HANCOCK COUNTY – BAR HARBOR AIRPORT

Airport Master Plan Update

Hoyle, Tanner Project Number: 030340
AIP Number: 3-23-0006-30-2010

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The County of Hancock, Maine

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July 2011

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Introduction

1.0 Overview

The consultant, Hoyle, Tanner & Associates, Inc. was awarded the contract from Hancock County to conduct an update to the existing May 2004 Airport Master Plan Update (AMPU) for Hancock County – Bar Harbor Airport (BHB).

Key objectives of this AMPU include the following:

- Present a flexible plan for the airport that considers economic development taking place within the local community, as well as fiscal and environmental constraints.
- Provide a comprehensive update of the airport's existing AMPU and plan set graphics to reflect objective above.
- Develop a comprehensive business plan for BHB.
- Provide a public forum for the discussion of the airport's role that includes a diverse mix of public, private, aviation and non-aviation perspectives.

2.0 The Process

Understanding that an airport is not an isolated facility, rather a vital component of the surrounding community which it serves, is essential in planning efforts. Therefore, all future developments identified must consider potential impacts to the community as well as the surrounding environment. This AMP Update provides a systematic approach to identifying, analyzing, and programming BHB's required developments. The process and resulting AMP provides officials responsible for scheduling, budgeting, and ultimate funding of airport improvement projects with an advance notice of BHB's future needs.

This AMP was prepared in accordance with current requirements of the Federal Aviation Administration (FAA), Maine Department of Transportation – Bureau of Transportation Systems Planning (Maine DOT), and the needs of Hancock

County. All portions of this document are based on the criteria set forth in the FAA Advisory Circulars (AC) 150/5070-6B, *Airport Master Plans*, and AC 150/5300-13, Change 15, *Airport Design*.

Throughout this process, reviews of this AMPU were conducted at strategic points such as the completion of the forecasts and during the evaluation of airfield development alternatives. This ensured that input was received from key stakeholders, including Hancock County, FAA and Maine DOT prior to moving on to the next step in the planning process. Each step is built upon information and decisions made by consensus during previous steps. A planning advisory committee (PAC) was also created to include the public and facilitate the AMP process by providing input and insight on technical issues as they pertain to the study's elements.

3.0 SUMMARY

It is anticipated that aviation will continue to grow as a large component of the transportation industry nationally, in Maine, and the region surrounding Hancock County. A critical factor in the airport's future success depends upon determining the viability of the present airside facilities' ability to accommodate anticipated demand. The analysis conducted in the development of this AMP provides the forum for discussion and establishment of links between community and airport goals. This AMP is a tool, serving as a guide to decision makers, users, and the general public relative to realistic and achievable development that is consistent with both airport and community objectives.

CHAPTER 1 Inventory

1.0 AIRPORT SETTING

The Hancock County – Bar Harbor Airport (BHB) is conveniently located half way between the City of Ellsworth and the Town of Bar Harbor, Maine. Overlooking Mount Desert Narrows, Frenchman Bay and Mount Desert Island with the prominence of Cadillac Mountain in the background, the airport offers spectacular views and is a true gateway to nearly endless local recreational possibilities offered by 'Downeast Maine', most notable being the world renowned Acadia National Park.

Hancock County – Bar Harbor Airport
Trenton, Maine

2.0 LOCATION

BHB is located approximately 8-miles northwest of Bar Harbor, situated in the Town of Trenton, Maine. Public ground access is provided to the west side of the airfield via Maine State Route 3.

The airport currently consists of about 468 acres of land with an airfield elevation of 83 feet above mean sea level.

3.0 MANAGEMENT AND ADMINISTRATION

BHB is owned and operated by Hancock County and governed by three County Commissioners who have legislative authority over the operation of all county offices. BHB also has a seven member voluntary Airport Advisory Committee (AAC) that makes recommendations regarding the development, use, and operation of the airport.

The County Commissioners delegate responsibility for the day-to-day operations of the airport to a full-time Airport Manager. The Airport Manager has a staff of eight (8) who fulfill the dual roles of qualified Airport Rescue Fire Fighters (ARFF) and airport maintenance personnel.

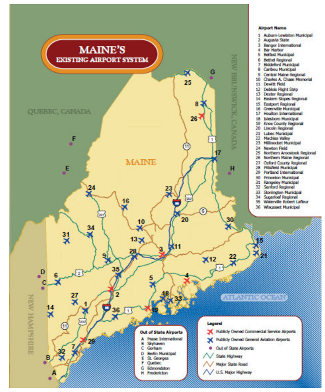
The county's rules and regulations applicable to the operation of BHB are supplemented by federal and state regulatory statutes regarding airport operations. At the federal level, BHB is subject to the regulations of the United States Department of Transportation (USDOT) through the Federal Aviation Administration (FAA) and Maine Department of Transportation – Bureau of Transportation System Planning (Maine DOT) on the state level. BHB also enforces its own *Minimum Standards for the Conduct of Aeronautical Activity*, last updated in 2010.

4.0 ROLE IN NATIONAL AIR TRANSPORTATION SYSTEM

BHB is designated by the FAA as a publicly owned, public-use facility. Under the Airport and Airways Improvement Act, the Secretary of Transportation is required to publish a national plan for the development of public-use airports. The plan is published as the National Plan of Integrated Airport Systems (NPIAS) and includes all commercial service, relievers [high capacity general aviation (GA) airports in metropolitan areas], and select GA airports.

The most recent NPIAS (2009-2013) classifies BHB as a non-hub primary commercial service airport. The non-hub designation is given to those airports that enplane more than 10,000 annual passengers, but are less than one-half percent of the national's total commercial service activity. BHB also supports a significant amount of GA activity as discussed in the next chapter.

5.0 STATE AVIATION SYSTEMS PLAN



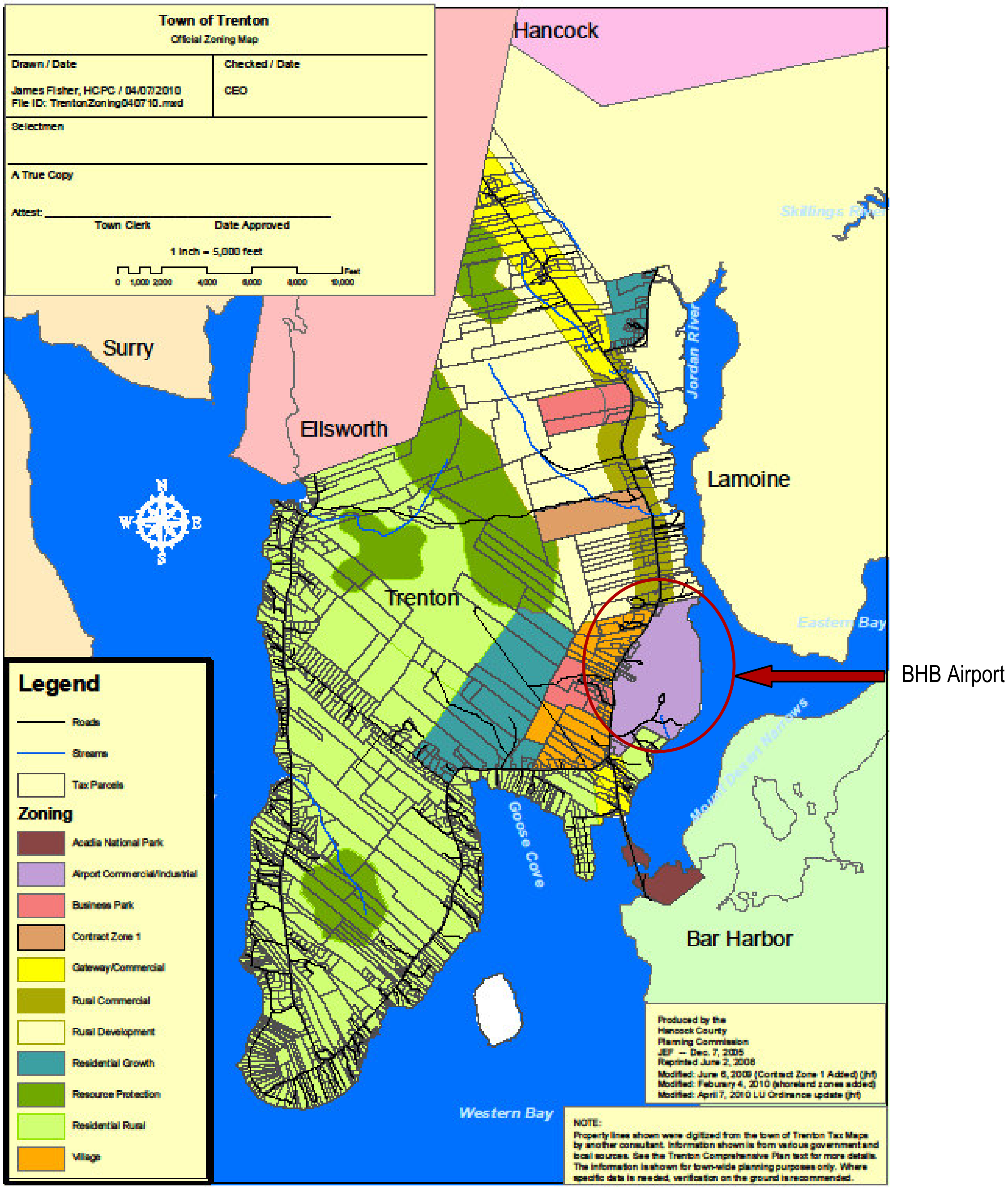
BHB is one of the 36 public-use airports analyzed in the Maine Aviation Systems Plan Update (MASPU). The 2006 MASPU groups these facilities based on several factors including service level, economic contribution, geographic location, etc. BHB is defined as a Level I airport, which includes other commercial air service and higher level GA providers. The determination of levels facilitates overall system planning which aids in establishing goals, identifying assets, accommodating demand, and determining project funding among other benefits.

6.0 LAND USE

The entire BHB airport land is currently designated as Airport Commercial/Industrial as illustrated on the most current Town of Trenton Land Use Map, **Figure 1-1**.

Adjacent off-airport land uses include Business Park, Rural Commercial, Village, etc. All are considered compatible with the airport. Future land use planning should include prevention of residential type land uses adjacent to BHB.

Figure 1-1
Town of Trenton Land Use Map



7.0 AIRFIELD ENVIRONMENT

This section provides information relative to BHB's existing airside facilities, which includes those that are required to support the movement and operation of aircraft. The information presented in this airport master plan update (AMPU) is from the study's baseline year of 2009.

An illustration of the airport is provided in **Figure 1-2** below.

Figure 1-2
BHB Airport – Aerial Plan View

7.1 Runways

BHB has two active runways, Runway 4-22 and Runway 17-35. Runway 4-22 is considered the primary runway due to its precision instrument approach capability, greater length and load bearing ability, as well as the fact that it has a full-length parallel taxiway. Runway 17 has a significantly displaced threshold, artificially reducing its length, to compensate for rising terrain and tall trees on the visual approach. Other key runway information is provided in **Table 1-1**.

Table 1-1
Runway Information

	Runway 4	Runway 22	Runway 17	Runway 35
Length, feet	5,200		3,253	
Width, feet	100		75	
Traffic Pattern	Left	Left	Left	Left
Runway Heading	044 magnetic, 024 true	224 magnetic, 205 true	169 magnetic, 150 true	349 magnetic 330 true
Latitude/ Longitude	44-26.631513N 068-22.038093W	44-27.409648N 068-21.540717W	44-27.161850N 068-21.730515W	44-26.700302N 068-21.352038W
Displaced Threshold, feet	No	No	684	111
Threshold Elevation, feet, MSL	69.0	69.1	78.6	45.4
Pavement Condition Index (PCI)	86		93	
Surface Material (Condition)	Asphalt (Good)		Asphalt (Excellent)	
Weight Limitations, pounds	Dual Wheel – 72,000 Dual Tandem – 100,000		Single Wheel – 13,000 Dual Wheel – 20,000	
Runway Markings (Condition)	Nonprecision (Good)	Precision (Good)	Basic (Good)	
Runway/Approach Lights	REILs, HIRLs	MALSF (medium intensity)	None	None
Other Navigational and Visual Aids	4-box VASI on left	4-box VASI on left	None	None
	Wind Indicator, Segmented Circle, Airport Rotating Beacon, and AWOS			
Instrument Approaches	GPS	ILS/DME/GPS	None	None

Source: FAA Form 5010, *Airport Master Record*; Maine DOT; www.airnav.com

7.2 Taxiways

BHB's taxiway system consists of an old runway converted to a taxiway, several stub taxiways and Runway 4-22's parallel taxiway, all shown on **Figure 1-2** below. Key taxiway information is provided in **Table 1-2** below.

Table 1-2
BHB Taxiway Information

Taxiway/Taxilane	A	B	C [1]	D	E	F	G	H	J
Length (feet)	1,990	640	970	550	450	200	800	5,700	350
Width (feet)	50	35	35	50	50	35	50	35	35
Surface Material	Asphalt	Asphalt	Asphalt	Asphalt	Asphalt	Asphalt	Asphalt	Asphalt	Asphalt
Surface Material Condition	Excellent	Excellent	Excellent	Poor	Poor	Excellent	Excellent	Excellent	Excellent
Marking	Centerline and holding position, partial edge, enhanced	Centerline, holding position, enhanced	Centerline, edge, holding position, enhanced	Centerline, holding, enhanced	Centerline, holding, enhanced	Centerline, edge, surface painted hold sign	Centerline, edge and holding position, enhanced	Centerline and holding position, enhanced	Centerline and holding position, enhanced
Marking Condition	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
Taxiway signs	Directional and runway holding position	Directional and runway holding position	Directional and runway holding position	Directional and runway holding position	Directional and runway holding position	None	Directional and runway holding position	Directional and runway holding position	Directional and runway holding position
Lighting	MITL	MITL	Reflectors	None	None	None	None	MITL	MITL

Note:
1. C is a taxilane

Source: Hoyle, Tanner & Associates, Inc.

7.3 Aprons

BHB currently has four (4) aircraft tie-down and parking areas, as shown on **Table 1-3**. The based aircraft apron is used primarily for based aircraft parking, but if space is available, is also used for itinerant parking. The smaller itinerant parking apron is reserved primarily for multi-engine aircraft, such as the Beech Baron, Piper Seneca, up to a Cessna 402 size.

The larger itinerant back aircraft apron actually consists of two (2) parking areas, located along Taxiways D and E. The apron is typically only used for overflow itinerant parking because it is difficult to access and aircraft parked there often intrude within the Taxiway Object Free Area (TOFA) of Taxiways D and E.

The terminal apron is primarily used for commercial service aircraft and for larger corporate type jet aircraft.

Table 1-3
BHB Apron Information

Apron	Size (square yards)	Condition	A/c Tie-down or Parking Capacity
Based Aircraft Apron (GA Apron)	15,300	Excellent	43
Itinerant Aircraft Apron	3,600	Poor	10
Larger Itinerant Aircraft Apron	8,800	Poor	14
Terminal / Itinerant Apron	25,000	Excellent	12
		Total Capacity Itinerant Aircraft	***36***
		Total Capacity for Based Aircraft	***43***

Source: Hoyle, Tanner & Associates, Inc.

8.0 BUILDINGS AND TENANTS

BHB owns the land that in turn is leased to tenants who have constructed privately owned buildings including the fixed base operator and 16 privately owned hangars. The airport owns the terminal building, the aircraft rescue and fire fighting facility, a maintenance/snow removal equipment storage garage, and another smaller storage building. A brief description of key buildings and tenants is provided below, while a complete list of buildings and hangars is provided on the airport layout plan (ALP) graphic in **Appendix C**.

8.1 Terminal Building

The BHB terminal building is a 4,000 square foot facility that acts as a gateway for commercial passengers arriving via the US Air Express Saab 340 turboprops servicing the airport. The terminal building houses one year round and one seasonal rental car agency, provides a public waiting area and restrooms, and accommodates Transportation Security Administration (TSA), and air carrier administrative and baggage handling personnel.

BHB Terminal Building

8.2 Fixed Base Operator

Columbia Air Services, LLC

BHB has one full service fixed base operator (FBO), Columbia Air Service. They offer full-service fueling, aircraft maintenance up to and including turboprop, pilot supplies, aircraft hangaring, and provide the services needed by the general aviation customer and their passengers. Columbia owns the building shown here that houses their administrative and maintenance staff, flight planning and lounge space for pilots, while the adjoining heated hangar is used for aircraft maintenance. Another larger unheated hangar near their offices along with a smaller unheated hangar near the aircraft rescue and fire fighting facility are used for aircraft storage.

Maine Coastal Flight Center is a subtenant of Columbia Air Services and offers flight training and sight seeing flights. Acadia Air Tours provides scenic biplane and glider rides.

8.3 Aircraft Rescue and Fire Fighting Facility

BHB has a new Aircraft Rescue and Fire Fighting facility (ARFF) that was completed in late 2009 with American Recovery and Reinvestment Act funding. The facility ensures a timely rescue response, protects life and property, and minimizes the effects of an aircraft accident or incident at the airport.


BHB Airport Rescue and Fire Fighting Facility

The ARFF facility was designed and built to meet Index ‘A’ fire fighting capabilities as required by Part 139 certificated airports, discussed later in this chapter.

The former ARFF facility is now being used as a snow removal equipment storage building and maintenance garage. The garage does not have the capacity for heated sand storage or for all of the airport motorized equipment.

9.0 Fueling and Fuel Facilities

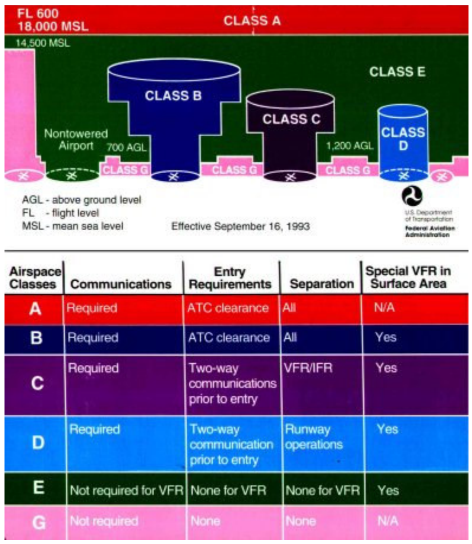
BHB Fuel Trucks

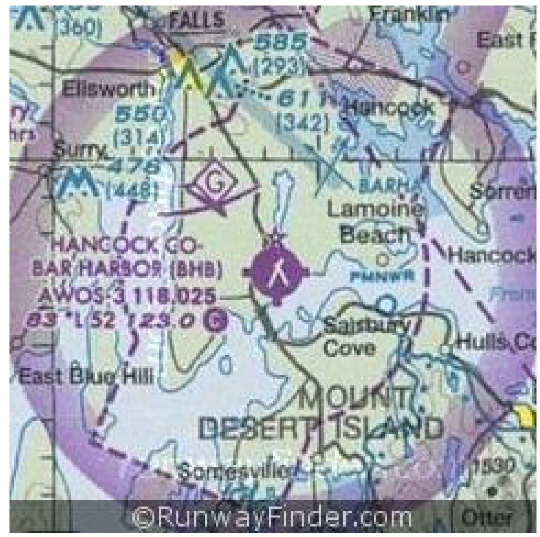
BHB's existing fueling operation is owned and operated by Columbia Air Services FBO. The fuel farm is located on the terminal apron, with two (2) underground 10,000-gallon Jet-A tanks and one (1) 10,000-gallon 100LL Avgas fuel tank. The FBO also owns two (2) fuel trucks that include a 3,000-gallon Jet A truck and a 1,200-gallon Avgas fuel truck. A third 5,000-gallon Jet-A truck is leased during peak season (typically April through October).

10.0 Airspace

Without an air traffic control tower, BHB is designated as Class G, uncontrolled airspace, which extends up to 700 feet above the ground. The airspace then becomes Class E, which is uncontrolled for aircraft operating clear of clouds while aircraft operating in the clouds are controlled by Bangor Approach Control. BHB also has a designated UNICOM and common traffic advisory frequency, (CTAF) which pilots should use to announce their position to other pilots in the area for traffic safety. **Figure 1-3** illustrates the U.S. Airspace System as well as BHB on an aeronautical map commonly referred to as a sectional chart.

Figure 1-3
U.S. Airspace System & BHB Sectional Chart





11.0 FAR PART 139 CERTIFICATION

Airports that provide commercial passenger service with aircraft carrying more than 10 passengers per flight are required to be certificated by the FAA under Title 14, Code of Federal Regulations (CFR), Part 139. The certification process is conducted on an annual basis through airport inspections and a review of the minimum requirements, to ensure air transportation safety. Being a Part 139 airport, BHB agrees to certain operational and safety standards and provide for such things as firefighting and rescue equipment to maintain their certificate.

Type of Air Carrier Operation	Class I	Class II	Class III	Class IV
Scheduled large air carrier a/c (30+ seats)	X			
Unscheduled large air carrier a/c (30+ seats)	X	X		X
Scheduled small air carrier a/c (10-30 seats)	X	X	X	

BHB maintains a Class I certificate providing scheduled commercial air service with more than 30 seat air carrier aircraft.

11.1 Airport Certification Manual

The FAA requires an approved Airport Certification Manual (ACM) prior to initiating Part 139 operations at an airport. BHB maintains an updated ACM in the Airport Manager's office. Key elements of that ACM are discussed below.

11.2 Public Protection and Security

To ensure public safety and security, additional precautions are implemented at Part 139 airports. Approximately 12,321 linear feet of BHB's perimeter (about 57%) is secured with chain link fence in order to deter people, vehicles and wildlife from entering the airport. Transportation Security Administration (TSA) personnel are on-hand to secure the terminal building and screen scheduled air carrier passengers.

BHB maintains an updated Airport Emergency Plan in the Airport Manager's office. This vital component of the ACM provides direction and procedures for a variety of emergency operating situations, lines of responsibility, and pertinent agency contact information.

11.3 Aircraft Rescue and Fire Fighting (ARFF) Equipment

Operators of Part 139 airports are required to provide Aircraft ARFF services during air carriers operations that require a Part 139 certificate.

Based on the largest air carrier aircraft serving BHB, a Saab 340 which is less than 90-feet in length, the airport is classified as an Index 'A' ARFF facility. BHB has one (1) Index 'A' ARFF vehicle as required, a 2008 Danko, Rapid Intervention Vehicle (RIV) equipped with 500 pounds of dry chemical and 300 gallons of premixed aqueous film forming foam (AFFF). The Trenton Volunteer Fire Department, located 1-mile from the airport's terminal building, provides back-up services to BHB's ARFF department.

11.4 Snow Removal Equipment

Because of its northern location and snow fall, BHB is required to maintain a Snow and Ice Removal Plan under Part 139. The updated plan is in the Airport Manager's office. BHB's existing snow removal equipment (SRE) is listed below.

- 1 – 2008 Chevrolet – ¾ ton pick-up truck with plow
- 1 – 2003 John Deere 744J – Loader with 20-foot ramp plow and 11-yard snow bucket;

- 2 – 2003 John Deere 772CH II – Motor grader with 14-foot moldboard and 14-foot wing;
- 1 – 1985 John Deere 644C – Loader with 6-yard snow bucket;
- 1 – 1985 Idaho Norland – Snow blower, loader mount (for 644C);
- 1 – 1952 FWD Snow blower, chassis mount;
- 1 – Osh Kosh blower; and
- 1 – F-800 Truck with sweeper

Each of BHB's SRE vehicles is equipped with yellow strobe lights and two-way radios providing the operator Unicom/CTAF and airport communications frequencies.

12.0 SUMMARY

Overall, this inventory chapter provides a 'snapshot' of BHB airport and its facilities in this study's baseline year of 2009. The inventory process consisted of analysis of existing documents and information relative to the airport, including collection of historical data, visiting the airport, conducting tenant interviews and discussions with the Airport Manager.

The Existing ALP graphic in **Appendix C** provides a visual depiction of BHB's current facilities and this inventory effort.

CHAPTER 2 Aviation Activity Forecasts

1.0 Overview

This chapter presents projections of aviation activity that will be used as the basis for facility planning at BHB. By comparing the demand for future facilities with existing facilities, it is possible to identify deficiencies. Thus, these forecasts serve as the foundation of the master planning process. The two most recent forecasts prepared for BHB include the 2004 Airport Master Plan Update (AMPU) and 2006 Maine Aviation System Plan Update (MASPU). Each year the airport is also included in the FAA Terminal Area Forecasts (TAF). These studies have been reviewed and considered in developing updated forecasts, including a direct comparison to the FAA TAF which is required as part of the FAA review process.

Additionally, each year the FAA prepares projections in their Aerospace Forecasts for a number of aviation and aerospace elements. While there have been recent declines in the industry, overall the 2010 FAA Aerospace Forecasts project most facets to rebound after a few years and positive growth to occur through the long term planning period. A number of the industry projections by the FAA are described in the applicable forecast sections.

The standard planning period for an airport master plan is 20 years. Since this study was primarily conducted in 2010, forecasts are presented for 2015, 2020, and 2030 as the key planning periods are generally considered at the five, ten, and 20-year horizons. The forecast for based aircraft, enplanements, and operations use calendar year data obtained through 2009. The analyses of historic data and industry trends have been supplemented by information obtained during interviews with airport management, tenants, and users to derive a more complete picture of operational activities and emerging trends at BHB.

