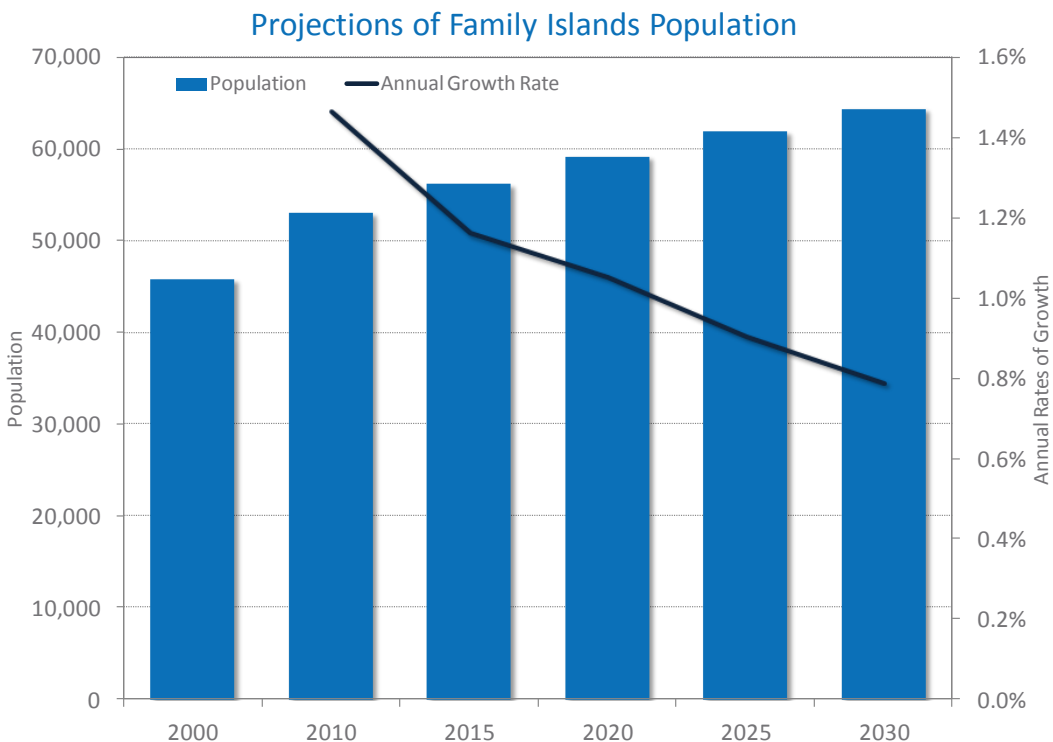


Figure 28: Projections of Family Islands Population

Source: DKMA estimates based on the Department of Statistics of the Bahamas

4.1.2.2 Supply-side Assumptions

All forecasts are unconstrained and we assume that no new airport will be built in the Bahamas during the forecast period. The international markets have a greater potential than the domestic market, while the Tier 1 airports have the greatest potential.

Carrier competition: The nature of the competition has evolved in the Family Islands during the last decade and in the future it will continue to evolve. It is impossible to know who exactly will compete but at a country level we expect to see at least two Bahamian carriers compete on the main domestic routes. Also, although no specific information is available, we know that domestic air fares are high and in the future they will remain high. There are some structural issues related to the domestic airfares being high as well that could be considered as part of the wider reforms. International routes to/ from the Family Islands Airports will tend to be operated by only one carrier for a particular destination.

Load factors and average aircraft size will increase: In spite of increases, the average aircraft size will remain small for most airports and this is linked to the nature of the demand that, for most markets, will remain small. The exception is San Salvador Airport's international service, which today is the only airport in the Family Islands to offer international service outside of the Americas. The airport has service to Paris (operated by XL Airways) and in 2013 the average

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aircraft size for international routes was 230 seats per movement. We project that, in the future, tourism demand at San Salvador Airport will continue to come largely from Europe (to visit the Club Med on the Island) which by definition will continue to require larger aircraft.

4.2 ECONOMIC IMPACT ANALYSIS METHODOLOGY & ASSUMPTIONS

4.2.1 Economic Impact Analysis Overview

The Task 1 Final Report requires an economic impact analysis (EIA) for each of the 28 Family Islands Airports included in the overall study being conducted for the Government of The Bahamas. Specifically, and led by DKMA, the team has been tasked with ranking the airports in terms of their potential to support the economic development of the islands on which they are situated. In turn, the team's airport planners are tasked with overlaying this ranking on their estimates of capital development requirements for each airport. This will enable the team to prioritize the airports on the basis of a cost-benefit assessment.

The team examined the extent to which individual islands meet and/or support the Government's strategies/criteria for investment attraction and economic development. Toward that end, the team set out to:

- Identify the key drivers of economic growth for individual Family Islands: i.e., local attributes, advantages, and opportunities that could be exploited for the development of tourism.
- Identify and assess public/private investments and investment intentions for each of the islands where the airports are situated.

The results of these lines of investigation are outlined in the following sections of this report. This is followed by an explanation of our methodology for ranking the islands/airports and discussion of the results of our scoring system.

4.2.2 Economic Impact Methodology

The objective of the analysis is to determine the amount of funding that can be justified for upgrading/expanding the airports. That is, given that there is a finite sum of money that will be available to upgrade/expand the airports, we seek to find the proportion of the total funds available that should be allocated to each airport.

A typical economic impact analysis would seek to assign a dollar value to the impact that each of the airports has on its surrounding community/region. This approach requires the use of an input-output model of the economy for the regions where the airports are located and such models require access to wages & salaries and GDP data for local economies and their industries. As neither input-output models nor wages & salaries and GDP data were available to Stantec for this project, an alternative approach to attain the goal of determining a reasonable allocation of funds that will be available for airport upgrades/expansions was taken.



COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

Since tourism is the principal driver of the Bahamian economy, including that of the Family Islands, we focused on the role that each airport serves in supporting the local population and tourism-related activities on the island where it is located. With that in mind, we collected data on the following metrics:

- Size of local population;
- Seasonal residents ("Winter" visitors);
- Timeshare visitors;
- Annual hotel visitors;
- Number of hotel rooms; and
- Tourism-related investments (approved over the past five years).

Table 6: EIA Metrics – Airport Level

EIA Metrics - Airport Level								
Island/ Archipelago	Airport	Tier	Population (2010)	Seasonal residents	Timeshare visitors	Hotel visitors	Number of hotel rooms	Tourism- related investments (millions)
Abaco	Marsh Harbour	1	6,283	4,004	631	11,778	488	2,374
Abaco	Treasure Cay	3	1,187	3,791	597	11,151	462	338
Abaco	Sandy Point	3	547	115	18	338	14	352
Abaco	More's Island	3	593	0	0	-	0	0
Acklins Island	Spring Point	3	36	0	0	-	47	0
Andros	San Andros	2	207	51	0	506	40	0
Andros	Andros Town (Fresh Creek)	2	59	158	1	1,582	125	0
Andros	Mangrove Cay	3	892	51	0	506	40	0
Andros	Congo Town	3	90	138	1	1,380	109	60
Berry Islands	Great Harbour Cay	2	353	0	0	-	20	470
Bimini	South Bimini	1	182	629	6	7,542	174	165
Cat Island	New Bight	2	117	0	0	-	72	1,237
Cat Island	Arthur's Town	C	143	0	0	-	93	0
Crooked Island	Crooked Island	3	323	0	0	-	33	31
Eleuthera	North Eleuthera	1	2,918	1,684	31	13,652	260	254
Eleuthera	Governor's Harbour	1	701	985	18	7,981	152	1,439
Eleuthera	Rock Sound	2	961	285	5	2,310	44	15
Exuma	George Town	1	1,437	1,046	16	18,903	615	187
Exuma	Staniel Cay	3	118	94	1	1,690	55	21
Exuma	Blackpoint	3	414	0	0	-	0	35
Exuma	Farmer's Cay	3	65	0	0	-	0	0
Inagua	Matthew Town	2	911	0	0	-	14	0
Long Island	Deadman's Cay	2	110	0	0	-	110	56
Long Island	Stella Maris	3	80	0	0	-	87	113
Mayaguana	Mayaguana	3	271	0	0	-	13	0
Ragged Island	Ragged Island	3	70	0	0	-	5	0
Rum Cay	Rum Cay	3	99	0	0	-	6	0
San Salvador	San Salvador	1	930	57	0	14,456	278	122

Source: Bahamas Tourism Today, Bahamas Department of Statistics, and Bahamas Investment Authority

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

Two key considerations governed the ranking of the airports in terms of the proportion of the total available funding that could justifiably be allocated to each of them:

1. For each of the metrics, we needed to determine how each airport region stands relative to each of the other airport regions ; and
2. Looking across the metrics for all the airports, we needed to determine how much emphasis to place on each of them.

Based on those considerations, we started by summing across airports the values for each metric: i.e., we summed the population figures across the airport regions. In turn we computed the proportion of each metric accounted for by each airport region and this yielded a ranking of airports for each metric. Weights were then assigned to each metric and the sum of the weighted metrics for each airport yielded its total score and the airports were then rank-ordered on the basis of their individual scores (see Section 4.2.3).

Our next step was to address the matter of how to assign relative scores to airports that are on the same island and/or are in close proximity to each other on the same island: e.g., Marsh Harbour and Treasure Cay on Abaco. To take an extreme scenario, it would be difficult to justify assigning an airport with relatively low traffic a score that is higher than that received by an airport with a higher traffic volume, especially if the airports are in close proximity to each other on the same island. To ensure that this did not happen, we adjusted our initial set of scores so that they would fall in line with the percentage of each island's total traffic accounted for by each airport on that island.

4.2.3 Economic Impact Assumptions

The assumptions underlying the economic impact scores for each of the airports pertain to the set of weights that were assigned to each of the metrics in our airport scoring system. That is, we had to make certain assumptions concerning the relative importance of each of the metrics: e.g., should population be assessed as a stronger determinant of traffic development at the airport in relation to hotel visitors or tourism-related investments? In the absence of empirical evidence, this is highly judgmental and largely based on experience and employing a consistent logic.

Accordingly, we employed the following assumptions:

- Seasonal residents and timeshare visitors are repeat customers for the airport and will tend to fly to and from the island on multiple trips per annum due to fixed accommodations.
- Hotel visitors and hotel rooms will take the next highest relative share. This is due to the absolute volume of flights that are generated by these categories though lower numbers of seasonal and timeshare visitors.
- Local population, although important economically, is not as highly weighted as other categories related to airport investment due to the small proportion of local residents that will fly annually.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

- Finally, tourism-related investments (approved over the past five years) was given the most weight due to these investments being very good barometers of investors' perceptions of areas of the Family Islands where they are most likely to receive the best return on their investment and, by extension, these are strong indicators of future air traffic demand.

5.0 FORECAST & ECONOMIC IMPACT ANALYSIS RESULTS

5.1 FORECAST RESULTS

During the next two decades, passenger demand in the Family Islands is projected to increase annually by 2.4% to reach 1.7 million passengers by 2033, where most of the growth will be driven by Tier 1 airports.

Table 7: Scheduled Passengers Forecast, FIA

Scheduled Passengers Forecast (000), Family Islands Airports, Preliminary												
Tier	3-Letter Code	4-Letter Code	Airport Name	Domestic			Int'l			Total		
				2013	2033	%	2013	2033	%	2013	2033	%
1	MHH	MYAM	Marsh Harbour	96.3	140.8	1.9%	120.3	240.7	3.5%	216.6	381.5	2.9%
1	GGT	MYEF	Exuma/ George Town	90.4	148.5	2.5%	73.9	153.5	3.7%	164.3	302.0	3.1%
1	ELH	MYEH	North Eleuthera	102.4	168.2	2.5%	55.4	102.4	3.1%	157.8	270.5	2.7%
1	ZSA	MYSM	San Salvador	27.8	43.0	2.2%	28.6	65.8	4.2%	56.4	108.8	3.3%
1	BIM	MYSB	South Bimini	9.4	13.7	1.9%	39.0	68.0	2.8%	48.3	81.6	2.7%
1	GHB	MYEM	Governour's Habour	69.8	90.4	1.3%	8.9	12.4	1.7%	78.7	102.9	1.4%
2	RSD	MYER	Rock Sound	86.7	112.4	1.3%	1.7	2.0	0.8%	88.4	114.4	1.3%
2	LGI	MYLD	Deadman's Cay	43.5	57.5	1.4%	0.0	0.0	-	43.5	57.5	1.4%
2	TBI	MYCB	New Bight	32.5	53.3	2.5%	1.6	3.3	3.7%	34.1	56.6	2.6%
2	ASD	MYAF	Andros Town	10.7	14.2	1.4%	5.8	8.3	1.8%	16.6	22.5	1.5%
2	IGA	MYIG	Matthew Town/ Inagua	8.2	10.3	1.1%	0.4	0.4	0.7%	8.6	10.7	1.1%
2	GHC	MYBG	Great Harbour Cay	0.2	0.3	0.7%	7.6	11.2	1.9%	7.9	11.4	1.9%
2	SAQ	MYAN	San Andros	9.1	12.3	1.5%	7.7	12.6	2.5%	16.8	24.9	2.0%
3	TCB	MYAT	Treasure Cay	13.5	15.4	0.7%	34.5	38.9	0.6%	48.0	54.3	0.6%
3	MYG	MYMM	Mayaguana	1.8	1.9	0.3%	0.0	0.0	-	1.8	1.9	0.3%
3	RCY	MYRP	Rum Cay	3.7	4.0	0.4%	0.0	0.0	-	3.7	4.0	0.4%
3		MYAS	Sandy Point	0.0	0.0	-	0.0	0.0	-	0.0	0.0	-
3		MYAO	Moore's Island	0.0	0.0	-	0.0	0.0	-	0.0	0.0	-
3		MYAB	Mangrove Cay	1.6	2.1	1.3%	0.0	0.0	-	1.6	2.1	1.3%
3	SML	MYLS	Stella Maris	24.4	33.6	1.6%	1.8	2.0	0.7%	26.2	35.6	1.6%
3	TYM	MYES	Staniel Cay	0.0	0.0	-	0.0	0.0	-	0.0	0.0	-
3		MYEB	Blackpoint	0.0	0.0	-	0.0	0.0	-	0.0	0.0	-
3	MYE3		Farmer's Cay	0.0	0.0	-	0.0	0.0	-	0.0	0.0	-
3	TZN	MYAK	Congo Town	9.1	12.0	1.4%	2.9	3.2	0.4%	12.0	15.2	1.2%
3	CRI	MYCI	Crooked Island	9.1	10.7	0.8%	0.0	0.0	-	9.1	10.7	0.8%
3	AXP	MYAP	Spring Point	7.1	7.5	0.3%	0.0	0.0	-	7.1	7.5	0.3%
3	DCT	MYRD	Ragged Island	0.0	0.0	-	0.0	0.0	-	0.0	0.0	-
C	ATC	MYCA	Arthur's Town	7.6	9.0	0.9%	0.0	0.0	-	7.6	9.0	0.9%
	Total			665.0	961.1	1.9%	390.1	724.7	3.1%	1,055.1	1,685.7	2.4%

Source: DKMA



COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

Table 8: Aircraft Movements Forecast, FIA

Aircraft Movements Forecast (000), Family Islands Airports, Preliminary															
Tier	3-Letter Code	4-Letter Code	Airport Name	Scheduled - Dom			Scheduled - Int'l			Non-Commercial			Total		
				2013	2033	%	2013	2033	%	2013	2033	%	2013	2033	%
1	MHH	MYAM	Marsh Harbour	4.5	5.7	1.1%	4.1	6.6	2.4%	1.1	1.4	1.3%	9.8	13.7	1.7%
1	GGT	MYEF	Exuma/ George Town	4.4	6.4	1.9%	2.2	3.9	3.0%	0.8	1.1	1.3%	7.4	11.4	2.2%
1	ELH	MYEH	North Eleuthera	9.3	13.8	2.0%	1.8	2.8	2.4%	3.8	4.9	1.2%	14.9	21.5	1.9%
1	ZSA	MYSM	San Salvador	1.5	2.0	1.6%	0.3	0.5	2.7%	0.3	0.4	1.4%	2.0	2.9	1.7%
1	BIM	MYSB	South Bimini	0.5	0.7	1.3%	0.7	1.0	1.7%	0.6	0.7	0.9%	1.8	2.3	1.3%
1	GHB	MYEM	Governour's Harbour	5.4	6.3	0.8%	0.45	0.54	0.9%	1.6	2.1	1.5%	7.4	8.9	1.0%
2	RSD	MYER	Rock Sound	6.1	6.6	0.4%	0.14	0.14	0.3%	0.8	0.9	0.8%	7.0	7.7	0.4%
2	LGI	MYLD	Deadman's Cay	3.5	4.2	0.8%	0.0	0.0	-	0.3	0.4	0.7%	3.9	4.5	0.8%
2	TBI	MYCB	New Bight	2.1	3.0	1.8%	0.05	0.09	2.5%	0.10	0.12	1.2%	2.3	3.3	1.8%
2	ASD	MYAF	Andros Town	1.3	1.6	0.9%	0.12	0.16	1.4%	4.58	6.29	1.6%	6.0	8.0	1.5%
2	IGA	MYIG	Matthew Town/ Inagua	0.31	0.34	0.5%	0.025	0.027	0.3%	0.03	0.04	1.3%	0.36	0.41	0.6%
2	GHC	MYBG	Great Harbour Cay	0.052	0.054	0.2%	0.36	0.44	1.0%	0.9	1.0	0.7%	1.3	1.5	0.8%
2	SAQ	MYAN	San Andros	1.3	1.6	1.0%	0.16	0.24	2.2%	5.1	7.1	1.7%	6.5	9.0	1.6%
3	TCB	MYAT	Treasure Cay	0.59	0.63	0.4%	0.79	0.82	0.2%	0.22	0.24	0.4%	1.6	1.7	0.3%
3	MYG	MYMM	Mayaguana	0.23	0.24	0.2%	0.0	0.0	-	0.049	0.053	0.4%	0.28	0.29	0.2%
3	RCY	MYRP	Rum Cay	0.36	0.38	0.2%	0.0	0.0	-	0.049	0.053	0.4%	0.41	0.44	0.3%
3		MYAS	Sandy Point	0.0	0.0	-	0.0	0.0	-	0.28	0.32	0.7%	0.28	0.32	0.7%
3		MYAO	Moore's Island	0.0	0.0	-	0.0	0.0	-	0.088	0.095	0.4%	0.088	0.095	0.4%
3		MYAB	Mangrove Cay	0.7	0.9	1.1%	0.0	0.0	-	1.4	1.7	1.0%	2.1	2.6	1.0%
3	SML	MYLS	Stella Maris	2.5	2.9	0.7%	0.20	0.22	0.5%	1.0	1.2	0.6%	3.7	4.3	0.7%
3	TYM	MYES	Staniel Cay	0.0	0.0	-	0.0	0.0	-	4.8	5.9	1.1%	4.8	5.9	1.1%
3		MYEB	Blackpoint	0.0	0.0	-	0.0	0.0	-	0.068	0.074	0.4%	0.068	0.074	0.4%
3	MYE3		Farmer's Cay	0.0	0.0	-	0.0	0.0	-	0.09	0.10	0.4%	0.088	0.095	0.4%
3	TZN	MYAK	Congo Town	0.9	1.1	1.1%	0.12	0.13	0.2%	0.37	0.42	0.6%	1.4	1.7	0.9%
3	CRI	MYCI	Crooked Island	0.5	0.6	0.5%	0.0	0.0	-	0.01	0.01	0.4%	0.5	0.6	0.5%
3	AXP	MYAP	Spring Point	0.32	0.33	0.2%	0.0	0.0	-	0.058	0.065	0.5%	0.38	0.40	0.2%
3	DCT	MYRD	Ragged Island	0.0	0.0	-	0.0	0.0	-	0.058	0.065	0.5%	0.058	0.065	0.5%
C	ATC	MYCA	Arthur's Town	0.4	0.5	0.6%	0.0	0.0	-	0.02	0.02	0.3%	0.4	0.5	0.6%
	Total			46.9	59.7	1.2%	11.5	17.7	2.2%	28.5	36.6	1.3%	86.8	114.1	1.4%

Source: DKMA

5.2 TIER 1 AIRPORTS

5.2.1 Marsh Harbour (MHH - MYAM - Abaco)

Four of the airports under study are situated on Abaco: Marsh Harbour, Moore's Island, Sandy Point and Treasure Cay. Together, they handled 269,444 passengers in 2013 (representing over 25% of total passengers for the Family Islands).

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The Marsh Harbour International Airport on the island of Great Abaco is the largest airport under study with an estimated 220,924 passengers in 2013. This airport is classified as a Port of Entry (POE) or Airport of Entry (AOE) and accounts for 31% of international passengers travelling in the Family Islands Airports. In 2013, according to the OAG, seven international routes were served between Marsh Harbour and Florida in the USA. However, since 2008 international passengers and international commercial movements have decreased. Passengers have decreased annually by 2.0%, while movements decreased substantially (18.0%). Two routes were responsible for this: Fort Lauderdale (FLL) and Miami (MIA). In both cases, the reduction of activity is linked to the 2010 merger between Continental and United. Following the merger, the annual movements to Fort Lauderdale were cut by a factor of 4 (and seats by a factor of 2) while Continental exited the Miami market altogether, leaving American Airlines as the sole operator. The reduction of movements has translated into an average increase of aircraft size on the international routes from 22.7 seats per movement in 2008 to 39.9 by 2013.

In terms of domestic activity, the network counted two routes in 2013, where Nassau was the main route (92% of seats) and Treasure Cay the other domestic route. In 2008, Marsh Harbour also offered service to North Eleuthera which was dropped in 2009. This, along with a reduction of service to Treasure Cay, explains the decline of passengers between 2008 and 2009.

The main carrier at the airport is Bahamasair (40% of seats) while the largest international carrier is United Continental, followed by American Airlines.

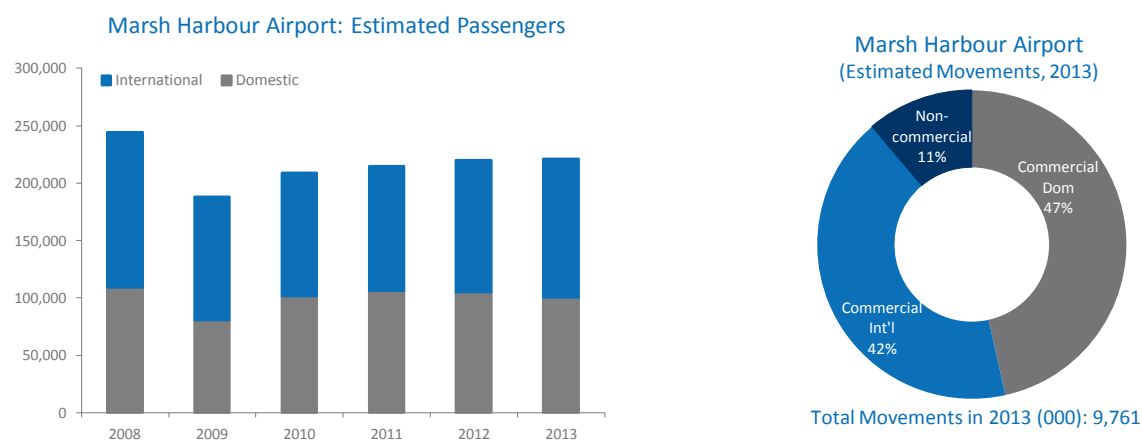


Figure 29: Marsh Harbour Traffic

Source: DKMA Estimates

Marsh Harbour Airport recently opened its new terminal facility in early June 2014. Substantial investment has been made in this facility over the past two years, including a control tower construction project and a new runway overlay. During the 20 year forecast, we assume that the new terminal and airport facilities will mainly serve the tourism market but, in parallel, the airport will also serve the local population. Abaco is the largest island of the Family Islands with 7,646 residents according to the 2010 census, and Marsh Harbour will be the main gateway to the island. Other airports in Abaco will remain operational but all will be smaller in size, and none of

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the other airports on Abaco will offer international service aside from Treasure Cay (discussed later in the report).

Over the next 20 years, we project demand to increase annually by 2.6%, reaching 369,595 passengers by 2033. The international market is projected to increase by an average of 3.1% annually, while domestic traffic will increase by an average of 1.9%. By the end of the forecast, 60% of the passenger activity at the airport will be linked to international activities. Because load factors will increase, the aircraft movements will develop less quickly (1.5% per annum).

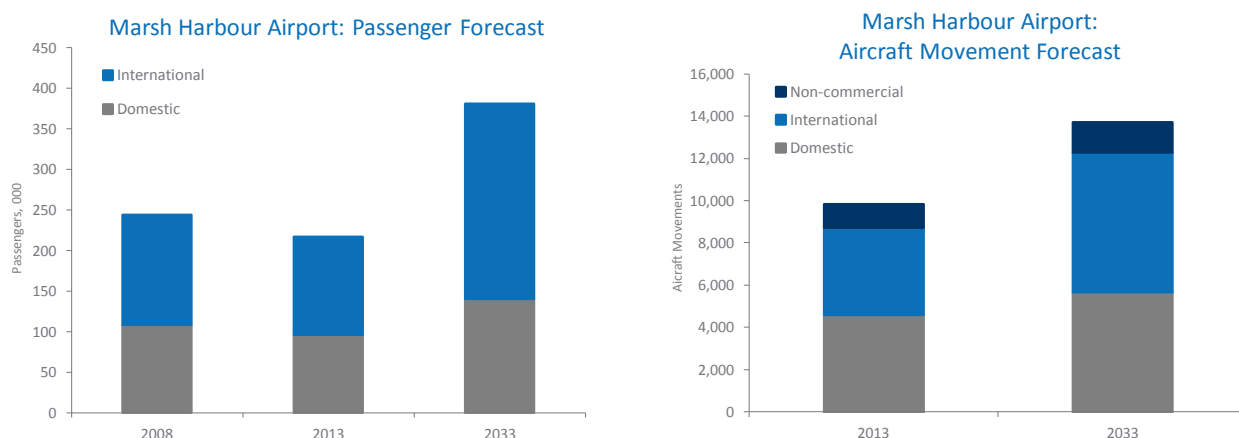


Figure 30: Marsh Harbour Forecasts

Source: DKMA

Situated about 30 minutes north of Marsh Harbour Airport is Treasure Cay Airport which, like Marsh Harbour Airport, is classified as a Port of Entry (POE). Marsh Harbour Airport handles about three times more traffic volume than Treasure Cay, and given their close proximity for the foreseeable future it will be a challenge for Treasure Cay to develop its activities. Based on this, and other considerations, it has been recommended that Treasure Cay Airport ceases to be a POE. Should this be the case, international demand would relocate from Treasure Cay Airport to Marsh Harbour Airport, and by 2033 it would represent 38,932 additional international passengers and 824 international aircraft. This additional demand would mean that by 2033, Marsh Harbour would handle 420,492 total passengers and 14,524 movements.

5.2.2 Exuma/ George Town (GGT - MYEF - Great Exuma)

The capital of the Exumas is George Town, located on Great Exuma Island. The Exumas are a chain of islands that stretch over 100 miles, and the islands rely on tourism. The major hotel is Sandals (183 villas and suites) and a golf course built by Greg Norman.

The Exuma International Airport (MYEF) is the largest airport serving The Exumas, and according to the latest census data (2010), the island group has a population of 6,928. In 2013, it is estimated that 168,324 passengers were handled at the airport and the majority (56%) were domestic passengers. However, international passenger traffic has developed more rapidly

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since 2008 (3.0% per annum for domestic versus 4.6% per annum for international), for an average of 3.7% for the airport as a whole.

This airport is classified as a Port of Entry (POE) or Airport of Entry (AOE). According to the OAG, the international network is focused on four US routes (MIA and ATL are the largest) and one Canadian route (YYZ). The airport also has domestic flights from Nassau arriving and departing daily and limited service to Rock Sound.

In 2013, the main carrier at the airport was Bahamasair, accounting for 35% of seats; SkyBahamas follows, accounting for 27% of seats. In addition, American Airlines was the largest international carrier, accounting for 18% of total international seats. Most of the domestic growth is linked to the development of SkyBahamas, especially in 2009 when the carrier doubled its capacity at Exuma International Airport.

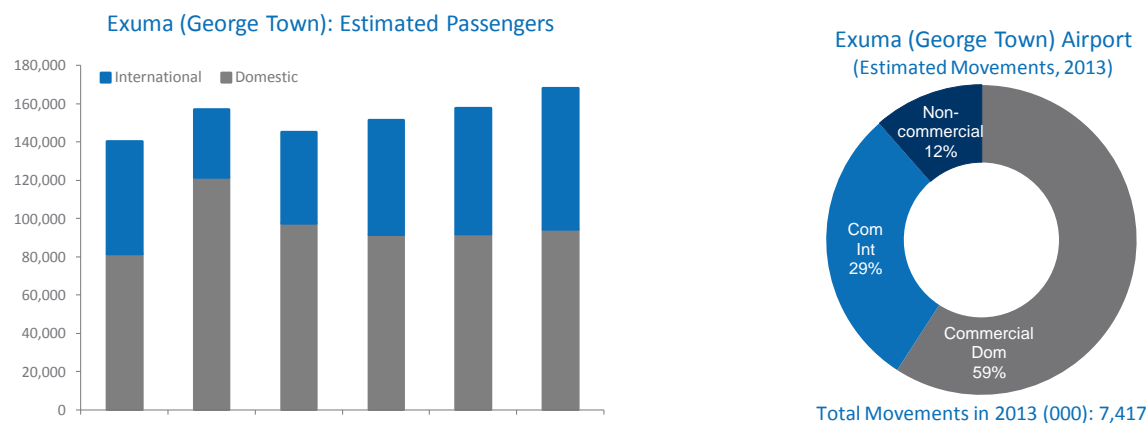


Figure 31: Exuma Airport Traffic

Source: DKMA Estimates

In line with tourism development (see Exuma Island profile above), over the next 20 years we project demand to increase annually by 3.1% to reach 309,323 passengers. The international market is projected to increase at an average of 3.7% annually focusing on North America, while the increase in domestic traffic will average 2.5%, meaning that by the end of the forecast half of the passenger activity at the airport will be linked to international activities. In parallel, aircraft movements are projected to increase annually by 1.5% and, by 2033, the average aircraft size is projected to be 25 seats compared to 29 in 2013.

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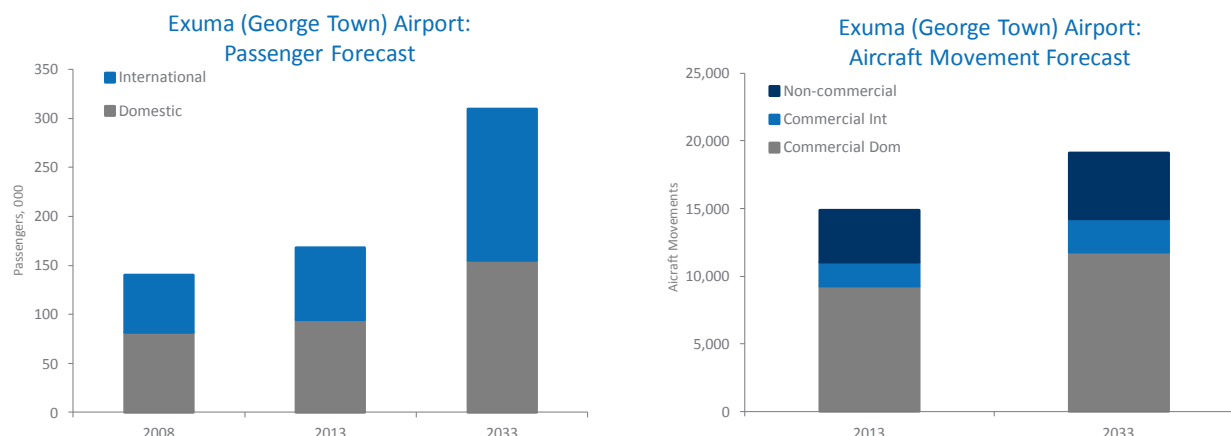


Figure 32: Exuma Airport Forecasts

Source: DKMA

5.2.3 North Eleuthera (ELH - MYEH - Eleuthera)

The North Eleuthera International Airport is the main airport in Eleuthera, and is the third largest airport under study with 157,819 passengers in 2013. This airport is classified as a Port of Entry (POE) or Airport of Entry (AOE), and last year 35% of its passengers were international – a figure that has been stable over the last 5 years.

According to the OAG, in 2013 two domestic routes were served, namely Nassau and Governor's Harbour. The latter is a multi-stop route which was combined with Nassau. The international network is focused on two routes (FLL and MIA), both of the same size. The network is completed by three very small routes: Key West, West Palm Beach and Tampa Bay, all with less than 1,000 departure seats last year.

In 2013, the main carrier at the airport was Bahamasair, followed closely by Pineapple Air. Despite being the same size (about 26% market share in 2013 for both carriers), their direction in recent years has changed. Since 2008, Bahamasair has reduced its capacity by 30%, while Pineapple started to serve North Eleuthera in 2011 and has quadrupled in size over the past three years.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

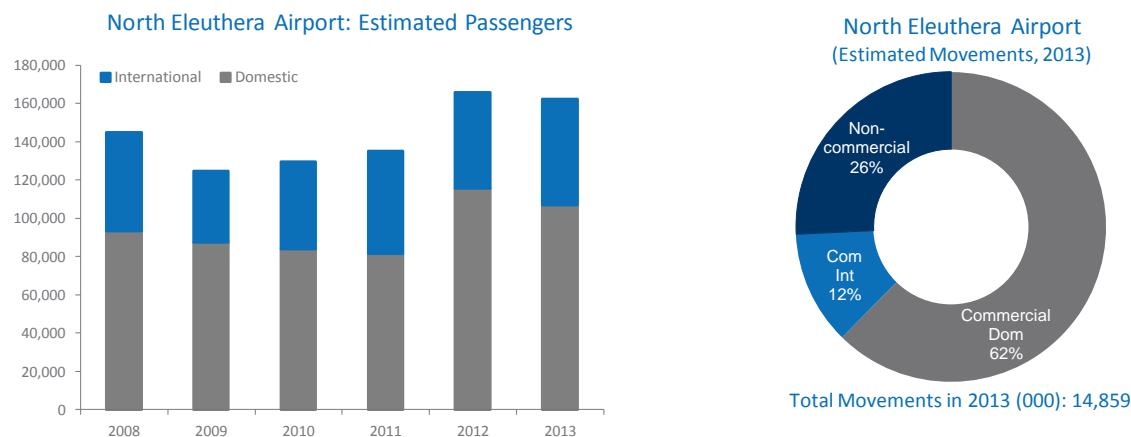


Figure 33: North Eleuthera Airport Traffic

Source: DKMA Estimates

The airport's current and future mission is to serve the tourism market (refer to 'Island Profiles' section above). In parallel, the airport will continue to be the main airport in Eleuthera and serve the regional population of the island, estimated at 3,247 in the 2010 census.

During the last five years, in part due to Pineapple Air's development, the domestic market has grown more rapidly than the international market (2.7% vs. 1.6%) but moving forward we expect the trend to be reversed. On-going tourism development will help reverse this trend, and the international network will continue to focus on routes to and from North America. By 2033, we expect North Eleuthera to reach 270,547 passengers, reflecting growth of 2.7% per annum, and international activities are expected to account for 38% of all passengers (compared to 35% in 2013).

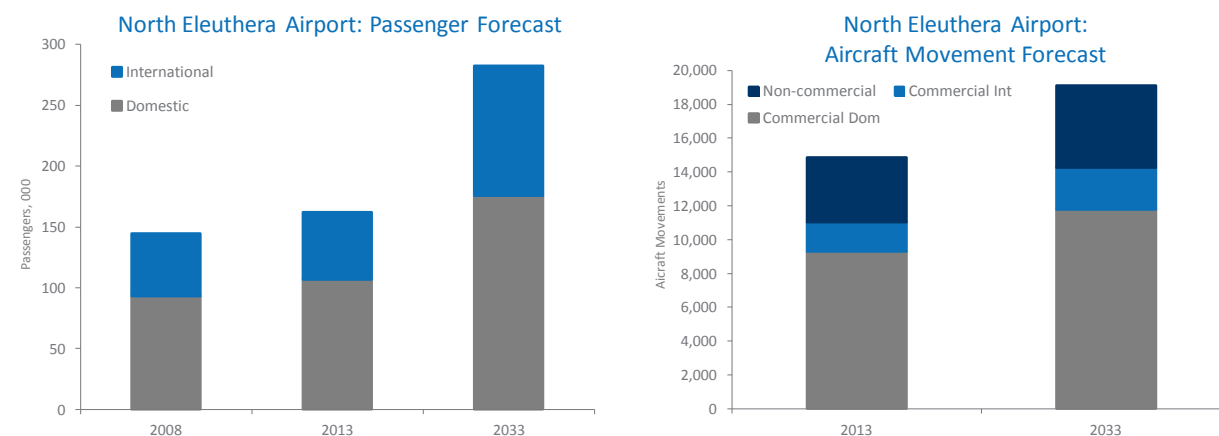


Figure 34: North Eleuthera Airport Forecasts

Source: DKMA Estimates

5.2.4 San Salvador (ZSA - MYSM- San Salvador)

This airport is classified as a Port of Entry (POE) or Airport of Entry (AOE). In 2013, it is estimated that San Salvador Airport handled 108,772 passengers, of which 51% were international passengers. In the Family Islands, San Salvador is unique since it is the only airport that has scheduled service to Europe (specifically to Paris, France). In 2009, XL Airways started service to Paris and, aside from this long haul route, the San Salvador Airport serves three international short haul destinations (ex: FLL, CUN & PUJ). The domestic network is small and almost entirely focused on Nassau.

The main carrier at the airport is XL Airways (43% of seats) and this is the only airport in the Family Islands whose main tenant is a foreign carrier as opposed to a domestic carrier.

Because of the route to Paris, the average aircraft size for San Salvador is the highest in the Family Islands Airports at 66 seats per departure in 2013 (230 seats per departure for the international market). Club Med is the largest resort on the island, and is the reason the airport receives wide-body (Airbus 330) aircraft through international commercial traffic. International passengers account for half of the passengers at the airport, and international movements account for only 14% of movements.

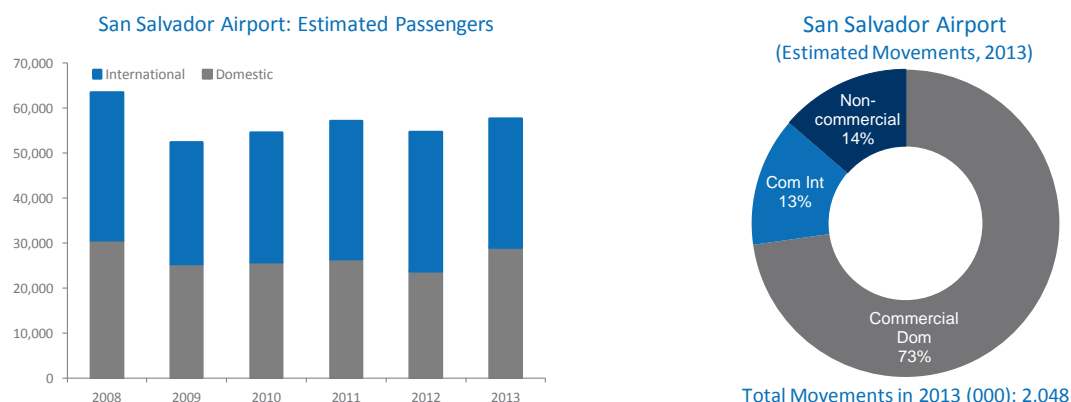


Figure 35: San Salvador Airport Traffic

Source: DKMA estimate

The local population is small (~1100 residents) and will generate only a small number of movements. Instead, the airport operations will be linked almost entirely to the tourism market: currently air passenger demand is largely linked to the Club Med. It is interesting to note that Club Med promotes the destination as 'Columbus Isle', as opposed to San Salvador. In the future, the airport's growth will move in tandem with the tourism development on the island (refer to 'Island Profiles' section above).

During the forecast period, San Salvador Airport will remain the only airport on the island.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

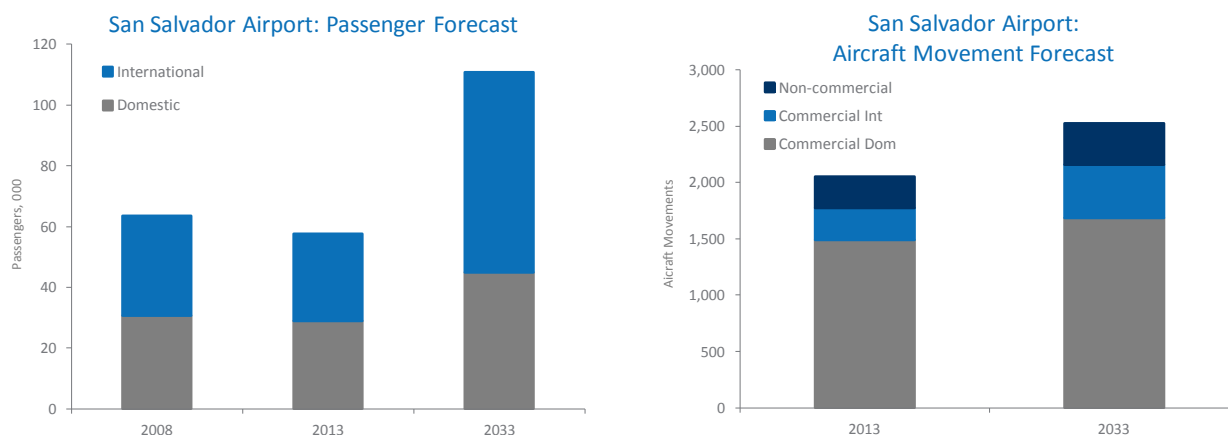


Figure 36: San Salvador Airport Forecasts

Source: DKMA

In line with the tourism development, over the next 20 years we project demand to increase annually by 3.3% to reach 108,772 passengers; in other words, operations will nearly double. The international market is projected to average 4.2% annually, while domestic will average 2.2%, meaning that by the end of the forecast almost 60% of the passenger activity at the airport will be linked to international activities. However, since most of the expected route development is geared toward North American hotel chains (ex: Sands), we assume that short- and medium-haul routes will expand more rapidly than long-haul routes. In parallel, aircraft movements are projected to increase annually by 1.7% and by 2033, the average passenger per flight is projected to be 43, compared to 32 in 2013.

5.2.5 South Bimini (BIM - MYSB - Bimini Islands)

In 2013, Bimini Island had 10 hotels, representing 4% of all hotels in the Family Islands but representing 19% of overall room capacity. In other words, in Bimini the hotels are much larger than on the rest of the Family Islands. For example, Resort World has a hotel with 350 rooms. The airport is undergoing a significant expansion and upgrade to accommodate expansion of the tourism base (refer to 'Island Profiles' section above).

In 2013, it is estimated that Bimini Airport handled 48,328 passengers. This represents an annual increase of 8.3% since 2008, making it one of the fastest growing Family Islands Airports. Prior to 2009, domestic service was non-existent, and its recent development greatly explains the overall airport development.

Bimini Airport offers scheduled service to Fort Lauderdale and Nassau. SkyBahamas is the main carrier, but in 2013 it cut its capacity by 30%. That same year, a US based carrier called Silver Air, started service. The third and last scheduled carrier at Bimini is United, which cut capacity in 2013 by 40%.

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The island population is approximately 2,200 and grows to 3,200 seasonally. Being closely situated to Florida, there are also rapid ferries travelling to South Bimini from Miami on weekends, transporting between 700-1200 guests a weekend. According to the Ministry of Tourism, since 2008, tourist arrivals by sea to Bimini have nearly tripled and reached 89,000 arrivals in 2013 (compared to 29,553 in 2008). This rapid development means that last year 8 out of 10 tourists arrived by sea compared to only 6 out of 10 five years earlier.

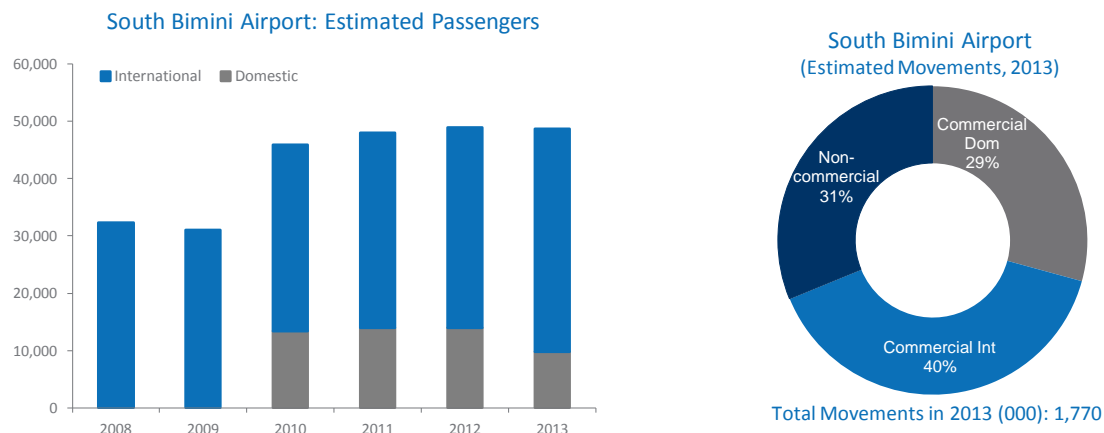


Figure 37: South Bimini Airport Traffic

Source: DKMA Estimates

The airport serves the majority of Americans that have homes on the island, as well as the resort and casino. The majority of tourists are American and ongoing development on the island will favour tourism (refer to 'Island Profiles' section above). However, even if Bimini Airport is the sole airport on the island, we expect that the majority of tourists will arrive by sea rather than air given the island's proximity to Florida.

By 2033, we expect Bimini Airport to handle 81,642 passengers, representing an annual growth of 2.7%. International traffic will develop more rapidly than domestic (2.8% per annum versus 1.9% per annum), meaning that by the end of 2033 nearly 83% of passengers will be international.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

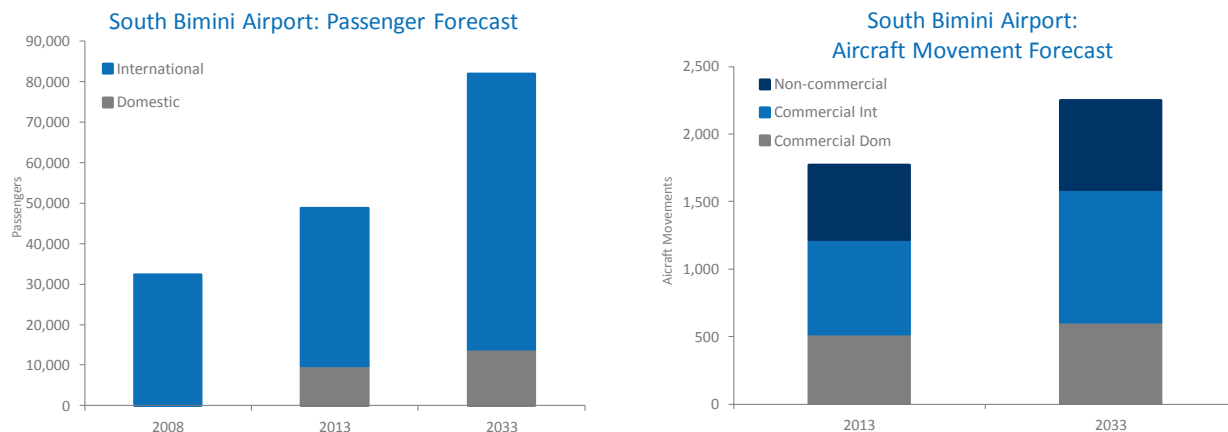


Figure 38: South Bimini Airport Forecast

Source: DKMA

5.2.6 Governor's Harbour (GHB - MYBG - Eleuthera)

Eleuthera is served by three airports: North Eleuthera, Rock Sound and Governor's Harbour. Within the Family Islands, the airport system of Eleuthera is important, representing 32% of total passengers in 2013. Of the three airports, Governor's Harbour is the smallest with an estimated 78,661 passengers last year. This number has been in a decline of 1.2% per annum since 2008. During this period, domestic traffic has increased at 0.2% per annum while international traffic declined significantly at 9.2% per annum. Fort Lauderdale is the only international market served from the airport and since 2008, American, LynxAir and Wings Air have ceased all scheduled operations from Governor's Harbour while Continental reduced capacity. Domestically, Nassau is served by Bahamasair, Pineapple and Southern Air Charter. In 2013, all three carriers offered similar capacity (~22,000 departing seats each). However, in the case of Bahamasair, this represents a significant decline of 25% since 2008. Southern Air has remained stable, while Pineapple is a recent entry (2012).

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

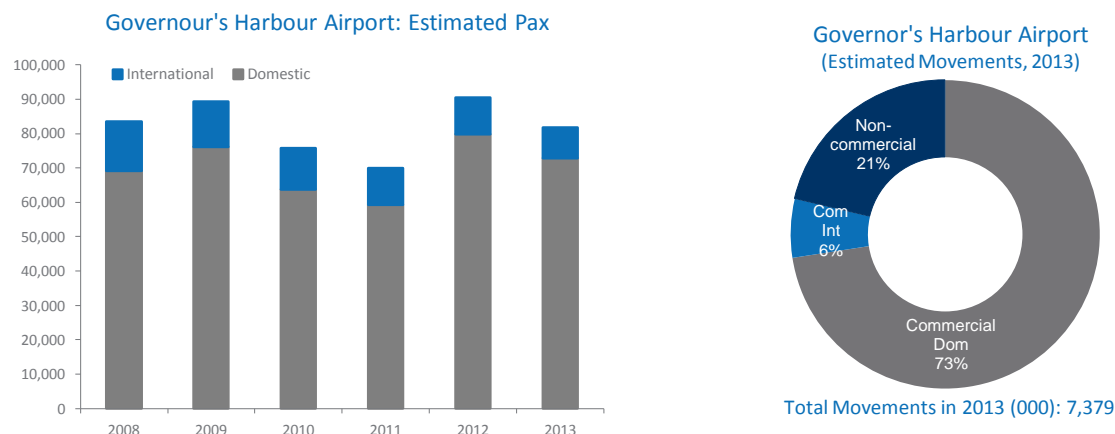


Figure 39: Governor's Harbour Airport Traffic

Source: DKMA Estimates

Moving forward, we expect this trend to reverse and project passenger demand to increase, albeit, at a slow pace of 1.4% per annum. By 2033, the airport is projected to handle 102,892 passengers. Most of the activities will continue to focus on the domestic market (88% in 2033) but we do believe that three carriers operating scheduled domestic service is too high of a figure, and we expect the number of operators to decline to two. The development of the regional medical facility will possibly add to the local domestic traffic through medevacs and health related travel. International service at Governor's Harbour will be limited, but alternatives will be offered from North Eleuthera Airport, which is expected to offer a greater number of destinations and frequency than Governor's Harbour.

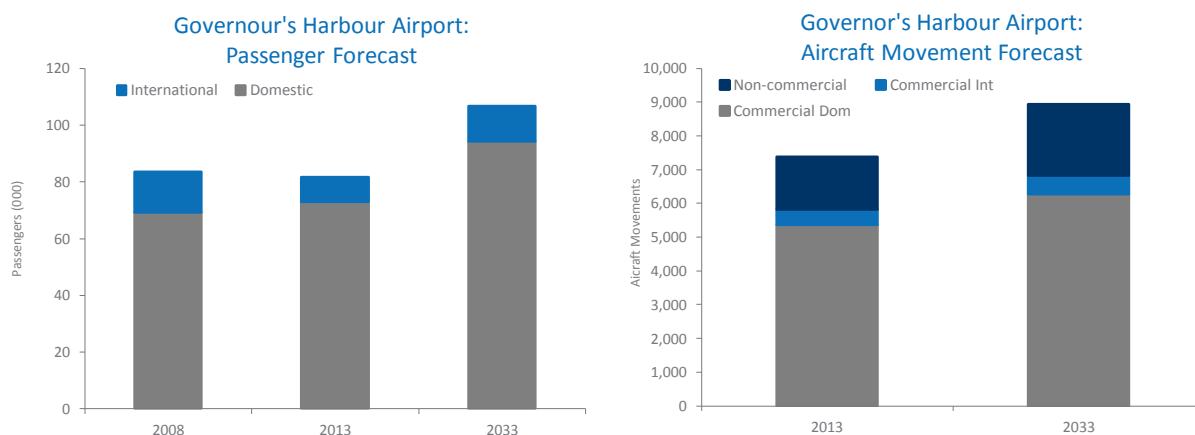


Figure 40: Governor's Harbour Airport Forecasts

Source: DKMA

5.3 TIER 2 AIRPORTS

5.3.1 Rock Sound (RSD - MYER - Eleuthera)

The population of South Eleuthera is estimated at 5,000 inhabitants, of which about a fifth live in Rock Sound. Situated in the southern portion of Eleuthera, Rock Sound is the second largest airport in Eleuthera, having served 88,434 passengers in 2013 and averaging an annual growth of 10.8% since 2008. Until 2011, Bahamasair was the sole scheduled domestic operator at Rock Sound, but that year the carrier was joined by Pineapple Air and Southern Air; by 2013, capacity at the airport had doubled. All three carriers serve Nassau and while the airport is classified as a Port of Entry (POE), it currently offers no international scheduled service. According to the Ministry of Tourism, 901 international visitors arrived in Rock Sound last year, of which 96% arrived by air, but since 2008 total international arrivals (air and sea combined) have declined by 15.5% annually. Air arrivals in Rock Sound reduced by more than half from 2008-2013, going from 2,039 to 847.

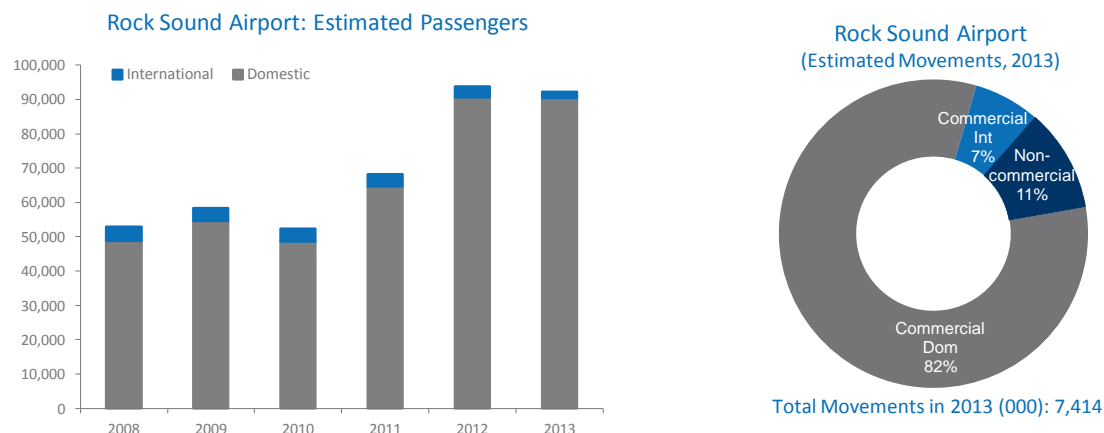


Figure 41: Rock Sound Airport Traffic

Source: DKMA Estimates

Since 2011, Rock Sound has benefitted from being served by three scheduled domestic carriers. It is one of only a handful of Family Islands Airports in this situation and, based on local demand, there is reason to think that in the long run one carrier might pull out, or at least drastically reduce capacity. By 2033, the airport is projected to handle 114,386 passengers, representing annual growth of 1.3%, and the vast majority of the activities will continue to focus on domestic operations.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

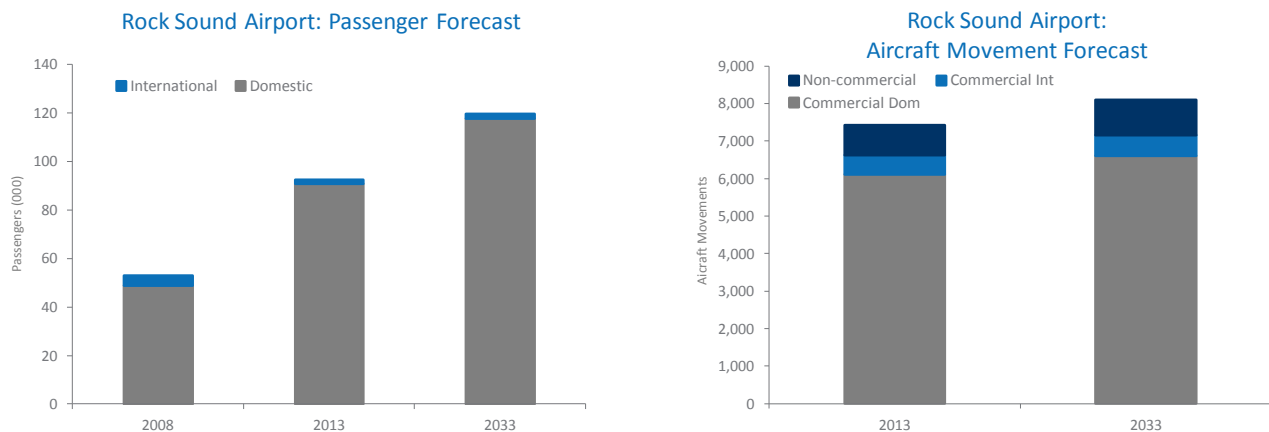


Figure 42: Rock Sound Airport Forecasts

Source: DKMA

5.3.2 Deadman's Cay (LGI - MYLD - Long Island)

Long Island is served by two airports: Deadman's Cay and Stella Maris. Together, they handled 72,700 passengers last year representing 7% of total passenger traffic to the Family Islands.

Deadman's Cay's passenger traffic is focused on domestic travel with scheduled service to Nassau offered by three carriers, namely: Bahamasair, Pineapple Air and Southern Air. Bahamasair is the dominant carrier (45% seats in 2013) but has steadily lost ground to Pineapple Air and Southern Air, which have steadily expanded their capacity since 2011. Last year, it is estimated that the airport handled 45,509 passengers, representing an annual increase of 6.3% since 2008. Hotel accommodations have been on the rise in the wake of a number of tourism-related investments that the Government has approved over the past five years (refer to 'Island Profiles' section above)

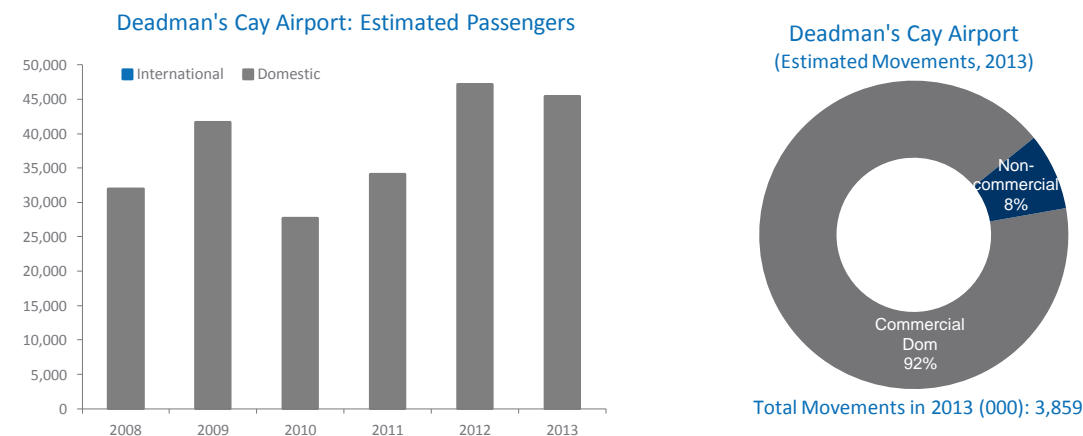


Figure 43: Deadman's Cay Airport Traffic

Source: DKMA Estimates

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

During the next two decades, we project demand to grow annually by 1.4% and reach 57,456 passengers by 2033.

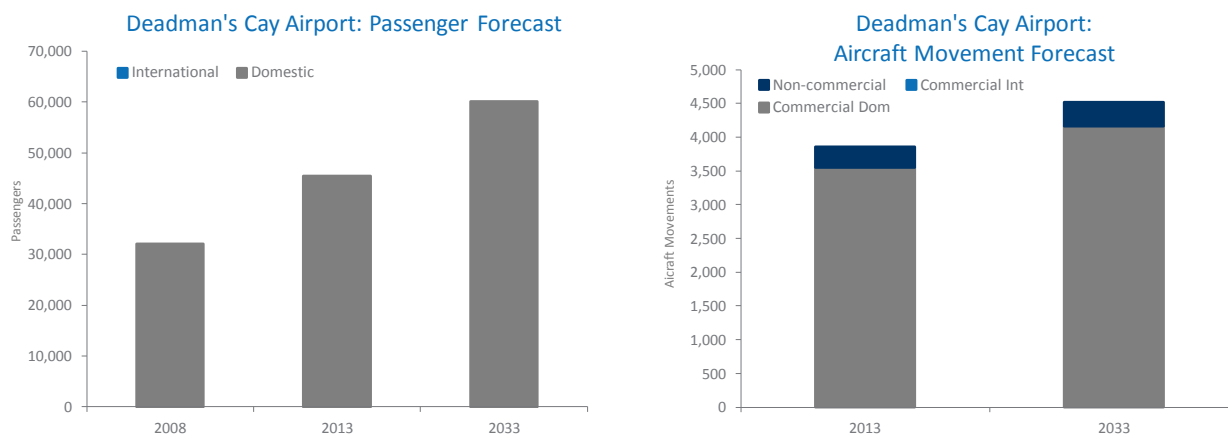


Figure 44: Deadman's Cay Airport Forecasts

Source: DKMA

Stella Maris Airport, situated in the northern portion of Long Island, is one of the airports that is being recommended for removal of its POE status. Should this occur, decreased international passengers and movements at Stella Maris Airport will subsequently increase activity to Deadman's Cay Airport. By 2033, it is projected that Stella Maris Airport will handle 2,023 international passengers and 216 international aircraft movements. If they are transferred to Deadman's Cay Airport, by 2033, Deadman's Cay would handle 59,488 total passengers and 4,734 total aircraft movements.

5.3.3 New Bight (TBI - MYCB - Cat Island)

The population of Cat Island is 1,503 based on the 2010 census. In 2000, the population was 1,647. The main settlement is Arthur's Town. In 2013, Cat Island had 19 boutique hotels for a total of 181 rooms. Cat Island has two airports: Arthur's Town Airport and New Bight. Collectively, these two airports handled 43,393 passengers last year of which 35,493 (over 80%) used New Bight. Traffic growth in New Bight has been very high, averaging 21.2% per annum since 2008. While international traffic declined during this period by 23.5% per annum, domestic has grown annually by 36.2%.

This airport is classified as a Port of Entry (POE) or Airport of Entry (AOE). Continental Airlines ceased its scheduled operations in New Bight in 2010 and since then there are no scheduled international flights to the airport, only scheduled domestic flights arriving and departing from Nassau. SkyBahamas started to serve New Bight in 2010 and, by itself, has tripled domestic capacity and largely explains the strong passenger growth. Prior to SkyBahamas' entry Bahamasair served New Bight, but has since exited the market.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

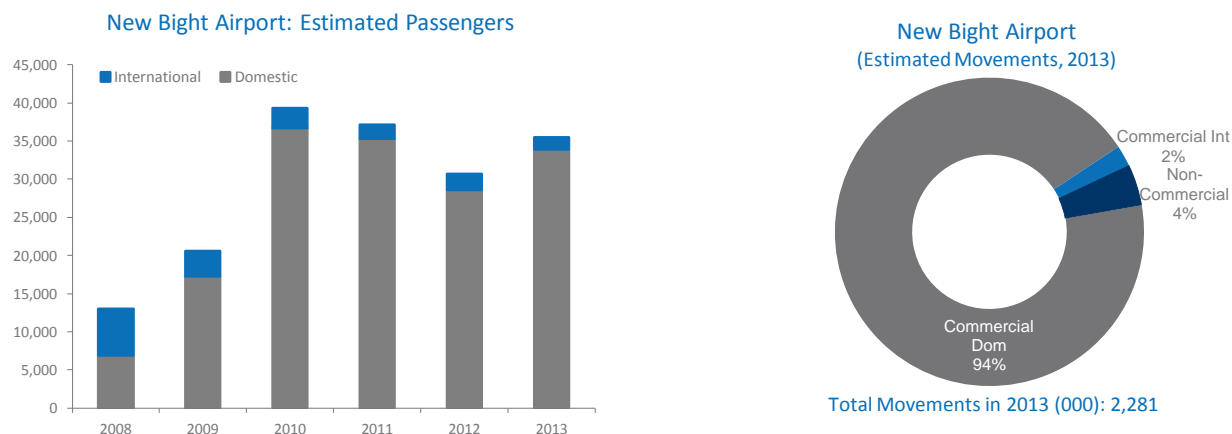


Figure 45: New Bight Airport Traffic

Source: DKMA Estimates

There are plans to develop the New Bight area of the island with new accommodations, potentially increasing the amount of tourism on the island. Based on this, we project demand to reach 56,645 by 2033, where the majority of the scheduled demand will be domestic. In parallel, movements are projected to increase annually by 1.8% and by the end of the forecast we project that, on average, schedule departures will have 18 passengers compared to 16 in 2013. Lastly, the future for the neighbour airport of Arthur's Town is limited, meaning that a portion of the demand will migrate to New Bight.

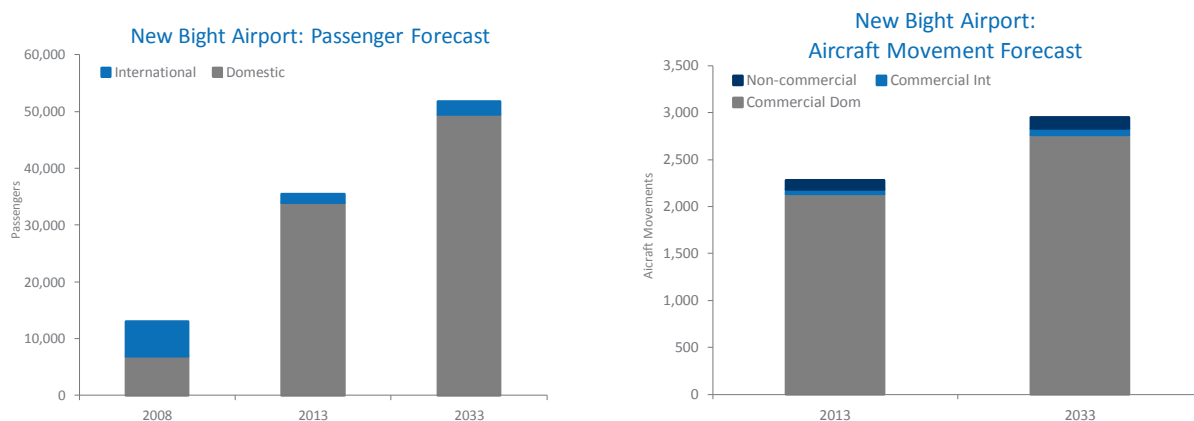


Figure 46: New Bight Airport Forecasts

Source: DKMA

Arthur's Town Airport is a candidate for closure and should this be the case, we expect the demand to shift to the larger New Bight Airport. Under these circumstances, by 2033 New Bight Airport would handle 65,694 total passengers and 3,757 total aircraft movements.

5.3.4 Andros Town/Fresh Creek (ASD - MYAF - Andros)

Andros Island has four airports: Andros Town, San Andros, Congo Town and Clarence A Bain (Mangrove Cay). Overall tourism activity is small and centres on eco-tourism. Andros Town offering a mix of scheduled domestic and international operations. International operations, after reaching a peak of 9,754 passengers in 2011, have since declined to 6,064 by 2013. International scheduled service focuses on Fort Lauderdale and the recent decrease can be attributed to Continental which, following its merger with United, has reduced capacity to The Bahamas, including cessation of service to Andros Airport in 2012. Today, the airport relies on charter and private flights. Domestically, its operations rely on Western Air which offers twice-daily service to Nassau.

Andros Town Airport is the second busiest Family Islands Airport for non-commercial movements: in 2013, it is estimated that the airport handled 4,582 movements, representing, 13 daily movements on average. Andros Town and San Andros together handled 50% of all non-commercial movements to the Family Islands in 2013.

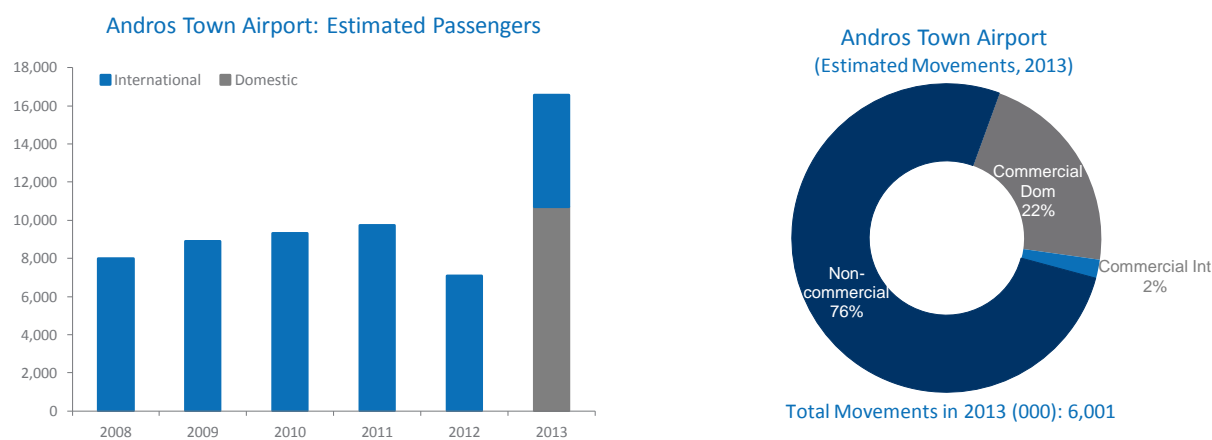


Figure 47: Andros Town Airport Traffic

Source: DKMA Estimates

Despite the fact that the island is being marketed and developed for ecotourism, this report assumes that there will be limited growth in tourists (i.e., in terms of absolute volumes of accommodations and visitors) in order to preserve the sites, and that the airport will be more focused on military operations.