2.0 BASED AIRCRAFT

The number of aircraft owners projected to use BHB as their base is an important consideration when planning facilities. The based aircraft forecast will directly influence the type and number of aircraft storage facilities and apron areas needed. Projections of based aircraft also provide one indication of the anticipated growth in flight activity that is expected to occur at the airport. For BHB, growth in the number of based aircraft is expected to occur during the planning period. The following sections describe the methods evaluated to estimate this growth.

2.1 Historic Growth

A common technique for projecting the number of based aircraft is to simply apply the historic growth rate experienced over a set timeframe. Unfortunately, over the past 10 years the number of based aircraft has remained relatively static, with the lowest counts occurring over the past couple of years. When this slight decline is applied to the most recent count of 43 in 2009, clearly the overall result is a reduction in the total number of based aircraft for the planning period.

2.2 Previous Projections

The projections of based aircraft in the 2004 AMPU are nearly identical to those in the 2006 MASPU. This is due to the fact that both studies are based on the preferred forecasts from the 2001/2002 MASPU. Therefore, only the current state system plan was considered for comparison purposes since it benefits from newer base data. When the overall growth from the 2006 MASPU is applied to the current count, the result is 51 aircraft by the end of the planning period.

2.3 National Active Fleet Forecasts

After analyzing fleet attrition and aircraft utilization rates along with manufacturing shipments, the FAA documented in the 2010 Aerospace Forecasts that the active general aviation fleet actually increased in 2009. This data also shows the number of active general aviation aircraft (in the nation) increasing at an average of 0.9 percent through 2030. When applied to the 2009 count, this growth rate resulted in 52 based aircraft by the end of the planning period.

Table 2-1
Comparison of Based Aircraft Projections

	Historic Growth	Statewide System Plan	National Active Fleet	Adjusted Forecast
Base Year				
2009	43	43	43	43
Forecast				
2015	42	45	45	47
2020	42	47	47	51
2030	41	51	52	56

Source: Hoyle, Tanner & Associates, Inc., 2010.

2.4 Selected Based Aircraft Forecast

BHB has not seen the limited growth in based aircraft anticipated by the two previous studies conducted a few years ago. However, given the very cyclical nature of general aviation, it is not believed that this trend will continue over the next 20 years. In addition to the expected increase in active general aviation aircraft, the FAA also predicts the number of hours flown by general aviation aircraft to grow 2.5 percent annually through 2030. These industry forecasts assume that much of the growth will be attributed to the regain in business and corporate jet traffic growth after 2010 as well as the continued utilization of light sport aircraft.

While the most recent based aircraft counts have been somewhat stagnant, a more optimistic outlook is expected for the planning horizon. For a number of years airport management has maintained a hangar waiting list. There are currently 17 people on the waiting list, most of which own single-engine aircraft and desire t-hangar space. In order to develop a forecast of based aircraft which is truly unconstrained, this waiting list must be considered. However, it is not uncommon for up to 50 percent of the individuals to withdraw, once hangar facilities become available. This reduction also accounts for the few people on the list that currently base their aircraft on the airport's parking apron (i.e. would not be a new based aircraft). Therefore, it is more realistic to assume there are only eight new aircraft waiting to be based at BHB.

Because an optimistic approach is needed to properly plan future airport facilities and given that the County desires to construct additional hangars, it is assumed that the additional eight based aircraft will be realized by the middle of the 20-year planning period. For the remaining years, the average growth from the statewide and national projections was applied. This "Adjusted Forecast" is shown in **Table 2-1**, and results in an average growth rate of 1.2 percent annually.

3.0 BASED AIRCRAFT FLEET MIX

Projecting the mix of the based aircraft fleet is necessary since different aircraft require different facilities. The future based aircraft fleet mix was determined by studying the projections of the national fleet and comparing that to the aircraft types currently at BHB.

3.1 The Nation's Active General Aviation Fleet

Every year, the nation's active general aviation fleet is published as part of the FAA Aerospace Forecasts. In 2009 there were 229,149 active general aviation aircraft. By 2030, the FAA predicts this figure to increase to 278,722 aircraft. While the FAA provides counts for a number of aircraft categories, they have been simplified into the five shown in **Table 2-2**. Within the single-engine grouping is the single-engine piston, experimental and light sport aircraft (LSA) categories. The multi-engine group contains both piston and turboprop models as the rotorcraft group contains both piston and turbine models. The jet category covers all ranges of turbojet general aviation aircraft, from the newer very light jets (VLJs) to the heaviest business jets.

Table 2-2
Forecast of Nation's Active Fleet

	2009 Fleet Mix	2030 Fleet Mix	Average Annual Growth Rate
Single-Engine	76.5 %	72.2 %	0.7 %
Multi-Engine (piston & turboprop)	11.5 %	9.6 %	None
Jet	5.0 %	9.7 %	4.2 %
Rotorcraft	4.5 %	6.5 %	2.8 %
Other (gliders, balloons, etc.)	2.5 %	2.0 %	None

Source: 2010 FAA Aerospace Forecasts.

These projections suggest a noticeable growth in the jet category. Several reasons exist to support this anticipated growth. The use of business aircraft by smaller companies has escalated as various charter, lease, time-share, partnership, and fractional ownership agreements have emerged. Despite the impact of the current recession on business jet operators, the FAA predicts this segment will continue to use general aviation, outpacing both personal and recreational use.

The continuing popularity of travel by general aviation aircraft is also due to the ability to use smaller, less-congested airports located closer to one's final destination. Despite the bankruptcy of Eclipse and DayJet, new VLJs continue to enter the market. In the FAA's projections, the VLJs as well as other jet aircraft models are expected to replace a number of piston aircraft in the future, especially those in the multi-engine group. Hence the reason the multi-engine group shows no growth. In fact, the FAA predicts a decline in the multi-engine piston fleet; however, this is balanced by the expected increase in multi-engine turboprop aircraft.

Finally, while growth in the single-engine category seems small, there is a significant increase in the number of LSA expected across the nation. By 2030, the FAA predicts that the nearly 7,000 of these aircraft registered in 2008 will increase to 16,311.

3.2 BHB Based Aircraft Fleet Mix

The existing based aircraft fleet mix at the BHB is 93.0 percent single-engine, 4.7 percent multi-engine and 2.3 percent other (glider). Throughout the planning period, the mix of aircraft is expected to remain predominately single-engine. In addition to the traditional single-engine aircraft, it is expected that some light sport aircraft will eventually be based at BHB.

Perhaps the more significant issue to consider for future airport planning are the jet aircraft and rotorcraft that are expected to be based at the airport. While only two jets are shown during the 20-year planning period, this figure is considered conservative for the overall planning period. As predicted by the FAA, turbojet technology is at the point where it is truly feasible for jet aircraft to be considered as replacements to a number of the traditional piston fleet. Rotorcraft are expected to be based at the airport in the near future due to their popularity with law enforcement, medevac, and tour operators.

Table 2-3
Forecast of Based Aircraft Fleet Mix

	2009	2015	2020	2030
Single-Engine	40	43	46	48
Multi-Engine (piston & turboprop)	2	2	2	3
Jet	0	0	1	2
Rotorcraft	0	1	1	2
Other (gliders, balloons, etc.)	1	1	1	1
Total	43	47	51	56

Source: Hoyle, Tanner & Associates, Inc., 2010.

As with most airports, the single and multi-engine categories are predominantly comprised of Beech, Cessna, Mooney, and Piper models. Likewise, most turboprops and multi-engine aircraft tend to include the Beech King Air series; Cessna models, such as the 337 Skymaster and 414 Chancellor; or the Piper Seminole and Seneca aircraft. The type of based jets anticipated would likely be a small to medium sized business jet aircraft and/or perhaps a newer very light jet aircraft, while the rotorcraft would probably include the smaller piston or turbine models.

4.0 PASSENGER ENPLANEMENTS

Enplanements, or the number of revenue passengers departing the airport, are the most common measure used in the aviation industry to gauge passenger activity. Passenger enplanements can dictate nearly everything from the airline fleets serving an airport, the various terminal building components, to the landside facilities.

4.1 Essential Air Service Program

Over the past ten years, the annual revenue enplanements at BHB have been somewhat static, hovering just above the 10,000 level. Passenger service is limited to daily roundtrips to Boston's Logan International Airport. These US Airways Express flights are operated by the regional airline Colgan Air as part of the FAA's Essential Air Service program. The Essential Air Service program was created to maintain a level of scheduled passenger air service to those communities that might otherwise have lost such service after deregulation. The U.S. Department of Transportation (DOT) manages this program by determining the minimum level of service for each eligible airport, including specifying which hub the community will be linked to in the nation's airline network. The department also specifies the minimum number of departures, seats, and some aircraft characteristics.

Airlines respond to specific Essential Air Service market solicitations by submitting proposals to provide the minimum service for what is typically a two year period. For a number of years, Boston has prevailed as the primary hub or market for BHB in these solicitations. Past consideration has been given to linking BHB with other potential hub destinations. These have primarily included the New York and Washington D.C. area airports as potential market pairs.

Through December 2008, the US Airways Express flights were offered using 19 seat, Beechcraft BE-1900 aircraft. In January 2009, Colgan Air replaced the

Beechcraft BE-1900 service with the airline's Saab-340 aircraft. While both aircraft are turboprop, this change in fleet increased the level of service offered to BHB passengers. In addition to providing 34 seats on each aircraft, the Saab-340s also provide the passengers with in-flight cabin service and a lavatory.

4.2 BHB Passenger Catchment Area

While the enplanements at BHB have not shown consistent growth, it is believed that the airport has the ability to increase its passenger base. The geographical area served by an airport, referred to as the catchment area, typically consists of a primary and total catchment area. In the simplest terms, the primary catchment area represents the area where passengers using BHB have originated from historically. The total catchment is a larger area which represents the market potential if additional services, frequency, or destinations were offered.

Many factors contribute to an airport's draw for passengers. The most critical being the distance to competing airports, the number and type of destinations available at these airports, the presence of low cost carriers, and whether the competing airports are considered an airline hub or provide international connections. The three commercial service airports which compete directly with the passengers in BHB's catchment areas include the Bangor International, Augusta State, and Knox County Regional Airports.

As documented in the 2006 MASPU, the areas within the respective 30 minute drive time to BHB and to Bangor overlap and the 60 minute drive time service areas from all four of these airports overlap. The 2006 MASPU also compared different factors for the state's airports. Of the various characteristics, BHB only ranked higher than the other three competing commercial service airports in tourism and was equal with respect to major facilities and services provided. The elements that appear to place the airport at the most disadvantage would be the accessibility, population served, and surrounding development. The most significant competition in the region comes from Bangor International since they have three different airlines and jet service to four non-stop destinations (New York, Detroit, Orlando/Sanford, and St. Petersburg/Clearwater). However, none of these carriers offer significantly lower or low cost airfares.

Expansion of the current passenger service at BHB will rely heavily on the ability to attract new passengers through the introduction of service to/from additional market pairs. Given that the airport is part of the Essential Air Service program and a tourist destination, a more immediate focus would be for the County and Colgan Air to partner in a marketing campaign aimed at increasing the public's awareness of the airport's commercial service. An example might include outdoor advertisement for the airport along State Route 3, between Ellsworth and Bar Harbor, reminding them they could have flown into BHB instead, which is ahead up on the left.

Once better exposure exists, future increases in market share will likely require some reduction in fares for enplanements to increase. Nonetheless, in the absence of a full commercial passenger service study for BHB, it is believed that during the course of the planning period, BHB has the ability to not only maintain past passenger levels, but also to expand those figures. The following sections explore the methodologies to forecast passenger enplanements.

4.3 Historic Growth

The first enplanements projection simply extrapolates the base year level by the average annual growth rate over the past decade. However, due to the fluctuating nature of the historic revenue passenger enplanements, the result is a negative projection.

4.4 National Forecasts

In the 2010 FAA Aerospace Forecasts, growth in the revenue enplanements for the nation's regional/commuter carriers is projected to increase at a greater rate than those of the domestic mainline carriers. In fact, between 2000 and 2009, domestic mainline carriers were down an average of 1.8 percent annually while regional carriers were up an average of 7.6 percent annually. Regional passenger enplanements for 2010 are expected to be up 4.6 percent over 2009 figures with long term growth projected to average 3.0 percent annually between 2009 and 2030.

The regional carrier enplanement growth is in part attributed to the fact that mainline carriers are likely to reduce capacity for the 3rd consecutive year, while the regionals are projected to increase again after only the first decline since airline deregulation. The FAA also projects average load factors to remain high (77 percent) for regional carriers throughout the forecast period. Although BHB did not experience similar growth or load factors, the FAA's rates regional airline enplanements were applied. This resulted in a total of 18,834 enplanements at BHB by 2030.

4.5 Regression Analysis

Both linear and multiple regression models were also created to evaluate the passenger activity at BHB. These utilized individual and combined sets of socioeconomic data from the Maine Consensus Economic Forecasting Commission (CEFC) in an effort to identify potential correlations with passenger enplanements. The assumption is that the tendency for people to travel (business or pleasure) is related to variables such as a market area's population, income, and employment. Specifically:

- Population data was included based on the assumption that enplanements are inherently related to the number of people in the region served by the airport.
- Income data was utilized because the use of aviation has a median level of expense. In other words, it is believed that more people will use air travel as their income levels increase, especially in the leisure markets.
- Employment data was included as it is considered to indicate the relative growth and/or stability of the market area's economy. Both total employment and the projections for the leisure and hospitality service industries were considered since BHB is primarily a tourist destination market.

Most of the models resulted in somewhat low statistical correlation values; however, a few did indicate some correlation in the data sets. These limited relationships are attributed to the fact that nearly all of the socioeconomic variables considered experienced consistent growth between 1999 and 2009. The primary exception being the total employment figures, which had similar up and down fluctuations, to those in the historic passenger enplanements for BHB. The most significant correlation resulted when the level of passengers was evaluated against the independent variables for Maine population, personal income, and total employment. The resulting multiple regression equation was exponentially smoothed to create a projection of passenger enplanements for the planning period.

4.6 Market Share Analysis

Another common methodology for forecasting aviation activity is the use of market share analysis. This approach evaluates the extent to which BHB captures a portion of a defined market, whether at a national or regional level. Since reliable regional passenger data was not available, the FAA's projection for the U.S. regional carriers was utilized. In this analysis, BHB's historic passenger enplanements were compared to those of the nation's regional carriers between 1999 and 2009. The average of BHB's share during this period was then applied to the FAA's forecast. It is interesting to note that BHB's recent market share is approximately half of what it was prior to 2002. While the exact reason for this cannot be confirmed, much is likely due to the continuing, long term affects that the terrorist events of September 11th have had on the industry. Regardless, the average market share since 1999 was applied to the national projections to create another enplanement forecast for BHB.

4.7 Selected Annual Enplanement Forecast

Of the four projections considered, the historic data forecast was immediately rejected. While the airport may continue to experience irregular passenger levels before any consistent gains are recognized, it is not believed that this trend will continue beyond the short term planning period. Conversely, the market share analysis is considered overly optimistic with passenger levels nearly doubling by 2015; thus it too was eliminated from further consideration.

Both the national growth and regression analysis provide realistic projections for the 20-year planning period, but at slightly different overall growth rates. Because the airport has experienced a varying level of enplanements over the past 10 years, the lower national growth rate is considered optimistic enough for the short term planning period. However, it is difficult to accept an overall forecast based solely on the projection of national trends, especially when the historic market share for BHB resulted in a higher growth rate than the national projections.

Table 2-4
Comparison of Passenger Enplanement Projections

	Historic Growth	National Growth	Regression Analysis	Market Share	Adjusted Forecast
Base Year					
2009	10,124[1]	10,124[1]	10,124[1]	10,124[1]	10,124[1]
Forecast					
2015	9,461	12,089	12,722	19,066	12,089
2020	8,943	14,014	15,390	21,936	14,708
2030	7,989	18,834	22,520	28,862	21,771

Source: Hoyle, Tanner & Associates, Inc., 2010.
Notes: 1. Estimated total for 2009 as official final calendar year enplanement data not available from FAA.

Therefore, the result of the regression analysis was applied to project enplanements beyond the short term planning period. In spite of the limited data, it is believed that BHB's tourist market and the fact that the airport is not expected to compete head-on with any low fare alternatives in the surrounding markets will eventually boost enplanements. This increase is expected to occur beyond the short term planning period and coincide with the likely introduction of regional jet service at about the same time. The following section discusses how regional jet aircraft are expected to enter the market. Over the long term, a reduction in fares as well as continued marketing of the airport's passenger service is mandatory if enplanements are to increase. The resulting adjusted forecast (shown in **Table 2-4**) provides a more conservative projection for the next five years, but then applies the local variables of the regression analysis for the latter part of the planning horizon.

5.0 COMMERCIAL PASSENGER SERVICE OPERATIONS

The FAA defines an operation as either a single aircraft landing or a single aircraft takeoff, while commercial passenger service refers to the operations conducted by an air carrier, regional/commuter airline, or air taxi/charter operators. In general terms, the FAA defines air carrier and regional/commuter airlines as those providing scheduled passenger services while air taxi/charter operations are normally general aviation flights that are conducted on a non-scheduled commercial or "for hire" basis.

The projection of passenger enplanements provides a point of beginning for the determination of future commercial service aircraft operations when considered in conjunction with other factors that influence the level of operations. This includes the aircraft type (fleet mix) or number of seats available on a per departure basis, as well as the average passenger boarding load factor.

5.1 Expected Changes in Scheduled Passenger Airline Fleet

Since airline deregulation in 1978, the flying public has witnessed a significant shift in the way airlines provide service to communities. For many markets this change has included the introduction of regional/commuter aircraft into airports that had previously seen service by the mainline carriers using large jet aircraft. While the trend of an expanded role for regional and commuter airlines in new and/or larger markets continues, the possible affect on a market such as BHB is less apparent. As regional airlines serve additional larger markets, many of these carriers are faced with decisions relating to which markets provide the most efficient and profitable use for their aircraft.

It is anticipated that a portion, if not all of the current 34 seat turboprop aircraft serving BHB will eventually be replaced with either the smaller or mid-sized regional jets currently in service today. This would likely include the introduction of those regional jets with 37 to 50 seats. While the turboprop aircraft work well on the short-haul markets, it is believed they will eventually fall out of the mix as either the market expands or the current turboprop fleet is simply retired. This is supported by the fact that the FAA projects very limited growth in number of turboprop aircraft utilized by regional carriers in the future. As such, a majority of the fleet expected to serve BHB beyond the short term planning period include aircraft such as the Embraer RJ-135 (37 seats), Canadair RJ-200 (50 seats), and Embraer RJ-145 (50 seats). As the parent company for Colgan Air, Pinnacle Airlines presently owns and operates the Canadair RJ-200LR (50 seats) and the Canadair RJ-900 (76 seats). Even though these aircraft currently fly under the Delta code share, it is not unrealistic to consider that these or similar regional jet aircraft might be utilized at BHB as part of a future Essential Air Service agreement.

5.2 Expected Changes in Average Aircraft Load Factors

The most recent load factor data from Colgan Air only included monthly reports for 2009 when the airline began flying the Saab-340. During that first year the average boarding load factor was 28 percent for the 34 seat aircraft. For previous years with the Beechcraft BE-1900, the average boarding load factors were calculated using activity levels, flight schedules, aircraft seating, and recorded passenger enplanements. This resulted in an average 41 percent load factor between 1999 and 2008.

On the national level, load factors have increased from around 59 percent in 2000 to an average of 74 percent in 2009 for regional carriers. While the current 28 percent at BHB is low, it should be remembered that the airport is a seasonal market with summer peaks only occurring about 10 weeks out of the year. In fact, for August 2009 the average load factor was 65 percent. In the future, the FAA Aerospace Forecasts project regional carrier load factors to hover around the 77 percent mark. Regardless, it is not expected for the overall average at BHB to increase significantly over the planning period, but it will need to increase some if regional jet aircraft are ever to be considered for this market, especially since they would have to be accepted by the U.S. DOT as part of a future Essential Air Service program proposal.

Table 2-5
Forecast of Regional Carrier Operations

	Passenger Enplanements	Average Seats	Load Factor	Enplanements per Departure	Annual Departures	Annual Operations
Base Year						
2009	10,124[1]	34	28%	9.5	1,063	2,126
Forecast						
2015	12,089	34	33%	11.2	1,077	2,154
2020	14,708	50	35%	17.5	840	1,680
2030	21,771	50	45%	22.5	968	1,936

Source: Hoyle, Tanner & Associates, Inc., 2010.
Notes: 1. Estimated total for 2009 as official final calendar year enplanement data not available from FAA.

Table 2-5 presents a forecast of the regional carrier operations through 2030. To compute annual operations, first average seats were multiplied by the load factor to compute enplanements per departure. Total forecasted enplanements were then divided by the result to forecast annual departures, which is doubled to arrive at the projected operations. It should be noted that under this methodology, any increase in load factor (with or without additional seats per departure) would result in a reduction of the number of daily flights offered. Therefore, the expected fleet and load factor changes are not expected to occur until the latter part of the planning period, when the enplanement levels are forecast to increase the most.

The historic enplanement data since 1999 includes a number of revenue passengers that are carried by the non-scheduled air taxi/charter operators. Unfortunately, there is no detail related to the number or types of aircraft conducting these flights each year. What is known is that these operators have carried up to five percent of the total revenue passenger enplanements recorded by the FAA. If it is assumed that each non-scheduled commercial departure carried two people on average, this would translate to 253 annual flights or 506 annual operations for 2009. This approach was applied to the forecast of passenger enplanements to predict the number of non-scheduled commercial operations shown in **Table 2-6**.

Table 2-6
Projected Non-Scheduled Commercial Operations

	Annual Operations
Base Year	
2009	506
Forecast	
2015	604
2020	736
2030	1,088

Source: Hoyle, Tanner & Associates, Inc., 2010.

6.0 GENERAL AVIATION OPERATIONS

There are many elements of aviation that make up the broad definition of general aviation. Its activities include the training of new pilots, sightseeing, aerial photography, law enforcement, and medical flights, as well as business, corporate, and personal travel. General aviation operations are also divided into the categories of local or itinerant. Local operations are those arrivals or departures performed by aircraft that remain in the airport traffic pattern or are within sight of the airport. This covers an area within a 20 nautical mile radius of the airfield. Local operations are most often associated with training activity and flight instruction. Itinerant operations are arrivals or departures other than local operations, performed by either based or transient aircraft.

Recreational flying and training activities make up the majority of the local operations. The FAA defines an operation as either a single aircraft landing or takeoff. Under this definition, touch and go training procedures are considered two operations (one arrival and one departure) and are local operations. Itinerant general aviation operations are typically comprised of private and business/corporate transportation flights. While an understanding of the difference is needed for forecasting general aviation operations, the actual split between these types is included in a subsequent section.

6.1 Historic Growth

The historic level of general aviation operations are estimates given there is no airport traffic control tower at BHB. Regardless, the historic estimates between 2000 and 2009 reflect an average annual growth of 1.3 percent.

6.2 Previous Projections

As with the forecast for based aircraft, general aviation operations in the 2004 AMPU are nearly identical to those in the 2006 MASPU since both are based on the 2001/2002 MASPU. Accordingly, both studies resulted in an average annual growth of 2.0 percent; thus only the more recent state system plan was considered for comparison purposes.

6.3 National General Aviation Activity Growth

General aviation operations at those airports with either an FAA or federal contract air traffic control tower are documented in the 2010 FAA Aerospace Forecasts. Between 2000 and 2009, general aviation operations at these facilities declined an average of 3.9 percent annually. Most of this decline was attributed to the impacts that September 11th, then rising insurance, and increasing fuel costs had on the industry. More recently the downturn in the economy has kept general aviation activity down which the FAA expects to continue through the end of 2010. However, starting in 2011, the FAA projects an average annual growth of 1.1 percent through 2030.

6.4 Operations per Based Aircraft

Another forecast was generated by assigning a representative level of operations for each based aircraft. This is a methodology recommended by the FAA to project the level of activity for non-towered airports. To do so, the FAA recommends applying different levels of operations per based aircraft according to the airport's role in the National Plan of Integrated Airport Systems (NPIAS). For BHB's non-hub primary commercial service designation, 700 operations per based aircraft should be applied.

For BHB this yields 30,100 annual operations for 2009. Based on all of the previous estimates and studies conducted for BHB over the past 10 years, this figure is low and does not appear representative of the actual activity occurring. While the FAA operations per based aircraft is meant to reflect local plus itinerant operations, the rate may not relate as well to BHB which has a low number of based aircraft and high percent of itinerant operations resulting from its primary role as a tourist destination.

If the general aviation activity for 2009 is divided by the current based aircraft count, the result is 979 operations per based aircraft. This is significantly higher than the operations per based aircraft suggested by the FAA. Therefore, 979 was applied to project future general aviation activity. It is interesting to note that while activity is projected at the same rate as based aircraft, the resulting operations are very similar to those from other methodologies.

Table 2-7
Comparison of General Aviation Operations Projections

	Historic Growth	Statewide System Plan	National Growth	Operations per Based Aircraft	Selected Forecast
Base Year					
2009	42,078	42,078	42,078	42,078	42,078
Forecast					
2015	45,453	47,387	44,933	45,992	44,933
2020	48,471	52,319	47,459	49,906	47,459
2030	55,121	63,776	52,946	54,799	52,946

Source: Hoyle, Tanner & Associates, Inc., 2010.

6.5 Selected Forecast of General Aviation Operations

There is little difference between the projections considered. While each is based on accepted methodologies, the reliability depends on the data that was used. This is always a challenge at non-towered airports where no official activity logs exist. Along these lines, while non-towered airport activity data can always be argued, each projection has been made after accepting the 2009 estimate as realistic. However, given the uncertainty in actual activity levels over multiple years, the historic growth projection could be questioned and therefore was not selected to forecast general aviation activity.