Over the next 20 years, we project demand to increase annually by 1.5% to reach 22,507 passengers, where most of the demand will be linked to the projected eco-tourism development. We expect the continuation of high usage of non-commercial movements, including military, and project non-commercial movements to increase annually by 1.6%, making it the fastest growing Family Islands Airport when measured in non-commercial movements. By 2033, the airport is expected to handle 6,294 non-commercial movements representing 17 daily movements on average.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

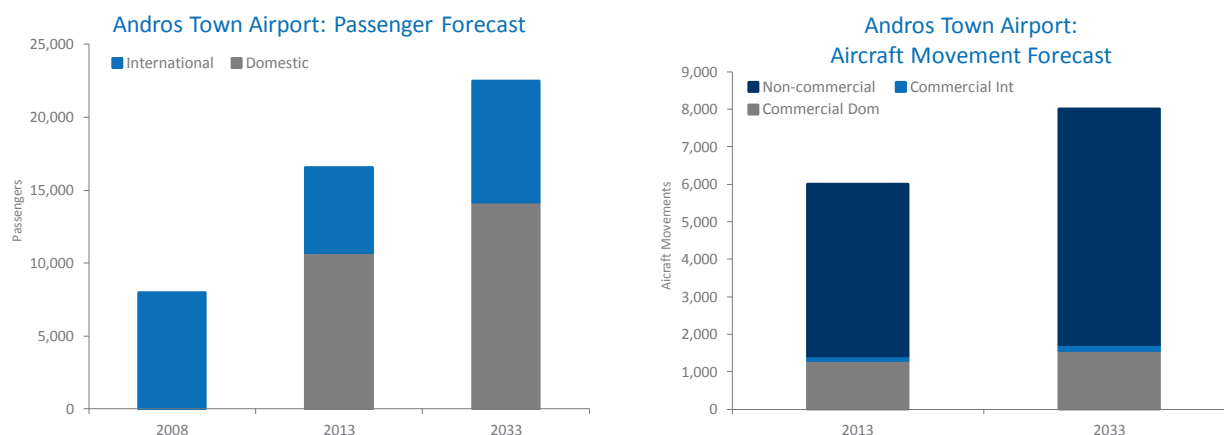


Figure 48: Andros Town Airport Forecasts

Source: DKMA

Congo Town Airport, which is situated in the southern portion of Andros Island, is one of the airports recommended for removal of its POE status. Should this occur, decreased international passengers and movements at Congo Town Airport will increase activity at San Andros Airport and Fresh Creek/Andros Town Airport. By 2033, it is projected that Congo Town Airport will handle 3,163 international passengers and 130 international aircraft movements, and we expect the international activities to be evenly split between San Andros and Fresh Creek/Andros Town. Under these circumstances, by 2033 Andros Town Airport would handle 24,078 total passengers and 8,071 total aircraft movements.

5.3.5 Matthew Town/Inagua (IGA - MYIG - Great Inagua)

Inagua is the southernmost district of the Bahamas, comprised of the islands of Great Inagua and Little Inagua. Great Inagua is the third largest island in The Bahamas and Matthew Town is its main city. According to the 2010 census, Inagua counts 911 residents down from 969 in 2000. Matthew Town Airport serves the local community along with the US Coast Guard, which has a base in Inagua. Matthew Town Airport is classified as a Port of Entry (POE) and according to the Ministry of Tourism, 1,090 visitors arrived in Inagua in 2013. The majority (897) arrived by sea, leaving 193 arrivals by air.

Inagua centres on eco-tourism and is a haven for birdwatchers, with over 140 species of native and migratory birds. The island is also home to three national parks and preserves. In 2013 a new hotel opened, increasing the number of hotels from two to three, for a total of 27 rooms.

Passenger operation in Matthew Town Airport centres on domestic activities and in 2013, traffic was estimated at 8,987, representing a decline of 7.4% since 2008. Bahamasair is the sole scheduled operator to Matthew Town and, since 2010, the carrier has decreased its capacity by 9.9% annually, which largely explains the accompanying passenger decline.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

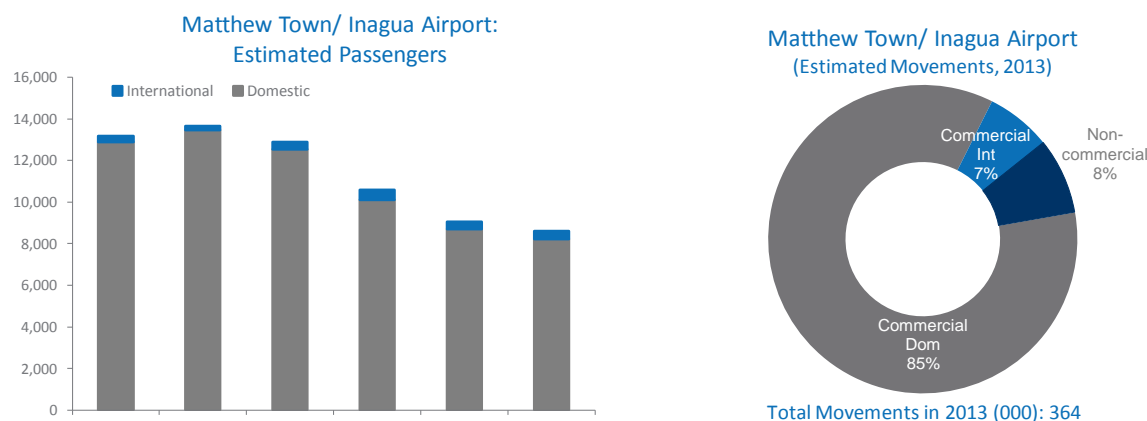


Figure 49: Matthew Town Airport Traffic

Source: DKMA Estimates

Mindful that its bird sanctuary needs to be preserved, tourism will be developed in small numbers with the overall objective of protecting the sanctuary. Based on this, over the next twenty years, we project demand to grow modestly at 1.1% per annum and, by 2033, the passenger volumes are expected to reach 10,705 annually.

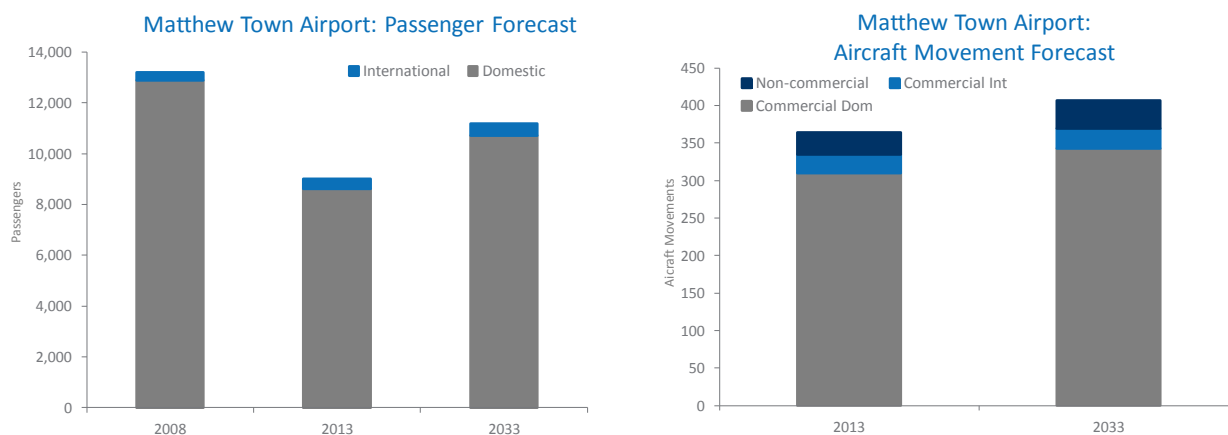


Figure 50: Matthew Town Airport Forecasts

Source: DKMA

5.3.6 Great Harbour Cay (GHC - MYBG -Berry Islands)

Great Harbour Cay is one of three airports in the Family Islands whose passenger demand is focused almost entirely on international demand, more precisely demand from the USA (the two other airports are Andros Town and San Andros). In 2013, it is estimated that the airport handled 7,880 passengers (97% were international), and since 2008 demand has declined annually by 4.5%.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

The airport is the only one serving the small Berry Islands and is classified as a Port of Entry. According to the 2010 census, there are about 798 inhabitants, most of who are on Great Harbour Cay, and about 150 homeowners that travel to the Berry Islands. The Berry islands are still relatively undeveloped with no major airport, hotel or other attractions. Most of the islands are uninhabited, or owned by a single wealthy person as a second home. During the winter season, the islands are visited by out-of-town guests and second home residents, but the difficulty of reaching the Berry Islands and the lack of infrastructure keeps the population low. In 2013, the Berry Islands had five hotels for a total of 34 rooms, and in 2014 a new tourism development in the area called 'Stingray Island' opened. According to the Ministry of Tourism 99% of the tourists to the Berry Islands arrived by sea, compared to 97% five years earlier.

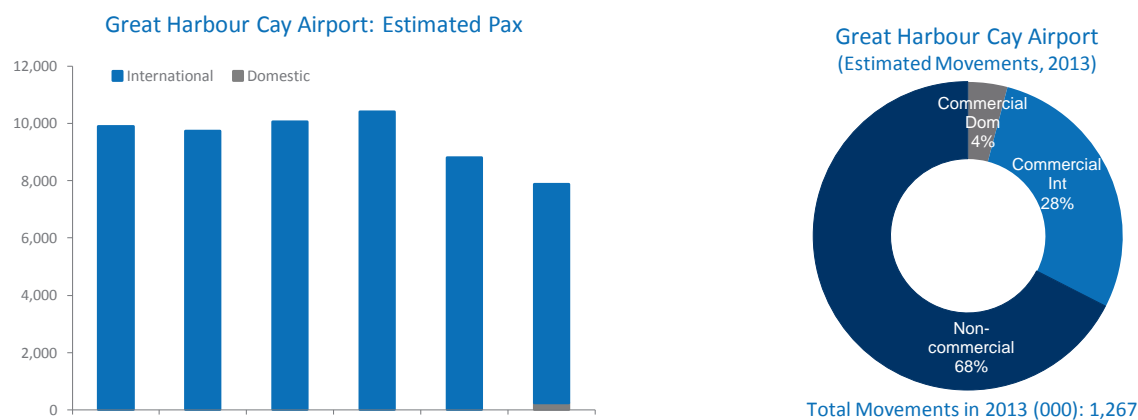


Figure 51: Great Harbour Cay Airport Traffic

Source: DKMA Estimates

In line with limited tourism and population development, coupled with on-going competition from the sea, over the next 20 years we project demand to increase annually by 1.9% to reach 11,434 passengers. The international market is projected to increase by an average of 1.9% annually while domestic will increase by an average of 0.7%, meaning that Great Harbour Cay will continue to focus on international passenger demand.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

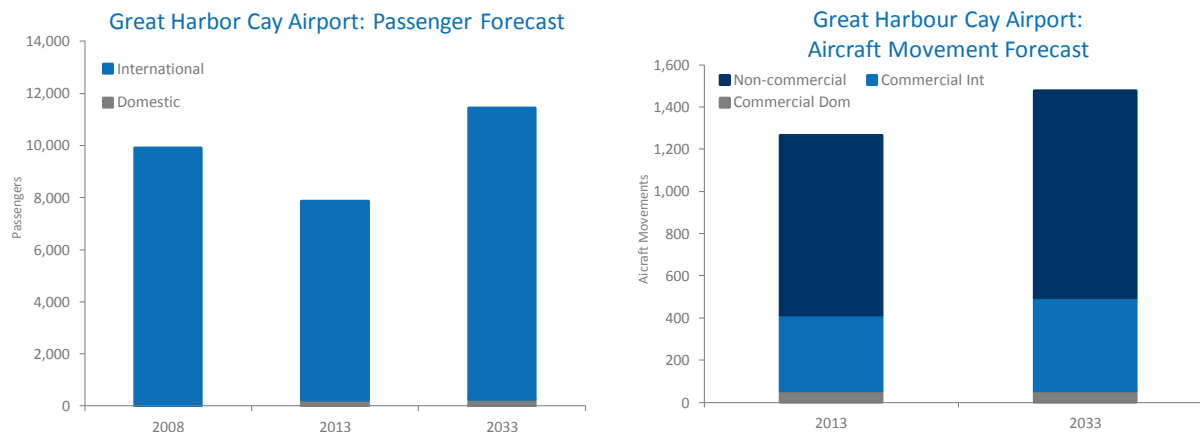


Figure 52: Great Harbor Cay Airport Forecasts

Source: DKMA

5.3.7 San Andros (SAQ - MYAN - Andros)

Andros Island is an archipelago within the Bahamas with an estimated 7,386 inhabitants. Tourism is Andros Island's largest industry and largest private employer. In 2013 there were 43 hotels, motels, resorts, guest houses and lodges (the number varies), with a total of 393 rooms; to compare, in 2008 Andros had 340 hotel rooms. Andros has the world's third largest fringing barrier reef, blue holes, the Tongue of the Ocean (a mile-deep abyss with marine life) and numerous species of flora and fauna. For an eco-traveller, Andros is a destination of choice.

Andros Island has four airports: San Andros Airport at Nicholls Town, Andros Town International Airport located at Fresh Creek, the Clarence A. Bain Airport at Mangrove Cay and Congo Town Airport in South Andros. Within the Family Islands, the airport system of Andros only accounted for 47,050 passengers or 4.5% of all passengers in the Family Islands. About a third of the passengers to the Andros fly to San Andros making it the largest airport in Andros Islands with an estimated 16,816 passengers. In San Andros, domestic demand has declined significantly since 2008 because the scheduled domestic operations ceased when Bahamasair stopped serving the airport in 2009. Since then, Western Air has set up a significant base in San Andros. Today, the carrier operates twice-daily service to Nassau.

San Andros Airport is the airport in the Family Islands with the most non-commercial movements; in 2013, it is estimated that the airport handled 5,087 movements, representing 14 daily movements on average.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

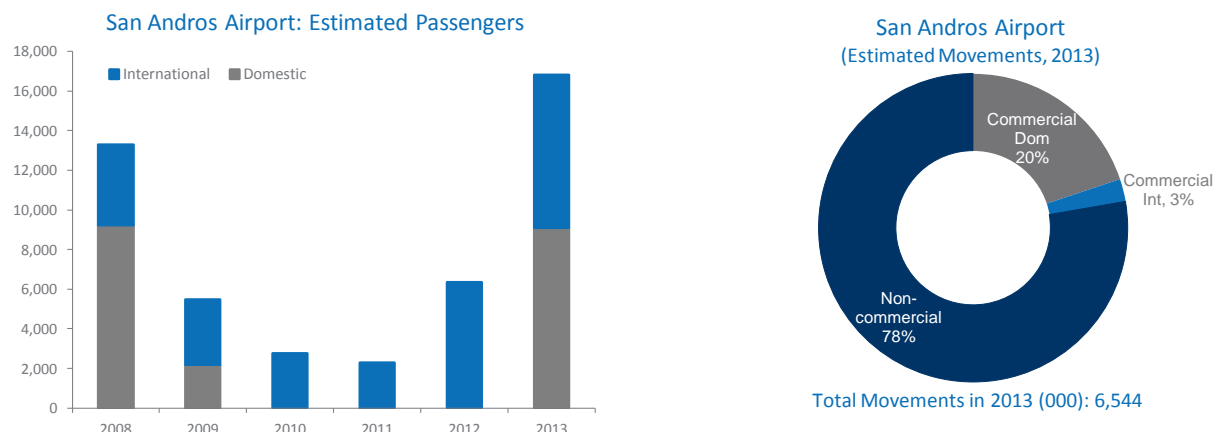


Figure 53: San Andros Airport Traffic

Source: DKMA Estimates

Despite the fact that the island is being marketed and developed for ecotourism, we assume that there is limited ecotourism potential (i.e., in terms of absolute volumes of accommodations and visitors) and that the focus will be on conservation.

Over the next 20 years, we project demand to increase annually by 1.6% to reach 24,893 passengers where most of the demand will be linked to the projected eco-tourism development.

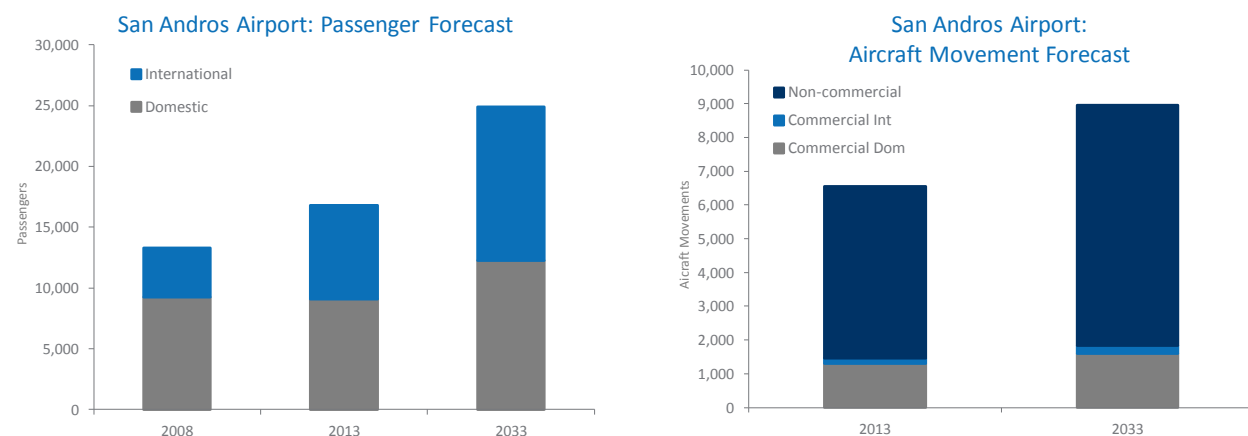


Figure 54: San Andros Airport Forecasts

Source: DKMA

Congo Town Airport, which is situated in the southern portion of Andros Island, is one of the airports recommended for removal of its POE status. Should this occur, decreased international passengers and movements at Congo Town Airport will increase activity at San Andros Airport and Fresh Creek/Andros Town Airport. By 2033, it is projected that Congo Town Airport will handle 3,163 international passengers and 130 international aircraft movements, and we expect the international activities to be evenly split between San Andros and Fresh Creek/ Andros Town.



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If this activity is transferred, by 2033 San Andros would handle 26,474 total passengers and 9,020 total movements.

5.4 TIER 3 AIRPORTS

5.4.1 Treasure Cay (TCB - MYAT - Abaco)

Four airports under study are situated on Abaco, namely: Marsh Harbour, Moore's Island, Sandy Point and Treasure Cay. Together they handled 269,444 passengers in 2013 (representing over 25% of total passengers in the Family Islands). Treasure Cay, which is situated north of Marsh Harbour, is the second largest airport in Abaco, with an estimated 47,925 passengers last year. During the last five years, passenger figures have fallen by nearly half (or -11.2% p.a.). Domestic and international passengers have both declined, but the decline was more dramatic on the domestic side where passenger volumes have fallen from 43,359 in 2008 to 13,383 in 2013. Bahamairair is the sole scheduled operator at Treasure Cay, offering service to Nassau which has been significantly scaled back by 40% since 2008. Treasure Cay is a Port of Entry (POE) and nearly all international visitors arrive by air (98% in 2013). According to the Ministry of Tourism, last year 17,271 visitors arrived by air, which is a decline of 4.5% per annum since 2008. Today, the only scheduled service is to Fort Lauderdale and is operated by both United and US Airways. Until recently, the airport's international network included West Palm Beach, Daytona Beach and Melbourne (Florida).



Figure 55: Treasure Cay Airport Traffic

Source: DKMA Estimates

Treasure Cay is about a 30 minute drive from the larger Marsh Harbour Airport. This close proximity is a challenge to Treasure Cay, since passengers typically will not mind driving 30 minutes in exchange for a greater choice of destinations and greater flight frequencies. By 2033, we project passenger demand to reach 54,319 passengers of which 72% will be international passengers.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

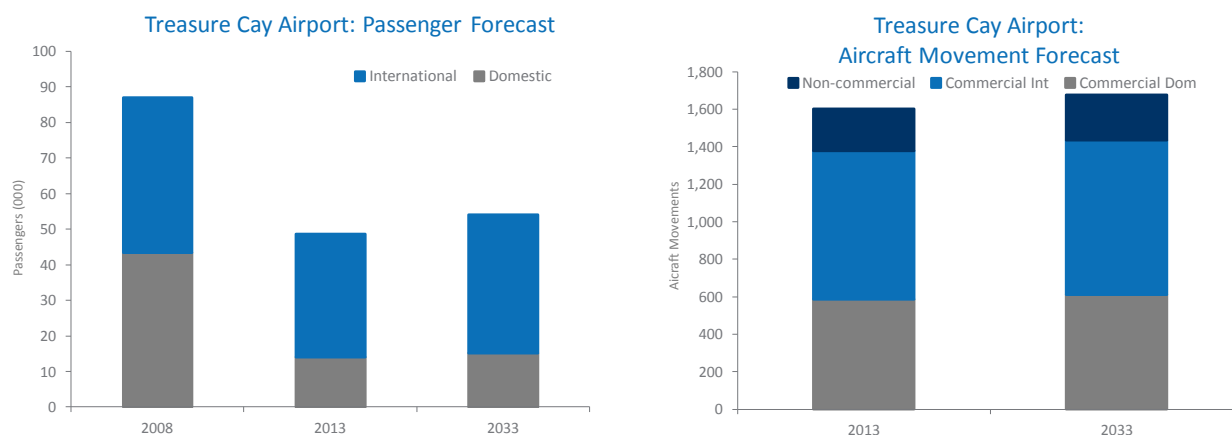


Figure 56: Treasure Cay Airport Forecasts

Source: DKMA

As mentioned, this airport is classified as a Port of Entry (POE) or Airport of Entry (AOE), providing Immigration/Customs support and services. International passenger demand has been declining since 2008 and during the next 20 years, international demand is expected to be limited to 0.6% per annum. Given the close proximity to Marsh Harbour, this POE could be closed and international demand could easily be re-located to Marsh Harbour. Should this POE be closed, by 2033, it is estimated that 38,932 international passengers and 824 international aircraft movements would be relocated Marsh Harbour leaving 15,387 domestic passengers and 877 movements (domestic and non-commercial combined) at Treasure Cay.

5.4.2 Mayaguana (MYG - MYMM - Mayaguana)

Mayaguana is the most easterly island of the Bahamas. Mayaguana is considered to be the halfway point between South Florida and Puerto Rico. It is a popular stopover for yachtsmen on a direct route to the Caribbean.

The airport is a domestic airport only with no international flights. Bahamasair has scheduled flights, providing two flights per week to and from the island. Since 2008, the carrier has reduced capacity by 29.4% annually. Further, apart from flying with Bahamasair, one needs to charter a plane to get to/from this island.

It is estimated that in 2013, the airport handled 1,817 domestic passengers, which is a significant decline of 32% per annum since 2008. Mayaguana is the Family Islands airport which has seen the most significant decline during the last 5 years.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

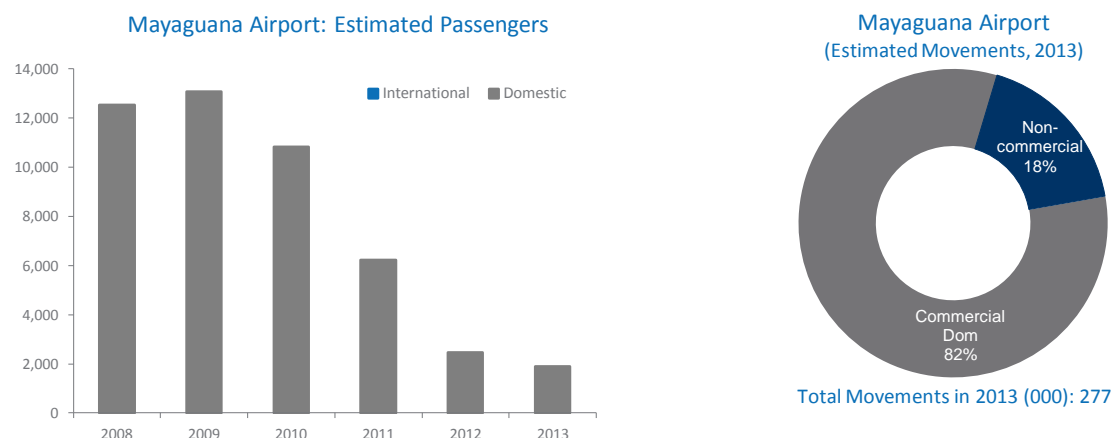


Figure 57: Mayaguana Airport Traffic

Source: DKMA Estimates

The island is served by one airport. In general, no significant tourism-related investments have been approved over the past five years and no significant future developments have been identified.

For the next 20 years, we project passenger demand to increase annually by 0.3%, meaning that by 2033 the airport is expected to handle 1,929 passengers, all of which will be domestic. Non-commercial activity will remain small and non-commercial movements are projected to increase from 277 in 2013 to 290 by 2033; i.e. about one daily movement on average.

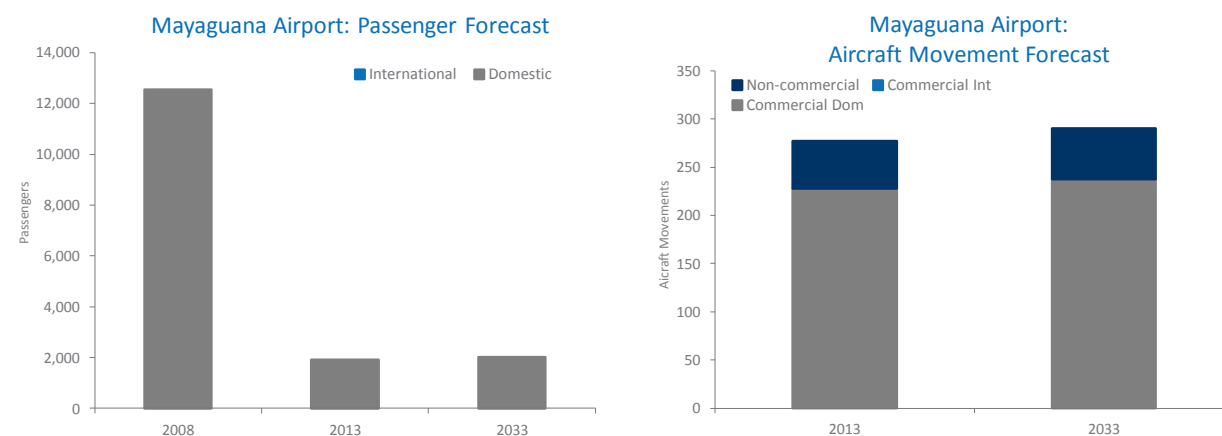


Figure 58: Mayaguana Airport Forecasts

Source: DKMA

5.4.3 Rum Cay (RCY - MYRP - Rum Cay)

In 2012, Southern Air started operating schedule service to Nassau.

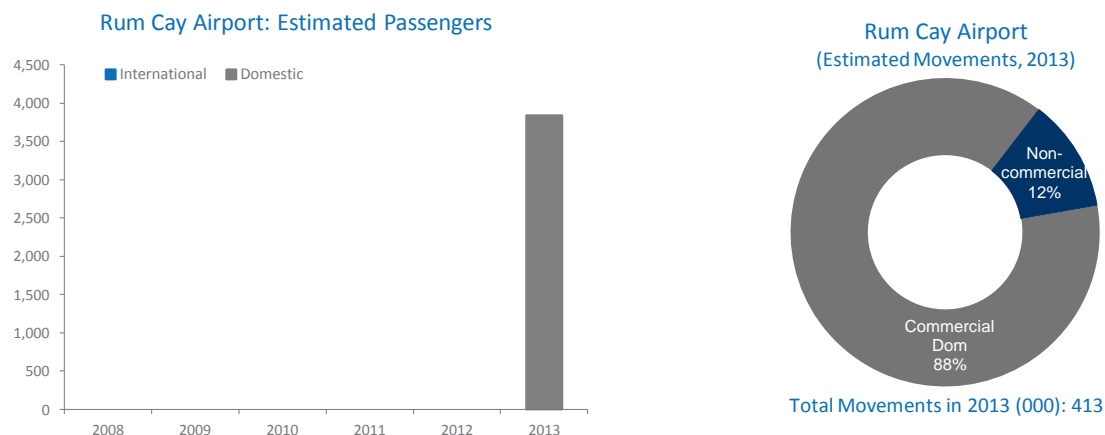


Figure 59: Rum Cay Airport Traffic

Source: DKMA Estimates

No major economic or tourism growth is planned for Rum Cay and future passenger growth is projected to be limited to 0.4% per annum, meaning that by 2033 passengers will reach 3,979. In parallel, non-commercial activity will also be limited and, over the 20 year forecast period, we project non-commercial movements to increase from 413 in 2013 to 434 in 2033.

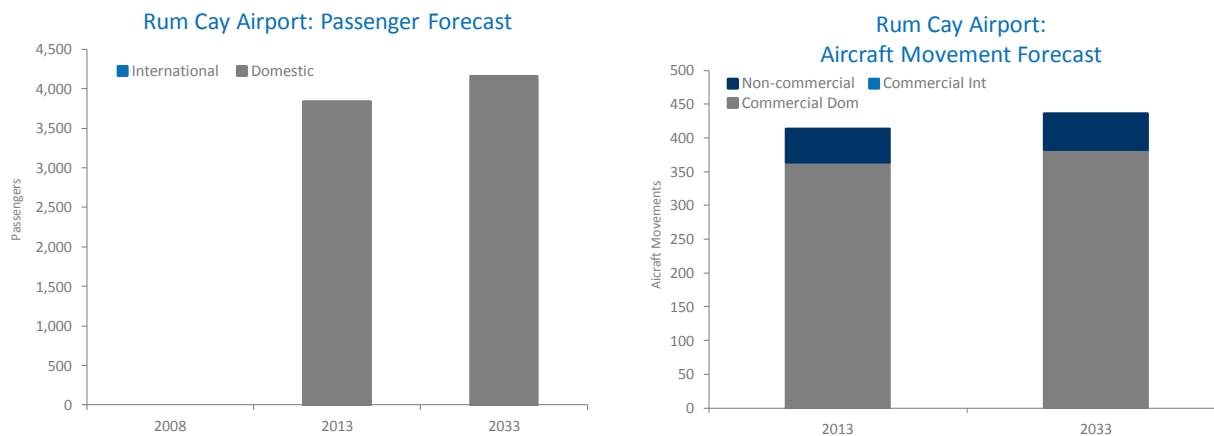


Figure 60: Rum Cay Airport Forecast

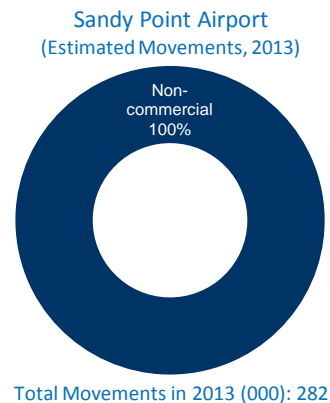
Source: DKMA

5.4.4 Sandy Point (MYAS - Abaco)

Four airports under study are situated on Abaco namely Marsh Harbour, Moore's Island, Sandy Point and Treasure Cay. Sandy Point itself is a small settlement with about 600 inhabitants. Together, the four airports handled 269,444 passengers in 2013 (representing over 25% of total

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

passengers in the Family Islands) and Sandy Point Airport and Moore's Island Airport have no commercial service.

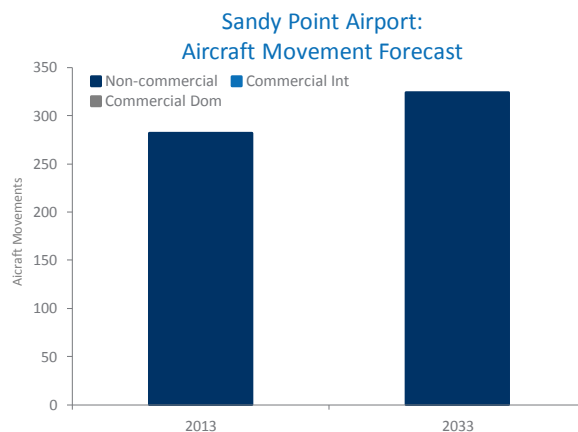


No Commercial Passengers

Figure 61: Sandy Point Airport Traffic

Source: DKMA

Even if some tourism development in South Abaco is planned, we do not expect Sandy Point to have commercial service during the next twenty years. Instead, passengers will drive to the larger airport of Marsh Harbour which is situated about one hour drive from Sandy Point. In terms of non-commercial activity, the airport is planning to increase marginally from 282 movements in 2013 to 322 by 2033 (or 0.7% per annum).



No Commercial Passengers

Figure 62: Sandy Point Airport Forecast

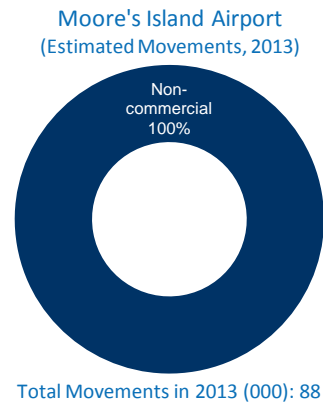
5.4.5 Moore's Island (MYAO - Abaco)

Moore's Island (approximately 2,200 inhabitants) is a little cay off the main land of Abaco. It has two settlements: Hard Bargain, which is the capital, and Bight, with about 600 inhabitants between them.

Four airports under study are situated on Abaco namely Marsh Harbour, Moore's Island, Sandy Point and Treasure Cay. Together they handled 269,444 passengers in 2013 (representing over

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

25% of total passengers in the Family Islands) and Sandy Point Airport and Moore's Island Airport have no commercial service. Activity in Moore's Island Airport is limited with an estimated 88 non-commercial movements in 2013.

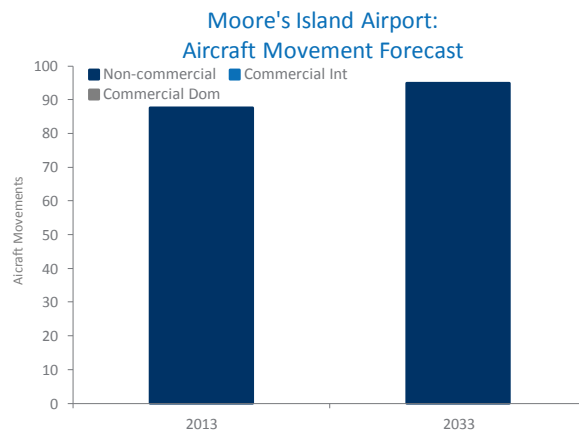


No Commercial Passengers

Figure 63: Moore's Island Airport Traffic

Source: DKMA

No major economic or tourism growth is planned for Moore's Island and aircraft movement growth is projected to be limited (+0.4% p.a.). Further, we do not expect the airport to receive schedule passenger service during this period.



No Commercial Passengers

Figure 64: Moore's Island Airport Forecast

Source: DKMA

5.4.6 Mangrove Cay/Clarence A. Bain (MYAB - Andros)

As previously mentioned Andros Island has four airports and overall tourism activity is small and centres on eco-tourism. This airport is classified as a Port of Entry (POE) or Airport of Entry (AOE). Clarence A. Bain Airport is a small airport that has only domestic commercial service, and it is the only airport located on that part of the island. In 2013, it is estimated that non-commercial movements reached 1,390, representing about four movements per day. The airport does not require ongoing POE status and this will have to be considered going forward.



COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

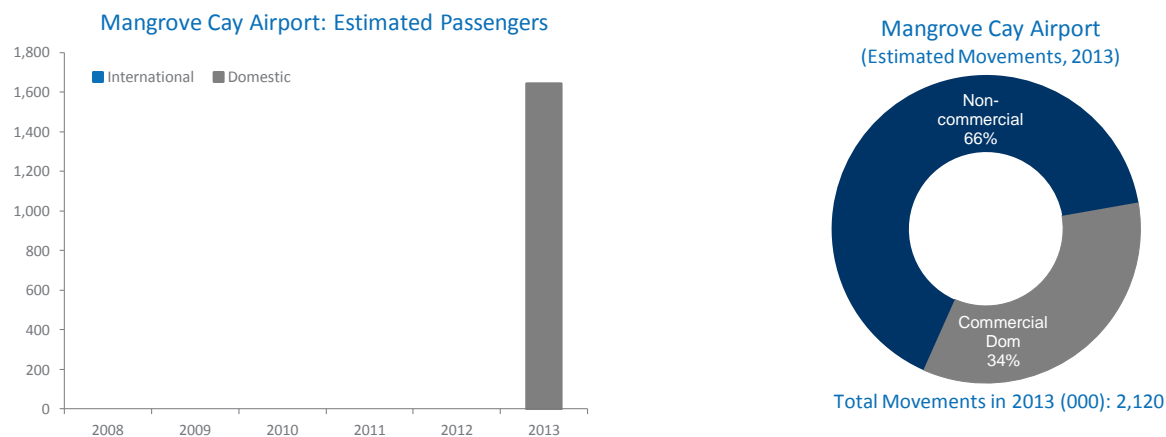


Figure 65: Mangrove Cay Airport Traffic

Source: DKMA Estimates

No major economic or tourism growth is planned for Mangrove Cay and aircraft movement growth is projected to be limited to 1% per annum, reaching 2,591 annual movements by 2033. We do expect the airport to continue to receive some scheduled domestic service and domestic passenger service is projected to reach 2,127 by the end of the forecast, increasing at 1.3% per annum.

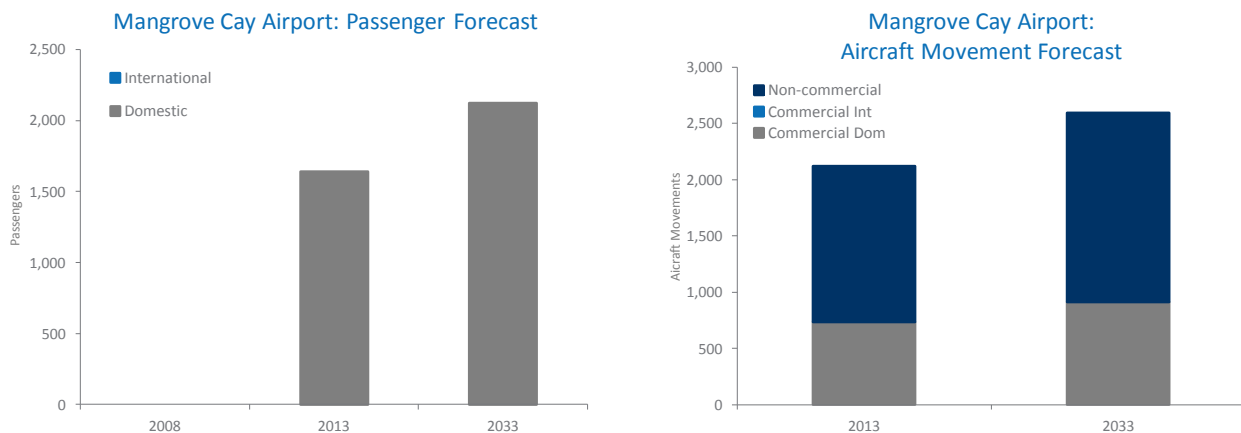


Figure 66: Mangrove Cay Airport Forecasts

Source: DKMA

5.4.7 Stella Maris (SML - MYLS - Long Island)

As already mentioned, Long Island is a scenic island with a population estimated at 3,024. Its capital is Clarence Town. Long Island is served by two airports: Deadman's Cay and Stella Maris. Together they handled 72,700 passengers last year, representing 7% of total passenger traffic to the Family Islands. Stella Maris is the smaller of the two airports, handling 27,252 passengers in 2013, which represented growth of 7.2% per annum since 2008. Contrary to Deadman's Cay, Stella Maris has some international traffic which has been stable over recent years, estimated at

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

1,760 passengers last year. In terms of aircraft movements, Stella Maris had nearly 3,600 movements last year, which is a figure comparable to Deadman's Cay (3,859).

Historically, Bahamasair was the dominant carrier at Stella Maris. In 2011, both Pineapple Air and Southern Air entered this market by offering service to Nassau, and by 2013 Pineapple was the largest scheduled carrier at Stella Maris, with a market share of 49% (measured in seats). They have since discontinued service and only Southern Air remains. The airport is a Port of Entry (POE) and, based on Ministry of Tourism data, arrivals by air have been slowly declining since 2008: in 2008, 918 individuals arrived by air compared to 880 in 2013.

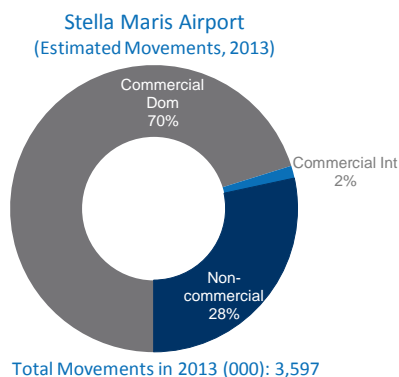


Figure 67: Stella Maris Airport Traffic

Source: DKMA Estimates

Moving forward, we expect most of the air transport activity to continue to centre on Deadman's Cay rather than at Stella Maris, and over the next two decades, we project demand to grow annually by 1.6% to reach 35,602 passengers by 2033.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

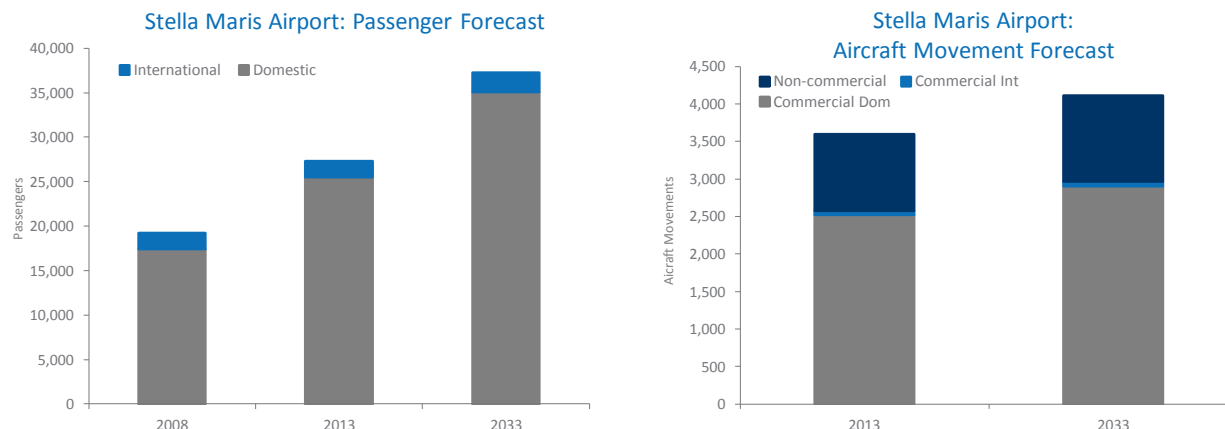


Figure 68: Stella Maris Airport Forecasts

Source: DKMA

Stella Maris Airport, which is situated in the northern portion of Long island, is one of the airports that is being recommended for removal of its POE status. Should this occur, decreased international passengers and movements at Stella Maris Airport will increase activity to Deadman's Cay Airport. By 2033 it is projected that Stella Maris Airport will handle 2,023 international passengers and 216 international aircraft movements, and if they are transferred to Deadman's Cay Airport, by 2033, this would leave 33,579 total passengers and 4,052 total movements at Stella Maris Airport.

5.4.8 Staniel Cay (TYM - MYES -Exuma)

Staniel Cay, situated at the northern point on Exuma offers no schedule passenger service but has a vibrant General Aviation sector. Last year, the airport handled nearly 4,800 non-commercial movements, representing 13 daily movements on average and only San Andros had more non-commercial movements (5,087). The tourism in the area is driven by David Hoher, who owns the yacht club as well as Watermakers Charter Air Service, flying approximately twice a day to Nassau and twice a day from Florida via San Andros.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

No Commercial Passengers

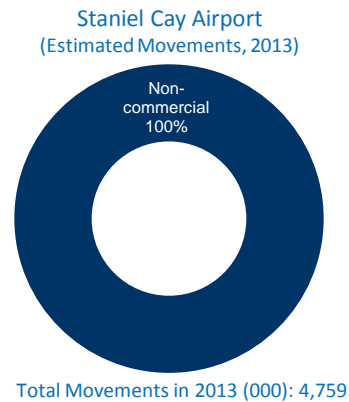


Figure 69: Staniel Cay Airport Traffic

Source: DKMA Estimates

Residents of Staniel Cay are wealthy, and we expect that in the future the airport's operations will continue to be centred on non-commercial activity. Significant tourism development is not expected, and the number of wealthy residents will marginally increase, meaning that non-commercial activity is projected to grow annually by 1.1% per annum over the next 20 years to reach 5,923 by 2033.

No Commercial Passengers

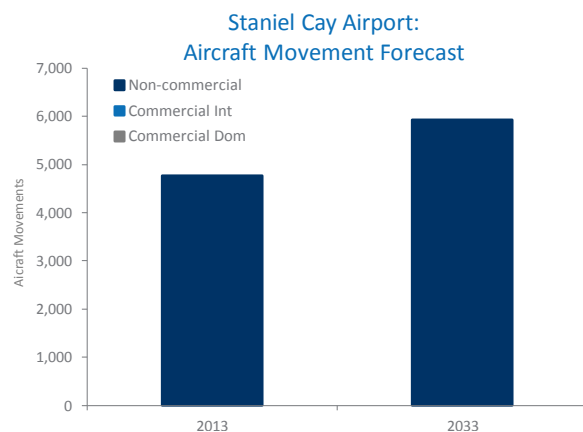


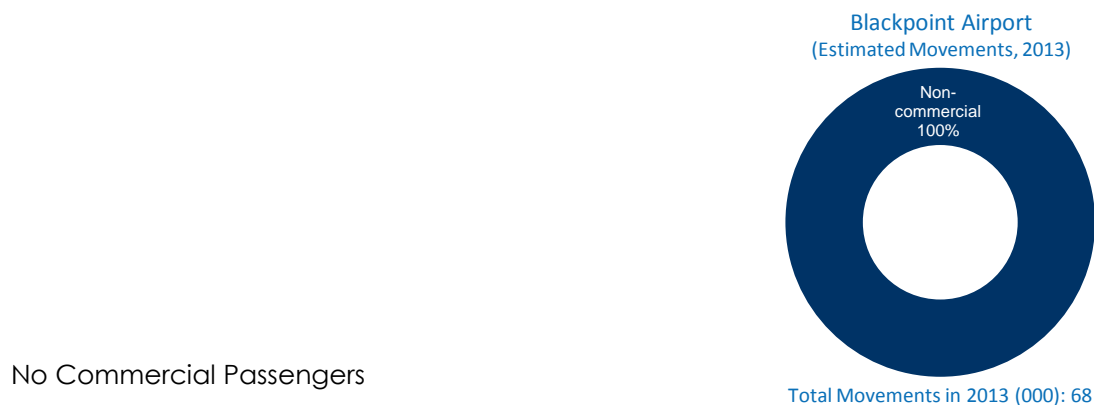
Figure 70: Staniel Cay Airport Forecast

Source: DKMA

5.4.9 Blackpoint (MYEB - Exumas)

The Exumas is a chain of islands that spans a distance of approximately 100 miles. Blackpoint is situated south of Staniel Cay and north of Farmer's Cay and, similar to its counterpart airports in the Exumas, Blackpoint offers no scheduled passenger service and also has a limited non-commercial sector. It is estimated that the airport handled 68 non-commercial movements last year. Blackpoint, Farmer's Cay and Rum Cay are the three smallest airports in this study.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

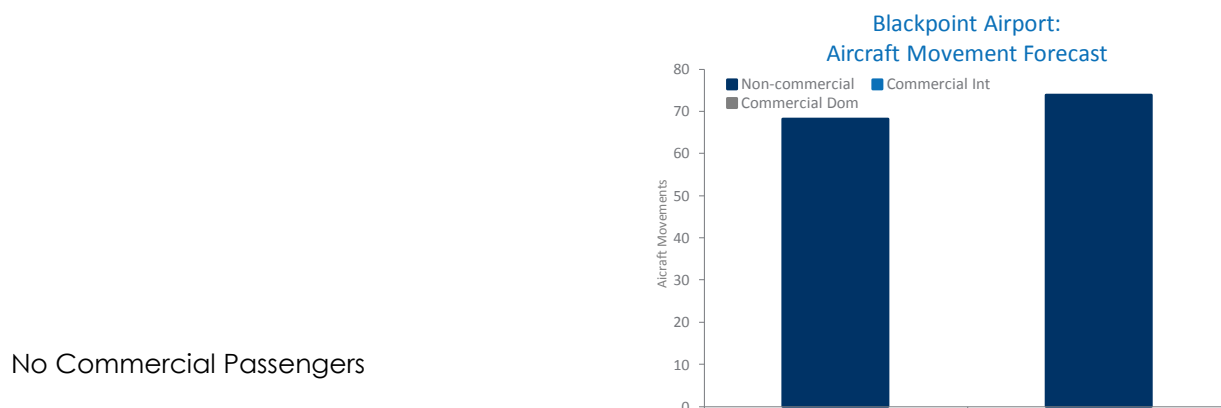


No Commercial Passengers

Figure 71: Blackpoint Airport Traffic

Source: DKMA Estimates

Blackpoint Airport serves a local community of about 400 people and no major tourism development is planned. Based on this, we do not expect commercial scheduled during the next 20 years and non-commercial movements will see modest growth of 0.4% per annum to reach 74 movements by 2033.



No Commercial Passengers

Figure 72: Blackpoint Airport Forecast

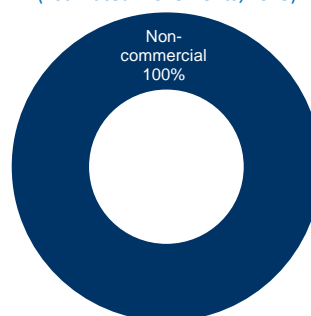
Source: DKMA

5.4.10 Farmer's Cay (MYE3 - Exumas)

Farmer's Cay is situated south of both Staniel Cay and Blackpoint. Similar to its counterpart airports in the Exumas, Farmer's Cay Airport offers no schedule passenger service and also has a limited non-commercial sector. It is estimated that the airport handled 88 non-commercial movements last year. Blackpoint, Farmer's Cay and Rum Cay are the three smallest airports in this study.

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Farmer's Cay Airport
(Estimated Movements, 2013)



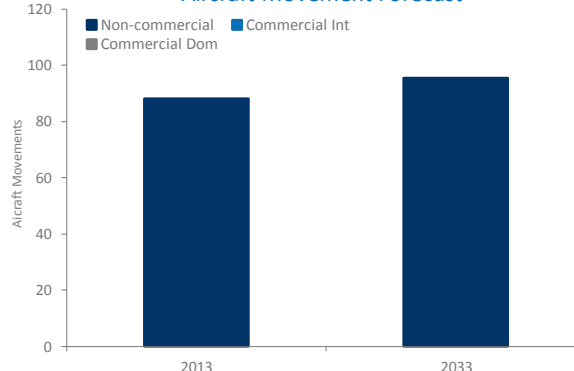
No Commercial Passengers

Figure 74: Farmer's Cay Airport Traffic

Source: DKMA Estimates

Farmer's Cay Airport serves a local community of about 65 people and no major tourism development is planned. Based on this, we do not expect commercial scheduled service over the next 20 years and non-commercial movements will see modest growth of 0.4% per annum to reach 95 movements by 2033.

Farmer's Cay Airport:
Aircraft Movement Forecast



No Commercial Passengers

Figure 75: Farmer's Cay Airport Forecast

Source: DKMA

5.4.11 South Andros/ Congo Town (TZN - MYAK - Andros)

As already mentioned, Andros Island has four airports and overall tourism activity is small. South Andros is the southernmost third of the land mass colloquially called Andros, which includes the districts of North Andros, Central Andros and South Andros. The districts are divided by broad unspanned "creeks", some of which offer public ferry crossing; otherwise, the only way to travel from one district to another is by private plane or boat. Since 2010 the airport no longer offers scheduled domestic service while the international schedule service has declined since 2008.

In 2013, the airport handled an estimated 12,037 passengers and this airport is classified as a Port of Entry (POE) or Airport of Entry (AOE) Airport. All international visitors arrive by air (i.e. none

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arrive by sea according to the Ministry of Tourism) and the international flights are charter or private flights from the US; regular scheduled flight services ceased in 2009.

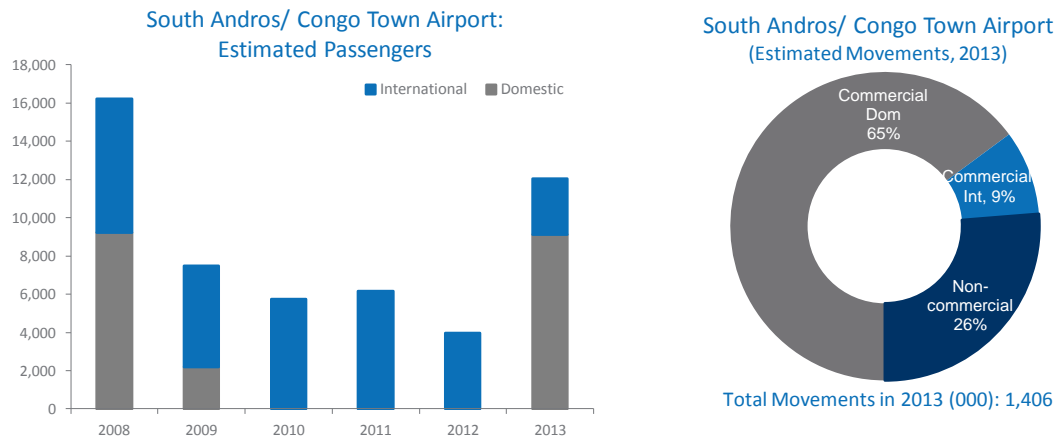


Figure 76: South Andros Airport Traffic

Source: DKMA Estimates

Commercial activity will continue to centre on domestic routes (more precisely Nassau) and we do not expect international schedules service to re-start. We project demand to reach 15,202 passengers by 2033 representing an annual growth of 1.2% and, by that year, the airport is expected to handle 1,681 movements which will mostly be domestic.

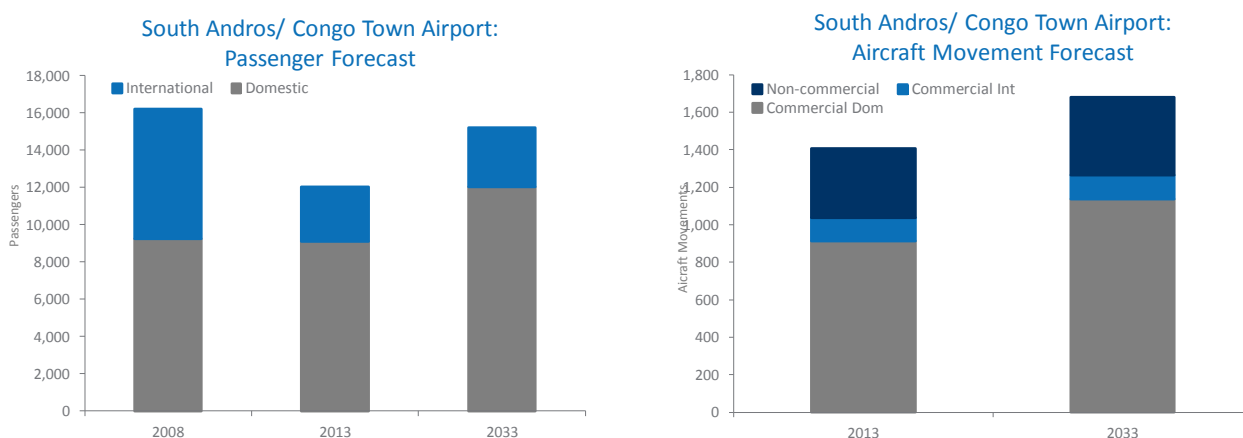


Figure 77: South Andros Airport Forecasts

Source: DKMA

Congo Town Airport, which is situated in the southern portion of Andros Island, is one of the airports recommended for removal of its POE status. Should this occur, decreased international passengers and movements at Congo Town Airport will increase activity at San Andros Airport and Fresh Creek/Andros Town Airport. By 2033 it is projected that Congo Town Airport will handle 3,163 international passengers and 130 international aircraft movements, and we expect the

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international activities to be evenly split between San Andros and Fresh Creek/Andros Town. If this activity is transferred, by 2033 South Andros Airport would handle 12,040 total passengers and 1,551 total movements.

5.4.12 Crooked Island/ Colonel Hill (CRI - MYCI)

It is estimated that last year the airport handled 9,545 domestic passengers, representing growth of 1.6% per annum since 2008. Traffic growth since 2011 is largely due to Pineapple Air's opening of scheduled service to Nassau. Non-commercial/private aircraft movements are limited in Crooked Island.

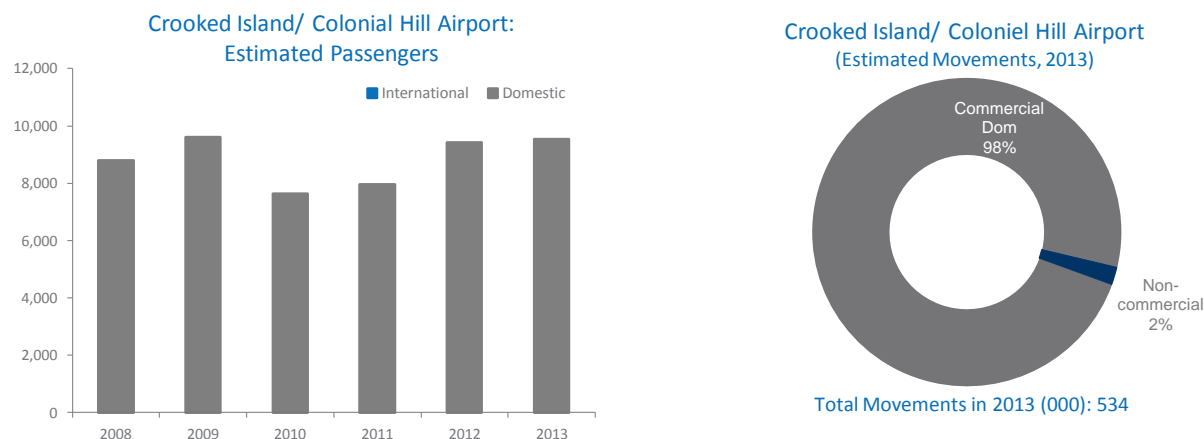


Figure 78: Crooked Island Airport Traffic

Source: DKMA Estimates

Colonel Hill Airport serves a relatively small community and no major tourism development is planned. Based on this, we expect the scheduled activities to continue to focus on domestic activities, with limited growth for private/non-commercial activities. Over the next 20 years, passengers are projected to increase to 10,718, representing annual growth of 0.8%, and movements will increase annually by 0.5%.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

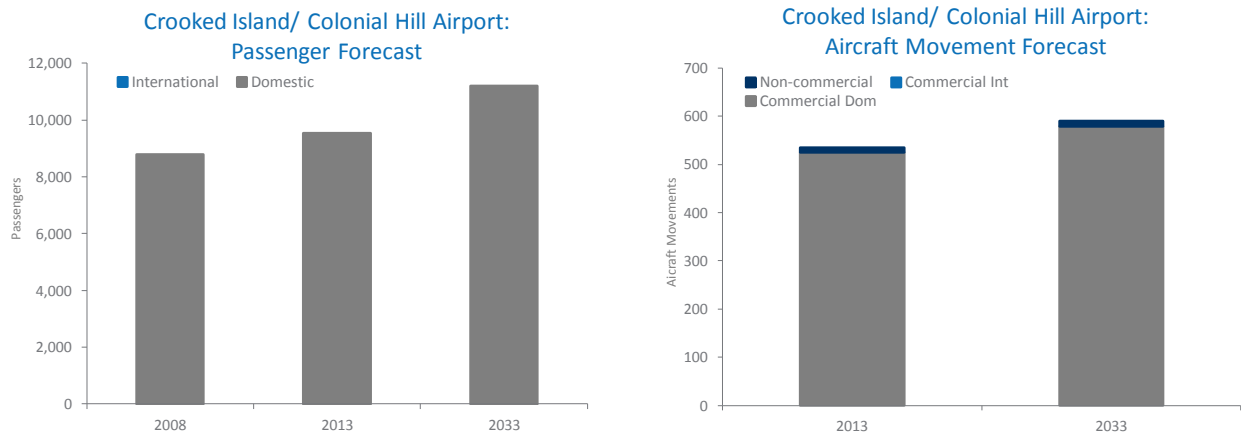


Figure 79: Crooked Island Airport Forecasts

Source: DKMA

5.4.13 Spring Point (AXP - MYAP - Acklins Island)

It is estimated that last year the airport handled 7,066 domestic passengers, representing a decline of 3.7% per annum since 2008. Bahamasair offers scheduled flights to Nassau and since 2008 the capacity offered has been stable (~6,500 departure seats per annum).

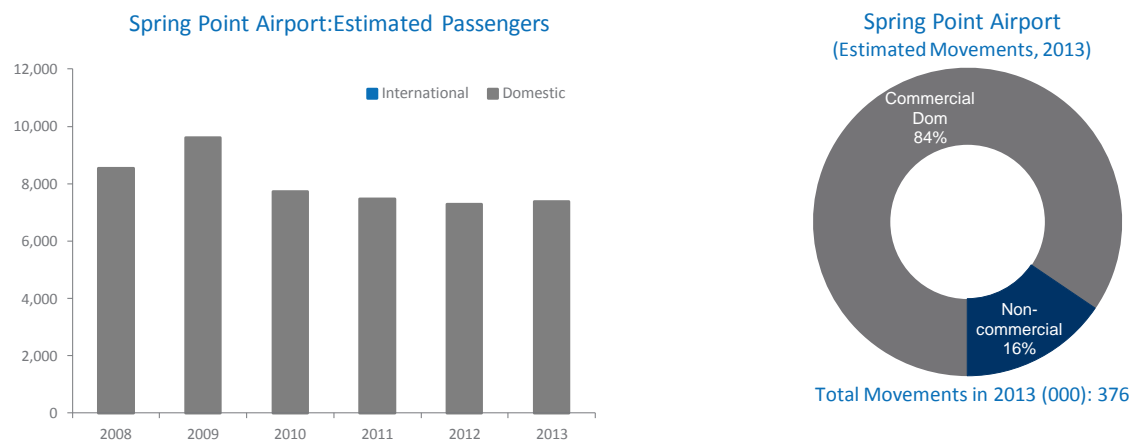


Figure 80: Spring Point Airport Traffic

Source: DKMA Estimates

Spring Point Airport serves a small community and no major tourism development is planned. Based on this, we expect the scheduled activities to continue to focus on domestic activities with limited growth for private/non-commercial activities. Over the next 20 years, passengers are projected to increase to 7,502, representing annual growth of 0.3% and movements will increase annually by 0.2%. Of the two airports that serve Acklins and Crooked Islands, Colonel Hill Airport will remain the larger of the two.

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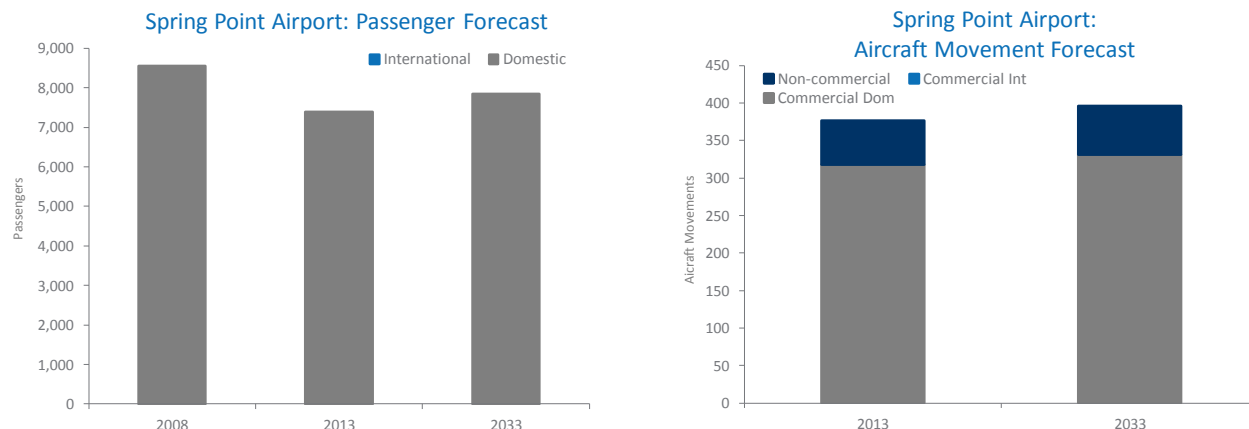
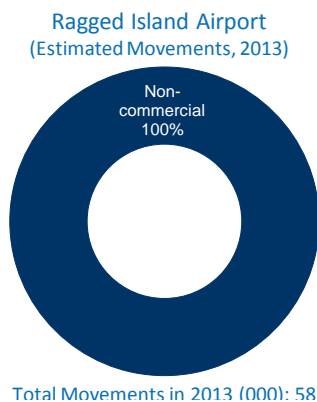


Figure 81: Spring Point Airport Forecasts

Source: DKMA

5.4.14 Ragged Island/Duncan Town (DCT - MYRD - Ragged Island)

Airport activity at Ragged Island Airport is minimal with an estimated 58 movements last year and no scheduled commercial passenger activity.



No Commercial Passengers

Figure 82: Ragged Island Airport Traffic

Source: DKMA Estimates

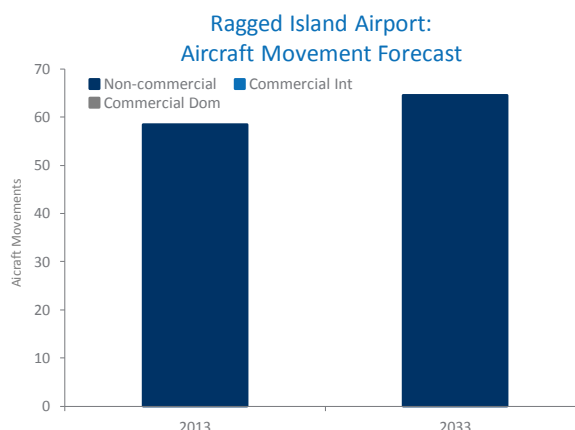
The local population will continue to be fairly isolated and the airport activity on Ragged Island will be centred on non-commercial activities.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

No Commercial Passengers

Figure 83: Ragged Island Airport Forecast

Source: DKMA



5.5 POSSIBLE CLOSURE AIRPORTS

5.5.1 Arthur's Town (ATC - MYCA - Cat Island)

Cat Island has two airports: Arthur's Town Airport and New Bight. Collectively these airports handled 43,393 passengers last year, of which 7,990 (less than 20%) used Arthur's Town.

Bahamasair served Arthur's Town until it exited in 2011. There was a void in 2012, and in 2013 Pineapple Air started operations in Arthur's Town offering service to Nassau.

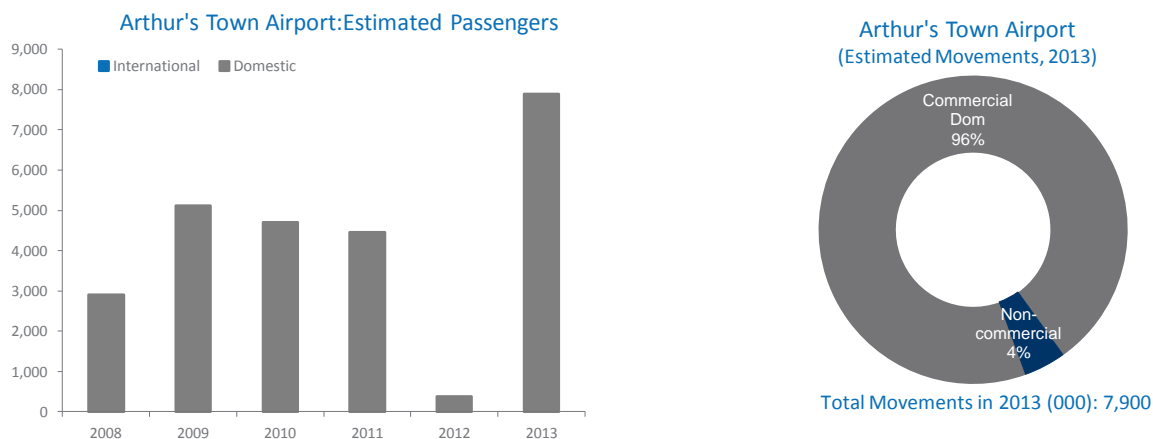


Figure 84: Arthur's Town Airport Traffic

Source: DKMA Estimates

Arthur's Town is about a 30 minute drive from the larger New Bight Airport. This close proximity is a challenge to Arthur's Cay, since passengers typically will not mind driving 30 minutes in exchange for a greater choice of destinations and greater flight frequencies. While major investments have been approved for Cat Island (see above), none are planned for the Arthur's

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Town area in particular. We project passenger demand to reach 9,048 passengers by 2033, representing growth of 0.6% per annum.

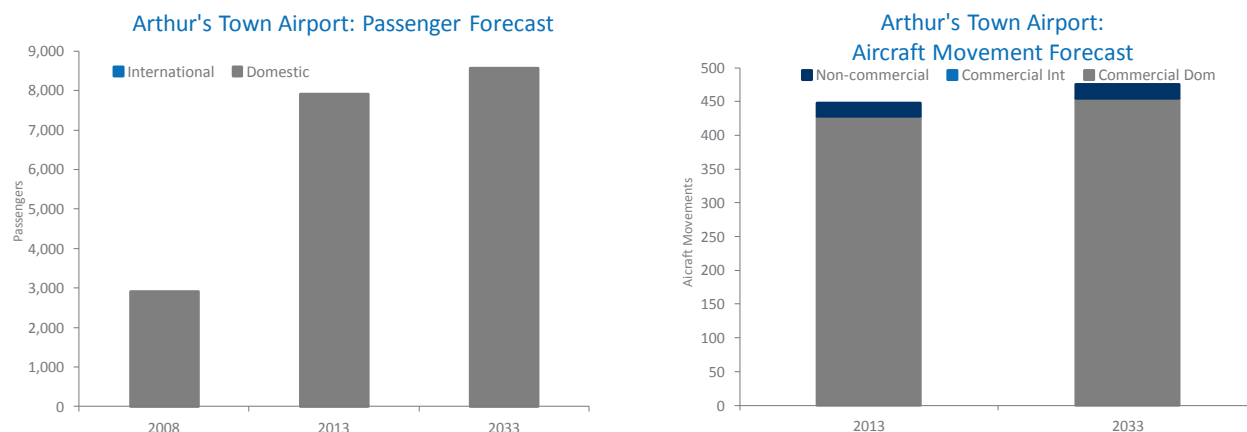


Figure 85: Arthur's Town Airport Forecasts

Source: DKMA

Arthur's Town Airport is a candidate for closure and should this be the case, we expect the demand to shift to the larger New Bight Airport.

5.6 ECONOMIC IMPACT ANALYSIS RESULTS

Before reviewing the results of the economic impact analysis, it is important to recall from the Methodology section that each airport receives a basic score and an adjusted score. To review: for islands or island groups that have more than one airport, the scores for those particular airports must be reflective of their share of total airport traffic on their given island. Hence, the adjusted score makes this accounting and ensures that an airport with relatively low traffic volume does not receive a higher score than one with a higher traffic volume, especially in the case of airports in close proximity to each other. The basic and adjusted scores are equivalent in cases where a given airport is the only airport on an island (or the only airport under consideration on that island).

Our results are outlined in the accompanying table, which can be read as follows: there are 28 airports competing for a total of 100 possible credits and these credits are awarded on the basis of the attributes (metrics) identified previously (e.g., number of hotel visitors, number of seasonal residents, amount of tourism-related investments in recent years, etc.). Here, the total credits (100) are arbitrary, but what is important is how they are allocated amongst the airports.

As previously mentioned, our mandate is to provide a scoring system that ultimately can be used as a guide for funding allocation. With that in mind, we can infer from the "adjusted" scores that, of the total funding that may be available for development of the Family Island Airports, Marsh Harbour could merit up to 36.7% of those funds; Treasure Cay, 8.1%; Governor's Harbour, 5.1%, etc.