As indicated previously, projections in both the 2004 AMPU and 2006 MASPU were based largely in part on the 2001/2002 MASPU. Because there have been a number of changes in the general aviation industry since those studies were conducted, the statewide system plan projection was not considered further.

The remaining projections (national growth and operations per based aircraft) result in very similar levels of activity by the end of the planning period; however, they arrive at these figures in completely different manners. While the based aircraft projection provides a method to consider activity expected by new tenants as well as that of existing users and itinerant operations, it does not completely account for some of the factors affecting general aviation. In other words, while the forecast of based aircraft combined elements of local, state, and national trends, it does not truly consider elements critical to activity in the industry.

The only projection to incorporate such factors is the FAA's analysis of the nation's general aviation operations. This preferred projection, albeit the most conservative of those considered, takes into account current information related to industry trends, including pilot certification, aircraft manufacturing levels, aircraft utilization, and attrition rates. The national forecasts are also tempered by the economic realities of the 2009 recession, current unemployment trends, and other indicators, such as fuel price expectations.

Even though the selected forecast of general aviation operations is below those of previous studies, none were able to predict the declines that different segments of the industry had over the past five to 10 years. Nonetheless, growth is expected and the selected projection is considered the most realistic with respect to the current industry environment.

7.0 MILITARY OPERATIONS

Military operations are aircraft operations, which are conducted by an official branch of the U.S. military services. Historically there have not been a significant number of military operations conducted at BHB with the FAA only documenting 400 operations each year. By nature, military operations are difficult to forecast at any airfield, including military bases, since they rely so heavily on each year's available budget. Previous forecasting efforts, including the current FAA TAF and 2006 MASPU have kept this level of operations fixed through their planning horizons. The same approach has been applied to this study, maintaining military operations at 400 annual operations through 2030.

8.0 TOTAL ANNUAL AIRCRAFT OPERATIONS

Total activity at BHB encompasses the projections for the commercial passenger service carriers, general aviation operators, and military described above. These different projections are combined in **Table 2-8** to provide the total aircraft operations expected at BHB over the planning period.

Table 2-8
Selected Projections of Annual Aircraft Operations

	Regional Carriers	Non-Scheduled Carriers	General Aviation	Military	Total
Base Year					
2009	2,126	506	42,078	400	45,110
Forecast					
2015	2,154	604	44,933	400	48,091
2020	1,680	736	47,459	400	50,275
2030	1,936	1,088	52,946	400	56,370

Source: Hoyle, Tanner & Associates, Inc., 2010.

9.0 Types of Operations

The following sections address the different types of aviation activity that are conducted. This includes a break out of the local, itinerant, and instrument operations, as well as estimates on the number of touch and go and night operations conducted. Further analyses include determining the operational aircraft fleet mix and activity peaks for the planning period.

9.1 Local versus Itinerant Split

There are only a few sources where the activity has been split between local and itinerant operations. The 2004 AMPU estimated a 25 percent local and 75 percent itinerant split for all study years while the 2009 FAA TAF recorded a historic 40/60 split prior to 2006 and then a slight shift to a 38/62 split from that point into the future.

For 2009 it has been estimated that the local share is probably closer to 30 percent. This is based on the discussions with airport management and different tenants. Overall, there was a general consensus that while flight training is not a predominant business, there are a number of local recreational flights, not the least of which includes the scenic biplane and glider rides.

It is anticipated that a shift towards more itinerant operations will occur over the new 20-year planning period, but only to an estimated 28/72 local and itinerant split. For the majority of the planning period, the continued 30 percent local share reflects the expected improvements in the economy (supporting flight training and recreational activity), as well as the potential addition of a based helicopter. This helicopter and any others would likely be utilized for either sight seeing, law enforcement, or medevac type operations, all of which would almost exclusively conduct local operations.

Table 2-9
Forecast of Local Versus Itinerant Operations

	Local Operations		Itinerant Operations		Total
Base Year					
2009	13,533	30%	31,577	70%	45,110
Forecast					
2015	14,427	30%	33,664	70%	48,091
2020	15,082	30%	35,193	70%	50,275
2030	15,784	28%	40,586	72%	56,370

Source: Hoyle, Tanner & Associates, Inc., 2010.

A number of factors also indicate that itinerant operations will grow. Most significant are the industry expected increases in business aviation and other forms of general aviation for point-to-point transportation (such as the continued sale of very light jets), which will generate more itinerant operations. Thus, throughout the planning period, it is anticipated that both local and itinerant operations will increase.

9.2 Instrument Operations

A separate count of the instrument operations conducted is important to evaluate future facility requirements. Given the limited data available, the best way to project the number of potential instrument operations is to simply use known weather data for the area.

Hourly weather observations over the past 10 years were collected from the on-airport automated weather observing system (AWOS). This data was then analyzed for the periods when instrument meteorological conditions were observed. These periods are when there are less than visual conditions, but greater than poor visibility and ceiling (PVC) conditions. Generally PVC is defined as when the cloud ceiling is less than 200 feet above ground level (AGL) and/or the visibility is less than ½ statute mile. For this analysis, the PVC threshold was adjusted to reflect the current published instrument landing minimums of 200 feet AGL and/or ¾ statute mile visibility.

Over the past 10 years, instrument conditions have been observed 14.7 percent of the time. Applying this to the total operations generates estimates (**Table 2-13**) that would include all commercial service (since they operate under instrument flight plans) and a number of the general aviation operations. Essentially, these figures illustrate the number of operations that could be impacted by weather each year to facilitate planning future improvements to the navigational aids for the airfield.

9.3 Touch and Go Operations

As mentioned previously, touch and go operations are counted as one landing and one takeoff (i.e., two operations) and are normally associated with initial and recurrent flight training. The percent of touch and go operations is useful in evaluating certain elements of airfield capacity as well as providing additional detail for potential noise analyses; therefore, an estimate for this activity was made.

On average it is assumed that there are 20 full time students taking flight lessons at BHB each year. It is reasonable to assume that each student conducts a total of 120 touch and go maneuvers (240 operations) as part of their minimum 40 hours of flight training time. This translates to 4,800 annual operations or just over 10 percent of the total operations. Increasing that number to 15 percent would provide a realistic estimate for the total touch and go operations conducted, to include licensed pilots conducting the maneuvers to maintain currency of their certificate. The results of these assumptions are shown in **Table 2-13**.

9.4 Night Operations

The number of operations conducted at night was calculated to provide additional detail on the types of activity conducted at BHB. Since this information could also be used for potential noise analyses, these were defined as those taking place between the hours of 10:00 p.m. and 7:00 a.m. This fits the FAA definition of nighttime operations when evaluating potential aircraft impacts under a federal noise study.

While it was evident from discussions with airport tenants and users that not a lot of activity occurs at night, there are a few. It was agreed that previous estimates of up to five percent of total operations could be conducted at night. Therefore, this percentage was re-applied to the updated forecasts and is included in **Table 2-13**. This estimate incorporates some of the commercial service flights since US Airways Express offers some departures before 7:00 a.m. in both their winter and summer schedules. However, no regularly scheduled commercial flights arrive after 10:00 p.m.

As with touch and go operations, some night flights are also conducted as part of night training and currency requirements. In the summer months some pilots have to fly later in the evening to meet these requirements since the FAA defines nighttime for the purposes of flight requirements as the time between the end of evening civil twilight and the beginning of morning civil twilight. For BHB, evening civil twilight can occur as late as 9:00 p.m. in the summer while morning civil twilight extends up to 6:45 a.m. in the winter months.

9.5 Operational Fleet Mix

Operational fleet mix is an important factor in determining the needs for airfield improvements. While the airport supports all types of aircraft, a majority of the current operations are conducted by single-engine aircraft. Because there are no records kept on the actual operational mix, the current levels were initially set using national averages and then adjusted based on information provided by airport management, tenants, and other airport users.

Information from the 2010 FAA Aerospace Forecasts was then utilized to project how the operational fleet mix would change over the next 20 years. With the exception of the multi-engine piston category, the FAA anticipates increases in the activity of all general aviation aircraft. Again, the national activity was analyzed subjectively and adjusted for the trends expected to occur locally. These adjustments account for factors such as the commercial service operators, seasonal fluctuations, and the very limited rotorcraft operations at BHB.

Table 2-10
Projected Operational Fleet Mix

	2009	2015	2020	2030
Single-Engine	33,832	34,144	35,192	36,641
Multi-Engine (piston & turboprop)	6,767	7,214	7,039	6,764
Jet	3,609	4,809	6,033	9,583
Rotorcraft	451	1,443	1,508	2,819
Other (includes gliders)	451	481	503	564
Total	45,110	48,091	50,275	56,730

Source: Hoyle, Tanner & Associates, Inc., 2010.

Single-engine aircraft will increase and continue to conduct a majority of the activity throughout the planning period. Conversely, the multi-engine category is expected to increase only slightly over the short term and then decline back to current levels by 2030. This reflects the slight increases in operations by commercial turboprop aircraft before a number are replaced with regional jet aircraft alternatives. It also reflects the FAA and industry prediction that multi-engine piston activity will decline.

A considerable growth in jet activity is expected to occur at BHB, following industry trends that this category of aircraft has produced in the past decade. This activity will predominantly include a number of the light to medium sized business jets which have a maximum allowable takeoff weight between 10,000 and 60,000 pounds. Examples include the Bombardier Challenger/Learjet, Cessna Citation, Dassault Falcon, and Hawker Beechcraft type jet aircraft that currently operate into BHB. In addition, this increase accommodates the eventual use of regional jets for the scheduled passenger airline service as well as activity by the newer VLJs (under 10,000 pounds). Finally the jet mix includes larger business jet over 60,000 pounds which operate on an occasional basis, but are expected to increase over the course of the planning period. Examples include the Bombardier Global Express and Grumman Gulfstream series aircraft, both of which continue to use the airport.

While there are no rotorcraft currently based at the BHB, some helicopter operations do occur. This includes occasional approaches being flown by National Guard helicopters, some U.S. Coast Guard helicopters, and Life Flight operations. Even though this activity is currently below the average for most airports, it is expected to continue and ultimately increase as rotorcraft are based at the airfield in the future. Finally the other category was set at one percent of the total operations to reflect the glider activity conducted primarily during the summer months.

9.6 Peak Operational Activity Estimates

Annual projections provide a good overview of the activity at an airport, but may not reflect operational characteristics of the facility. In many cases, facility requirements are not driven by annual demand, but rather by the capacity shortfalls and delays experienced during peak times. Therefore, breakouts of the peak month, the average day in the peak month, and the peak hour of the peak day are needed.

The only consistent records that document peak activity for BHB are the monthly passenger reports filed by Colgan Air. While these do not include aircraft operations, the very significant seasonal peaks can be considered representative of the overall activity for the airport. Over the past six years, the month of August has consistently been the busiest, accommodating an average of 22 percent of the annual passenger activity. August is also considered one of the busiest months for general aviation operations as it is not uncommon for every bit of available ramp and sometimes taxiway space to be utilized for aircraft parking during this time of year. Therefore, it is expected that this level of peak activity will continue throughout the planning period.

Table 2-11
Forecast Peak Operational Activity

	Total Annual Operations	Peak Month	Average Day Peak Month	Peak Hour (ADPM)
Base Year				
2009	45,110	9,924	320	48
Forecast				
2015	48,091	10,580	341	51
2020	50,275	11,061	357	54
2030	56,370	12,401	400	60

Source: Hoyle, Tanner & Associates, Inc., 2010.

The values for average day peak month and for the peak hour were then calculated using the methodology in FAA Advisory Circular 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*. Under this methodology, the average day peak month is derived by taking the number of operations calculated for the peak month and dividing that figure by the number of days in the peak month (31 days for August). There is no data available to determine the peak hour operations at the airport; therefore, it was estimated that 15 percent of the average day peak month would best represent the number of peak hour operations.

The figures in **Table 2-11** only estimate peaks in aircraft operations and not passenger movements. To properly analyze passenger trends, a more detailed analysis would need to be conducted to identify how enplanement and terminal facility peaks are affected by the size of commercial aircraft used, boarding load factors, level of meters and greeters, etc. Such an analysis is typically conducted as part of a more detailed passenger terminal area or air service market study.

10.0 COMPARISON TO FAA TERMINAL AREA FORECASTS

If an airport is included in the FAA Terminal Area Forecasts, any new aviation activity forecasts need to be reviewed and approved by the agency before they can be applied to further analyses. During this review the FAA looks to see if the based aircraft, passenger enplanements, or annual operations forecasts differ from the TAF by more than ten percent in the five year and 15 percent in the ten year planning period.

Table 2-12
Comparison of Forecasts

	Selected Forecasts	2009 FAA TAF	Difference
Based Aircraft			
Base Year (2009)	43	42[2]	2.4%
5 Year (2015)	47	42	11.9%
10 Year (2020)	51	42	21.4%
Passenger Enplanements			
Base Year (2009)	10,124	9,248[2]	9.4%
5 Year (2015)	12,089	11,056	9.3%
10 Year (2020)	14,708	12,832	14.6%
Annual Operations			
Base Year (2009)	45,110	45,145[2]	0.0%
5 Year (2015)	48,091	45,356	6.0%
10 Year (2020)	50,275	45,538	10.4%

Source: Hoyle, Tanner & Associates, Inc., 2010.
Notes: 1. Estimated total for 2009 as official final calendar year enplanement data not available from FAA.
2. 2009 figure from the December 2009 TAF is the first forecast year since the base year is 2008.

As shown only the based aircraft forecast exceeds the limits stated by the FAA. However, it is discouraging to see that the 2009 TAF locks the current and future based aircraft at 42 with no explanation for the lack of growth.

11.0 SUMMARY OF ACTIVITY FORECASTS

Table 2-13 presents an overview of the selected forecasts. These are considered to reasonably reflect the activity anticipated through 2030 given the information analyzed and available during this study.

Table 2-13
Summary of Activity Forecasts

	2009	2015	2020	2030
Based Aircraft				
Single-Engine	40	43	46	48
Multi-Engine (piston & turboprop)	2	2	2	3
Jet	0	0	1	2
Rotorcraft	0	1	1	2
Other (gliders, balloons, etc.)	1	1	1	1
Total	**43**	**47**	**51**	**56**
Passenger Enplanements	**10,124**[1]	**12,089**	**14,708**	**21,771**
Operations				
Regional Carriers	2,126	2,154	1,680	1,936
Non-Scheduled Carriers	506	604	736	1,088
General Aviation	42,078	44,933	47,459	52,946
Military	400	400	400	400
Total	**45,110**	**48,091**	**50,275**	**56,370**
Types of Operations				
Local	13,533	14,427	15,082	15,784
Itinerant	31,577	33,664	35,193	40,586
Instrument	6,631	7,069	7,390	8,286
Touch and Go	6,767	7,214	7,541	8,456
Night	2,256	2,405	2,514	2,819
Single-Engine	33,832	34,144	35,192	36,640
Multi-Engine (piston & turboprop)	6,767	7,214	7,039	6,764
Jet	3,609	4,809	6,033	9,583
Rotorcraft	451	1,443	1,508	2,819
Other (gliders, balloons, etc.)	451	481	503	564
Peak Month Operations	9,924	10,580	11,061	12,401
Average Day Operations	320	341	357	400
Peak Hour Operations	48	51	54	60

Source: Hoyle, Tanner & Associates, Inc., 2010.
Notes: 1. Estimated total for 2009 as official final calendar year enplanement data not available from FAA.

CHAPTER 3 Facility Requirements & Development Plan

1.0 OVERVIEW

The Facility Requirements and Development Plan is the result of an analysis comparing the facilities inventory effort conducted in Chapter 1 with the forecast of aviation activity identified in Chapter 2 of this AMP. Together, the inventory and forecasts serve as the basis for planning the facilities needed to meet Hancock County's aviation demand for the 20-year planning period.

The purpose of this chapter is to determine the adequacy of BHB's existing facilities in accommodating the projected aviation activity levels. An analysis conducted to determine the airport's critical aircraft and corresponding Airport Reference Code is the first step in that process and is provided below.

2.0 AIRPORT PLANNING AND DESIGN CRITERIA

In order to determine facility requirements, existing airport facilities must be evaluated against the expected aircraft activity. However, before that can be done, it is necessary to identify the FAA criteria for the planning and design of airports. Such criteria is a key element in defining airport development needs as most facilities are directly associated with the size and type of aircraft using the airport.

The FAA critical aircraft for airport planning and design is the most demanding aircraft conducting or expected to conduct a minimum of 500 operations each year. Once the critical aircraft has been determined, an Airport Reference Code (ARC) is established based on specific characteristics of that aircraft.

The characteristics defining the ARC are the approach speed and physical aircraft size. The ARC is identified using an alphanumeric designation, a letter designation followed by a roman numeral. The letter designator is used to identify the Approach Category and the Roman numeral designates the Design

Group in terms of tail height and wingspan. **Table 3-1** and **Table 3-2** delineate the criteria used in defining Aircraft Approach Categories and Aircraft Design Groups according to FAA AC 150/5300-13 Change 15, *Airport Design*.

Table 3-1
Aircraft Approach Categories

Category	Approach Speed (knots)
A	< 91
B	91 – 120
C	121 – 140
D	141 – 165
E	> 165

Source: FAA AC 150/5300-13 Change 15.

Table 3-2
Aircraft Design Groups

Design Group	Wingspan (feet)	Tail Height (feet)
I	< 49	< 20
II	49 – 78	20 – 29
III	79 – 117	30 – 44
IV	118 – 170	45 – 59
V	171 – 213	60 – 65
VI	214 – 262	66 – 80

Source: FAA AC 150/5300-13 Change 15.

Currently, Runway 04-22 provides the proper design criteria for C-II aircraft, with the Grumman Gulfstream III as the representative critical aircraft. This ARC accommodates nearly all of the light to medium sized business jets, as well as some of the larger jet aircraft (over 60,000 pounds) like the Gulfstream III. The C-II criterion also supports the Saab-340 aircraft operated by Colgan Air, since it is a B-II aircraft.

It should be noted that while no single C-II aircraft generates 500 annual itinerant operations at BHB, collectively a number of aircraft with Approach Category C and/or Design Group II characteristics do. Examples of these aircraft include the

Bombardier Challenger series jet aircraft, as well as the largest Cessna Citation models (Citation VI, VII, and X). The airport also sees jet aircraft with Approach Category D and/or Design Group III requirements; however, these do not operate often enough to warrant a change in the ARC. Examples of these include the Bombardier Global Express and Grumman Gulfstream II, IV, and V jet aircraft.

As mentioned in the forecast chapter, it is expected that the number and size of the business jets using BHB will increase. However, it is unlikely that the number of larger and heavier business jet aircraft will conduct enough operations to warrant changing the ARC for Runway 04-22. Therefore, Approach Category C and Design Group II standards need to remain as the existing and future design standards for Runway 04-22. Additionally, the Grumman Gulfstream III will remain as the representative aircraft for this grouping with its maximum allowable takeoff weight of 69,700 pounds and a dual wheel landing gear configuration.

What does need to be considered is the expected change in the type of aircraft used for the commercial passenger service. While aircraft such as the Embraer RJ-135 (37 seats), Canadair RJ-200 (50 seats), and Embraer RJ-145 (50 seats) all fall within the C-II category, some of these first generation regional jets have longer runway length requirements. This is addressed and included in the runway length analysis section of this chapter.

Table 3-3
BHB Airport Reference Codes

	Existing	Future
Runway 04-22	C-II Grumman Gulfstream III	C-II Grumman Gulfstream III
Runway 17-35	B-II Beechcraft King Air 350	B-II Beechcraft King Air 350

Source: Hoyle, Tanner & Associates, Inc.

Currently, Runway 17-35 provides the proper design criteria to accommodate B-II aircraft. As such, the runway is capable of safely accommodating nearly every single-engine piston and multi-engine piston aircraft, as well as a number of twin turboprops. In fact, there are a number of the light to medium size business jets including the smaller Cessna Citation models that could utilize Runway 17-35; at the pilot's discretion given the limited runway length.

Grumman Gulfstream G-III

Grumman Gulfstream G-III

Approach Speed (knots)	136
Wing Span (feet)	77.8
Length (feet)	83.1
ARC	C-II
Aircraft Parking Area (square yards)	720

Since Runway 04-22 provides the required wind coverage for the C-II aircraft, the ARC for Runway 17-35 is not required to change throughout the course of this planning period, but the representative critical aircraft should. Like the primary runway, no single aircraft conducts 500 itinerant operations each year on Runway 17-35 and the Cessna 441 Conquest II was previously selected as the critical aircraft. This turboprop is considered a small aircraft by the FAA since it is under 12,500 pounds. Given that the current pavement has a published weight bearing capacity of 20,000 pounds for dual wheel aircraft, the new existing and future critical aircraft should be one of the larger B-II aircraft that can operate safely on the runway. While there are a number of turboprop models with an ARC of B-II using the airfield, the Beechcraft King Air 350 has been selected as the representative critical aircraft with its maximum allowable takeoff weight of 15,000 pounds and dual wheel landing gear configuration.

Beechcraft King Air 350

Approach Speed (knots)	115
Wing Span (feet)	57.9
Length (feet)	46.7
ARC	B-II
Aircraft Parking Area (square yards)	310

Beechcraft King Air 350

3.0 RUNWAY REQUIREMENTS

As the primary airfield component, a runway must have the proper length, width, and strength to safely accommodate the critical aircraft. FAA advisory circulars and specific aircraft performance data provide guidelines to determine the ultimate runway length required. Runway width requirements are delineated in FAA AC 150/5300-13 Change 15, *Airport Design*. These and other design standards are based on the critical aircraft's Approach Category, and Design Group as discussed above, as well as the airport's approach visibility minimums.

Pavement strength is predicated upon the critical aircraft's weight and how that weight is distributed through the landing gear. Projects to rehabilitate runway pavements are routinely conducted every 20 to 25-years based on pavement condition. These projects repair damage to the runway pavement resulting from normal wear and need to be conducted along with regular pavement maintenance programs, including crack sealing and surface seal coats.

In addition to the physical characteristics of the runway, there are a number of other safety-related criteria including the requirement for a Runway Safety Area, Runway Object Free Area, Runway Protection Zones, and Obstacle Free Zone. The FAA definitions for these surfaces are:

Runway Safety Area (RSA) - A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overrun, or veer off the runway. The RSA needs to be: (1) cleared and graded with no potentially hazardous ruts, humps, depressions, or other surface variations; (2) drained by grading or storm sewers to prevent water accumulation; and (3) capable, under dry conditions of supporting the occasional passage of aircraft without causing structural damage to the aircraft. Finally, the RSA must be free of objects, except for those that need to be located in the safety area because of their function.

Runway Object Free Area (ROFA) - The ROFA is centered on the runway centerline. Standards for the ROFA require clearing the area of all ground objects protruding above the RSA edge elevation. Except where precluded by other clearing standards, it is acceptable to place objects that need to be located in the ROFA for air navigation or aircraft ground maneuvering purposes and to taxi and hold aircraft in the ROFA. Objects non-essential for air navigation or aircraft ground maneuvering purposes are not to be placed in the ROFA. This includes parked airplanes.

Runway Protection Zone (RPZ) - A RPZ, or clear zone as it was formerly named, is a two-dimensional trapezoidal shaped area beginning 200 feet from the usable pavement end of a runway. The primary function of this area is to preserve and enhance the protection of people and property on the ground. Airports are required to maintain control of each runway's RPZ. Such control includes keeping the area clear of incompatible objects and activities. While not required, this control is much easier to achieve and maintain through the acquisition of sufficient property interests in the RPZs.

Obstacle Free Zone (OFZ) - The OFZ is a three-dimensional volume of airspace centered on the runway that supports the transition of ground to airborne operations (or vice versa). The OFZ clearing standards prohibit taxiing, parked airplanes, and other objects, except frangible navigational aids or fixed-function objects (such as signage), from penetrating this zone. Precision instrument runways also require inner-transitional and precision OFZs. If there is an approach lighting system, then an inner-approach OFZ is also required.

BHB's design criteria described above is depicted on the airport layout plan (ALP) of the airport plans provided as **Appendix C**, while **Tables 3-4** and **3-5** provides the safety area's dimensions.

Table 3-4
Runway Protection Zone (RPZ)

Runway	Approach Category	Length "L"	Inner Width "A"	Outer Width "B"
4	Non-precision	1,700	500	1,010
22	Precision	1,700	1,000	1,510
17	Visual / Utility	1,000	500	700
35	Visual / Utility	1,000	500	700

Source: FAA AC 150/5300-13 Change 15, *Airport Design*.

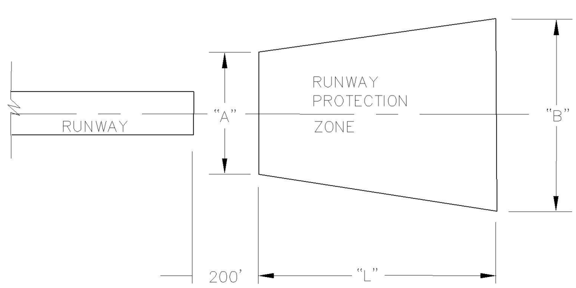


Table 3-5
Runway Design Criteria

Design Elements	Design Criteria (feet)	
	B-II	C-II
Runway	17-35	04-22
Runway Visibility Minimums	Not lower than ¾-statute mile	Not lower than ¾-statute mile
Runway Width	75	100
Runway Shoulder Width	10	10
Runway Blast Pad		
Length	150	150
Width	95	95
Runway Safety Area		
Length beyond runway end	300	1,000
Width	150	500[1]
Runway Obstacle Free Zone		
Length beyond runway end	200	200
Width	400	400
Runway Object Free Area		
Length beyond runway end	300	1,000
Width	500	800

Source: FAA AC 150/5300-13 Change 15, *Airport Design*.

3.1 Runway Safety Criteria

The size of a runway's Runway Safety Area (RSA), Runway Object Free Area (ROFA), Runway Protection Zone (RPZ), and Object Free Zone (OFZ) are a function of the Approach Category and Design Group as well as the minimums associated with the most critical approach to each runway. BHB's runway safety criteria are identified in **Table 3-4** and **Table 3-5** above.

A critical, multi-phased project is currently underway to bring both ends of BHB's Runway 4-22 RSA into compliance with the FAA's safety criteria. Although the existing RSA width of 400 feet instead of 500 feet is acceptable, the safety criteria's length beyond both runway ends is being increased to the required 1,000 feet.

1 According to FAA AC 150/5300-13 Change 15, a Runway Safety Area (RSA) width of 400' is permissible.

3.2 Runway Length Requirement for Regional Jet Aircraft

Performance characteristics of regional jet aircraft actually improve with the larger aircraft (70 and 90 seat models) currently in the fleet. This is primarily attributed to modifications made to the wing designs of these second generation regional jets which include increased wing area and the addition of forward leading edge slats. Most of the first generation or smaller regional jets (37 to 50 seat range) have greater runway length requirements than their larger offshoots. At a maximum takeoff weight of 51,000 pounds, the CRJ-200 has a takeoff distance of 5,800 feet (at sea level). Similarly, the ERJ-145 at 48,500 pounds maximum takeoff weight requires 6,519 feet at sea level. Given these general length requirements, the current airfield configuration would limit the ability of most commercial operators to utilize any of the first generation regional jet aircraft with 37 to 50 seats into BHB without payload penalties.

It is not certain at this time what the performance characteristics might be for the 50 seat regional jets expected to serve BHB in the future. While production has stopped on the current models, certainly a number of them will still be active in five or more years. However, due to their inefficiencies by today's standards, there are varied opinions as to whether these aircraft might be modified and/or replaced with a new generation of 50 seat regional jet aircraft. There have even been discussions that the more efficient 70 seat airframes might be utilized in the future with a reduced seating capacity to comply with airline scope clauses. Therefore at this time, the Grumman Gulfstream III will be considered as the critical aircraft with respect to the ultimate runway length required at BHB.

Runway Length Requirement for Grumman Gulfstream III

The Grumman Gulfstream III was selected as the representative critical aircraft for the airport's future ARC of C-II on Runway 04-22. While not all of the C-II aircraft weigh more than 60,000 pounds, the maximum allowable takeoff weight of the Gulfstream III is 69,700 pounds. Therefore, takeoff performance charts for this specific aircraft were evaluated for runway length requirements.

As with any aircraft performance charts a number of factors must be considered for the conditions expected and unlike the general FAA performance curves, a number of aircraft configurations with respect to takeoff weight are given. In addition to the maximum allowable takeoff weight, performance of the Gulfstream III at 64,000 pounds was also considered. This weight, which represents approximately a 75 percent useful load, was based on the maximum zero fuel weight (44,000 pounds), maximum passenger and cargo payload (6,000 pounds), and half a load of fuel (14,000 pounds). With a maximum range around

3,500 nautical miles, the half fuel load would represents a configuration that would either allow the aircraft to fly non-stop to any point in the U.S. or to do a round trip to a number of destinations on the eastern half of the nation. Specific fuel reserves and other operating limitations would certainly need to be taken into consideration for specific missions.

Given the above, both the 10 and 20 degree takeoff flap setting charts were evaluated. Likewise the charts specifically for wet runways (contamination less than 0.1 inch) were selected as the local average annual rainfall is 57.3 inches. The resulting runway length calculations, shown in **Table 3-6**, range from 5,240 to 6,700 feet.

Table 3-6
Grumman Gulfstream III Length Requirements

Takeoff Weight	20° Takeoff Flap Setting	10° Takeoff Flap Setting
64,000 Pounds	5,240'	5,720'
69,700 Pounds	6,130'	6,700'

Source: Gulfstream III Operational Information Supplement (GIII-OIS-10), "Operations on Contaminated Runways."

The runway length analysis for the G-III above supports both the 1993 and 2004 master plan's findings to extend Runway 04-22. While the existing length of Runway 17-35 is considered adequate for this planning period, a 300 foot extension to Runway 04-22 is recommended in order to better accommodate larger or more fully loaded GA jet traffic at BHB. A cost/benefit analysis will need to be conducted.

3.3 Runway Width Requirements

According to FAA AC 150/5300-13 Change 15, *Airport Design*, runways with an ARC of C-II are required to have a width of 100 feet. BHB's primary runway, Runway 04-22 continues to have a C-II ARC designation and currently has 100 foot width. Runway 17-35's current and future ARC of B-II requires a runway width of 75 feet for visual and not lower than ¾ mile instrument approach visibility minimums.

Both BHB's runways meet current FAA runway width requirements.

3.4 Runway Pavement Strength

The current published pavement strength for Runway 4-22 indicates that it is capable of continually landing aircraft with a maximum gross takeoff weight of 100,000 pounds with dual tandem wheel configuration as indicated in **Table 3-7.** It is important to note that the occasional landing of aircraft heavier than 100,000 pounds is permissible with Airport Manager approval but that repeated landings of heavier aircraft may lead to premature pavement deterioration.

Table 3-7
Runway Weight Limitations

	Runway 4-22	Runway 17-35
Weight Limitations (pounds)	Dual Wheel – 72,000 Dual Tandem – 100,000	Single Wheel – 13,000 Dual Wheel – 20,000

Source: FAA Form 5010, *Airport Master Record*

The majority of jet aircraft that currently operate at BHB have a dual wheel landing gear and are between 12,500 and 60,000 pounds. BHB's critical aircraft, the G-III and King Air 350 have maximum gross takeoff weights of 68,700 and 15,000 pounds, respectively. Both aircraft have dual wheel landing configurations and are within the runway weight limitations indicated above. Runway 4-22 and 17-35's weight limitations are therefore expected to be sufficient for this planning period.

3.5 Wind Coverage

The FAA recommends that sufficient runways be provided to achieve 95 percent wind coverage, which is computed based on a crosswind not exceeding 10.5 knots (12 mph) for aircraft with an ARC of A-I and B-I; 13 knots (15 mph) for ARC A-II and B-II; 16 knots (18 mph) for ARC A-III, B-III and C-I through D-III; and 20 knots (23 mph) for ARC A-IV through D-VI. If 95 percent wind coverage is not provided at an airport for the maximum crosswind component, then a crosswind runway should be considered.

FAA AC 150/5300-13, Change 15, *Airport Design* states that a period of at least ten consecutive years of wind data should be examined when carrying out an airfield wind coverage evaluation. Wind coverage calculations also need to take into account the different ceiling and visibility minimums associated with aircraft operations. Therefore data for all weather, visual flight rule (VFR) and instrument flight rule (IFR) conditions were analyzed. The crosswind components shown in **Table 3-8** were calculated using the FAA's Airport Design software (version 4.2D).

Table 3-8
Wind Coverage Analysis

	Crosswind Component		
	10.5 knots (12 mph)	**13 knots (15 mph)**	**16 knots (18 mph)**
All Weather Conditions			
Runway 04-22	96.06%	97.97%	99.59%
Runway 17-35	93.57%	96.94%	99.23%
Combined	99.17%	99.78%	99.96%
VFR Conditions (ceiling > 1,000 feet and visibility > 3 miles)			
Runway 04-22	96.09%	97.98%	99.64%
Runway 17-35	94.28%	97.40%	99.44%
Combined	99.31%	99.83%	99.98%
IFR Conditions (ceiling 200 to 1,000 feet and visibility 0.75 to 3 miles)			
Runway 04-22	95.51%	97.67%	99.24%
Runway 17-35	90.00%	94.65%	98.17%
Combined	98.33%	99.45%	99.86%

Source: National Climatic Data Center records for the Hancock County - Bar Harbor Airport – January 2000 to December 2009.

Based on the overall averages, Runway 04-22 provides 95 percent coverage for the conditions analyzed. However, for the six months spanning November to May each year, Runway 04-22 does not provide the proper wind coverage. For those aircraft in the 10.5 knot category, the coverage is less than 95 percent, especially during IFR conditions where the coverage drops below 90 percent. The 10 years of weather observations also show that Runway 04-22 cannot provide 95 percent coverage in December during IFR conditions for those aircraft requiring 13 knots of coverage. Therefore, Runway 17-35 is required to minimize adverse wind conditions and ensure the safety of operations during the colder weather months.

4.0 TAXIWAY SYSTEM REQUIREMENTS

The purpose of any taxiway system is to support the operational activity and enhance the safety of aircraft ground movements. Taxiways also act to enhance the capacity of the existing runway system by allowing aircraft to move on and off the active runway system in an efficient fashion. A good taxiway system is designed to provide freedom of movement to and from the runways and between aviation facilities at an airport. Such a system is essential at non-towered airports such as BHB. Taxiway systems include parallel taxiways, entrance/exit taxiways, by-pass taxiways, taxiway run-up areas, apron taxiways, and taxilanes.

Currently, all of the taxiways and the one taxilane at BHB meet the criteria for Design Group II aircraft. In fact, Taxiways A, D, E, and G are 50-feet wide, exceeding Design Group II criteria. The dimensions of the various associated taxiway safety areas are depicted on the ALP of the plan set provided as **Appendix C**.

BHB recently completed enhancements to their taxiway markings, as required by 14 CFR Part 139 certified airports. The project included the addition of yellow dashed lines to both sides of the taxiway centerline leading to all hold-short positions, as depicted on the graphic to the right.

Enhanced Taxiway Markings

The current taxiway configuration at BHB allows for manuevering of aircraft among the aircraft movement areas but potential runway incursions and conflicts between aircraft and ground vehicles exist due to the configuration and location of vehicle gates and taxiway markings adjacent to the West side of the approach end of Runway 35 in the areas of Taxiway A, E, and D and Taxilane C. These issues will be resolved with construction of a partial parallel taxiway for Runway 17-35, additional vehicle gates, and relocated taxiway markings.

4.1 Run-Up/Holding Areas

The FAA recommends that each taxiway serving a runway end provide either a bypass taxiway or run-up area. A run-up area increases maneuverability by providing space for aircraft conducting pre-takeoff engine checks while allowing other aircraft to safely pass.

According to FAA AC 150/5300-13 CHG 15, run-up/holding areas are to be provided when operations reach a level of 30 per hour. Although this level of operation is not expected to be reached in the planning period, a run-up area is recommended for Runway 22 because of the runway's preference for takeoff. Congestion at the runway end does occur, especially during peak season.

5.0 Instrument Approach Procedures

Runway 22 has BHB's only precision approach. The runway has an instrument landing system (ILS), which is a ground-based instrument approach system that provides both vertical and horizontal guidance to pilots during landing.

Runway ends 04 and 22 have global positioning system (GPS) non-precision approaches, while Runway ends 17 and 35 are currently visual runways only with no published approaches.

During the 2004 master plan update, the study's advisory committee determined that the enhancement of operational capabilities on Runway 17-35 was necessary. A GPS approach to Runway 35 was determined to be the preferred option as Runway 17 has existing obstructions. This master plan continues to recommend the design of a GPS, non-precision instrument approach to Runway 35.

6.0 FAR Part 77 Imaginary Surfaces

The airspace surrounding airports is protected by the imaginary surfaces defined in Federal Aviation Regulation (FAR) Part 77, *Objects Affecting Navigable Airspace*. When combined, the five different imaginary surfaces of this federal regulation protect the ability for aircraft to safely fly into and out of an airport. These surfaces are enforced through local planning and land use jurisdictions to control the type and height of objects in the vicinity of the airport. The specific imaginary surfaces, which must be protected from obstructions, include:

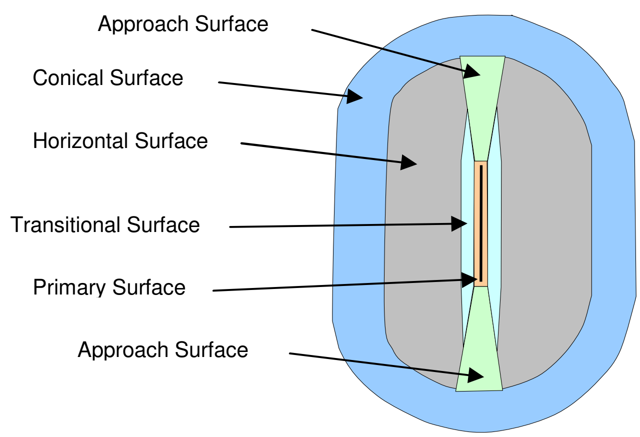
Primary Surface - A rectangular area symmetrically located about each runway centerline and extending a distance of 200 feet beyond each runway threshold. Width of the Primary Surface is based on the type of approach a particular runway has, while the elevation follows, and is the same as that of the runway centerline, along all points.

Horizontal Surface – A level oval-shaped area situated 150 feet above the established airport elevation, extending 5,000 or 10,000 feet outward, depending on the runway category and approach procedure available.

Conical Surface - Extends outward for a distance of 4,000 feet beginning at the outer edge of the Horizontal Surface, and sloping upward at a ratio of 20:1.

Approach Surface - These surfaces begin at the end of the Primary Surface (200' beyond the runway threshold) and slope upward at a ratio determined by the runway category and type of instrument approach available to the runway. The width and elevation of the inner end conforms to that of the Primary Surface while Approach Surface width and length to the outer end are also governed by the runway category and instrument approach procedure available.

Transitional Surface - A sloping area beginning at the edges of the Primary and Approach Surfaces and sloping upward and outward at a 7:1 slope.



14 CFR Part 77 Imaginary Surfaces

Table 3-9
FAR Part 77 Airspace Surfaces

Airport Data	Existing Runway 4	Ultimate Runway 4	Existing Runway 22	Ultimate Runway 22	Existing Runway 17	Ultimate Runway 17	Existing Runway 35	Ultimate Runway 35
Classification	Non-precision	Same	Precision	Same	Visual / Utility	Same	Visual / Utility	Non-precision
Approach	Non-precision	Same	Precision	Same	Visual	Same	Visual	Non-precision
Visibility Minimums	1 mile	Same	3/4 mile	1/2 mile	1 mile	Same	1 mile	Same
Airport Elevation (feet, MSL)				83				
Airport Imaginary Surfaces								
Horizontal Surface								
Horizontal Surface Elevation (feet, MSL)				233				
Horizontal Surface Radius	10,000	Same	10,000	Same	5,000	Same	5,000	Same
Conical Surface								
Conical Surface Elevation (feet, MSL)				433				
Horizontal Distance				4,000				
Slope				20:1				
Primary Surface								
Length Beyond Rwy End	200	Same	200	Same	200	Same	200	Same
Width	1,000 (1)	Same	1,000 (1)	Same	250	500	250	500
Approach Surface								
Horizontal Distance	10,000	Same	10,000 / 40,000 (2)	Same	5,000	Same	5,000	Same
Inner Edge Width	1,000	Same	1,000	Same	250	500	250	500
Outer Edge Width	3,500	Same	16,000	Same	1,250	Same	1,250	2,000
Slope	34:1	Same	34:1 (2)	Same	20:1	Same	20:1	Same
Transitional Surface	7:1	Same	7:1	Same	7:1	Same	7:1	Same

Source: USDOT, FAA, FAR Part 77 - *Objects Affecting Navigable Airspace*, and Hoyle, Tanner & Associates.

Notes: Dimensions are in feet, unless otherwise noted.

1. The width of the Primary Surface of the overall runway is determined by the most precise approach for that runway. The precision approach on Runway 22 determines the Primary Surface width of 1,000 feet for Runway 04-22.

2. FAR Part 77's approach surface standards require a horizontal distance of 10,000 feet at a slope of 50 (horizontally) to 1 (vertically) with an additional 40,000 feet at a slope of 40:1 for all precision instrument runways with 3/4 mile visibility minimums, such as Runway 22. Due to New England's mountainous terrain, a 34:1 slope is permissable by FAA.

Obstructions to the instrument approaches can be manmade like buildings, towers, or utility poles or natural such as trees that gradually grow to become a hazard to planes arriving or departing at the airport. An obstruction analysis is used prior to construction to determine the necessity to locate or mark obstructions with lights so pilots can see and avoid the obstruction. If the obstruction cannot be relocated or removed the approach or departure minimums may be increased to insure the pilot sees the obstruction. This increase in the instrument approach ceiling or visibility minimums reduces the pilot's opportunity to successfully break out of the clouds in bad weather and land as he or she cannot descend as low due to the obstruction. Therefore it is critical that obstructions not be built in the approach and departure paths to runway ends and that periodic surveys of vegetation growth be conducted to identify trees to remove that have grown to be obstructions.

The results of a recent obstruction analysis revealed some buildings within BHB's FAR Part 77 Imaginary Surfaces off the approach end of Runway 4 that were in need of obstruction lighting. The same area has utility poles that need to be removed. Additionally, there are several trees in the Approach Surface of Runways 4, 22 and 17 as well as the Transitional Surface of Runway 04-22 that need to be removed. Additionally, avigation easements are required to achieve full RPZ's on runway ends 17 and 22. The identified obstructions are shown on the Ultimate ALP, Drawing 3 provided in **Appendix C**.

7.0 AIRFIELD ENVIRONMENT

A number of facilities are necessary to support the operations of the airfield environment. Airfield lighting is required for airports intended to be utilized for nighttime operations as well as for operations during less than visual meteorological conditions. These along with BHB's pavement markings, navigational aids, and signage are addressed in the following sections.

7.1 Runway Lighting

Stake-mounted high intensity runway lights (HIRLs) are installed on Runway 04-22, as required for runways with precision instrument approach capability using runway visual range (RVR) based minimums. The lights are activated through a special frequency designated for pilot controlled lighting 122.7 (CTAF 123.0). Although Runway 17-35 does not currently have runway lights, medium intensity runway lights (MIRLs) will need to be installed once a GPS approach is installed on Runway 35.

Runway 04-22's stake-mounted HIRLs are currently in fair condition, but there is a growing national trend toward installing base mounted light fixtures on cans with conduit primarily for environmental purposes. The existing stake-mounted HIRLs will likely need to be replaced with the can and conduit type of installation within the 20-year planning period. Additionally, planning for Runway 17-35's MIRLs at the time of GPS installation should include a can and conduit installation.

7.2 Taxiway Lighting

Taxiways A, B, H, and J all have medium intensity taxiway lights (MITLs), while Taxilane C has reflectors. Taxiways D, E, F and G do not have lights or reflectors. BHB's existing taxiway lighting is sufficient. All future taxiway lighting systems should include a can and conduit type installation, which will likely require additional regulators be added to the airfield electrical vault.

7.3 Pavement Markings

Airport pavements are marked with painted lines and numbers in order to aid in the identification of the runways from the air and to provide information to the pilot during the approach phase of flight. There are three standard sets of markings used depending on the type of runway:

Visual - For runways with only visual or circle to land procedures. These markings consist of runway designation markers and a centerline stripe.

Non-precision - For runways to which a straight-in non-precision instrument approach has been approved. These markings consist of runway designation markers, a centerline stripe, and threshold markings.

Precision - For runways with a precision instrument approach. These markings consist of the non-precision markings plus aiming point markings, touchdown zone markings, and side stripes indicating the extent of the full strength pavement.

Depending on the type of aircraft activity and physical characteristics of the pavement, additional markings may be required for any of the three categories above. For example, the FAA requires aiming point markings on any visual or non-precision runway that is greater than 4,000 feet and used by jet aircraft. The FAA also allows markings on a runway to be upgraded at any time to include elements that are not required, but may be deemed to enhance safety. Runway pavement and displaced threshold markings are painted white, while taxiway pavement markings are painted yellow. Newly painted runway markings typically last for two (2) years.

Runway 04-22

Runway 04-22 is properly marked with precision instrument approach pavement markings on Runway 22 and non-precision markings on Runway 4. The existing pavement markings are considered in fair condition therefore will require remarking in the short-term planning period.

Runway 17-35

Runway 17-35 does not currently have any approach procedures, therefore has visual pavement markings. The runway is also marked to indicate the use of declared distances on both ends.

While the markings for Runway 17-35 are currently in good condition, additional markings will need to be added once a GPS, non-precision approach is established on Runway 35.

Taxiways and Taxilane

As stated previously, BHB recently underwent a project that provided enhanced taxiway markings. All taxiway and taxilane markings are currently in excellent condition. However, recent adjustments to FAA marking standards will require the partial grinding and remarking of existing surface painted hold positions.

7.4 Takeoff and Landing Aids

Over the course of the planning period, some of the various takeoff and landing aids at BHB will need to be replaced or relocated. This section describes those facilities that will need upgrading as well as new equipment that will be required.

Non-precision Approach Lighting System

As part of the establishment of a non-precision approach to Runway 35, an approach lighting system will be required for the runway. According to FAA AC 150/5300-13 Change 15, *Airport Design*, a variety of approach lighting systems are acceptable, but vary depending on the visibility minimums established for the GPS approach.

Precision Approach Lighting System

Runway 22 currently has a medium intensity approach lighting system with sequenced flashers (MALSF) to aid pilots in the transition from instrument flight to visual flight for landing. According to FAA AC 150/5300-13 Change 15, *Airport Design*, the current MALSF should be replaced with a medium intensity approach lighting system with runway alignment indicator lights (MALSR). MALSR consists of a combination of threshold lamps, steady burning light bars and flashers, provides visual information to pilots on runway alignment, height perception, roll guidance, and horizontal references for Category I Precision Approaches.

The upgrade from MALSF to MALSR needs to be analyzed more closely through the process of an environmental assessment (EA) due to the expected impacts to the Jordan River as well as private property to the northeast of the runway.

Visual Glide Slope Indicators

Visual descent guidance information is provided to pilots using Runway 04-22 via the current 4-light Visual Approach Slope Indicator (VASI) systems installed on each end. At such time as a GPS approach is installed on Runway 35, PAPI's would need to replace the current VASI system.

Wind Cone

All four runway ends currently share a single wind cone, which provide pilots visual wind direction information. Additional wind cones are recommended for runway ends 22 and 35 as terrain and necessary airport features can prevent a pilot's clear view of the wind sock.

7.5 Airfield Signage

Proper airfield signage provides essential surface movement guidance that is necessary for the safe and efficient operation of aircraft at an airport. Signage should include the following:

- Provide the ability to easily determine the designation of present location.
- Readily identify route(s) toward desired destination.
- Identify boundaries for approach areas, ILS critical areas, and runway safety areas and obstacle free zones.

An updated Sign and Marking Plan was recently completed and approved in August 2010 for BHB. In addition to the minor marking adjustments mentioned previously in this chapter, the airport is in need of updated signs at Runway 35, the intersection of Runways 4-22 and 17-35 as well as Taxiways A, C, D and E.

8.0 AIRPORT FACILITIES

This section addresses the various airport facilities required to support the activity expected during the planning period. These include the requirements for hangar facilities, aircraft parking areas, general aviation terminal space, aviation fuel storage, airfield security fencing, and other support facilities.

8.1 Aircraft Hangar Requirements

Hangars are one of the most desirable means for aircraft storage at any airport when offered at competitive rates. Most hangar space is primarily utilized by the aircraft based at the airfield with only a small percentage used by itinerant traffic (usually for maintenance or occasional overnights). In general, hangar types include a combination of the following facilities:

> **T-hangars** – A fully enclosed building housing individual stalls, each capable of storing one aircraft, typically a single-engine or light multi-engine aircraft.
>
> **Clearspan Hangars** – A fully enclosed building typically capable of holding multiple aircraft. These are often referred to as storage or box hangars.
>
> **Corporate Hangars** – Similar to clearspan hangars, but typically have attached office space. These hangars may only store one aircraft each.
>
> **Shade Hangars** – A structure with a protective roof but no walls, typically capable of holding numerous aircraft each. These are often referred to as aircraft shelters or shade ports and are most often found in warmer, southern climates.

Currently, about 70% or 30 of BHB's 43 based aircraft are stored in hangars. The airport has one (1) stand alone t-hangar and all other existing hangars are of the clearspan or box type. All hangars are currently occupied by based aircraft. The remaining 13 based aircraft are tied-down on the based aircraft apron.

Given BHB's location in the northeast with sunny summer days and cold winter months with ice and snow, an estimated 75% of based aircraft would prefer to shelter their aircraft in a hangar, given the option. In fact, as stated in *Chapter 2 – Aviation Activity Forecasts*, there are currently 17 people on a hangar wait list. Three of the 17 are currently based at BHB, but must tie-down their aircraft due to insufficient hangar space. Given the above, the number of hangars required to accommodate BHB's need for this planning period is summarized in **Table 3-10** below.

Table 3-10
Projected Hangar Demand

Year	Adjusted Based Aircraft Forecast	Hangars Required
2009	43	33
2015	47	35
2020	51	38
2030	56	42

Source: Hoyle, Tanner & Associates, Inc.

Although existing hangars are all of the clearspan type at BHB, this master plan continues the recommendation of the previous plan which is to construct a 10 unit bay of t-hangars. T-hangars are popular among single-engine and small twin engine owners, make the best use of limited space and are typically more affordable. A set of t-hangars and numerous additional clearspan corporate style hangars are depicted on the plan set. Maximum flexibility is intended to allow the airport to move forward with development when opportunity arises. Ultimately, the hangars will be constructed based on the availability of funds, demand at the time, and the business decisions of the tenants using the facilities.