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Table 9: EIA – Airport Level

EIA - Airport Level						
Tier	Airport	Island/ Archipelago	Rank	Score	Adjusted Score	Post Adjustment Rank
1	Marsh Harbour	Abaco	1	28.75	36.73	1
3	Treasure Cay	Abaco	2	13.14	8.07	5
1	Governor's Harbour	Eleuthera	3	12.93	5.05	7
2	New Bight	Cat Island	4	8.73	9.03	3
1	George Town	Exuma	5	7.74	8.71	4
1	North Eleuthera	Eleuthera	6	6.63	10.03	2
1	San Salvador	San Salvador	7	4.12	4.12	8
1	South Bimini	Bimini	8	3.40	3.40	9
2	Great Harbour Cay	Berry Islands	9	3.33	3.33	10
3	Sandy Point	Abaco	10	2.84	0.00	22
3	Congo Town	Andros	11	1.35	0.54	15
2	Rock Sound	Eleuthera	12	1.22	5.70	6
3	Stella Maris	Long Island	13	1.17	0.77	14
2	Deadman's Cay	Long Island	14	0.89	1.28	12
2	Andros Town (Fresh Creek)	Andros	15	0.77	1.11	13
3	Staniel Cay	Exuma	16	0.68	0.00	23
2	San Andros	Andros	17	0.60	1.41	11
3	Crooked Island	Crooked Island	18	0.34	0.34	16
3	Mangrove Cay	Andros	19	0.33	0.00	24
C	Arthur's Town	Cat Island	20	0.29	0.00	25
3	Blackpoint	Exuma	21	0.28	0.00	26
3	Spring Point	Acklins Island	22	0.14	0.14	17
2	Matthew Town	Inagua	23	0.13	0.13	18
3	Mayaguana	Mayaguana	24	0.07	0.07	19
3	More's Island	Abaco	25	0.06	0.00	27
3	Rum Cay	Rum Cay	26	0.03	0.03	20
3	Ragged Island	Ragged Island	27	0.02	0.02	21
3	Farmer's Cay	Exuma	28	0.01	0.00	28
			Total	100.00	100.00	

Source: DKMA

After generating the above-indicated scores for the airports, a set of impacts are generated where Marsh Harbour and Treasure Cay are excluded from the analysis. This was done for two key reasons: 1) Treasure Cay's traffic demand is expected to be shifted to Marsh Harbour and, hence, there is not much reason to allocate funding for it; and 2) Marsh Harbour's recent development and investments are already sufficiently developed to accommodate the traffic volumes that are forecast for the airport over the next twenty years and, hence, there is also no reason to allocate funding to this airport.

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Accordingly, those airports were removed from the analysis and this had the impact of raising the scores for the 26 airports that remained under consideration. The revised scores (based on the same methodology outlined previously) are outlined in the following table.

Table 10: EIA – Airport Level (excluding Marsh Harbour and Treasure Cay)

EIA - Airport Level (Excluding Marsh Harbour and Treasure Cay)						
Tier	Airport	Island/ Archipelago	Rank	Score	Adjusted Score	Post Adjustment Rank
1	Governor's Harbour	Eleuthera	1	22.41	9.36	5
2	New Bight	Cat Island	2	13.89	14.29	3
1	North Eleuthera	Eleuthera	3	13.69	18.59	1
1	George Town	Exuma	4	13.14	14.76	2
3	Sandy Point	Abaco	5	6.18	6.18	6
1	South Bimini	Bimini	6	5.93	5.93	7
1	San Salvador	San Salvador	7	5.80	5.80	8
2	Great Harbour Cay	Berry Islands	8	5.29	5.29	9
2	Rock Sound	Eleuthera	9	2.42	10.57	4
3	Congo Town	Andros	10	2.18	0.86	14
3	Stella Maris	Long Island	11	1.79	1.17	13
2	Deadman's Cay	Long Island	12	1.32	1.94	11
2	Andros Town (Fresh Creek)	Andros	13	1.30	1.79	12
3	Staniel Cay	Exuma	14	1.16	0.00	23
2	San Andros	Andros	15	0.92	2.28	10
3	Mangrove Cay	Andros	16	0.54	0.00	24
3	Crooked Island	Crooked Island	17	0.52	0.52	15
3	Blackpoint	Exuma	18	0.44	0.00	25
C	Arthur's Town	Cat Island	19	0.41	0.00	26
3	Spring Point	Acklins Island	20	0.20	0.20	16
2	Matthew Town	Inagua	21	0.19	0.19	17
3	Mayaguana	Mayaguana	22	0.09	0.09	18
3	More's Island	Abaco	23	0.09	0.09	19
3	Rum Cay	Rum Cay	24	0.04	0.04	20
3	Ragged Island	Ragged Island	25	0.03	0.03	21
3	Farmer's Cay	Exuma	26	0.01	0.00	22
			Total	100.00	100.00	

Source: DKMA

The Tier 1 airports are at the top, or close to the top, of the rankings (pre and post adjustment), where the four Tier 1 airports remaining in the analysis fall within the top eight ranked list of airports. This is due to the fact that these airports tended to have the highest values for most of the metrics included in the analysis. In particular, they tended to have the highest traffic volumes and also tended to have the highest levels of investments approved over the past five years.

Cat Island Airport, which ranked third place on the adjusted scoring, is the noted outlier in this analysis. The region around the airport ranks behind most of the other airport on the basis of most of the metrics covered in the model (e.g., population, hotel rooms, hotel visitors, etc.). However,



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the region around the airport has received a disproportionate share (\$1.2 billion) of approved investments over the past five years and the particular investment being made on Cat Island will have a strong connection to the airport. The investment project is contingent upon the existence of an airport that can transport tourists to/from the island, and the airport will require adequate facilities/capacity to support the project.

In addition, Sandy Point, a Tier 3 airport, received a relatively high ranking (sixth place) mainly due to the fact that relative to many other airports included in the analysis, a significant amount of investment is coming to the southern part of Abaco Island, where the airport is located.

As mentioned previously, due to the dominance of tourism in the economy of The Bahamas, this analysis focuses on the connection between the Family Islands Airports and the tourism industry in the region around each airport. At the same time, it is recognized that airports can serve social functions, such as medivac services. However, determining the utility of airports in supporting such services is beyond the scope of this analysis. For example, the value of Governor's Harbour Airport to the hospital in that region is not incorporated in this analysis.

6.0 THE AIRPORT TIER SYSTEM RECOMMENDATIONS

The Aerodrome Technical Assessment and the associated Economic Analysis with its traffic forecast and economic impact reporting has provided a level of knowledge and detail on the operation and infrastructure at the 28 airports necessary to provide recommendations on the aviation service to optimize the Family Islands Airports.

The project team visited all 28 Family Islands Airports and the overall interest level and support was very good. The individuals that were point of contacts were generally security related and several Island Administrators also met the team. The level of awareness of the airport operating environment and its ongoing requirements was low, and most of the contacts expressed interest and desire to receive airport training for their sites.

The existing operating environment cannot continue in its present state. The airports require significant attention and resources (human and capital) to close the gap to an acceptable operating state.

The combination of airport activity, capacity and role for individual Family Islands Airports provided the project team with a methodology to create categories/tiers of airport operations and response as follows:

- Tier 1 – airports are significant Port of Entry gateways for the Family Islands and have economic opportunity to be operationally sustainable;
- Tier 2 – airports have Port of Entry status and provide Customs and Immigration services to Family Islands where there is existing international traffic and/or economic development to support limited or shared services (and some with future potential to transition to tier 1); and
- Tier 3 – domestic services only and limited traffic (or transitional airport) that requires local coordination with Island Administrators for daily inspections and maintenance.

The airport locations and recommended tiers are shown in **Figure 85**. The tier system can influence the shape of standards and recommended practices (SARPs) including operating conditions for the airports.

The 28 Family Islands Airports have a wide range of aviation activity and infrastructure requirements and the airport environment certainly does not need all the sites to meet the same level of compliance or facilities and equipment. The tier system is a means to shape and design an appropriate level of infrastructure, roles and oversight for the airports in the respective tiers.

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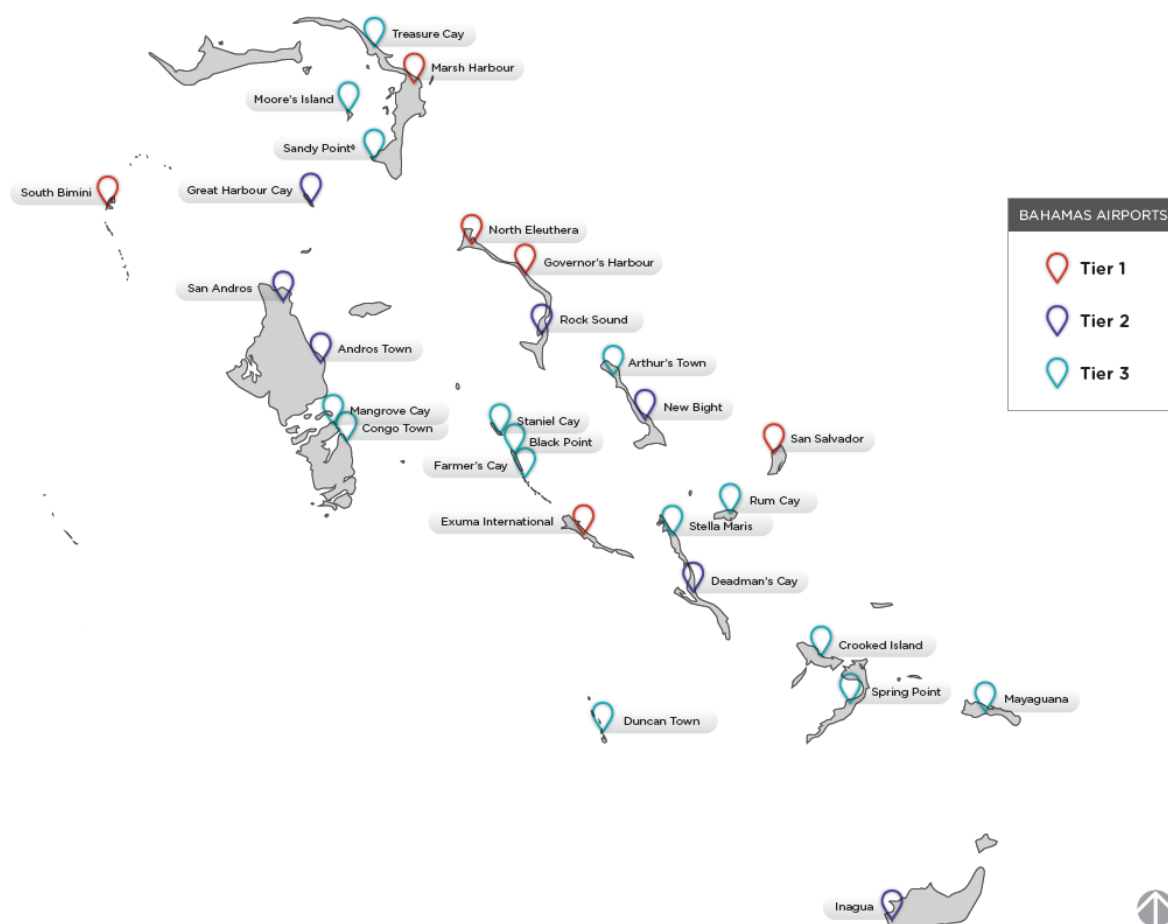


Figure 86: Family Islands Airport Locations and Recommended Tiers

The Consultant Team used its three tier definitions to assign airports into appropriate categories to support its analysis on compliance requirements to establish a safe aviation environment for air travellers. The tiers also supported the team's strategies on improving the overall operating performance at the airports and the Family Islands Airports' contributions to the local economy and tourism. The tourism growth is largely aligned with air carriers and tourism integrators establishing strong links to The Bahamas. The airlines are seeing strict operating conditions dictate the locations and sites that they will consider for travel. The key element in establishing the right climate and environment for airlines, and in turn the integrators, is ensuring the airport environment is safe, well managed and welcoming.

The Family Islands Airports are presently managed from a security centric perspective and the airports are aligned into four security categories. **Table 11** presents the airports in their tiers and overlays the existing security categories for comparison. The airport environment for the Family Islands Airports requires an operational shift in focus and, while security is a critical element, it is only one of the programming responsibilities at the sites and other essential operational requirements are urgently needed at the majority of the Family Islands Airports. The airside and

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landside technical assessments will provide focus on the gaps for compliance and the priority areas for response.

Table 11: Proposed Airport Tier and Associated Security Level

Family Islands Airports (28)	Tier 1	Tier 2	Tier 3
	1. Marsh Harbour	7. New Bight	14. Treasure Cay
	2. Exuma Intl'	8. San Andros Intl'	15. Mayaguana
	3. San Salvador	9. Rock Sound	16. Rum Cay
	4. North Eleuthera Intl'	10. Great Harbour Cay	17. Sandy Point
	5. Governor's Harbour	11. Deadman's Cay (note 1)	18. Moore's Island
	6. South Bimini	12. Andros Town	19. Mangrove Cay
		13. Matthew Town	20. Stella Maris
			21. Staniel Cay
			22. Blackpoint
			23. Farmer's Cay
			24. Congo Town (note 1)
			25. Crooked Island
			26. Spring Point
			27. Ragged Island
			28. Arthur's Town
Proposed Closure			Arthur's Town (note 4)
Proposed Transfers (notes 2 & 3)	South Bimini (note 2)		Treasure Cay (note 3)
			Stella Maris (notes 1 & 3)
			Farmer's Cay (note 3)
			Staniel Cay (note 3)

Note 1: the port of entry status for these sites will need to be revisited and changed to address efficiencies and compliance issues

Note 2: consider transfer of operational responsibilities through Lease for South Bimini to a contractor or private entity

Note 3: consider transfer of airport ownership to private interests with some 'Grant Assurance' support for safety items

Note 4: the Arthur's Town Airport is recommended for closure to concentrate the activity and costs at one site in New Bight (30 minutes away)

Color Coding of Airport name refers to Security Level

	Level 1 Security		Level 3 Security
	Level 2 Security		Level 4 Security

7.0 AERODROME STANDARDS AND PHYSICAL DESIGN CRITERIA

7.1 INTRODUCTION

As part of the comprehensive program to modernize the institutional arrangements of the air transport sector for the Commonwealth of the Bahamas, the government has commissioned the assessment of the 28 Family Islands Airports, currently managed under The Bahamas Civil Aviation Department, in order to identify the gaps in achieving a reasonable level of compliance and to formulate an optimization strategy for their operation and development.

This section of the report documents the current gaps in meeting international aerodrome standards and recommended practices for the Family Islands Airports, and provides high-level recommended development plans for each airport necessary to meet the applicable standards and design criteria.

It is understood that the Bahamas Civil Aviation Safety Regulations (BASRs) – Schedule 21 – Aerodrome Standards and Certification has been prepared in final form but to date has not been enacted. The schedule prescribes the requirements of the Commonwealth of The Bahamas for certification of aerodromes, their operations, and their operators. The schedule will be applicable to people and organizations that operate aerodromes within The Bahamas and those performing duties on their behalf.

A fundamental requirement of the aerodrome certification process will be an Aerodrome/Airport Operations Manual (AOM). It will act as a reference document providing a checklist of aerodrome certification standards that must be maintained and the required level of airside services at the aerodrome.

In the absence of BASR Schedule 21 being promulgated at this stage, an initial set of recommended standards and design criteria have been prepared which are applicable to the Family Islands Airports under consideration in The Bahamas.

7.2 RATIONALE FOR AERODROME STANDARDS APPLICABLE TO THE BAHAMAS

The combination of airport activity and capacity has provided the Consultant Team with a methodology to create categories of airport operations and response through a tier system. On a preliminary basis, the tiers are defined as follows:

- Tier 1 – Aerodromes which are deemed to be significant Port of Entry gateways for the Family Islands and have the economic opportunity and means to be operationally sustainable.

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- Tier 2 – Aerodromes with Port of Entry status and provide customs and immigration services to Family Islands where there is existing international traffic and/or economic development to support limited or shared services (some with the capability to move to Tier 1 in future).
- Tier 3 – Aerodromes that are transitional airports or those with only domestic services and limited traffic that requires local coordination with island administrators for daily inspections and maintenance.

The tier system is suggested to be referred to in the future Aerodrome Standards and Recommended Practices (SARPs) in Schedule 21 for The Bahamas CAD. The SARPs should define the operating conditions (infrastructure and personnel) required for each of the certified or registered aerodromes based on the three tiers.

There are many sets of documentation covering the aerodrome standards applicable to specific countries or regions. For example, the United Kingdom Overseas Territories are covered by the requirements in OTAR (Overseas Territories Aerodrome Requirements) Part 139 and the United Kingdom is covered by CAP168 (UK CAA Publication) Licensing of Aerodromes. Each of these aerodrome standards is based on the standards and recommended practices of ICAO Annex 14 Aerodromes – Volume 1 Aerodrome Design and Operations. A standard is recognized as necessary for the safety or regularity of international air navigation and the contracting ICAO state needs to conform to them. A recommended practice, on the other hand, is recognized as desirable in the interest of safety, regularity or efficiency of international air navigation and the contracting state should endeavour to conform to them.

Our criteria are based on the standards and recommended practices stated in this Final Report. These criteria cover only some of the standards and recommended practices in Annex 14 but they are considered to be the initial criteria that must be applied to the Family Islands Airports under consideration.

The initial aerodrome standards and physical design criteria include the following:

Precision Approach Path Indicators (PAPI)

Criteria: All Tier 1 and 2 aerodromes must have a PAPI for each approach which does not have an operating electronic glide path.

In addition, any Tier 3 aerodrome approaches, falling under the following criteria, should be considered for a PAPI where the approach is:

- Regularly used by jet traffic.
- From over water or a featureless terrain.
- Displaced from the runway threshold.

Wind Direction Indicators (WDI)

Criteria: All aerodromes must have at least one WDI.



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In addition, for all aerodromes with a runway longer than 1200 m, WDIs are to be at each end, except where there is an operable Automated Weather Observing System (AWOS) and then only one WDI is required.

For IFR/VFR aerodromes, all WDIs are to be continuously illuminated.

For VFR aerodromes, only one WDI is to be continuously lit by solar power and a photocell.

Runway Pavement Markings

Criteria: The following runway pavement markings should be provided:

- **Designation:** A runway designation marking must be provided at each threshold for all sealed or paved runways.
- **Centreline:** A runway centreline marking must be provided on all sealed or paved runways.
- **Threshold:** A runway threshold marking must be provided at each threshold for all sealed or paved runways where the runway width is 75 feet (23 m) or greater.
- **End (Transverse) Stripe:** A runway end stripe marking must be provided on all sealed or paved runways.
- **Side Stripe:** A runway side stripe marking must be provided where there is a lack of contrast between the runway edge and the shoulders or surrounding terrain.
- **Aiming Point:** An aiming point (or fixed distance) marking must be provided at each approach on all sealed or paved runways that are greater than 100 feet (30.5 m) wide and greater than 5,000 feet (1,524 m) long.
- **Touchdown Zone:** A touchdown zone marking must be provided at each approach on all sealed or paved runways that are greater than 100 feet (30.5 m) wide and greater than 5,000 feet (1,524 m) long.

In addition, any aerodromes that have a displaced thresholds, stopways, blast pads, etc. may require additional runway markings.

Apron Safety Line

Criteria: Whenever an existing aircraft apron encroaches a runway strip or where there is a risk that an aircraft tail may penetrate the runway transition surface, an apron safety line must be provided to ensure that aircraft are parked a safe distance from the runway facility.

Non-Precision and Non-Instrument Approaches over Roadways

Criteria: Whenever a runway approach surface traverses over a public roadway, a minimum vertical clearance (above the road surface) of 16 feet (4.8 m) must be maintained.

Safety Security Fencing

Criteria: For all Tier 1 aerodromes, security fencing must be provided around the entire airport perimeter, except where the airport borders oceanfront.



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For all Tier 2 and 3 aerodromes, perimeter security fencing must be provided in areas where there is a risk of public entry and regular security surveillance does not exist.

For all Tier 2 and 3 aerodromes, additional perimeter security fencing must be provided where there is a medium to high risk of wildlife incursions onto the runway. Alternatively, three strand wildlife control fencing may be provided.

Airport perimeter security fencing will consist of 8 feet (2.4 m) high chain link plus a 2 feet (0.6 m) high barb wire section on top.

7.3 RECOMMENDED STANDARDS AND DESIGN CRITERIA

This section will detail some of the key characteristics and locational requirements of the chosen criteria. In addition, reference will be made to which aspects are in compliance with ICAO Annex 14 and where these criteria are referenced in the Bahamas Civil Aviation Safety Regulations (BASRs) – Schedule 21.

7.3.1 Visual Aids – Precision Approach Path Indicators (PAPI)

A visual approach slope indicator system must be provided to serve the approach to a runway whether or not the runway is served by other visual approach aids or by non-visual aids, where one or more of the following conditions exist:

- The runway is used by turbojet or other aeroplanes with similar approach guidance requirements;
- The pilot of any type of aeroplane may have difficulty judging the approach due to:
 - inadequate visual guidance such as is experienced during an approach over water or featureless terrain by day or in the absence of sufficient extraneous lights in the approach area by night;
 - misleading information such as is produced by deceptive surrounding terrain or runway slopes;
 - the presence of objects in the approach area which may create a serious hazard if an aeroplane descends below the normal approach path, particularly if there are no non-visual or other visual aids to give warning of such objects;
 - physical conditions at either end of the runway presenting a serious hazard in the event of an aeroplane undershooting or overrunning the runway; and
 - terrain or prevalent meteorological conditions that the aeroplane may be subjected to unusual turbulence during approach
- Where a runway is temporarily displaced from the normal position and one or more of the above conditions exist

7.3.1.1 PAPI Characteristics

The PAPI consists of four sharp transition units located as a wingbar. They are normally installed on the left hand side of the runway, viewed from the approach; a right hand installation is



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permitted if it is not practicable to position them on the left or if a second set is required. If roll guidance is required and is not provided by other visual means, four units should be positioned on each side of the runway so that the wingbars appear opposite each other.

The units direct a beam of light, red in the lower half and white in the upper, towards the approach. They are set at different elevation angles to give a combination of red and white for an on-slope signal, all-red if the aircraft is too low, and all-white if it is too high.

The siting and elevation settings of approach slope indicators installed on runways served by ILS should be such that the visual approach slope conforms as closely as possible to the ILS glide path. Systems required for day and night use should consist of high intensity units with a luminous intensity control.

The distance of PAPI from the runway threshold will depend on the following:

- The need to provide adequate wheel clearance over the threshold of a non-instrument or non-precision instrument approach runway for all types of aircraft for which the runway is intended, having due regard to the length of runway available for stopping the aircraft
- Obstacle clearance considerations
- The operational requirement that PAPI be compatible with the instrument glide path down to the minimum possible range and height for the types of aircraft for which the runway is intended
- Any difference in elevation between the PAPI units and the runway threshold

PAPI units should be mounted as close to ground level as practicable but overall height should never exceed 3 ft. The units of a wingbar should all lie on the same horizontal plane. The spacing between units will normally be 30 ft \pm 3 ft. The inner edge of the unit nearest the runway should be 45 ft \pm 3 ft from the runway edge.

Firm stable bases are essential for PAPI units and concrete should be used. Bases should be either depressed below ground level and covered with a suitable infill or flush fitted.

7.3.1.2 Maintenance

PAPI installations should be equipped with a monitoring system which will detect lamp failure so that flight crew may be advised and the failure investigated and remedied without delay.

Lenses must be kept clean and free of condensation to produce a usable sign, because in certain meteorological conditions, condensation may form on either side of the lenses when the units are not in use. The condensation will degrade and distort the signal to an unacceptable extent for some time after the system is switched on. The problem can be overcome either by running the lamps at very low power while the unit is not in use, or by operating low powered heaters fitted to the units. Where neither of these provisions is made, the units should be set to full luminous intensity for at least 15 minutes, or other such period recommended by the units' manufacturer, before they are required for use.

7.3.1.3 Compliance with ICAO Annex 14 Recommendations

All the above stated criteria comply with the standards and recommended practices stated in ICAO Annex 14 and cover the main points to be addressed. For more specific details and recommendations in more complex situations, see Section 5.3.5 of the Annex.

7.3.1.4 References in BASR Schedule 21

Reference is made in Appendix 3 to 21.497 of BASR Schedule 21 to visual aids for approach procedures. It is noted here that particulars of the Aerodrome Dimensions and related information needs to be reported to the AIS (Aeronautical Information Service). Visual aids for approaches procedures, including PAPI/APAPI, are included here.

The Extract from appendix 3 to 21.497 states:

“(b) Particulars of the Aerodrome dimensions and related information shall include details of— [...]

(6) visual aids for approach procedures viz. approach lighting type and visual approach slope indicator system (PAPI/APAPI and T- VASIS/AT-VASIS); marking and lighting of runways, taxiways, and aprons; other visual guidance and control aids on taxiways (including runway holding positions, intermediate holding positions and stop bars) and aprons, location and type of visual docking guidance system; availability of standby power of lighting.”

7.3.2 Visual Aids – Wind Direction Indicators (WDI)

The following are requirements for the number, type, colour, location, and lighting of the WDIs at aerodromes:

- At least one wind direction indicator should be provided at an aerodrome
- WDIs should be coloured to give maximum contrast with their background. Their location should be emphasised by a white circular band 15 m in diameter and 1.2 m wide around the base of their mast.
- Wind direction indicator should be so positioned on the aerodrome so they are visible from the approaches to all runways and be free from the effects of any disturbances caused by nearby objects. They should be sited so that at least one WDI is visible from each take-off position.
- An illuminated wind direction indicator should provide flight crew both in the air and on the ground with a clear indication of wind speed and direction at night. Aerodromes licensed for the landing and take-off of aircraft at night should provide at least one illuminated wind sleeve.
- The illuminated wind direction indicator shall be lighted so that it is fit for purpose, ensuring that it is conspicuous by day and night from the landing and take-off threshold and ensuring that, from an observer's standing position on ground level, there is no glare at a range of 25 m or more.

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- All aerodromes certified for night operations will have at least one illuminated wind indicator.

7.3.2.1 WDI Characteristics

- The wind direction indicator must be in the form of a truncated cone and made of fabric
- The dimensions of the cone must not be less than 3.6 m in length with a diameter, at the larger end, of not less than 0.9 m. It must give a clear indication of the direction and a general indication of the surface wind speed
- The colour(s) of the cone must make it clearly visible and understandable from a height of at least 300 m. Where practicable, a single colour, preferably white or orange, must be used
- If a combination of two colours is required to give adequate conspicuity, then they must, preferably, be orange and white, red and white, or black and white. These colours should be arranged in five alternate bands, the first and last bands being the darker colour

7.3.2.2 WDI Location and Number

When deciding on the most appropriate location, account should be taken to ensure that the wind direction indicator is:

- Outside the cleared and graded area of the runways and taxiways and beneath the 1:10 obstacle surface;
- Clear of the OFZ and ILS critical/sensitive areas where appropriate;
- Preferably not more than 200 m lateral displacement from the runway edge;
- Preferably between 300 m and 600 m from the runway threshold measured along the runway;
- In an area with low background levels of illumination;
- Visible from the approach and take-off positions of all licensed runways; and
- Free from the effects of air disturbance caused by nearby objects.

Ideally, the WDI should be sited no further from the runway threshold than 600 m. Obstacle criteria excluded, the ideal location is 300 m along the runway from the threshold and laterally displaced at 80 m from the runway centreline.

Aerodromes with thresholds less than 1200 m apart can meet the minimum requirement with a single unit. Most Code 3 and 4 aerodromes will require two or more units suitably sited to provide the best possible coverage.

7.3.2.3 Compliance with ICAO Annex 14 Recommendations

All the above characteristics, location and number of wind direction indicators comply with those standards and recommended practices in Section 5.1.1 of ICAO Annex 14.

7.3.2.4 References in BASR Schedule 21

Wind direction indicators are referenced in 21.280 Aerodrome Serviceability and Technical Inspections Program. An inspection of the WDI is included as part of the Aerodrome Serviceability Safety Inspection.

The Extract from 21.573 states:

- “(b) The aerodrome serviceability safety inspection shall include-
- (1) an inspection- [...]
 - (ii) of aerodrome markings, lighting, wind direction indicators and ground signals.”

Reference is also made in Appendix 2 to 21.497. Here it is required that the particulars of the aerodrome site be given including the position of the WDI.

The Extract from Appendix 2 to 21.497 states:

“Particulars shall include the following general information –

- (1) a plan of the aerodrome showing the main aerodrome facilities for the operation of the aerodrome including, particularly, the location of each runway, taxiway, apron, and other facilities of interest to pilots including the wind direction indicator.”

7.3.3 Visual Aids – Runway Pavement Markings

Our criteria for the initial aerodrome standards and physical design include the following runway pavement markings:

- Designation;
- Centreline;
- Threshold;
- End (transverse) stripe;
- Side stripe;
- Aiming point; and
- Touchdown zone.

7.3.3.1 Designation

Runway designation markings should conform to the following:

- A runway designation marking shall be provided at the thresholds of runways;
- Runway designation markings shall be located at a threshold as shown in ICAO Annex 14, Volume 1, Figure 5-2;
- A runway designation marking shall consist of a two-digit number and on parallel runways shall be supplemented with a letter;

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- On a single runway, dual parallel runways and triple parallel runways the two- digit number shall be the whole number nearest the one-tenth of the magnetic North when viewed from the direction of approach;
- In the case of two parallel runways, each runway designation number shall be supplemented by a letter "L" or "R"; and
- The numbers and letters on runways shall be in the form and proportion shown in ICAO Annex 14, Volume 1, Figure 5-3.

7.3.3.2 Centreline

Runway Markings shall be white and shall be outlined in black on runway surfaces of a light colour.

- A runway centre line marking shall consist of a line of uniformly spaced stripes and gaps. The length of a stripe plus a gap shall be neither less than 50 m nor more than 75 m. The length of each stripe shall be at least equal to the length of the gap or 30 m, whichever is greater.

The width of the stripes shall be not less than:

- 0.90 m on precision approach category II and III runways;
- 0.45 m on non-precision approach runways where the code number is 3 or 4, and precision approach category I runways; and
- 0.30 m on non-precision approach runways where the code number is 1 or 2, and on non-instrument runways.

7.3.3.3 Threshold

- Aerodromes shall provide a threshold marking at the threshold of a runway;
- The stripes of the threshold marking shall commence 6 m from the threshold;
- A runway threshold marking shall consist of a pattern of longitudinal stripes of uniform dimensions disposed symmetrically about the centre line of a runway as shown in ICAO Annex 14, Volume. 1, Figure 5-2 (a) and (b) for a runway width of 45 m;
- On non-precision approach and non-instrument runways 45 m or greater in width, markings may be as detailed in ICAO Annex 14, Volume 1, Figure 5-2 (c); and
- The threshold stripes shall extend laterally to within 3 m of the edge of a runway or to a distance of 27 m on either side of a runway centre line, whichever is the smaller lateral distance. Where a runway designation marking is placed within a threshold marking there shall be a minimum of three stripes on each side of the centre line of the runway. Where a runway designation marking is placed above a threshold marking, the stripes shall be continued across the runway. The stripes shall be at least 30 m long and approximately 1.80 m wide with spacing of approximately 1.80 m between them. Where the stripes are continued across a runway, a double spacing shall be used to separate the two stripes nearest the centre line of the runway, and in the case where the designation marking is included within the threshold marking this spacing shall be 22.5 m.

7.3.3.4 End Stripe

- A runway end (transverse) stripe must be provided on all sealed or paved runways; and
- A transverse stripe shall be not less than 1.80 m wide.

7.3.3.5 Side Stripe

- Runway side stripes shall be provided on a paved precision approach runway and where there is a lack of contrast between the runway edges and the shoulders or the surrounding terrain;
- A runway side stripe marking shall consist of a stripe placed along each edge of the runway with the outer edge of each stripe approximately on the edge of the runway. Where the runway is greater than 60 m in width, the stripes shall be located 30 m from the runway centre line; and
- A runway side stripe shall have an overall width of at least 0.9 m on runways 30 m or more in width and at least 0.45 m on narrower runways.

7.3.3.6 Aiming Point

- An aiming point marking shall be provided at each approach on all sealed or paved runways that are greater than 100 feet (30.5 m) wide and greater than 5,000 feet (1,524 m) long; and
- An aiming point marking shall consist of two conspicuous stripes. Where a touchdown zone marking is provided, the lateral spacing between the markings shall be the same as that of the touchdown zone marking.

7.3.3.7 Touchdown Zone

- A touchdown zone marking shall be provided at each approach on all sealed or paved runways that are greater than 100 feet (30.5 m) wide and greater than 5,000 feet (1,524 m) long;
- A touchdown zone marking shall consist of pairs of rectangular markings symmetrically disposed about the runway centre line. The number of such pairs is related to the landing distance available; and
- A touchdown zone marking shall conform to either of the two patterns shown in ICAO Annex 14, Volume 1, Figure 5-5.

7.3.3.8 Compliance with ICAO Annex 14 Recommendations

All the above characteristics and location details of the above markings are in compliance with the standards and recommended practices stated in section 5.2 Markings of ICAO Annex 14.

7.3.3.9 References in BASR Schedule 21

An inspection of the aerodrome markings is included as part of the Aerodrome Serviceability Safety Inspection referenced in 21.280 Aerodrome Serviceability and Technical Inspection program.

The Extract from 21.573 states:

“An aerodrome serviceability safety inspection is an inspection of the aerodrome to ensure that it is safe for aircraft operations.

The aerodrome serviceability safety inspection shall include —
an inspection —

- (i) of the movement area to check its surface condition;
- (ii) of aerodrome markings, lighting, wind direction indicators and ground signals;”

7.3.4 Visual Aids – Apron Safety Line

Apron safety lines and other markings should be provided as required to define the areas intended for use by ground vehicles and other aircraft servicing equipment, etc., to provide safe separation from aircraft. They should include items such as wing tip clearance lines and service road boundary lines, vehicle parking and no parking areas, pedestrian routes and airbridge operating areas as required by the parking configurations and ground facilities. Markings should be of colours that do not conflict with markings used by aircraft and should be maintained to remain conspicuous.

Unless marshalling guidance is available, aircraft stand markings should be provided on a paved apron. The extent of the markings should be considered on an airport by airport basis.

7.3.4.1 Apron Safety Line Characteristics

- Apron safety lines shall be of a conspicuous colour that shall contrast with those used for aircraft stand markings;
- Apron safety lines shall be provided on the paved aprons of aerodromes as required by parking configurations and ground facilities to provide safe separation from aircraft;
- Apron Safety lines shall be located to define the areas intended for use by ground vehicles and other aircraft servicing equipment;
- Apron safety lines shall include such elements as wing tip clearance lines and service road boundary lines; and
- An apron safety line shall be continuous in length and at least 10 cm wide.

7.3.4.2 Compliance with ICAO Annex 14 Recommendations

The main standard for apron safety lines in ICAO Annex 14 is that they shall be of a conspicuous colour which contrasts with that used for aircraft stand markings. It also recommends that at aerodromes where operations take place at night, pavement markings should be made with reflective materials designed to enhance the visibility of the markings.

7.3.4.3 References in BASR Schedule 21

No specific reference is made to apron safety lines within BASR Schedule 21. However, it will be included as part of any references to runway, taxiway and apron markings. In addition, reference is made to a need for an apron management service when the volume of traffic and operating conditions at the aerodrome warrant it.

With the use of apron safety lines, a degree of apron management is covered in terms of defining the areas intended for use by ground vehicles and other aircraft service equipment, etc., thereby providing safe separation from aircraft.

7.3.5 Safeguarding – Non-Precision and Non-Instrument Approaches over Roadways

Our criteria states that, “Whenever a runway approach surface traverses over a public roadway, a minimum vertical clearance (above the road surface) of 14 feet (4.3 m) shall be maintained.”

Whilst this is a clear instruction to pilots, this should also be factored into the obstacle limitation surfaces analysis. When designing the approach surface, allowance should be made for any objects (e.g. car, bus or truck) which may travel on a nearby roadway. This may necessitate displacement of the threshold to fully comply with the approach surface obstacle criteria.

Where possible, road-holding position lights should also be provided at the intersection of all roads with runways used in runway visual range conditions of values between 350 m and 550 m. The lights should be located 1.5 m from the edge of the road and adjacent to the road-holding position marking and sign.

The road-holding position light should consist of either:

- A red/green traffic light where a controlled crossing exists; or
- An amber light system meeting the characteristics of runway guard lights at a point where caution should be exercised.

It should always be accompanied by a road-holding position sign in the form of a standard road traffic stop sign with, where appropriate, instructions for how the driver of a vehicle should proceed.

7.3.5.1 Compliance with ICAO Annex 14 Recommendations

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In guidance material in ICAO Annex 14 Volume 1, all roads are considered to be obstacles extending to 4.8 m above the crown of the road. As a result, the criteria comply with ICAO standards and recommendations regarding maintaining correct clearances on roads crossing the approaches. Road-holding lights are also set as a standard where the runway visual range conditions less than a value of 350 m and a recommended practice where runway visual range conditions fall between 350 m and 550 m.

7.3.5.2 References in BASR Schedule 21

Reference is made to mobile objects on roads and the requirement for this to be adjusted 4.8 m upwards. Whilst this is covered under proposed new development, it should also apply to existing roadways crossing the approaches.

The extract from BASR 21 regarding Obstacle Limitation states:

“(a) A person shall notify the Authority of any proposed— (1) High-rise construction or alteration above the ground level at its site; (2) Construction or alteration which extends above an obstacle limitation surface prescribed in ICAO Document 9184, Airport Planning Manual, and associate guidance material; (3) Highway, railroad or other transverse way for mobile objects of which if adjusted upwards 4.8m for roads and highways, 5.4m for railroads or the height of the highest mobile object that would traverse the road, will not exceed a standard of this Schedule; “

7.3.6 Safety and Security – Perimeter Security Fencing

7.3.6.1 Security fencing and barriers

Security fencing type and location should take into account the following criteria:

- A fence or other suitable barrier shall be provided on an aerodrome to prevent the entrance to the movement area of animals large enough to be a hazard to aircraft. This is intended to include the obstruction of sewers, ducts, tunnels, etc., where necessary to prevent access;
- A fence or other suitable barrier shall be provided on an aerodrome to deter the access of an unauthorized person onto a non-public area of the aerodrome;
- Special measures shall be required to prevent the access of an unauthorized person to runways or taxiways which cross over public roads;
- Suitable means of protection shall be provided to deter the access of unauthorized persons into ground installations and facilities essential for the safety of civil aviation located off the aerodrome;
- The fence or barrier shall be located so as to separate the movement area and other facilities or zones on the aerodrome vital to the safe operation of aircraft from areas open to public access;
- When greater security is required, a cleared area shall be provided on both sides of the fence or barrier to facilitate patrols and to make trespassing more difficult. Consideration

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shall be given to the provision of a perimeter road inside the aerodrome fencing for the use of both maintenance personnel and security patrols;

- Where necessary, a fence or other barrier provided for the protection of international civil aviation and its facilities shall be illuminated at a minimum essential level. Consideration shall be given to locating lights so that the ground area on both sides of the fence or barrier, particularly at access points, is illuminated; and
- International civil aviation security measures shall be integrated into the design and construction of new facilities and alterations to existing facilities at an aerodrome.

7.3.6.2 Perimeter Fencing Characteristics

Our criteria for Tier 1-3 aerodromes, where there is a risk of public entry and regular security surveillance does not exist, is for an airport perimeter security fencing 8 feet (2.4 m) high chain link plus 2 feet (0.6 m) high barb wire section on top.

If there is a medium to high risk of wild life incursions on to the runway, a three-strand wildlife control fencing can be used.

7.3.6.3 Compliance with ICAO Annex 14 Recommendations

The above criteria for the installation of fencing at aerodromes comply fully with those standards and recommended practices stated in ICAO Annex 14, section 9.10. No specific dimensions are given but the criteria we have recommended is classed as industry best practice.

7.3.6.4 References in BASR Schedule 21

There is an element in the 21.280 Aerodrome Serviceability and Technical Inspections Program which indicates as part of the Aerodrome Serviceability Safety Inspection aerodrome fencing should be inspected. This highlights that as well as installing adequate security measures to comply with the criteria an appropriate inspection or maintenance program should be in place to maintain the integrity of the fencing at all times.

The extract the BASR 21, as part of the Aerodrome Serviceability Safety Inspection states:

“An aerodrome serviceability safety inspection is an inspection of the aerodrome to ensure that it is safe for aircraft operations.

The aerodrome serviceability safety inspection shall include— (1) an inspection—

- of the movement area to check its surface condition;
- of aerodrome markings, lighting, wind direction indicators and ground signals;
- foreign obstacles infringing the take-off, approach and transitional surfaces;
- for any birds or animals on or near the movement area;
- of any measures to control the inadvertent entry of persons or animals into the movement area, including aerodrome fencing;”



Figure 87: Non-Compliance Observations in Terms of Runway Lighting and Obstacles

7.4 THE FAMILY ISLANDS AIRPORTS TECHNICAL REQUIREMENTS AND CAPITAL RESPONSE

The strategy for the Family Islands Airports needs to ensure that the country is well positioned to benefit from the improved tourism market conditions expected over the next 20 years. In order for the Family Islands to capture a strong market presence in a very competitive Caribbean environment, it is crucial that the island gateway airports offer the highest possible level of safety and services. This is particularly true not only for passengers and tourists but for retaining and attracting air carriers serving the market as well. Air carriers will pull out of a market at a moment's notice if it feels that it no longer makes economic sense to fly to and from as a destination.

To achieve this, the first step must be for the government to bring each of the key Family Islands Airports into compliance with the relevant safety standards and international best practices.

7.4.1 Aerodrome Technical Assessments and Identified Gaps

At the commencement of the assignment, the Consultant Team undertook a site assessment of each of the 28 Family Islands Airports. The purpose was to identify any gaps in compliance with relevant technical and operational aerodrome standards and recommended practices. Although the site assessments were limited to about two to three hours in duration, the Team was able to gather the relevant data, visually inspect key areas of the airport and, in some cases, consult with airport representatives (island administrators, airport managers, security and law enforcement agent, etc.). The detailed results and documentation of this assessment was provided to The Bahamas Civil Aviation Department under separate cover at the end of April, 2014.

Although each airport is unique in terms of its physical environment, activity level, user demographic and available services, many of the airports assessed had similar issues and compliance gaps:

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- **Obstacles Infringing the Aeronautical Zoning** – Many, if not all, of the aerodromes had some degree of obstacles within the airport boundaries infringing on the aeronautical zoning or established obstacle limitation surfaces. For the most part, the obstacles were trees, but also included buildings and towers. Many of the airport personnel consulted were not aware of the extent of the obstacle infringements or the zoning criteria specific to their airport. It is evident from aerial photographs that at one time extensive tree clearing had been done at most of the aerodromes in compliance with the zoning. However, a regular program of tree cutting and removal was not maintained.
- **Non-frangible Obstacles Within the Runway Strip** – Many of the aerodromes assessed were found to have significant obstacles within the runway strip which could be a serious hazard in the event of an aircraft runway excursion. The obstacles identified included trees, brush, protruding vaults, non-frangible post or supports (i.e., wind direction indicators), fences, buildings, abandoned aircraft, surplus piles of earth or gravel, rocks or boulders and general garbage. Some unique obstacles discovered included an abandoned bulldozer and elevated water discharge points. At some airports, significant sized trees (30 feet in height) were found to be within 40 feet to 100 feet of the runway edge, such as at Sandy Point Airport.
- **Miss-Match of Operational Demand with Runway Capability** – There are Family Islands Airports whose runway infrastructure either exceeds or is inadequate to meet the required operational demand. For example, Spring Point, Arthur's Town and Treasure Cay airports do not require a 150 ft wide runway and thus could reduce their future capital and maintenance costs.
- **Aircraft Parking Aprons Within the Runway Strip** – At more than half of the aerodromes assessed, the aircraft parking aprons were found to be situated within the runway strip or close enough that aircraft tails would be infringing the runway transition surface. In the extreme case at Farmers Cay Airport, the parking aprons are butting up against the runway edge (well within the runway strip).
- **Lack of Physical Infrastructure Maintenance** – It is evident at most all of the 28 Family Islands Airports that there is a lack of regular and preventative maintenance. This has resulted in airport physical infrastructure and equipment prematurely deteriorating. For example, at many of the aerodromes, the shoulder gravel along the runway edge has not been maintained which has resulted in not only a significant vertical drop along the edge but also a premature breakup of the asphalt pavement. With respect to the airfield lighting, all of the assessed airports had some degree of damaged, missing or non-compliant lighting fixtures (i.e., incorrect lens colour, incorrect location or alignment). There are multiple reasons for the lack of maintenance: little or no maintenance training, inadequate or unserviceable maintenance equipment, no structured maintenance program, delays in receiving parts and equipment, lack of a dedicated maintenance budget for each airport, etc.
- **Inadequate Runway Visual Aids** – Many Family Islands Airports have no runway pavement markings and the use of lighting equipment is strictly control. There is also a lack of visual approach slope equipment for some of the key airports. It is understood that the government is concerned about airport use by smugglers (contraband and

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persons) and thus limits the availability of runway visual aids. However, the safety of aircraft and passengers should always be paramount. The control of smuggling activity at the airports therefore should be handled by other means, such as increased law enforcement inspection and vigilance, after-hours detection of aircraft (i.e., use of motion-sensors at the apron entrance which triggers an alert to law enforcement officers).

- Security and Wildlife Control – Many of the Family Islands Airports are situated in remote or sparsely populated areas which expose the aerodromes to wildlife interaction that can be a serious hazard to aviation. Many of the airport representatives consulted reported runway crossing by wild boars, hog, dog, crabs and other wildlife. Serious incidents have occurred in the past and BCAD has reacted to those by erecting perimeter fencing. However, typical chain link security fencing can be costly and at least for the Tier 2 and Tier 3 airports, 3-strand wildlife control fencing may be more cost-effective. Consultations have suggested that some airports continue to have issues with the public wandering onto airside areas or driving along or across the runway (such, as at Farmers Cay). For these aerodromes, standard perimeter security fencing will be required in order to deter public entry.

The investment by the government in the Family Islands Airports is a delicate issue and requires a careful and well laid out plan that is consistent, transparent and based on criteria that support the safe operation of the airports while ensuring the capacity is in step with the economic potential and anticipated growth for the next 20 years. The following steps have been taken to establish the site specific requirements and investments:

- Determine the infrastructure and operational requirements and associated costs to bringing each of the 28 Family Islands Airports into compliance with the relevant standards and international best practices (although in the case of Farmers Cay and Staniel Cay, this may not be achievable);
- Analyse the air traffic and market demand and projections to determine any capacity enhancements which may be required over the short- and medium-term; and
- Rank and prioritize the proposed capital development requirements in order to develop a realistic implementation strategy which clearly recognises the resource and funding limitations.

7.5 AIRSIDE ASSESSMENTS & DEVELOPMENT PLANNING

Detailed airport development plans have been prepared to address the specific compliance gaps, as well as address traffic and operational demands from users. The development plans are included in Appendix A, along with a plan of the existing airport layout and operational conditions.

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7.5.1.1 Tier 1 Airside Costs

The probable cost of required airside capital development for the 28 Family Islands Airports is detailed in Appendix B, including the respective compliance rank (1 – 4 with 4 being the greatest need for address), risk of each capital work item (scale of 1 – 10 with 10 being the greatest risk items) and an overall priority score. The tables that follow summarize the probable development costs by airport tier and their compliance rank only to indicate the items most urgently requiring address for compliance.

<i>Airport Name</i>	<i>Compliance Rank</i>	<i>Probable Costs</i>
Exuma Int'l	Rank 4	\$230,500.00
	Rank 3	\$760,000.00
	Rank 2	\$855,600.00
	Rank 1	\$40,000.00
	sub-total	\$1,886,100.00
Governor's Harbour	Rank 4	\$175,500.00
	Rank 3	\$142,500.00
	Rank 2	\$185,000.00
	Rank 1	\$0.00
	sub-total	\$503,000.00
Marsh Harbour	Rank 4	\$392,000.00
	Rank 3	\$73,000.00
	Rank 2	\$25,500.00
	Rank 1	\$0.00
	sub-total	\$490,500.00
North Eleuthera	Rank 4	\$25,639,000.00
	Rank 3	\$13,000.00
	Rank 2	\$719,000.00
	Rank 1	\$0.00
	sub-total	\$26,371,000.00

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San Salvador	Rank 4	\$612,000.00
	Rank 3	\$587,800.00
	Rank 2	\$1,312,300.00
	Rank 1	\$0.00
	sub-total	\$2,512,100.00
South Bimini	Rank 4	\$88,000.00
	Rank 3	\$90,000.00
	Rank 2	\$984,400.00
	Rank 1	\$0.00
	sub-total	\$1,162,400.00
TIER 1 AIRSIDE TOTALS		\$32,925,100.00

<i>Airport Name</i>	<i>Compliance Rank</i>	<i>Probable Costs</i>
Fresh Creek	Rank 4	\$360,000.00
	Rank 3	\$1,695,000.00
	Rank 2	\$6,118,500.00
	Rank 1	\$0.00
	sub-total	\$8,173,500.00
Deadman's Cay	Rank 4	\$203,000.00
	Rank 3	\$1,522,500.00
	Rank 2	\$490,000.00
	Rank 1	\$0.00
	sub-total	\$2,215,500.00

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Great Harbour Cay	Rank 4	\$533,000.00
	Rank 3	\$1,586,000.00
	Rank 2	\$98,000.00
	Rank 1	\$0.00
	sub-total	\$2,217,000.00
Matthew Town	Rank 4	\$247,000.00
	Rank 3	\$2,181,500.00
	Rank 2	\$10,520,000.00
	Rank 1	\$0.00
	sub-total	\$12,948,500.00
New Bight	Rank 4	\$104,500.00
	Rank 3	\$2,425,300.00
	Rank 2	\$626,000.00
	Rank 1	\$0.00
	sub-total	\$3,155,800.00
Rock Sound	Rank 4	\$183,000.00
	Rank 3	\$874,000.00
	Rank 2	\$2,626,000.00
	Rank 1	\$0.00
	sub-total	\$3,683,000.00
San Andros Int'l	Rank 4	\$384,000.00
	Rank 3	\$788,600.00
	Rank 2	\$8,842,000.00
	Rank 1	\$0.00
	sub-total	\$10,014,600.00
TIER 2 AIRSIDE TOTALS		\$42,407,900.00

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<i>Airport Name</i>	<i>Compliance Rank</i>	<i>Probable Costs</i>
Arthur's Town	Rank 4	\$200,000.00
	Rank 3	\$1,341,000.00
	Rank 2	\$8,905,000.00
	Rank 1	\$0.00
	sub-total	\$10,446,000.00
Black Point	Rank 4	\$157,000.00
	Rank 3	\$51,000.00
	Rank 2	\$22,000.00
	Rank 1	\$0.00
	sub-total	\$230,000.00
Clarence A. Bain	Rank 4	\$468,000.00
	Rank 3	\$1,064,000.00
	Rank 2	\$7,270,000.00
	Rank 1	\$0.00
	sub-total	\$8,802,000.00
Congo Town	Rank 4	\$480,000.00
	Rank 3	\$459,500.00
	Rank 2	\$1,360,000.00
	Rank 1	\$0.00
	sub-total	\$2,299,500.00
Colonel Hill	Rank 4	\$240,000.00
	Rank 3	\$399,000.00
	Rank 2	\$5,900,000.00
	Rank 1	\$0.00
	sub-total	\$6,539,000.00

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Farmers Cay	Rank 4	\$66,000.00
	Rank 3	\$672,000.00
	Rank 2	\$1,240,000.00
	Rank 1	\$690,000.00
	sub-total	\$2,668,400.00
Mayaguana	Rank 4	\$188,000.00
	Rank 3	\$39,000.00
	Rank 2	\$0.00
	Rank 1	\$0.00
	sub-total	\$157,000.00
Moores Island	Rank 4	\$155,000.00
	Rank 3	\$61,000.00
	Rank 2	\$184,000.00
	Rank 1	\$57,000.00
	sub-total	\$457,000.00
New Port Nelson	Rank 4	\$468,000.00
	Rank 3	\$538,000.00
	Rank 2	\$180,000.00
	Rank 1	\$0.00
	sub-total	\$1,186,000.00
Duncan Town	Rank 4	\$128,000.00
	Rank 3	\$610,000.00
	Rank 2	\$300,000.00
	Rank 1	\$0.00
	sub-total	\$1,038,000.00

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Sandy Point	Rank 4	\$340,000.00
	Rank 3	\$895,000.00
	Rank 2	\$3,320,000.00
	Rank 1	\$65,000.00
	sub-total	\$4,620,000.00
Spring Point	Rank 4	\$374,000.00
	Rank 3	\$44,000.00
	Rank 2	\$7,250,000.00
	Rank 1	\$0.00
	sub-total	\$7,669,000.00
Staniel Cay	Rank 4	\$545,000.00
	Rank 3	\$3,344,000.00
	Rank 2	\$916,000.00
	Rank 1	\$90,000.00
	sub-total	\$4,895,000.00
Stella Maris	Rank 4	\$438,000.00
	Rank 3	\$307,000.00
	Rank 2	\$4,980,000.00
	Rank 1	\$0.00
	sub-total	\$5,725,000.00
Treasure Cay	Rank 4	\$280,000.00
	Rank 3	\$587,000.00
	Rank 2	\$78,000.00
	Rank 1	\$0.00
	sub-total	\$945,000.00
TIER 3 AIRSIDE TOTALS		\$57,676,500.00*

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**The Tier 3 airside costs are \$76.58 million (or \$18.9 million greater) if five Tier 3 sites have runway rehabilitation done by full excavation and asphalt rather than sand and seal approach. These five airports (include 3 sites addressed in the rationalization recommendations) are: 1) Arthur's Town; 2) Farmer's Cay; 3) Sandy Point; 4) Spring Point; and 5) Staniel Cay.*

The overall airside capital costs for compliance for all three tiers and the 28 Family Island Airports is \$133 million US (\$151.9 million US with full runway rehabilitation at noted 5 sites).

As evident from the aerodrome assessments and the proposed development plans, there is significant capital works which must be undertaken to bring each of the Family Islands Airports to a reasonable level of compliance, services and user satisfaction. However, the government's resources and funding are limited and therefore must be judiciously allocated to those capital works which provide the greatest benefit.

For this reason, the Consultant Team has developed a priority scoring for each recommended capital work item. This will aid The Bahamas and its Transport and Aviation Ministry in determining the most appropriate priority for addressing the capital items.

The priority scoring is comprised of a compliance rank (from 1 to 4, with 4 being the most critical), as well as a risk rating which expressed the overall risk to BCAD and users if the capital item is not implemented. The multiplication of these two values results in the priority score.

The rationale for the compliance rank is based on aviation safety as being the highest order objective and passenger or user comfort as being the lowest order objective. In general terms, the compliance rank values address:

- Rank 4 - Obstacle clearance within the runway strip and other major hazards to aviation;
- Rank 3 - Obstacle clearance beyond the runway strip, visual aids (lighting, markings, PAPls) and security and wildlife control
- Rank 2 - Pavements and other physical infrastructure within the airside areas, as well as infrastructure related to the provision of emergency response; and
- Rank 1 – Infrastructure situated external to the airside areas (landside), as well as any other works which are not critical to maintain operational safety and security

It is recommended that the aerodrome development works be implemented in stages over a five year development period.

7.6 LANDSIDE ASSESSMENT & DEVELOPMENT PLANNING

The landside assessment is an important component of the overall assessment although its areas of address are outside of the airside and thus, a lower priority for aerodrome standards compliance. The landside for the airports is an aspect of the airport's capacity to process passengers and handle goods through the airport – it is a processor and an important link to the airside for the airport. The facilities at each site have been assessed in terms of the following:

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- The overall condition and state of repair;
- The activity level and category of airport (i.e., POE) that will determine the programming space needed;
- Health and Safety issues for both staff and the travelling public;
- Accessibility of the facilities;
- Energy programming modifications for improved operating performance; and
- Parking and landside facilities that are not part of the passenger facility

The elements of the landside infrastructure priorities and the recommended program additions requiring attention are referenced in the airport development plans found in **Appendix A**.

7.6.1 The Passenger Processing Facility – Programming Requirements

The airports have different facility requirements and the project team has recommended an approach to standardize the area required for each of the tiers of airport categories. There is a minimum and maximum range of space identified for each category and it is still anticipated that any new facility would work to create a local ambience and design that promotes the area as the "front door" for the community and the region.

7.6.1.1 Tier 1 Airport Passenger Facilities

The Programming for the Tier 1 airports has spatial and operational requirements that the Tier 2 and 3 sites do not and thus the range of space is from 7,450 sq. ft. to 14,900 sq. ft. The Tier 1 sites have POE and resident Customs and Immigration officers at the airport and also require sterile space for international passengers and baggage claim areas. There are generally larger passenger numbers at peak times and the processing space has to accommodate that congestion at certain travel periods. The number of washrooms, concessions and tourism information space are all seen as elements of the Tier 1 programs. These are noted as recommended practices only and do not indicate that the facilities cannot adjust the programming recommendations to suite the local market conditions. See the following table for Tier 1 space.

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Table 12: Tier1 Programming Recommendations

	Minimum Sq/Ft	Maximum Sq/Ft
Tier 1		
Check-In	800	1600
Airline Counters	275	550
Airline Offices	175	350
Pre-board Security	300	600
Holding room	1300	2600
Domestic Arrivals Area	400	700
International Arrivals Area	300	500
Circulation Space	300	800
Baggage-Pick-up - Domestic	200	400
Baggage-Pick-up - International	300	600
Baggage Scanning	200	400
Admin Office	300	600
Public Washrooms	500	1000
Staff Washrooms	175	350
Storage	250	500
Immigration Inspection Area	500	1000
Customs Inspections Area	400	800
Immigration/Customs Offices	250	500
Retail	225	450
Food and Beverage	200	400
Tourism Counter	100	200
Total	7450	14900

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The Suggested Floor Plan for a potential Tier 1 facility is shown in **Appendix C**.

7.6.1.2 Tier 1 Landside Costs

The landside costs also have addressed the repairs and maintenance items that would enhance the travellers' experience and the safety and cost effectiveness of the airport facilities. The facility costs of structures for the storage of Aircraft Rescue and Fire Fighting (ARFF) equipment is also included in the landside cost assessment for the airports.

	<i>Description of requirements</i>	<i>Estimated costs</i>
Exuma Int'l	Domestic ATB Repairs/upgrades	\$172,500.00
	new Customs/Immigration Facility (integrated into domestic terminal): 5,900 sq. ft. of new space	\$1,770,000.00
	Design/tender budget (12.5% of construction)	\$221,250.00
	Contract admin/inspection/testing (7.5% of construction)	\$132,750.00
	Contingency (10% of construction budget)	\$177,000.00
	ARFF facilities (2 bays)	\$1,872,000.00
	sub-total	\$4,345,500.00
Governor's Harbour	Domestic / Int'l repairs and upgrades	\$48,000.00
	expand terminal by 1 650 sq ft	\$495,000.00
	Design/tender budget (12.5% of construction)	\$61,875.00
	Contract admin/inspection/testing (7.5% of construction)	\$37,125.00
	Contingency (10% of construction budget)	\$49,500.00
	note: parking lot needs repaving and curbing in airside	
	sub-total	\$691,500.00
Marsh Harbour	new facilities - finish off and OPEN: staff the ATC tower, open and staff fire hall and get the groundside parking opened	\$0.00

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North Eleuthera	Domestic / Int'l Terminal repairs and upgrades	\$97,150.00
	<i>Note: major airside investments needed to ensure existing landside infrastructure and facilities are compliant; otherwise these costs are exorbitant</i>	
	Terminal expansion of 4000 sq. ft. (negotiate with White Crown for leasing of space for Customs and Immigration)	TBD
	Aircraft rescue and firefighting facility/combined services facility	\$936,000.00
	sub-total	\$1,033,150.00
San Salvador	Domestic Upgrade / Repairs	\$79,400.00
	Expansion with Int'l terminal	\$1,185,000.00
	Design/tender budget (12.5% of construction)	\$148,125.00
	Contract admin/inspection/testing (7.5% of construction)	\$88,875.00
	Contingency (10% of construction budget)	\$118,500.00
	ARFF facility (2 bay)	\$1,872,000.00
	sub-total	\$3,491,900.00
South Bimini	Domestic / Int'l upgrades	\$3,000.00
	ARFF facility (1 bay)	\$936,000.00
	mostly all rebuilt - terminal should be expanded (possibly at cost of Lessee if airport transferred)	
	sub-total	\$939,000.00
TIER 1 LANDSIDE TOTALS		\$10,501,050.00

7.6.1.3 Tier 2 and Tier 3 Airport Passenger Facilities

The Tier 2 space requirements are scaled to a smaller processing facility and although many programming aspects are the same, they require less area and the peak activity and congestion at the sites is less than at the tier 1 facilities.

The Tier 3 facilities are all recommended as domestic facilities only and there are also some airports that do not have scheduled traffic at the site. Thus the Tier 3 sites have been further



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segregated into two styles of passenger processing facility: 1) Scheduled traffic occurs and airline space is required for operations and security of passengers; and 2) no scheduled operations and only some limited charter activity occurs. The two levels of activity can influence the programming and the style of facility that can be provided for an inviting passenger experience while recognizing the two very different requirements for space. The programming space is shown in the following table as a reference. The tables (and the Tier 1 space recommendations) were utilized to provide costing for the landside improvements recommended for the Family Islands Airports.

Table 13: Tier 2 Programming Recommendations

Tier 2	Minimum Sq/Ft	Maximum Sq/Ft
Check-In	450	750
Airline Counters	130	220
Airline Offices	100	160
Pre-board Security	360	600
Holding room	600	1000
Arrivals Area	180	300
Vending and Concession	120	200
Baggage-Pick-up	180	300
Baggage Scanning	220	360
Admin Office	100	160
Public Washrooms	300	500
Staff Washrooms	60	100
Storage	120	200
Immigration Inspection Area	240	400
Customs Inspections Area	120	200
Immigration/Customs Offices	100	160
Total	3380	5610

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Table 14: Tier 3 Programming Recommendations Options

Tier 3 Option 1		
Check-in/Waiting Area	360	1000
Airlines counters	70	200
Airline Offices	100	320
Washrooms	60	240
Storage	70	240
Total	660	2000
Tier 3 Option 2		
No Scheduled Flights		
Waiting Area	260	440
Washrooms	60	60
Total	320	500

The Tier 2 and two alternatives for Tier 3 space layouts are shown in **Appendix C**.

7.6.1.4 Tier 2 Landside Costs

	<i>Description of requirements</i>	<i>Estimated costs</i>
Andros Town	Domestic / Int'l terminal upgrade/repair	\$89,800.00
	plumbing upgrades	\$1,200.00
	Expansion with terminal	\$234,000.00
	Design/tender budget (12.5% of construction)	\$29,250.00
	Contract admin/inspection/testing (7.5% of construction)	\$17,550.00
	Contingency (10% of construction budget)	\$23,400.00
	sub-total	\$395,200.00

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Deadman's Cay	Domestic upgrades/plumbing	\$2,850.00
	expand terminal for POE (2620 sq ft)	\$786,000.00
	Design/tender budget (12.5% of construction)	\$98,250.00
	Contract admin/inspection/testing (7.5% of construction)	\$58,950.00
	Contingency (10% of construction budget)	\$78,600.00
	fix fencing, relocate	?
	address abandoned bar/restaurant that sits in strip	?
	fix the stop/hold bars	\$0.00
sub-total		\$1,024,650.00
Great Harbour Cay	new terminal needed (5610 sq ft)	\$1,683,000.00
	Design/tender budget (12.5% of construction)	\$210,375.00
	Contract admin/inspection/testing (7.5% of construction)	\$126,225.00
	Contingency (10% of construction budget)	\$168,300.00
sub-total		\$2,187,900.00
Matthew Town	Addition of new terminal space of 2530 sq ft added to existing	\$759,000.00
	Design/tender budget (12.5% of construction)	\$94,875.00
	Contract admin/inspection/testing (7.5% of construction)	\$56,925.00
	Contingency (10% of construction budget)	\$75,900.00
	check condition of existing facility	?
sub-total		\$986,700.00

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New Bight	Domestic upgrades	\$9,390.00
	major terminal expansion (4290 sq ft)	\$1,287,000.00
	Design/tender budget (12.5% of construction)	\$160,875.00
	Contract admin/inspection/testing (7.5% of construction)	\$96,525.00
	Contingency (10% of construction budget)	\$128,700.00
	ARFF facility	\$936,000.00
sub-total		\$2,618,490.00
Rock Sound	Domestic/Int'l facility upgrades	\$88,900.00
	sub-total	\$88,900.00
San Andros	New facility required (based on 3110 sq ft)	\$933,000.00
	Design/tender budget (12.5% of construction)	\$116,625.00
	Contract admin/inspection/testing (7.5% of construction)	\$69,975.00
	Contingency (10% of construction budget)	\$93,300.00
sub-total		\$1,212,900.00
TIER 2 LANDSIDE TOTALS		\$8,514,740.00

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7.6.1.5 Tier 3 Landside Costs

	<i>Description of requirements</i>	<i>Estimated costs</i>
Arthur's Town	Plan for closure due to proximity of airport from New Bight. Bus shelter, facility costs. Aware of PW upgrades but this is the most recommended approach to provide effective, optimal island assets and features.	\$10,480.00
	sub-total	\$10,480.00
Black Point	airfield lighting	\$0.00
	ARFF concerns	
	sub-total	\$0.00
Clarence A Bain (Mangrove Cay)	Domestic upgrades	\$6,800.00
	sub-total	\$6,800.00
Congo Town	oversized for use	
	Domestic upgrades	\$92,800.00
	if (and when) replaced, it should be 2800 sq ft facility	\$1,200.00
	sub-total	\$94,000.00
Crooked Island	Domestic upgrades	\$4,100.00
	minor expansion (50 sq ft)	\$15,000.00
	Design/tender budget (12.5% of construction)	\$1,875.00
	Contract admin/inspection/testing (7.5% of construction)	\$1,125.00
	Contingency (10% of construction budget)	\$1,500.00
	sub-total	\$23,600.00
Farmer's Cay	transfer site and location to yacht club	
	sensitivity for support but not likely a site that can be certified	
	sub-total	\$0.00

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Mayaguana	New domestic terminal (1240 sq ft) - can be smaller	\$372,000.00
	Design/tender budget (12.5% of construction)	\$46,500.00
	Contract admin/inspection/testing (7.5% of construction)	\$27,900.00
	Contingency (10% of construction budget)	\$37,200.00
	sub-total	\$483,600.00
Moore's Island	Domestic upgrades	\$21,000.00
	sub-total	\$21,000.00
Port Nelson (Rum Cay)		\$0.00
	sub-total	\$0.00
Ragged Island	Domestic upgrades	\$8,950.00
	sub-total	\$8,950.00
Staniel Cay	Transfer to yacht club	\$0.00
	too challenging for compliance and certification	
	could convert intended Customs/Immigration facility to terminal	
	sub-total	\$0.00
Sandy Point	nothing required at this time	\$0.00
	sub-total	\$0.00
Spring Point	Domestic upgrades	\$16,300.00
		\$600.00
	sub-total	\$16,900.00
Stella Maris	Transfer airport (facility and ownership issue)	
	some washroom upgrades	\$1,200.00
	sub-total	\$1,200.00

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Treasure Cay	Transfer or close airport, minimize investment	
	Domestic upgrade	\$80,500.00
	Washrooms	\$1,200.00
sub-total		\$81,700.00
TIER 3 LANDSIDE TOTALS		\$748,230.00

7.7 AIRPORT EQUIPMENT REQUIREMENTS

Properly trained airport personnel are limited in their capacity to respond to the operational requirements related to safety and ongoing maintenance and oversight unless equipped with the proper airport mobile and maintenance equipment. Not all airports require the same degree and standard of equipment. The Family Islands Airports have been assessed utilizing the tier system to align the airport mobile and maintenance equipment for its response requirements and the operating environment that it is responsible to maintain.

7.7.1 Maintenance Equipment

Presently, each of the Family Islands Airports has significant maintenance deficiencies which prevent the aerodromes from achieving compliance with various Aerodrome Standards and Recommended Practices (SARPs). These deficiencies range from trees penetrating the obstacle limitation surfaces, to poorly graded runway strips, to damaged or malfunctioning runway lights.

Most all of the aerodromes visited by the Consultant Team had little to no maintenance equipment present and in many cases relied upon external sources, such as the Ministry of Public Works, to provide any maintenance work. As well, none of the Family Islands Airports appeared to have a structured routine or preventative maintenance management regime. In the most part, aerodrome maintenance appears to be initiated on purely a reactive basis.

It should be noted that the cooperation with the Ministry of Public Works is very positive but the Ministry has its own mandate and the lending of equipment is not optimal for maintaining the aerodromes to the level required to achieve compliance and then sustain it going forward.

It is recommended that each aerodrome receive an allotment of basic maintenance tools which, at a minimum, will allow selective tree topping and removal (i.e., chain saw), brush/vegetation mowing and clearing, maintenance of surface grades, collection and removal of foreign object debris (FOD) and general repairs. The specific allotment of tools should be commensurate with the size and scale of the aerodrome and its designated tier classification. Each aerodrome should also be equipped with a lockable tool storage cabinet or room to prevent theft or tampering.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

Few of the Family Islands Airports presently have mobile equipment dedicated for use in aerodrome maintenance other than the odd pick-up truck and electric golf cart, which tend to be old and in need of repair. It is recommended that each aerodrome be provided with mobile equipment to aide in inspections, general upkeep and maintenance and, in some cases, crash and fire-fighting response. The following is the recommended mobile equipment complement by tier of aerodrome:

- Tier 1 Airports:
 - **Four-wheel drive, pick-up truck** with 1 ton capacity and capable of rapid transport of rolling fire extinguishers to a fire event; and
 - **Combination front-end loader and backhoe** capable of tree stump removal, general surface grading of the runway strip, repair of pavement shoulders, clean-up following storms, pavement sweeping, etc.



Figure 88: Typical Combination Front-End Loader and Backhoe

- Tier 2 Airports:
 - **Four-wheel drive, pick-up truck** with a 1 ton carrying capacity and capable of rapidly transporting rolling fire extinguishers to an aircraft fire event.
- Tier 3 Airports:
 - **Six-wheel, all-terrain utility vehicle** with rear bed for use in general aerodrome inspections and maintenance, and the transport of equipment to a crash or fire-fighting event.



Figure 89: Typical Six-Wheel, All-Terrain Utility Vehicle

7.7.2 Aircraft Crash, Rescue and Fire-fighting (ARFF) Equipment

ICAO Annex 14, Chapter 9 provides standards and recommended practices for aircraft crash, rescue and fire-fighting (ARFF), and which is further elaborated in ICAO Airport Services Manual, Part 1.

In order to specify the level of protection, ICAO has categorized aerodromes according to aircraft length and fuselage width, as shown in the table below. ICAO also specifies the appropriate number of ARFF personnel and training requirements. The ICAO SARPs imply that all aerodromes should have some level of ARFF response capability.

However, ICAO ARFF equipment and personnel requirements can be quite onerous for small aerodromes. As a result, many countries, such as Australia, Canada and the United States, only have mandatory ARFF response requirements for aerodromes which have scheduled services. Typically, response capabilities meeting Annex 14 are only required for aerodromes which accommodate scheduled aircraft with 20 or more passengers.