8.2 Aircraft Parking Apron Requirements

Currently, 30% or 13 of the 43 based aircraft are currently parked outside on BHB's based aircraft apron which is located southwesterly of the terminal and itinerant aircraft parking apron.

For planning purposes, based and itinerant aircraft requirements are usually considered separately since they serve different functions. Aircraft parking areas are typically divided between small and large aircraft, defined as:

Small Aircraft - An outdoor parking space with tie-down capability, sized to accommodate single-engine and light multi-engine aircraft.

Large Aircraft - Spaces on a paved apron suitable for parking the larger turboprop multi-engine aircraft and business jets.

Formulas to estimate the apron space required for based and itinerant aircraft parking are provided in FAA AC 150/5300-13 Change 15. The following sections describe the FAA methodology.

FAA Methodology for Based Aircraft Parking Area

A minimum area of 300 square yards (SY) should be applied to each single-engine and light multi-engine based aircraft expected to be parked on an apron. For planning purposes, the FAA recommends increasing this value by ten percent for expansion over the following two year period. This methodology requires 4,290 SY of apron space for the 13 small aircraft currently stored outside.

As stated in the hangar requirements section above, it is assumed that the airport will continue to have a higher percentage of aircraft stored in hangars. It is estimated that 75% of the based aircraft parking demand will be met through the use of hangar facilities by the end of the planning period. Therefore, of the 56 based aircraft projected by 2030, only 25% or 14 total aircraft will require approximately 4,620 SY apron space.

FAA Methodology for Itinerant Aircraft Parking Area

Itinerant apron space is intended for relatively short-term parking periods, usually less than 24 hours (possibly overnight), as they are primarily for transient aircraft. When possible, such aprons should also be located as to provide easy access to FBO, fueling, and ground transportation facilities. For planning purposes, the FAA provides a detailed approach to calculate the total number of peak day itinerant aircraft that can be expected on the ramp at any given time.

For BHB, this was calculated using the operations forecasts, expected local versus itinerant splits, and operational fleet mix figures from the aviation activity forecasts chapter. Once calculated, the minimum area of 360 SY per itinerant aircraft parking area was applied for the each of the smaller aircraft, while 1,000 SY was applied for the larger turboprops and jet aircraft expected. This resulted in 19,200 SY of itinerant apron space required in 2010 and 25,800 SY by 2030.

Table 3-11
Summary of Aircraft Parking Apron Requirements

	2010	2030
Based Aircraft		
Number of Small Aircraft on Apron	13	14
Area Required for Based Aircraft	4,290 SY	4,620 SY
Itinerant Aircraft		
Small Aircraft on Peak Day	45	55
Area Required for Small Aircraft	16,200 SY	19,800 SY
Large Aircraft on Peak Day	3	6
Area Required for Large Aircraft	3,000 SY	6,000 SY
Total Apron Area Required	23,490 SY (211,410 SF)	30,420 SY (273,780 SF)
Apron Area Available in 2010	52,700 SY	52,700 SY
Surplus (+) / Deficit (-)	29,210 SY	22,280 SY

Source: Hoyle, Tanner & Associates, Inc.

Based on FAA methodology and criteria, BHB's existing apron will accommodate existing and forecast activity. Although no additional aprons are required, two of the three existing itinerant aircraft aprons are determined to be in poor condition and will therefore need to be reconstructed in the planning period.

8.3 Aviation Fuel Storage

BHB's current fuel farm containing three underground 10,000-gallon fuel tanks, (two Jet-A and one 100LL Avgas) is owned and operated by Columbia Air Services FBO. Although the fuel farm provides sufficient volume of both fuel types, the tanks are over 30-years old and out of compliance. All three existing fuel tanks will need to be replaced during the planning period.

8.4 Wildlife/Security Fencing

As an FAR Part 139 certificate holder, BHB is charged with preventing inadvertent entry to the movement area by unauthorized persons or vehicles as well as wildlife. The majority of the airport's perimeter, approximately 12,321 linear feet or 57% of the 21,763 linear foot perimeter, is currently protected by eight (8) foot high chain link fence. This master plan recommends the remainder of BHB's Airport Operating Area, approximately 9,442 linear feet, be fenced.

Fencing must adhere to the recommendations by the FAA, Maine DOT, and Transportation Security Administration (TSA). This includes the use of at least six (6) foot high, chain link fence with three strands of barb wire on top. In addition, the various electronic or manual gates must have adequate equipment for Hancock County to control access.

Provision of a paved perimeter road is also required in order to properly maintain the fence.

8.5 Airfield Electrical Vault

The current airfield electrical vault is in good condition and should have the space required to house the additional regulators and panels for the airfield lighting and electronic navigational aids proposed over the 20-year planning period. Additional future electrical designs will determine the equipment and vault modifications required.

8.6 Aircraft Rescue and Fire Fighting

Aircraft Rescue and Fire Fighting (ARFF) services are dictated by the type and level of operations conducted. Colgan Air's current use of the Saab 340 aircraft, which is less than 90 feet in length, classifies BHB as an Index 'A' ARFF facility.

BHB has one (1) Index 'A' ARFF vehicle as required, a 2008 Danko, Rapid Intervention Vehicle (RIV) equipped with 500 pounds of dry chemical and 300 gallons of premixed aqueous film forming foam (AFFF). The Trenton Volunteer Fire Department, located 1-mile from the airport's terminal building, provides back-up services to BHB's ARFF department. The Airport has sufficient fire fighting capabilities for the planning period.

9.0 GENERAL AVIATION PASSENGER TERMINAL

The passenger terminal at any airport acts as a gateway, the interface between ground and air transportation. As such, the terminal's primary purpose is to provide for the safe, efficient, and comfortable transfer of passengers and their baggage to and from aircraft and various modes of ground transportation. To accomplish this, essential elements such as ticketing, passenger processing, baggage handling, and security inspection are required. These are typically supported by food service, car rental, rest rooms, airport management, and other supplemental functions.

FAA AC 150/5360-9, *Planning and Design of Airport Terminal Facilities at Nonhub Locations,* and the Transportation Research Board's (TRB) Airport Cooperative Research Program's (ACRP) *Airport Passenger Terminal Planning and Design, Volume 1 and 2* provided guidance for determining appropriate passenger terminal sizing. An in-depth passenger terminal building analysis was conducted as part of the 2004 master plan and included several schematics developed by the project's architect showing the layout of the terminal's various components. The methodologies and recommendations of that analysis are consistent to those applied in this master plan, updated with current forecast data provided in Chapter 2 as well as input provided by the Airport Manager and Planning Advisory Committee (PAC).

Colgan Air is currently the only scheduled service provider at BHB. Due to the lack of an Air Traffic Control Tower (ATCT) at the airport, the airline's station activity reports were analyzed to determine enplanements, load factors and since BHB has seasonal fluctuations in ridership, peak month activity. The month of August consistently proves to provide peak activity for BHB, with a six year average of 22% of annual revenue generating passengers.

Table 3-12 below provides historical airline and passenger data to determine the amount of people likely to be in the terminal building during a one-hour time period of August, accounting for arriving and departing passengers in the terminal at the same time, as well as loved ones or well-wishers meeting/greeting those passengers. The historical data is applied to forecast data from Chapter 2 to project the number of people utilizing the terminal in the same one-hour time period of August for five, 10 and 20 years into the future.

Table 3-12
Peak Hour People in Terminal

Analysis of August Passengers

	2004	2005	2006	2007	2008	2009	2015	2020	2030
Revenue Pax (August)	2,130	2,178	2,075	2,378	2,286	2,591	2,660	3,236	4,790
Avg Daily Flights (see note 1)	5.6	5.6	5.6	5.6	5.6	3.7	3.7	3.7	3.7
Avg Flights per Month	173	173	173	173	173	115	115	115	115
Seats per A/C	19	19	19	19	19	34	34	50	50
Available Seats per Month	3,282	3,282	3,282	3,282	3,282	3,915	3,915	5,757	5,757
Avg Load Factor	65%	66%	63%	72%	70%	66%	68%	56%	83%
Avg Enplanments per Flight	12	13	12	14	13	23	23	28	42
Peak Hour Pax in Terminal (number of people - see note 2)	25	25	24	28	26	45	46	56	83
with 1 meeter/greeter per 4 pax 0.25	31	32	30	34	33	56	58	70	104
Worse Case for August Passengers									
Peak Hour Pax in Terminal (number of people - see note 3)	38	38	38	38	38	68	68	100	100
with 1 meeter/greeter per 4 pax 0.25	48	48	48	48	48	85	85	125	125

Notes:
1. Daily Flights prior to January 2009 were 4-5 Daily M-F and 6-7 Daily S+S using Beech 1900. After January 2009 4 Daily Th-M and 3 Daily T+W using Saab 340.
2. For Aug 2009 and 2010 schedules, 3 of the 4 daily flights arriving from BOS were scheduled to turn around within a half hour to go back to BOS. Therefore, the peak hour must account for arriving and departing pax.
3. Assumes scenario where both the arriving and departing flights (within 1 hour) are full or 100 load factor.

Comprehensive programming of the various spaces for a passenger terminal was developed using the data provided in **Table 3-12** above as well as the previously mentioned sources. For each space, the recommended minimum size is based upon average load factors for peak hour people for the baseline year of 2009, which is 56, as well as for load factors of 100% for both arriving and departing passengers for August, totaling 85 for the same year. Average peak hour passengers represent the low end of the spectrum for terminal space, while the high end is indicative of 100% load factors. Typical terminal elements are shown in **Table 3-13** below for 2009 as well as for the forecast years of 2015 and 2020.

Table 3-13
Passenger Terminal Space Programming

Terminal Elements	2009		2015		2020		Notes
	Low	High	Low	High	Low	High	
Administration							
Office - Airport Mgr	225	225	225	225	225	225	Desk, table, file cabinet
Office - Assist Mgr	175	175	175	175	175	175	Desk, file cabinet
Conference Room	350	350	350	350	350	350	Table with seating for 12
Storage Room	200	200	200	200	200	200	General Storage
Subtotal Administration	950	950	950	950	950	950	
Airline							
Ticket Counter	180	180	180	180	180	180	3 airline positions, 6 linear feet each
Office - Mgr	150	150	150	150	150	150	Desk, file cabinet
Office - Ops	150	150	150	150	150	150	Seating for 2, equipment
Crew/Break Room	200	200	200	200	200	200	Seating for 2, table, couch
Outbound Bag Room	540	540	540	630	630	700	Peak hour pax plus 20%
Exterior Protected Storage	170	170	170	170	180	180	APU, sand/salt, wx gear
Subtotal Airline	1,390	1,390	1,390	1,480	1,490	1,560	
Security							
Passenger Screening	500	500	500	500	500	500	Single screening station
Checked Baggage Screening	300	300	300	300	300	300	Manual, space for in-line system
Special Person/Bag Search	200	200	200	200	200	200	Desk, table, space for search and interview
TSA - Office	150	150	150	150	150	150	TSA request
TSA - Meeting Room	225	225	225	225	225	225	TSA request
TSA - Storage Room	75	75	75	75	75	75	TSA request
Subtotal Security	1,450	1,450	1,450	1,450	1,450	1,450	
Tenant							
Rental Car 1 - Counter	80	80	80	80	80	80	2 agent positions, 5 linear ft ea
Rental Car 1 - Office	120	120	120	120	120	120	Desk, file cabinet
Rental Car 2 - Counter	80	80	80	80	80	80	2 agent positions, 5 linear ft ea
Rental Car 2 - Office	120	120	120	120	120	120	Desk, file cabinet
Information Area	90	90	90	90	90	90	Kiosk, counter, display area
Taxi Stand (2)	100	100	100	100	100	100	Podium with chair
Subtotal Tenant	590	590	590	590	590	590	
Support							
General Facility Storage	500	500	500	550	550	550	Shelving and bulk item storage
Public Restrooms	660	660	660	726	726	726	With baby changing station
Janitor Closet	60	60	60	60	60	60	Shelving and slop sink
Electrical Closet	80	80	80	80	80	80	In addition to main elec closet
Vending Machine/Newspapers	120	120	120	120	120	120	3 each vending and newspaper machines
ATM	32	32	32	32	32	32	1 ATM kiosk in lobby
Public Telephone	25	25	25	25	25	25	1 public telephone
Subtoal Support	1,477	1,477	1,477	1,593	1,593	1,593	

Terminal Elements	2009		2015		2020		Notes
	Low	High	Low	High	Low	High	
Public							
Landside Entry Vestibule	120	120	120	120	120	120	Double sliding airlock doors
Terminal Lobby	200	200	200	200	200	200	
Airline Counter Queu	240	340	240	340	280	500	20 SF per pax - assume no more than 50% pax at one time
Departures Waiting (Unsecure)	0	0	0	0	0	0	
Security Queu	240	340	240	340	280	500	20 SF per pax - assume no more than 50% pax at one time
Departures Waiting (Secure) Holdroom	299	442	299	442	364	650	13 SF per pax
Secure Restrooms	220	220	220	220	220	220	Single fixture with sink (M & W)
Departures Exit Vestibule	120	120	120	120	120	120	Double sliding airlock doors
Subtotal Departures	1,439	1,782	1,439	1,782	1,584	2,310	
Airside Entry Vestibule	0	0	0	0	0	0	Shared with departures exit above
Bag Claim / Arrivals Area	548	800	548	800	648	1,120	22' / 30' long x 4' wide counter - 20 SF per pax
Car Rental Queu	100	100	100	100	100	100	50 SF per car rental agency
Landside Exit Vestibule	0	0	0	0	0	0	Shared with landside entry above
Subtotal Arrivals	648	900	648	900	748	1,220	
Subtotal Public	2,087	2,682	2,087	2,682	2,332	3,530	
Subtotal Terminal nsf	**7,944**	**8,539**	**7,944**	**8,745**	**8,405**	**9,673**	
Building Structure, Walls - 5%	397	427	397	437	420	484	
Circulation Space - 10%	794	854	794	875	841	967	
Mechanical Systems - 10%	794	854	794	875	841	967	
Total Terminal gsf	9,930	10,674	9,930	10,931	10,506	12,091	

Source: Hoyle, Tanner & Associates, Inc.

Updated planning-level terminal programming resulted in smaller overall terminal sizes from the 2004 AMPU. The lesser values are the product of several factors. First, space for one of the three programmed car rental agencies was removed. Currently, there is one year round agency, with a second added during peak season only. There is no expected need for a third car rental agency at BHB. Likewise, since there is a single airline operating at BHB, it is assumed that only one landside and one airside vestibule only for passenger/people entry and egress is needed. Allocation for two of the four vestibules was therefore removed.

Additionally, several of the 2004 AMPU's public terminal elements were scrutinized to create a more efficient plan for space. Therefore, the public areas section of the terminal programming was refined using a square footage (SF) per passenger methodology based on figures from ACRP's 2010 *Airport Passenger Terminal Planning and Design* guidance. Throughout the ACRP report, ranges of space per passenger are provided for the various elements of a passenger terminal. These ranges are associated with six levels of service (LOS) varying from excellent with free flow, no delays, and excellent level of comfort all the way to unacceptable with undesirable cross flows, system breakdown, unacceptable delays and level of comfort. The second tier providing a high LOS was selected as the goal for terminal space programming for this AMPU. The per passenger shown in **Table 3-13** are therefore based on the ACRP report's high LOS for the programming elements.

After a subtotal of terminal space was derived, space for circulation to include stairs, elevators and hallways was accounted for. Typically, 20-30% is allotted for circulation, but the BHB terminal will be one level. The fact that the terminal will not have stairs and is planned to be comprised of mostly open spaces, a minimized circulation of 10% of the terminal's space is expected to be sufficient. Although the existing terminal's mechanical system's are located in the building's basement, modification and addition of the existing facility or new construction may bring those systems up to the main floor. A typical allowance of 10% of the passenger terminal's subtotal of space is added as a placeholder to account for mechanical systems.

BHB's existing passenger terminal building provides 4,000 square feet with a prime location, offering convenient access to existing airside and landside facilities. The terminal building is considered in fair condition.

To accommodate the passenger terminal space required over the next 10 years, a future 11,000 SF building footprint will be shown near the existing site. This provides the flexibility to either expand the current structure or develop a new facility that would take advantage of existing airport facilities and infrastructure. The final size, layout, and location will need to depend on a more detailed analysis prior to construction which at a minimum considers the airline requirements, aircraft fleet, TSA needs, level of service, building codes, economy, and condition of the existing terminal building at that time. Changes in any one of these variables could significantly alter the space requirements or layout of the future passenger terminal facility.

10.0 Landside Access, Automobile Parking, and Utility Infrastructure

An integral yet often overlooked aspect of an airport's operation is that which is not directly related to aircraft or air travel. The landside facilities such as local street access, airport circulation roads, automobile parking, and utilities are equally critical to development. Likewise, the airside components addressed previously are dependent upon the availability of the proper landside features. The following sections address these elements.

10.1 Landside Access

Direct public access to BHB is provided to the west side of the airfield only via Caruso Drive off of Maine State Route 3. The 2004 AMPU noted a steady progression of what used to be seasonal traffic congestion along Route 3. Although Maine DOT and the Hancock County Planning Commission have an ongoing analysis relating to redesign options for Maine State Route 3, BHB realigned Caruso Avenue in order to allow for an adequate Runway Safety Area (RSA) for Runway 4. Caruso Avenue was pushed westerly, reconstructed, and a right turn only lane was added at the Route 3 intersection to allow for less airport egress congestion.

10.2 Automobile Parking

Automobile parking is available to terminal users directly adjacent to that facility. Likewise, FBO and hangar lessee's and users have auto parking available for their use in close proximity to those facilities at BHB. This section provides an analysis of the adequacy of the existing automobile parking available for itinerant GA operations and commercial air service at BHB only; the users of the terminal building.

The methodology for auto parking used in the 2004 AMPU is consistent with this AMPU using updated forecast and enplanement data. Peak hour passengers in terminal, as is found in **Table 3-12** of this report, is used to provide a low and high end range for auto parking. Once again, average peak hour passengers represent the low end of the spectrum for terminal space, while the high end is indicative of 100% load factors. August enplanements were used in this analysis as the month has historically provided peak activity at BHB, as was discussed in *Section 9.0 – General Aviation Passenger Terminal* above.

Table 3-14
Automobile Parking Requirements

Auto Parking Areas	2009		2015		2020	
	Low	High	Low	High	Low	High
Commercial Pax Service	70	70	73	85	88	125
Itinerant GA	72	72	75	75	81	81
Rental Car	60	60	60	81	60	86
Island Explorer	9	9	9	10	10	11
Subtotal	211	211	217	251	239	303
Employee (12% of total)	25	25	26	30	29	36
Total	236	236	242	281	267	339
Area Required (45 SY per space)	10,634	10,634	10,912	12,650	12,020	15,271
Area Available (SY)	10,500	10,500	10,500	10,500	10,500	10,500
Surplus (Deficit)	(134)	(134)	(412)	(2,150)	(1,520)	(4,771)
Total of Surplus (Deficit) Spaces	(3)	(3)	(9)	(48)	(34)	(106)

Source: Hoyle, Tanner & Associates, Inc.

10.3 Utility Infrastructure

The ability to provide the utilities (electric, water, and wastewater) to future facilities is an important consideration since the associated costs can be a significant portion of the overall development. Extending the existing electric power and water utilities into future development areas should be considered as part of the projects providing access into the new areas. A sewage treatment facility should be considered in the future as available land and soil types are not conducive to adding more septic leach fields. A possible treatment facility location has been identified on the Airport Layout Plan.

Even areas only expected to support aircraft hangars require utilities. For example, if no water or wastewater services are provided, than the hangar cannot obtain a certificate of occupancy. This limits the use and therefore the types of tenants that may lease the facilities from the airport. Nearly every company and many private entities require a bathroom and potable water in their facilities. Without, the buildings would be limited to only the storage of aircraft. It should be noted that aircraft storage may be the only activity allowed in certain facilities given lease or insurance requirements.

11.0 SNOW REMOVAL EQUIPMENT

Snow Removal Equipment (SRE) is critical for safe aircraft operations in regions such as the northeast where pavement can become contaminated with snow and ice.

FAA provides guidance to assist airport operators in developing a snow and ice control plan, and establishing snow removal and control procedures, but no longer provides guidance in determining specific SRE. A list of current SRE is provided in Chapter 1 – Inventory. Airport management identified the need for an additional piece of SRE, which is supported by this AMPU. Specifically, BHBs snow and ice control process would benefit from a loader with blower attachment.

SRE is currently stored in the Airport maintenance building on the easterly side of the based aircraft apron. The structure is not properly sized or configured as a SRE building. This master plan recommends the construction of a new SRE building with heated sand storage. Based on FAA guidance in FAA *AC 150/5200-30C – Airport Winter Safety and Operations*, the new SRE building should be approximately 6,300 SF, as currently shown on the Ultimate ALP graphic, southwesterly of the existing SRE storage facility.

12.0 POLLUTION PREVENTION PLANS

The U.S. Environmental Protection Agency (EPA) developed a program under the Clean Water Act to regulate certain high priority stormwater sources. As such, discharges of stormwater from industrial facilities (which includes most airports) must be covered by a National Pollutant Discharge Elimination System (NPDES) permit. Even if there is no active construction, an airport which discharges stormwater to navigable waters of the U.S., waters of the contiguous zone, or the ocean triggers the need for a NPDES Stormwater Multi-Sector General Permit for Industrial Activities.

Airports qualify under Sector S “Air Transportation Facilities” of the Multi-Sector Permit. “Navigable” water is a highly debated term within the text of the Clean Water Act; however, in Maine it is safe to assume that there is a requirement to file a Notice of Intent (NOI) for a Multi-Sector General NPDES permit.

A requirement of the NPDES permit is to have a Stormwater Pollution Prevention Plan (SWPPP). A SWPPP is applicable to the standard operations of an airport, as well as for individual construction projects. In addition, a Spill Prevention, Control, and Countermeasure (SPCC) plan may need to be included in the SWPPP. As opposed to a SWPPP, which is a tool used to prevent spills, a SPCC plan addresses what to do if a spill occurs.

In addition to helping manage the activities of the various facilities at the airport, a SWPPP will also facilitate obtaining NPDES construction permits for future development projects. Any of the ground breaking projects such as the installation of the new fuel farm discussed previously in this chapter would trigger an update to BHB's existing SWPPP.

The SPCC plan is required if more than 1,320 gallons (cumulative for all airport facilities) or more of oil of any kind or in any form (including, but not limited to petroleum, fuel oil, sludge, and oil refuse) is stored above ground. BHB is required to have an SPCC plan. The airport's existing plan is current and up to date.

13.0 Acquisition of Additional Land

There are three (3) parcels near the end of Runway 22 that the County is interested in purchasing, if available. One parcel contains an old race track that actually protrudes onto airport property. The parcels are identified on the Ultimate ALP graphic provided in **Appendix C**.

The Airport Improvement Program (AIP), the FAA grant program, does allow retroactive reimbursement to an airport sponsor for land acquisition, as long as the acquisition is accomplished in accordance with FAA rules and procedures. This allows the County to react quickly should a piece of property come available at a reasonable cost. If the County contemplates making a land purchase with the intent of eventually seeking reimbursement from FAA, the Airports Division at the regional FAA offices in Burlington, Massachusetts should be contacted.

14.0 Summary of Facility Requirements

Table 3-15 provides a summary of the facility requirements that were determined necessary to satisfy the forecasts of aviation demand. Essentially, this table includes the minimum improvements required over the 20-year planning period. Some additional facilities will also be planned and included as part of the final ALP drawing set and Capital Improvement Program to enhance the airport. The order in which these improvements are listed does not have any relation to the priority or phasing of such projects.

Table 3-15
Summary of Facility Requirements

Category	Required Improvement
Runways	Extend Rwy 4-22 300 feet
Taxiways	Construct Rwy 17-35 partial parallel twy
	Construct aircraft run-up area (Rwy 22)
Airfield Environment	Install GPS Instrument Approach on Rwy 35
	Install MIRL's on Rwy 17-35 (at time of GPS install)
	Remark Rwy 4-22
	Remark Rwy 17-35 and apply non-precision approach markings (at time of GPS install)
	Install non-precision approach lighting system on Rwy 35 (at time of GPS install)
	Reconstruct itinerant and large itinerant aircraft aprons (12,400 SY)
	Install updated airfield signs per 8/2010 Sign and Marking Plan
	Remove/light FAR Part 77 obstructions
	Acquire avigation easement (RPZ Rwys 17 & 22)
	Install two additional wind cones on Runways 22 and 35
Airport Facilities	Replace two 10,000-gallon Jet A fuel tanks
	Replace 10,000-gallon 100LL Avgas fuel tank
	Install 9,442 LF of wildlife/security fencing
	Construct a paved perimeter road
	Construct 10-unit bay of t-hangars
	Construct clearspan hangars
	Expand existing or construct new terminal building
	Construct 6,300 SF SRE building
Other Facilities	Construct Wastewater Treatment Facility
	Acquire SRE (Loader with blower attachment)
	Acquire parcels 20/19, 20/20, and 20/21, if available

Source: Hoyle, Tanner & Associates, Inc.

CHAPTER 4 Environmental Considerations

1.0 THE NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act (NEPA) of 1969 requires any project funded by the federal government that affects the environment undergo environmental processing. To comply with NEPA in airport development, FAA issued Order 5050.4B, *Airport Environmental Handbook*. The document identifies three project categories for airport developments:

- Actions requiring an Environmental Impact Statement (EIS);
- Actions requiring an Environmental Assessment (EA); and
- Actions which are Categorically Excluded (CATEX).