In the case of the Tier 3 Family Islands Airports, many of the airports cater exclusively to a low volume of small piston aircraft with little to no scheduled service and there are no permanently based airport operational personnel. As a result, it is not seen as being financially feasible to meet Annex 14 ARFF requirements for many of the Tier 3 airports.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

Table 15: Aircraft Crash, Rescue and Fire-fighting (ARFF) Equipment Capabilities

Aerodrome Category	Aeroplane Overall Length [m]	Maximum Fuselage Width [m]	Minimum Number of ARFF Vehicles	Water [L]		Foam Solution Discharge Rate [L/min]		Complementary Agent [kg]
				Perform. Level A	Perform. Level B	Perform. Level A	Perform. Level B	
1	$0 < L < 9$	< 2	1	350	230	350	230	145
2	$9 \leq L < 12$			1000	670	800	550	190
3	$12 \leq L < 18$	< 3		1800	1200	1300	900	135
4	$18 \leq L < 24$	< 4		3600	2400	2600	1800	135
5	$24 \leq L < 28$	< 4		8100	5400	4500	3000	180
6	$28 \leq L < 39$	< 5	2	11800	7900	6000	4000	225
7	$39 \leq L < 49$	< 5		18200	12100	7900	5300	225
8	$49 \leq L < 61$	< 7	3	27300	18200	10800	7200	450
9	$61 \leq L < 76$			36400	24300	13500	9000	450
10	$76 \leq L < 90$	< 8		48200	32300	16600	11200	450

Source: ICAO Annex 14, Volume 1 - Aerodrome Design and Operations, 6th Edition, July 2013.

As a minimum, it is recommended that all Family Islands Airports maintain two 350 lbs. rolling fire extinguishers which should be regularly recharged and inspected. One of the two fire extinguishers shall serve as a spare when the other unit is shipped away for repair or recharge. In addition, the following minimum ARFF equipment requirements should be maintained at each of the Family Island Airports according to their respective tier classification:

- Tier 1 Airports:
 - **ARFF Vehicles** in numbers and specifications as per Annex 14 and according to the respective ICAO ARFF Category (as determined by the critical aircraft); and
 - **Additional fire/rescue equipment** in accordance with Annex 14 including personal protection equipment, respiratory equipment, first aid equipment, extrication equipment, communication equipment and fire alarms.
- Tier 2 Airports:

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

- **Trailer-mounted, water/foam tanks and dispensing unit** with capacities generally meeting ICAO ARFF Category 2 and capable of being rapidly deployed to an aircraft crash/fire event; and



Figure 90: Typical Trailer-mounted, water/foam tanks and dispensing unit

- **Additional fire/rescue equipment** in accordance with Annex 14 including personal protection equipment, first aid equipment, extrication equipment and communication equipment.
- Tier 3 Airports:
 - Other than the requirement for two rolling fire extinguishers (as noted above), no other requirements are recommended. The fire extinguishers would be towed or transported to an event site using the recommended six-wheeled utility vehicle in order to provide a rapid response. (Note that during any future implementation related to ARFF, The Bahamas Civil Aviation Department should undertake a risk assessment of each of the Tier 3 airports to determine whether the current aviation activity may warrant additional ARFF requirements.)

7.7.3 Airfield Lighting Equipment

Based on the airport site assessments undertaken by the Consultant Team, nearly all of the Family Islands Airports had some degree of airfield lighting deficiencies (i.e., missing or damaged fixtures, incorrect lens colour, etc.). In some cases, up to 20% of a particular runway's edge/threshold/end lights were not operable. From consultations, it is evident that these deficiencies are not being resolved due to a lack of technical knowledge and significant delays in obtaining replacement parts and equipment.

To resolve this issue, it is recommended that commonly used airfield lighting system spare parts and equipment be maintained at each of the airports. The spare parts package should be tailored to the size and scale of the airport according to the tier classification, and stored within

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

a secure enclosure or room at the airport. As parts and equipment are depleted from the airport's stores, the items should be promptly replaced.

In addition, it is not reasonable to assume that each airport, particularly the Tier 3 airports, will have maintenance personnel knowledgeable in the repair, maintenance and inspection of an airport's airfield lighting system. Therefore, it is recommended that the airfield lighting systems for the Family Islands Airports be inspected, maintained and repaired by a specialized crew that rotates among the various airports. This crew could either be comprised of centralized or regional airport personnel or undertaken by a third-party under contract.

7.8 MAINTENANCE MANAGEMENT

The Family Islands Airports collectively require a substantial capital investment to provide an operating environment that moves toward compliance with recognized international standards and recommended practices. This is only part of the challenge for the Family Islands Airports though and they also require appropriate operational oversight as well as a program of regular and preventative maintenance to protect and preserve the infrastructure that is in place. This sustainability of the assets is a critical piece in the transformation of the Family Islands Airports. Based on the visual site assessments, all of the airports displayed a lack of maintenance or a maintenance program, but to differing degrees. Typically, the level of maintenance, if any, found at the airports was dependent on the airport personnel and their respective knowledge base. Little in the way of a planned or structured maintenance management program seems to have been developed by BCAD and conveyed to the individual airports. There is a requirement for operational staff at all Tier 1 and 2 airports, with maintenance oversight and responsibilities. The staffing level will vary depending on the level of activity at the site,

The key reasons for implementing a planned or structured maintenance management program are:

- Increased level of aviation and public safety;
- Less risk of airport unavailability;
- Improved ability to establish realistic capital budgets for each airport;
- Greater accountability and transparency in terms of airport maintenance costs;
- Extend the useful life of physical assets and equipment; and
- Greater predictability in terms of personnel and resource scheduling.

A computerized airport maintenance management system is a valuable tool in providing a safe and secure airfield and airport environment. This does not need to be setup at each site but can be centralized in Nassau or a select few locations. The items to be included in the preventative programme would be comprehensive and include warranty periods, weekly, monthly, semi-annual and annual inspections. The work orders associated with the inspections and testing would be established and trained personnel would complete the tasks and provide written updates or completed checklists back to the host site. The system will also include an inventory of parts that are available centrally or regionally or on a site level. Each site should have access

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

to parts based on priority within set timeframes that would range from within 24 hours to two weeks.

The maintenance of airfield lighting at the Family Islands Airports seems to be particularly challenging given the difficulties in obtaining replacement parts and equipment and the lack of knowledgeable operations and maintenance personnel. Given these challenges, it is recommended that the maintenance of the airfield lighting systems at the Family Islands be managed and controlled from a central or regional operational entity (i.e., Nassau or trained site personnel at a regional airport).

A good example of such an approach is used by the Government of the Province of Manitoba in Canada that owns and operates 24 remote airports. These airports, all with less than 10,000 movements per year, are situated in challenging environments with no direct road access, and limited on-site operational and maintenance personnel. The Government recognized that in order to have a truly effective maintenance management program, the maintenance of airfield lighting for the 24 airports would need to be centralized. The government department responsible employs a specialized team of airfield lighting specialists that travel on a continuous basis between the 24 airports in order to carry out inspections, tests, preventative maintenance and repairs for the airfield lighting systems.

8.0 FAMILY ISLANDS AIRPORTS OPTIMIZATION STRATEGY RECOMMENDATIONS

8.1 THE AERODROME COMPLIANCE CHALLENGE

The 28 Family Islands Airports have been lacking in investment and operational attention recently and it is an opportunity to provide an improved aviation environment for The Bahamas and its Family Islands. This will also create a new tourism partner and "front door" for the islands and each region's unique blend of tropical paradise away from the large resort style packages.

The capital costs associated with bringing the 28 Family Island Airports into compliance with Standards and Recommended Practices that would serve the Bahamas Aviation environment total approximately \$160 million and are summarized both by tier and by airside, landside and mobile equipment including some site inventory.

The landside recommendations also provide a suggested passenger processing model for each tier with minimum and maximum area requirements based on their specific programming requirements. These are intended as guides and can also reduce the future facility design costs although each site is encouraged to integrate the aesthetics of the local environment into its facility within reason.

The mobile equipment category is intended to identify and address the site equipment required to support the airport operations related to its recommended and forecasted activity levels.

Tier 1 Airports

<i>Airside Compliance Capital Costs:</i>	<i>\$32.93 million US</i>
<i>Landside Capital Costs (including ARFF facilities):</i>	<i>\$ 10.50 million US</i>
<i>Mobile Equipment:</i>	<i>\$ 5.47 million US</i>
<hr/>	
<i>Sub-total for Tier 1 Airports:</i>	<i>\$48.90 million US</i>

Tier 2 Airports

<i>Airside Compliance Capital Costs:</i>	<i>\$42.41 million US</i>
<i>Landside Capital Costs (including ARFF facilities):</i>	<i>\$ 8.51 million US</i>
<i>Mobile Equipment:</i>	<i>\$ 0.99 million US</i>
<hr/>	
<i>Sub-total for Tier 2 Airports:</i>	<i>\$51.92 million US</i>

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

Tier 3 Airports

Airside Compliance Capital Costs: **\$57.68 million US**

Landside Capital Costs (including ARFF facilities): **\$ 0.75 million US**

Mobile Equipment: **\$0.40 million US**

Sub-total for Tier 3 Airports: **\$58.82 million US**

The total cost of compliance and provision of a safe and operationally effective airport environment for the 28 Family Islands Airports is estimated at \$160 million US. Over one third of the cost (36.85%) is associated with airports categorized as Tier 3 airports that have less traffic, less economic potential and a lower risk profile. These airports are certainly requiring attention as well but the strategy put forward for the government to consider is a means to invest in the airport infrastructure that will provide the greatest return – in this case through tourism stimulation and greatest risk reduction. The Tier 3 airports require a regular maintenance program and some priority fixes associated with obstacle clear zones and visual aids but the major capital associated with runway rehabilitation can be deferred in many cases and avoided altogether through the optimization strategy that will be put forward.

8.1.1 Strategy for Optimization

The airports require a substantial level of effort in maintenance and improvements in operating conditions but also require more attention to the protection of the airside and its operating protection zones. The airports require immediate capital programming for the first two levels of priority with an implementation schedule for the next two years to have fully compliant on these identified items. Many of these are not the most significant costs for the government to consider.

The airside pavement requirements are very costly and need to be carefully implemented, consistent with their ability to provide a safe flying environment, and provide capacity to meet the forecasted demand in passengers and tourism for the respective island region. This investment will require a phased approach and the larger design projects require geotechnical, legal survey, engineering design and tendering activity prior to construction and thus there is a lag effect in the cash flow of much of the investment.

The stimulation of the tourism opportunity for Tier 1 and 2 airports will also benefit from attractive and fully functional terminal facilities. Although the landside investments are not as high an item for compliance, they do support the economic development in an island economy by facilitating the travellers through an inviting and welcoming processing area.

The overall investment in the Family Islands Airports is a very positive one for the government. Studies of tourism economic impacts in The Bahamas have yielded GDP multipliers ranging from .87 to 1.25. Applying these multipliers to the direct tourist expenditures figure (\$339,366,403 for 2011) yields total economic impacts (direct, indirect and induced) accounted for by the Family

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

Islands airports, ranging from \$634,615,174 to \$763,574,407: this translates to average per tourist economic impacts ranging from \$3,272 to \$3,937.

A significant factor in the overall cost to the government that requires policy agreement and then action toward implementation is this report's recommendations toward transfers of airports to private interests, airport closures and airport leases for ongoing operational responsibilities. The Tier 3 government airports requiring runway rehabilitation can defer this capital spending altogether as part of the transition process but should address and ensure the obstacle clear zones are protected and the sites are enhanced with visual aids. Improved maintenance and patching can extend life until these sites can be reassessed for more extensive rehabilitation. The implementation of the full recommendations put forward in this draft report would reduce the capital costs for the government by over \$49 million US (this would include looking to establish an MOU with the US Coast Guard for cost sharing of infrastructure improvements). This would reduce the costs of compliance to \$110 million US and this would be programmed over the next five to seven years. Other key elements of the strategy are:

- Turn the Tier 1 airports from cost centres to profit centres;
- Commit to an investment strategy for \$34 million to complete initial activities related to compliance of critical infrastructure for all sites (including Tier 3 airports);
- Implement revenue generation strategies (airport improvement fees, leases, concession agreements, airline charges, etc.) estimated to generate \$5 million per year - leverage funding for the balance;
- Organizational change to devolve responsibilities, including budgeting, from a centralized to airport site level operating model;
- Budget and look at capacity building and training; and
- Rationalize tier recommendations to achieve ICAO compliance on Tier 1 and Tier 2, while Tier 3 assets will see top priority safety issues addressed and lower priority for pavements.

Alternative service delivery options are limited due to the high level of subsidization required and the huge capital deficit that has built up at the airports.

There are three options for the government to consider that are being put forward:

- 1) Address all of the ICAO gaps for compliance and safe operations of all the 28 Family Islands Airports at a cost of over \$160 million;
- 2) Implement the airport transfers, leases and closures and phase in/defer some Tier 3 capital spending at a cost of approx. \$110 million (and a priority of \$35 million US to aggressively invest in the airports and tourism strategy); or
- 3) Address the top two levels of priority for all sites, including fire-fighting equipment, and defer capital spending on pavements and facilities while looking to secure additional contracting options for specific airports.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

The Consultant Team recommendation is for the government to initiate the rationalization of its airports in the Family Islands and commence with an aggressive implementation plan for 22 of the 28 family Islands Airports.

The compliance also requires an investment in the people and operational support, training and plan development for all sites (Airport Operations Manuals, Maintenance Management Systems, and commercial development workshops and program training) would require an investment of approximately \$150,000 US to support the first 2 years implementation strategy. Additionally, and once the first wave of initiatives is addressed, The Bahamas would be well served to undertake Air Service development activity to stimulate the market and attract new carriers and tour operators to The Bahamas.

Lastly, it should be recognized that the investment in new infrastructure will require an annual commitment to preserve and provide regular maintenance on the infrastructure and on a life cycle basis, this is estimated to be an incremental and additional \$4.6 million US per annum for the Family Islands Airports.

Night Operations

The Consultant Team would recommend that the airport best suited for night operations is at Marsh Harbour and it requires staffing the Air Traffic Control Tower. The second site to move to night operations would be Exuma International Airport and it has a Flight Services Station/Tower at the site with some visual obstruction due to trees. The obstacle clear zones are required and this facility could likely be functional for staffing of Air Traffic Control Services with limited start-up or transition costs for facilities. The other Tier 1 sites could potentially all be capable of night operations in the future but there is significant terminal work required at San Salvador and runway work at North Eleuthera that would be required to be in place first. The South Bimini site would require a tower as would Governor's Harbour.

The Risk of not investing in the Family Islands

The Tourism growth has been stagnant for the past 12 years and this could actually see a decline of the product, and that includes the Family Islands Airports, is not invested in to provide the aviation community with a safe and well managed airport environment. Additionally, it only takes one incident to create an international reaction and impose tremendous liability on The Bahamas as well as reputational damage.

**COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS –
AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS**

APPENDIX A - AERODROME COMPLIANCE AND DEVELOPMENT PLANS

July 22, 2014

**APPENDIX A - AERODROME COMPLIANCE AND
DEVELOPMENT PLANS**

Appendix A-1
July 17, 2014

Appendix A-1

AERODROME TECHNICAL ASSESSMENT – DEVELOPMENT PLANS – TIER 1



RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	09-27	Runway Strip Width (ft/m):	984 [300]	RWY	09	27	Aerodrome Tier No.:	1	
Length (ft/m):	6100 [1859.3]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	6100	6100	Runway Code (ICAO):	4	
Width (ft/m):	100 [30.5]	Strip Divergence (Each Side):	15%	TODA	6100	6100	Traffic Permitted:	IFR/VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	2.0%	ASDA	6100	6226	Scheduled Service:	Yes	
Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	6100	6100	ARFF Category (ICAO):	5	
Clearway:	None	Transitional Slope:	14.3%	Displaced Threshold	NIL	NIL	Port of Entry:	Yes	

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Stantec



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Professional Consulting Engineers

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- Note:
- Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation.
 - Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.
 - As of February 2014, the airport was under construction. An assessment should be undertaken once completed.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:6000

050100150200250

meters

0200500750

feet

drawing title			
EXISTING LAYOUT AND OPERATION MARSH HARBOUR AIRPORT (MYAM) ABACO ISLAND			
date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 1 1-1



PROPOSED CAPITAL IMPROVEMENTS:

- ① CORRECT RUNWAY PAVEMENT OVERLAY TRANSITIONS
- ② CLEAR VEGETATION FROM TAXIWAY STRIP AND REGRADE AREA
- ③ NEW ILLUMINATED WIND DIRECTION INDICATOR
- ④ NEW RUNWAY MARKINGS
- ⑤ HAZARD LIGHTS AND MARKINGS ON NEW ATC TOWER (NOTE 2)
- ⑥ REMOVE TREES AND VEGETATION FROM RUNWAY STRIP AND INFRINGING TRANSITION SURFACE

- ⑦ NEW AERODROME BEACON
- ⑧ RESOLVE OBSTACLES (TREES, TERRAIN, BUILDINGS) PENETRATING THE TAKE-OFF/ APPROACH SURFACES

LEGEND

- Passenger Terminal Building
- ARFF Building
- Existing Pavement
- Stopway
- Future Runway End Safety Area
- OLS Limit Line
- Building Restriction Line (20' Height)

Consultants



Notes:

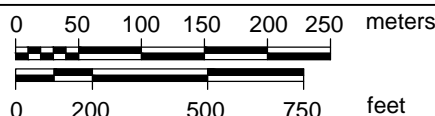
- Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation.
- The new ATC Tower infringes the runway transition surface and is a hazard to aviation. BCAD should appropriately notify and publish the existence of the hazard.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:6000



drawing title

PROPOSED LAYOUT AND CAPITAL PLAN
MARSH HARBOUR AIRPORT (MYAM)
ABACO ISLAND

date

14 JULY 2014

revision

3

project no.

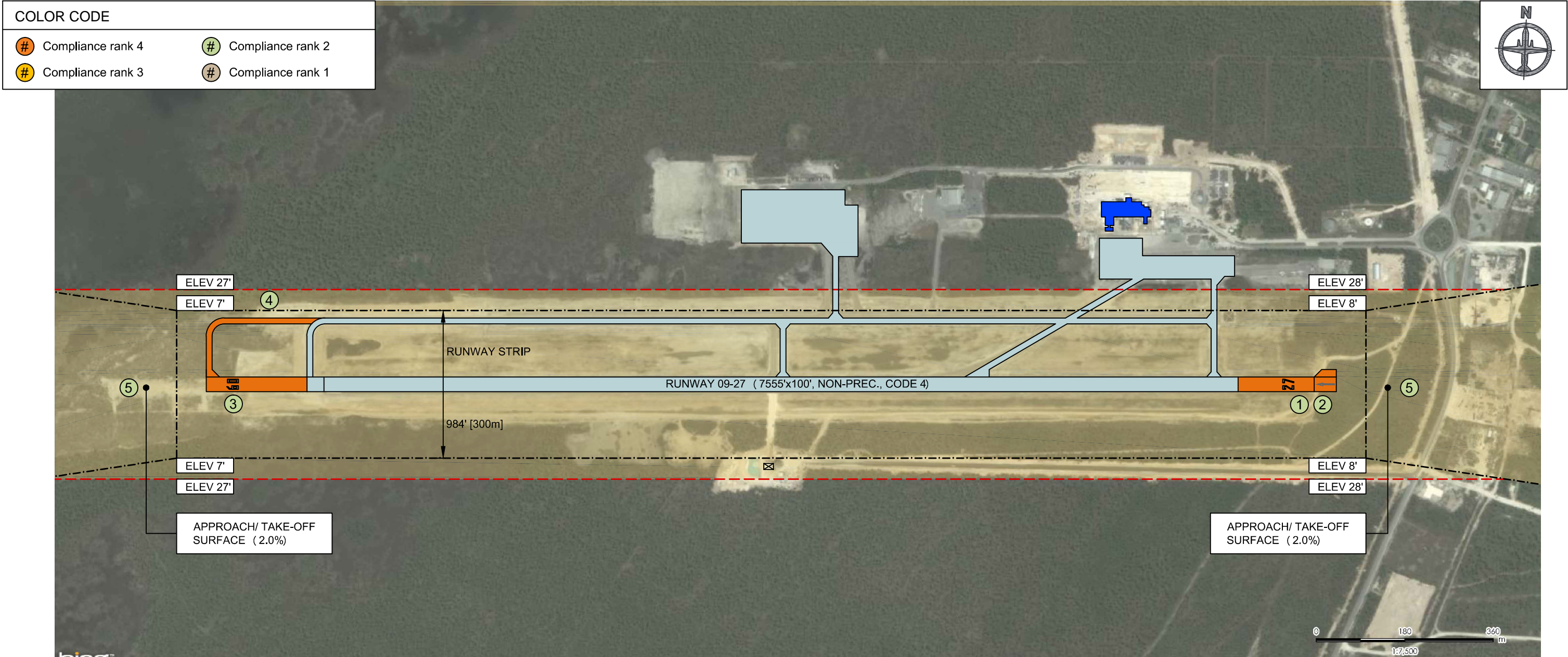
AP1302

exhibit

TIER 1
1-2

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PROPOSED CAPITAL IMPROVEMENTS:

- 656 FT. EXTENSION TO RUNWAY 27 THRESHOLD
- 147.6 FT. DISPLACEMENT TO RUNWAY 27 THRESHOLD
- 673 FT. EXTENSION TO RUNWAY 27 THRESHOLD
- EXTEND PARALLEL TAXIWAY
- RELOCATE RUNWAY APPROACH LIGHTING

LEGEND

- Passenger Terminal Building
- ARFF Building
- Existing Pavement
- New Pavement
- OLS Limit Line
- Building Restriction Line (20' Height)

Consultants



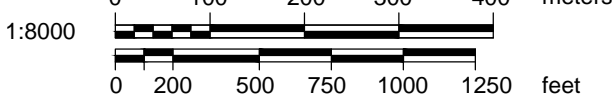
Notes:

- Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation.
- The new ATC Tower infringes the runway transition surface and is a hazard to aviation. BCAD should appropriately notify and publish the existence of the hazard.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale



drawing title

FUTURE RUNWAY 09-27 EXTENSION
MARSH HARBOUR AIRPORT (MYAM)
ABACO ISLAND

date

14 JULY 2014

revision

3

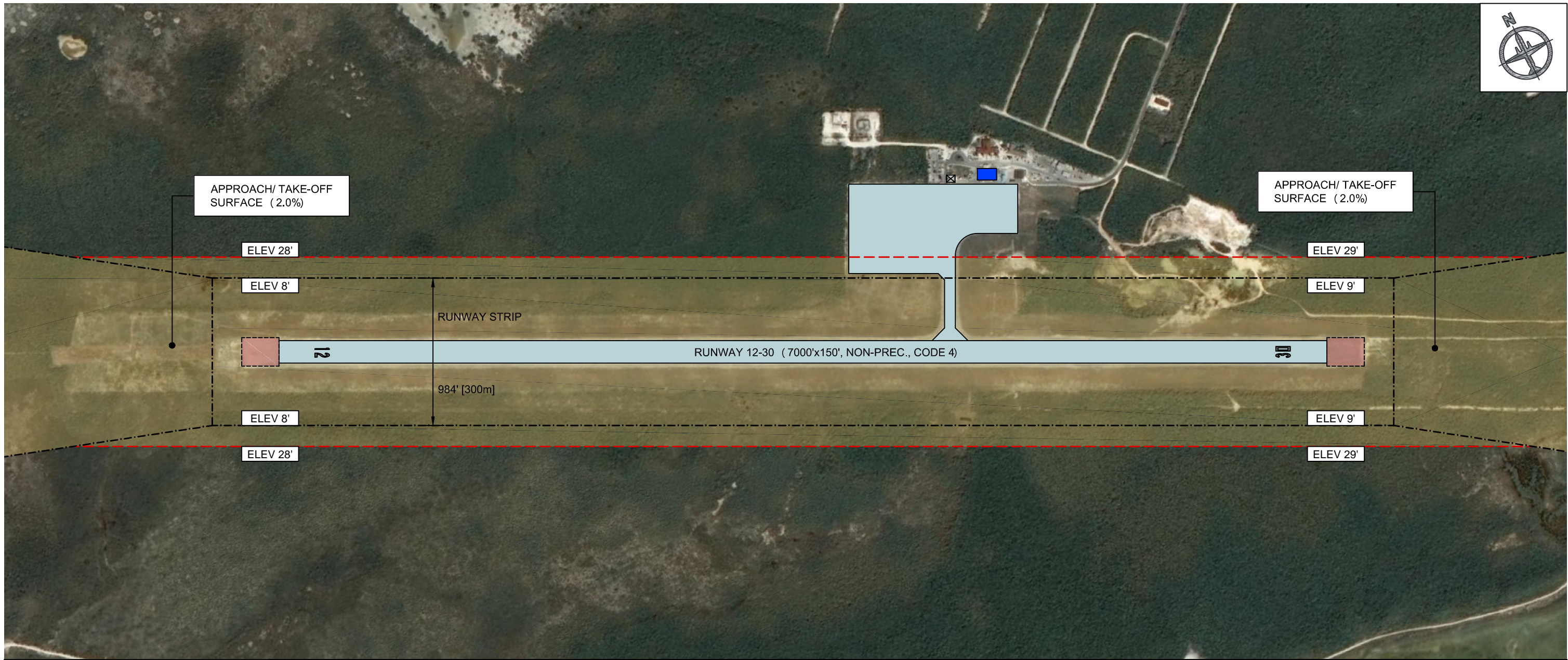
project no.

AP1302

exhibit

TIER 1
1-3

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RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	12-30	Runway Strip Width (ft/m):	984 [300]	RWY	12	30	Aerodrome Tier No.:	3	
Length (ft/m):	7000 [2133.6]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	7000	7000	Runway Code (ICAO):	4	
Width (ft/m):	150 [45.7]	Strip Divergence (Each Side):	15%	TODA	7000	7000	Traffic Permitted:	IFR/VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	2.0%	ASDA	7250	7250	Schedule Service:	Yes	
Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	7000	7000	ARFF Category (ICAO):	6	
Clearway:	None	Transitional Slope:	14.3%	Displaced Threshold	NIL	NIL	Port of Entry:	Yes	

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- Note:
1. Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation.

2. Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.

3. Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

0 100 200 300 400 meters

1:8000

0 200 500 750 1000 1250 feet

drawing title

EXISTING LAYOUT AND OPERATION
EXUMA INTERNATIONAL AIRPORT (MYEF)
EXUMA ISLAND

date

14 JULY 2014

revision

3

project no.

AP1302

exhibit

TIER 1
2-1



PROPOSED CAPITAL IMPROVEMENTS:

- NEW RUNWAY MARKING
- REMOVE TALL TREES AND HEAVY VEGETATION FROM RUNWAY STRIP AND INFRINGING TRANSITION SURFACE AND APPROACHES
- NEW ILLUMINATED WIND DIRECTION INDICATOR (2)
- NEW AIRCRAFT TURN PAD
- LOCALIZED REPAIRS TO AIRCRAFT PARKING APRON
- DRAIN WETLAND AREA AND IN-FILL WITHIN THE RUNWAY STRIP AREA

- REPLACE RWY 12 APPROACH LIGHTING SYSTEM
- REPAIRS TO PAPI UNITS (ELECTRICAL)
- REPAIRS TO RUNWAY LIGHTING (DAMAGED OR UNSERVICEABLE)
- APRON SAFETY MARKING AND AIRCRAFT HOLDING POINT MARKING MARKING AND SIGN.
- MAJOR TERMINAL RENOVATION AND EXPANSION
- RECONSTRUCTION OF ARFF BUILDING (TO HOUSE 2 VEHICLES)

LEGEND

- | | |
|--|--|
| | Passenger Terminal Building |
| | ARFF Building |
| | Existing Pavement |
| | Proposed Pavement |
| | Stopway |
| | Future Runway End Safety Area |
| | OLS Limit Line |
| | Building Restriction Line (20' Height) |

Consultants



Note:

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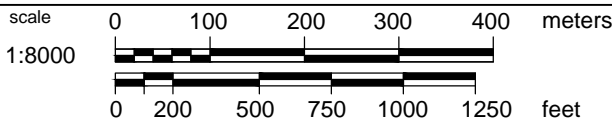
project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

drawing title

PROPOSED LAYOUT AND CAPITAL PLAN
EXUMA INTERNATIONAL AIRPORT (MYEF)
EXUMA ISLAND

scale



date

14 JULY 2014

revision

3

project no.

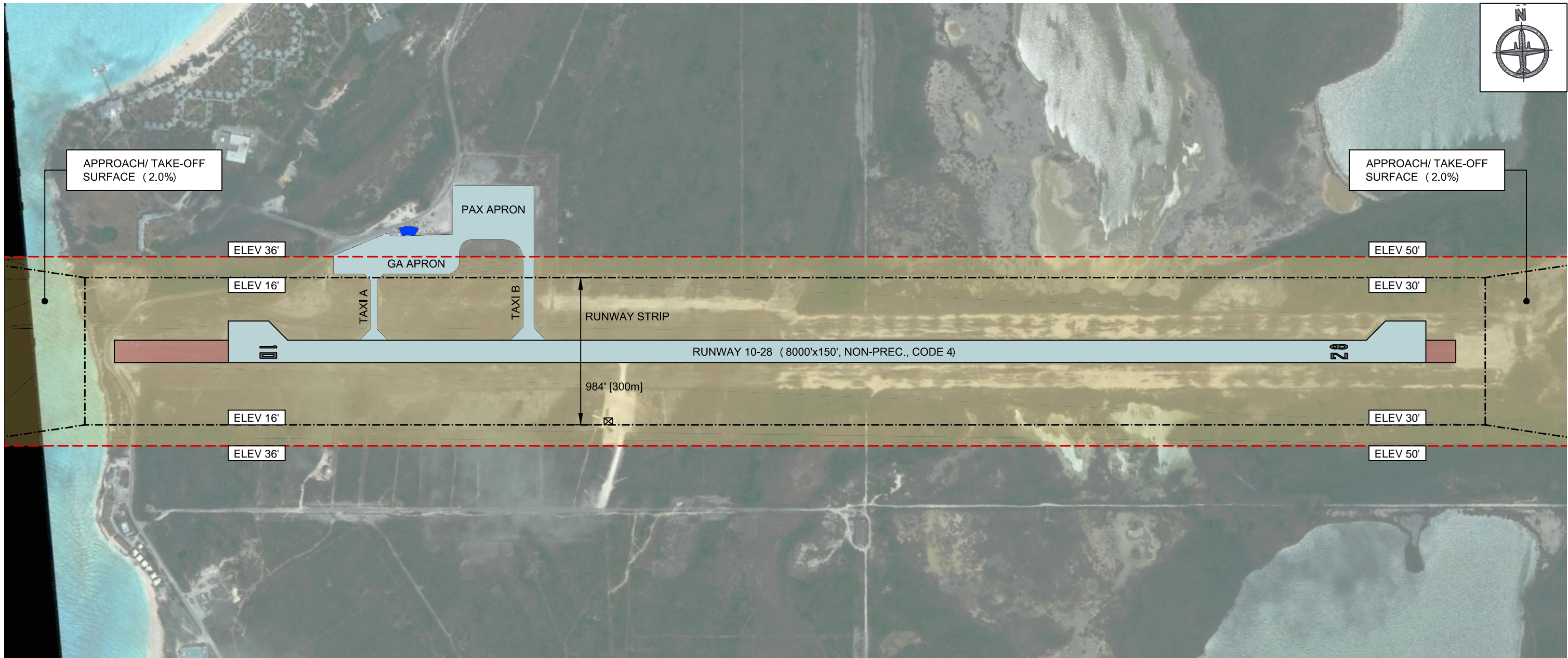
AP1302

exhibit

TIER 1
2-2

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RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	10-28	Runway Strip Width (ft/m):	984 [300]	RWY	10	28	Aerodrome Tier No.:	1	
Length (ft/m):	8000 [2438.4]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	8000	8000	Runway Code (ICAO):	4	
Width (ft/m):	150 [45.7]	Strip Divergence (Each Side):	15%	TODA	8000	8000	Traffic Permitted:	IFR/VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	2.0%	ASDA	8200	8760	Scheduled Service:	Yes	
Stopway:	760' (28), 200' (10)	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	8000	8000	ARFF Category (ICAO):	7	
Clearway:	None	Transitional Slope:	14.3%	Displaced Threshold	NIL	NIL	Port of Entry:	Yes	

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 - Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.
 - Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:8000

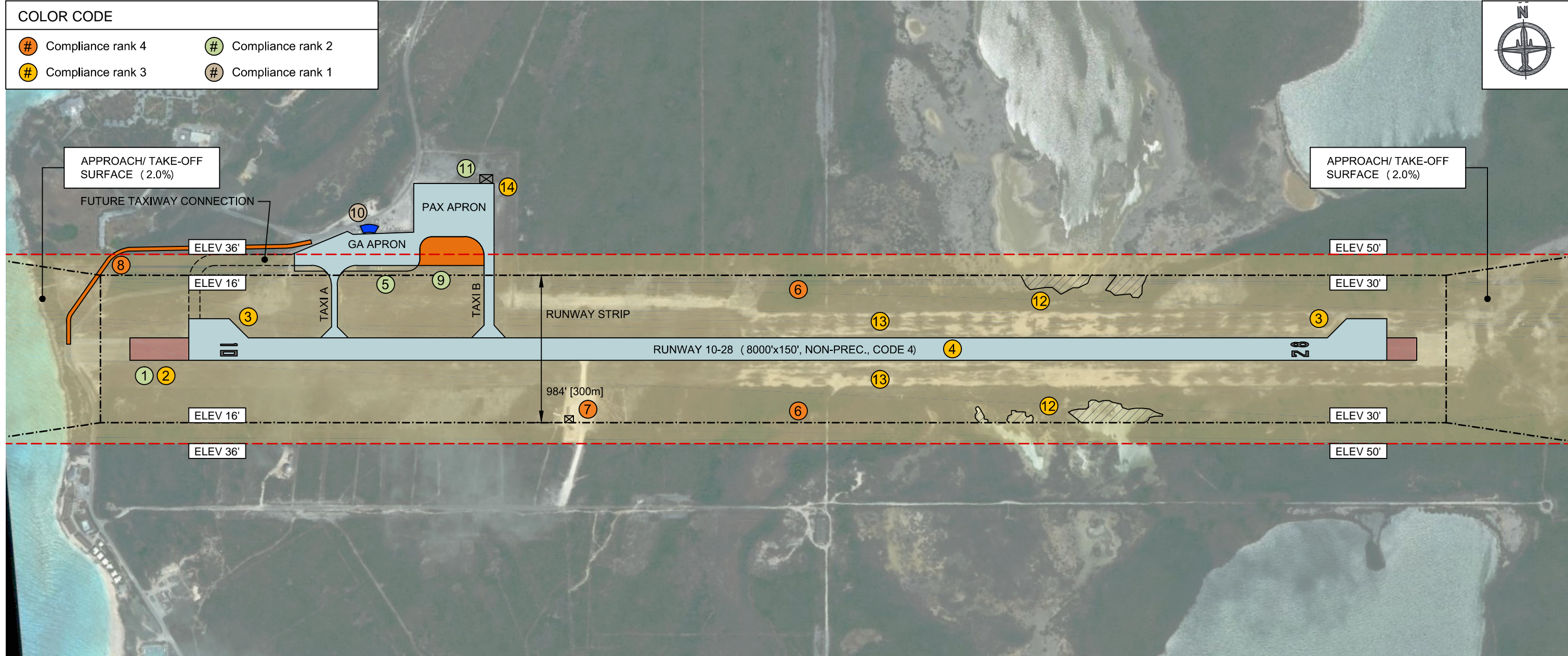
0100200300400meters

020050075010001250feet

drawing title

EXISTING LAYOUT AND OPERATION
SAN SALVADOR AIRPORT (MYSM)
SAN SALVADOR ISLAND

date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 1 3-1



PROPOSED CAPITAL IMPROVEMENTS:

- REPAIR STOPWAY PAVEMENT AND REDUCE LENGTH TO 393' (120m)
- REPLACE RWY 10 APPROACH LIGHTING (FRANGIBLE)
- NEW WIND DIRECTION INDICATOR (2)
- NEW RUNWAY MARKINGS
- DECOMMISSION PORTION OF EXISTING GA APRON
- REMOVE TREES AND VEGETATION FROM RUNWAY STRIP AND INFRINGING TRANSITION SURFACE
- REMOVE BUILDING STRUCTURES FROM RUNWAY STRIP

- REALIGN EXISTING ROADWAY
- EXPAND GA/ PAX APRON
- EXPAND TERMINAL AND CONNECT INTERNATIONAL TO DOMESTIC TERMINALS
- NEW ARFF BUILDING
- INFILL WETLAND AREAS WITHIN RUNWAY STRIP
- CORRECT GRADING AND SLOPES WITHIN RUNWAY STRIP AND ELIMINATE PROTRUSIONS
- REPLACE AERODROME BEACON

LEGEND

- | | |
|--|--|
| | Passenger Terminal Building |
| | ARFF Building |
| | Existing Pavement |
| | Proposed Pavement |
| | Stopway |
| | OLS Limit Line |
| | Building Restriction Line (20' Height) |

Consultants

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project title
BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale
1:8000

0 100 200 300 400 meters
0 200 500 750 1000 1250 feet

drawing title
PROPOSED LAYOUT AND CAPITAL PLAN
SAN SALVADOR AIRPORT (MYSM)
SAN SALVADOR ISLAND

date 14 JULY 2014	revision 3	project no. AP1302	exhibit TIER 1 3-2
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RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	07-25	Runway Strip Width (ft/m):	984 [300]	RWY	07	25	Aerodrome Tier No.:	1	
Length (ft/m):	6019 [1834.6]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	6019	6019	Runway Code (ICAO):	4	
Width (ft/m):	100 [30.5]	Strip Divergence (Each Side):	15%	TODA	6019	6019	Traffic Permitted:	IFR/VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	2.0%	ASDA	6019	6019	Scheduled Service:	Yes	
Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	6019	6019	ARFF Category (ICAO):	5	
Clearway:	None	Transitional Slope:	14.3%	Displaced Threshold	NIL	NIL	Port of Entry:	Yes	

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- Notes:
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 - Aerodrome has a published RNAV (GNSS) approach procedure for runway 07 and departure procedure for runways 07 and 25
 - Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.
 - Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:6000

050100150200250meters

0200500750feet

drawing title			
EXISTING LAYOUT AND OPERATION NORTH ELEUTHERA AIRPORT (MYEH) ELEUTHERA ISLAND			
date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 1 4-1



PROPOSED CAPITAL IMPROVEMENTS:

- SELECTIVE REPAIR OF APRON PAVEMENT
- EXPAND COMMERCIAL PASSENGER APRON
- CONVERT APRON INTO DUAL TAXIWAY CONNECTIONS
- CONVERT RUNWAY INTO 75' WIDE TAXIWAY WITH EDGE LIGHTING AND DECOMMISSION EXISTING LIGHTING
- NEW PAPI INSTALLATION (EACH APPROACH)
- REMOVE TREES AND VEGETATION WITHIN NEW RUNWAY STRIP, APPROACHES AND INFRINGING TRANSITION SURFACES.

- CONSTRUCT NEW 6800'x150' RUNWAY AND TAXIWAY CONNECTIONS WITH EDGE, THRESHOLD AND END LIGHTING
- NEW APPROACH LIGHTING (ODALS)
- NEW SOLAR ILLUMINATED WIND DIRECTION INDICATORS (2)
- NEW ARFF FIRE STATION
- NEW AERODROME BEACON
- REHABILITATE PAVEMENT NEAR FORMER RWY 07 THRESHOLD.

LEGEND

- | | |
|--|--|
| | Passenger Terminal Building |
| | ARFF Building |
| | Existing Pavement |
| | Proposed Pavement |
| | Clearway |
| | Future Runway End Safety Area |
| | OLS Limit Line |
| | Building Restriction Line (20' Height) |

Consultants



Note:

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project title

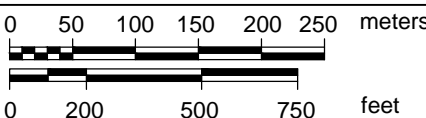
BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

drawing title

PROPOSED LAYOUT AND CAPITAL PLAN
NORTH ELEUTHERA AIRPORT (MYEH)
ELEUTHERA ISLAND

scale

1:6000



date

14 JULY 2014

revision

3

project no.

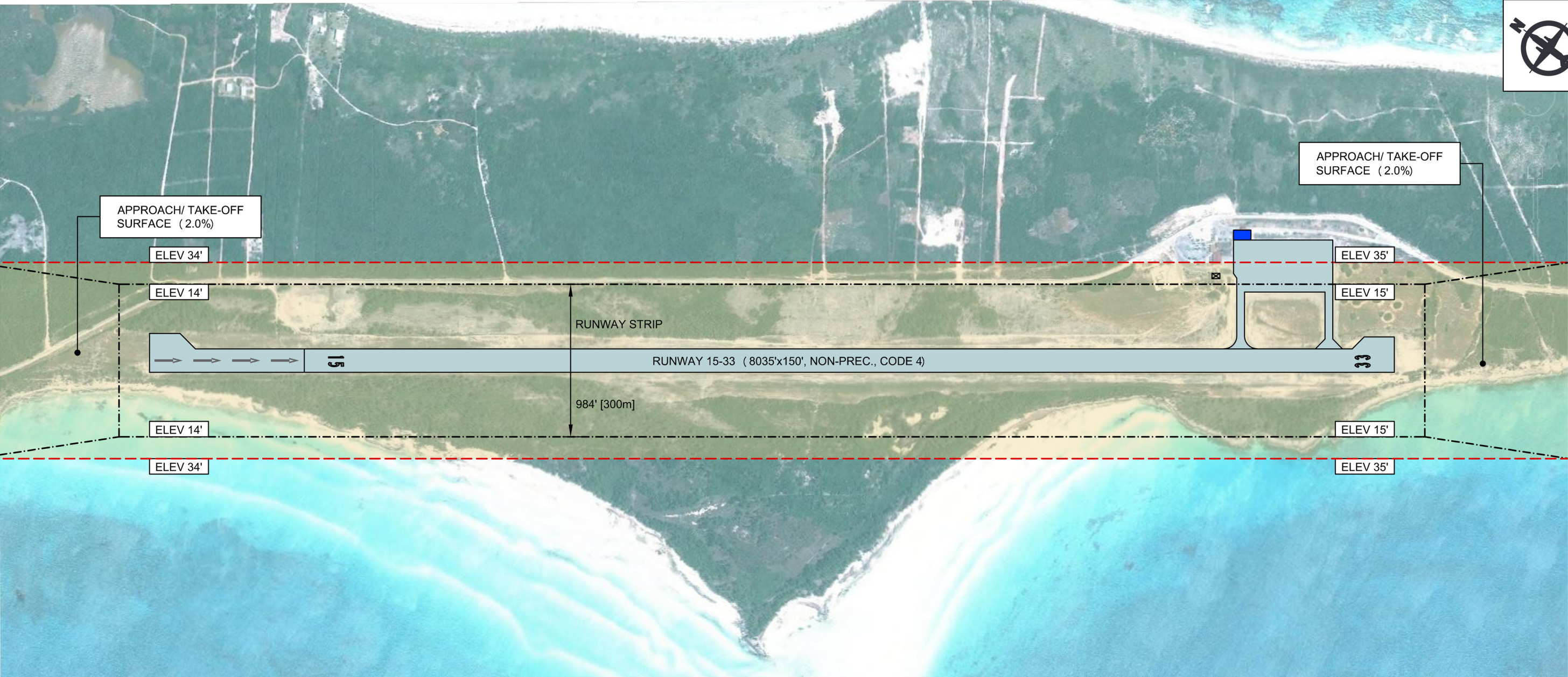
AP1302

exhibit

TIER 1
4-2


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RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	15-33	Runway Strip Width (ft/m):	984 [300]	RWY	15	33	Aerodrome Tier No.:	1	
Length (ft/m):	8035 [2449.1]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	8035	8035	Runway Code (ICAO):	4	
Width (ft/m):	150 [45.7]	Strip Divergence (Each Side):	15%	TODA	8035	8035	Traffic Permitted:	IFR/VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	2.0%	ASDA	8035	8035	Scheduled Service:	Yes	
Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	7038	8035	ARFF Category (ICAO):	4	
Clearway:	None	Transitional Slope:	14.3%	Displaced Threshold	997	NIL	Port of Entry:	Yes	

Consultants

 **Stantec**

 **Aviotech**

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Professional Consulting Engineers

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- Note:
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2. Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.

3. Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

0 100 200 300 400 meters

1:8000

0 200 500 750 1000 1250 feet

drawing title

EXISTING LAYOUT AND OPERATION
GOVERNOR'S HARBOUR INTERNATIONAL (MYEM)
ELEUTHERA ISLAND

date

14 JULY 2014

revision

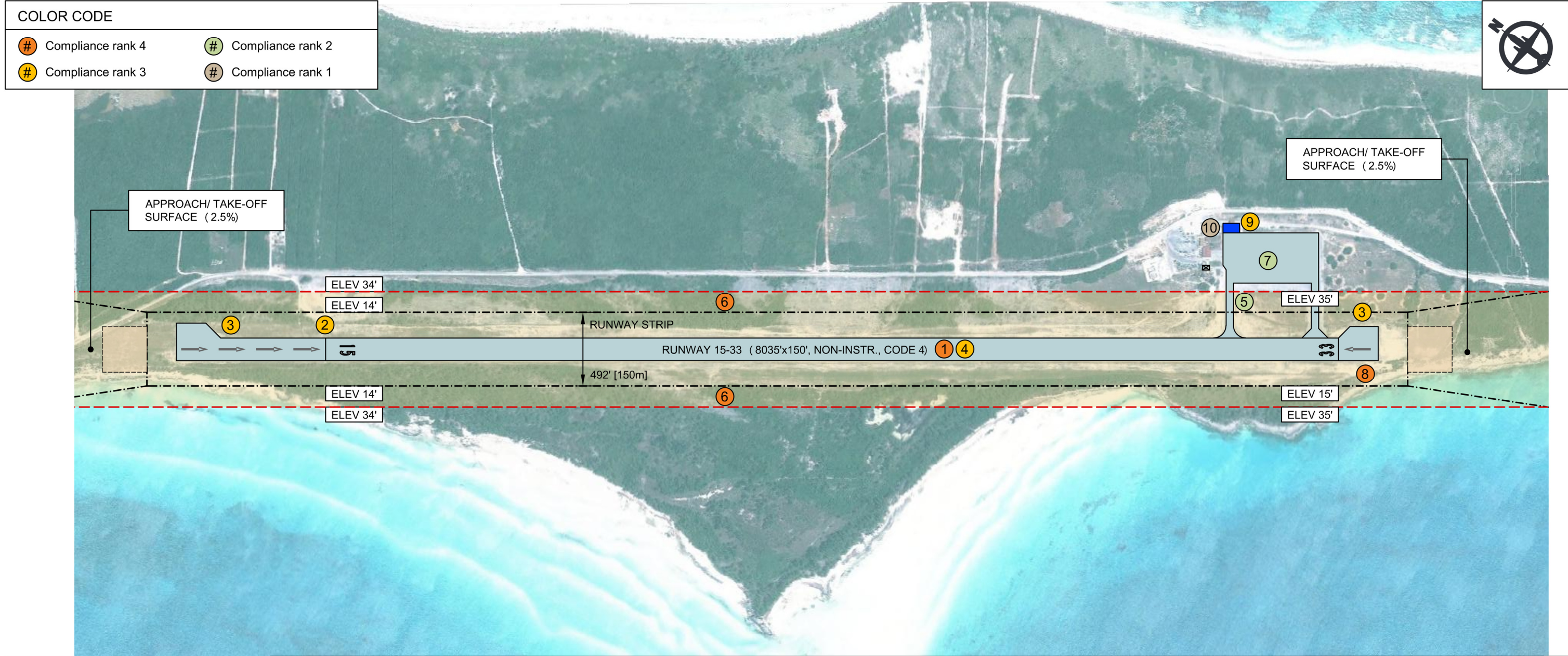
3

project no.

AP1302

exhibit

TIER 1
5-1



PROPOSED CAPITAL IMPROVEMENTS:

- 1

ELIMINATE INSTRUMENT APPROACH/ DEPARTURE PROCEDURES
- 2

REPLACE THRESHOLD/ END LIGHTS (NON-STANDARD LAYOUT)
- 3

NEW ILLUMINATED WIND DIRECTION INDICATOR
- 4

NEW RUNWAY MARKINGS
- 5

FILL TAXIWAY GRADED AREA AND PROVIDE PROPER SLOPES
- 6

REMOVE TREES AND VEGETATION FROM RUNWAY STRIP AND INFRINGING TRANSITION SURFACE

7

LOCALIZED REPAIRS TO AIRCRAFT APRON

8

DISPLACE RWY 33 THRESHOLD BY 265' (80.8m)

9

NEW AERODROME BEACON

10

TERMINAL BUILDING EXPANSION

LEGEND

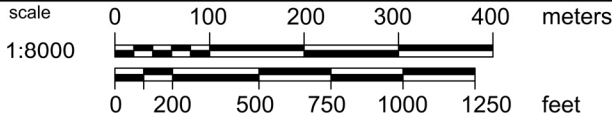
- Passenger Terminal Building
- ARFF Building
- Existing Pavement
- Proposed Pavement
- Future Runway End Safety Area
- OLS Limit Line
- Building Restriction Line (20' Height)

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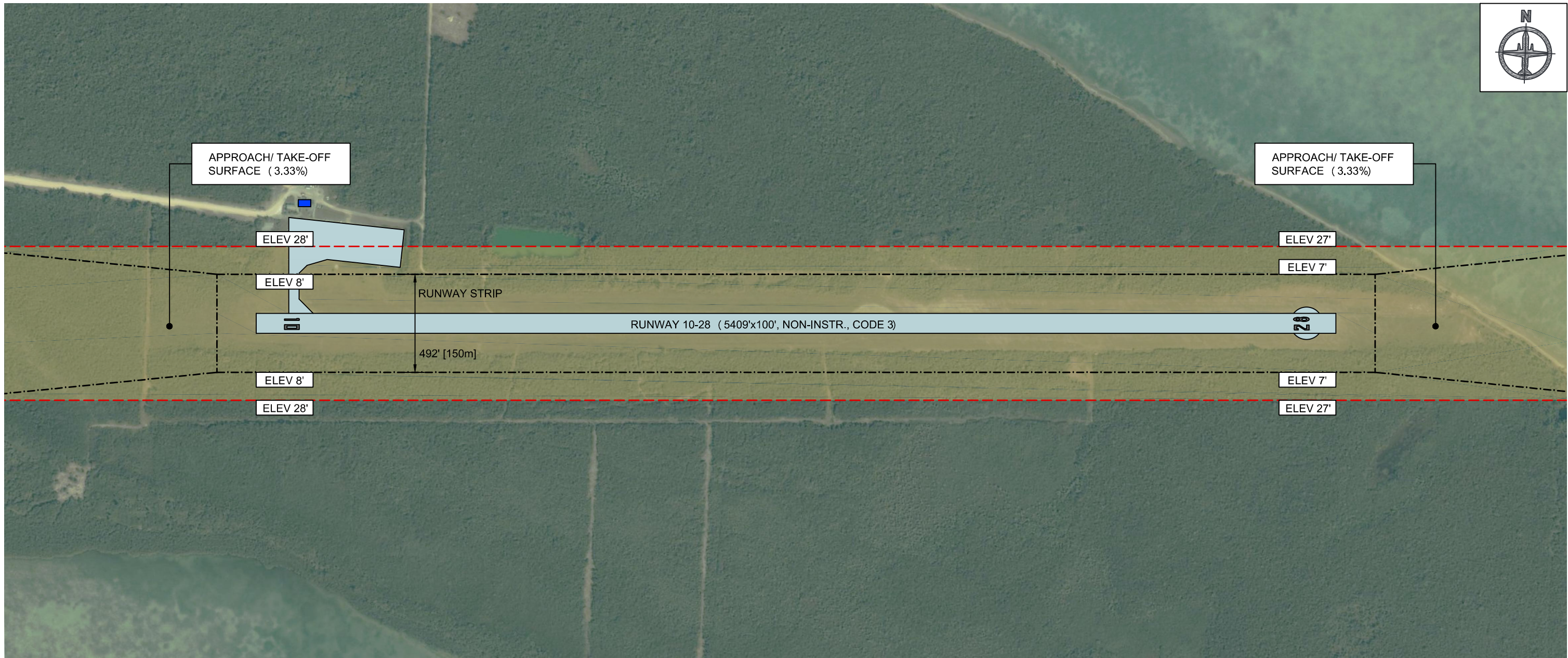
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project title
BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION



drawing title
PROPOSED LAYOUT AND CAPITAL PLAN
GOVERNOR'S HARBOUR INTERNATIONAL (MYEM)
ELEUTHERA ISLAND

date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 1 5-2



	RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
	Designation:	10-28	Runway Strip Width (ft/m):	492 [150]	RWY	10	28	Aerodrome Tier No.:	1	
	Length (ft/m):	5409 [1648.7]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	5409	5409	Runway Code (ICAO):	3	
	Width (ft/m):	100 [30.5]	Strip Divergence (Each Side):	10%	TODA	5409	5409	Traffic Permitted:	VFR	
	Surface Type:	Asphalt	Approach Slope (First Section):	3.33%	ASDA	5409	5409	Scheduled Service:	Yes	
	Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	5409	5409	ARFF Category (ICAO):	4	
	Clearway:	None	Transitional Slope:	14.3%	Displaced Threshold	NIL	NIL	Port of Entry:	Yes	

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Note:

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- Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.
- Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:6000

drawing title

EXISTING LAYOUT AND OPERATION
SOUTH BIMINI AIRPORT (MYBS)
BIMINI ISLAND

date

14 JULY 2014

revision

3

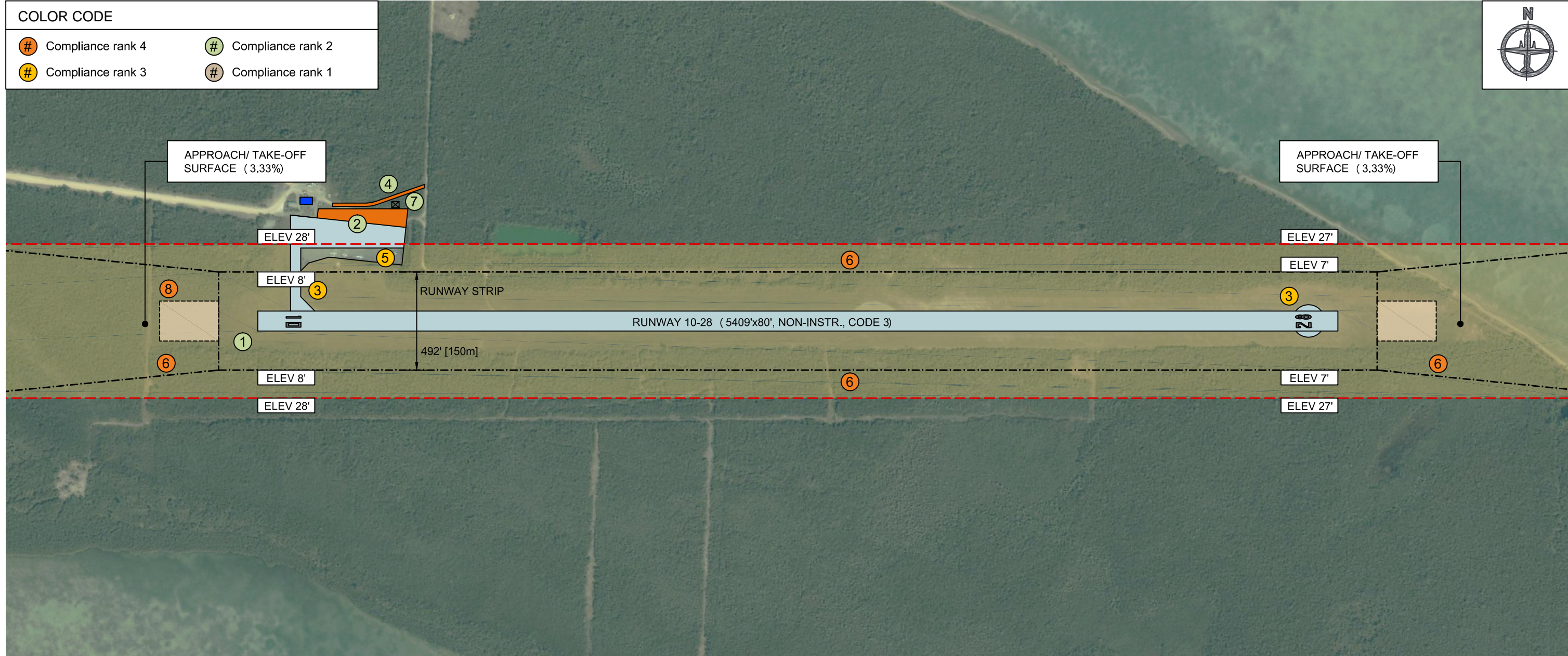
project no.

AP1302

exhibit

TIER 1
6-1

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PROPOSED CAPITAL IMPROVEMENTS:

- 1. FILL AND GRADE RUNWAY STRIP BEYOND RWY 10 THRESHOLD TO MINIMIZE FLOODING
- 2. EXPAND AIRCRAFT PARKING APRON AND LOCALIZED REPAIRS TO EXISTING APRON
- 3. WIND DIRECTION INDICATOR (FRANGIBLE)
- 4. RELOCATE PUBLIC ROADWAY
- 5. DECOMMISSION PORTION OF EXISTING GA APRON

- 6. REMOVE TREES AND VEGETATION INFRINGING TRANSITION SURFACE AND APPROACHES
- 7. NEW ARFF FIRE STATION
- 8. RELOCATE FENCING UNDER RWY 10 APPROACH SURFACE

LEGEND

- Passenger Terminal Building
- ARFF Building
- Existing Pavement
- Proposed Pavement
- Future Runway End Safety Area
- OLS Limit Line
- Building Restriction Line (20' Height)

Consultants

Stantec **Aviotech**

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project title

**BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION**

scale

1:6000

0 50 100 150 200 250 meters

0 200 500 750 feet

drawing title

**PROPOSED LAYOUT AND CAPITAL PLAN
SOUTH BIMINI AIRPORT (MYBS)
BIMINI ISLAND**

date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 1 6-2

Appendix A-2
July 17, 2014

Appendix A-2

AERODROME TECHNICAL ASSESSMENT – DEVELOPMENT PLANS – TIER 2



RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND	
Designation:	09-27	Runway Strip Width (ft/m):	492 [150]	RWY	09	27	Aerodrome Tier No.:	2	<div>■ Passenger Terminal Building</div> <div>⊠ ARFF Building</div> <div>■ Existing Pavement</div> <div>--- OLS Limit Line</div> <div>--- Building Restriction Line (20' Height)</div>	
Length (ft/m):	4980 [1517.9]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	4980	4980	Runway Code (ICAO):	3		
Width (ft/m):	100 [30.5]	Strip Divergence (Each Side):	10%	TODA	4980	4980	Traffic Permitted:	VFR		
Surface Type:	Asphalt	Approach Slope (First Section):	3.33%	ASDA	4980	4980	Scheduled Service:	Yes		
Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	4980	4980	ARFF Category (ICAO):	4		
Clearway:	None	Transitional Slope:	14.3%	Displaced Threshold	NIL	NIL	Port of Entry:	Yes		

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 - Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.
 - Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:5000

0 50 100 150 200 250 meters

0 200 500 750 feet

drawing title

EXISTING LAYOUT AND OPERATION
NEW BIGHT AIRPORT (MYCB)
CAT ISLAND

date

14 JULY 2014

revision

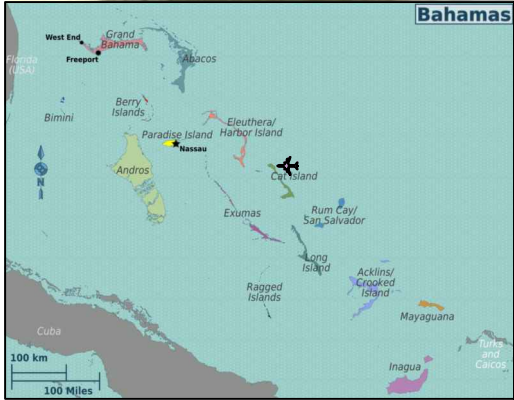
3

project no.

AP1302

exhibit

TIER 2
7-1



PROPOSED CAPITAL IMPROVEMENTS:

- 1 SELECTIVE REPAIRS TO RUNWAY PAVEMENT
- 2 REPAIRS TO RUNWAY EDGE LIGHTING
- 3 NEW SOLAR ILLUMINATED WIND DIRECTION INDICATOR
- 4 NEW RUNWAY MARKINGS
- 5 NEW AIRCRAFT TURN PAD (2)
- 6 REMOVE TREES AND VEGETATION INFRINGING TRANSITION SURFACE

- 7 NEW TAXIWAY CONNECTION WITH SOLAR EDGE LIGHTING
- 8 NEW AIRCRAFT PARKING APRON WITH SOLAR EDGE LIGHTING
- 9 NEW ARFF BUILDING AND DECOMMISSION EXISTING ARFF TRAILER
- 10 NEW ACCESS ROAD AND ARFF PARKING
- 11 DISPLACE RWY 09 THRESHOLD BY 423' (128.9)
- 12 DECOMMISSION AND REMOVE EXISTING APRON PAVEMENT

LEGEND

- Passenger Terminal Building
- ARFF Building
- Existing Pavement
- Proposed Pavement
- OLS Limit Line
- Building Restriction Line (20' Height)



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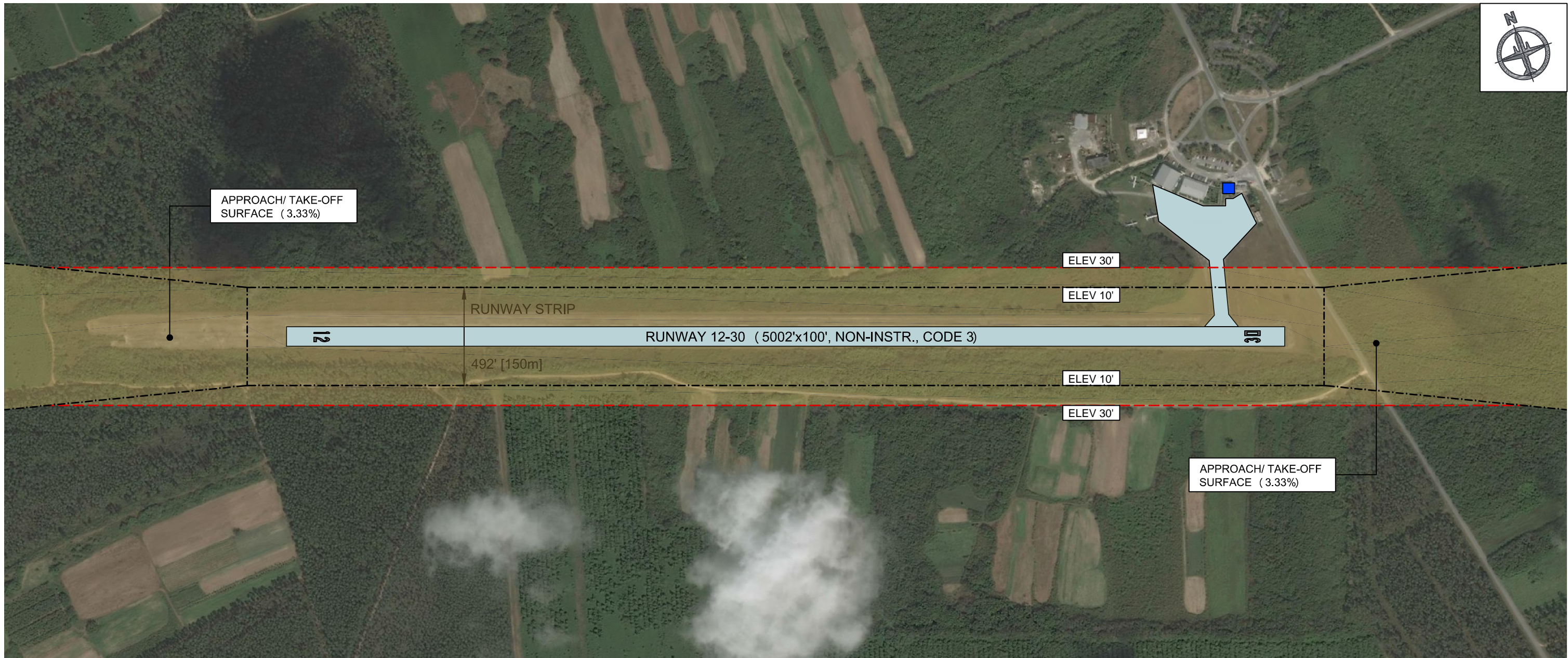
Note:
1. Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation.
2. As of February BCAD is currently installing airport perimeter security fencing to resolve serious wildlife control issues

project title
BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale
1:5000
0 50 100 150 200 250 meters
0 200 500 750 feet

drawing title
PROPOSED LAYOUT AND CAPITAL PLAN
NEW BIGHT AIRPORT (MYCB)
CAT ISLAND

date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 2 7-2



RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	12-30	Runway Strip Width (ft/m):	492 [150]	RWY	12	30	Aerodrome Tier No.:	2	
Length (ft/m):	5002 [1524.6]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	5002	5002	Runway Code (ICAO):	3	
Width (ft/m):	100 [30.5]	Strip Divergence (Each Side):	10%	TODA	5002	5002	Traffic Permitted:	VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	3.33%	ASDA	5002	5002	Scheduled Service:	Yes	
Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	5002	5002	ARFF Category (ICAO):	N/A	
Clearway:	None	Transitional Slope:	14.3%	Displaced Threshold	NIL	NIL	Port of Entry:	Yes	

Consultants

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 - Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.
 - Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:6000

0 50 100 150 200 250 meters

0 200 500 750 feet

drawing title

EXISTING LAYOUT AND OPERATION
SAN ANDROS INTERNATIONAL (MYAN)
ANDROS ISLAND

date

14 JULY 2014

revision

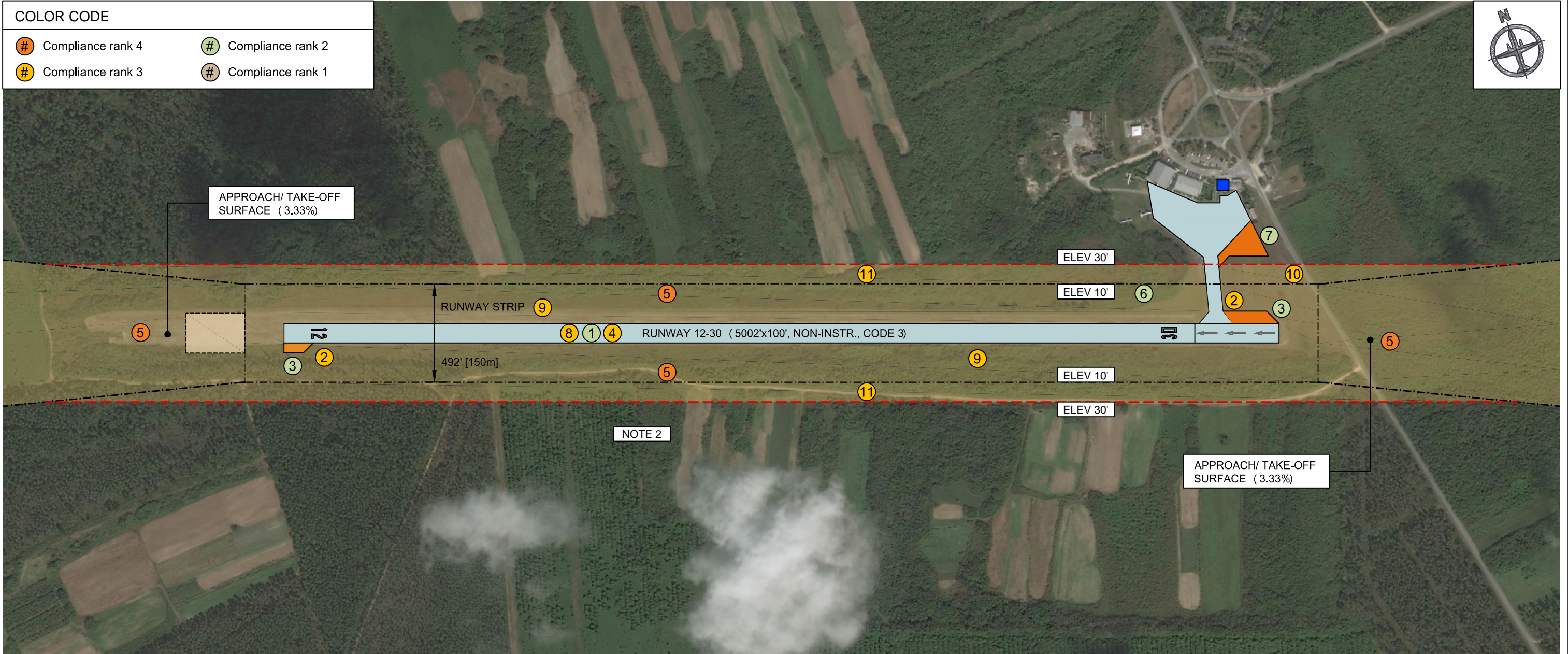
3

project no.

AP1302

exhibit

TIER 2
8-1



PROPOSED CAPITAL IMPROVEMENTS:

- REHABILITATE FULL RUNWAY AND TAXIWAY PAVEMENT
- NEW SOLAR ILLUMINATED WIND DIRECTION INDICATOR (2)
- NEW AIRCRAFT TURN PAD
- NEW RUNWAY MARKINGS
- REMOVE TALL TREES AND HEAVY VEGETATION FROM RUNWAY STRIP AND INFRINGING TRANSITION SURFACE AND APPROACHES AND REGRADE RUNWAY STRIP
- FILL-IN WET LAND AREA ENCROACHING RUNWAY STRIP

- EXPAND AIRCRAFT PARKING APRON
- NEW SOLAR RUNWAY EDGE, THRESHOLD/ END LIGHTING AND DECOMMISSIONING OF EXISTING LIGHTING SYSTEM
- NEW PAPI INSTALLATION (EACH APPROACH)
- NEW PERIMETER SECURITY FENCE IN SELECT AREAS
- NEW 3-STRAND WILDLIFE CONTROL FENCING AROUND AIRPORT PERIMETER

LEGEND

- Passenger Terminal Building
- Existing Pavement
- Proposed Pavement
- Future Runway End Safety Area
- OLS Limit Line
- Building Restriction Line (20' Height)

Consultants



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Note:

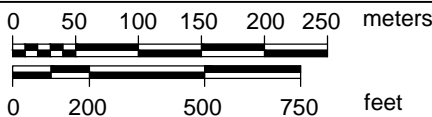
- Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation.
- BCAD should ensure that local farmer(s) discontinue use of farm land and farm access roads which encroach into the critical airport zoning area.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:6000



drawing title

PROPOSED LAYOUT AND CAPITAL PLAN
SAN ANDROS INTERNATIONAL (MYAN)
ANDROS ISLAND

date

14 JULY 2014

revision

3

project no.