As defined in FAA AC 150/5070-6A, *Airport Master Plans*, "...actions categorically excluded are actions which have been found, in normal circumstances, to have no potential [individually or cumulatively] for significant environmental impact." Actions requiring an EA may or may not have significant environmental impact but due to the unknown, further analysis is required. Lastly, actions with known significant impacts require an EIS.

Several projects identified in Chapter 3 – *Facility Requirements and Development Plan* are expected to trigger an EA (i.e. parallel taxiway, SRE and terminal building expansions, as well as hangar construction). Reference and compliance with FAA Order 1050.1E – *Policies and Procedures for Considering Environmental Impacts* is required for all development projects. Based on Order 1050.1E, the following developments proposed in Chapter 3 – *Facility Requirements & Development Plan* are expected to be eligible for a CATEX designation:

- Implement a GPS Instrument Approach to Runway 35
- Remark Runway 4-22
- Reconstruct itinerant and large itinerant aircraft aprons (12,400 SY)
- Install updated airfield signs per 8/2010 Sign and Marking Plan
- Install 9,442 LF of wildlife/security fencing

The following are developments required as the result of the proposed GPS approach to Runway 35 and are expected to be eligible for a CATEX designation:

- Install MIRL's on Runway 17-35
- Remark Runway 17-35 and apply non-precision approach markings
- Install non-precision approach lighting system on Runway 35

Should an EA be called for, a purpose and need followed by a comprehensive account of relevant environmental considerations will be analyzed and discussed as part of the EA. Since understanding of the existing airport environment is vital to proper planning, a cursory review of key environmental elements as they pertain to the development identified in Chapter 3 – *Facility Requirements & Development Plan* is provided in the following areas:

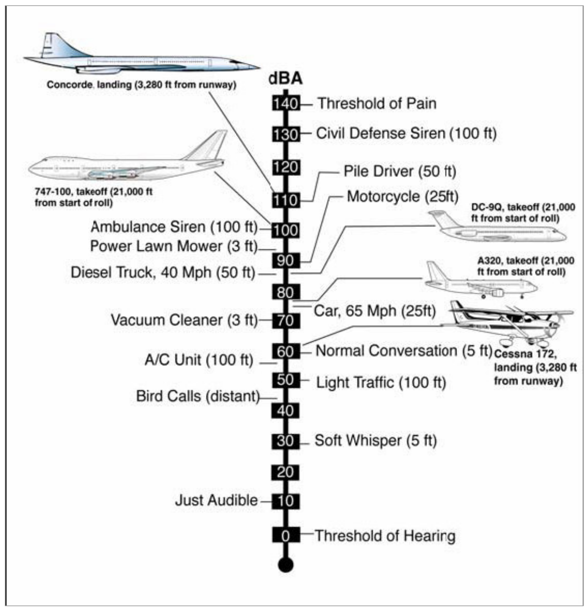
- Aircraft noise and land use
- Wetland impacts
- Wildlife habitat

2.0 AIRCRAFT NOISE AND LAND USE

Noise is often defined as unwanted sound. As such, noise from aircraft is one of the most controversial issues facing airports today. Aircraft noise is therefore a prominent factor in the public's perception of an airport.

FAR Part 150, *Airport Noise Compatibility Planning*, contains federal standards on determining land use compatibility for given airport noise levels measured in terms of DNL thresholds. Land use designations deemed compatible with levels at or less than 65 DNL include: residential, public use, commercial use, manufacturing and production and recreational. The 65 DNL is typically used as the benchmark for disturbance as it is the point which aircraft noise interferes with normal conversation, the average speaking voice. Other land uses, such as industrial and commercial, are compatible with somewhat higher DNL levels. The 65 DNL contour defines the area outside of which noise sensitive communities are compatible.

Figure 4-1
FAA Noise Barometer



Source: www.faa.gov, *Noise and Its Effect on People*

In general, noise levels are loudest on the airport, surrounding the runway itself. Noise levels diminish with increasing distance from the runways and runway ends. Typical aircraft both currently and expected to utilize BHB range in size from small, aircraft similar to the Cessna 172 on the FAA noise barometer above, to large, aircraft comparable to the Boeing 747.

Encroachment of incompatible development in the vicinity of public-use airports can be prevented and further development controlled by the management of noise sensitive land uses. Incompatible development, particularly residential development near airports, will inevitably create a body of activists who are displeased by the noise they are subjected to from airport operations.

Additionally, noise compatible land use in the vicinity of airports is necessary to uphold the public's health and welfare while preserving the airport's capability to provide air transportation.

BHB has achieved reasonable noise compatibility by establishing local zoning ordinances that control or prohibit noise sensitive land uses and activities in the vicinity of an airport as is illustrated in Figure 1-1 – *Town of Trenton Land Use Map*. Zoning ordinances are determined at a local level, not by the state or federal government. The Town of Trenton currently designated BHB as Airport Commercial / Industrial. Residential and public land uses such as schools, hospitals, and churches are generally not recommended to be located immediately adjacent to airports. Some land uses that are considered more compatible include commercial uses, manufacturing and production facilities, most businesses, and industrial uses.

Planning is a critical element in minimizing or eliminating the encroachment of incompatible land uses near airports. This AMPU is a tool to ensure that aviation planning among federal, state, regional and local agencies is coordinated. The process undertaken to develop the plans herein required interagency communication and review.

3.0 WETLAND IMPACTS

A wetlands analysis was conducted by Woodlot Alternatives, Inc. in October 1993 for BHB. The complete wetlands study is provided as Appendix A of the 2004 AMPU, while a summary of those findings, which are carried forward to this study, are provided below. The methodology described for locating wetlands included review of National Wetland Inventory Maps, aerial photograph stereo pairs, (Maine DOT photos DOT89-58-6 through 10) and Soil Conservation Service maps for the project area, as well as a limited onsite wetland delineation (Environmental Laboratory 1987) was performed to determine the location of wetlands under the jurisdiction of the Maine Department of Environmental Protection (DEP) and the U.S. Army Corp of Engineers.

Table 4-1 below identifies the 26 wetland areas found during the 1993 wetlands study, while the ALP graphics provided in **Appendix C** illustrates these areas.

Table 4-1
Wetlands at BHB

Number	Acres	Type	DEP Class (1)
1	27.0	Meadow & Shrub	III
2	4.2	Meadow & Shrub	III (2)
3	0.2	Meadow	n/a
4	6.4	Meadow	III (3)
5	2.0	Meadow	III (4)
6	1.1	Meadow	n/a
7	1.1	Meadow	n/a
8	2.5	Meadow & Shrub	II
9	1.0	Meadow & Shrub	II
10	7.2	Meadow, Shrub & Forested	II (floodplains only)
11	1.0	Shrub & Forested	II (floodplains only)
12	0.6	Shrub	II
13	1.2	Shrub	II (floodplains only)
14	1.5	Shrub	II
15	0.1	Shrub	n/a
16	48.0	Shrub & Forested	II & III
17	1.4	Meadow	n/a
18	1.1	Meadow	n/a
19	4.4	Meadow	n/a
20	18.3	Meadow	III
21	1.0	Meadow	II (floodplains only)
22	2.1	Meadow	n/a
23	0.2	Meadow	III (5)
24	24.0	Meadow, Shrub & Forested	III
25	4.1	Meadow	III (6)
26	5.0	Meadow & Shrub	II

Source: Woodlot Alternatives, Inc.

Notes:

(1) If no class is given, wetland is not under DEP jurisdiction.
(2) Contiguous with wetland #1
(3) Contiguous with wetlands on north side of Route 3
(4) Contiguous with wetland #4
(5) Contiguous wit wetland #25
(6) Contiguous with wetland #24

Any proposed airport development will require a review of the specific area as wetlands can change over time. Any impacts to wetlands caused by airport development will require approval and coordination with the Town of Trenton, and permitting coordination with the Army Corps of Engineers and the Maine Department of Environmental Protection (MDEP), Bureau of Land & Water Quality. MDEP may require compensatory mitigation for wetland disturbance greater than 10,000 square feet to achieve the replacement or protection of similar functions and values lost through the elimination of the wetland. There are cases where the Bureau of Land & Water Quality will approve a monetary contribution to assist with the construction of another wetland enhancement project in the same watershed if compensatory mitigation is not possible. Consultation with MDEP will be required to determine if these impacts will be considered major, minor, or minimum and determine the applicable types of mitigation for each project which may impact these wetlands.

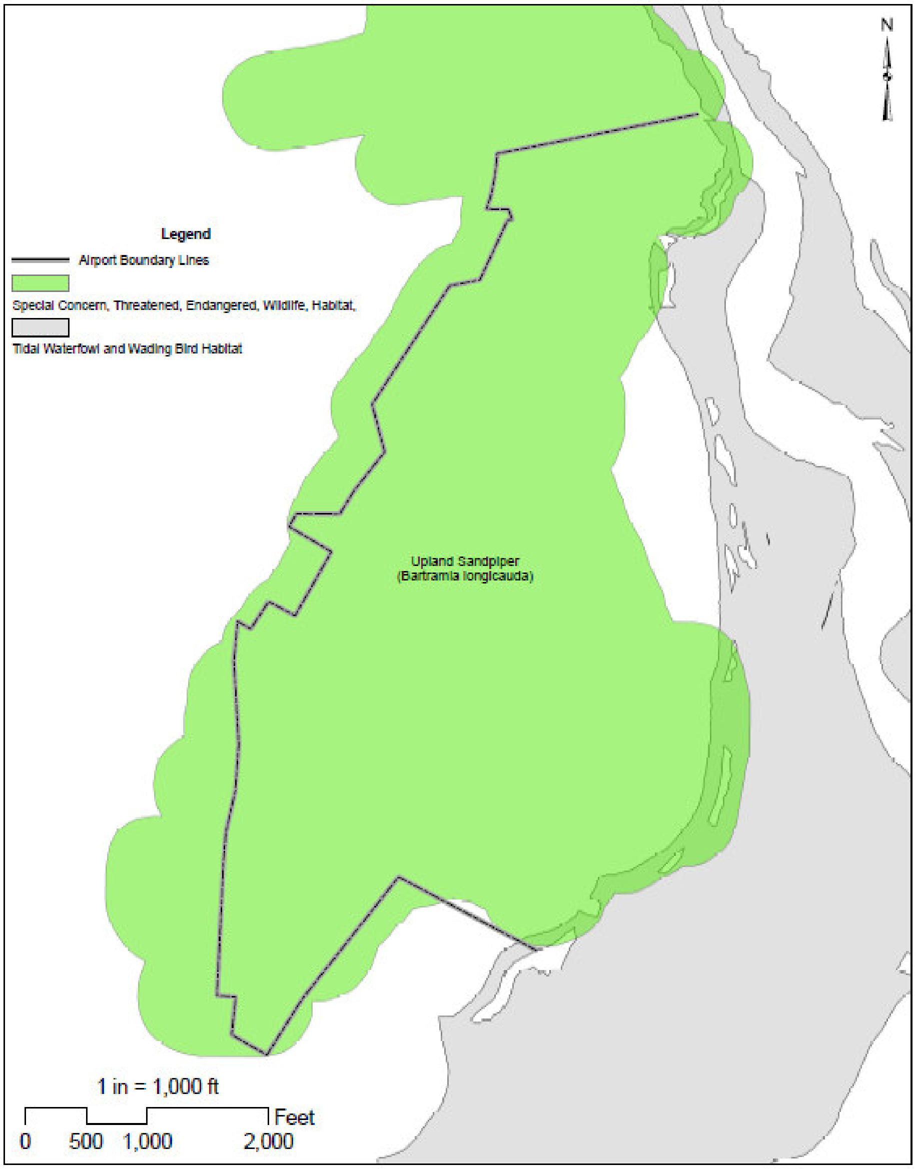
4.0 WILDLIFE HABITAT

Two key agency regulators were contacted to solicit review of BHB's ultimate development plan to determine whether any wildlife-related concerns requiring subsequent analysis, beyond this study, were expected. The agencies are identified along with a summary of their responses presented below, while copies of the request letters and responses received are provided in **Appendix A**.

4.1 State of Maine Department of Inland Fisheries and Wildlife

The Maine Department of Inland Fisheries and Wildlife (MDIFW) was contacted and responded with the results of a search of their database containing records of rare species at BHB, as illustrated on **Figure 4-2**. The Upland Sandpiper is the primary concern of MDIFW and is discussed in greater detail in Section 4.3 below.

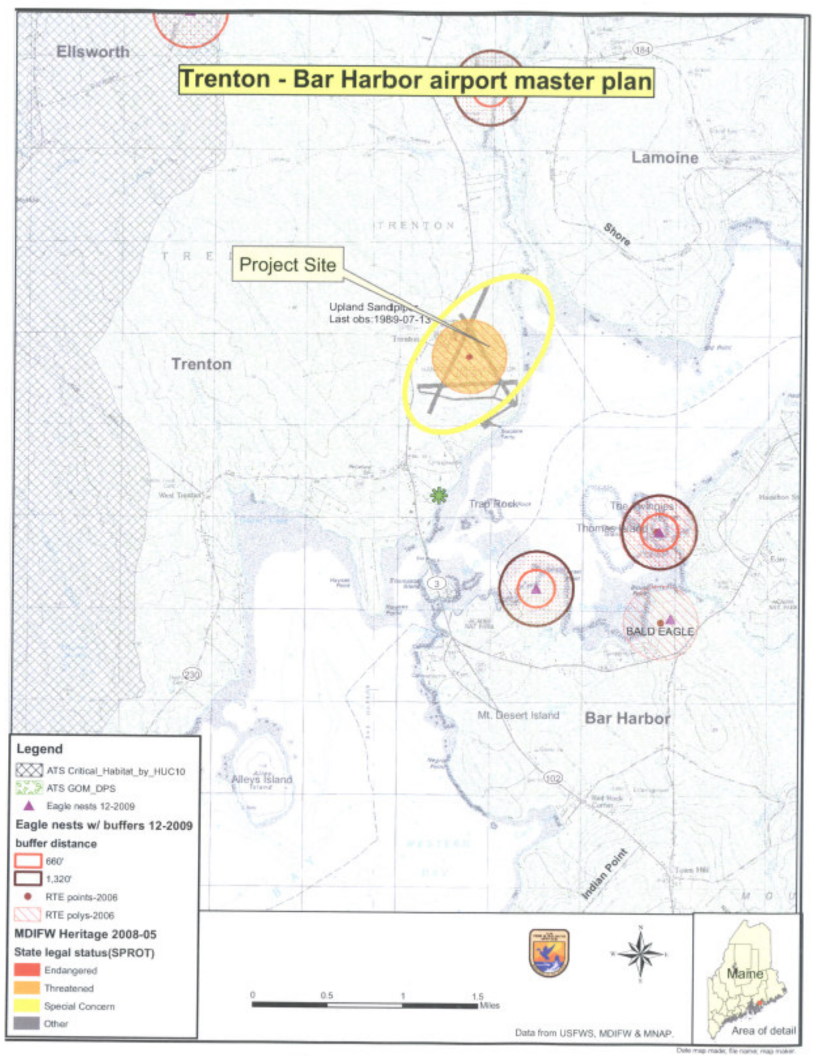
Figure 4-2
MDIFW – Known Occurrences Map



4.2 US Fish and Wildlife Service

A representative from the New England Field Office of the U.S. Fish and Wildlife Service identified that BHB is within the range of the Gulf of Maine Distinct Population Segment of Atlantic salmon in Maine, which is a federally endangered species. The response then declared that BHB 'does not occur in a watershed that has been designated as critical habitat for Atlantic salmon' by the National Marine Fisheries Service. Additionally, 'no other federally-listed species under the jurisdiction of the Service are known to occur in the project area.'

Figure 4-3
USFWS – Known Occurrences Map



Hoyle, Tanner & Associates, Inc.

4.3 Upland Sandpiper


Upland Sandpiper

Congress passed the Endangered Species Act in 1973 due to concerns that many plant and animal species were at risk. According to the U.S. Environmental Protection Agency website, '*The Endangered Species Act provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found*.'[1]

The open grasslands surrounding the runway and taxiway areas are known habitats of the Upland Sandpiper, a species of bird currently considered threatened by the State of Maine. In recognition of the importance in protecting the Upland Sandpiper, BHB adjusts its mowing schedule to accommodate the bird's nesting season.

In order to insure continued protection of the natural communities, plants and animals identified, additional coordination with the aforementioned agencies is required prior to construction of any project.

1 United States Environmental Protection Agency, "Finding Answers," Endangered Species Act, 2004, www.epa.gov/region5/defs/html/esa.htm, October 2005

CHAPTER 5 Airport Plans

1.0 OVERVIEW

The Airport Layout Plan (ALP) is a graphic presentation to scale of both the current airport facilities and the proposed airport development. The future development is the result of input from the Planning Advisory Committee (PAC) airport master plan meeting process and the analysis completed in previous chapters.

The ALP set consists of drawings that illustrate detail required by the FAA in AC *150/5070-6A, Airport Master Plans* and *AC 150/5300-13, Airport Design.*

The ALP set includes the following drawings:

- Cover/Title Drawing 1 of 12
- ALP (Existing Facilities) 2 of 12
- ALP (Ultimate Facilities) 3 of 12
- ALP (Ultimate Avigation Easements) 4 of 12
- ALP Data Sheet 5 of 12
- Terminal Area Plan 6 of 12
- Runway 04-22 Plan and Profile 7 of 12
- Runway 17-35 Plan and Profile 8 of 12
- FAR Part 77 Airspace Surfaces, Sheet 1 9 of 12
- FAR Part 77 Airspace Surfaces, Sheet 2 10 of 12
- Land Use and Noise Contour Plan 11 of 12
- Property Map (Exhibit A) 1 of 1 (12 of 12)

The airport plans provide the physical details of the 20-year development plan. The primary drawing is the Ultimate ALP, which is the overall development plan for the airport showing both the existing and ultimate facilities. The FAA, Maine

DOT, Hancock County, and airport tenants and users refer to the ALP set as a guide for future airport development.

The ALP must be approved by the FAA in order for BHB to be eligible for federal funding for airport development projects. Likewise, the plan must be approved by the Maine DOT for the airport to receive state funding of eligible airport development projects.

Standard 22-inch by 34-inch drawings of the ALP drawings are available through BHB, FAA and Maine DOT. Reduced 11 by 17 inch copies of the plans are included provided as **Appendix C**. A brief description of each drawing is provided in the following sections.

2.0 COVER/TITLE SHEET

Drawing 1 of 12, the Cover/Title Sheet, lists the subsequent drawings within the ALP set. It also provides the reader with a map depicting the general location of the airport within the State of Maine and the Town of Trenton.

3.0 EXISTING AND ULTIMATE AIRPORT LAYOUT PLANS (ALP'S)

The Existing ALP, drawing 2 of 12, is provided as both a reference document to identify existing facilities (including runways, taxiways, buildings and other structures) and a presentation document to identify a beginning point to this study.

The Ultimate ALP, drawing 3 of 12, is a graphic depicting all of the existing facilities as well as the detail of the ultimate improvement for the 20-year development plan for BHB. The Ultimate ALP illustrates the developments contained within Chapter 3 - Facility Requirements & Development Plan. Drawing 4 of 12 depicts ultimate avigation easements at BHB.

4.0 ULTIMATE AIRPORT LAYOUT PLAN (ALP) DATA DRAWING

The ALP Data Sheet, drawing 5 of 12, provides a broad-spectrum of information about BHB. Data included consists of general airport data, approach slope data, property ownership data, and other key information regarding the airport.

5.0 TERMINAL AREA PLAN

This plan, drawing 6 of 12, depicts a detailed development plan for the operations area of the airport in the area of the terminal building and existing hangars. The drawing is a magnified version of the terminal area from the Ultimate ALP.

6.0 RUNWAY PLAN AND PROFILES

The runway plans and profiles, drawings 7 and 8 of 12, illustrate the runways (04-22 and 17-35) and the approach areas immediately beyond the ends of the runways at BHB. The runways are shown in profile with an exaggerated vertical scale to clearly depict any obstacles located within the existing and ultimate approaches to the runways and to depict runway elevation differences.

7.0 FAR PART 77 AIRSPACE SURFACES

The FAA describes imaginary airspace surfaces on and around an airport in *Federal Aviation Regulations (FAR), Part 77, Obstructions Affecting Navigable Airspace.* These surfaces, when kept clear, protect aircraft from manmade and natural obstructions in the airspace around the airport. The FAR Part 77 Airspace Surfaces, drawings 9 and 10 of 12, depicts those imaginary airspace surfaces.

FAR Part 77 surfaces are utilized in zoning and land use planning adjacent to the airport to protect the navigable airspace from encroachment by hazards, which would potentially affect the safety of airport operations.

8.0 LAND USE PLAN

The Land Use Plan (City zoning) is overlain with the Noise Contour Plan, drawing 11 of 12, depicts the existing and ultimate on and off-airport land use as well as the 65 DNL noise contour.

9.0 AIRPORT PROPERTY MAP (EXHIBIT A)

The Property Map, also known as Exhibit A, is not technically included as part of the plan set, but is placed at the conclusion of the plan set for organizational purposes. Identified as drawing 1 of 1, (and here as 12 of 12), the Airport Property Map depicts all the land interests designated as airport property. The graphic also serves as an inventory of all parcels that make up the airport. The Airport Property Map must show the property interests held or to be acquired in all lands to be developed or used in connection with BHB. The map also indicates how various parcels within the airport boundaries were acquired (i.e. federal funds, surplus property, local funds only, etc.)

CHAPTER 6 Capital Improvement Plan & Plan Implementation

1.0 OVERVIEW

A staging plan and a financial plan are presented to describe the steps required to achieve the Development Plan identified in Chapter 3. The staging plan considers the demand-driven need for facilities, and necessary improvements to meet FAA standards according to *Chapter 2 – Aviation Activity Forecasts*, and *Chapter 3 – Facility Requirements & Development Plan*. The financial feasibility of construction was considered when determining the CIP.

A Business Plan was developed as part of this master planning effort. The document is provided as **Appendix B**. The plan evaluates BHB's resources and proposes financial actions and revenue improvements.

2.0 CAPITAL IMPROVEMENT PLAN

The CIP represents a schedule and cost estimate for implementing the Development Plan, which has been recommended as a result of the AMP process and approved by the PAC. Scheduling of improvements has been divided into three phases: short-term (2011-2016), mid-term (2017-2021) and long-term (2022-2031). The CIP must be viewed as a constantly evolving document. Additionally, planning for BHB should remain flexible and incorporate annually updated estimates of costs and priorities.

The CIP is structured in a manner that presents a logical sequence of improvements, while attempting to reflect available funding from the state (Maine DOT), and federal (FAA) levels. Those airport improvements, which are eligible for Airport Improvement Plan (AIP) funding, currently receive 95 percent funding from the FAA, 2.5 percent from Maine DOT, and the remaining 2.5 percent from the local sponsor, Hancock County. AIP funding contributions do fluctuate and may revert back to 90 percent federal participation in the future, with 5 percent participation from the state and county. Projects eligible for state funding receive 90, 80, or 50 percent funding depending on the project and funding availability. Projects ineligible for AIP funding must either be funded by the state, the airport or by private entities, such as airport businesses or private developers.

BHB's federal entitlement is currently $1,000,000 a year as the Airport maintains a minimum of 10,000 annual enplanements with scheduled air service.

Tables 6-1, **6-2**, and **6-3** depict the proposed airport improvements for the short, mid, and long-term phases, respectively. The short-term phase is presented by individual fiscal years. The long-term phase includes all other projects from which BHB can select projects for implementation as the six-year CIP is accomplished and updated.