AP1302

exhibit

TIER 2
8-2



RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	09-27	Runway Strip Width (ft/m):	984 [300]	RWY	09	27	Aerodrome Tier No.:	2	<div>Passenger Terminal Building</div> <div>ARFF Building</div> <div>Pavement</div> <div>OLS Limit Line</div> <div>Building Restriction Line (20' Height)</div>
Length (ft/m):	7213 [2198.5]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	7213	7213	Runway Code (ICAO):	4	
Width (ft/m):	150 [45.7]	Strip Divergence (Each Side):	15%	TODA	7213	7213	Traffic Permitted:	IFR/VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	2.0%	ASDA	7213	7213	Scheduled Service:	Yes	
Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	7213	7213	ARFF Category (ICAO):	N/A	
Clearway:	None	Transitional Slope:	14.3%	Displaced Threshold	NIL	NIL	Port of Entry:	Yes	

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- Note:
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 - Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.
 - Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

0 100 200 300 400 meters

1:8000

0 200 500 750 1000 1250 feet

drawing title

EXISTING LAYOUT AND OPERATION
ROCK SOUND AIRPORT (MYER)
ELEUTHERA ISLAND

date

14 JULY 2014

revision

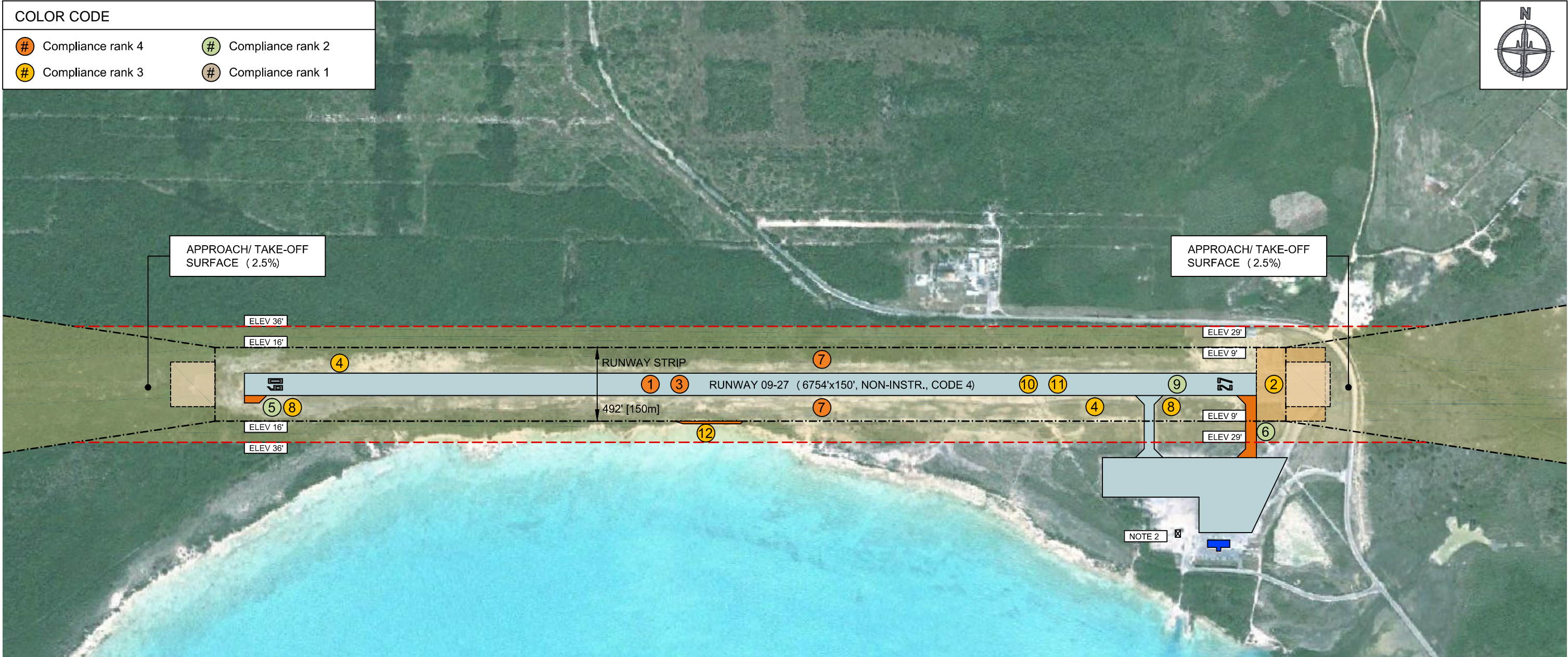
3

project no.

AP1302

exhibit

TIER 2
9-1



PROPOSED CAPITAL IMPROVEMENTS:

- 1 REDUCE RUNWAY TO 6754' LENGTH
- 2 NEW 492'x460' CLEAR WAY
- 3 ELIMINATE INSTRUMENT APPROACH/ DEPARTURE PROCEDURES
- 4 NEW PAPI INSTALLATION (EACH APPROACH)
- 5 NEW AIRCRAFT TURN PAD
- 6 RELOCATE TAXIWAY CONNECTION

- 7 REMOVE TREES AND VEGETATION FROM RUNWAY STRIP AND REGRADE
- 8 NEW SOLAR ILLUMINATED WIND DIRECTION INDICATOR
- 9 REHABILITATE PORTION OF PAVEMENT FROM RUNWAY RWY 27 THRESHOLD TO 1000'
- 10 REPLACE RUNWAY EDGE/ THRESHOLD/ END LIGHTING WITH SOLAR FIXTURES
- 11 NEW PAVEMENT MARKING
- 12 CONSTRUCT 500' OF SEA WALL AND IN-FILL RUNWAY STRIP AREA

LEGEND

- Passenger Terminal Building
- ARFF Building
- Existing Pavement
- Proposed Pavement
- Clearway
- Future Runway End Safety Area
- OLS Limit Line
- Building Restriction Line (20' Height)

Consultants



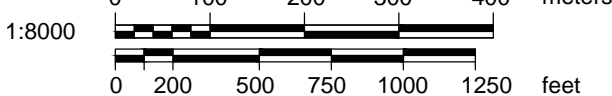
Note:

1. Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation.
2. In area of ARFF Building, soils may need to be remediated due to past fuel spills/ leaks. Soil investigations should be undertaken by BCAD.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale



drawing title

PROPOSED LAYOUT AND CAPITAL PLAN
ROCK SOUND INTERNATIONAL AIRPORT (MYER)
ELEUTHERA ISLAND

date

14 JULY 2014

revision

3

project no.

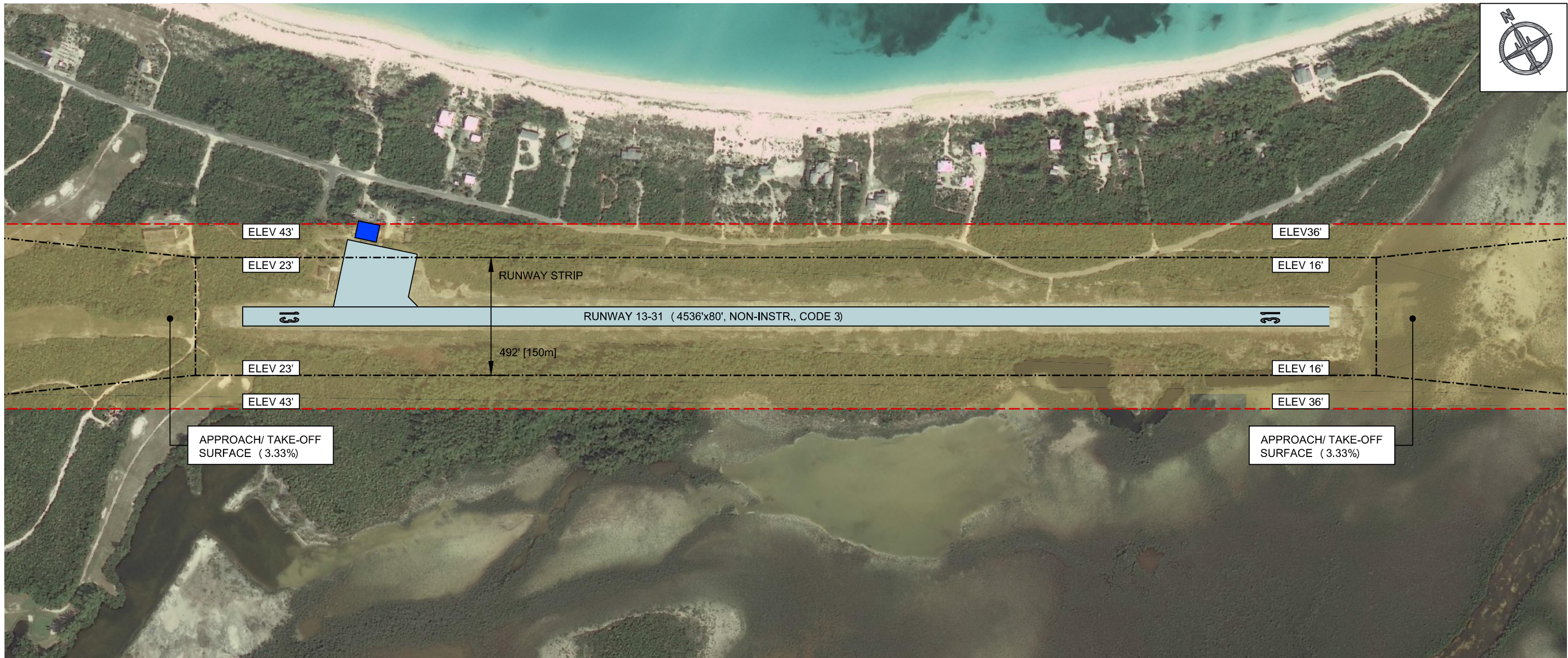
AP1302

exhibit

TIER 2
9-2

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RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	13-31	Runway Strip Width (ft/m):	492 [150]	RWY	13	31	Aerodrome Tier No.:	2	
Length (ft/m):	4536 [1382.6]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	4536	4536	Runway Code (ICAO):	3	
Width (ft/m):	80 [24.4]	Strip Divergence (Each Side):	10%	TODA	4536	4536	Traffic Permitted:	VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	3.33%	ASDA	4536	4536	Scheduled Service:	Yes	
Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	4536	4536	ARFF Category (ICAO):	N/A	
Clearway:	None	Transitional Slope:	14.3%	Displaced Threshold	NIL	NIL	Port of Entry:	Yes	

Consultants

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Professional Consulting Engineers

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 - Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.
 - Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:5000

0 50 100 150 200 250 meters

0 200 500 750 feet

drawing title

EXISTING LAYOUT AND OPERATION
GREAT HARBOUR CAY AIRPORT (MYBG)
BERRY ISLANDS

date

14 JULY 2014

revision

3

project no.

AP1302

exhibit

TIER 2
10-1



PROPOSED CAPITAL IMPROVEMENTS:

- REDUCE RUNWAY TO 3936' (ICAO CODE 2)
- NEW 262'x380' CLEAR WAY
- NEW 100'x220' STOP WAY
- NEW PAPI INSTALLATION (EACH APPROACH)
- NEW AIRCRAFT TURN PAD
- NEW AIRCRAFT PARKING APRON AND TAXIWAY CONNECTION

- REMOVE TALL TREES AND HEAVY VEGETATION FROM RUNWAY STRIP AND TRANSITION SURFACE AND REGRADE RUNWAY GRADED AREA
- NEW TERMINAL BUILDING AND ASSOCIATED PARKING LOTS
- DEMOLISH EXISTING TERMINAL, STORAGE BUILDING AND CUSTOMS AND IMMIGRATION FACILITY
- RELOCATE PUBLIC ROAD WAY
- COMPLETE PERIMETER SECURITY FENCING ALONG NORTH AND WEST SIDES
- REINSTALL SOLAR RUNWAY THRESHOLD/ END LIGHTING

LEGEND

- | | |
|-----|--|
| ■ | Passenger Terminal Building |
| ■ | Existing Pavement |
| ■ | Proposed Pavement |
| ■ | Clearway |
| ■ | Stopway |
| ■ | Future Runway End Safety Area |
| --- | OLS Limit Line |
| --- | Building Restriction Line (20' Height) |

Consultants



Note:

- Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation.
- Runway width should be increased to 100' [30.5m] per ICAO Annex 14 during next pavement rehabilitation.

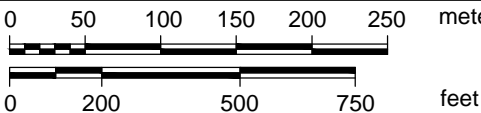
project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

drawing title

PROPOSED LAYOUT AND CAPITAL PLAN
GREAT HARBOUR CAY AIRPORT (MYBG)
BERRY ISLANDS

scale



date

14 JULY 2014

revision

3

project no.

AP1302

exhibit

TIER 2
10-2

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RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	09-27	Runway Strip Width (ft/m):	492 [150]	RWY	09	27	Aerodrome Tier No.:	3	
Length (ft/m):	4000 [1219.2]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	4000	4000	Runway Code (ICAO):	3	
Width (ft/m):	100 [30.5]	Strip Divergence (Each Side):	10%	TODA	4000	4000	Traffic Permitted:	VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	3.33%	ASDA	4000	4000	Scheduled Service:	Yes	
Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	4000	4000	ARFF Category (ICAO):	N/A	
Clearway:	None	Transitional Slope:	14.3%	Displaced Threshold	NIL	NIL	Port of Entry:	No	

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 - Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.
 - Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:4000

0

50

100

150

200

meters

0

100

250

375

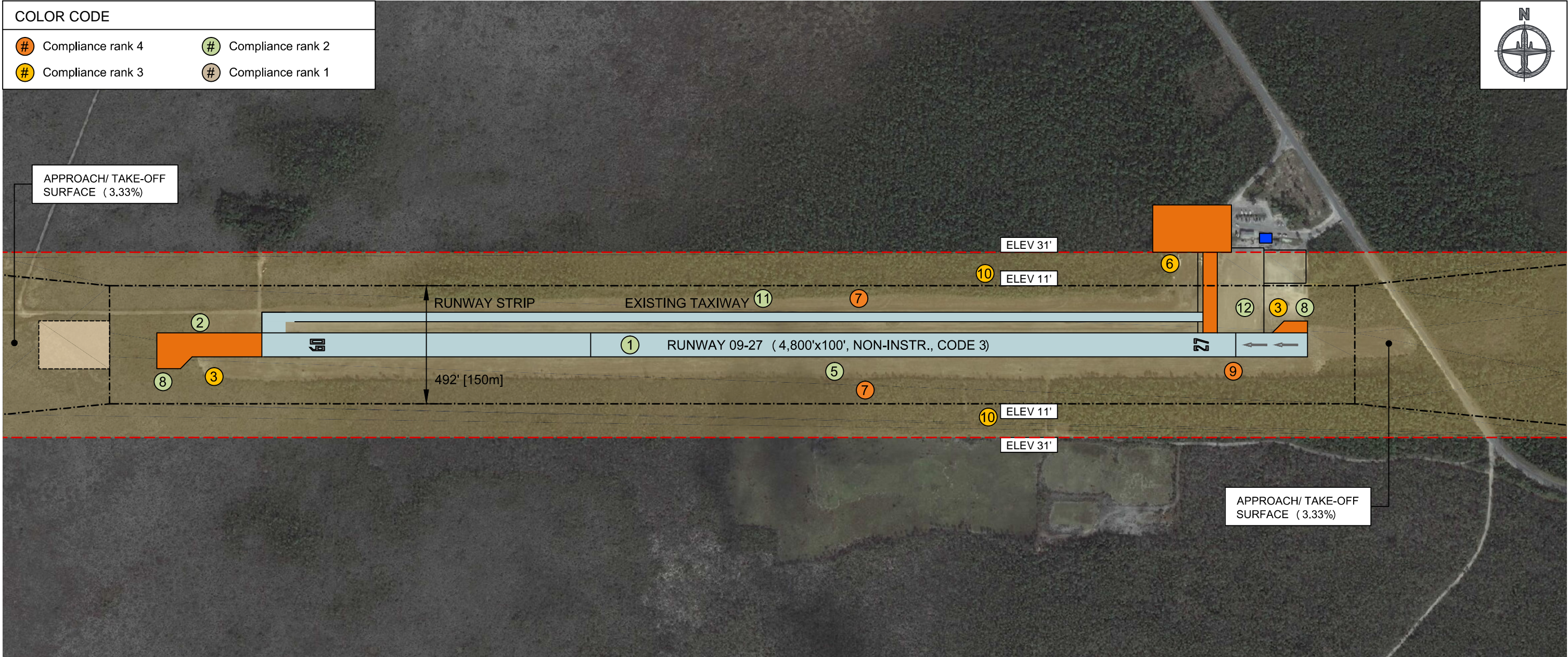
500

625

feet

drawing title			
EXISTING LAYOUT AND OPERATION DEADMAN'S CAY AIRPORT (MYLD) LONG ISLAND			
date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 2 11-1







RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	10-28	Runway Strip Width (ft/m):	492 [150]	RWY	10	28	Aerodrome Tier No.:	2	
Length (ft/m):	7020 [2139.7]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	7020	7020	Runway Code (ICAO):	4	
Width (ft/m):	100 [30.5]	Strip Divergence (Each Side):	10%	TODA	7020	7020	Traffic Permitted:	VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	2.5%	ASDA	7020	7020	Scheduled Service:	Yes	
Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	7020	7020	ARFF Category (ICAO):	N/A	
Clearway:	None	Transitional Slope:	14.3%	Displaced Threshold	NIL	NIL	Port of Entry:	Yes	

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 - Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:8000

0100200300400meters

020050075010001250feet

drawing title

EXISTING LAYOUT AND OPERATION
MATTHEW TOWN AIRPORT (MYIG)
INAGUA ISLAND

date

14 JULY 2014

revision

3

project no.

AP1302

exhibit

TIER 2
13-1



PROPOSED CAPITAL IMPROVEMENTS:

- REHABILITATE FULL RUNWAY PAVEMENT
- REPLACE THRESHOLD/ END LIGHTS (NON-STANDARD LAYOUT)
- NEW SOLAR ILLUMINATED WIND DIRECTION INDICATOR
- NEW RUNWAY MARKINGS
- NEW PAPI INSTALLATION (RWY 10 APPROACH)
- REMOVE TREES AND VEGETATION FROM RUNWAY STRIP AND INFRINGING TRANSITION SURFACE

- NEW AIRCRAFT PARKING APRON AND TAXIWAY CONNECTION (INCL. SOLAR EDGE LIGHTING)
- NEW PASSENGER TERMINAL BUILDING
- NEW 328'x492' CLEARWAY AT RWY 10 APPROACH
- NEW 492'x492' CLEARWAY AT RWY 28 APPROACH

LEGEND

- | | |
|-----|--|
| ■ | Passenger Terminal Building |
| ■ | Existing Pavement |
| ■ | Proposed Pavement |
| ■ | Clearway |
| ■ | Future Runway End Safety Area |
| --- | OLS Limit Line |
| --- | Building Restriction Line (20' Height) |

Consultants



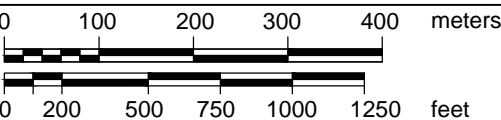
Note:

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- Certain U.S. Coast Guard facilities and equipment are also obstacles within the runway strip and / or infringe the transition surface.
- BCAD should establish a memorandum of understanding with the U.S. Coast Guard for use of thier ARFF equipment and personnel in the event of an aircraft emergency.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale
1:8000



drawing title

PROPOSED LAYOUT AND CAPITAL PLAN
MATTHEW TOWN AIRPORT (MYIG)
INAGUA ISLAND

date

14 JULY 2014

revision

3

project no.

AP1302

exhibit

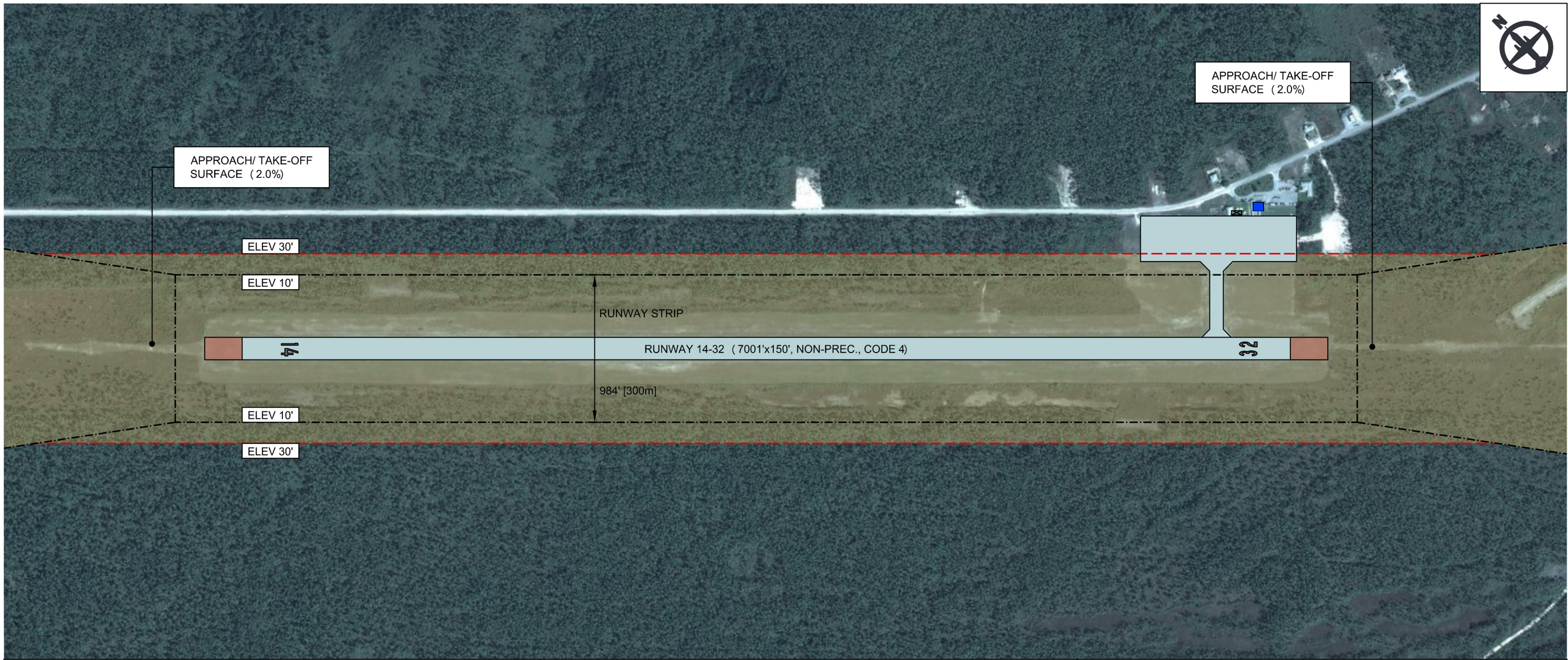
TIER 2
13-2

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Appendix A-3
July 17, 2014

Appendix A-3

AERODROME TECHNICAL ASSESSMENT – DEVELOPMENT PLANS – TIER 3



RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	14-32	Runway Strip Width (ft/m):	984 [300]	RWY	14	32	Aerodrome Tier No.:	3	
Length (ft/m):	7001 [2133.9]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	7001	7001	Runway Code (ICAO):	4	
Width (ft/m):	150 [45.7]	Strip Divergence (Each Side):	15%	TODA	7001	7001	Traffic Permitted:	IFR/VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	2.0%	ASDA	7251	7251	Scheduled Service:	Yes	
Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	7001	7001	ARFF Category (ICAO):	4	
Clearway:	None	Transitional Slope:	14.3%	Displaced Threshold	NIL	NIL	Port of Entry:	Yes	

Consultants

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 - Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

0 100 200 300 400 meters

1:8000

0 200 500 750 1000 1250 feet

drawing title

EXISTING LAYOUT AND OPERATION
TREASURE CAY AIRPORT (MYAT)
ABACO ISLAND

date

14 JULY 2014

revision

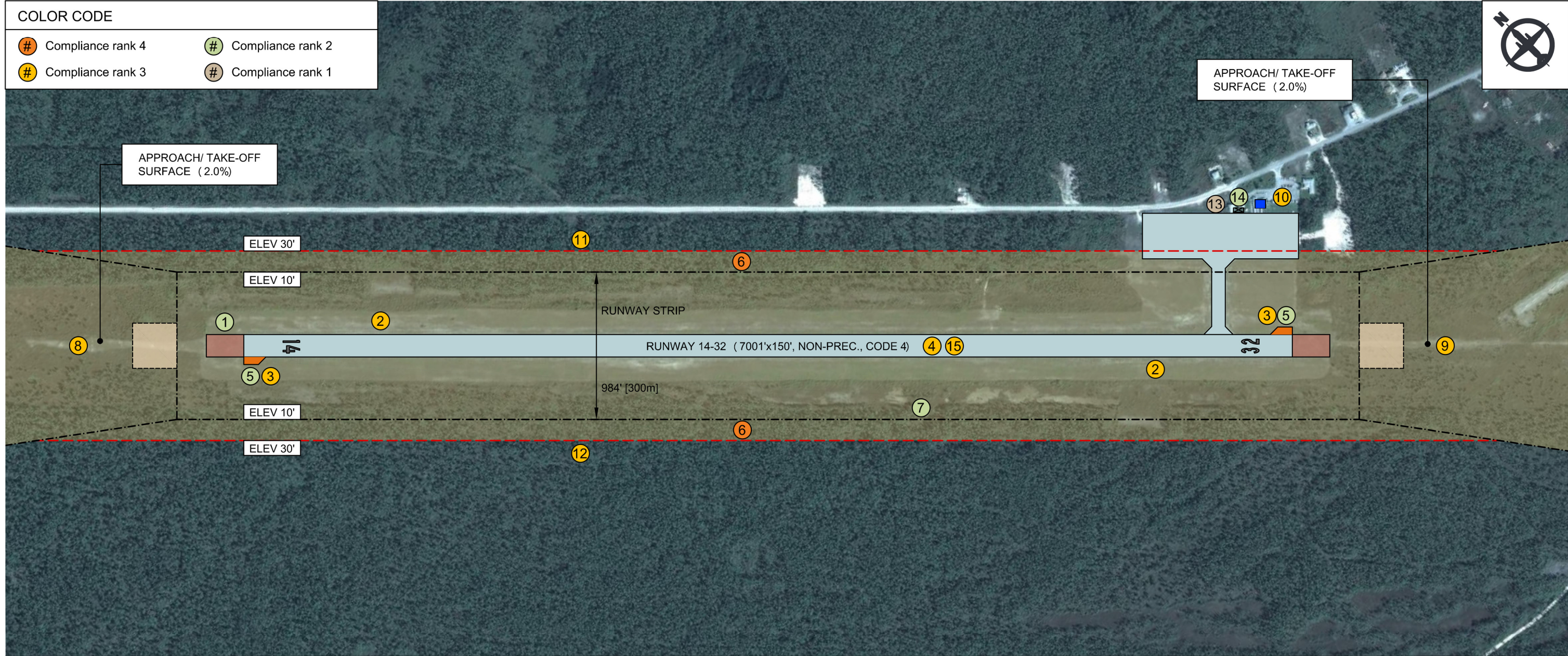
3

project no.

AP1302

exhibit

TIER 3
14-1



PROPOSED CAPITAL IMPROVEMENTS:

- REHABILITATE STOPWAY PAVEMENT
- REPLACE PRECISION APPROACH PATH INDICATORS (PAPI)
- NEW WIND DIRECTION INDICATOR (2)
- NEW RUNWAY MARKINGS
- NEW AIRCRAFT TURN PAD (2)
- REMOVE TREES AND VEGETATION FROM RUNWAY STRIP AND INFRINGING TRANSITION SURFACE AND APPROACHES
- INFILL WETLAND AREAS AND REGRADE RUNWAY STRIP. REMOVE DEBRIS.

- REPAIRS TO RWY 14 APPROACH LIGHTING
- REPLACE RWY 32 APPROACH LIGHTING (CURRENT NON-COMPLIANCE)
- NEW AERODROME BEACON
- NEW PERIMETER SECURITY FENCING
- NEW THREE STRAND WILDLIFE CONTROL FENCING
- NEW APRON FLOOD LIGHTING
- RECONSTRUCT ARFF BUILDING
- GENERAL REPAIRS TO RUNWAY EDGE, THRESHOLD/ END LIGHTING

LEGEND

- | | |
|--|--|
| | Passenger Terminal Building |
| | ARFF Building |
| | Existing Pavement |
| | Proposed Pavement |
| | Stopway |
| | Future Runway End Safety Area |
| | OLS Limit Line |
| | Building Restriction Line (20' Height) |

Consultants

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Notes:

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project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

0 100 200 300 400 meters

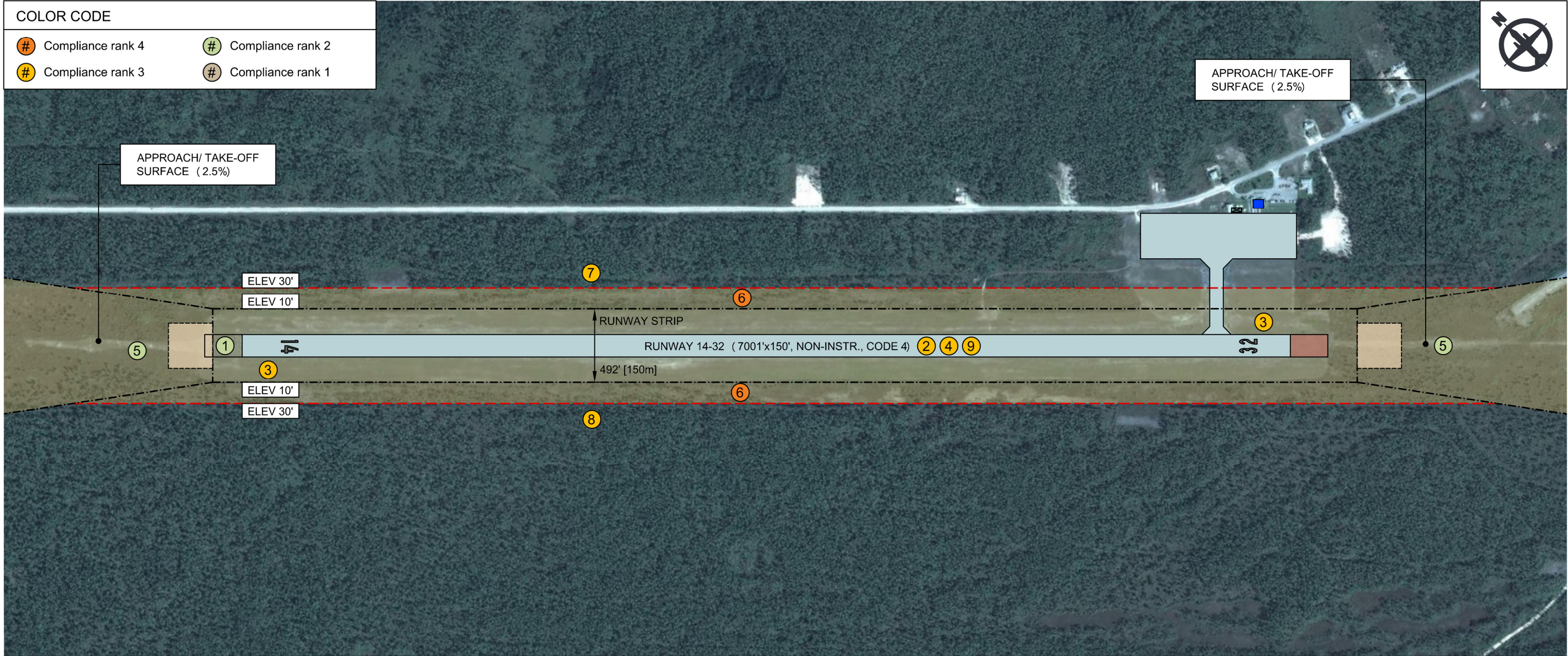
1:8000

0 200 500 750 1000 1250 feet

drawing title

PROPOSED LAYOUT AND CAPITAL PLAN - ALTERNATIVE 1
TREASURE CAY AIRPORT (MYAT)
ABACO ISLAND

date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 3 14-2



PROPOSED CAPITAL IMPROVEMENTS:

1

DECOMMISSION STOPWAY AND ASSOCIATED PAVEMENT

2

CHANGE RUNWAY OPERATIONS TO STRICTLY VFR

3

NEW WIND DIRECTION INDICATOR (2)

4

NEW RUNWAY MARKINGS

5

DECOMMISSION/ REMOVE APPROACH LIGHTING (BOTH APPROACH)

6

REMOVE TREES AND VEGETATION FROM RUNWAY STRIP AND INFRINGING TRANSITION SURFACE AND APPROACHES

7

NEW PERIMETER SECURITY FENCING

8

NEW THREE STRAND WILDLIFE CONTROL FENCING

9

GENERAL REPAIRS TO RUNWAY EDGE, THRESHOLD/ END LIGHTING

LEGEND

Passenger Terminal Building

ARFF Building

Existing Pavement

Stopway

Future Runway End Safety Area

OLS Limit Line

Building Restriction Line (20' Height)

Consultants

Stantec

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Professional Consulting Engineers

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Notes:

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project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

0 100 200 300 400 meters

1:8000

0 200 500 750 1000 1250 feet

drawing title

PROPOSED LAYOUT AND CAPITAL PLAN - ALTERNATIVE 2
TREASURE CAY AIRPORT (MYAT)
ABACO ISLAND

date

14 JULY 2014

revision

3

project no.

AP1302

exhibit

TIER 3
14-3



RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	06-24	Runway Strip Width (ft/m):	492 [150]	RWY	06	24	Aerodrome Tier No.:	3	
Length (ft/m):	4175 [1272.5]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	4175	4175	Runway Code (ICAO):	3	
Width (ft/m):	100 [30.5]	Strip Divergence (Each Side):	10%	TODA	4175	4175	Traffic Permitted:	VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	3.33%	ASDA	4175	4175	Scheduled Service:	Yes	
Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	4175	4175	ARFF Category (ICAO):	N/A	
Clearway:	None	Transitional Slope:	14.3%	Displaced Threshold	NIL	NIL	Port of Entry:	No	

Consultants

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- Note:
1. Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation.

2. Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.

3. As of February 2014, the airport was under construction, with a new 6170' runway. An assessment should be undertaken once completed.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

0 50 100 150 200 250 meters

1:5000

0 200 500 750 feet

drawing title

EXISTING LAYOUT AND OPERATION
MAYAGUANA AIRPORT (MYMM)
MAYAGUANA ISLAND

date

14 JULY 2014

revision

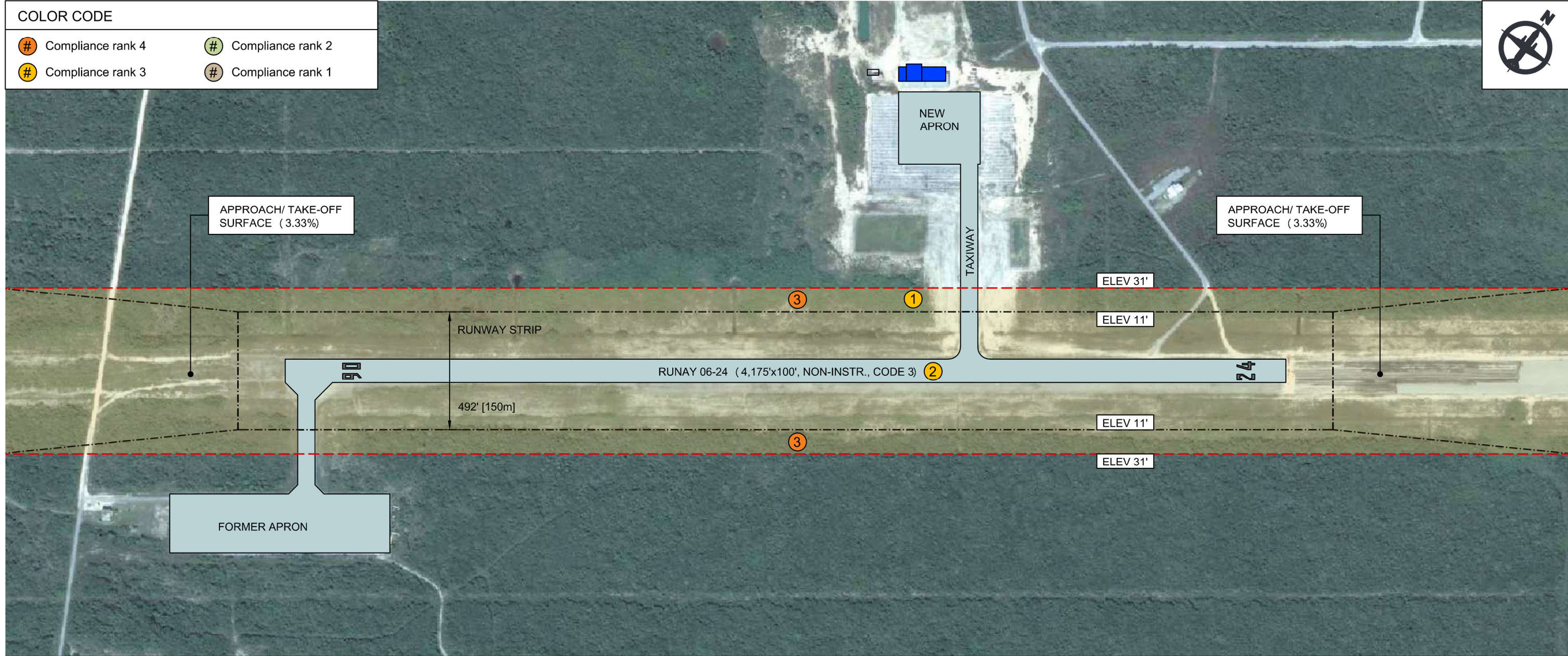
3

project no.

AP1302

exhibit

TIER 3
15-1



PROPOSED CAPITAL IMPROVEMENTS:

- 1

NEW SOLAR ILLUMINATED WIND DIRECTION INDICATOR
- 2

NEW RUNWAY MARKINGS
- 3

REMOVE TREES AND VEGETATION INFRINGING TRANSITION SURFACE

LEGEND

- Passenger Terminal Building
- Existing Pavement
- OLS Limit Line
- Building Restriction Line (20' Height)

Consultants

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Note:

1.

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2.

A revised capital plan should be prepared once a reassessment is undertaken following completion of the current airport construction program.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

050100150200250

 meters

1:5000

0200500750

 feet

drawing title			
PROPOSED LAYOUT AND CAPITAL PLAN MAYAGUANA AIRPORT (MYMM) MAYAGUANA ISLAND			
date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 3 15-2



RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	09-27	Runway Strip Width (ft/m):	492 [150]	RWY	09	27	Aerodrome Tier No.:	3	
Length (ft/m):	4500 [1371.6]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	4500	4500	Runway Code (ICAO):	3	
Width (ft/m):	100 [30.5]	Strip Divergence (Each Side):	10%	TODA	5000	5000	Traffic Permitted:	VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	3.33%	ASDA	4500	4500	Scheduled Service:	No	
Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	4500	4500	ARFF Category (ICAO):	N/A	
Clearway:	500' (09), 500' (27)	Transitional Slope:	14.3%	Displaced Threshold	NIL	NIL	Port of Entry:	No	

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- Notes:
1. Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation.

2. Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.

3. Based on an airport site assessment, the current runway strip, approach/ take-off surfaces and clearways contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

0 50 100 150 200 250 meters

1:5000

0 200 500 750 feet

drawing title			
EXISTING LAYOUT AND OPERATION NEW PORT NELSON AIRPORT (MYRP) RUM CAY ISLAND			
date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 3 16-1



PROPOSED CAPITAL IMPROVEMENTS:

- 1

SELECTIVE REPAIRS TO RUNWAY PAVEMENT
- 2

NEW SOLAR RUNWAY EDGE, THRESHOLD/ END LIGHTING
- 3

NEW SOLAR ILLUMINATED WIND DIRECTION INDICATOR
- 4

NEW RUNWAY MARKINGS (CURRENT NON-COMPLIANCE)
- 5

TAXIWAY HOLDING MARKING
- 6

REMOVE TREES AND VEGETATION FROM RUNWAY STRIP AND INFRINGING TRANSITION SURFACE AND APPROACHES

- 7

THREE STRAND WILDLIFE CONTROL FENCE AROUND AIRPORT PERIMETER
- 8

DISPLACE RWY 27 THRESHOLD BY 120' (36.6m) AND INSTALL NEW SOLAR THRESHOLD LIGHTING

LEGEND

- Passenger Waiting Area
- Existing Pavement
- Clearway
- Future Runway End Safety Area
- OLS Limit Line
- Building Restriction Line (20' Height)

Consultants



Note:
1. Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation.

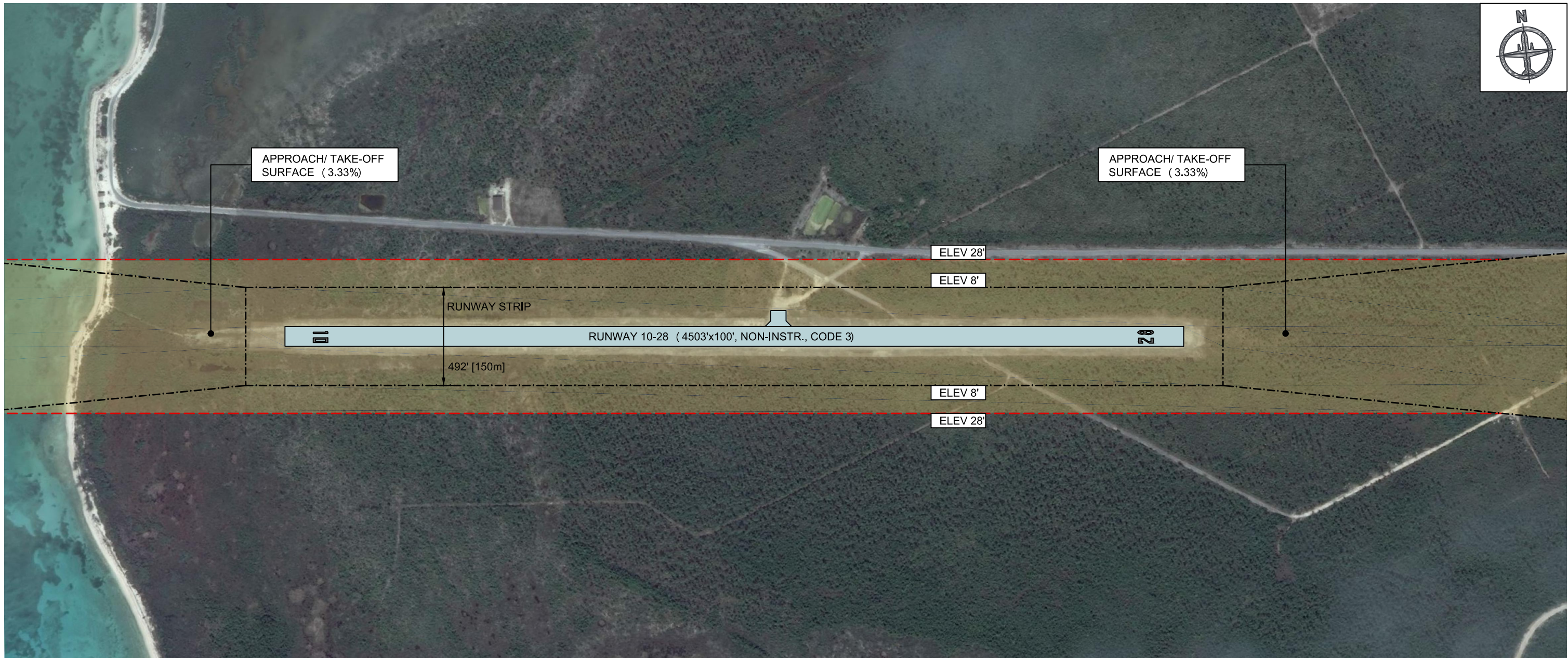
project title
BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

drawing title
PROPOSED LAYOUT AND CAPITAL PLAN
NEW PORT NELSON AIRPORT (MYRP)
RUM CAY ISLAND

scale
1:5000
0 50 100 150 200 250 meters
0 200 500 750 feet

date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 3 16-2

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RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	10-28	Runway Strip Width (ft/m):	492 [150]	RWY	10	28	Aerodrome Tier No.:	3	<div>Existing Pavement</div> <div>OLS Limit Line</div> <div>Building Restriction Line (20' Height)</div>
Length (ft/m):	4503 [1372.5]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	4503	4503	Runway Code (ICAO):	3	
Width (ft/m):	100 [30.5]	Strip Divergence (Each Side):	10%	TODA	4503	4503	Traffic Permitted:	VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	3.33%	ASDA	4503	4503	Scheduled Service:	No	
Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	4503	4503	ARFF Category (ICAO):	N/A	
Clearway:	None	Transitional Slope:	14.3%	Displaced Threshold	NIL	NIL	Port of Entry:	No	

Consultants

 **Stantec**

 **Aviotech**

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- Note:
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 - Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.
 - Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:6000

0 50 100 150 200 250 meters

0 200 500 750 feet

drawing title

EXISTING LAYOUT AND OPERATION
SANDY POINT AIRPORT (MYAS)
ABACO ISLAND

date

14 JULY 2014

revision

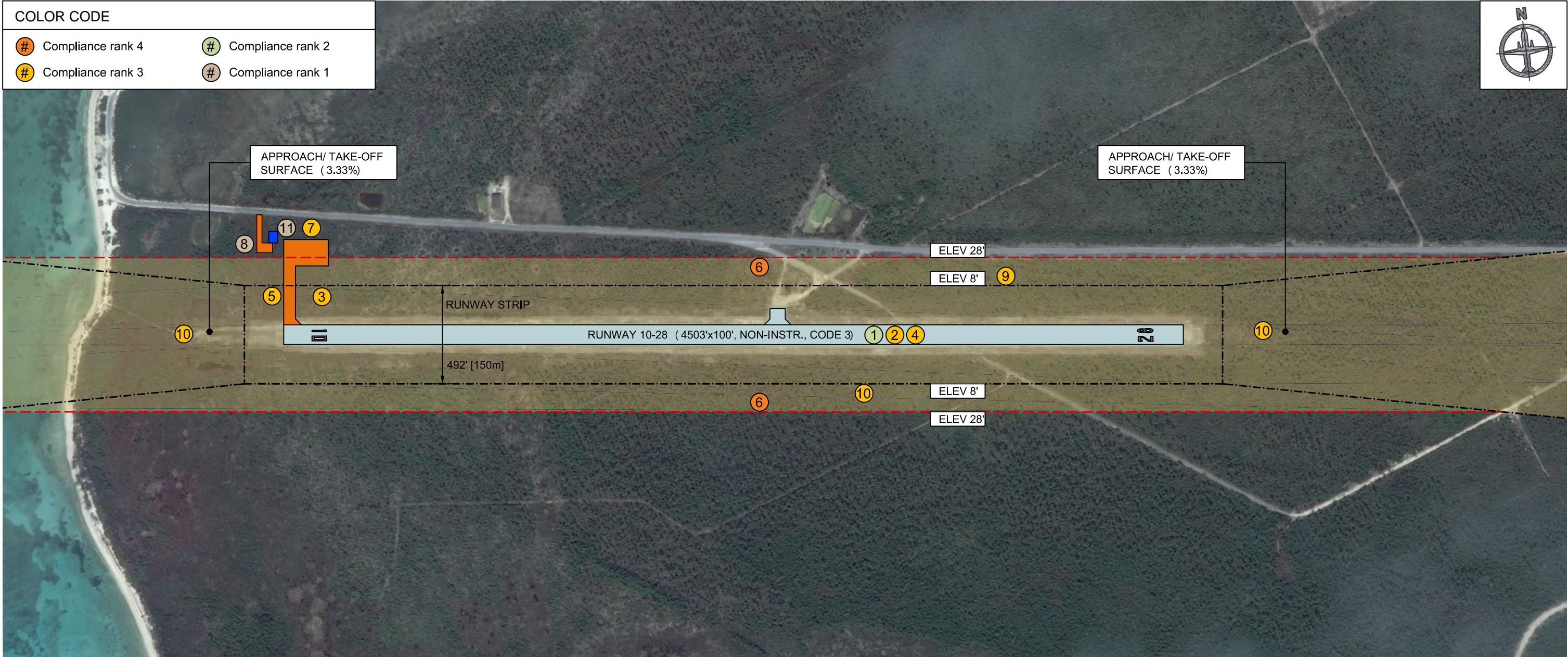
3

project no.

AP1302

exhibit

TIER 3
17-1



PROPOSED CAPITAL IMPROVEMENTS:

- REHABILITATION OF FULL RUNWAY PAVEMENT
- REPAIRS TO RUNWAY EDGE AND THRESHOLD/ END LIGHTS
- NEW SOLAR ILLUMINATED WIND DIRECTION INDICATOR
- NEW RUNWAY MARKINGS
- NEW TAXIWAY CONNECTION WITH SOLAR EDGE LIGHTING
- REMOVE TREES AND VEGETATION AND ABANDONED AIRCRAFT FROM RUNWAY STRIP AND INFRINGING TRANSITION SURFACE AND APPROACHES

- NEW AIRCRAFT PARKING APRON
- NEW AIRPORT ACCESS ROAD AND PARKING
- NEW SECURITY FENCING ALONG NORTH PERIMETER
- NEW WILDLIFE CONTROL FENCE ALONG SOUTH, WEST AND EAST PERIMETERS
- NEW TERMINAL WAITING AREA (GAZEBO)

LEGEND

- Passenger Waiting Area
- Existing Pavement
- Proposed Pavement
- OLS Limit Line
- Building Restriction Line (20' Height)

Consultants



Note:

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project title

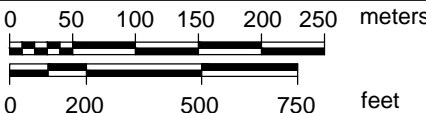
BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

drawing title

PROPOSED LAYOUT AND CAPITAL PLAN
SANDY POINT AIRPORT (MYAS)
ABACO ISLAND

scale

1:6000



date

14 JULY 2014

revision

3

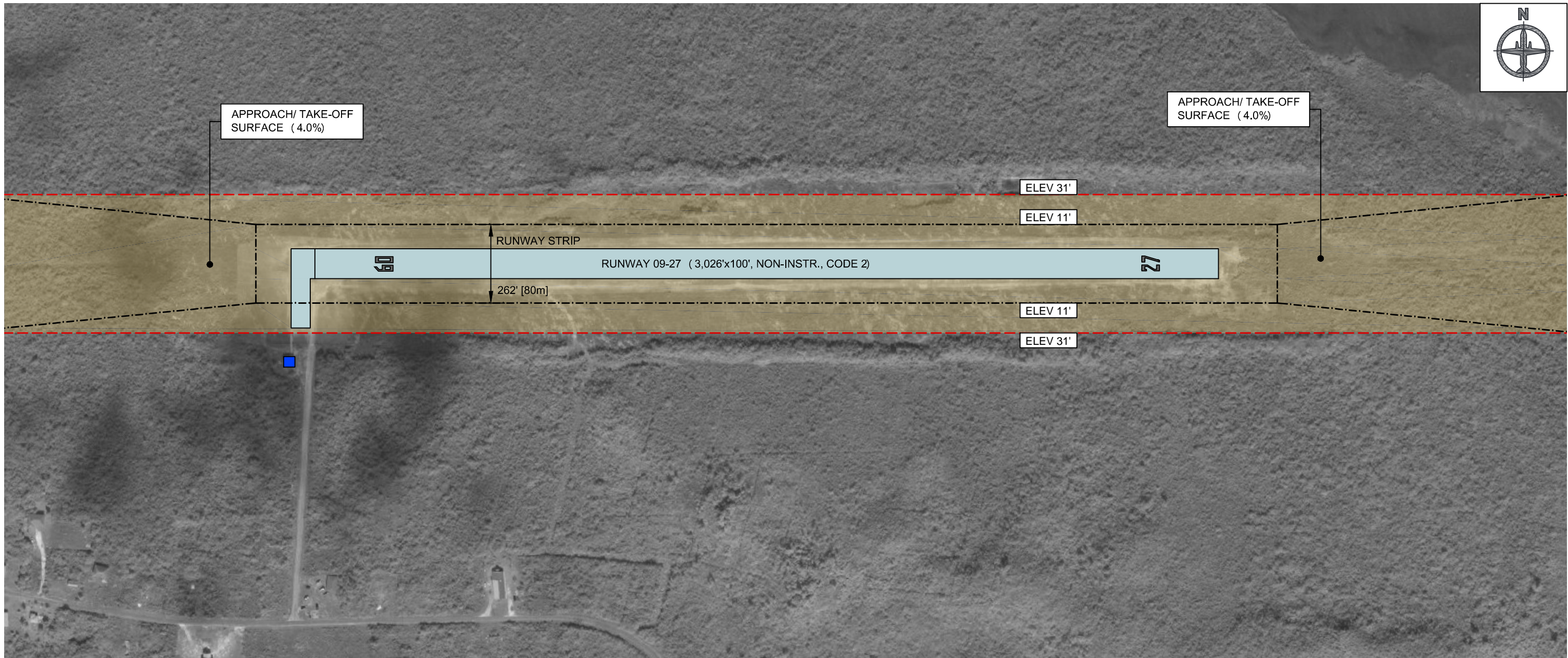
project no.

AP1302

exhibit

TIER 3
17-2

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RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	09-27	Runway Strip Width (ft/m):	262 [80]	RWY	09	27	Aerodrome Tier No.:	3	
Length (ft/m):	3026 [922.3]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	3026	3026	Runway Code (ICAO):	2	
Width (ft/m):	100 [30.5]	Strip Divergence (Each Side):	10%	TODA	3026	3026	Traffic Permitted:	VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	4.0%	ASDA	3026	3026	Scheduled Service:	No	
Stopway:	None	Approach Length (First Section) (ft/m):	8202 [2500]	LDA	3026	3026	ARFF Category (ICAO):	N/A	
Clearway:	None	Transitional Slope:	20.0%	Displaced Threshold	NIL	NIL	Port of Entry:	No	

Consultants



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 - Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.
 - Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:4000

0

50

100

150

200

meters

0

100

250

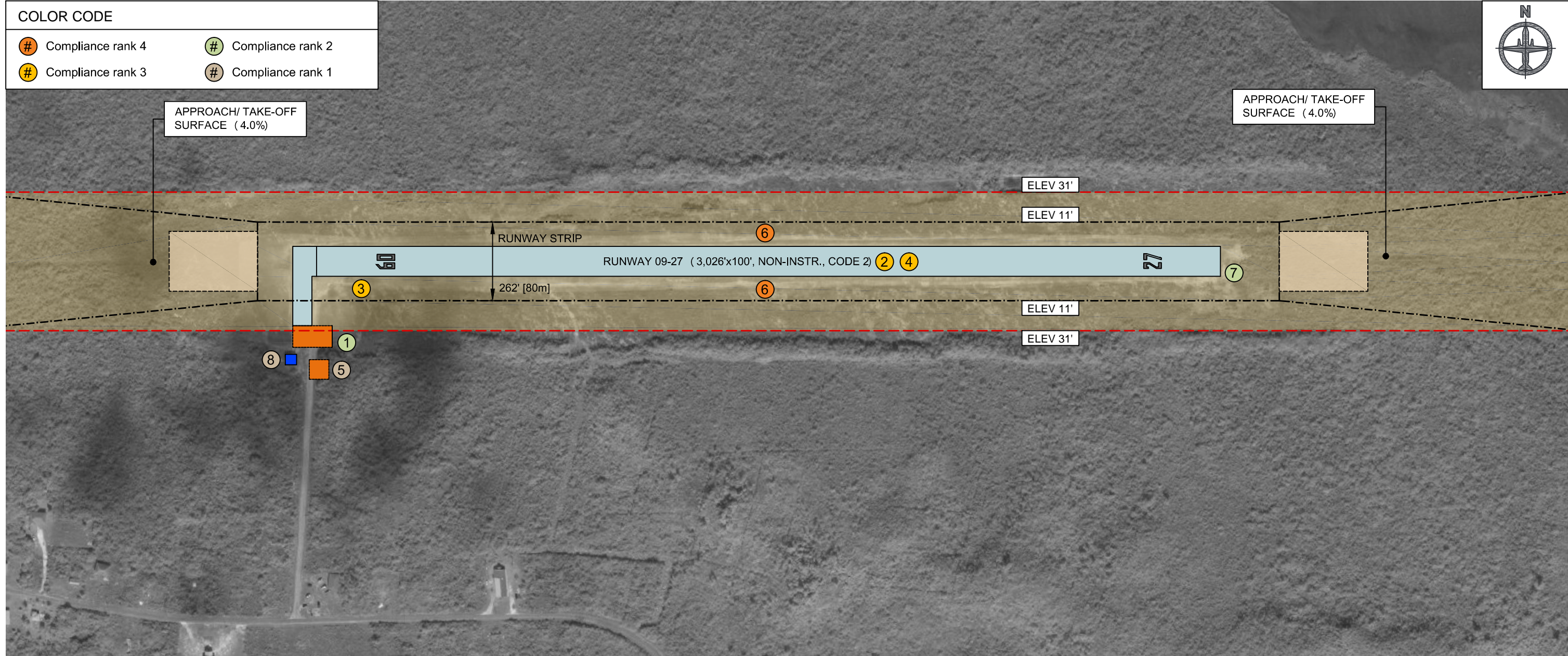
375

500

625

feet

drawing title			
EXISTING LAYOUT AND OPERATION MOORES ISLAND AIRPORT (MYAO) ABACO ISLAND			
date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 3 18-1



PROPOSED CAPITAL IMPROVEMENTS:

- EXPAND AIRCRAFT PARKING APRON
- MINOR REPAIRS TO RUNWAY EDGE AND THRESHOLD/ END LIGHTS
- NEW SOLAR ILLUMINATED WIND DIRECTION INDICATOR
- NEW RUNWAY MARKINGS
- NEW PUBLIC PARKING LOT
- REMOVE TREES AND VEGETATION FROM RUNWAY STRIP AND INFRINGING TRANSITION SURFACE AND APPROACHES

- FILL AREAS NEAR RWY 27 THRESHOLD AND REGRADE RUNWAY STRIP
- SECURITY FENCING AT WAITING AREA AND PUBLIC PARKING LOT

LEGEND

- Passenger Waiting Area
- Existing Pavement
- Proposed Pavement
- Future Runway End Safety Area
- OLS Limit Line
- Building Restriction Line (20' Height)

Consultants



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project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale



drawing title

PROPOSED LAYOUT AND CAPITAL PLAN
MOORES ISLAND AIRPORT (MYAO)
ABACO ISLAND

date

14 JULY 2014

revision

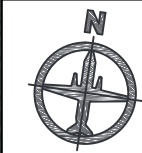
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project no.





AP1302

exhibit




TIER 3
18-2



RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	09-27	Runway Strip Width (ft/m):	492 [150]	RWY	09	27	Aerodrome Tier No.:	3	
Length (ft/m):	5015 [1528.6]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	5015	5015	Runway Code (ICAO):	3	
Width (ft/m):	100 [30.5]	Strip Divergence (Each Side):	10%	TODA	5015	5015	Traffic Permitted:	VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	3.33%	ASDA	5015	5015	Scheduled Service:	Yes	
Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	5015	5015	ARFF Category (ICAO):	N/A	
Clearway:	None	Transitional Slope:	14.3%	Displaced Threshold	NIL	NIL	Port of Entry:	No	

-  Passenger Terminal Building
-  Existing Pavement
-  OLS Limit Line
-  Building Restriction Line (20' Height)

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- Notes:
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2. Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.

3. Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

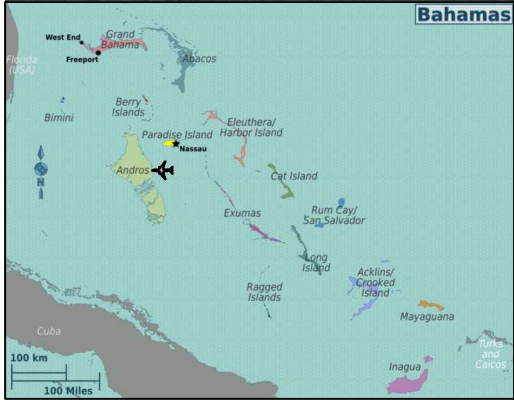
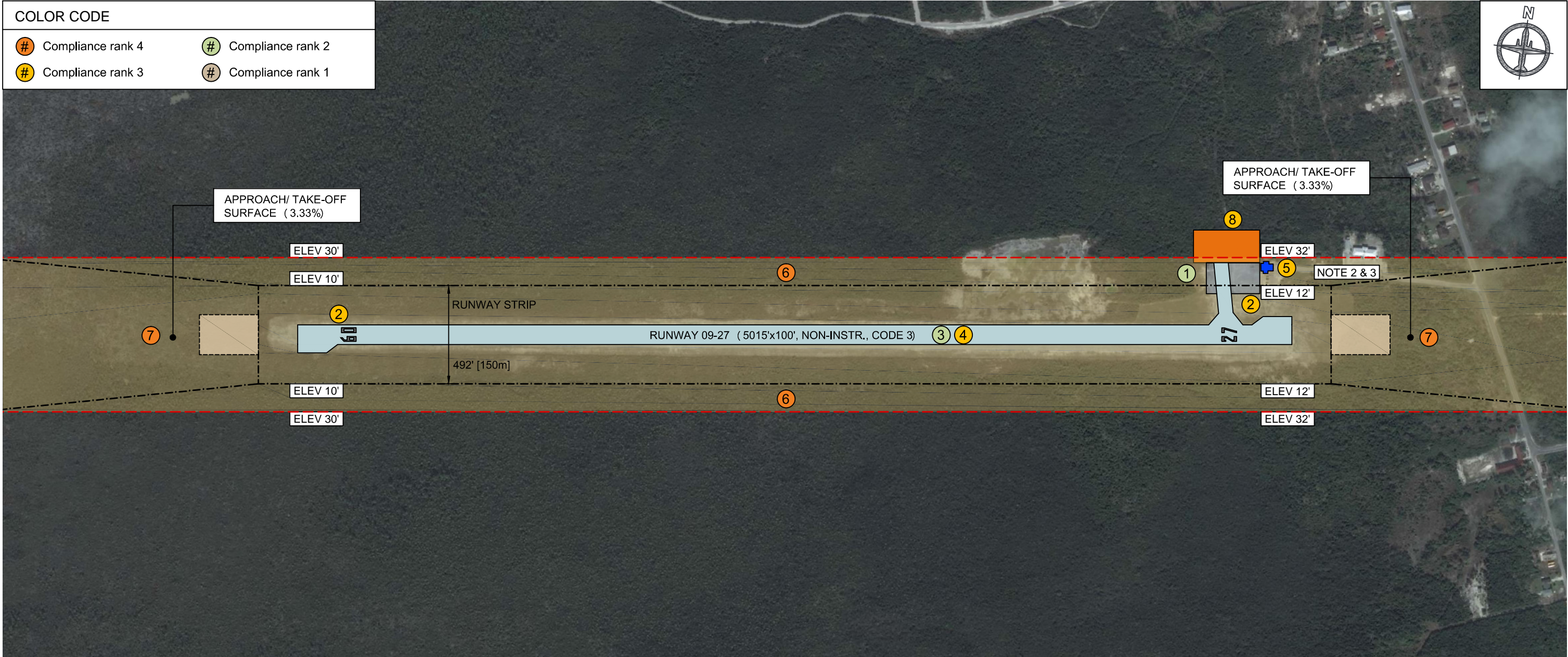
scale

1:6000

0 50 100 150 200 250 meters

0 200 500 750 feet

drawing title			
EXISTING LAYOUT AND OPERATION CLARENCE A. BAIN AIRPORT (MYAB) ANDROS ISLAND			
date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 3 19-1



PROPOSED CAPITAL IMPROVEMENTS:

- 1

DECOMMISSION AND REMOVE A PORTION OF EXISTING APRON
- 2

NEW SOLAR ILLUMINATED WIND DIRECTION INDICATOR (2)
- 3

FULL REHABILITATION OF RUNWAY PAVEMENT
- 4

NEW RUNWAY MARKINGS
- 5

RELOCATE PARKING LOT (TO NORTH OF TERMINAL BUILDING)
- 6

REMOVE TREES AND HEAVY VEGETATION FROM RUNWAY STRIP AND INFRINGING-TRANSITION SURFACE

- 7

REMOVE TALL TREES FROM UNDER APPROACH SURFACES
- 8

RELOCATE AND EXPAND AIRCRAFT PARKING APRON

LEGEND

- Passenger Terminal Building
- Existing Pavement
- Proposed Pavement
- Future Runway End Safety Area
- OLS Limit Line
- Building Restriction Line (20' Height)

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Notes:

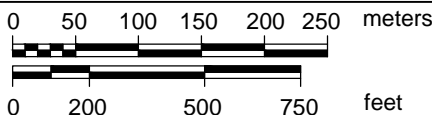
1. Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation.
2. BCAD should undertake a survey of the existing terminal building to determine if it infringes the transition surface.
3. BCE communication tower near apron is most likely infringing transition surface. BCAD should access the risk to aviation.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:6000



drawing title

EXISTING LAYOUT AND OPERATION
CLARENCE A. BAIN AIRPORT (MYAB)
ANDROS ISLAND

date

14 JULY 2014

revision

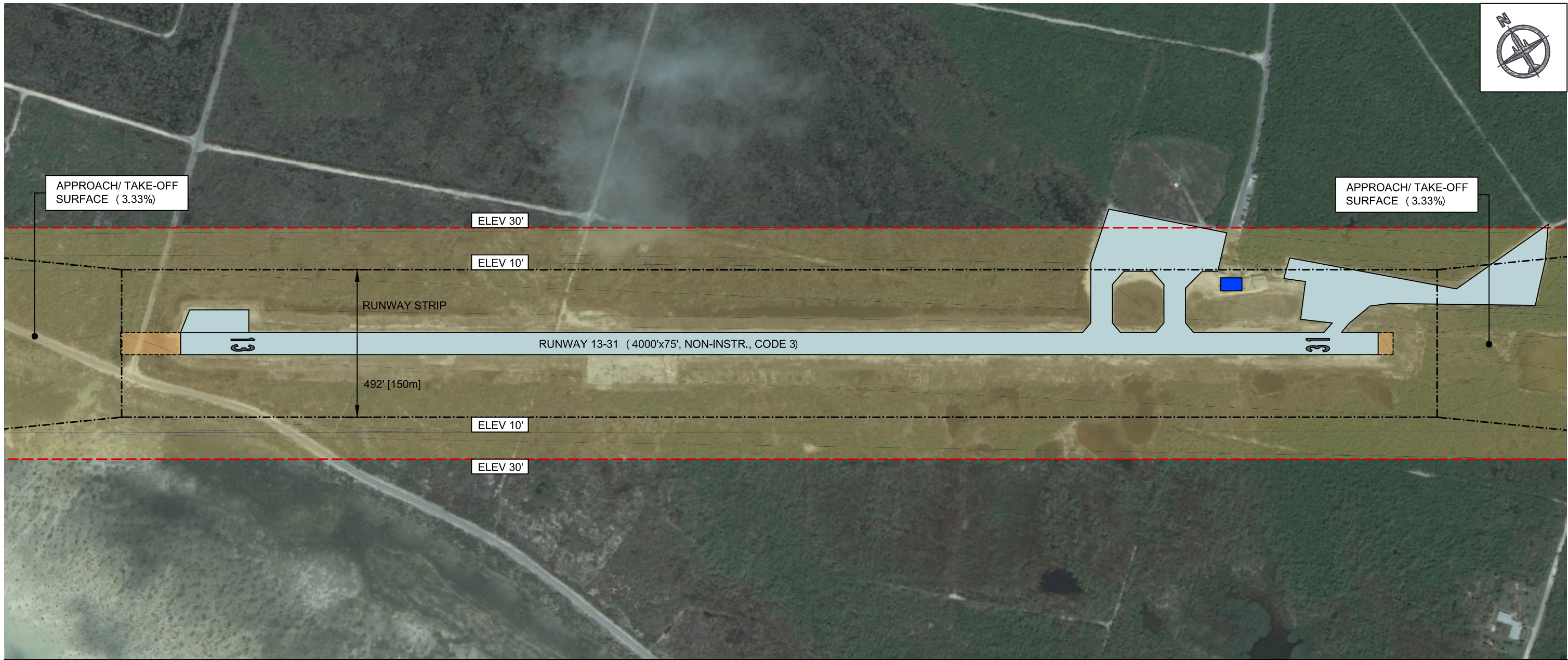
3

project no.

AP1302

exhibit

TIER 3
19-2



RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	13-31	Runway Strip Width (ft/m):	492 [150]	RWY	13	31	Aerodrome Tier No.:	3	
Length (ft/m):	4000 [1219.2]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	4000	4000	Runway Code (ICAO):	3	
Width (ft/m):	75 [22.9]	Strip Divergence (Each Side):	10%	TODA	4050	4200	Traffic Permitted:	VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	3.33%	ASDA	4000	4000	Schedule Service:	Yes	
Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	4000	4000	ARFF Category (ICAO):	N/A	
Clearway:	Yes	Transitional Slope:	14.3%	Displaced Threshold	NIL	NIL	Port of Entry:	Yes	

Consultants

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 - Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.
 - Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:4000

050100150200meters

0100250375500625feet

drawing title

EXISTING LAYOUT AND OPERATION
STELLA MARIS AIRPORT (MYLS)
LONG ISLAND

date

14 JULY 2014

revision

3

project no.

AP1302

exhibit

TIER 3
20-1



- 7

REMOVE TREES AND VEGETATION FROM RUNWAY STRIP AND TRANSITION SURFACE
- 8

DISPLACE RWY 13 THRESHOLD BY 328' (100m)
- 9

NEW PERIMTER SECURITY FENCING IN SELECT AREAS

LEGEND

- Passenger Terminal Building
- Existing Pavement
- Proposed Pavement
- Future Runway End Safety Area
- OLS Limit Line
- Building Restriction Line (20' Height)



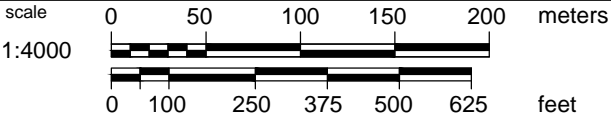
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Note:

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- BCAD should survey the terminal and customs building to determine whether they infringe the runway transitional surface.

project title

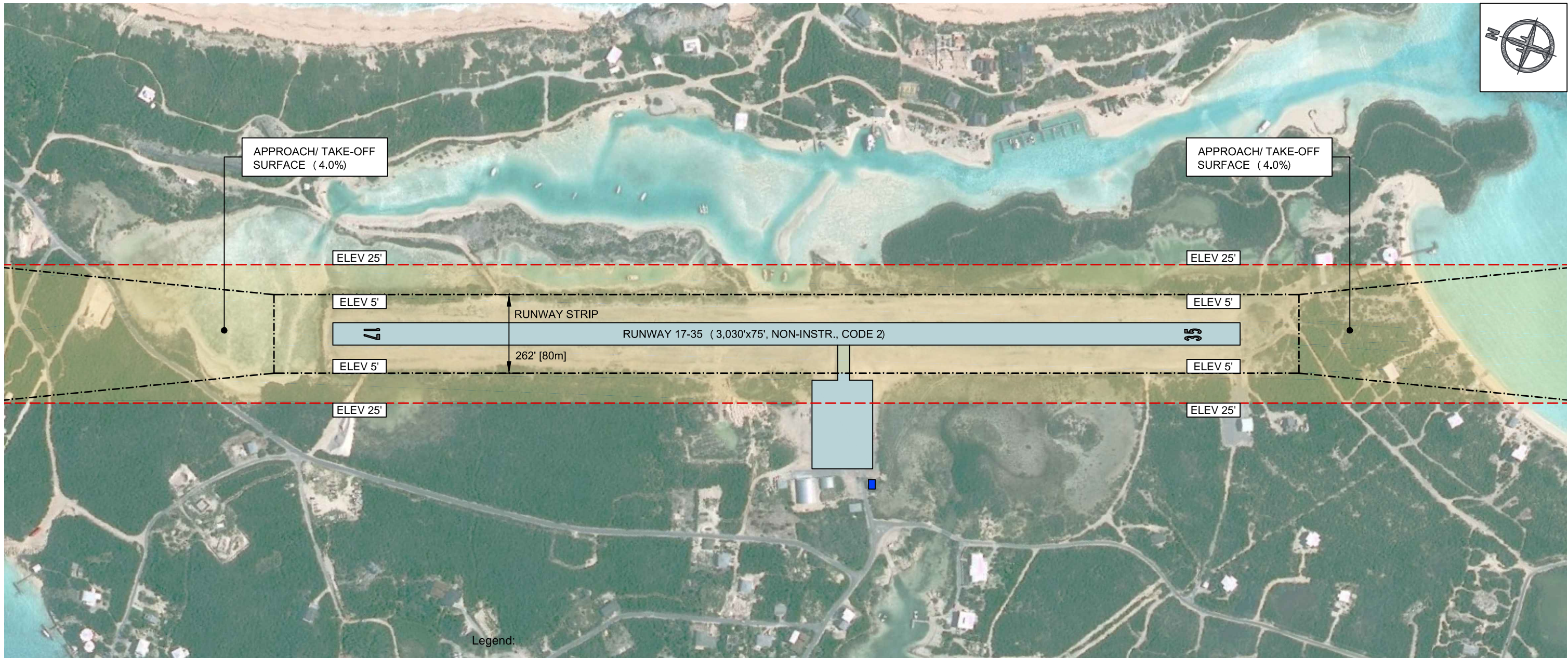
BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION








drawing title

PROPOSED LAYOUT AND CAPITAL PLAN
STELLA MARIS AIRPORT (MYLS)
LONG ISLAND

date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 3 20-2



 <div>Bahamas</div>	RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND	
	Designation:	17-35	Runway Strip Width (ft/m):	262 [80]	RWY	17	35	Aerodrome Tier No.:	3		Passenger Waiting Area
	Length (ft/m):	3030 [923.5]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	3030	3030	Runway Code (ICAO):	2		Existing Pavement
	Width (ft/m):	75 [22.9]	Strip Divergence (Each Side):	10%	TODA	3030	3030	Traffic Permitted:	VFR		OLS Limit Line
	Surface Type:	Asphalt	Approach Slope (First Section):	4.0%	ASDA	3030	3030	Scheduled Service:	Yes		Building Restriction Line (20' Height)
	Stopway:	None	Approach Length (First Section) (ft/m):	8202 [2500]	LDA	3030	3030	ARFF Category (ICAO):	N/A		
	Clearway:	None	Transitional Slope:	20.0%	Displaced Threshold	NIL	NIL	Port of Entry:	No		

Consultants

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Professional Consulting Engineers

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- Notes:
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2. Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.

3. Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

0 50 100 150 200 meters

1:4000

0 100 250 375 500 625 feet

drawing title

EXISTING LAYOUT AND OPERATION
STANIEL CAY AIRPORT (MYES)
EXUMA ISLAND

date

14 JULY 2014

revision

3

project no.

AP1302

exhibit

TIER 3
21-1



PROPOSED CAPITAL IMPROVEMENTS:

- 1 APRON SAFETY MARKING AND AIRCRAFT HOLDING POINT MARKING AND SIGN
- 2 RECONSTRUCT RUNWAY ALONG NEW ALIGNMENT
- 3 NEW SOLAR ILLUMINATED WIND DIRECTION INDICATOR
- 4 NEW SEA WALL AND LAND FILL AT RUNWAY END
- 5 RAISE ELEVATION AT RWY 17 THRESHOLD BY 1.5'
- 6 REINSTATE RUNWAY EDGE LIGHTING AND PROVIDE NEW THRESHOLD/END LIGHTING

- 7 REHABILITATE AIRCRAFT APRON AND TAXIWAY CONNECTION
- 8 EXPAND AIRCRAFT PARKING APRON
- 9 NEW SECURITY FENCING AROUND TERMINAL AREA AND SELECT AREAS
- 10 RELOCATE PUBLIC ROADWAY AND INSTALL VEHICLE CONTROL BARRIERS ON EACH SIDE
- 11 DISPLACE RWY 17 THRESHOLD BY 200' (61m)
- 12 DECOMMISSION AND REMOVE PORTION OF APRON

LEGEND

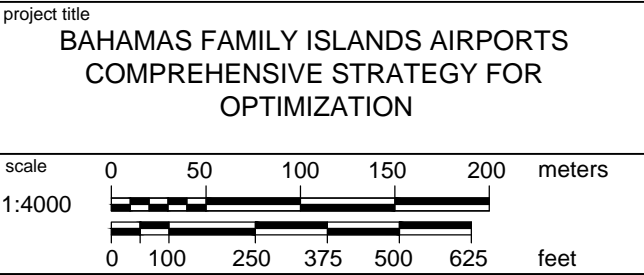
- Passenger Waiting Area
- Existing Pavement
- Proposed Pavement
- OLS Limit Line
- Building Restriction Line (20' Height)



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Notes:

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2. Although the plan shown herein attempts to provide a solution that meets a reasonable level of compliance, there are still many non-compliances which cannot be adequately resolved.



drawing title			
PROPOSED LAYOUT AND CAPITAL PLAN STANIEL CAY AIRPORT (MYES) EXUMA ISLAND			
date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 3 21-2



RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	11-29	Runway Strip Width (ft/m):	262 [80]	RWY	11	29	Aerodrome Tier No.:	3	
Length (ft/m):	2700 [823.0]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	2700	2700	Runway Code (ICAO):	2	
Width (ft/m):	60 [18.3]	Strip Divergence (Each Side):	10%	TODA	2700	2700	Traffic Permitted:	VFR	
Surface Type:	Sealed Gravel	Approach Slope (First Section):	4.0%	ASDA	2700	2700	Scheduled Service:	Yes	
Stopway:	None	Approach Length (First Section) (ft/m):	8202 [2500]	LDA	2700	2700	ARFF Category (ICAO):	N/A	
Clearway:	None	Transitional Slope:	20.0%	Displaced Threshold	NIL	NIL	Port of Entry:	No	

Consultants

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- Note:
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 - Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.
 - Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:4000

050100150200

meters

0100250375500625

feet

drawing title			
EXISTING LAYOUT AND OPERATION BLACK POINT AIRPORT (MYEB) EXUMA ISLAND			
date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 3 22-1



PROPOSED CAPITAL IMPROVEMENTS:

- 1 REMOVE TREES AND HEAVY VEGETATION FROM RUNWAY STRIP AND INFRINGING TRANSITION SURFACE AND APPROACHES
- 2 NEW SOLAR ILLUMINATED WIND DIRECTION INDICATOR
- 3 NEW TAXIWAY FILLETS
- 4 REPAIRS TO RUNWAY AND TAXIWAY LIGHTING (DUE TO MISSING, DAMAGED OR NON-STANDARD LAYOUT)
- 5 NEW RUNWAY MARKINGS

- LEGEND
- Passenger Waiting Area
 - Existing Pavement
 - Future Runway End Safety Area
 - OLS Limit Line
 - Building Restriction Line (20' Height)

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Note:

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2. A topographic survey should be undertaken to determine whether terrain beyond the RWY 29 threshold infringes the approach surface and thus requires threshold displacement.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

0 50 100 150 200 meters

1:4000

0 100 250 375 500 625 feet

drawing title

PROPOSED LAYOUT AND CAPITAL PLAN
BLACK POINT AIRPORT (MYEB)
EXUMA ISLAND

date

14 JULY 2014

revision

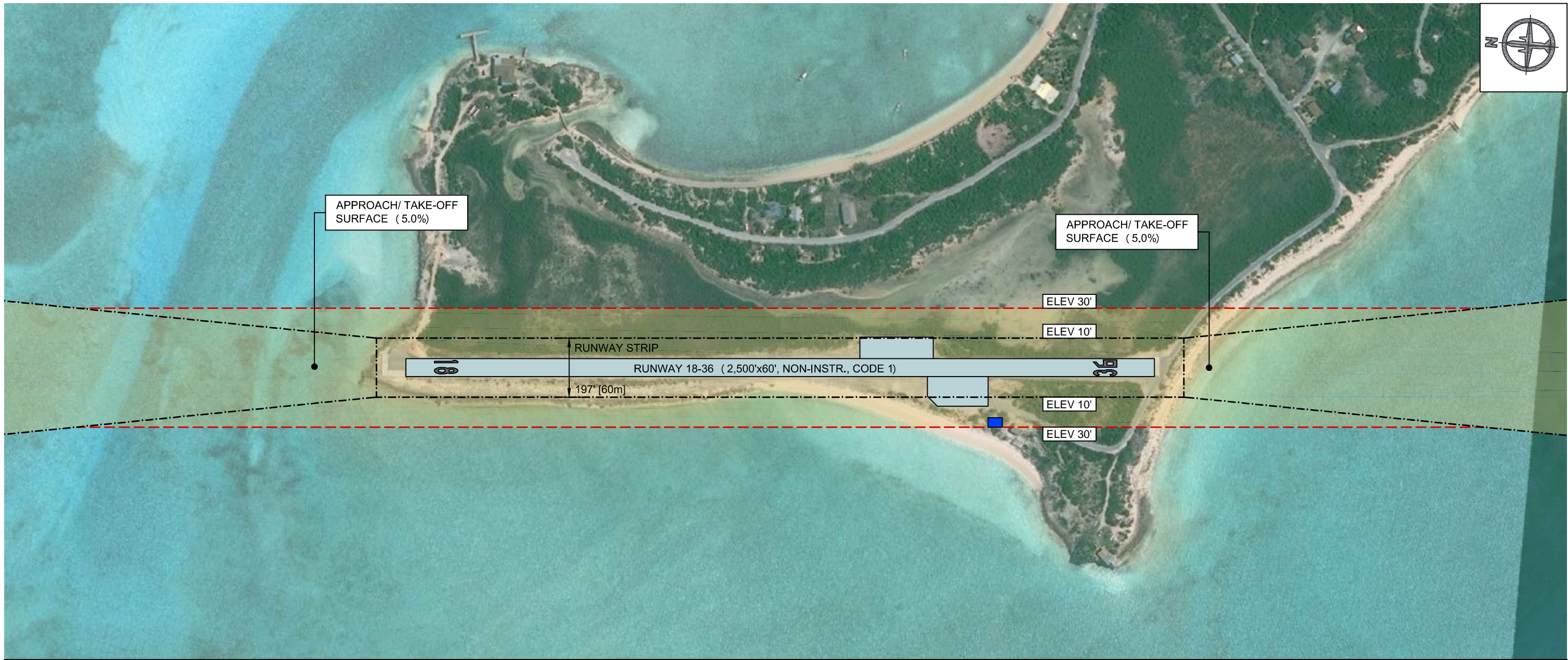
3

project no.

AP1302

exhibit

TIER 3
22-2



RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	18-36	Runway Strip Width (ft/m):	197 [60]	RWY	18	36	Aerodrome Tier No.:	3	
Length (ft/m):	2500 [762.0]	Strip Distance From Threshold (ft/m):	98 [30]	TORA	2500	2500	Runway Code (ICAO):	1	
Width (ft/m):	60 [18.3]	Strip Divergence (Each Side):	10%	TODA	2500	2500	Traffic Permitted:	VFR	
Surface Type:	Sealed Gravel	Approach Slope (First Section):	5.0%	ASDA	2500	2500	Scheduled Service:	No	
Stopway:	None	Approach Length (First Section) (ft/m):	5249 [1600]	LDA	2500	2500	ARFF Category (ICAO):	N/A	
Clearway:	None	Transitional Slope:	20.0%	Displaced Threshold	NIL	NIL	Port of Entry:	No	

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 - Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.
 - Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:4000

050100150200meters

0100250375500625feet

drawing title

EXISTING LAYOUT AND OPERATION
FARMERS CAY AIRPORT
EXUMA ISLAND

date

14 JULY 2014

revision

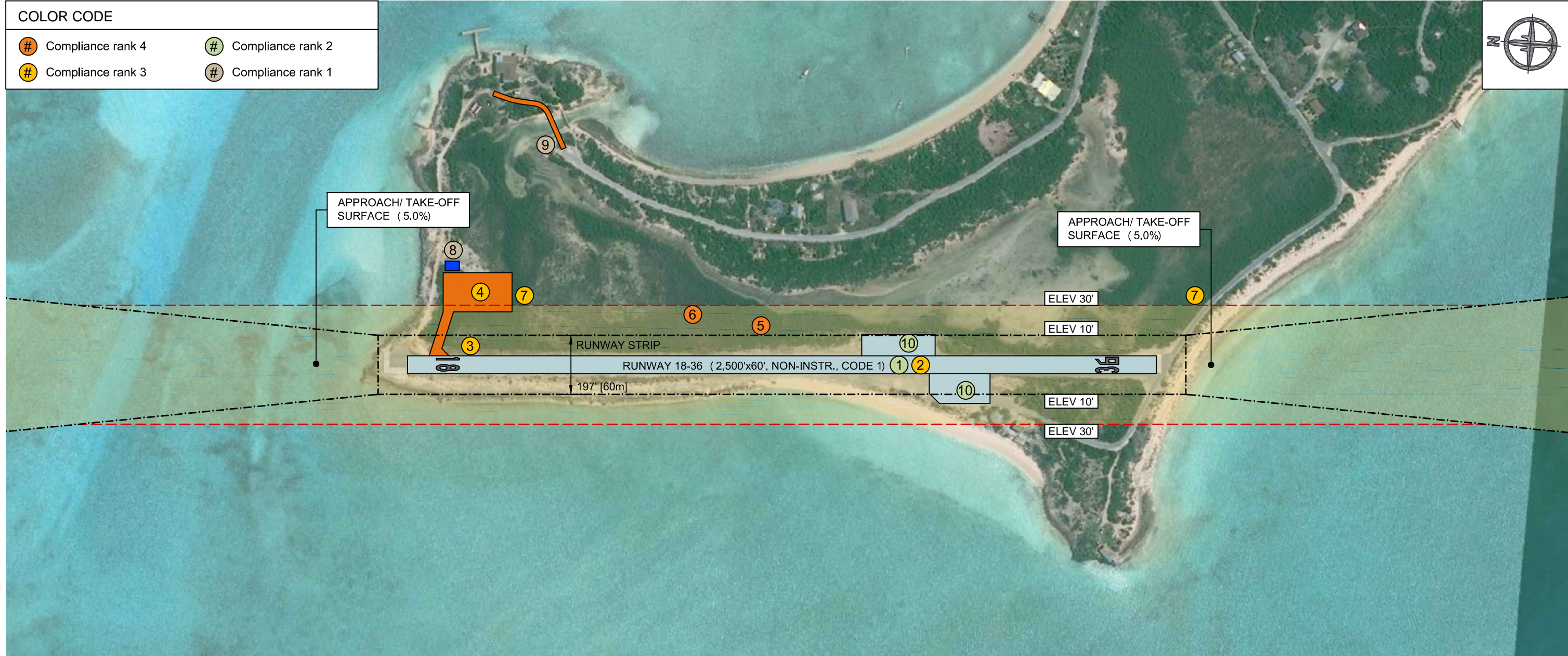
3

project no.

AP1302

exhibit

TIER 3
23-1



PROPOSED CAPITAL IMPROVEMENTS:

- 1 REHABILITATE FULL RUNWAY PAVEMENT (SEALED GRAVEL)
- 2 REPAIRS TO RUNWAY AND APRON LIGHTING (MISSING, DAMAGED OR NON-COMPLIANT LOCATION/ SPACING)
- 3 NEW SOLAR ILLUMINATED WIND DIRECTION INDICATOR
- 4 NEW AIRCRAFT PARKING APRON AND TAXIWAY CONNECTION
- 5 REMOVE GARBAGE AND DEBRIS FROM RUNWAY GRADED AREA AND CORRECT SURFACE SLOPES

- 6 REMOVE TREES AND VEGETATION FROM RUNWAY STRIP AND INFRINGING TRANSITION SURFACE
- 7 NEW SECURITY FENCING AND ACCESS GATE IN SELECT AREAS
- 8 RELOCATE PASSENGER WAITING AREA
- 9 SINGLE VEHICLE STEEL PREFABRICATED BRIDGE ON PILE FOUNDATIONS WITH GRAVEL ROAD APPROACHES
- 10 DECOMMISSION EXISTING AIRCRAFT APRONS

- LEGEND
- Passenger Waiting Area
 - Existing Pavement
 - Proposed Pavement
 - OLS Limit Line
 - Building Restriction Line (20' Height)

Consultants

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Notes:

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2. Although the plan shown herein attempts to provide a solution that meets a reasonable level of compliance, there are still many non-compliance which cannot be adequately resolved.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

0 50 100 150 200 meters

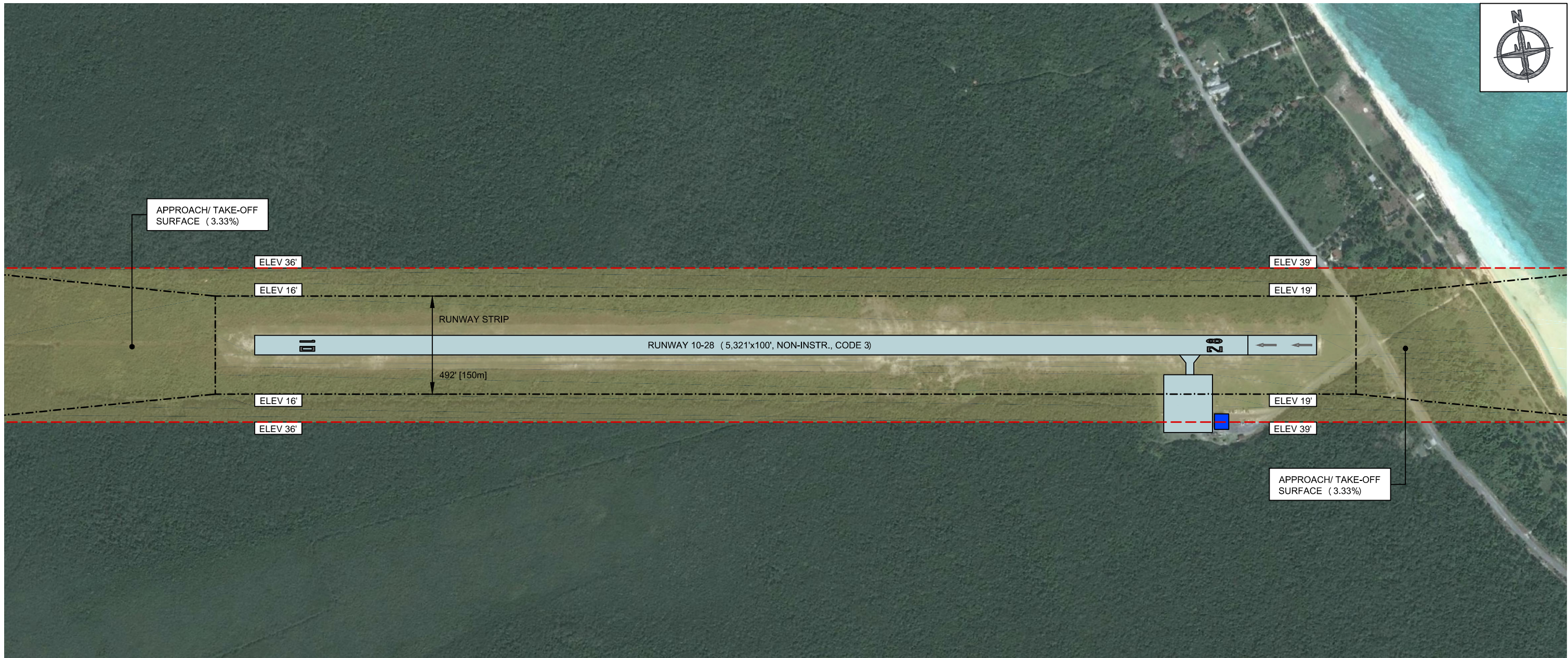
1:4000

0 100 250 375 500 625 feet

drawing title

PROPOSED LAYOUT AND CAPITAL PLAN
FARMERS CAY AIRPORT
EXUMA ISLAND

date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 3 23-2



RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	10-28	Runway Strip Width (ft/m):	492 [150]	RWY	10	28	Aerodrome Tier No.:	3	
Length (ft/m):	5321 [1621.8]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	5321	5321	Runway Code (ICAO):	3	
Width (ft/m):	100 [30.5]	Strip Divergence (Each Side):	10%	TODA	5321	5321	Traffic Permitted:	VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	3.33%	ASDA	5321	5321	Scheduled Service:	Yes	
Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	5321	4957	ARFF Category (ICAO):	N/A	
Clearway:	None	Transitional Slope:	14.3%	Displaced Threshold	NIL	364	Port of Entry:	Yes	

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- Note:
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 - Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.
 - Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:6000

050100150200250

meters

0200500750

feet

drawing title			
EXISTING LAYOUT AND OPERATION CONGO TOWN AIRPORT (MYAK) ANDROS ISLAND			
date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 3 24-1



PROPOSED CAPITAL IMPROVEMENTS:

- APRON SAFETY MARKING AND AIRCRAFT HOLDING POINT MARKING AND SIGN
- NEW SOLAR ILLUMINATED WIND DIRECTION INDICATOR (2)
- MINOR REPAIRS TO APRON PAVEMENT
- NEW RUNWAY MARKINGS
- REDUCE RUNWAY LENGTH BY 112' (34.1m) AND CHANGE RWY 28 THRESHOLD DISPLACEMENT TO 400' (121.9m)
- REMOVE TALL TREES AND HEAVY VEGETATION FROM RUNWAY STRIP AND INFRINGING TRANSITION SURFACES AND APPROACHES

- NEW AIRCRAFT TURN PAD (2)
- EXPAND AIRCRAFT PARKING APRON
- RELOCATE AIRPORT ACCESS ROAD
- NEW PAPI INSTALLATION (RWY 28 APPROACH)

LEGEND

- Passenger Terminal Building
- Existing Pavement
- Proposed Pavement
- Future Runway End Safety Area
- OLS Limit Line
- Building Restriction Line (20' Height)

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Note:

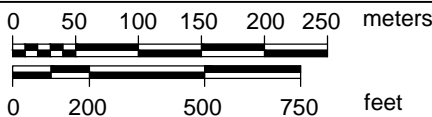
- Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation.
- A survey assesment is required to determine whether the existing terminal building infringes the runway transition surface.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:6000



drawing title

PROPOSED LAYOUT AND CAPITAL PLAN
CONGO TOWN AIRPORT (MYAK)
ANDROS ISLAND

date

14 JULY 2014

revision

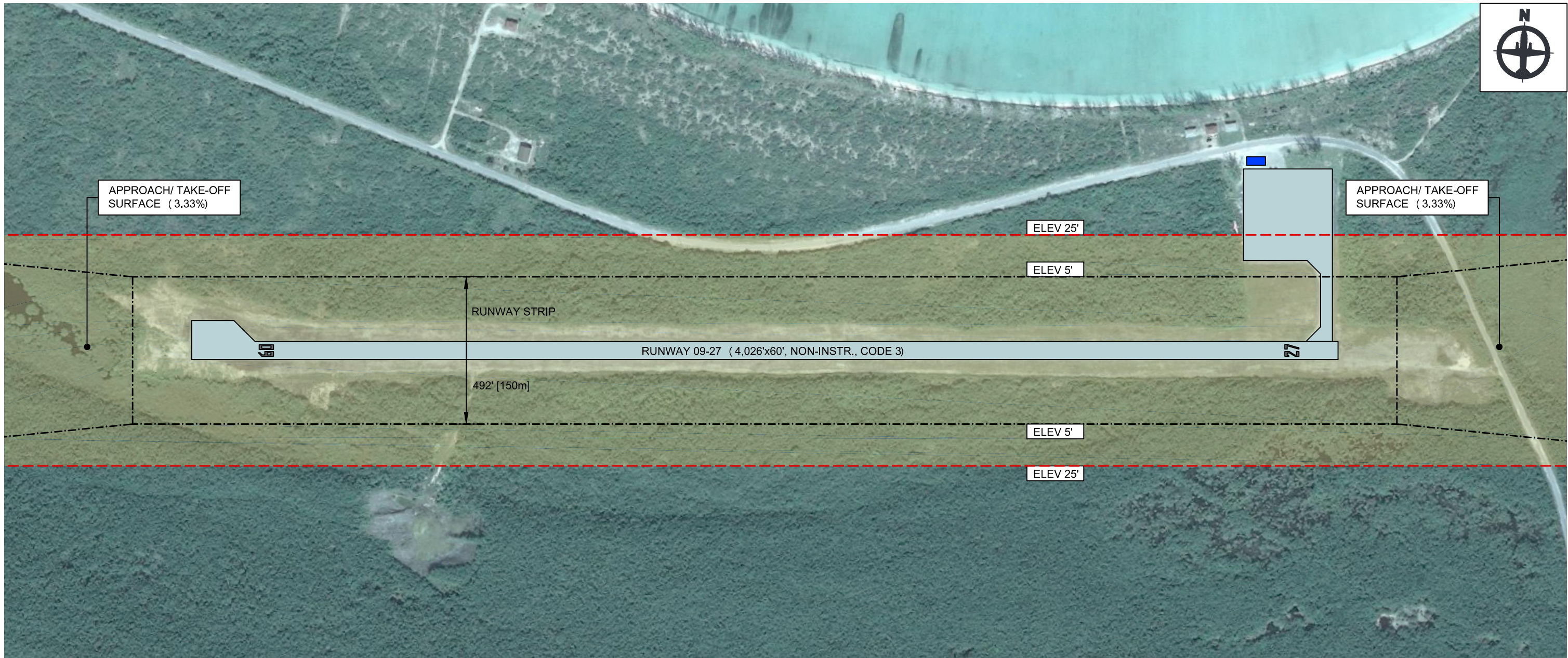
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project no.

AP1302

exhibit

TIER 3
24-2



RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	09-27	Runway Strip Width (ft/m):	492 [150]	RWY	09	27	Aerodrome Tier No.:	3	
Length (ft/m):	4026 [1227.1]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	4026	4026	Runway Code (ICAO):	3	
Width (ft/m):	60 [18.3]	Strip Divergence (Each Side):	10%	TODA	4026	4026	Traffic Permitted:	VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	3.33%	ASDA	4026	4026	Scheduled Service:	Yes	
Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	4026	4026	ARFF Category (ICAO):	N/A	
Clearway:	None	Transitional Slope:	14.3%	Displaced Threshold	NIL	NIL	Port of Entry:	No	

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 - Runway data from the current version of the Aeronautical Information Publication with changes to reflect recent runway extension.
 - Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

1:4000

0

50

100

150

200

 meters

0

100

250

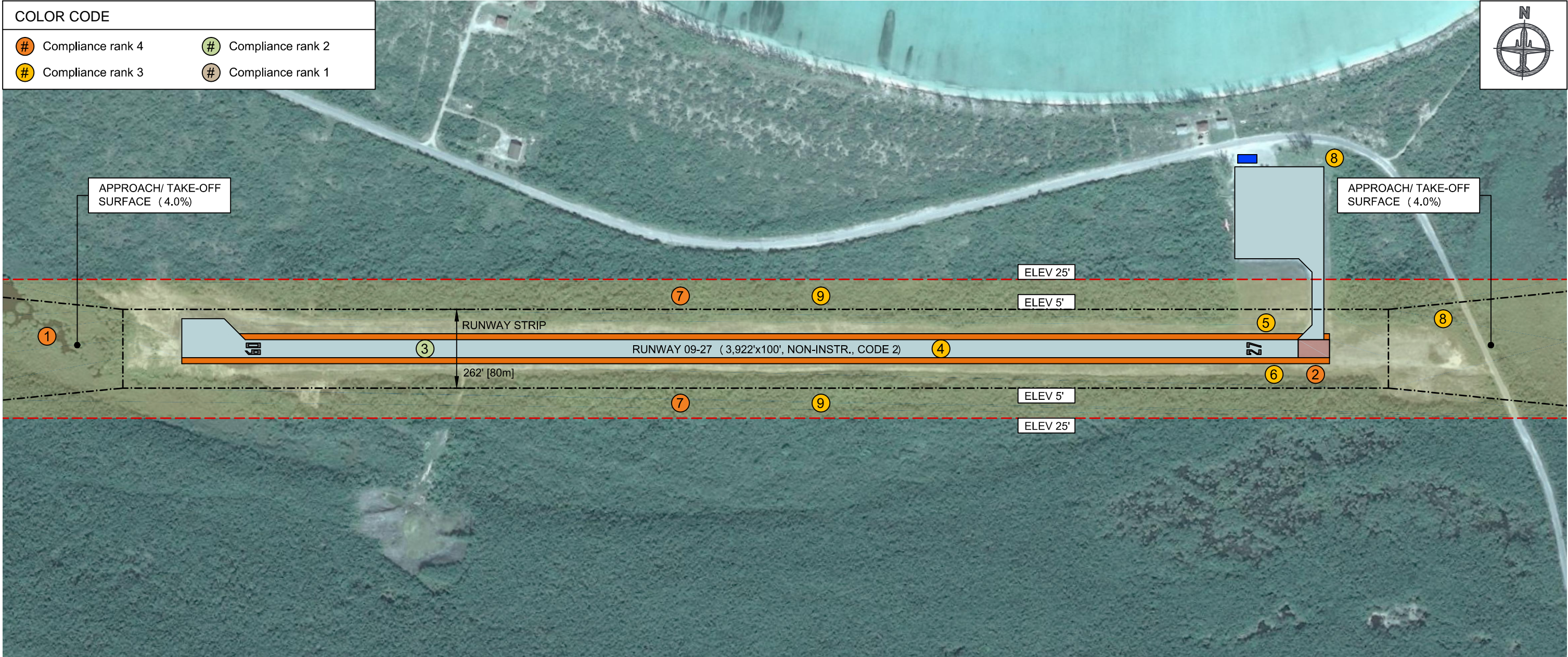
375

500

625

 feet

drawing title			
EXISTING LAYOUT AND OPERATION COLONEL HILL AIRPORT (MYCI) CROOKED ISLAND			
date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 3 25-1



PROPOSED CAPITAL IMPROVEMENTS:

- | | | | |
|---|---|---|---|
| 1 | TOPOGRAPHIC SURVEY TO CONFIRM WHETHER TERRAIN INFRINGES RWY 09 APPROACH | 7 | REMOVE TALL TREES AND HEAVY VEGETATION FROM RUNWAY STRIP AND INFRINGING TRANSITION SURFACE AND APPROACH |
| 2 | SHORTEN RUNWAY AT RWY 27 THRESHOLD BY 104' (31.7m) | 8 | PERIMETER SECURITY FENCING IN SELECT AREAS |
| 3 | WIDEN RUNWAY TO 100' (30.5m) WIDTH AND REHABILITATE EXISTING PAVEMENT | 9 | NEW THREE STRAND WILDLIFE CONTROL FENCING |
| 4 | NEW RUNWAY MARKINGS | | |
| 5 | NEW WIND DIRECTION INDICATOR | | |
| 6 | NEW RWY 27 THRESHOLD SOLAR LIGHTING | | |

LEGEND

- | | |
|-----|--|
| ■ | Passenger Terminal Building |
| ■ | Existing Pavement |
| ■ | Proposed Pavement |
| ■ | Stopway |
| --- | OLS Limit Line |
| --- | Building Restriction Line (20' Height) |

Consultants



Note:

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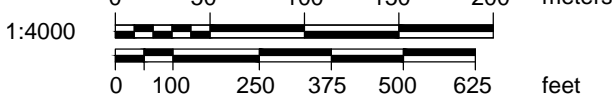
project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

drawing title

PROPOSED LAYOUT AND CAPITAL PLAN
COLONEL HILL AIRPORT (MYCI)
CROOKED ISLAND

scale



date

14 JULY 2014

revision

3

project no.

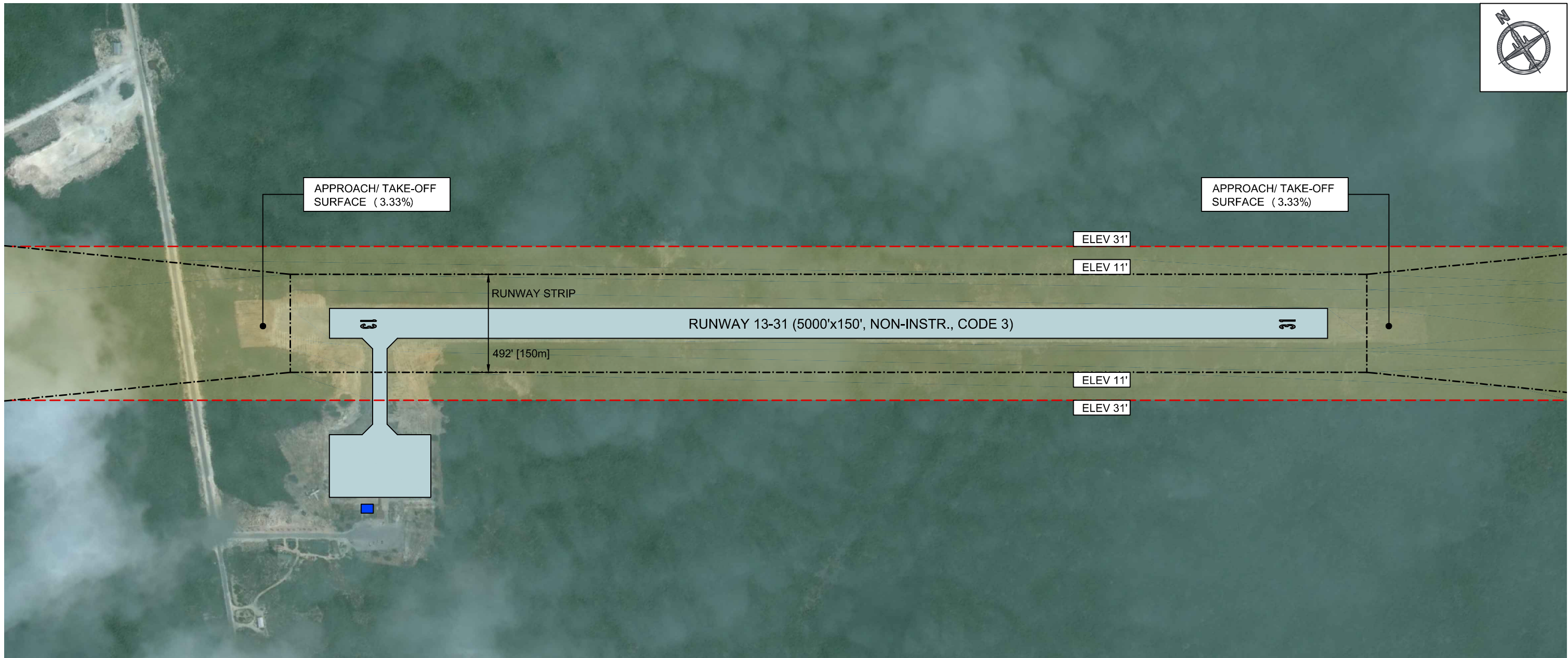
AP1302

exhibit

TIER 3
25-2

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RUNWAY GENERAL DATA		RUNWAY OBSTACLE LIMITATION SURFACES		DECLARED DISTANCES (distances in feet)			OPERATIONAL DATA		LEGEND
Designation:	13-31	Runway Strip Width (ft/m):	492 [150]	RWY	13	31	Aerodrome Tier No.:	3	
Length (ft/m):	5000 [1524]	Strip Distance From Threshold (ft/m):	197 [60]	TORA	5000	5000	Runway Code (ICAO):	3	
Width (ft/m):	150 [45.7]	Strip Divergence (Each Side):	10%	TODA	5000	5000	Traffic Permitted:	VFR	
Surface Type:	Asphalt	Approach Slope (First Section):	3.33%	ASDA	5000	5000	Scheduled Service:	Yes	
Stopway:	None	Approach Length (First Section) (ft/m):	9843 [3000]	LDA	5000	5000	ARFF Category (ICAO):	N/A	
Clearway:	None	Transitional Slope:	14.3%	Displaced Threshold	NIL	NIL	Port of Entry:	No	

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- Note:
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 - Runway data from the current version of the Aeronautical Information Publication for the Commonwealth of the Bahamas.
 - Based on an airport site assessment, the current runway strip, transition and approach/ take-off surfaces contain obstacles and are non-compliant.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale

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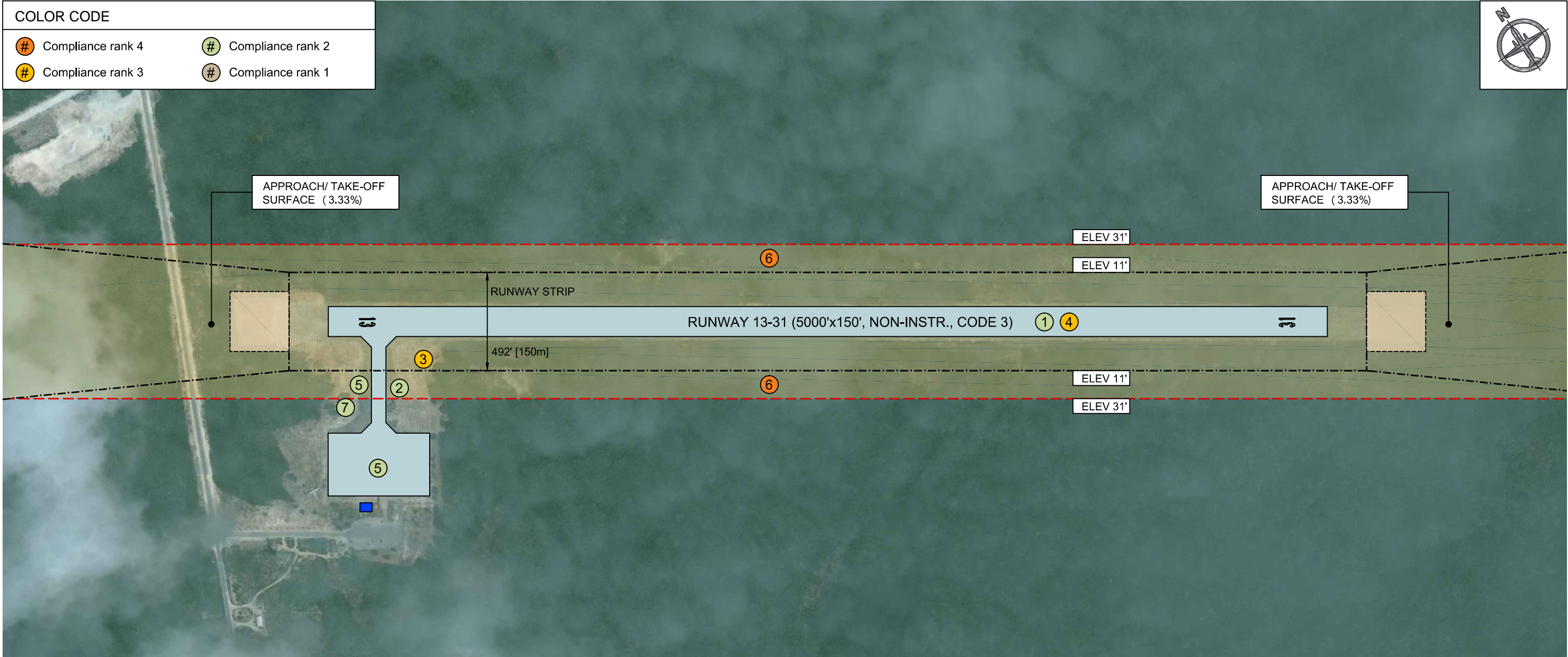
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meters

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feet

drawing title			
EXISTING LAYOUT AND OPERATION SPRING POINT AIRPORT (MYAP) ACKLINS ISLAND			
date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 3 26-1



PROPOSED CAPITAL IMPROVEMENTS:

- 1

REHABILITATE FULL RUNWAY PAVEMENT
- 2

CORRECT TAXIWAY GRADED AREA (WATER REGULARLY PONDING)
- 3

NEW SOLAR ILLUMINATED WIND DIRECTION INDICATOR
- 4

NEW RUNWAY MARKINGS
- 5

REHABILITATE TAXIWAY AND APRON PAVEMENTS
- 6

REMOVE TREES AND VEGETATION FROM RUNWAY STRIP AND INFRINGING TRANSITION SURFACE AND APPROACHES
- 7

REPAIR TAXIWAY EDGE LIGHTING

- LEGEND
- Passenger Terminal Building

Existing Pavement

Future Runway Safety Area

OLS Limit Line

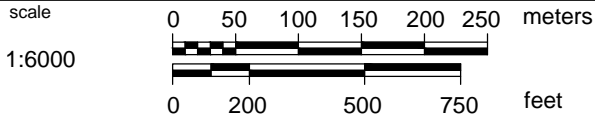
Building Restriction Line (20' Height)

Consultants

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Note:
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project title
BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION



drawing title
PROPOSED LAYOUT AND CAPITAL PLAN
SPRING POINT AIRPORT (MYAP)
ACKLINS ISLAND

date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 3 26-2



PROPOSED CAPITAL IMPROVEMENTS:

- 1

REPAIR RUNWAY PAVEMENT (FIRST THIRD FROM RWY 13 THRESHOLD)
- 2

REPLACE RUNWAY END LIGHTS (CURRENT NON-STANDARD LAYOUT)
- 3

NEW SOLAR ILLUMINATED WIND DIRECTION INDICATOR
- 4

NEW RUNWAY MARKINGS
- 5

NEW PAPI INSTALLATION (RWY 31 APPROACH)
- 6

REMOVE TREES AND VEGETATION INFRINGING TRANSITION SURFACE
- 7

THREE STRAND WILDLIFE CONTROL FENCE AROUND AIRPORT PERIMETER

8

DISPLACE RWY 31 THRESHOLD BY 265' (80.8m) AND NEW THRESHOLD LIGHTING

9

SECURITY FENCE AND RESTRICTED AREA SIGNAGE AT FORMER ROAD CROSSING

LEGEND

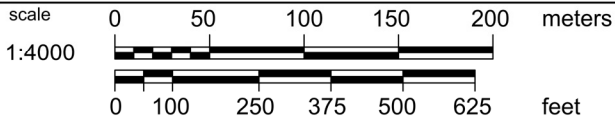
- Passenger Terminal Building
- Existing Pavement
- OLS Limit Line
- Building Restriction Line (20' Height)

Consultants

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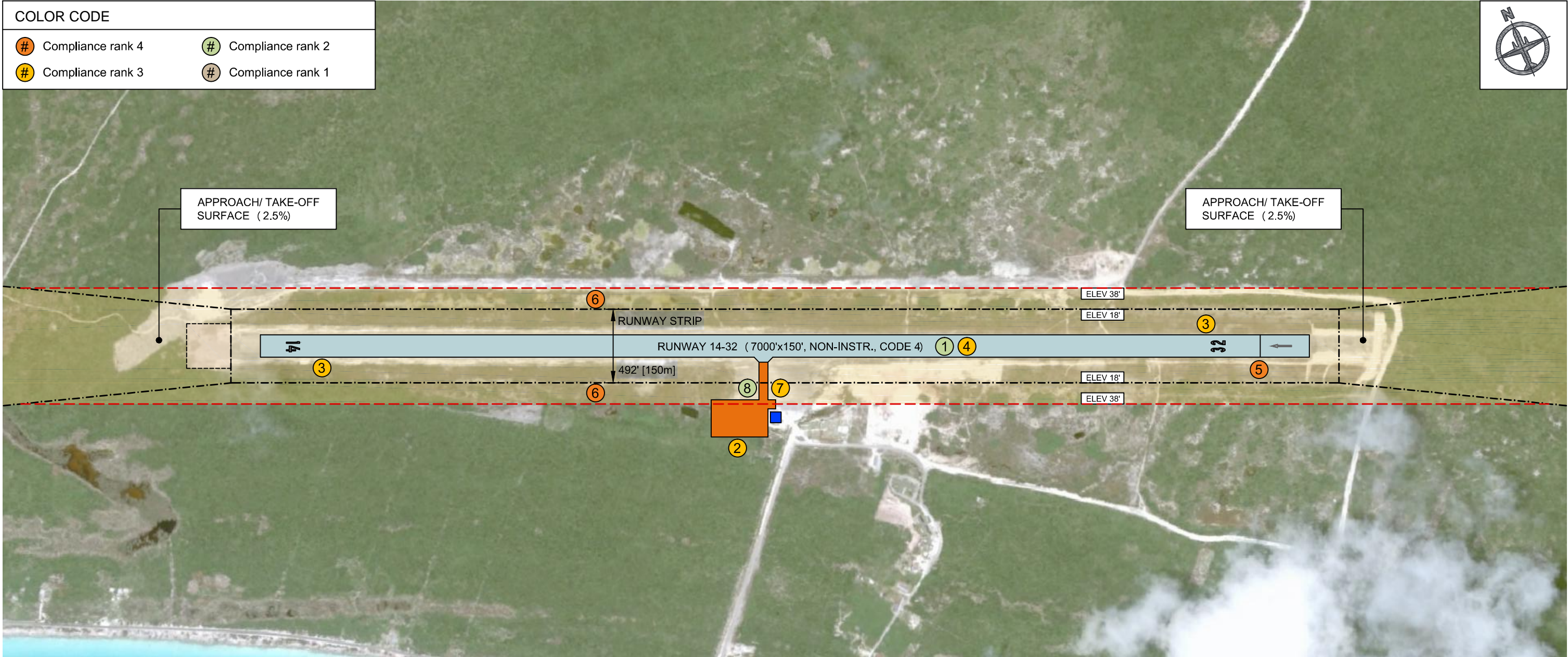
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project title
BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION



drawing title
PROPOSED LAYOUT AND CAPITAL PLAN
DUNCAN TOWN AIRPORT (MYRD)
RAGGED ISLAND

date	revision	project no.	exhibit
14 JULY 2014	3	AP1302	TIER 3 27-2



PROPOSED CAPITAL IMPROVEMENTS:

- 1 REHABILITATE FULL RUNWAY PAVEMENT
- 2 NEW AIRCRAFT PARKING APRON
- 3 NEW SOLAR ILLUMINATED WIND DIRECTION INDICATOR
- 4 NEW RUNWAY MARKINGS
- 5 DISPLACE RWY 32 THRESHOLD BY 328' (100.0m) AND INSTALL NEW SOLAR THRESHOLD LIGHTING
- 6 REMOVE TREES AND VEGETATION FROM RUNWAY STRIP AND INFRINGING TRANSITION SURFACE AND APPROACHES

- 7 NEW TAXIWAY CONNECTION WITH SOLAR EDGE LIGHTING
- 8 DECOMMISSION AND REMOVE EXISTING APRON PAVEMENT

LEGEND

- Passenger Terminal Building
- Existing Pavement
- Proposed Pavement
- Future Runway End Safety Area
- OLS Limit Line
- Building Restriction Line (20' Height)

Consultants



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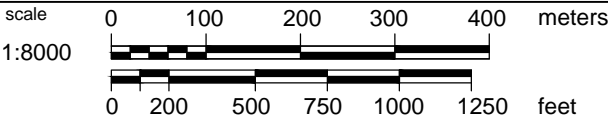
Note:

- 1. Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation.
- 2. As of February 2014, BCAD was in the process of installing perimeter security fencing due to serious wildlife control issues.

project title

BAHAMAS FAMILY ISLANDS AIRPORTS
COMPREHENSIVE STRATEGY FOR
OPTIMIZATION

scale



drawing title

PROPOSED LAYOUT AND CAPITAL PLAN
ARTHUR'S TOWN AIRPORT (MYCA)
CAT ISLAND

date

14 JULY 2014

revision

3

project no.

AP1302

exhibit

TIER 3
28-2

**COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS –
AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS**

APPENDIX B – AERODROME COMPLIANCE CAPITAL COST
July 22, 2014

APPENDIX B – AERODROME COMPLIANCE CAPITAL COST

APPENDIX B

Project: Comprehensive Strategy for Optimization - Capital Development Plans
Airport: Bahamas Family Islands Airports

AIRSIDE AND CIVIL WORKS DEVELOPMENT PLANS - PROBABLE CAPITAL COST SUMMARY

Tier No.	Aerodrome No.	Aerodrome Name	Probable Capital Cost
1	1	Marsh Harbour (MYAM), Abaco - 6,100' x 100', Non-Precision, Code 4	\$490,500
1	2	Exuma International (MYEF), Exuma - 7,000' x 150', Non-Precision, Code 4	\$1,886,100
1	3	San Salvador International (MYSM), San Salvador - 8,000' x 150', Non-Precision, Code 4	\$2,512,100
1	4	North Eleuthera (MYEH), Eleuthera - 6,800' x 150', Non-Precision, Code 4	\$26,371,000
1	5	Governor's Harbour (MYEM), Eleuthera - 8,035' x 150', Non-Instrument, Code 4	\$503,000
1	6	South Bimini (MYBS), Bimini Island - 5,409' x 100', Non-Instrument, Code 3	\$1,162,400
Probable Cost of Airside & Civil Works Capital Development - Tier 1 Aerodromes			\$32,925,100
2	7	New Bight (MYCB), Cat Island - 4,980' x 100', Non-Instrument, Code 3	\$3,155,800
2	8	San Andros International (MYAN), Andros - 5,002' x 100', Non-Instrument, Code 3	\$10,014,600
2	9	Rock Sound (MYER), Eleuthera - 7,213' x 150', Non-Instrument, Code 4	\$3,683,000
2	10	Great Harbour Cay (MYBG), Berry Islands - 4,536' x 80', Non-Instrument, Code 3	\$2,217,000
2	11	Deadman's Cay (MYLD), Long Island - 4,000' x 100', Non-Instrument, Code 3	\$2,215,500
2	12	Fresh Creek (MYAF), Andros Island - 4,362' x 100', Non-Instrument, Code 3	\$8,173,500
2	13	Matthew Town (MYIG), Inagua Island - 7,020' x 100', Non-Instrument, Code 4	\$12,948,500
Probable Cost of Airside & Civil Works Capital Development - Tier 2 Aerodromes			\$42,407,900
3	14	Treasure Cay (MYAT), Abaco Island - 7,001' x 150', Non-Precision, Code 4 (Alternative 2)	\$945,000
3	15	Mayaguana (MYMM), Mayaguana - 4,175 x 100', Non-Instrument, Code 3	\$157,000
3	16	New Port Nelson (MYRP), Rum Cay - 4,500' x 100', Non-Instrument, Code 3	\$1,186,000
3	17	Sandy Point (MYAS), Abaco Island - 4,503' x 100', Non-Instrument, Code 3	\$4,620,000
3	18	Moores Island (MYAO), Abaco Island - 3,026' x 100', Non-Instrument, Code 2	\$457,000
3	19	Clarence A. Bain (MYAB), Andros Island - 5,015' x 100', Non-Instrument, Code 3	\$8,802,000
3	20	Stella Maris (MYLS), Long Island - 4,000' x 75', Non-Instrument, Code 3	\$5,725,000
3	21	Staniel Cay (MYES), Exuma Island - 3,030' x 75', Non-Instrument, Code 2	\$4,895,000
3	22	Black Point (MYEB), Exuma Island - 2,700' x 60', Non-Instrument, Code 2	\$230,000
3	23	Farmers Cay, Exuma Island - 2,500' x 60', Non-Instrument, Code 1	\$2,668,000
3	24	Congo Town (MYAK), Andros Island - 5,321' x 100', Non-Instrument, Code 3	\$2,299,500
3	25	Colonel Hill (MYCI), Crooked Island - 4,026' x 60', Non-Instrument, Code 3	\$6,539,000
3	26	Spring Point (MYAP), Acklins Island - 5,000' x 150', Non-Instrument, Code 3	\$7,669,000
3	27	Duncan Town (MYRD), Ragged Island - 3,798' x 75', Non-Instrument, Code 2	\$1,038,000
3	28	Arthur's Town (MYCA), Cat Island - 7,000' x 150', Non-Instrument, Code 4	\$10,446,000
Probable Cost of Airside & Civil Works Capital Development - Tier 3 Aerodromes			\$57,676,500
PROBABLE COST OF AIRSIDE & CIVIL WORKS CAPITAL DEVELOPMENT - ALL AERODROMES			\$133,009,500

Notes:

1. Probable cost of capital is based on cursory (maximum 2 hour) site assessments of each aerodrome and information provided by BCAD.
2. Unless otherwise noted, no site surveys or investigations have been relied upon.
3. Costs are based on preliminary development plans (attached as Appendix A) prepared by Stantec/Aviotec.
4. Costs are in current (2014) U.S. dollars and include for all project management, planning, engineering/design, tendering, surveys, geotechnical investigations, contractor mark-up, mobilisation and demobilisation, contract administration and inspection and design/construction contingencies.

APPENDIX B

Project: Comprehensive Strategy for Optimization - Capital Development Plans - TIER 1
Airport: Bahamas Family Islands Airports

Estimate By: MAZ
Date: 15/07/2014

Reviewed By: JJD
Date: 16/07/2014

Estimate is based on Class D cost estimating methodology and 2014 US dollars.

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Marsh Harbour (MYAM), Abaco - 6,100' x 100', Non-Precision, Code 4					
1.1	Correct Runway Pavement Overlay Transition	2	2	4	\$4,500
1.2	Clear Vegetation from Taxiway Strip and Regrade Area	2	4	8	\$21,000
1.3	New Illuminated Wind Direction Indicator (2)	3	6	18	\$31,000
1.4	New Runway Pavement Markings	3	4	12	\$31,000
1.5	Hazard Lights and Markings on New ATC Tower	4	8	32	\$42,000
1.6	Remove Trees and Vegetation from Runway Strip and Infringing Transition Surface	4	6	24	\$235,000
1.7	New Aerodrome Beacon	3	4	12	\$11,000
1.8	Resolve Obstacles (trees, terrain, buildings) Penetrating the Take-off/Approach Surfaces	4	7	28	\$115,000
Probable Cost of Airside & Civil Works Capital Development - Marsh Harbour (MYAM)					\$490,500

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Exuma International (MYEF), Exuma - 7,000' x 150', Non-Precision, Code 4					
2.1	New Runway Pavement Markings	3	4	12	\$33,000
2.2	Remove Trees & Vegetation From Runway Strip and Infringing Transition Surface & Approaches	4	7	28	\$228,000
2.3	New Illuminated Wind Direction Indicator (2)	3	6	18	\$33,000
2.4	New Aircraft Turn Pad (2)	2	3	6	\$309,600
2.5	Localized Repairs to Aircraft Parking Apron	2	3	6	\$546,000
2.6	Drain Wetland Area and In-fill Within the Runway Strip Area	3	7	21	\$251,000
2.7	Replace Rwy 12 Approach Lighting System	3	5	15	\$375,000
2.8	Repairs to PAPI Units (Electrical)	3	7	21	\$40,000
2.9	Repairs to Runway Lighting (Various Damaged and Unserviceable Fixtures)	3	6	18	\$28,000
2.10	Apron Safety Marking and Aircraft Holding Point Marking and Sign	4	7	28	\$2,500
2.11	New Apron Flood Lighting	1	3	3	\$40,000
Probable Cost of Airside & Civil Works Capital Development - Exuma International (MYEF)					\$1,886,100

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
San Salvador International (MYSM), San Salvador - 8,000' x 150', Non-Precision, Code 4					
3.1	Repair Stopway Pavement and Reduce Stopway Length	2	8	16	\$430,000
3.2	Replace Rwy 10 Approach Lighting	3	5	15	\$390,000
3.3	New Illuminated Wind Direction Indicator (2)	3	6	18	\$33,000
3.4	New Runway Pavement Markings	3	4	12	\$36,800
3.5	Decommission Portion of Existing GA Apron	2	5	10	\$10,000
3.6	Remove Trees and Vegetation From Runway Strip and Infringing Transition Surface	4	7	28	\$102,000
3.7	Remove Building Structures From Runway Strip	4	6	24	\$30,000
3.8	Realign Existing Public Roadway	4	5	20	\$480,000
3.9	Expand GA and Passenger (International) Apron	2	4	8	\$872,300
3.10	In-fill Wetland Areas within Runway Strip	3	6	18	\$65,000
3.11	Correct Grading and Slopes within Runway Strip and Eliminate Protrusions	3	6	18	\$50,000
3.12	Replace Aerodrome Beacon	3	4	12	\$13,000
Probable Cost of Airside & Civil Works Capital Development - San Salvador International (MYSM)					\$2,512,100

APPENDIX B

Project: Comprehensive Strategy for Optimization - Capital Development Plans - TIER 1
Airport: Bahamas Family Islands Airports

Estimate By: MAZ
Date: 15/07/2014

Reviewed By: JJD
Date: 16/07/2014

Estimate is based on Class D cost estimating methodology and 2014 US dollars.

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
North Eleuthera (MYEH), Eleuthera - 6,800' x 150', Non-Precision, Code 4					
4.1	Selective Repair of Apron Pavement	2	3	6	\$105,000
4.2	Expand Commercial Passenger Apron	2	4	8	\$516,000
4.3	Convert Apron Into Dual Taxiway Connections	2	5	10	\$98,000
4.4	Convert Runway Into 75' Wide Taxiway with Edge Lighting & Decommission Existing Lighting	4	5	20	\$248,000
4.5	New PAPI Installation (Each Approach)	4	7	28	\$340,000
4.6	Remove Trees & Vegetation Within Runway Strip, Approaches & Infringing Transition Surfaces	4	8	32	\$1,045,000
4.7	Construct New 6800'x150' Runway and Taxiway Connections with Edge, Threshold/End Lighting	4	6	24	\$22,540,000
4.8	New Runway Approach Lighting (Both Ends)	4	6	24	\$780,000
4.9	New Illuminated Wind Direction Indicators (2)	4	6	24	\$35,000
4.10	New Aerodrome Beacon	3	4	12	\$13,000
4.11	Rehabilitate Pavement Near Former RWY 07 Threshold	4	3	12	\$651,000
Probable Cost of Airside & Civil Works Capital Development - North Eleuthera (MYEH)					\$26,371,000

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Governor's Harbour (MYEM), Eleuthera - 8,035' x 150', Non-Instrument, Code 4					
5.1	Eliminate Instrument Approach/Departure Procedures	4	8	32	N/A
5.2	Replace Threshold/End Lights	3	6	18	\$6,500
5.3	New Illuminated Wind Direction Indicator (2)	3	6	18	\$35,000
5.4	New Runway Pavement Markings	3	4	12	\$36,000
5.5	Fill Taxiway Graded Area and Provide Proper Slopes	2	4	8	\$75,000
5.6	Remove Trees & Vegetation From Runway Strip and Infringing Transition Surface & Approaches	4	6	24	\$168,000
5.7	Localized Repairs to Aircraft Apron	2	3	6	\$110,000
5.8	Displace Rwy 33 Threshold by 265'	4	7	28	\$7,500
5.9	Repairs to Taxiway Lighting (correct non-compliance)	3	5	15	\$12,000
5.10	Repairs to PAPI Units	3	6	18	\$40,000
5.11	New Aerodrome Beacon	3	4	12	\$13,000
Probable Cost of Airside & Civil Works Capital Development - North Eleuthera (MYEH)					\$503,000

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
South Bimini (MYBS), Bimini Island - 5,409' x 100', Non-Instrument, Code 3					
6.1	Fill and Grade Runway Strip Beyond Rwy 10 Threshold to Minimize Flooding	2	7	14	\$84,400
6.2	Expand Aircraft Parking Apron and Localized Repairs to Existing Apron	2	5	10	\$758,000
6.3	New Illuminated Wind Direction Indicator (2)	3	6	18	\$35,000
6.4	Relocate Public Roadway	2	4	8	\$142,000
6.5	Decommission Portion of Existing GA Apron	3	6	18	\$55,000
6.6	Remove Trees and Vegetation Infringing Transition Surfaces and Approaches	4	6	24	\$48,000
6.7	Relocate Fencing Underneath Rwy 10 Approach Surface	4	8	32	\$40,000
Probable Cost of Airside & Civil Works Capital Development - South Bimini (MYBS)					\$1,162,400

PROBABLE COST OF AIRSIDE & CIVIL WORKS DEVELOPMENT - ALL TIER 1 AERODROMES (Carried Forward To Summary)					\$32,925,100
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Notes:

1. Probable cost of capital is based on cursory (maximum 2 hour) site assessments of each aerodrome and information provided by BCAD.
2. Unless otherwise noted, no site surveys or investigations have been relied upon.
3. Costs are based on preliminary development plans (attached as Appendix A) prepared by Stantec/Aviotech.
4. Costs are in current (2014) U.S. dollars and include for all project management, planning, engineering/design, tendering, surveys, geotechnical investigations, contractor mark-up, mobilisation and demobilisation, contract administration and inspection and design/construction contingencies.

APPENDIX B

Project: Comprehensive Strategy for Optimization - Capital Development Plans - TIER 2
Airport: Bahamas Family Islands Airports

Estimate By: MAZ
Date: 15/07/2014

Reviewed By: JJD
Date: 16/07/2014

Estimate is based on Class D cost estimating methodology and 2014 US dollars.

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
New Bight (MYCB), Cat Island - 4,980' x 100', Non-Instrument, Code 3					
7.1	Selective Repairs to Runway Pavement	2	5	10	\$320,000
7.2	Repairs to Runway Edge Lighting	3	6	18	\$10,000
7.3	New Solar Illuminated Wind Direction Indicator (2)	3	6	18	\$36,000
7.4	New Runway Pavement Markings	3	4	12	\$24,300
7.5	New Aircraft Turn Pad (2)	2	3	6	\$285,000
7.6	Remove Trees and Vegetation Infringing Transition Surface	4	8	32	\$100,000
7.7	New Taxiway Connection with Solar Edge Lighting	3	7	21	\$380,000
7.8	New Aircraft Parking Apron with Solar Edge Lighting	3	6	18	\$1,910,000
7.9	New Access Road and ARFF Parking	2	3	6	\$21,000
7.10	Displace Rwy 09 Threshold by 423' (128.9m)	4	8	32	\$4,500
7.11	Decommission and Remove Existing Apron Pavement	3	4	12	\$65,000
Probable Cost of Airside & Civil Works Capital Development - New Bight (MYCB)					\$3,155,800

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
San Andros International (MYAN), Andros - 5,002' x 100', Non-Instrument, Code 3					
8.1	Rehabilitate Runway and Taxi Pavement	2	5	10	\$8,054,000
8.2	New Solar Illuminated Wind Direction Indicator (2)	3	6	18	\$35,000
8.3	New Aircraft Turn Pad (2)	2	3	6	\$290,000
8.4	New Runway Pavement Markings	3	4	12	\$23,600
8.5	Remove Trees and Vegetation From Runway Strip and Infringing Transition Surface and Approaches and Regrade Runway Strip	4	8	32	\$384,000
8.6	In-fill Wetland Area Encroaching Runway Strip	2	7	14	\$80,000
8.7	Expand Aircraft Parking Apron	2	4	8	\$418,000
8.8	New Solar Runway Edge/Threshold/End Lights and Decommission Existing Lighting System	3	6	18	\$113,000
8.9	New PAPI Installation (Each Approach)	3	7	21	\$340,000
8.10	New Perimeter Security Fence in Select Areas	3	6	18	\$95,000
8.11	New 3-Strand Wildlife Control Fencing Around Airport Perimeter	3	3	9	\$182,000
Probable Cost of Airside & Civil Works Capital Development - San Andros International (MYAN)					\$10,014,600

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Rock Sound (MYER), Eleuthera - 7,213' x 150', Non-Instrument, Code 4					
9.1	Reduce Runway to 6754' length	4	8	32	\$12,000
9.2	New 492'x460' Clearway	3	5	15	\$40,000
9.3	Eliminate Instrument Approach/Departure Procedures	4	8	32	N/A
9.4	New PAPI Installation (Each Approach)	3	7	21	\$340,000
9.5	New Aircraft Turn Pad	2	3	6	\$135,000
9.6	Relocate Taxiway Connection	2	6	12	\$511,000
9.7	Remove Trees and Vegetation from Runway Strip and Regrade	4	4	16	\$171,000
9.8	New Solar Illuminated Wind Direction Indicator	3	6	18	\$35,000
9.9	Rehabilitate Portion of Pavement From Runway Rwy 27 Threshold to 1000'	2	7	14	\$1,980,000
9.10	Replace Runway Edge/Threshold/End Lighting with Solar Fixtures	3	6	18	\$166,000
9.11	New Pavement Pavement Markings	3	4	12	\$33,000
9.12	Construct 500' of Sea Wall and In-Fill Runway Strip Area	3	7	21	\$260,000
Probable Cost of Airside & Civil Works Capital Development - Rock Sound (MYER)					\$3,683,000

APPENDIX B

Project: Comprehensive Strategy for Optimization - Capital Development Plans - TIER 2
Airport: Bahamas Family Islands Airports

Estimate By: MAZ
Date: 15/07/2014

Reviewed By: JJD
Date: 16/07/2014

Estimate is based on Class D cost estimating methodology and 2014 US dollars.

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Great Harbour Cay (MYBG), Berry Islands - 4,536' x 80', Non-Instrument, Code 3					
10.1	Reduce Runway to 3936' (Reduce to ICAO Code 2)	4	8	32	\$14,000
10.2	New 262' x 380' Clearway	3	5	15	\$30,000
10.3	New 100' x 220' Stopway	4	6	24	\$15,000
10.4	New PAPI Installation (2)	3	7	21	\$350,000
10.5	New Aircraft Turn Pad	2	3	6	\$98,000
10.6	New Aircraft Parking Apron and Taxiway Connection	3	6	18	\$988,000
10.7	Remove Trees & Vegetation From Runway Strip and Infringing Transition Surface & Approaches	4	7	28	\$163,000
10.8	Parking Lot Areas for New Terminal Building	3	3	9	\$70,000
10.9	Demolish Existing Terminal, Storage Building and Customs & Immigration Buildings	4	5	20	\$100,000
10.10	Relocate Public Roadway	4	4	16	\$241,000
10.11	Complete Perimeter Security Fencing Along North and West Sides	3	5	15	\$140,000
10.12	Reinstall Solar Runway Threshold/End Lighting	3	5	15	\$8,000
Probable Cost of Airside & Civil Works Capital Development - Great Harbour Cay (MYBG)					\$2,217,000

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Deadman's Cay (MYLD), Long Island - 4,000' x 100', Non-Instrument, Code 3					
11.1	Reduce Runway Length by 64' (Reduce to ICAO Code 2)	4	8	32	N/A
11.2	Repairs to Threshold/End Lights	3	4	12	\$6,500
11.3	New Solar Illuminated Wind Direction Indicator (2)	3	6	18	\$35,000
11.4	New Runway Pavement Markings	3	4	12	\$21,000
11.5	New PAPI Installation (2)	3	7	21	\$350,000
11.6	Localized Repairs to Runway and Apron Pavements	2	6	12	\$290,000
11.7	Remove Trees & Vegetation From Runway Strip and Infringing Transition Surface & Approaches	4	7	28	\$108,000
11.8	Demolish and Dispose of Out Buildings Within the Runway Strip and Infringing Transition Surface	4	7	28	\$55,000
11.9	Security Fencing and Restricted Signage in Select Areas	3	8	24	\$70,000
11.10	New 3-Strand Wildlife Control Fencing Around Airport Perimeter	3	4	12	\$180,000
11.11	New Aircraft Turn Pad (2)	2	4	8	\$200,000
11.12	Relocate Fencing From Underneath Rwy 09 Approach/Take-off Surface	4	7	28	\$40,000
11.13	Relocate Public Roadway to Beyond Rwy 27 Threshold	3	8	24	\$860,000
Probable Cost of Airside & Civil Works Capital Development - Deadman's Cay (MYLD)					\$2,215,500

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Fresh Creek (MYAF), Andros Island - 4,362' x 100', Non-Instrument, Code 3					
12.1	Rehabilitate Runway Pavement and New Pavement Markings	2	7	14	\$5,150,000
12.2	Extend Runway to 4800'	2	8	16	\$785,000
12.3	New Solar Illuminated Wind Direction Indicator (2)	3	6	18	\$35,000
12.4	New Solar Runway Edge/Threshold/End Lights and Decommission Existing System	3	6	18	\$120,000
12.5	Remove Distance Remaining Signs	2	4	8	\$5,500
12.6	New Aircraft Parking Apron with Taxiway Connection	3	7	21	\$1,400,000
12.7	Remove Tall Trees and Heavy Vegetation From Runway Strip and Regrade Runway Strip	4	9	36	\$352,000
12.8	Aircraft Turn Pad	2	3	6	\$110,000
12.9	Displace Rwy 27 Threshold by 300'	4	7	28	\$8,000
12.10	Complete Airport Perimeter Security Fence	3	7	21	\$140,000
12.11	Remove and Decommission Existing Taxiway	2	6	12	\$30,000
12.12	Remove and Decommission Existing Apron	2	4	8	\$38,000
Probable Cost of Airside & Civil Works Capital Development - Fresh Creek (MYAF)					\$8,173,500

APPENDIX B

Project: Comprehensive Strategy for Optimization - Capital Development Plans - TIER 2
Airport: Bahamas Family Islands Airports

Estimate By: MAZ
Date: 15/07/2014

Reviewed By: JJD
Date: 16/07/2014

Estimate is based on Class D cost estimating methodology and 2014 US dollars.

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Matthew Town (MYIG), Inagua Island - 7,020' x 100', Non-Instrument, Code 4					
13.1	Rehabilitate Full Runway Pavement	2	6	12	\$10,300,000
13.2	Replace Threshold/End Lights	3	7	21	\$7,000
13.3	New Solar Illuminated Wind Direction Indicator (2)	3	6	18	\$30,000
13.4	New Runway Pavement Markings	3	4	12	\$31,500
13.5	New PAPI Installation	3	6	18	\$185,000
13.6	Remove Trees and Vegetation from Runway Strip and Infringing Transition Surface	4	5	20	\$247,000
13.7	New Aircraft Parking Apron and Taxiway Connection	3	6	18	\$1,856,000
13.8	Parking Lot and Road Access for New Terminal Building	2	5	10	\$220,000
13.8	New Clearway at Rwy 10 Approach	3	5	15	\$32,000
13.9	New Clearway at Rwy 28 Approach	3	5	15	\$40,000
Probable Cost of Airside & Civil Works Capital Development - Matthew Town (MYIG)					\$12,948,500
PROBABLE COST OF AIRSIDE & CIVIL WORKS DEVELOPMENT - ALL TIER 2 AERODROMES (Carried Forward To Summary)					\$42,407,900

Notes:

1. Probable cost of capital is based on cursory (maximum 2 hour) site assessments of each aerodrome and information provided by BCAD.
2. Unless otherwise noted, no site surveys or investigations have been relied upon.
3. Costs are based on preliminary development plans (attached as Appendix A) prepared by Stantec/Aviotec.
4. Costs are in current (2014) U.S. dollars and include for all project management, planning, engineering/design, tendering, surveys, geotechnical investigations, contractor mark-up, mobilisation and demobilisation, contract administration and inspection and design/construction contingencies.

APPENDIX B

Project: Comprehensive Strategy for Optimization - Capital Development Plans - TIER 3
Airport: Bahamas Family Islands Airports

Estimate By: MAZ
Date: 15/07/2014

Reviewed By: JJD
Date: 16/07/2014

Estimate is based on Class D cost estimating methodology and 2014 US dollars.