Table 6-1
Short-term CIP

Description	Year	Total Project Cost	Federal Share	State Share	County Share
Install Perimeter Fencing (approx. 7,500 LF)	2011	$270,000	$256,500	$6,750	$6,750
Design & Permitting for 17-35 Parallel Taxiway D	2011	$160,000	$152,000	$4,000	$4,000
Pavement Markings	2011	$120,000	$114,000	$3,000	$3,000
Acquire Snow Removal Equipment (Loader)	2011	$550,000	$522,500	$13,750	$13,750
Acquire 4 end easements - Phase 1	2012	$100,000	$95,000	$2,500	$2,500
Design Terminal Building Expansion	2012	$100,000	$95,000	$2,500	$2,500
Design & Construct SRE Building to include Sand Storage	2012	$400,000	$380,000	$10,000	$10,000
Construct Parallel Taxiway D & Reconstruct Taxiway F	2012	$1,000,000	$950,000	$25,000	$25,000
Obstruction Removal/Lighting - Runway 4 - Phase 1	2013	$150,000	$142,500	$3,750	$3,750
Construct Terminal Building Expansion	2013	$2,185,000	$2,075,750	$54,625	$54,625
Construct wastewater treatment facility (WWTF)	2013	$350,000	$332,500	$8,750	$8,750
Install PAPIs Runway 4 and 22 (FAA installed)	2015	$120,000	$114,000	$3,000	$3,000
Reconstruct Taxiways A and B	2015	$1,000,000	$950,000	$25,000	$25,000
Design & Construct Itinerant Apron - Phase 1	2015	$600,000	$570,000	$15,000	$15,000
Reconstruct Runway 4-22 and Taxiway G	2016	$3,000,000	$2,850,000	$75,000	$75,000
Design & Construct Perimeter Road	2016	$500,000	$475,000	$12,500	$12,500
Pavement Maintainance ($30,000 every three years)		$50,000	$47,500	$1,250	$1,250
Short-term CIP Total		***$10,605,000***	***$10,074,750***	***$265,125***	***$265,125***

Source: Hoyle, Tanner & Associates

Table 6-2
Mid-term CIP

Description	Year	Total Project Cost	Federal Share	State Share	County Share
Expand existing and reconfigure the automobile parking lot	2017	$950,000	$902,500	$23,750	$23,750
Install Perimeter Fencing (approx. 7,500 LF)	2017	$250,000	$237,500	$6,250	$6,250
Obstruction Analysis (R/W 17, 35, 22) and eALP update	2018	$150,000	$142,500	$3,750	$3,750
Design & Construct Itinerant Apron - Phase 2	2018	$1,400,000	$1,330,000	$35,000	$35,000
Acquire 4 end easements - Phase 2	2018	$100,000	$95,000	$2,500	$2,500
Design & Construct GA Ramp Expansion - Phase 2	2019	$840,000	$798,000	$21,000	$21,000
Acquire easements (R/W 17, 35, 22)	2019	$100,000	$95,000	$2,500	$2,500
Install lighted supplemental windsocks at the approach ends of Runways 04, 22 and 35	2019	$30,000	$28,500	$750	$750
Install medium intensity runway lights (MIRLs) on Runway 17-35	2019	$60,000	$57,000	$1,500	$1,500
Install runway end identifier lights (REILS) for an approach to Runway 35	2019	$25,000	$23,750	$625	$625
Implement a GPS approach to Runway 35 (FAA)	2019	$80,000	$76,000	$2,000	$2,000
Install a PAPI for an approach to Runway 35 (FAA installed)	2019	$60,000	$57,000	$1,500	$1,500
Obstruction Removal/Lighting - Runway 4 - Phase 2	2020	$150,000	$142,500	$3,750	$3,750
Obstruction Removal (R/W 17, 35, 22)	2020	$200,000	$190,000	$5,000	$5,000
Reconstruct Taxiway H and J	2021	$2,000,000	$1,900,000	$50,000	$50,000
Pavement Maintenance ($30,000 every three years)		$40,000	$38,000	$1,000	$1,000
Mid-term CIP Total		***$6,435,000***	***$6,113,250***	***$160,875***	***$160,875***

Source: Hoyle, Tanner & Associates

Table 6-3
Long-term CIP

Description	Total Project Cost	Federal Share	State Share	County Share
Obtain property and avigation/hazard easements for Runway 22 extension	$285,000	$270,750	$7,125	$7,125
Install Perimeter Fencing (approx. 7,500 LF)	$100,000	$95,000	$2,500	$2,500
Obstruction Removal/Lighting - Runway 4 - Phase 3	$150,000	$142,500	$3,750	$3,750
Construct additional aircraft tiedowns	$95,000	$90,250	$2,375	$2,375
Reconstruct Terminal Apron	$1,300,000	$1,235,000	$32,500	$32,500
Extend Runway 22, Taxiway H and MALSR	$2,000,000	$1,900,000	$50,000	$50,000
Design & Construct Holding Bay/Run-up Area for Runway 22	$430,000	$408,500	$10,750	$10,750
Reconstruct GA Apron	$900,000	$855,000	$22,500	$22,500
Reconstruct Runway 17-35	$1,500,000	$1,425,000	$37,500	$37,500
Convert abandoned piece of pavement used for overflow parking to turf	$90,000	$85,500	$2,250	$2,250
Pavement Maintenance ($30,000 every three years)	$90,000	$85,500	$2,250	$2,250
Long-term CIP Total	***$6,940,000***	***$6,593,000***	***$173,500***	***$173,500***

Source: Hoyle, Tanner & Associates

Appendix A

Environmental Agency Review

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Maine Field Office – Ecological Services
17 Godfrey Drive, Suite #2
Orono, ME 04473
(207) 866-3344 Fax: (207) 866-3351

FWS/Region 5/ES/MEFO

October 28, 2010

Tracy McAllister
Hoyle, Tanner & Associates, Inc.
150 Dow Street
Manchester, NH 03101

Dear Ms. McAllister:

Thank you for your letter dated October 14, 2010, requesting information or recommendations from the U.S. Fish and Wildlife Service (Service). This letter provides the Service's response pursuant to Section 7 of the Endangered Species Act (ESA), as amended (16 U.S.C. 1531-1543), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, 54 Stat. 250), and the Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661-667d).

Project Name/Location:	Trenton - Bar Harbor airport master plan
Log Number:	53411-2011-SL-0020

Federally Listed Species

Atlantic Salmon

This project occurs within the range of the Gulf of Maine Distinct Population Segment (GOM DPS) of Atlantic salmon (*Salmo salar*) in Maine, a federally-endangered species under the joint jurisdiction of the Service and the National Marine Fisheries Service (NMFS) (74 FR 29344; June 19, 2009). The Atlantic salmon GOM DPS encompasses all naturally spawned and conservation hatchery populations of anadromous Atlantic salmon whose freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River and wherever these fish occur in the estuarine and marine environment. Also included in the GOM DPS are all associated conservation hatchery populations used to supplement these natural populations. Excluded are landlocked Atlantic salmon and those salmon raised in commercial hatcheries for aquaculture.

The proposed project site, however, does **not** occur in a watershed that has been designated as critical habitat for Atlantic salmon by NMFS (74 FR 29300; June 19, 2009).

For Atlantic salmon and its critical habitat, NMFS and the Service share consultation responsibilities under Section 7 of the ESA. The Service generally handles projects in the freshwater component of the salmon's habitat and NMFS handles projects in the marine and estuarine environment (generally below the head of tide).

Based on the information currently available to us, no other federally-listed species under the jurisdiction of the Service are known to occur in the project area.

Please note that under Section 7 of the ESA, it is the federal action agency's responsibility to determine if a project may affect a federally listed species. For example, if the project receives federal funding or needs a federal permit, those actions may provide a "nexus" for Section 7 consultation under the ESA[1]. If the federal action agency determines that a project would have "no effect" on a listed species or critical habitat, they do not need to seek the concurrence of the Service and there is no need for Section 7 consultation. If the federal agency determines that a project "may affect" a listed species or its critical habitat, then consultation pursuant to Section 7 of the ESA should be initiated. Please note, however, that there is no provision under Section 7 for consultation after a project has already been completed.

Other Protected Species

The bald eagle was removed from the federal threatened list on August 9, 2007 and is now protected from take under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. "Take" means to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. The term "disturb" under the Bald and Golden Eagle Protection Act was recently defined within a final rule published in the Federal Register on June 5, 2007 (72 FR 31332). "Disturb" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle; 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

Further information on bald eagle delisting and their protection can be found at http://www.fws.gov/migratorybirds/baldeagle.htm.

Please consult with our new national bald eagle guidelines, which can found at http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf. These Guidelines are voluntary and were prepared to help landowners, land managers and others meet the intent of the Eagle Act and avoid disturbing bald eagles. If you believe this project will result in taking or disturbing bald or golden eagles, please contact our office for further guidance. We encourage early and frequent consultations to avoid take of eagles.

We have not reviewed this project for state-threatened and endangered wildlife, wildlife species of special concern, and significant wildlife habitats protected under the Maine Natural Resources Protection Act. We recommend that you contact the Maine Department of Inland Fisheries and Wildlife:

[1] Section 7 consultation, however, is only necessary when a federal agency takes a *discretionary* action (e.g., an agency has a choice of whether or not to fund or permit a particular project).

Steve Timpano
Maine Department of Inland Fisheries and Wildlife
284 State St.
State House Station 41
Augusta, ME 04333-0041
Phone: 207 287-5258

We also recommend that you contact the Maine Natural Areas Program for additional information on state-threatened and endangered plant species, plant species of special concern, and rare natural communities:

Lisa St. Hilaire
Maine Natural Areas Program
Department of Conservation
93 State House Station
Augusta, ME 04333
Phone: 207 287-8046

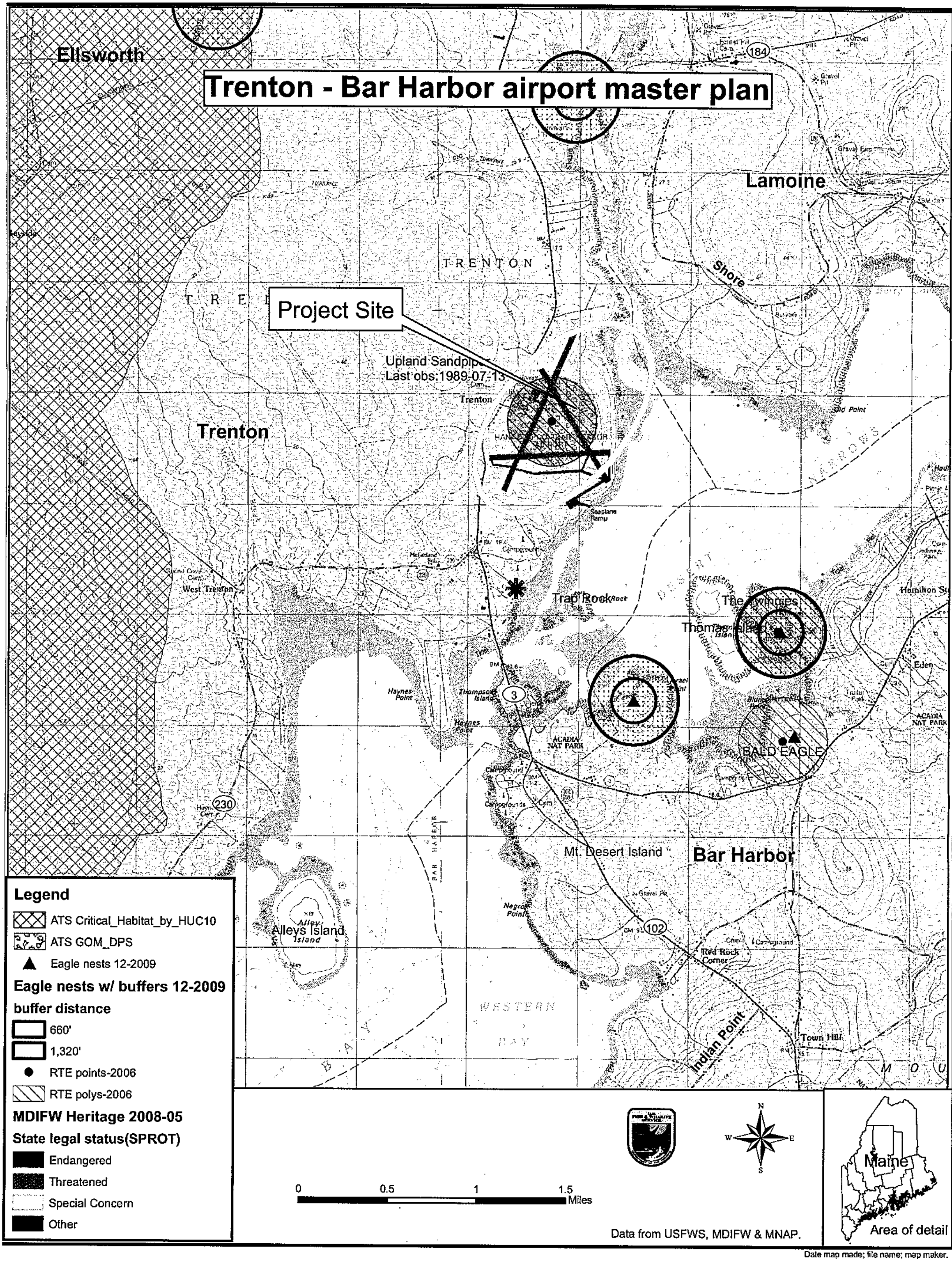
If you have any questions please call Mark McCollough, endangered species biologist, at (207) 866-3344 x115.

Sincerely,

Mark McCollough

Mark McCollough, Acting Field Supervisor
Maine Field Office

Enclosure


Trenton - Bar Harbor airport master plan
Ellsworth
Lamoine
TRENTON
Shore
Project Site
Upland Sandpiper
Last obs:1989-07-13
Trenton
Seaplane Ramp
West Trenton
Trap Rock
The Twinnies
Thomas Island
Haynes Point
Thompson Island
ACADIA NAT PARK
BALD EAGLE
Eden
Hamilton St
Mt. Desert Island
Bar Harbor
Alleys Island
Negro Point
Red Rock Corner
WESTERN BAY
Indian Point
Town Hill
184
230
3
102
Legend
ATS Critical_Habitat_by_HUC10
ATS GOM_DPS
Eagle nests 12-2009
Eagle nests w/ buffers 12-2009
buffer distance
660'
1,320'
RTE points-2006
RTE polys-2006
MDIFW Heritage 2008-05
State legal status(SPROT)
Endangered
Threatened
Special Concern
Other
0
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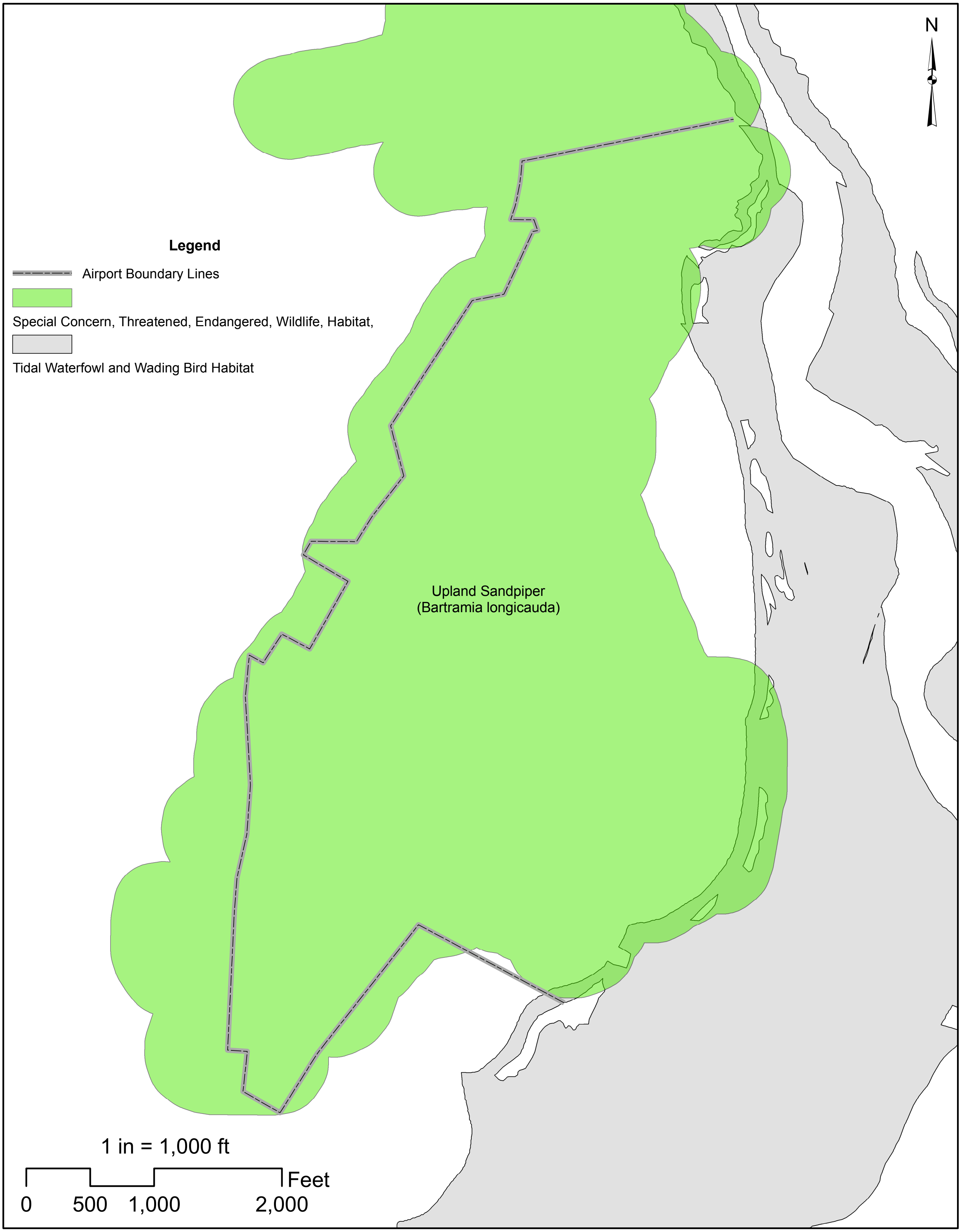
Maine
Area of detail
Data from USFWS, MDIFW & MNAP.
Date map made; file name; map maker.

Maine Department of Inland Fisheries and Wildlife - Known Occurances Map
Hancock County-Bar Harbor Airport

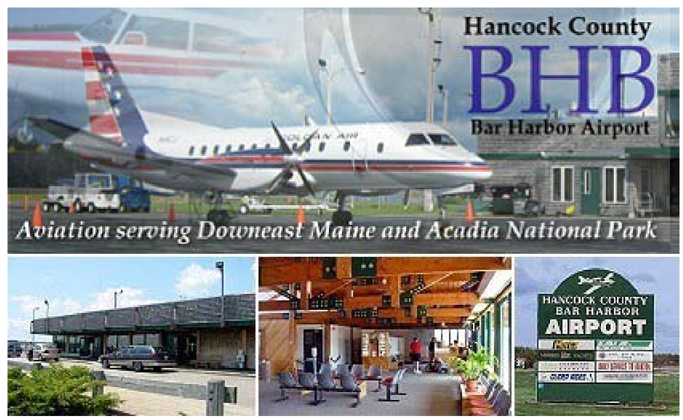


Appendix B

Business Plan

Business Plan

INTRODUCTION



The purpose of this *Business Plan* for the Hancock County - Bar Harbor Airport (BHB) is to provide an analysis of the current airport functions, revenue streams, and operating expenditures. Projections for two separate financial scenarios are then presented. Combined, these support the recommendations to preserve the self sufficiency of the airport while at the same time maintaining compliance with the applicable regulations and County goals.

Core Transportation Services

The airport provides a number of different aviation, ground, and to a lesser extent, marine transportation services. These include:

- Scheduled Commercial Passenger Flights
- Corporate/Business General Aviation
- Private General Aviation
- Flight Training
- Sightseeing Tours and Unique Flight Experiences
- Rental Cars
- Local Bus Service (seasonal)
- Automobile Parking
- Seaplane/Boat Ramp
- Boat Mooring and Storage

A number of projects continue to be planned by the County to preserve and enhance the airport facilities. The current 20-year program outlined in Chapter 6 does not include the improvements to private facilities and services also made on a regular basis by the companies operating different businesses at the airport. Throughout this analysis, different recommendations and initiatives are described with the primary intent on improving the current transportation services offered and to maintain the self sufficiency of the airport finances. A summary table of those recommendations and initiatives are provided at the conclusion of this analysis.

Organization and Management

BHB is owned and operated by Hancock County as an independent department. As such, a key financial goal is to maximize the potential revenue generation in order to cover the operating costs and match the necessary grants required for facility preservation and development. As required by the Federal Aviation Administration (FAA) and Maine Department of Transportation (MaineDOT), the County keeps the accounts for the airport separate from the general ledger.

Airport Leases

Key elements of the existing airport leases were evaluated with respect to industry standards and the applicable requirements. Even though Hancock County owns and controls the airport property, there are certain obligations which must be incorporated in each lease, including the airport's own minimum standards. A majority of these requirements come from the assurances that the County makes with both FAA and MaineDOT when accepting development grants. While the obligations between the two agencies vary, the key elements directly related to leasing airport land include:

- ✈ The Sponsor (Hancock County) must maintain a fee and rental structure to make the airport as self-sustaining as possible.
- ✈ Rental rates for non-aeronautical use must be based on fair market value.
- ✈ Revenues generated by the airport can only be used for the airport.
- ✈ The Sponsor cannot discriminate or deny use of airport facilities.
- ✈ The assurances associated with each grant are effective for 20 years after the last grant has been executed.[1]
- ✈ Assurances involving Federal surplus property land grants have no term limits.

[1] Some typical FAA assurances that guide the Airport on business practices include, but are not limited to assurance 13; accounting system, audit, and record keeping requirements, 22; economic non-discrimination, 23; exclusive rights, 25; airport revenues, 35; relocation and real property acquisition, 38; hangar construction, and 39, competitive access.

Airport leases either involve improvements that are owned by the airport (such as the terminal building) and then rented, or the airport simply provides a ground lease with the tenant developing their own facilities. In either case, the airport leases may need to provide revenue generation from several different separately recognized sources, especially depending on how it relates to the applicable minimum standards. The following are major revenue components identified during the review of the current airport lease terms:

- ✈ Land Leasing Fees: Land is an airport's major resource and Hancock County should be compensated for its use. Airport land should be leased, not sold, and at rates comparable to similar commercial/aviation rates or fair market value for non-aeronautical use.

- ✈ Terminal Building Rent: The County should be adequately compensated by users who rent or lease space in the airport owned terminal building.

- ✈ Percent of Gross Fee: This fee structure is based upon the fact that the airport's existence creates the market on which a fixed base operator (FBO) or commercial operator depends. The County should be compensated for the expense of maintaining the airport and creating that market opportunity.

- ✈ Other Fees: These are charges to direct users of the airport. Two primary examples include the monthly rates for based aircraft parking and annual fee for advertisement on the airport entrance sign.

Review of the existing leases showed that most were in compliance with the current fee structure. One aeronautical lease and one non-aeronautical lease were below the current fee structure, but in both cases, these were much older airport leases. And another lease only called for a lump sum annual payment. It should be noted that such a lease does not clearly identify what the lessee is paying for and makes it more difficult to alter the lease if conditions change in such a way as would warrant an adjustment in lease terms. This business plan provides recommendations relevant to the Airport's leases on page 23.

Airport Minimum Standards

In 1996, the airport's *Minimum Standards for the Conduct of Aeronautical Activity* was updated and amended again in 2010. This document was reviewed as it relates to the various requirements for FBOs, commercial operations, private facilities, or clubs operating at the airport. The current standards provide an adequate framework to ensure that all leases, contracts, or agreements by entities operating at BHB are in the airport's best interest. The minimums outline fair, equitable, and non-discriminatory requirements to not only facilitate the various activity at the airport, but also to ensure compliance with the applicable state and federal regulations. It appears that all existing leases with the airport are in compliance with the appropriate minimum standards.

FINANCIAL ANALYSIS

The following sections provide a description of the current revenue sources and expense categories for the airport. These are then projected through the year 2016 using information obtained from interviews with airport management, the historic financial data, existing lease information, current industry issues, and the overall economic conditions. In order to generate the two future scenarios presented, some assumptions regarding revenues and expenditures were made with each described as they were applied.

Historic Airport Revenues

Airports generate revenue through a variety of aeronautical users (commercial and general aviation aircraft operators) and non-aeronautical sources such as leases or services from tenants who are at the airport, but not directly involved in aviation activity. Some revenues, such as percent of gross fees are directly related to the amount of aviation activity, products, or services rendered at an airport facility, while others, such as rents, are less so.

Per Federal regulations, any revenues generated from airport land and facilities must remain in an airport's account to be used to offset airport expenses. Hancock County has a dedicated fund, into and from which airport revenues and expenses are deposited and withdrawn. This accounting practice ensures the airport's revenues are specifically used for airport operations and capital improvements. It also allows greater accuracy when tracking the airport's overall finances.

Airport revenues at BHB divided into three general categories: operating, non-operating, and non-aeronautical. Overall there are 16 revenue subcategories, five of which have had no activity for a number of years. This includes the line item for County Operating Subsidy, which the airport has not required as it is a financially self sufficient facility. The remaining 11 subcategories or revenue accounts have been evaluated for this analysis and are listed in **Table 1** for the past three fiscal years.

Table 1
Historic Airport Revenues

Operating Revenues	FY 2008	FY 2009	FY 2010	Average Annual Growth 08-10
Aeronautical Land Leases & Rents	17,742	23,159	20,355	1.07
Tie-down Fees	5,870	2,231	2,459	0.65
% of Gross Fees	162,749	113,954	135,515	0.91
Airline	124,616	371,782	351,896	1.68
Other (TSA Reimbursements)	98,346	94,601	94,477	0.98
Total Operating Revenues	**$409,323**	**$605,727**	**$604,702**	
Non-Operating Revenues				
Airport Interest	14,801	12,295	9,598	0.81
Excise Tax	2,512	2,708	2,688	1.03
Total Non-Operating Revenues	**$17,313**	**$15,003**	**$12,286**	
Non-Aeronautical Revenues				
Rental Cars	110,784	114,228	124,719	1.06
Non-aeronautical land leases	20,035	24,002	21,375	1.03
Concessions (vending machines)	3,367	2,634	592	0.42
Other (Misc, Boat Ramp, etc.)	52	6,817	5,597	10.37
Total Non-Aeronautical Revenues	**$134,238**	**$147,681**	**$152,283**	
Total Revenues	***$560,874***	***$768,411***	***$769,271***	

Source: Airport Management

Even though total revenues have increased each year, there is significant variation in the individual revenue accounts as shown in the average annual growth for each. It is also interesting to note the significant increase after FY 2008 due primarily to changes in the airline agreement under the Essential Air Service program and to a lesser extent, the larger aircraft used at BHB by Colgan Air in 2009. Information on the individual revenue accounts will be included as part of the different revenue projection scenarios.

Historic Airport Expenditures

BHB's current accounting system includes 28 different categories for operating expenditures. Most are associated with conducting the day-to-day operations of the airport such as staff salaries, utilities, insurance, and supplies. As such, these do not vary significantly with the level of aviation activity. There are also a number of capital expenditures associated with the upkeep of airport facilities, vehicles, and equipment.