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Treasure Cay (MYAT), Abaco Island - 7,001' x 150', Non-Precision, Code 4 (Alternative 2)					
14.1	Decommission Stopway and Associated Pavement	2	3	6	\$18,000
14.2	Change Runway Operations to Strictly VFR	3	6	18	N/A
14.3	New Wind Direction Indicator (2)	3	6	18	\$35,000
14.4	New Runway Pavement Markings	3	4	12	\$33,000
14.5	Decommission/Remove Approach Lighting	2	4	8	\$60,000
14.6	Remove Trees & Vegetation From Runway Strip and Infringing Transition Surface & Approaches	4	7	28	\$280,000
14.7	New Perimeter Security Fencing in Select Areas	3	4	12	\$164,000
14.8	New 3-Strand Wildlife Control Fencing Around Airport Perimeter	3	5	15	\$320,000
14.9	General Repairs to Runway Edge, Threshold/End Lighting	3	6	18	\$35,000
Probable Cost of Airside & Civil Works Capital Development - Treasure Cay (MYAT)					\$945,000

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Mayaguana (MYMM), Mayaguana - 4,175 x 100', Non-Instrument, Code 3					
15.1	New Solar Illuminated Wind Direction Indicator	3	6	18	\$16,000
15.2	New Runway Markings	3	4	12	\$23,000
15.3	Remove Trees and Vegetation From Runway Strip and Infringing Transition Surface	4	6	24	\$118,000
Probable Cost of Airside & Civil Works Capital Development - Mayaguana (MYMM)					\$157,000

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
New Port Nelson (MYRP), Rum Cay - 4,500' x 100', Non-Instrument, Code 3					
16.1	Selective Repairs to Runway Pavement	2	7	14	\$180,000
16.2	New Solar Runway Edge, Threshold/End Lighting	3	5	15	\$68,000
16.3	New Solar Illuminated Wind Direction Indicator	3	6	18	\$17,000
16.4	New Runway Markings	3	4	12	\$24,000
16.5	Apron Safety Line and Taxiway Holding Marking	3	6	18	\$9,000
16.6	Remove Trees & Vegetation From Runway Strip and Infringing Transition Surface & Approaches	4	7	28	\$455,000
16.7	New 3-Strand Wildlife Control Fence Around Airport Perimeter	3	7	21	\$420,000
16.8	Displace Rwy 27 Threshold by 120' (36.6m) and Install New Solar Threshold Lighting	4	6	24	\$13,000
Probable Cost of Airside & Civil Works Capital Development - New Port Nelson (MYRP)					\$1,186,000

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Sandy Point (MYAS), Abaco Island - 4,503' x 100', Non-Instrument, Code 3					
17.1	Rehabilitation of Full Runway Pavement (Sand Seal)	2	6	12	\$3,320,000
17.2	Repairs to Runway Edge and Threshold/End Lights	3	5	15	\$30,000
17.3	New Solar Illuminated Wind Direction Indicator	3	6	18	\$15,000
17.4	New Runway Pavement Markings	3	4	12	\$22,000
17.5	New Taxiway Connection with Solar Edge Lighting	3	6	18	\$180,000
17.6	Remove Trees & Vegetation From Runway Strip and Infringing Transition Surface & Approaches	4	7	28	\$340,000
17.7	New Aircraft Parking Apron	3	5	15	\$370,000
17.8	New Airport Access Road and Parking	1	3	3	\$65,000
17.9	New Security Fencing Along North Perimeter	3	3	9	\$120,000
17.10	New 3-Strand Wildlife Control Fencing Along South, West and East Perimeters	3	5	15	\$158,000
Probable Cost of Airside & Civil Works Capital Development - Sandy Point (MYAS)					\$4,620,000

APPENDIX B

Project: Comprehensive Strategy for Optimization - Capital Development Plans - TIER 3
Airport: Bahamas Family Islands Airports

Estimate By: MAZ
Date: 15/07/2014

Reviewed By: JJD
Date: 16/07/2014

Estimate is based on Class D cost estimating methodology and 2014 US dollars.

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Moore's Island (MYAO), Abaco Island - 3,026' x 100', Non-Instrument, Code 2					
18.1	Expand Aircraft Parking Apron	2	5	10	\$124,000
18.2	Minor Repairs to Runway Edge Lighting and Threshold/End Lights	3	5	15	\$10,000
18.3	New Solar Illuminated Wind Direction Indicator (2)	3	6	18	\$33,000
18.4	New Runway Pavement Markings	3	4	12	\$18,000
18.5	New Public Parking Lot	1	3	3	\$35,000
18.6	Remove Trees & Vegetation From Runway Strip and Infringing Transition Surface & Approaches	4	6	24	\$155,000
18.7	Fill Areas Near Rwy 27 Threshold and Regrade Runway Strip	2	8	16	\$60,000
18.8	Security Fencing at Waiting Area and Public Parking Lot	1	6	6	\$22,000
Probable Cost of Airside & Civil Works Capital Development - Moore's Island (MYAO)					\$457,000

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Clarence A. Bain (MYAB), Andros Island - 5,015' x 100', Non-Instrument, Code 3					
19.1	Decommission and Remove a Portion of Existing Aircraft Apron	2	2	4	\$30,000
19.2	New Solar Wind Direction Indicator (2)	3	6	18	\$33,000
19.3	Full Rehabilitation of Runway Pavement	2	7	14	\$7,240,000
19.4	New Runway Pavement Markings	3	4	12	\$26,000
19.5	Relocate Public Parking Lot	3	6	18	\$225,000
19.6	Remove Trees and Heavy Vegetation From Runway Strip and Infringing Transition Surface	4	9	36	\$388,000
19.7	Remove Tall Trees from Under Approach Surfaces	4	8	32	\$80,000
19.8	Expand Aircraft Parking Apron	3	6	18	\$780,000
Probable Cost of Airside & Civil Works Capital Development - Clarence A. Bain (MYAB)					\$8,802,000

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Stella Maris (MYLS), Long Island - 4,000' x 75', Non-Instrument, Code 3					
20.1	Reduce Runway Length by 157' (Reduce to ICAO Code 2)	3	9	27	\$6,000
20.2	New Solar Runway Edge, Threshold/End Lighting	3	5	15	\$65,000
20.3	New Solar Illuminated Wind Direction Indicator (2)	3	6	18	\$34,000
20.4	New Runway Pavement Markings	3	4	12	\$22,000
20.5	New Aircraft Turn Pad (2)	2	4	8	\$210,000
20.6	Rehabilitate Full Runway and Taxiway Pavements	2	6	12	\$4,770,000
20.7	Remove Trees and Vegetation From Runway Strip and Infringing Transition Surface	4	7	28	\$428,000
20.8	Displace Rwy 13 Threshold by 328'	4	7	28	\$10,000
20.9	New Perimeter Security Fencing in Select Areas	3	6	18	\$180,000
Probable Cost of Airside & Civil Works Capital Development - Stella Maris (MYLS)					\$5,725,000

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Staniel Cay (MYES), Exuma Island - 3,030' x 75', Non-Instrument, Code 2					
21.1	Apron Safety Marking and Aircraft Holding Point Marking and Sign	3	6	18	\$4,000
21.2	Reconstruct Runway Along New Alignment (Sand Seal)	3	7	21	\$3,000,000
21.3	New Solar Illuminated Wind Direction Indicator	3	6	18	\$15,000
21.4	New Sea Wall and Land Fill at Rwy 35 End	4	7	28	\$275,000
21.5	Raise Elevation at Rwy 17 Threshold by 1.5'	3	5	15	\$280,000
21.6	Reinstate Runway Edge Lighting and Provide New Threshold/End Lighting	3	4	12	\$45,000
21.7	Rehabilitate Aircraft Apron and Taxiway Connection	2	6	12	\$620,000
21.8	Expand Aircraft Parking Apron	2	5	10	\$276,000
21.9	New Security Fencing Around Terminal Area and Select Areas	1	6	6	\$90,000
21.10	Relocated Roadway and Install Vehicle Control Barriers on Each Side	4	6	24	\$260,000
21.11	Displace Rwy 17 Threshold by 200'	4	8	32	\$10,000
21.12	Decommission and Remove a Portion of Existing Apron	2	4	8	\$20,000
Probable Cost of Airside & Civil Works Capital Development - Staniel Cay (MYES)					\$4,895,000

APPENDIX B

Project: Comprehensive Strategy for Optimization - Capital Development Plans - TIER 3
Airport: Bahamas Family Islands Airports

Estimate By: MAZ
Date: 15/07/2014

Reviewed By: JJD
Date: 16/07/2014

Estimate is based on Class D cost estimating methodology and 2014 US dollars.

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Black Point (MYEB), Exuma Island - 2,700' x 60', Non-Instrument, Code 2					
22.1	Remove Trees & Vegetation From Runway Strip and Infringing Transition Surface & Approaches	4	8	32	\$157,000
22.2	New Solar Illuminated Wind Direction Indicator	3	6	18	\$15,000
22.3	New Taxiway Fillets	2	5	10	\$22,000
22.4	Repairs to Runway and Taxiway Lighting	3	5	15	\$20,000
22.5	New Runway Markings	3	4	12	\$16,000
Probable Cost of Airside & Civil Works Capital Development - Black Point (MYEB)					\$230,000

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Farmers Cay, Exuma Island - 2,500' x 60', Non-Instrument, Code 1					
23.1	Rehabilitate Full Runway Pavement (Sand Seal)	2	5	10	\$1,160,000
23.2	Repairs to Runway and Apron Lighting	3	4	12	\$25,000
23.3	New Solar Illuminated Wind Direction Indicator	3	6	18	\$17,000
23.4	New Aircraft Parking Apron and Taxiway Connection	3	7	21	\$560,000
23.5	Remove Garbage and Debris From Runway Graded Area and Correct Surface Slopes	4	5	20	\$45,000
23.6	Remove Trees and Vegetation From Runway Strip and Infringing Transition Surface	4	5	20	\$21,000
23.7	New Security Fencing and Access Gate in Select Areas	3	7	21	\$70,000
23.8	Relocate Passenger Waiting Area	1	6	6	\$90,000
23.9	Single Vehicle Steel Prefabricated Bridge on Pile Foundations with Gravel Road Approaches	1	3	3	\$600,000
23.10	Decommission Existing Aircraft Parking Aprons	2	3	6	\$80,000
Probable Cost of Airside & Civil Works Capital Development - Farmers Cay					\$2,668,000

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Congo Town (MYAK), Andros Island - 5,321' x 100', Non-Instrument, Code 3					
24.1	Apron Safety Marking and Aircraft Holding Point Marking and Sign	3	6	18	\$4,500
24.2	New Solar Illuminated Wind Direction Indicator (2)	3	6	18	\$33,000
24.3	Minor Repairs to Apron Pavement	2	4	8	\$200,000
24.4	New Runway Pavement Markings	3	4	12	\$27,000
24.5	Reduce Runway Length by 112' and Change Rwy 28 Threshold Displacement to 400'	4	7	28	\$10,000
24.6	Remove Trees & Vegetation From Runway Strip and Infringing Transition Surface & Approaches	4	8	32	\$470,000
24.7	New Aircraft Turn Pad (2)	2	4	8	\$200,000
24.8	Expand Aircraft Parking Apron	2	6	12	\$960,000
24.9	Relocate Airport Access Road	3	5	15	\$220,000
24.10	New PAPI Installation	3	5	15	\$175,000
Probable Cost of Airside & Civil Works Capital Development - Congo Town (MYAK)					\$2,299,500

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Colonel Hill (MYCI), Crooked Island - 4,026' x 60', Non-Instrument, Code 3					
25.1	Topographic Survey to Confirm Whether Terrain Infringes Rwy 09 Approach	4	7	28	\$22,000
25.2	Shorten Runway at Rwy 27 Threshold	4	7	28	\$7,000
25.3	Widen Runway to 100' (30.5m) width and Rehabilitate Existing Pavement	2	4	8	\$5,900,000
25.4	New Runway Pavement Markings	3	4	12	\$24,000
25.5	New Wind Direction Indicator	3	6	18	\$16,000
25.6	New Rwy 27 Threshold Solar Lighting	3	5	15	\$9,000
25.7	Remove Trees & Vegetation From Runway Strip and Infringing Transition Surface & Approaches	4	7	28	\$211,000
25.8	Perimeter Security Fencing in Select Areas	3	5	15	\$110,000
25.9	New 3-Strand Wildlife Control Fencing Around Airport Perimeter	3	6	18	\$240,000
Probable Cost of Airside & Civil Works Capital Development - Colonel Hill (MYCI)					\$6,539,000

APPENDIX B

Project: Comprehensive Strategy for Optimization - Capital Development Plans - TIER 3
Airport: Bahamas Family Islands Airports

Estimate By: MAZ
Date: 15/07/2014

Reviewed By: JJD
Date: 16/07/2014

Estimate is based on Class D cost estimating methodology and 2014 US dollars.

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Spring Point (MYAP), Acklins Island - 5,000' x 150', Non-Instrument, Code 3					
26.1	Rehabilitate Full Runway Pavement (Sand Seal)	2	6	12	\$6,110,000
26.2	Correct Taxiway Graded Area	2	6	12	\$30,000
26.3	New Solar illuminated Wind Direction Indicator	3	6	18	\$16,000
26.4	New Runway Pavement Markings	3	4	12	\$28,000
26.5	Rehabilitate Taxiway and Apron Pavements (Sand Seal)	2	5	10	\$1,090,000
26.6	Remove Trees & Vegetation From Runway Strip and Infringing Transition Surface & Approaches	4	8	32	\$375,000
26.7	Repair Taxiway Edge Lighting	2	6	12	\$20,000
Probable Cost of Airside & Civil Works Capital Development - Spring Point (MYAP)					\$7,669,000

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Duncan Town (MYRD), Ragged Island - 3,798' x 75', Non-Instrument, Code 2					
27.1	Repair Runway Pavement (first third of runway)	2	6	12	\$300,000
27.2	Replace Runway End Lights	3	5	15	\$25,000
27.3	New Solar Illuminated Wind Direction Indicator (2)	3	6	18	\$35,000
27.4	New Runway Pavement Markings	3	4	12	\$23,000
27.5	New PAPI Installation	3	5	15	\$185,000
27.6	Remove Trees and Vegetation Infringing Transition Surface	4	5	20	\$120,000
27.7	New 3-Strand Wildlife Control Fence Around Airport Perimeter	3	6	18	\$272,000
27.8	Displace Rwy 31 Threshold and New Threshold Lighting	4	6	24	\$8,000
27.9	Security Fence and Restricted Area Signage at Former Road Crossing	3	7	21	\$70,000
Probable Cost of Airside & Civil Works Capital Development - Duncan Town (MYRD)					\$1,038,000

Item No.	Item Description or Work Scope	Compl. Rank	Risk Rating	Priority Score	Probable Capital Cost
Arthur's Town (MYCA), Cat Island - 7,000' x 150', Non-Instrument, Code 4					
28.1	Rehabilitate Full Runway Pavement (Sand Seal)	2	6	12	\$8,820,000
28.2	New Aircraft Parking Apron	3	5	15	\$1,020,000
28.3	New Solar Illuminated Wind Direction Indicator (2)	3	6	18	\$35,000
28.4	New Runway Pavement Markings	3	4	12	\$34,000
28.5	Displace Rwy 32 Threshold by 328' (100m) and Install New Solar Threshold Lighting	4	7	28	\$8,000
28.6	Remove Trees & Vegetation From Runway Strip and Infringing Transition Surface & Approaches	4	7	28	\$192,000
28.7	New Taxiway Connection with Solar Edge Lighting	3	6	18	\$252,000
28.8	Decommission and Remove a Portion of Existing Apron Pavement	2	4	8	\$85,000
Probable Cost of Airside & Civil Works Capital Development - Arthur's Town (MYCA)					\$10,446,000

PROBABLE COST OF AIRSIDE & CIVIL WORKS DEVELOPMENT - ALL TIER 3 AERODROMES (Carried Forward To Summary)					\$57,676,500
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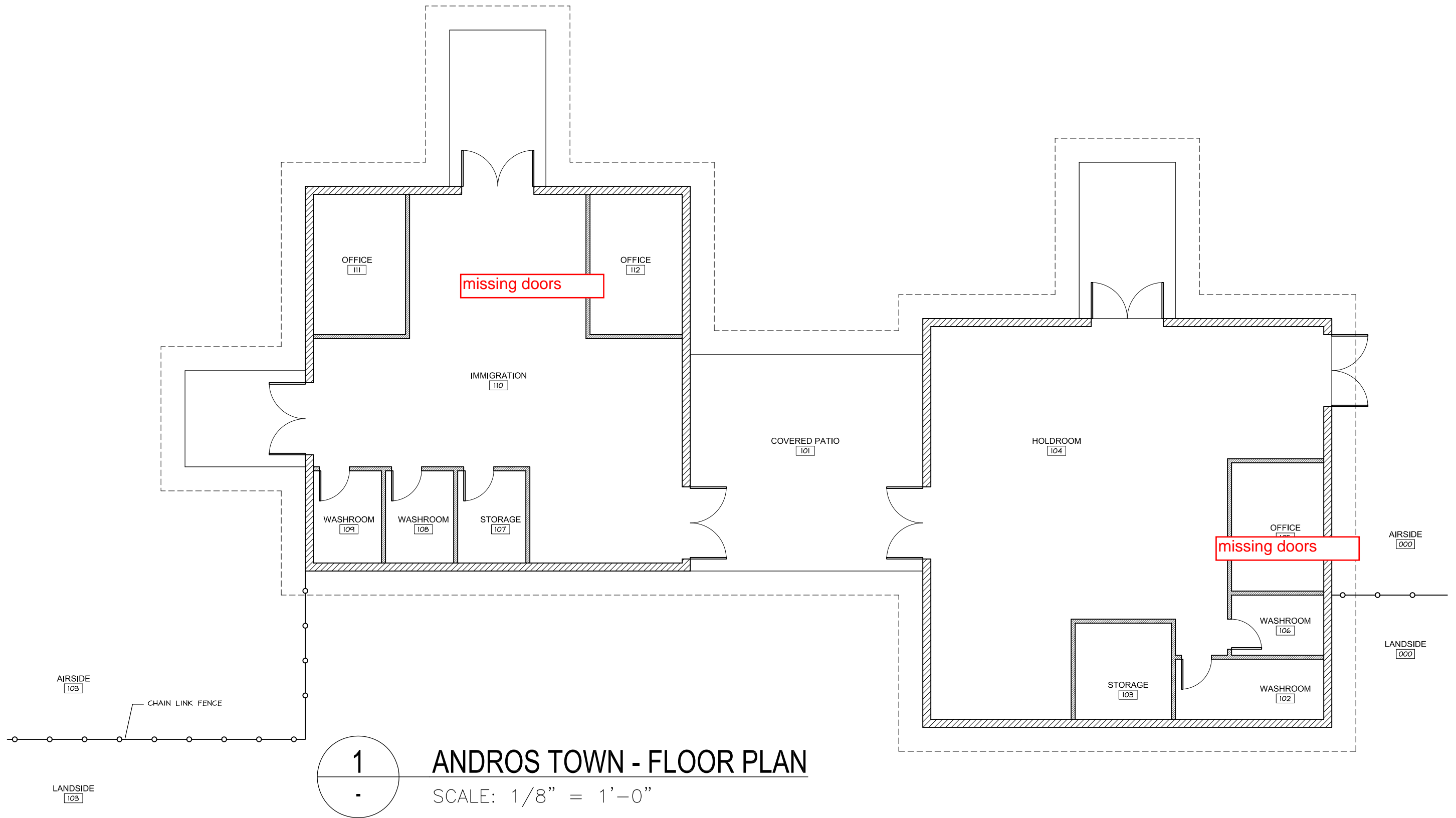
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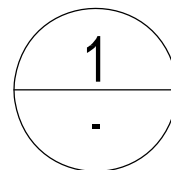
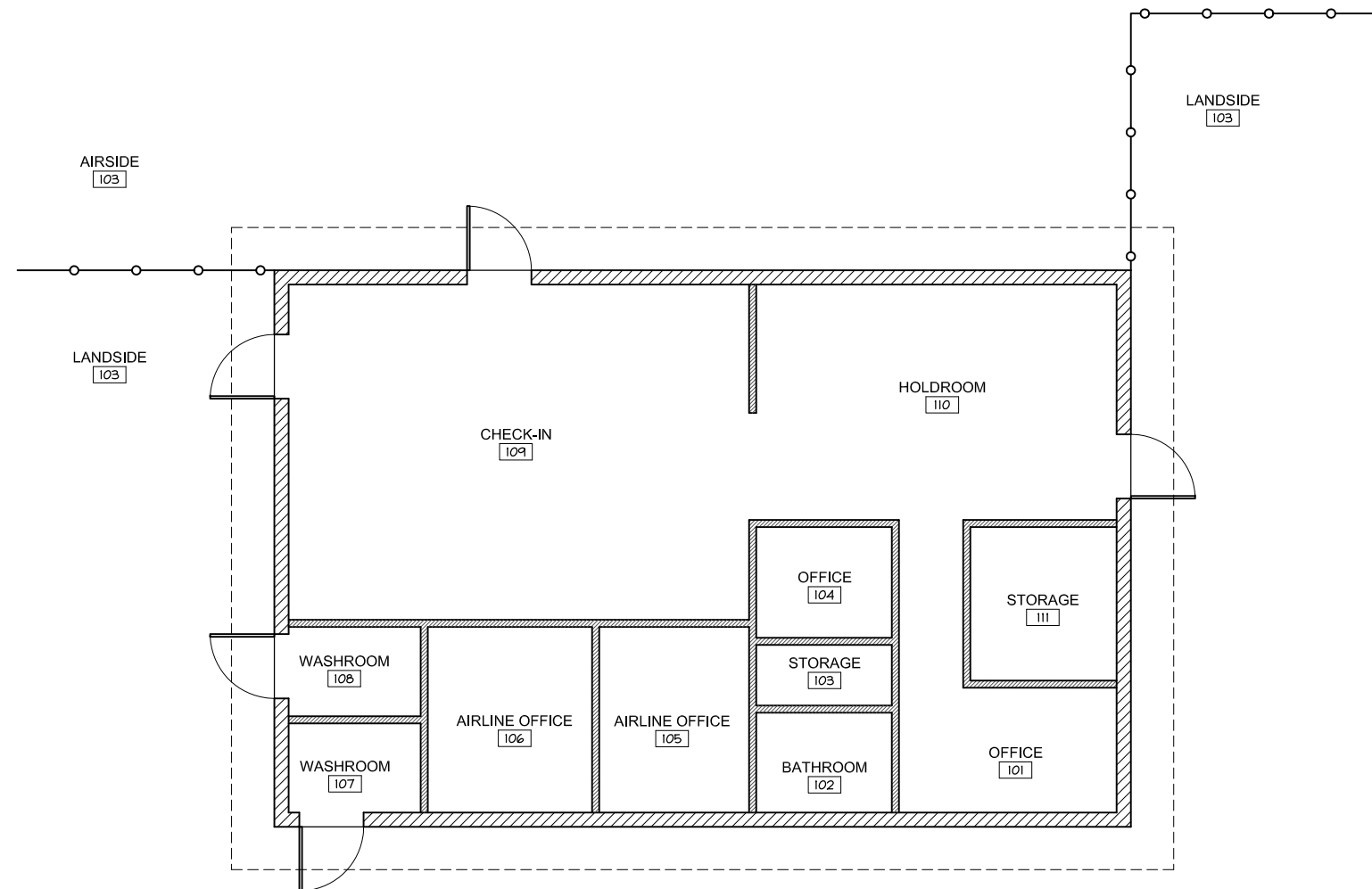
1. Probable cost of capital is based on cursory (maximum 2 hour) site assessments of each aerodrome and information provided by BCAD.
2. Unless otherwise noted, no site surveys or investigations have been relied upon.
3. Costs are based on preliminary development plans (attached as Appendix A) prepared by Stantec/Aviotec.
4. Costs are in current (2014) U.S. dollars and include for all project management, planning, engineering/design, tendering, surveys, geotechnical investigations, contractor mark-up, mobilisation and demobilisation, contract administration and inspection and design/construction contingencies.

**COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS –
AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS**

APPENDIX C – LANDSIDE PROGRAMMING AREAS AND COSTS
July 22, 2014

APPENDIX C – LANDSIDE PROGRAMMING AREAS AND COSTS





ARTHUR'S TOWN - FLOOR PLAN

SCALE: 1/8" = 1'-0"



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Civil Aviation Department, Bahamas
FAMILY ISLAND OPTIMIZATION

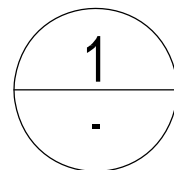
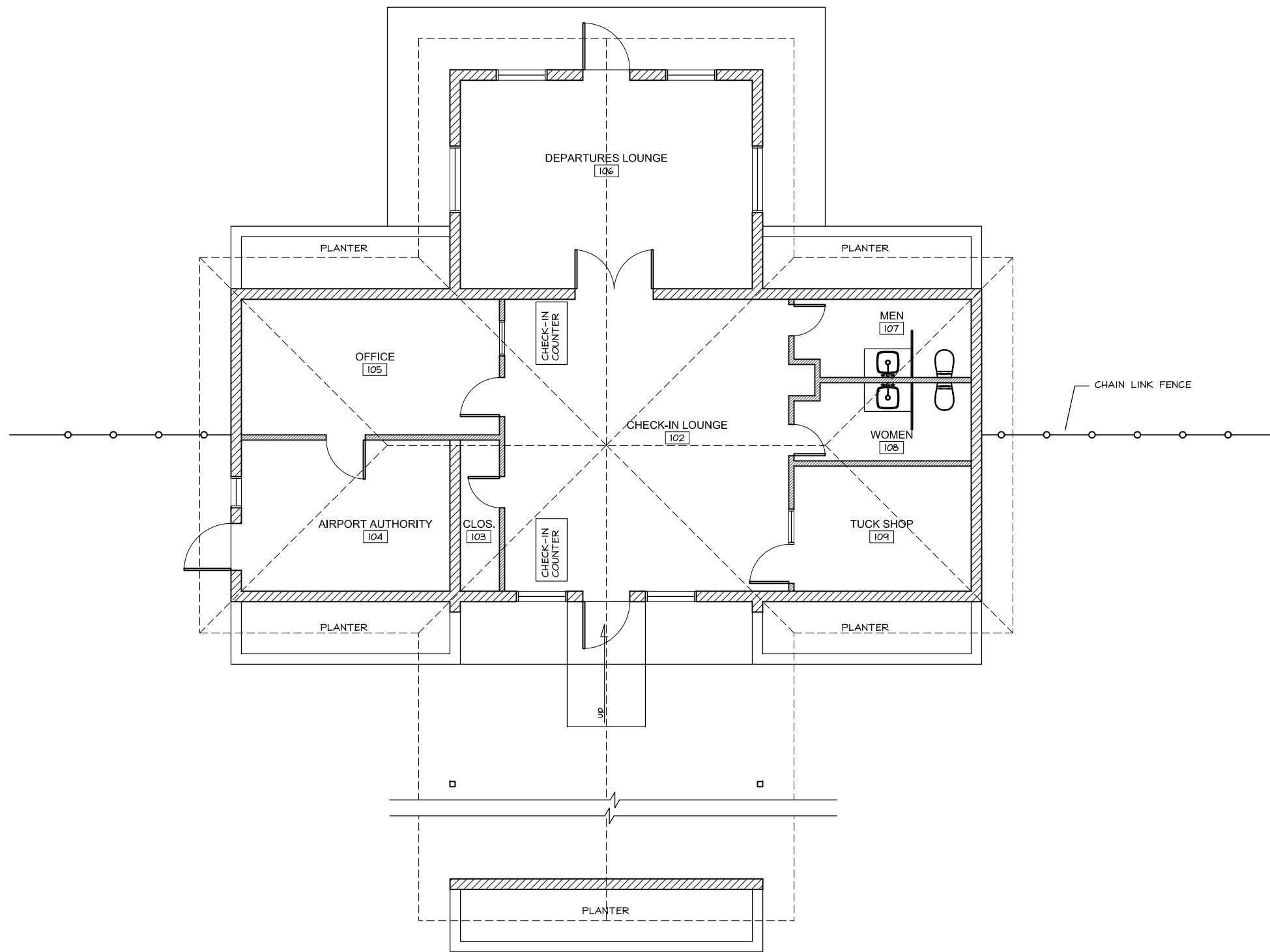
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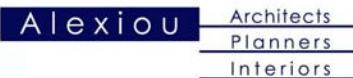


CLARENCE A. BAIN - FLOOR PLAN

SCALE: 1/8" = 1'-0"



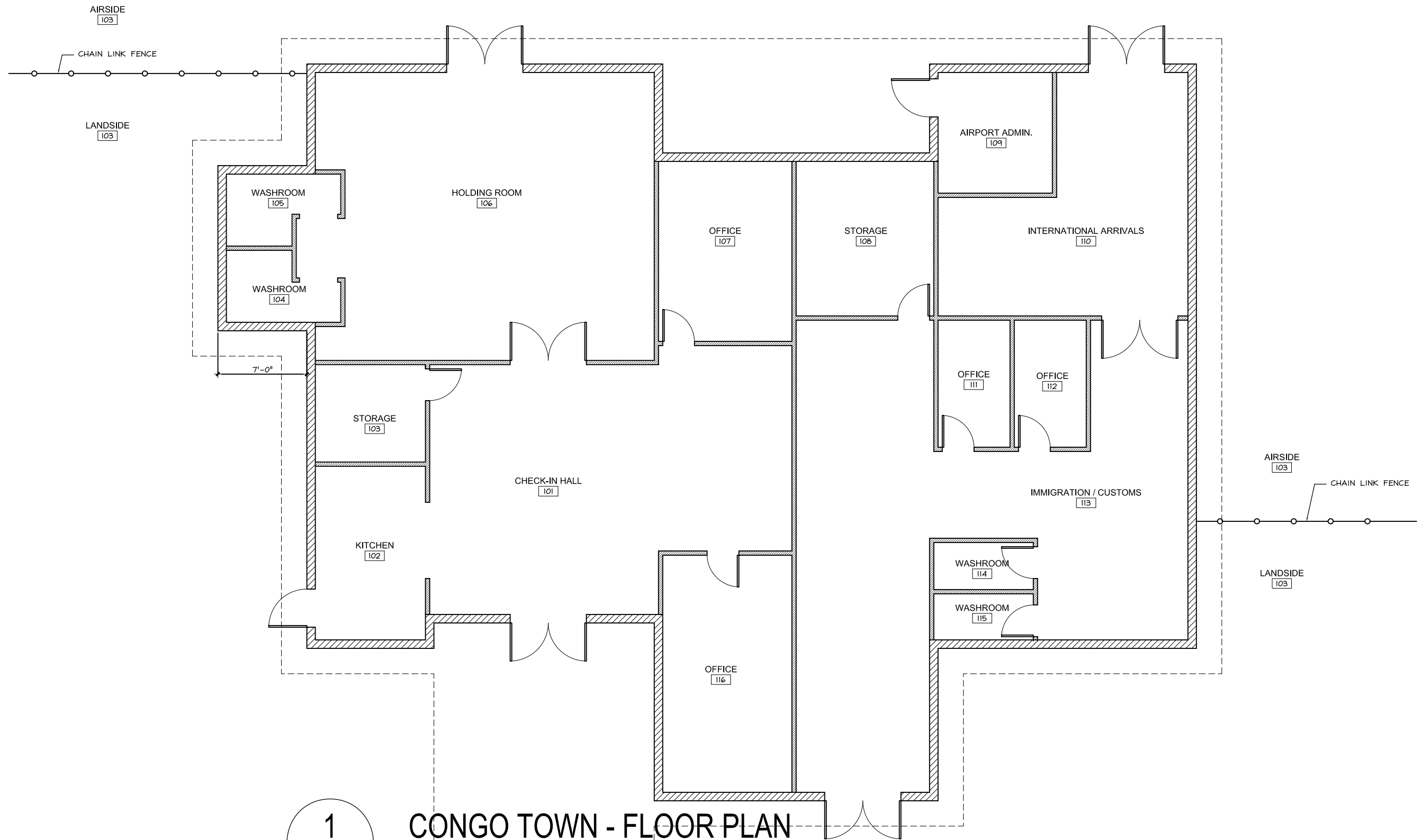
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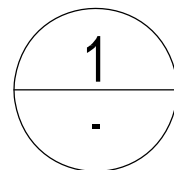
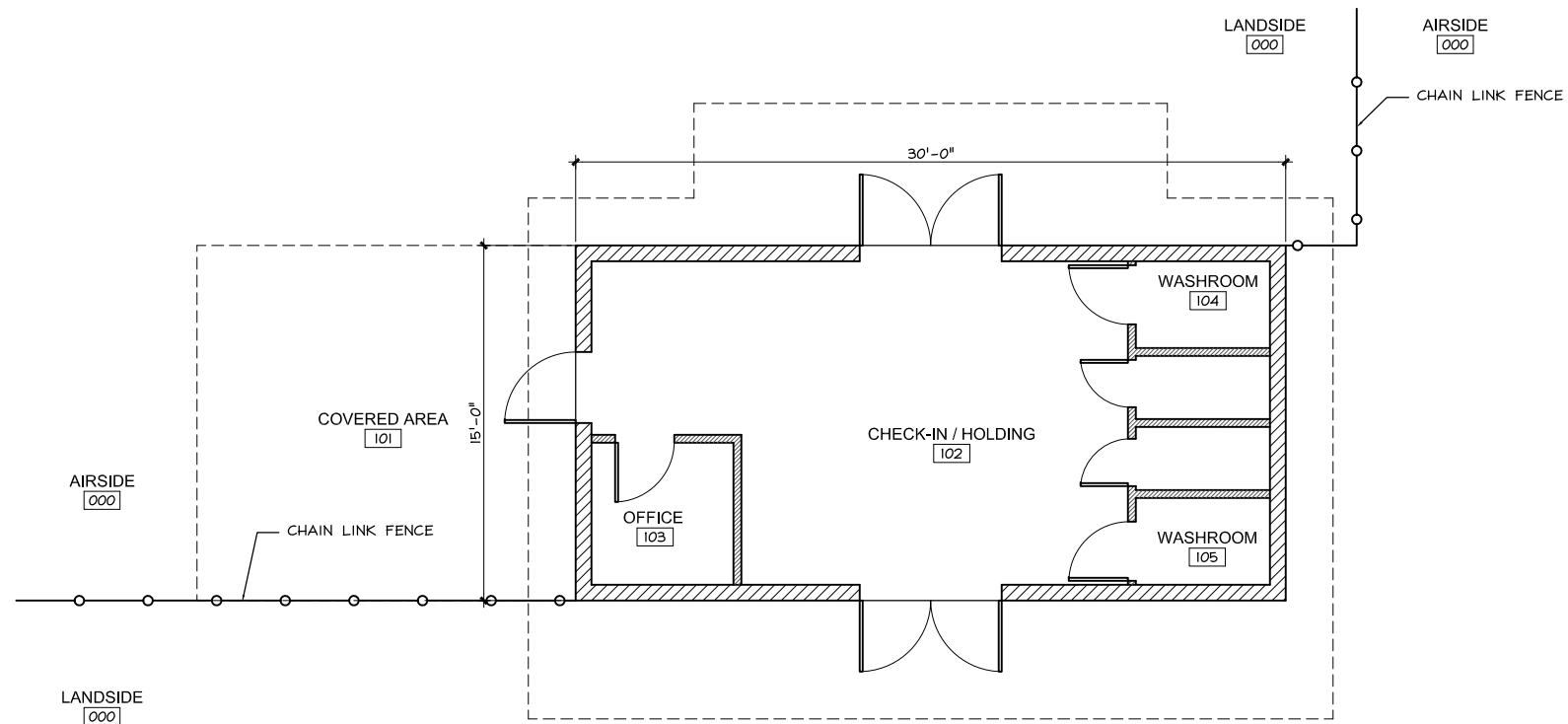


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CROOKED ISLAND AIRPORT

SCALE: 1/8" = 1'-0"



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FAMILY ISLAND OPTIMIZATION

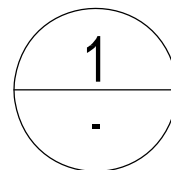
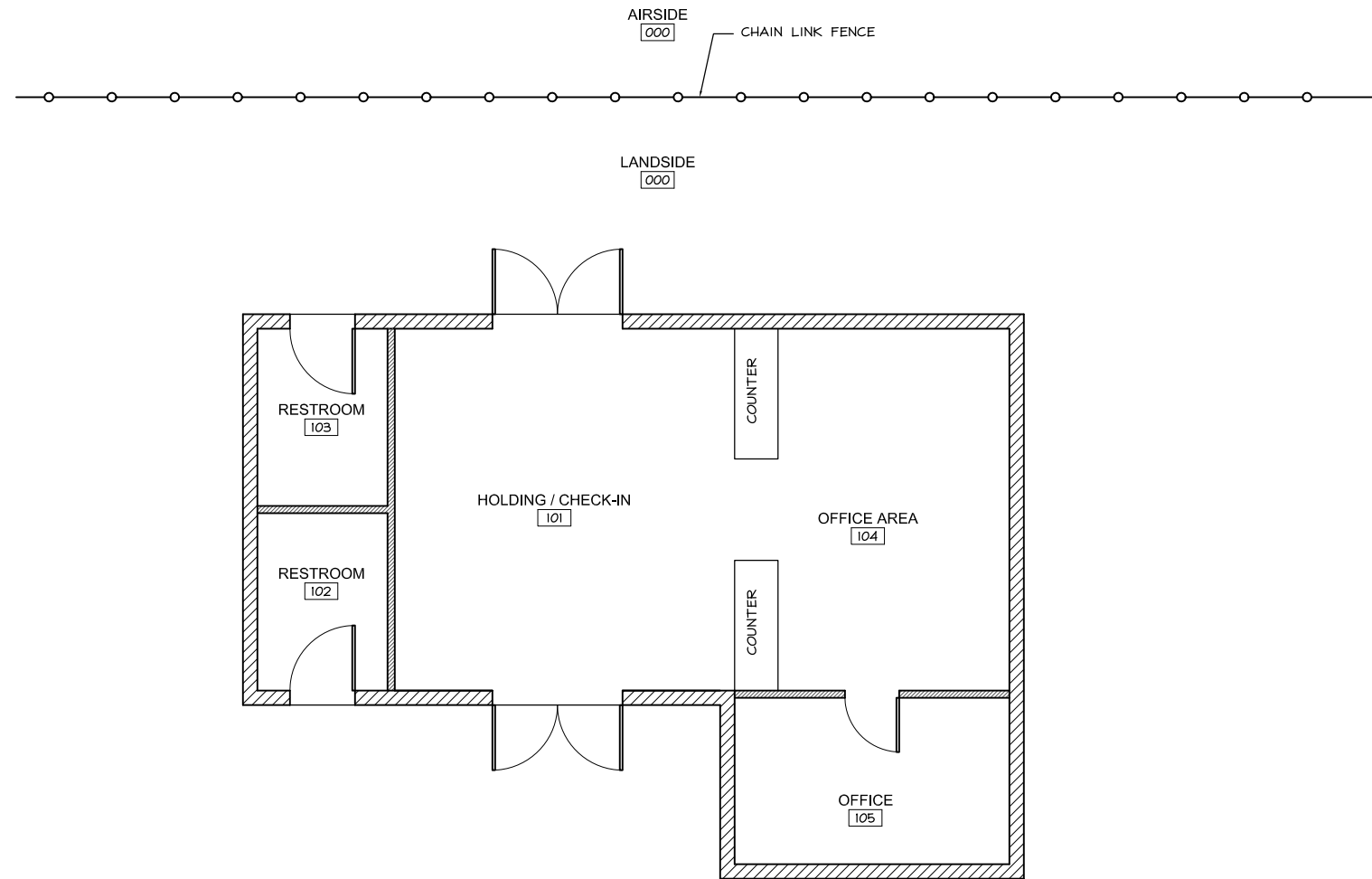
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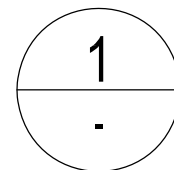
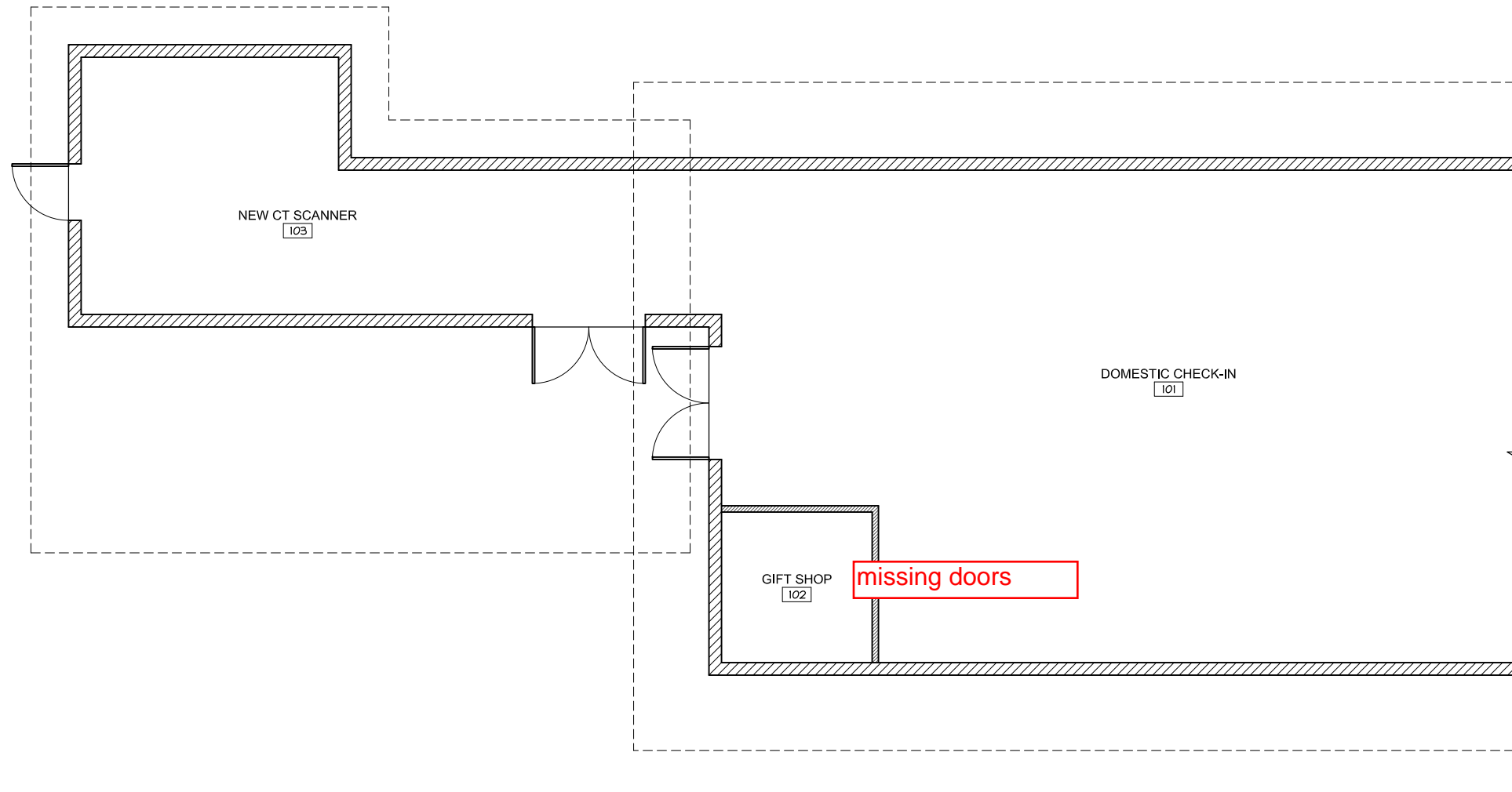
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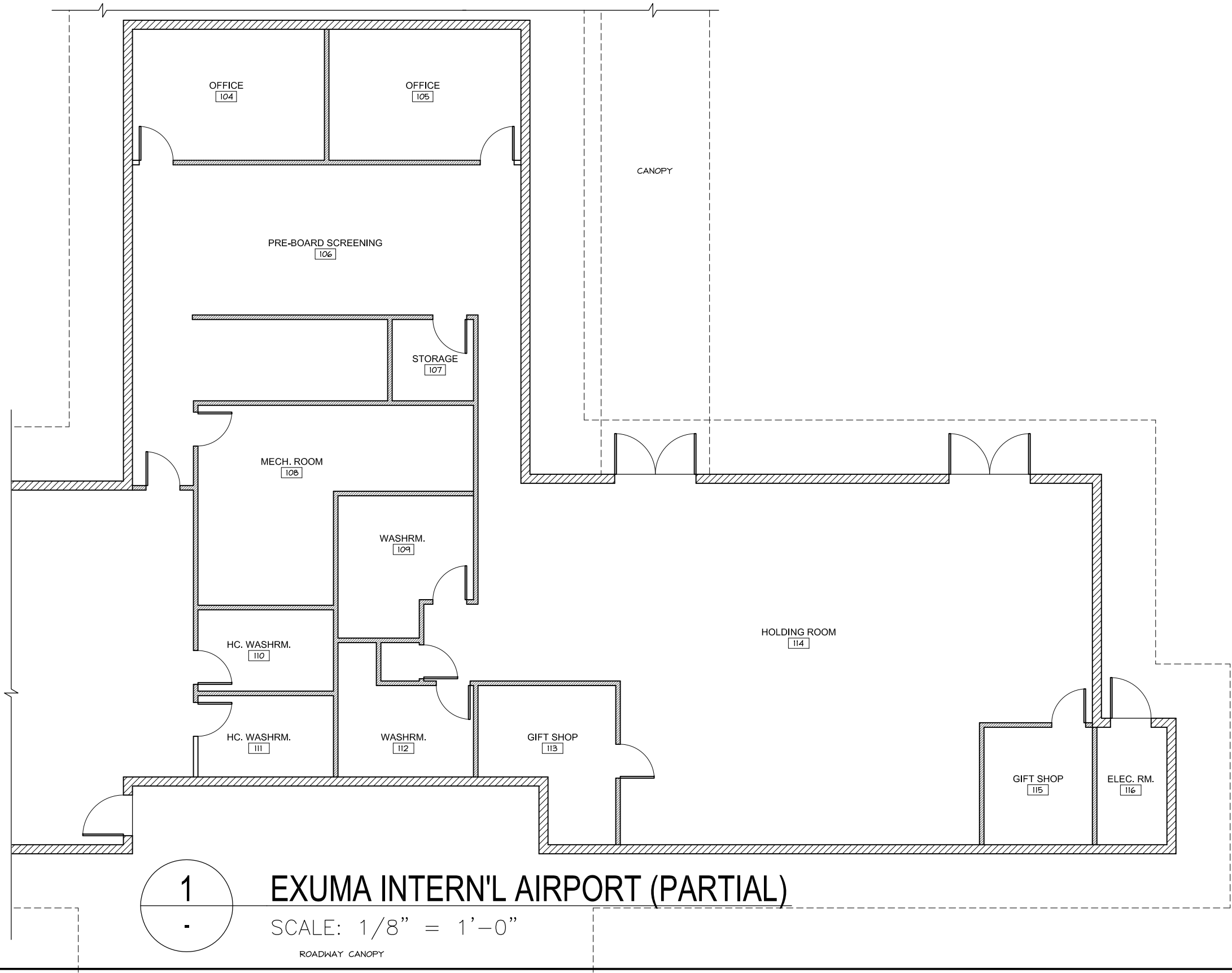
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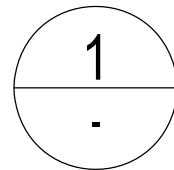
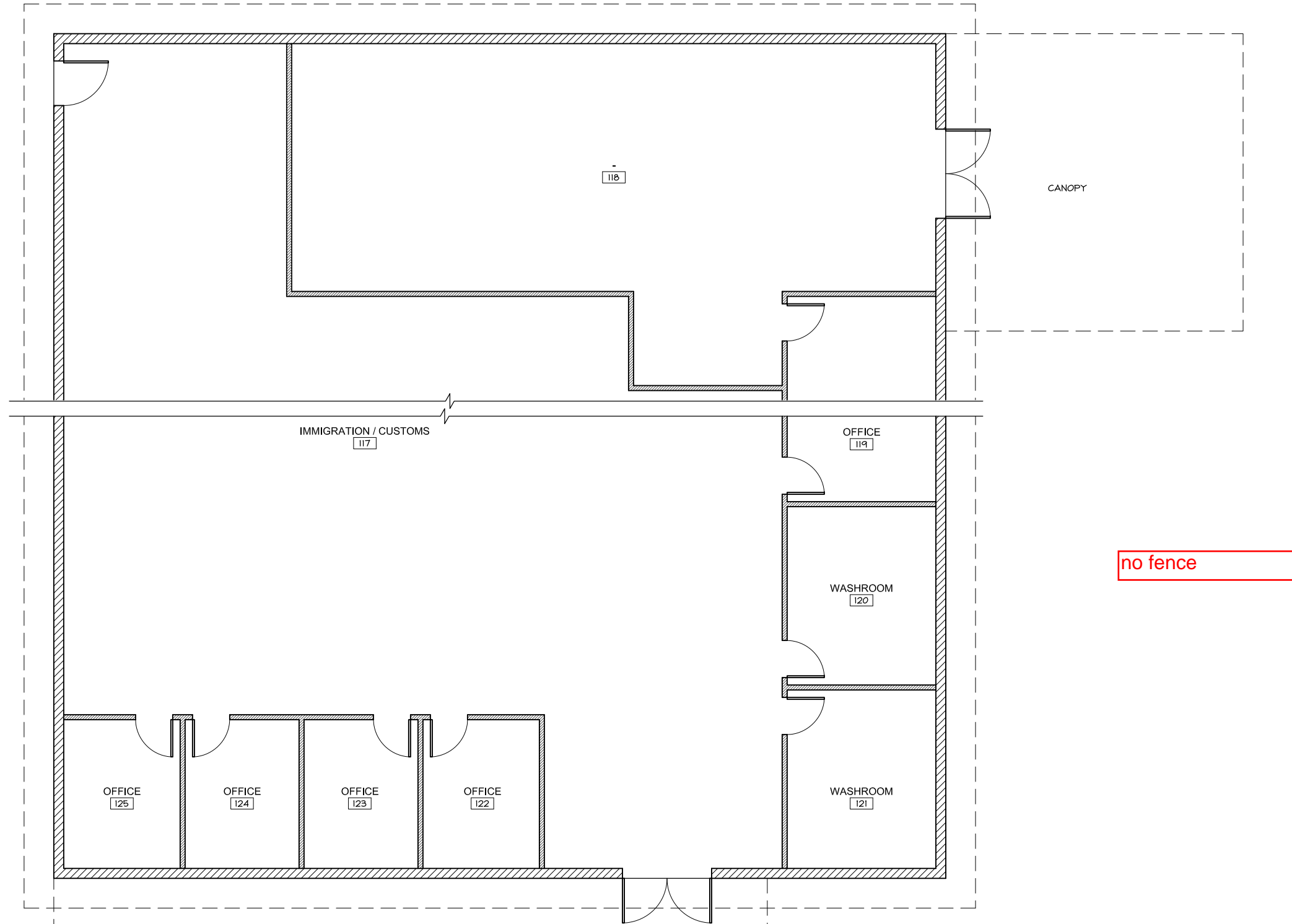
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EXUMA INTERN'L AIRPORT (PARTIAL)

SCALE: 1/8" = 1'-0"





EXUMA INTERN'L CUSTOMS / IMMIGRATION BUILDING

SCALE: 1/8" = 1'-0"



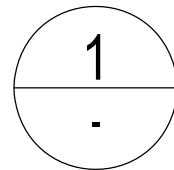
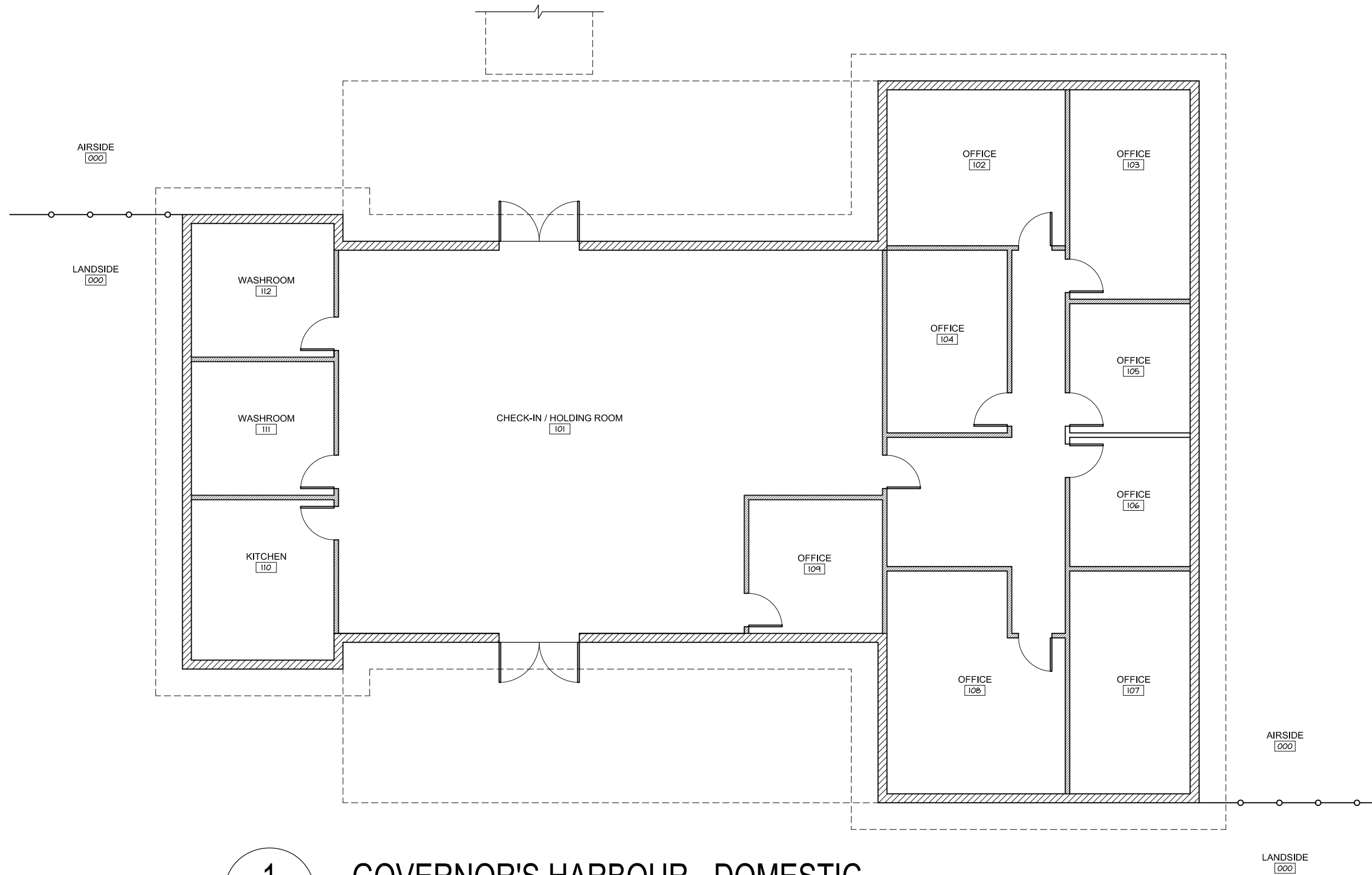
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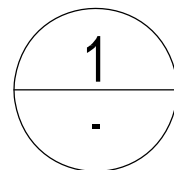
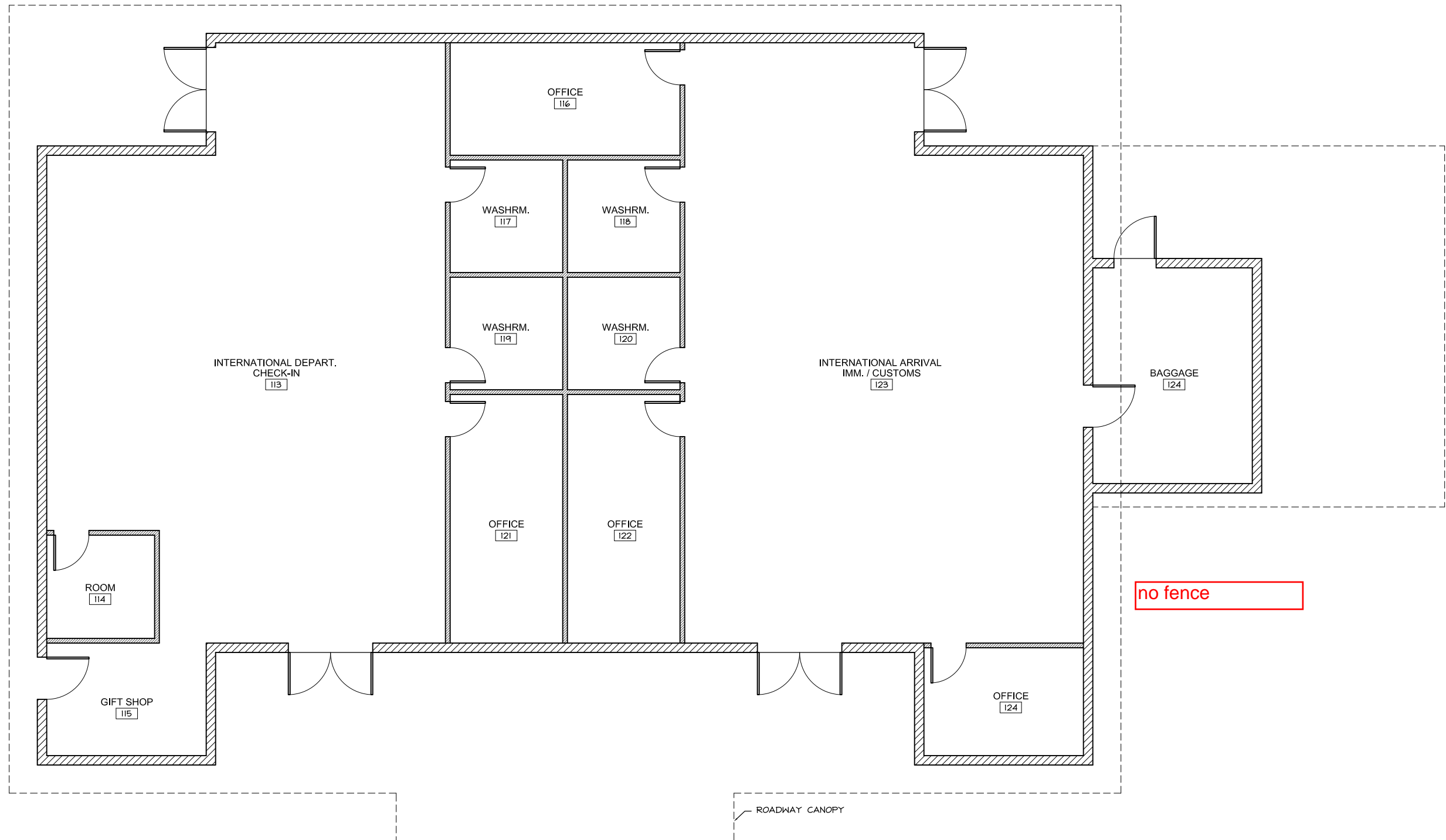
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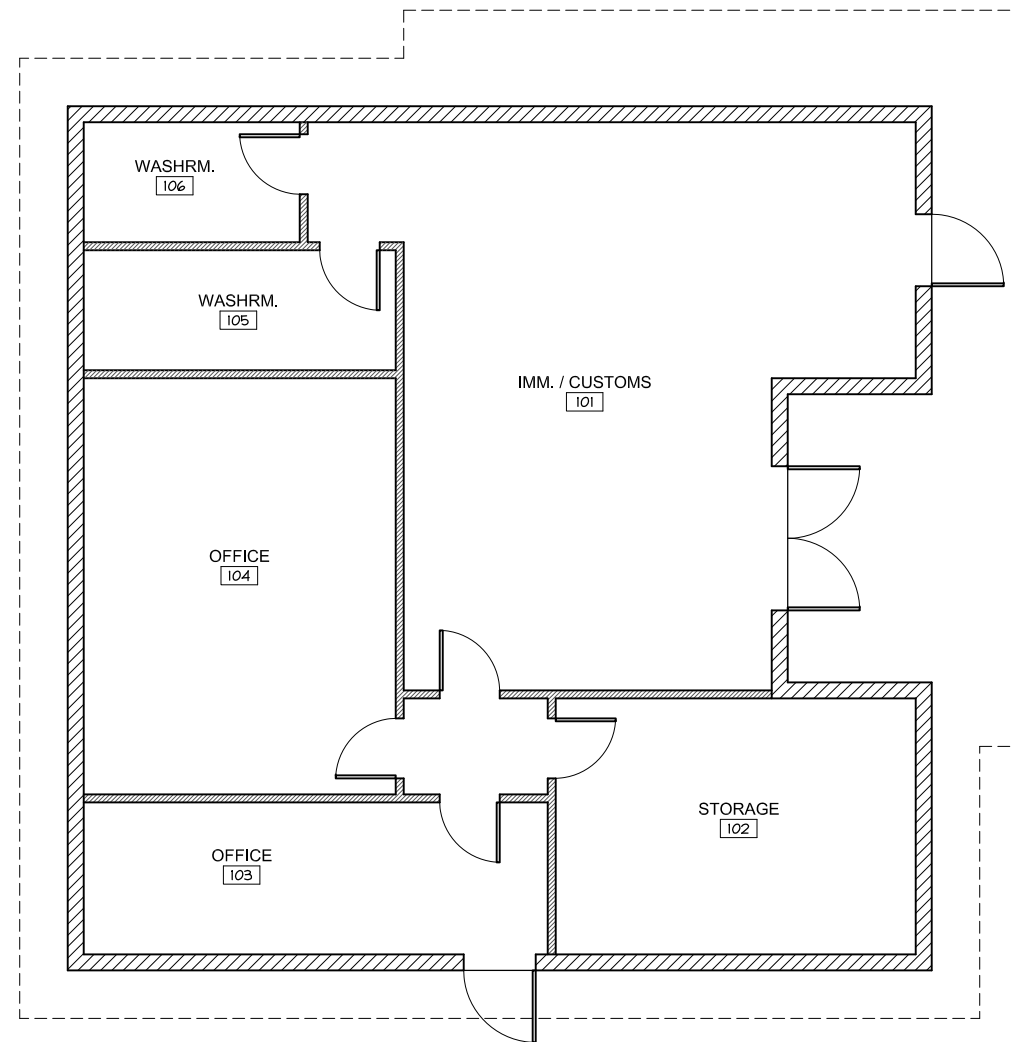
GOVERNOR'S HARBOUR - DOMESTIC

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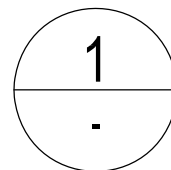


GOVERNOR'S HARBOUR - INTERNATIONAL

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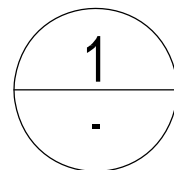
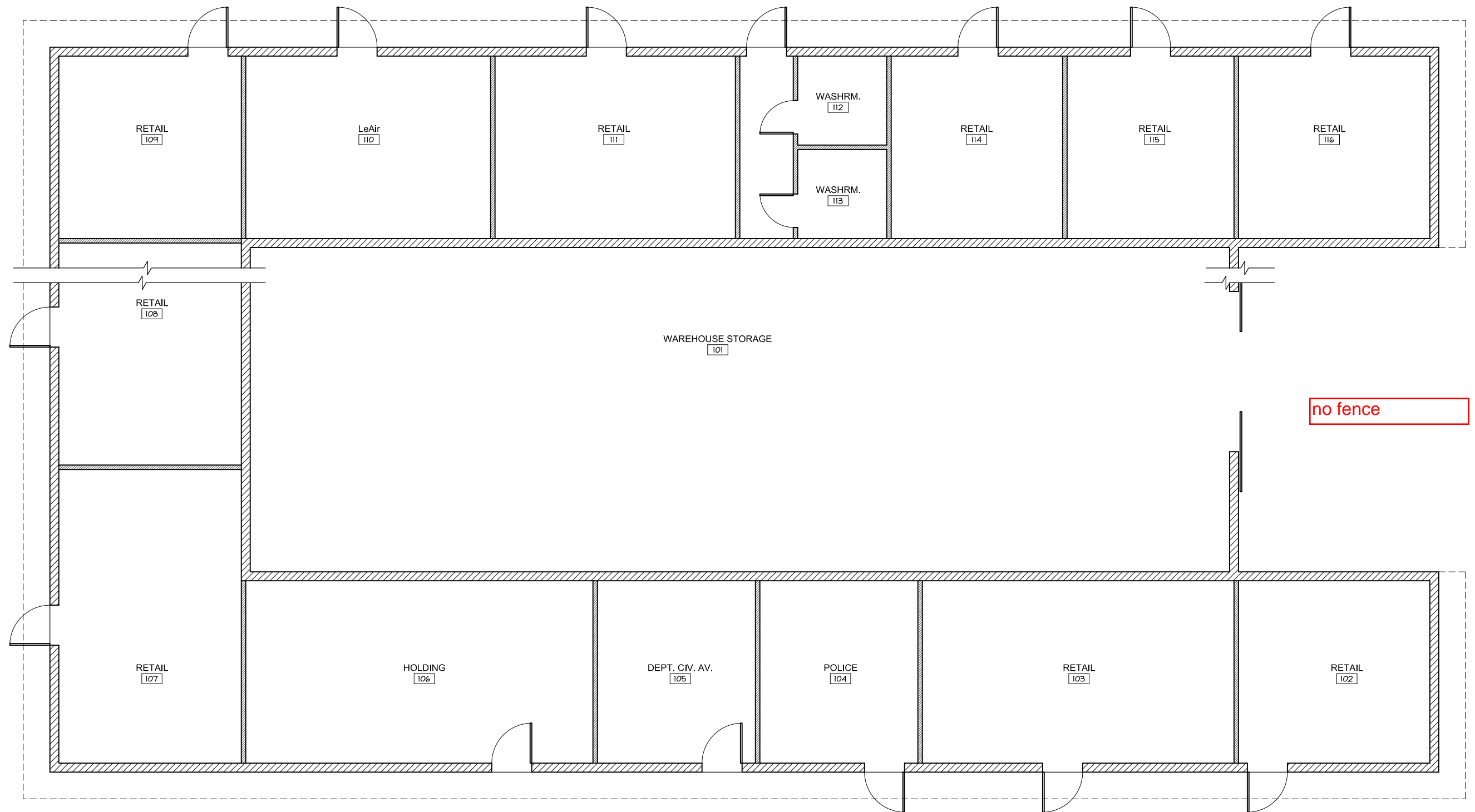


no fence



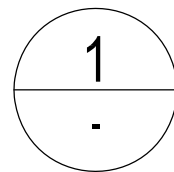
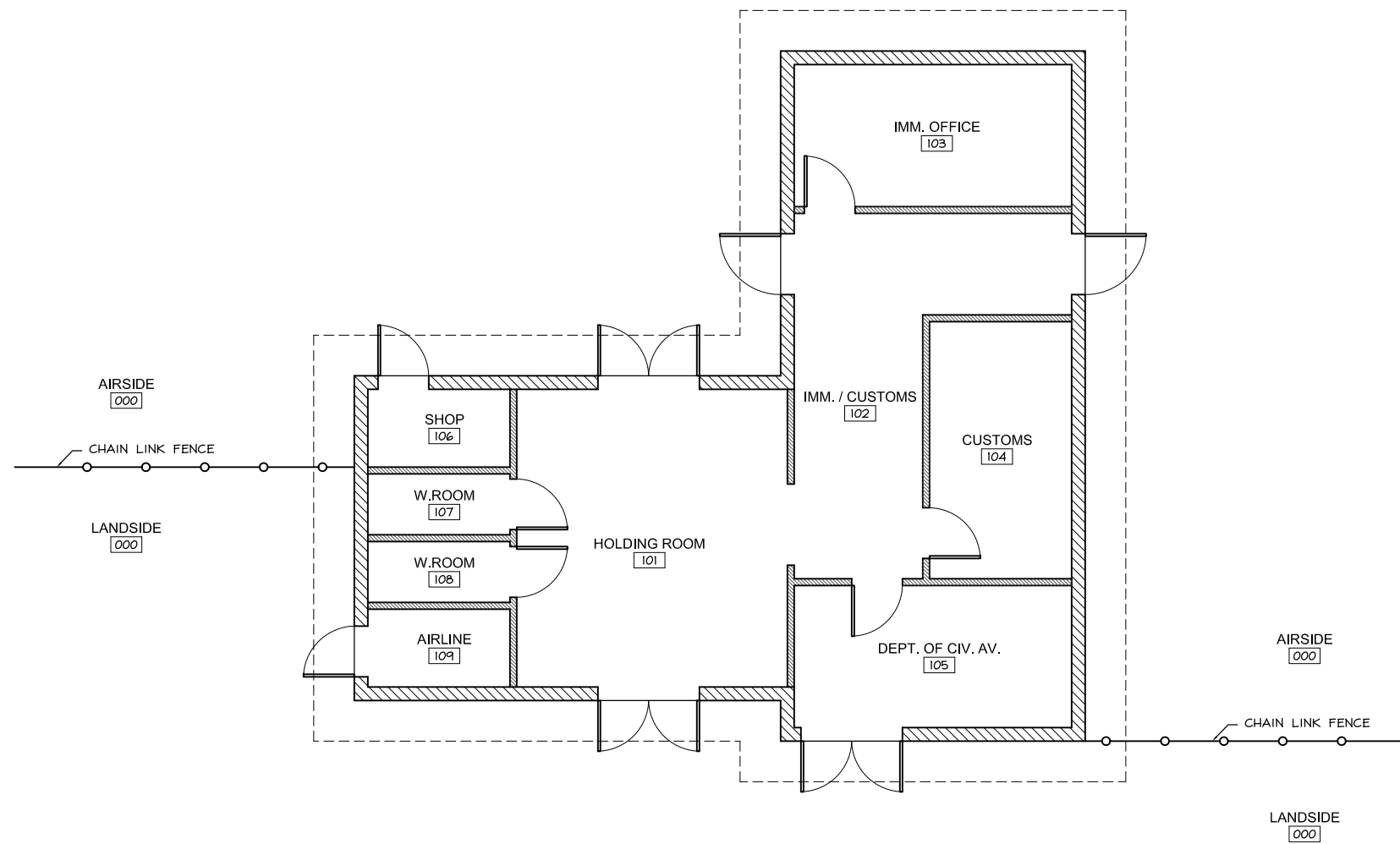
GREAT HARBOUR CAY - CUSTOMS AND IMM. BUILDING

SCALE: 1/8" = 1'-0"



GREAT HARBOUR CAY - WAREHOUSE BUILDING

SCALE: 1/8" = 1'-0"

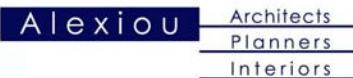


MATTHEW TOWN AIRPORT

SCALE: 1/8" = 1'-0"



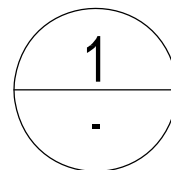
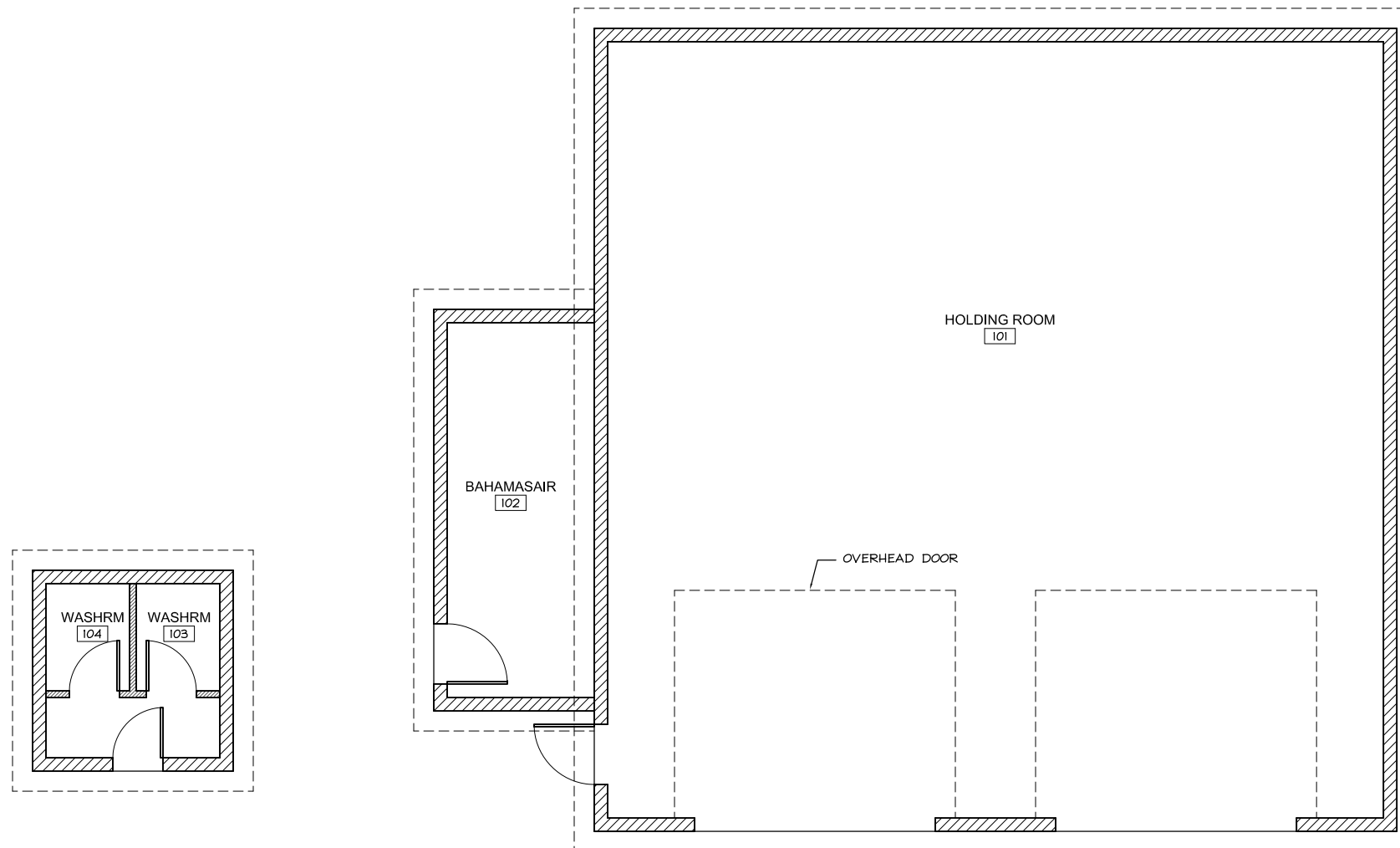
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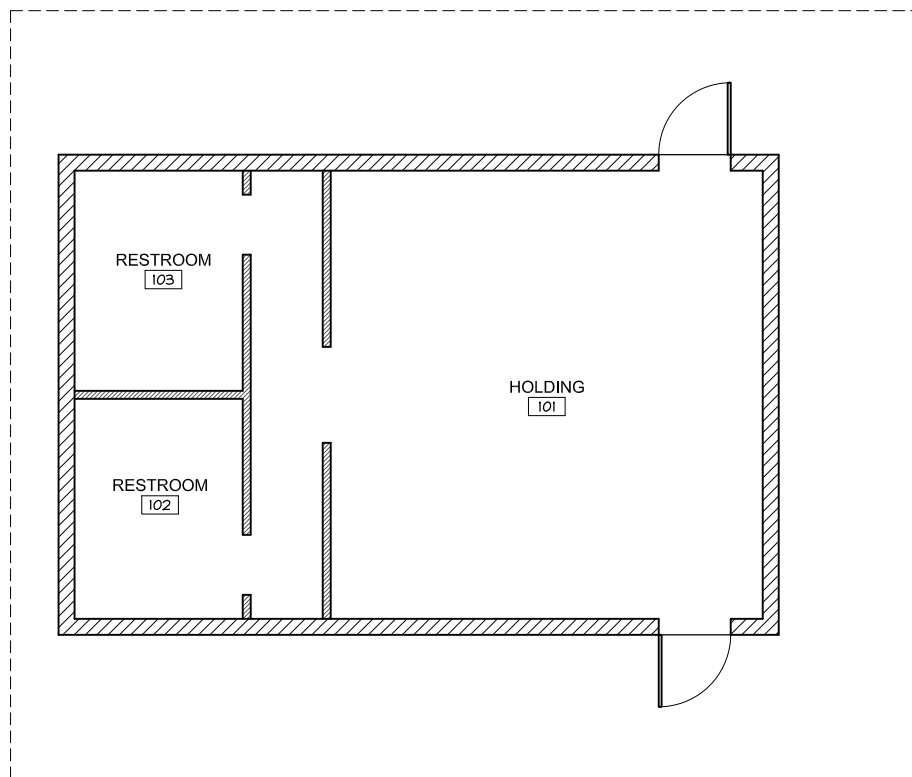
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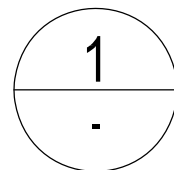


MAYAGUANA AIRPORT

SCALE: 1/8" = 1'-0"



no fence



MOORES ISLAND AIRPORT

SCALE: 1/8" = 1'-0"



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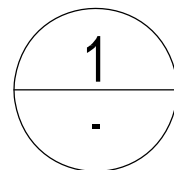
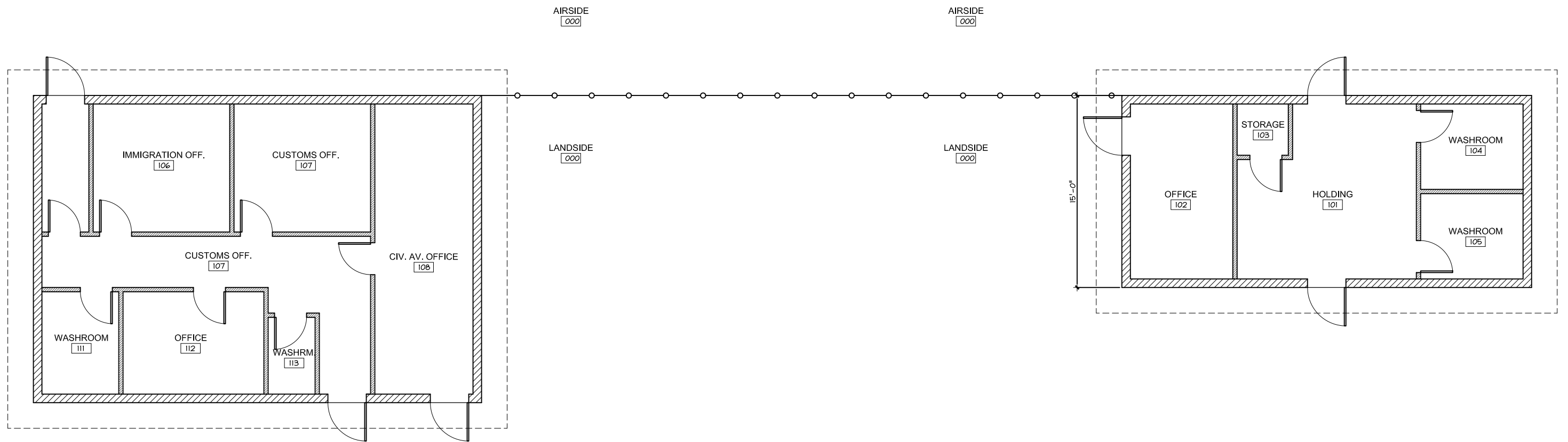
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NEW BIGHT AIRPORT

SCALE: 1/8" = 1'-0"



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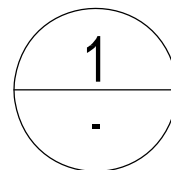
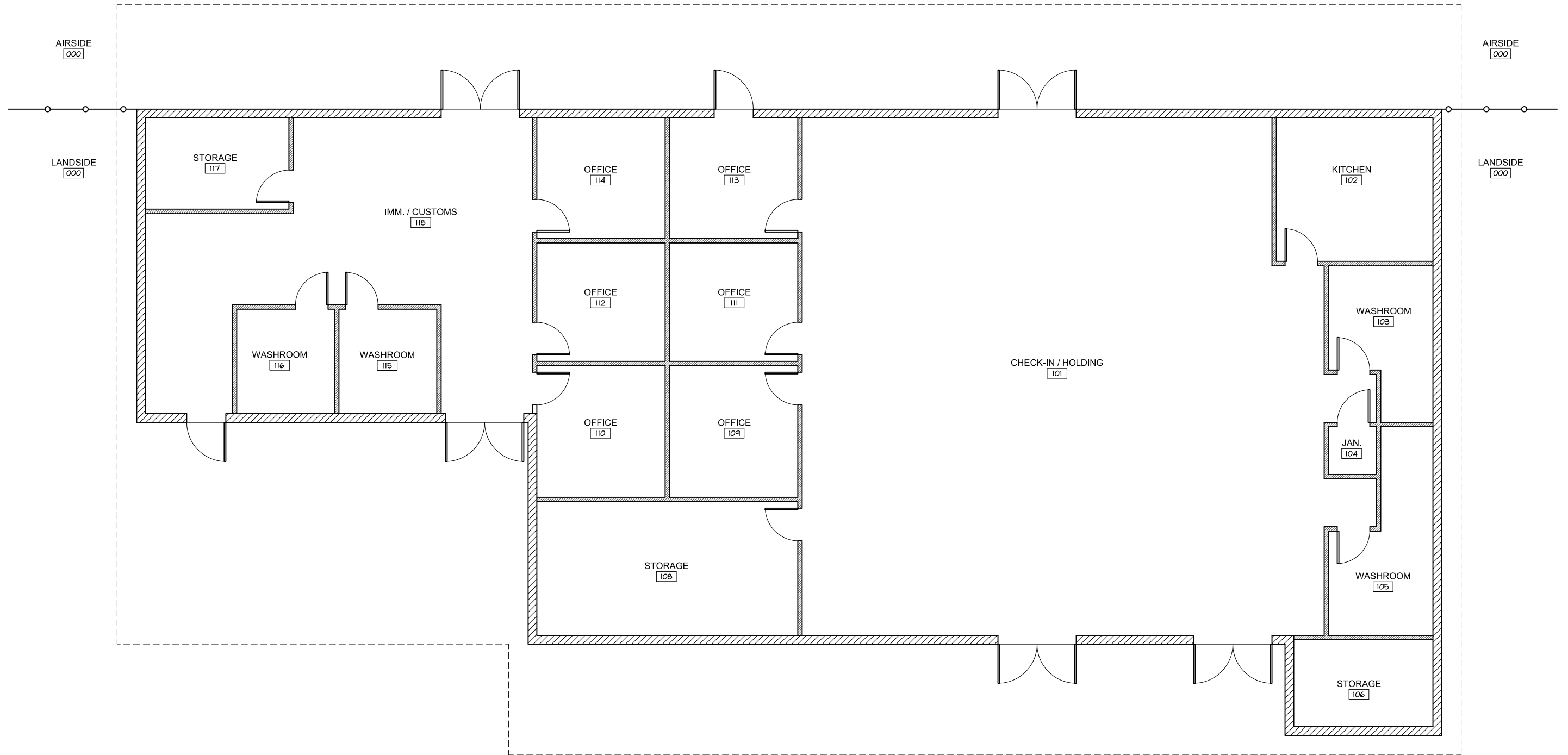
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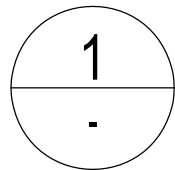
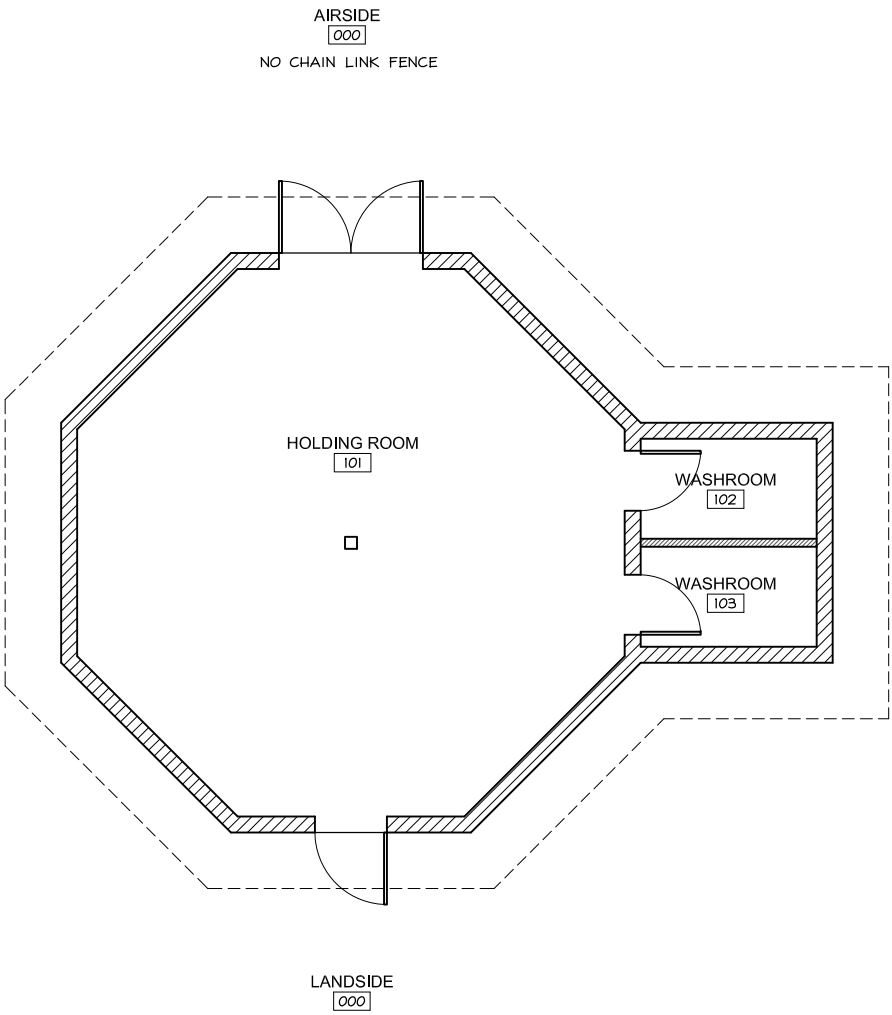
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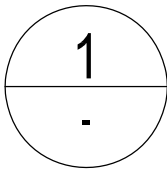
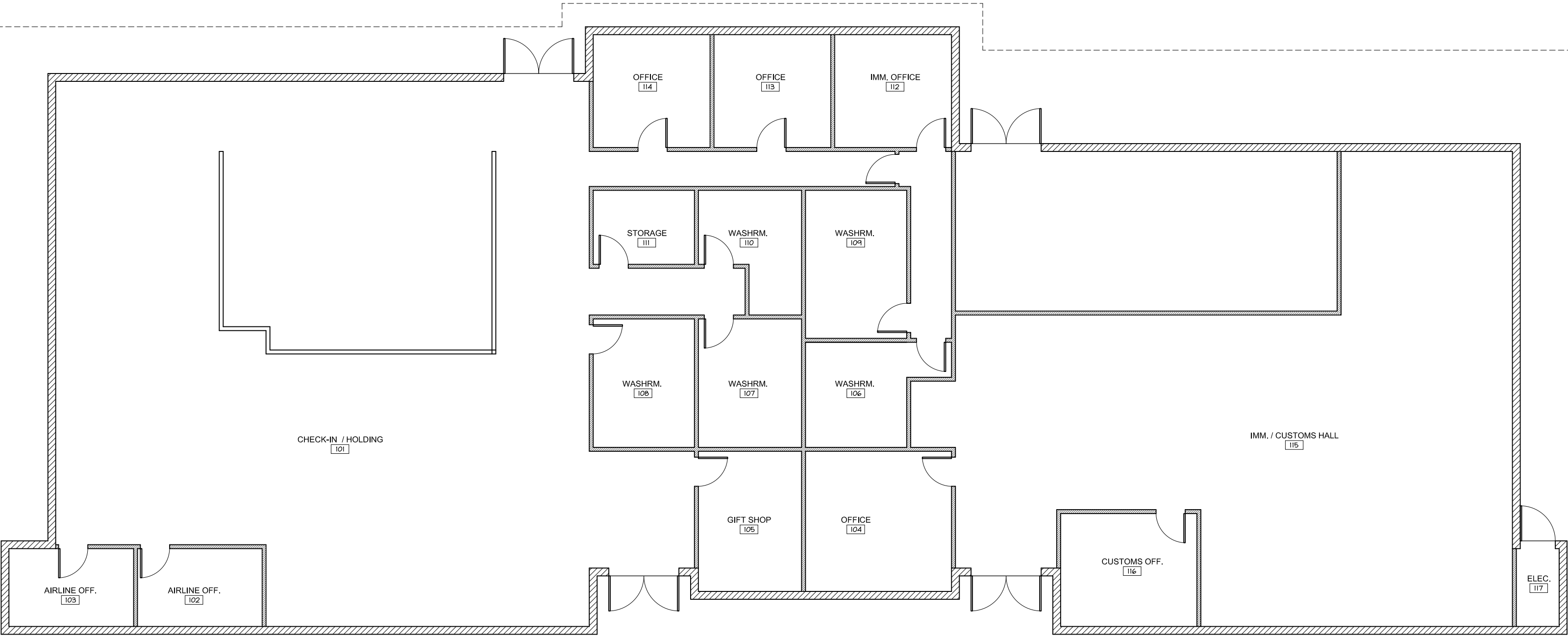
NORTH ELEUTHERA INTERN'L AIRPORT

SCALE: 1/8" = 1'-0"



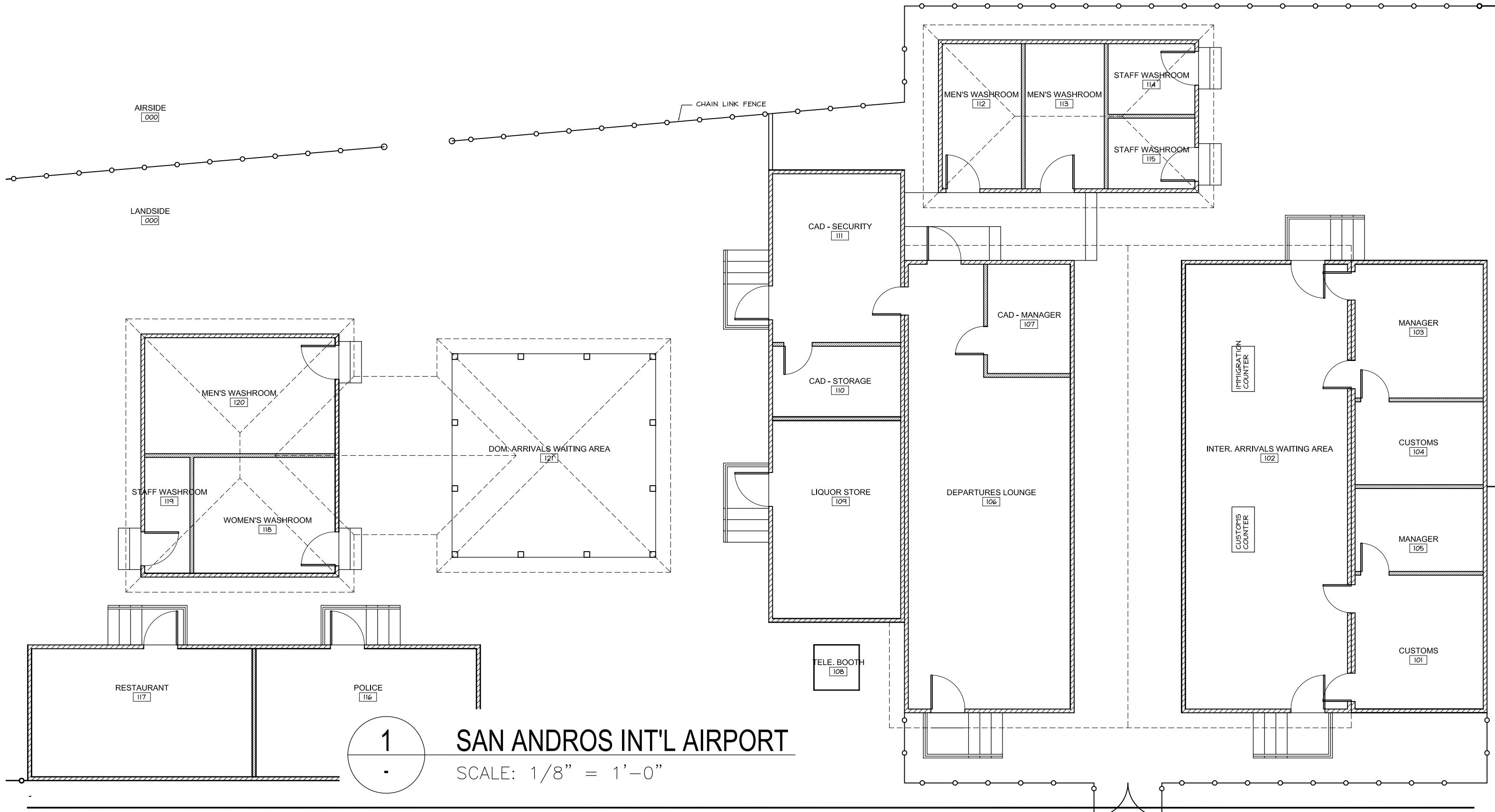
RAGGED ISLAND AIRPORT

SCALE: 1/8" = 1'-0"



ROCK SOUND INT'L AIRPORT

SCALE: 1/8" = 1'-0"



1

SAN ANDROS INT'L AIRPORT

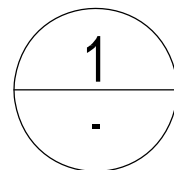
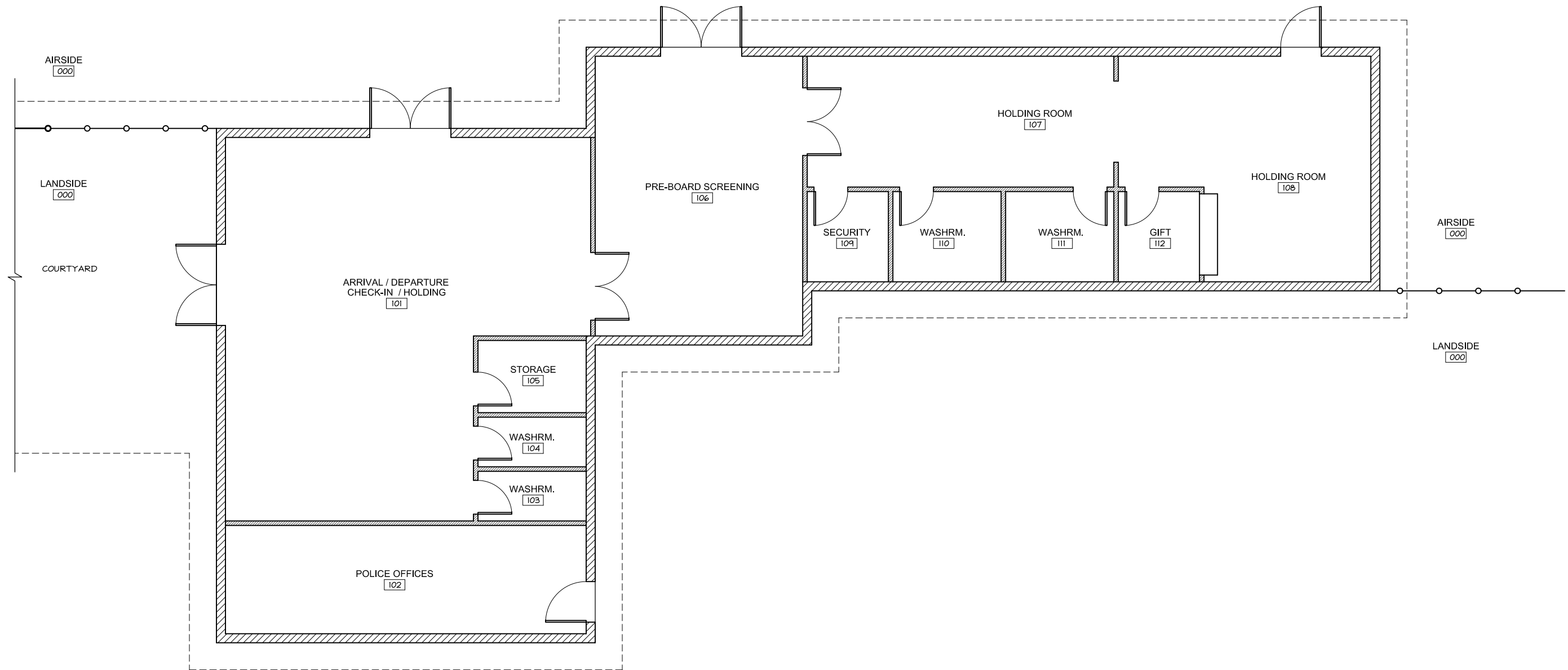
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SAN SALVADOR INT'L AIRPORT

SCALE: 1/8" = 1'-0"



SOUTH BIMINI INT'L AIRPORT (PARTIAL)

SCALE: 1/8" = 1'-0"



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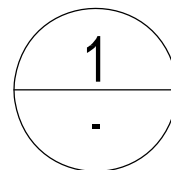
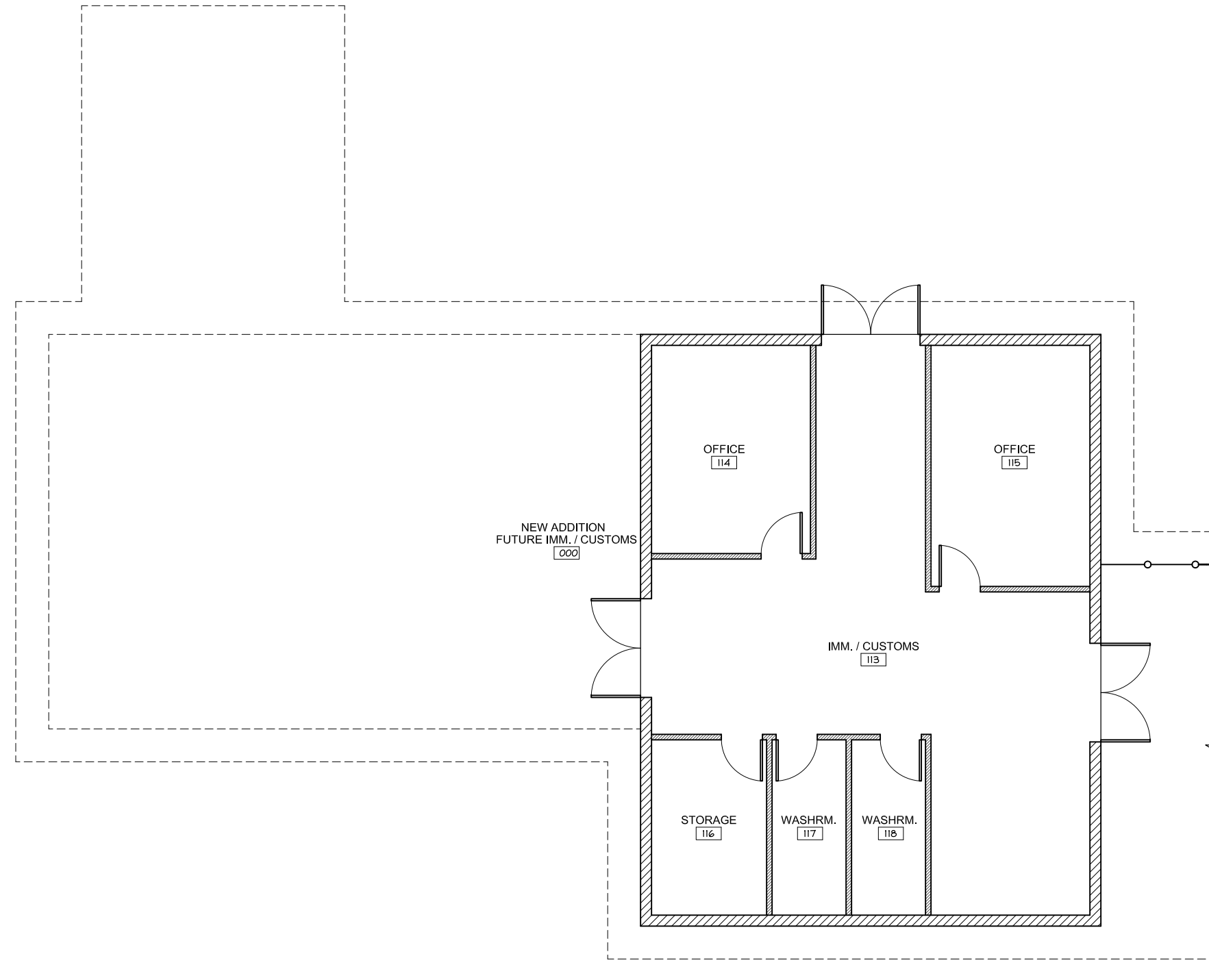
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SOUTH BIMINI INT'L AIRPORT (PARTIAL)

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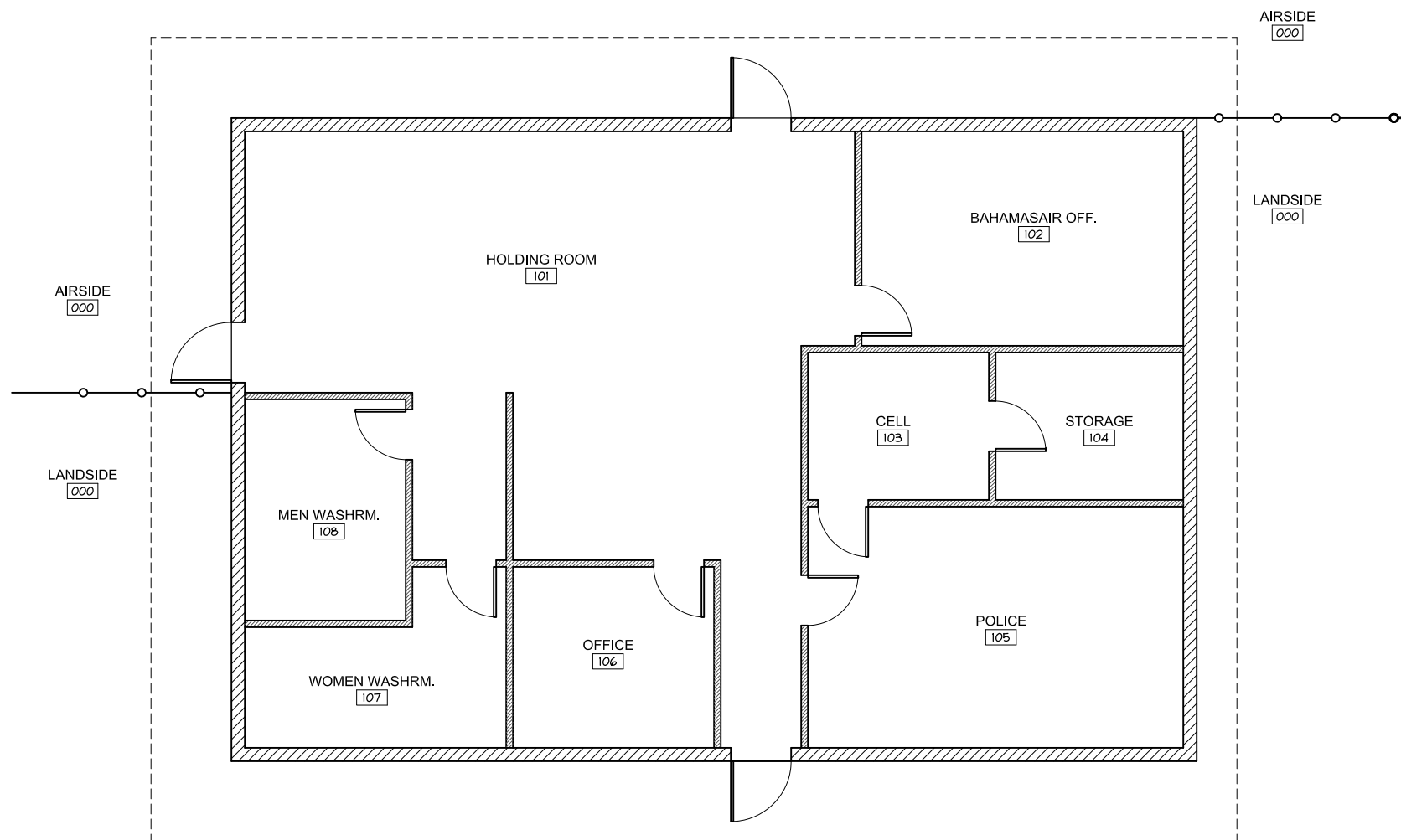
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SPRING POINT AIRPORT

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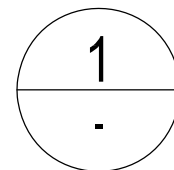
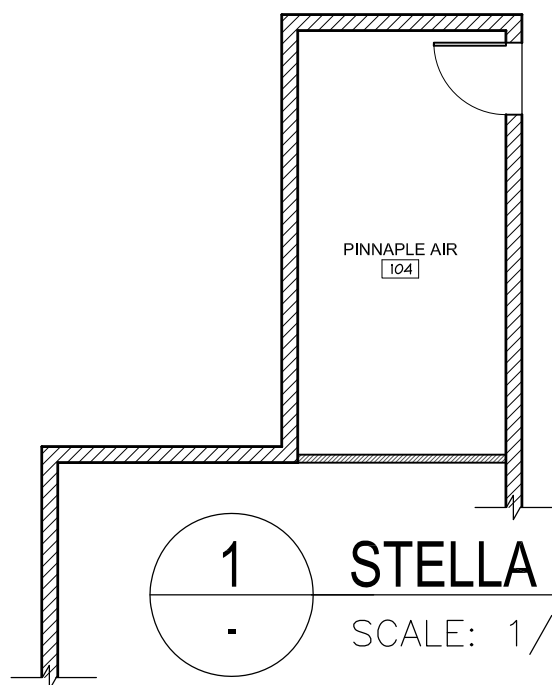
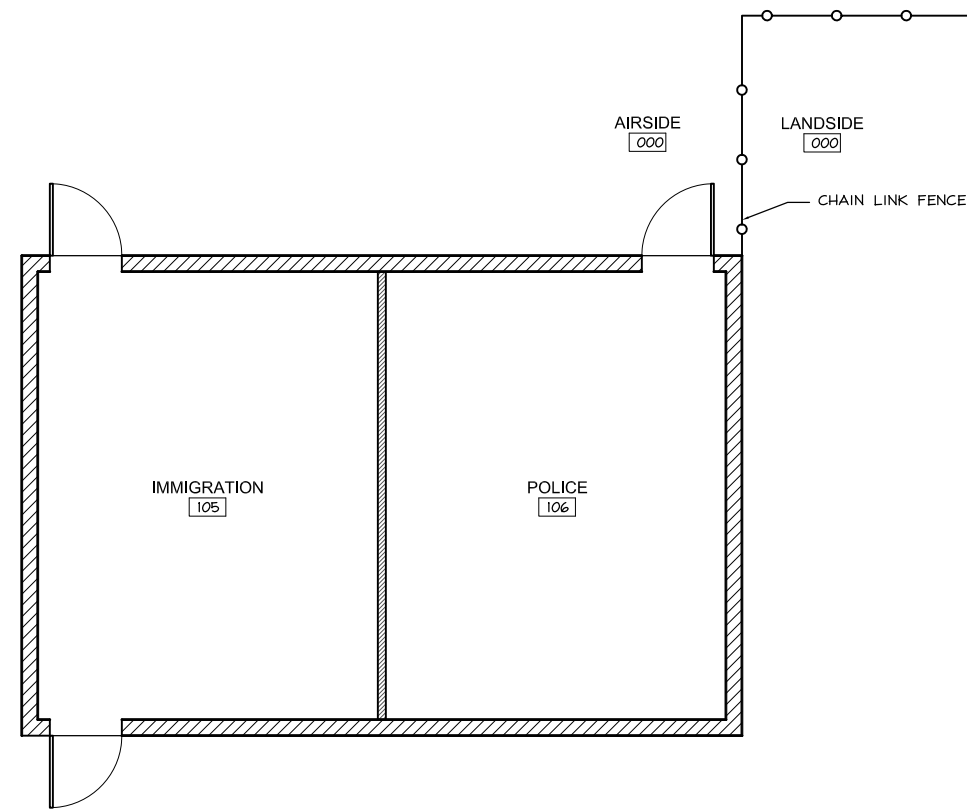
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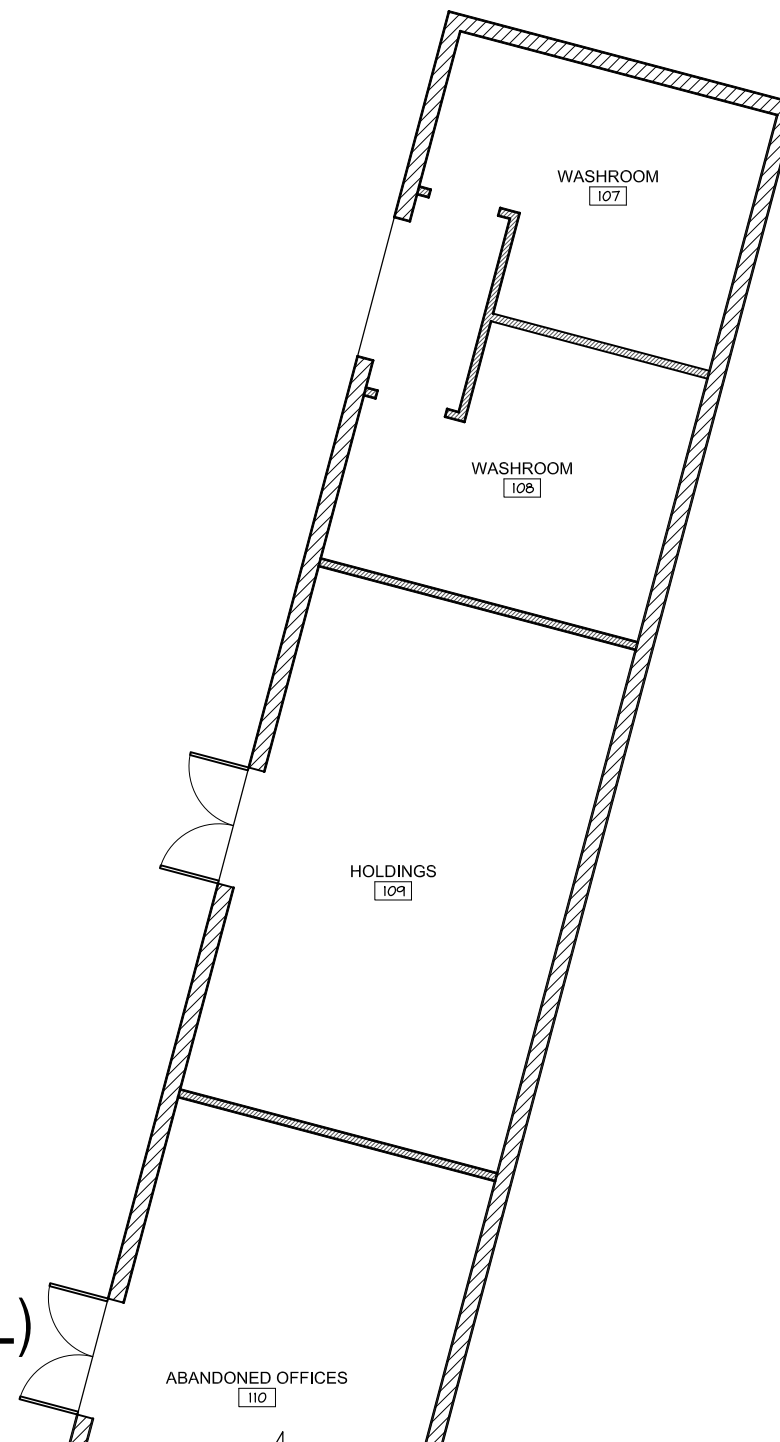
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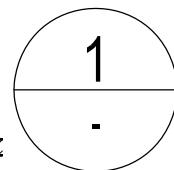
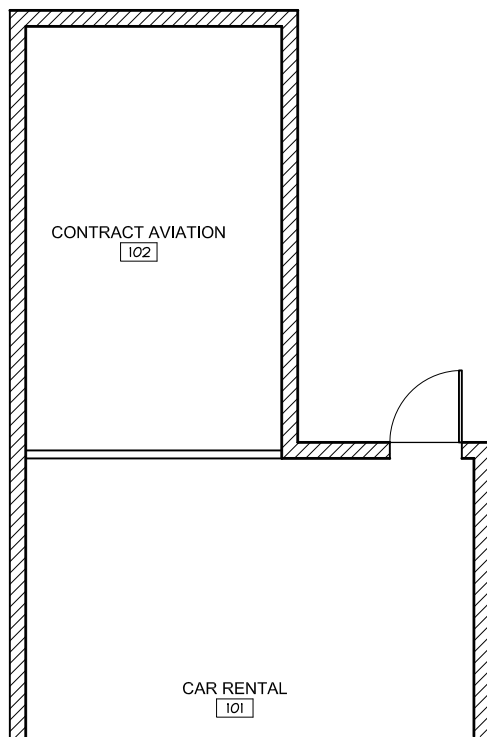
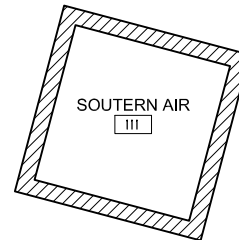
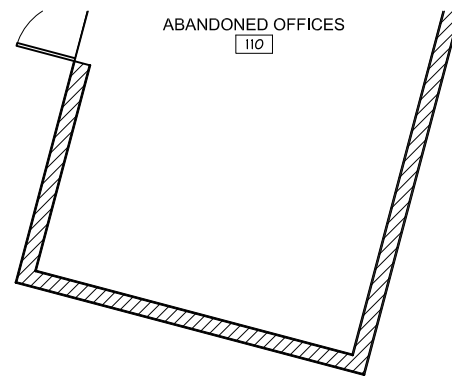
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STELLA MARIS AIRPORT (PARTIAL)

SCALE: 1/8" = 1'-0"





STELLA MARIS AIRPORT (PARTIAL)

SCALE: 1/8" = 1'-0"



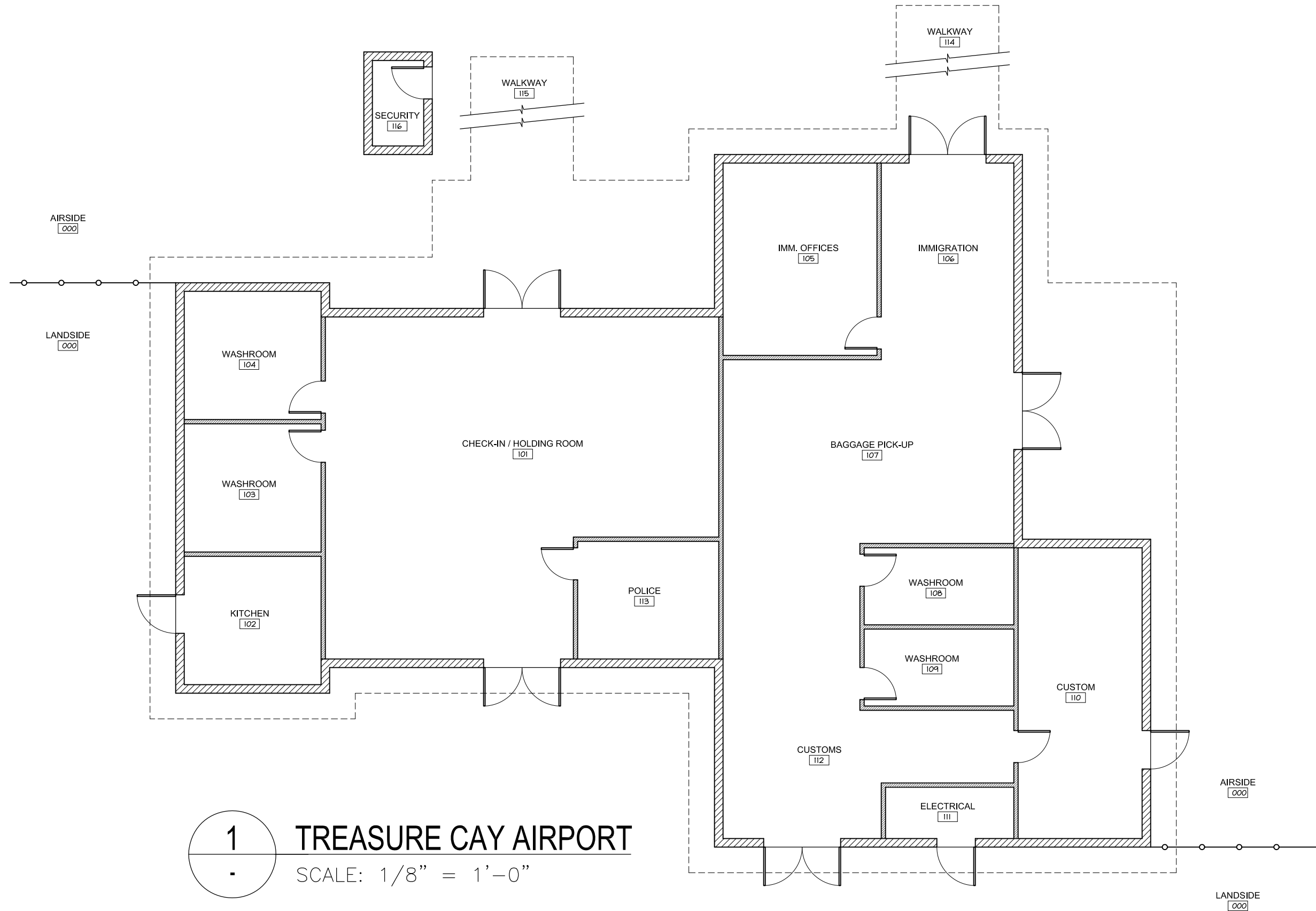
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COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

APPENDIX C – LANDSIDE PROGRAMMING AREAS AND COSTS

July 22, 2014

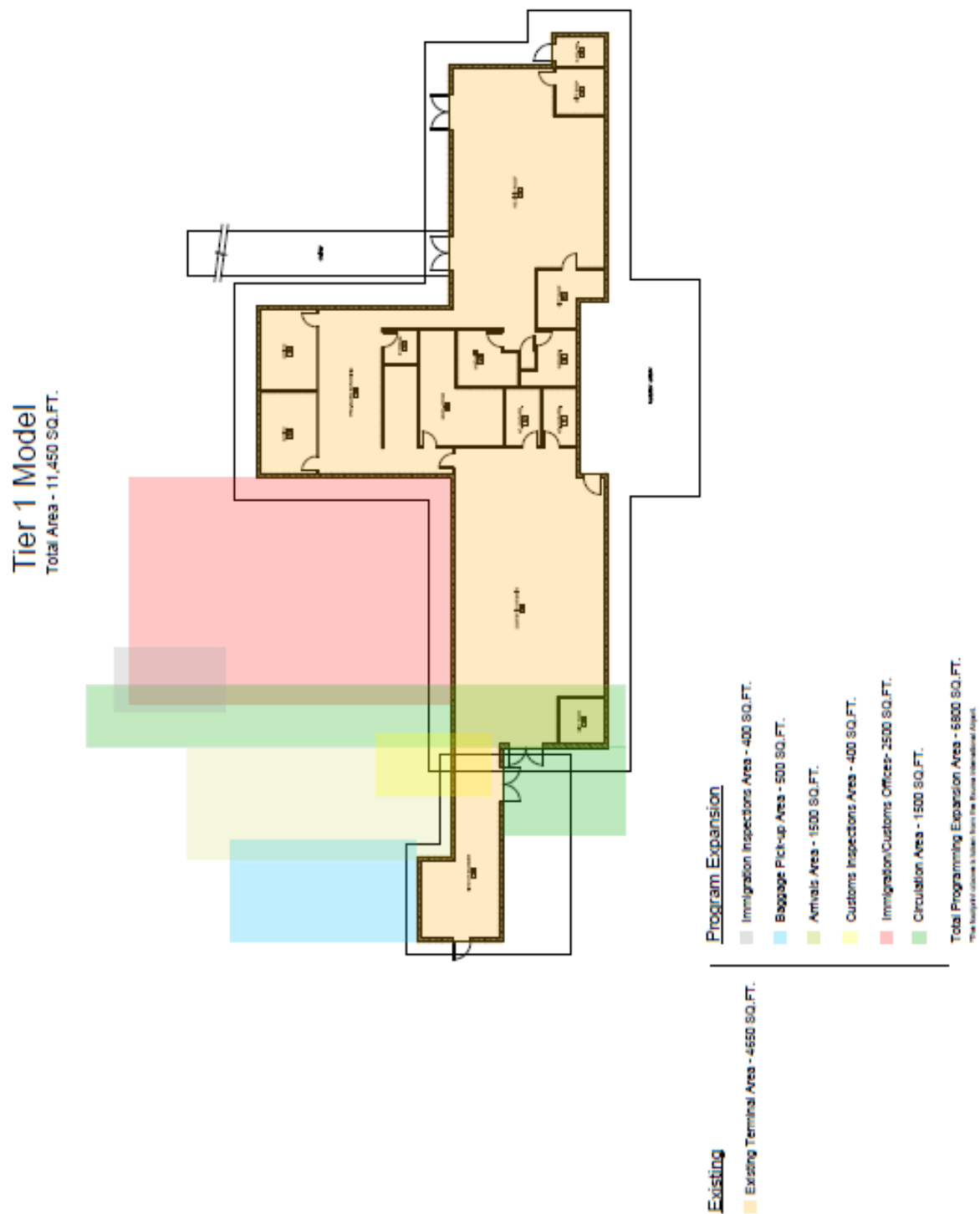


Figure 91: Tier 1 Airport Model Generic Floor Plan

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

APPENDIX C – LANDSIDE PROGRAMMING AREAS AND COSTS

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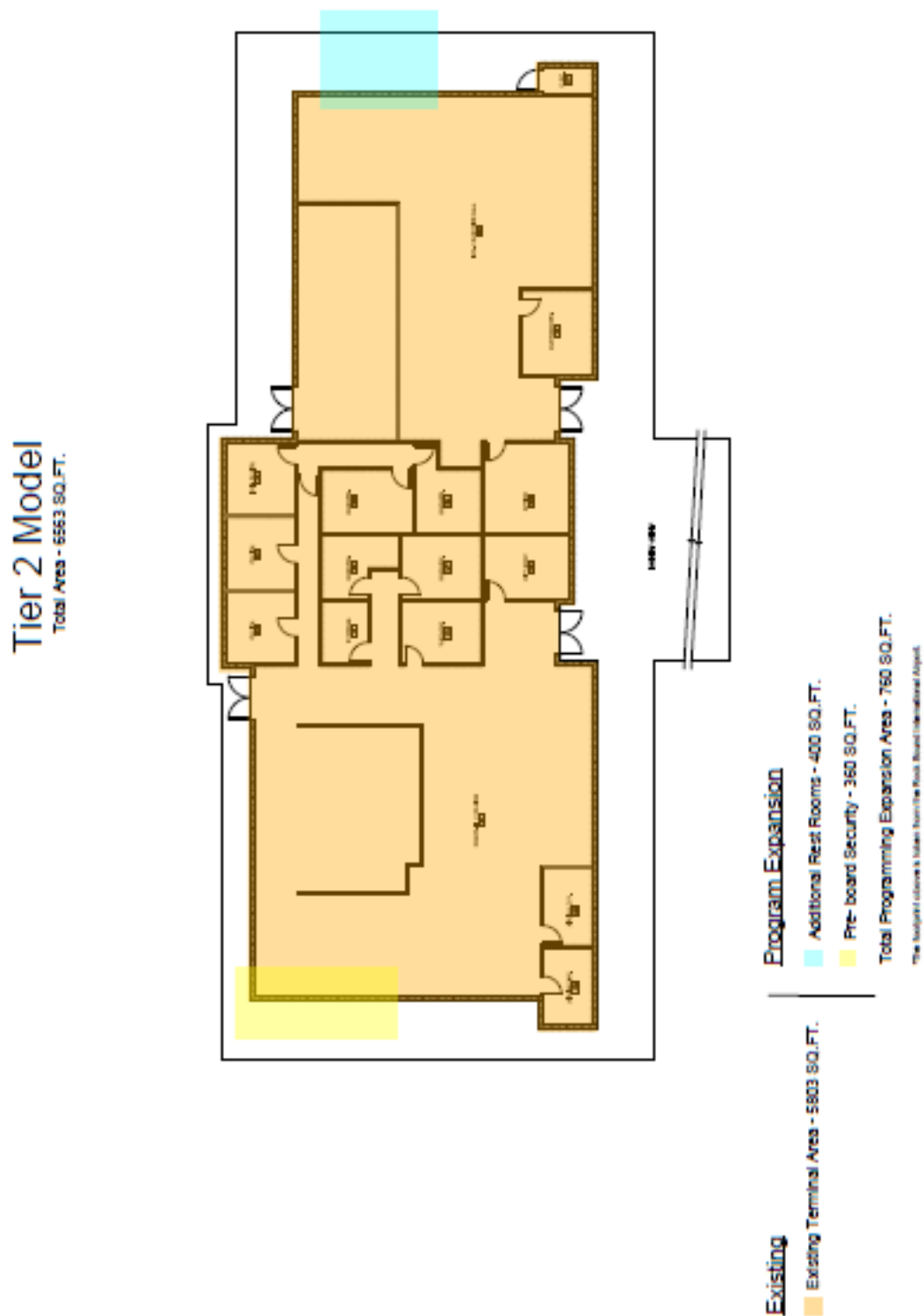


Figure 92: Tier 2 Airport Model Generic Floor Plan

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

APPENDIX C – LANDSIDE PROGRAMMING AREAS AND COSTS

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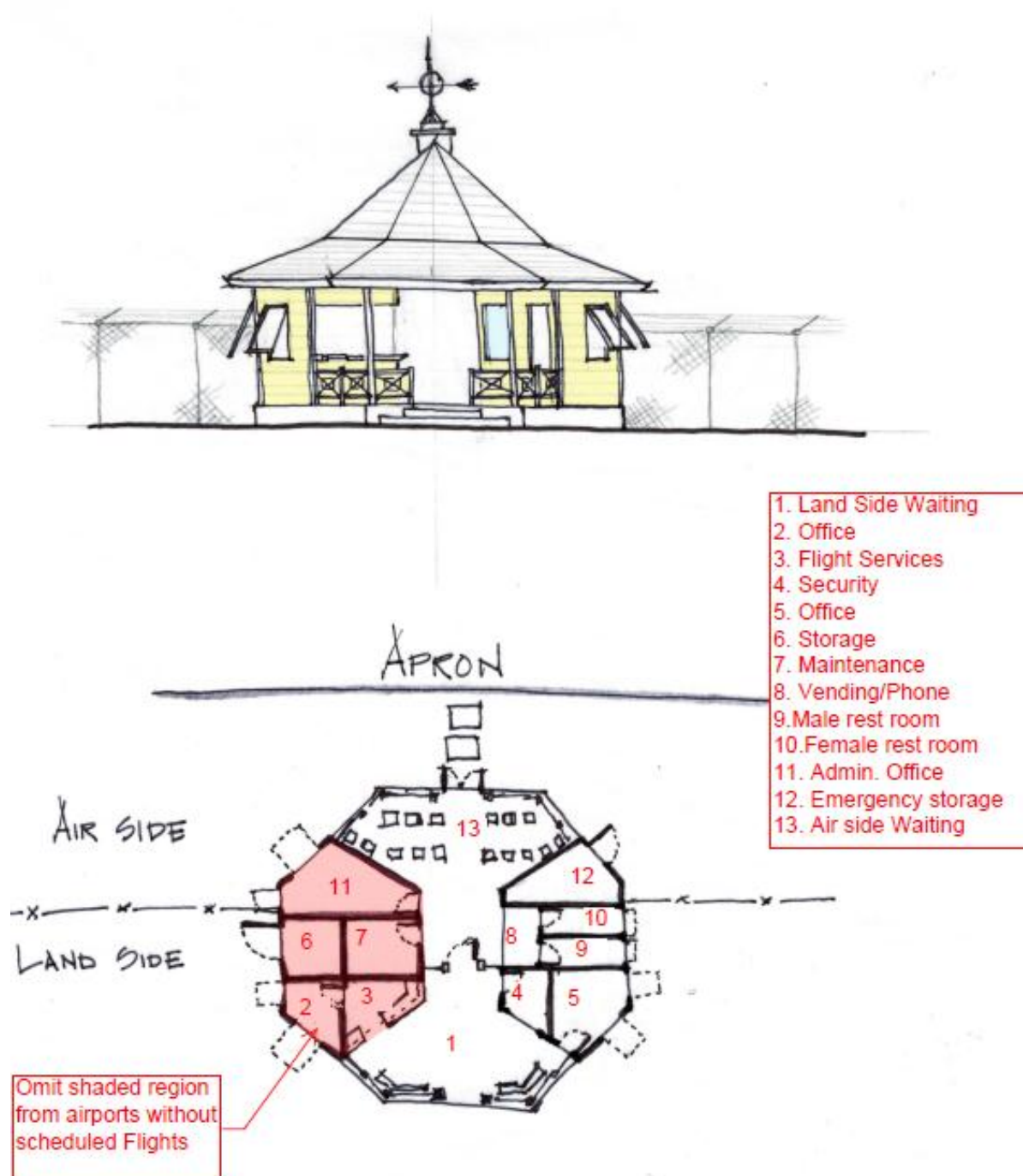


Figure 93: Conceptual Rendering for a Tier 3 Airport

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

APPENDIX C – LANDSIDE PROGRAMMING AREAS AND COSTS

July 22, 2014

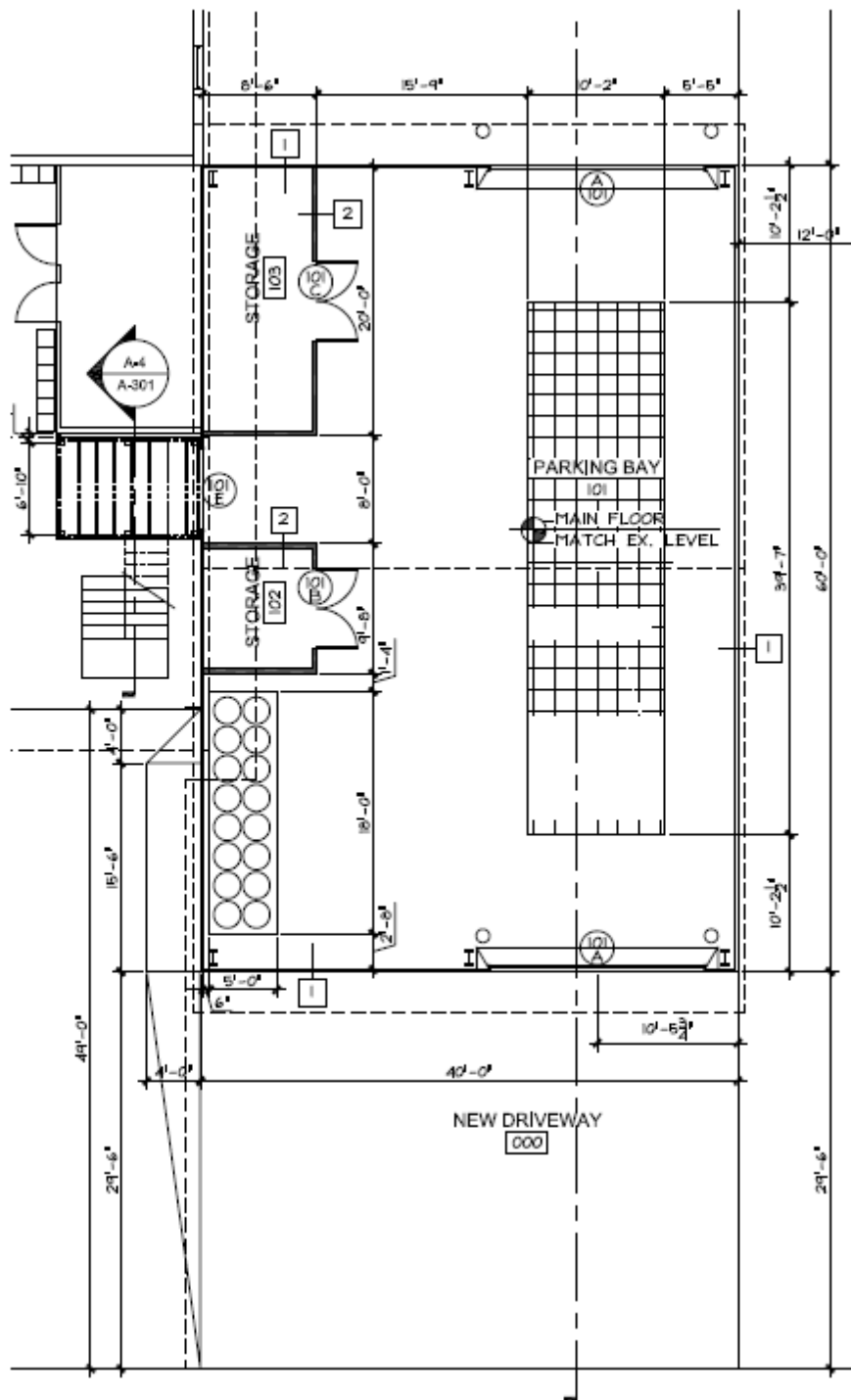


Figure 94: Sample One Bay Fire Hall

**COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS –
AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS**

APPENDIX D – MOBILE EQUIPMENT AIRPORT REQUIREMENTS & COSTS
July 22, 2014

**APPENDIX D – MOBILE EQUIPMENT AIRPORT REQUIREMENTS &
COSTS**

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

APPENDIX D – MOBILE EQUIPMENT AIRPORT REQUIREMENTS & COSTS

July 22, 2014

Airport Mobile Equipment

Item No.	Item / Equipment Description	Unit Cost	IFRAVFR										New Sign (MYCB)					Mackie Harbour (MYAM)	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.0	Aircraft Rescue and Fire Fighting	\$ 800,000.00																	
1.1	Rapid Intervention Vehicle (Self Foam Capacity)	\$ 350,000.00	1																
1.2	Small Water/Foam Tank Trailer-Mounted Unit (Ride 1)	\$ 25,000.00																	
1.3	Rolling Fire Extinguisher (500 lb Capacity)	\$ 3,800.00	1																
1.4	Additional fire/rescue equipment	\$ 20,000.00	1																
ANFF SUBTOTAL			\$ 373,800.00																
2.0	Six-Wheel All-Terrain Utility Vehicle	\$ 12,000.00																	
2.1	Front-end Loader and Backhoe Vehicle	\$ 150,000.00	1																
2.2	Four-Wheel Drive Pickup Truck (1 Ton Capacity)	\$ 38,000.00	1																
MAINTENANCE EQUIPMENT SUBTOTAL			\$ 186,000.00																
3.0	Airfield Lighting Spare Package - Tier 1	\$ 25,000.00																	
3.1	Airfield Lighting Spare Package - Tier 2	\$ 12,000.00																	
3.2	Airfield Lighting Spare Package - Tier 3	\$ 4,500.00																	
AIRFIELD LIGHTING SPARES PACKAGE SUBTOTAL			\$ 25,000.00																
TOTAL AIRPORT EQUIPMENT COSTS			\$ 586,800.00																

Notes: 1. Capable of meeting the intent of ICAO IFF Category 2 in terms of foam and water capacity.
2. Fresh Creek Airport should maintain a MOU agreement with the U.S. Coast Guard with regard to deployment of their ANFF vehicle in the event of an emergency.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

APPENDIX D – MOBILE EQUIPMENT AIRPORT REQUIREMENTS & COSTS

July 22, 2014

Airport Mobile Equipment

Item No.	Item / Equipment Description	Unit Cost	Airport Assessment									
			Treasure Cay (MYAT)	Sandy Point (MYAS)	Moore's Island (MYAC)	Great Harbour Cay (MYSC)	South Bimini (MYBS)	Governor's Harbour (MYEM)	North Eleuthera (MYEH)	Rock Sound (MYER)	San Andros Int'l (MYAN)	Clearance A. Bains (MYAB)
			IFR/VFR	VFR	VFR	VFR	VFR	IFR/VFR	IFR/VFR	IFR/VFR	VFR	VFR
			3	3	3	2	1	1	1	2	2	3
1.0	Aircraft Rescue and Fire Fighting	\$ 800,000.00							1			
1.1	Rapid Intervention Vehicle (w/ Foam Capacity)	\$ 350,000.00						1				
1.2	Small Water/Tank Trailer-Mounted Unit (Note 1)	\$ 24,000.00				1				1		
1.3	Rolling Fire Extinguisher (350 lb Capacity)	\$ 3,800.00	1	1	2	1						1
1.4	Additional fire/rescue equipment	\$ 20,000.00										
	AIRPORT SUBTOTAL	\$ 3,800.00	\$ 3,800.00	\$ 3,800.00	\$ 7,600.00	\$ 31,800.00	\$ -	\$ 350,000.00	\$ 800,000.00	\$ 28,000.00	\$ 28,000.00	\$ 3,800.00
2.0	Six-Wheel All-Terrain Utility Vehicle	\$ 12,000.00	1	1								1
2.1	Front-End Loader and Backhoe Vehicle	\$ 150,000.00					1	1	1			
2.2	Four-Wheel Drive Pickup Truck (1 Ton Capacity)	\$ 38,000.00				1	1	1	1	1	1	
	MAINTENANCE EQUIPMENT SUBTOTAL	\$ 12,000.00	\$ 12,000.00	\$ 12,000.00	\$ -	\$ 38,000.00	\$ 188,000.00	\$ 188,000.00	\$ 188,000.00	\$ 38,000.00	\$ 38,000.00	\$ 12,000.00
3.0	Airfield Lighting Spares Package - Tier 1	\$ 25,000.00						1	1			
3.1	Airfield Lighting Spares Package - Tier 2	\$ 12,000.00				1				1	1	
3.2	Airfield Lighting Spares Package - Tier 3	\$ 4,500.00	1	1	1							1
	AIRFIELD LIGHTING SPARES PACKAGE SUBTOTAL	\$ 4,500.00	\$ 4,500.00	\$ 4,500.00	\$ 4,500.00	\$ 50,000.00	\$ 83,000.00	\$ 83,000.00	\$ 83,000.00	\$ 50,000.00	\$ 50,000.00	\$ 4,500.00
	TOTAL AIRPORT EQUIPMENT COSTS	\$ 20,300.00	\$ 20,300.00	\$ 20,300.00	\$ 12,100.00	\$ 119,800.00	\$ 251,000.00	\$ 801,000.00	\$ 1,051,000.00	\$ 116,000.00	\$ 116,000.00	\$ 20,300.00

Notes: 1. Capable of meeting the intent of ICAO (RFF Category 2 in term
2. Fresh Creek Airport should establish a MOU agreement with B emergency.

COMPREHENSIVE STRATEGY FOR OPTIMIZATION OF THE BAHAMAS FAMILY ISLANDS AIRPORTS – AERODROME TECHNICAL ASSESSMENT AND ECONOMIC ANALYSIS

APPENDIX D – MOBILE EQUIPMENT AIRPORT REQUIREMENTS & COSTS
July 22, 2014

Airport Mobile Equipment

Item No.	Item / Equipment Description	Unit Cost		Staniel Cay (MYEB)		Farmers Cay		Black Point (MYEB)		Exuma Int(MYEF)		Stella Maris (MYLS)		Deadman's Cay (MYLD)		Fresh Creek (MYAF)		Congo Town (MYAK)	
		VFR		VFR		VFR		VFR		IFR/VFR		VFR		IFR/VFR		IFR/VFR		IFR/VFR	
		3		3		3		3		1		3		2		2		3	
1.0	Aircraft Rescue and Fire Fighting		\$ 800,000.00																
1.1	Rapid Intervention Vehicle (w/ Foam Capacity)		\$ 350,000.00							1									
1.2	Small Water/Foam Tank Trailer-Mounted Unit (Note 1)		\$ 28,000.00											1		Note 2			
1.3	Rolling Fire Extinguisher (350 lb Capacity)	1	\$ 3,800.00	2						1		2				1		1	
1.4	Additional fire/rescue equipment		\$ 20,000.00																
	AIRFF SUBTOTAL		\$ 3,800.00	\$ 7,800.00	\$ -	\$ 353,800.00	\$ 7,800.00	\$ 28,000.00	\$ 3,800.00	\$ 353,800.00	\$ 7,800.00	\$ 28,000.00	\$ 3,800.00	\$ 28,000.00	\$ 3,800.00	\$ 3,800.00	\$ 3,800.00	\$ 3,800.00	\$ 3,800.00
2.0	Six-Wheel All-Terrain Utility Vehicle	1	\$ 12,000.00	1		1		1				1						1	
2.1	Front-end Loader and Backhoe Vehicle		\$ 150,000.00							1									
2.2	Four-Wheel Drive Pickup Truck (1 Ton Capacity)		\$ 38,000.00							1				1		1			
	MAINTENANCE EQUIPMENT SUBTOTAL		\$ 12,000.00	\$ 12,000.00	\$ 12,000.00	\$ 188,000.00	\$ 12,000.00	\$ 188,000.00	\$ 12,000.00	\$ 188,000.00	\$ 12,000.00	\$ 38,000.00	\$ 38,000.00	\$ 38,000.00	\$ 38,000.00	\$ 38,000.00	\$ 38,000.00	\$ 38,000.00	\$ 38,000.00
3.0	Airfield Lighting Spares Package - Tier 1		\$ 25,000.00							1									
3.1	Airfield Lighting Spares Package - Tier 2		\$ 12,000.00											1		1			
3.2	Airfield Lighting Spares Package - Tier 3	1	\$ 4,500.00	1		1		1				1						1	
	AIRFIELD LIGHTING SPARES PACKAGE SUBTOTAL		\$ 4,500.00	\$ 4,500.00	\$ 4,500.00	\$ 83,000.00	\$ 4,500.00	\$ 83,000.00	\$ 4,500.00	\$ 83,000.00	\$ 4,500.00	\$ 24,100.00	\$ 24,100.00	\$ 116,000.00	\$ 91,800.00	\$ 50,000.00	\$ 50,000.00	\$ 4,500.00	\$ 4,500.00
	TOTAL AIRPORT EQUIPMENT COSTS		\$ 20,300.00	\$ 24,100.00	\$ 16,500.00	\$ 604,800.00	\$ 24,100.00	\$ 16,500.00	\$ 20,300.00	\$ 604,800.00	\$ 24,100.00	\$ 24,100.00	\$ 91,800.00	\$ 116,000.00	\$ 91,800.00	\$ 91,800.00	\$ 91,800.00	\$ 20,300.00	\$ 20,300.00
																			\$ 5,216,900.00

Notes: 1. Capable of meeting the intent of ICAO RFF Category 2 in term
2. Fresh Creek Airport should establish a MOU agreement with B emergency



Design with community in mind
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