This includes line items for airfield maintenance, runway crack sealing, pavement marking, and small capital costs to support the overall capital improvement program.

Three of the categories were eliminated from this analysis since there have been no entries over the past three years. These include the line items for fringe benefits, water/sewer, and crack sealing. The remaining 25 expenditure categories are listed in **Table 2** for the past three fiscal years.

Table 2
Historic Airport Expenditures

Operating Expenditures	FY 2008	FY 2009	FY 2010	Average Annual Growth 08-10
Salaries	156,127	156,000	221,568	1.19
Employee Costs	62,909	63,000	74,706	1.09
Overtime	411	411	8,584	4.57
Advertising	2,358	4,596	4,969	1.45
Telephone & Internet	3,239	2,322	2,139	0.81
Insurance	4,812	6,312	13,097	1.65
Legal Fees	200	400	380	1.38
Professional Services	2,206	1,961	1,624	0.86
Lights and Power	28,231	28,009	24,740	0.94
Building Maintenance	2,057	1,844	166	0.28
Building Heat	8,029	7,123	8,972	1.06
Vehicle Maintenance	284	1,332	5,670	4.47
Airfield Maintenance	995	1,607	1,175	1.09
Pavement Marking	0	0	520	
Dues and Memberships	750	675	610	0.90
Travel	969	667	1,191	1.11
Office Supplies	1,005	1,279	1,344	1.16
Operating Supplies	11,872	16,938	15,377	1.14
Oil and Gasoline	16,241	11,353	11,394	0.84
Small Capital Costs	0	0	9,873	
Other - HVAC	4,432	603	418	0.31
Other - County Fee	15,000	15,000	15,000	1.00
Other - Training	10,246	10,134	9,484	0.96
Other - Donations	1,500	1,500	1,500	1.00
Other - Security	99,747	101,101	101,455	1.01
Total Expenditures	**$433,620**	**$434,167**	**$535,956**	

Source: Airport Management

Total airport operating expenditures have increased then decreased over the past three years. The increase after FY 2008 is due to the additional salaries, airfield preservation, and other capital improvements in FY 2009. The additional salaries were related to staff changes required as part of the new Airport Rescue and Fire Fighting (ARFF) facility that opened at the end of the fiscal year. The decrease in FY 2010 was due primarily to the decrease in costs associated with airfield preservation and other capital improvements that year. As with airport revenues, there is significant variation among the individual categories as illustrated by the average annual growth and additional information will be included with the projection scenarios.

Airport Financial Scenarios

Two different scenarios were generated in order to project the most likely financial situations for BHB over the next five years. The first assumes that the current scheduled commercial passenger service will continue while the second considers the discontinuing of passenger airline service, making the airport a purely general aviation facility. Both scenarios illustrate the need to enhance existing revenue streams and create new ones that diversify the airport's overall financial sources.

It should also be noted that a number of the projections were based on the average inflation rate over the past 10 years. This figure, 2.4 percent, was obtained from analyses based on the historic consumer price index from the U.S. Bureau of Labor Statistics between 2001 and 2010.

<u>Scenario 1 – Existing Scheduled Commercial Passenger Service Continues</u>

Scenario 1 is considered the likely or base case for the airport's financial future. As such, it essentially pairs the historic revenue and expenditures with the Aviation Activity Forecasts of Chapter 2, the aviation industry as a whole, and the overall economy. This scenario is also grounded in the fact that BHB serves the entire Hancock County area and is one of the significant gateways to the Downeast/Acadia region. As both a commercial and full service general aviation facility, the airport provides numerous area transportation functions which facilitate the tourist industry as well as the operation of area businesses.

Revenue Projections

The following summarizes how the 11 revenue accounts were projected to increase through 2016 for Scenario 1 with the results for each shown in **Table 3**.

- ✈ <u>Aeronautical Land Leases and Rents</u> were projected based on the existing aeronautical land leases, which with the exception of two, all go beyond 2016.

For the two that expire in the next couple of years, it was assumed that they would be renegotiated at the airport's current rates and charges. In addition, two new leases were added, one in 2012 and one in 2014, to account for the future based aircraft expected to be stored in private hangars by 2016.

- Tie-down Fees have historically been quite variable. As such, the average annual growth for based aircraft (1.5 percent) was applied. While not all new based aircraft will require a tie-down as noted in the hangar assumption above, this growth helps account for some of the seasonal activity of those not basing their aircraft at BHB year round.

- Percent of Gross Fees primarily represents the revenue streams from the single full service FBO and other general aviation businesses at the airport. Under the current accounting system, this item combines the various land leases or rent with the actual percent of gross fee collected by the businesses per the airport fee structure. As shown in **Table 1**, between FY 2008 and FY 2009 this figure decreased 30 percent and then increased 19 percent in FY 2010. Therefore, this revenue account was projected to increase at the average inflation rate over the past 10 years.

- Airline revenue reflects the rent and fees collected for the scheduled commercial passenger service. As noted before, the significant increase after FY 2008 is primarily due to changes in the airline contract, which is updated every two years under the Essential Air Service program. Future airline revenue has been projected to increase at the same rate that the airport's passenger enplanements were forecasted to grow over the same period. This results in an average annual growth of 3.0 percent through 2016.

- Other (TSA Reimbursements), as the line item name suggests, shows the dollar amount reimbursed to the airport from the Department of Homeland Security. This amount, which is tied to the level of passenger activity, shows what the airport receives for the space and use of facilities by the Transportation Security Administration. The future amount has been projected to grow at the same rate as the passenger enplanement forecast for the same period.

- Airport Interest and Excise Tax are the only two non-operating revenue accounts. For the purposes of this analysis, these revenues were combined and then their average over the past three years projected out using the average inflation rate over the past 10 years.

- Rental Cars are the largest non-aeronautical revenues collected and have had an average annual growth of 6 percent over the past three years. This growth is projected to continue, which accounts for the expected growth in the commercial passengers, who are the primary users, but not the only customers of the rental car companies.

- Non-Aeronautical Land Leases reflect those tenants of the airport that do not have any tie to aviation or the airfield system. Currently there is only one non-aeronautical lease which runs through 2026. Therefore, since no other such arrangements are currently being considered (this will be addressed in a later section) the projection shown for this revenue account is simply based on the rate schedule through 2016 for the one current lease.

- Concessions (signage, etc.) can represent a number of sources of revenue from such items as advertisement, vending machines, or kiosks, in the passenger terminal as well as taxi cab fees and advertisers on the airport entrance sign. Because the number or type of concession agreements can vary significantly, the average revenue over the past three years was simply projected using the average inflation rate over the past 10 years.

- Other (Miscellaneous, Boat Ramp, etc.) non-aeronautical fees have primarily been related to the airport's ability to provide some services to boat operators. Over the past couple of years this has included fees from the temporary storage of boats either on land or shoreline adjacent to the seaplane ramp facility. Because these fees did not exist prior to FY 2009, only the average revenue from the past two years was projected using the average inflation rate over the past 10 years.

Table 3
Projected Revenues Scenario 1

Operating Revenues	2011	2012	2013	2014	2015	2016
Aeronautical Land Leases & Rents	21,600	22,900	24,300	25,700	27,300	28,900
Tie-down Fees	2,500	2,600	2,600	2,700	2,700	2,700
% of Gross Fees	38,800	42,100	145,600	149,100	152,600	156,300
Airline	362,500	373,400	384,600	396,100	408,000	420,200
Other (TSA Reimbursements)	97,400	100,300	103,300	106,400	109,600	112,900
Total Operating Revenues	**$622,800**	**$641,300**	**$660,400**	**$680,000**	**$700,200**	**$721,000**
Non-Operating Revenues						
Airport Interest	Non-Operating Revenues combined and then projected.					
Excise Tax						
Total Non-Operating Revenues	**$14,900**	**$15,300**	**$15,600**	**$16,000**	**$16,400**	**$16,800**
Non-Aeronautical Revenues						
Rental Cars	132,300	140,200	148,600	157,500	167,000	177,000
Non-aeronautical land leases	21,900	22,300	22,700	23,200	23,600	24,100
Concessions (signage etc.)	2,200	2,300	2,400	2,400	2,500	2,500
Other (Misc, Boat Ramp, etc.)	6,300	6,400	6,600	6,700	6,900	7,000
Total Non-Aeronautical Revenues	**$162,700**	**$171,200**	**$180,300**	**$189,800**	**$200,000**	**$210,600**
Total Revenues	**$800,400**	**$827,800**	**$856,300**	**$885,800**	**$916,600**	**$948,400**

Source: Airport Management and Hoyle, Tanner & Associates

Based on the descriptions of the revenue accounts above, total revenues are projected to grow at an average annual rate of 3.6 percent from the base year of FY 2010 through 2016.

Expenditure Projections

The following summarizes how the 25 expenditure categories were projected through 2016 for Scenario 1 with the results shown in **Table 4**.

- Salaries, Employee Costs, and Overtime were considered altogether for each historic year. When combined, the average annual growth from FY 2008 to FY 2010 was 18 percent. However, as noted previously, this includes the additional salaries in FY 2009 for the staff changes required as part of the new ARFF facility that opened that year. Since no additional staff increases are expected, these three expenditures were projected to increase at an average annual rate of 5 percent through 2016.

- ✈ Advertising for the airport nearly doubled after FY 2008 and then grew more than 8 percent from FY 2009 to FY 2010. Airport management indicated that the budget for advertising was going to be increased by $1,000 to $2,000 per year up to $15,000. A median value of $1,500 was therefore added to each year's advertising budget.

- ✈ Telephone and Internet; Lights and Power; Dues and Memberships; and Other – Training all decreased slightly over the past three years. To ensure a conservative projection, the annual expenditures for each were averaged and then projected to increase at the average inflation rate over the past 10 years.

- ✈ Insurance expenditures have increased significantly between FY 2008 and FY 2010. In fact the average annual increase was 65 percent. While increases are likely in the future, they are not expected to be at the same rate. Therefore, the FY 2010 was projected to increase 5 percent annually, which is slightly more than double the average inflation rate over the past 10 years.

- ✈ Legal Fees have fluctuated up and down in the past. While not a large expenditure each year, the future projection was based on taking the three year average and projecting it out at the average inflation rate over the past 10 years.

- ✈ Professional Services have decreased over 14 percent each year between FY 2008 and FY 2010. Because this category covers a number of services that the airport will require in the future, the highest level (FY 2008) was selected as a base budget figure and then projected to increase at the average inflation rate over the past 10 years.

- ✈ Building Maintenance in FY 2010 was insignificant while the previous years much higher. Therefore, the average of FY 2008 and FY 2009 were utilized to set a base budget figure and then projected to increase at the average inflation rate over the past 10 years.

- ✈ Building Heat, Office Supplies, and Operating Supplies have all experienced reasonable increases over the historic period. Therefore, these three expenditure categories were all projected at their historic growth rates through 2016.

- Vehicle Maintenance and Travel both increased over the past couple of years, albeit at different levels. The increases in vehicle maintenance were significant in FY 2010 over the previous years primarily due to the ARFF vehicles, snow removal equipment, and other vehicles owned by the airport. In both categories, the FY 2010 rate was increased through 2016 at the average inflation rate over the past 10 years.

- Airfield Maintenance costs have averaged just below $1,300 for the past three years. Since this is a very important and recurring element of the airport expenditures, a budget of $2,000 was set for FY 2010 and then increased at 10 percent annually through 2016.

- Pavement Marking and Small Capital Costs have varied over the past years, with a significant peak for both in FY 2009. As with airfield maintenance, these expenditure categories are very critical to the preservation and future improvement of the airport. Therefore, in order to create a conservative budget and to ensure that future capital improvement projects can be accomplished, the average of the past two years for these categories was combined. This results in a total $40,000 annual budget for both expenditure categories, which was then increased annually at 10 percent. This figure accounts for the $30,000 projected to be spent every three years in the Capital Improvement Plan for recurring pavement preservation projects.

- Oil and Gasoline costs for the airport have actually declined over the past three years. However, given the current airport vehicle fleet, future needs, and rising fuel costs, the historic decline is not expected to continue. For this analysis the average over the past three years was calculated and then projected with a 10 percent annual increase.

- Other – HVAC costs were reduced significantly between FY 2008 and FY 2009. However, since there are still some annual expenditures in this category, the average of the past two years was simply averaged and then projected to increase through 2016 at the average inflation rate over the past 10 years.

- Other – County Fee and Other – Donations are costs that have not varied in the recent past. Therefore, both of these categories were considered fixed costs in this analysis.

- Other – Security has only increased slightly (less than one percent annually) over the past three years. Regardless, this is a significant portion of the overall annual expenditures and primarily related to the commercial passenger activity at the airport. Therefore, the FY 2010 amount was projected using the forecasted growth in annual passenger enplanements for BHB.

Table 4
Projected Expenditures Scenario 1

Operating Expenditures	2011	2012	2013	2014	2015	2016
Salaries	232,700	244,300	256,500	269,400	282,800	297,000
Employee Costs	78,500	82,400	86,500	90,900	95,400	100,200
Overtime	9,100	9,500	10,000	10,500	11,000	11,600
Advertising	4,800	6,300	7,800	9,300	10,800	12,300
Telephone & Internet	2,600	2,700	2,700	2,800	2,900	2,900
Insurance	13,800	14,500	15,200	16,000	16,800	17,600
Legal Fees	400	400	400	400	400	400
Professional Services	2,300	2,400	2,400	2,500	2,500	2,600
Lights and Power	27,000	27,700	28,400	29,000	29,700	30,400
Building Maintenance	2,000	2,000	2,100	2,100	2,200	2,200
Building Heat	9,600	10,100	10,700	11,400	12,100	12,800
Vehicle Maintenance	5,900	6,000	6,100	6,300	6,400	6,600
Airfield Maintenance	2,000	2,200	2,500	2,700	3,000	3,300
Pavement Marking	0	0	0	0	0	0
Dues and Memberships	700	700	800	800	800	800
Travel	1,300	1,300	1,300	1,400	1,400	1,400
Office Supplies	1,600	1,800	2,100	2,500	2,800	3,300
Operating Supplies	17,600	20,000	22,700	25,800	29,400	33,500
Oil and Gasoline	13,000	14,300	15,800	17,300	19,100	21,000
Small Capital Costs	40,000	44,000	48,400	53,300	58,600	64,500
Other - HVAC	600	600	600	600	600	600
Other - County Fee	15,000	15,000	15,000	15,000	15,000	15,000
Other - Training	10,000	10,200	10,500	10,700	11,000	11,300
Other - Donations	1,500	1,500	1,500	1,500	1,500	1,500
Other - Security	104,500	107,700	110,900	114,200	117,700	121,200
Total Expenditures	***$596,500***	***$627,600***	***$660,900***	***$696,400***	***$733,900***	***$774,000***

Source: Airport Management and Hoyle, Tanner & Associates

Based on the descriptions of the categories above, total expenditures for the airport are projected to grow at an average annual rate of 6.2 percent from the base year of FY 2010 through 2016.

Scenario 2 – Scheduled Commercial Passenger Service Discontinued

Scenario 2 explores how the financial structure of the airport would change if the current scheduled commercial passenger service was discontinued. Even as a critical transportation link for the region's tourist and business travelers, the potential for such a scenario has always existed to some extent. However, this scenario needs to be given more consideration as members of both the U.S. Congress and Senate have called for the elimination of the Essential Air Service program in recent legislation attempting to reduce federal spending.

The current Essential Air Service contract for the scheduled commercial passenger service at BHB runs through October 31, 2012. Therefore, under this scenario, both revenues and expenditures are expected to remain the same through 2012 as described in Scenario 1. Significant changes would however result after 2012 as the airport would be an entirely general aviation facility in 2013 under this setting.

Revenue Projections

Three of the 11 revenue accounts would change significantly between 2013 and 2016 under Scenario 2 as described below. The other eight would remain the same as previously described. The revenue projections for Scenario 2 are shown in **Table 5**.

- <u>Airline</u> revenue reflects the rent and fees collected for the scheduled commercial passenger service. If the Essential Air Service program is cancelled then this significant revenue stream for the airport would simply go away after the current contract expires in 2012.

- <u>Other (TSA Reimbursements)</u> is tied to the level of passenger activity. Therefore, if the scheduled commercial passenger operations cease operations, this reimbursement or revenue stream would also go away after 2012.

- <u>Rental Cars</u> at the airport are primarily used by the commercial passengers arriving by scheduled airline service. However, a portion of the rental car demand is generated from both private and corporate/business general aviation operations, especially during the summer seasonal peaks. Currently one of the two rental car companies operates year round while the other is only for half of the year. If the scheduled commercial passenger service stopped, it is assumed that two thirds of the rental business would also go away. Therefore, for Scenario 2 is it is projected that in 2013 only one rental car company would operate on a six month schedule. This reduced level is still projected to increase at the historic annual growth.

Table 5
Projected Revenues Scenario 2 – Without Scheduled Service

Operating Revenues	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Aeronautical Land Leases & Rents	21,600	22,900	24,300	25,700	27,300	28,900
Tie-down Fees	2,500	2,600	2,600	2,700	2,700	2,700
% of Gross Fees	138,800	142,100	145,600	149,100	152,600	156,300
Airline	362,500	373,400	0	0	0	0
Other (TSA Reimbursements)	97,400	100,300	0	0	0	0
Total Operating Revenues	**$622,800**	**$641,300**	**$172,500**	**$177,500**	**$182,600**	**$187,900**
Non-Operating Revenues						
Airport Interest	Non-Operating Revenues combined and then projected.					
Excise Tax						
Total Non-Operating Revenues	**$14,900**	**$15,300**	**$15,600**	**$16,000**	**$16,400**	**$16,800**
Non-Aeronautical Revenues						
Rental Cars	132,300	140,200	49,100	52,000	55,100	58,400
Non-aeronautical land leases	21,900	22,300	22,700	23,200	23,600	24,100
Concessions (signage etc.)	2,200	2,300	2,400	2,400	2,500	2,500
Other (Misc, Boat Ramp, etc.)	6,300	6,400	6,600	6,700	6,900	7,000
Total Non-Aeronautical Revenues	**$162,700**	**$171,200**	**$80,800**	**$84,300**	**$88,100**	**$92,000**
Total Revenues	***$800,400***	***$827,800***	***$268,900***	***$277,800***	***$287,100***	***$296,700***

Source: Airport Management and Hoyle, Tanner & Associates

While only three of the 11 revenue accounts would be impacted under Scenario 2, these represent three of the top four revenue sources for the airport. As such, the potential revenue losses under Scenario 2 are nearly 70 percent of those projected in Scenario 1 for the same years between 2013 and 2016.

Expenditure Projections

Of the 25 expenditure categories projected through 2016, a number would realize sizeable decreases under Scenario 2. Others such as utilities, services, and maintenance would also likely decrease, but to a lesser extent. In essence the loss of scheduled commercial passenger service at BHB would impact nearly every category of expenses. However, for the purposes of this analysis, only the major cost elements are addressed. The general influences on these expenditures from 2013 on are described below, while all categories are shown in **Table 6**.

- Salaries, Employee Costs, and Overtime were all considered together under Scenario 2 as in the previous scenario. However, it is assumed that if airline service is lost, the need and expense for both ARFF services and Federal Aviation Regulation (FAR) Part 139 certification would dissolve. Therefore, it is assumed that each of these three expenditures would decrease in 2013 to a third of the levels projected for 2012.

- Insurance; Vehicle Maintenance; Operating Supplies; Oil and Gasoline; and Other – Security would also decrease in the absence of commercial passenger service. These would primarily be the result of loosing the ARFF services and the need to maintain FAR Part 139 certification. As with the employee costs, it is assumed that these expenditures would decrease by two thirds after 2012.

- Other – Training is predominantly related to the need for recurrent training and/or certification of the ARFF staff. Under Scenario 2 it is assumed that all of these expenses would not be required after 2012.

Table 6
Projected Expenditures Scenario 2 – Without Scheduled Service

Operating Expenditures	2011	2012	2013	2014	2015	2016
Salaries	232,700	244,300	84,700	88,900	93,400	98,000
Employee Costs	78,500	82,400	28,600	30,000	31,500	33,100
Overtime	9,100	9,500	3,300	3,500	3,700	3,800
Advertising	4,800	6,300	7,800	9,300	10,800	12,300
Telephone & Internet	2,600	2,700	2,700	2,800	2,900	2,900
Insurance	13,800	14,500	5,100	5,300	5,600	5,800
Legal Fees	400	400	400	400	400	400
Professional Services	2,300	2,400	2,400	2,500	2,500	2,600
Lights and Power	27,000	27,700	28,400	29,000	29,700	30,400
Building Maintenance	2,000	2,000	2,100	2,100	2,200	2,200
Building Heat	9,600	10,100	10,700	11,400	12,100	12,800
Vehicle Maintenance	5,900	6,000	2,100	2,100	2,200	2,200
Airfield Maintenance	2,000	2,200	2,500	2,700	3,000	3,300
Pavement Marking	0	0	0	0	0	0
Dues and Memberships	700	700	800	800	800	800
Travel	1,300	1,300	1,300	1,400	1,400	1,400
Office Supplies	1,600	1,800	2,100	2,500	2,800	3,300
Operating Supplies	17,600	20,000	7,500	8,600	9,700	11,100
Oil and Gasoline	13,000	14,300	5,200	5,800	6,300	7,000
Small Capital Costs	40,000	44,000	48,400	53,300	58,600	64,500
Other - HVAC	600	600	600	600	600	600
Other - County Fee	15,000	15,000	15,000	15,000	15,000	15,000
Other - Training	10,000	10,200	0	0	0	0
Other - Donations	1,500	1,500	1,500	1,500	1,500	1,500
Other - Security	104,500	107,700	36,600	37,700	38,900	40,000
Total Expenditures	**$596,500**	**$627,600**	**$299,800**	**$317,200**	**$335,600**	**$355,000**

Source: Airport Management and Hoyle, Tanner & Associates

Based on the above, total expenditures for the airport are projected to be 55 percent less than the same expenditures projected for Scenario 1 for the years 2013 through 2016. However, it should be noted that the circumstance described above are somewhat illustrative in nature. For example, if the airport were to lose airline service at the end of the current Essential Air Service contract, it may be decided at that time to keep the ARFF services and FAR Part 139 certification current. Such a decision might be made to enable the airport to attract some other level of commercial passenger service and would likely be based on the actual finances at that time.

Cash Flow Analysis

Table 7 presents the historic annual cash flow for BHB as well as the projected cash flow for both Scenarios 1 and 2. As shown, the airport has historically had a positive cash flow with an average surplus just over $170,000 for the past three years. The expected cash flow under Scenario 1 is also positive with an average surplus just over $190,000 per year. This again is considered the likely scenario, where the airport continues to have scheduled commercial passenger service with an annual passenger enplanement growth of 3.0 percent.

Conversely, cash flow in Scenario 2 is expected to go negative immediately after regular airline service is lost. While the assumptions under this scenario incorporate significant cuts in expenditures, the general analysis could not support a situation where the airport would still come out positive. Even with the cuts to ARFF services and the FAR Part 139 certification, the fact remains that a number of airport facilities and services will still need to be maintained. The result is an average loss of $40,000 per year from 2013 to 2016.

Table 7
Cash Flow Analysis

Financial Scenario 1	**FY 2008**	**FY 2009**	**FY 2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Total Revenues	560,874	768,411	769,271	800,400	827,800	856,300	885,800	916,600	948,400
Total Expenditures	433,620	613,456	535,956	596,500	627,600	660,900	696,400	733,900	774,000
Scenario 1 Balance	**$127,254**	**$154,955**	**$233,315**	**$203,900**	**$200,200**	**$195,400**	**$189,400**	**$182,700**	**$174,400**
Financial Scenario 2									
Total Revenues				800,400	827,800	268,900	277,800	287,100	296,700
Total Expenditures				596,500	627,600	299,800	317,200	335,600	355,000
Scenario 2 Balance				**$203,900**	**$200,200**	**$(30,900)**	**$(39,400)**	**$(48,500)**	**$(58,300)**

Source: Airport Management and Hoyle, Tanner & Associates

Since an airport cannot allow its cash flow to go negative, the airport would have to consider ways to lower expenditures even further, explore the potential for a subsidy from the County, and/or generate additional revenue. The airport would lose the $1 million dollar yearly level of capital improvements that the FAA currently provides as primary entitlement for airports with scheduled service and at least 10,000 enplanements annually. If funded as shown in Chapter 6, the short-term Capital Improvement Plan would require the following matching local shares from the airport for the years listed below:

2011	$13,750
2012	$41,250
2013	$67,125
2014	$0
2015	$43,000
2016	$88,750

REVENUE ENHANCEMENT OPPORTUNITIES

A number of potential revenue enhancing options are described below. While most apply to the airport today and under Scenario 1 where scheduled commercial service continues, a few only apply if the airport were to become a purely general aviation only facility. Those that are only considered applicable if BHB were to become a general aviation airport are specifically called out. It should be noted that there is no particular order of preference for the recommendations made.

Leasing Available Airport Land for Non-Aeronautical Purposes

Land is an airport's major resource with tenants compensating the facility for its use. There are two primary areas on the south side of the airport property that are suited for non-aeronautical development. The largest is located south of both Caruso Drive and Ramp Road while the other is just north of Ramp Road and Morris Yachts. Both of these are depicted on the Airport Layout Plan (ALP). There is also potential along Maine State Route 3 for a few, small non-aeronautical parcels to be developed.

Any non-aeronautical use of airport property will require FAA approval in order for the airport to remain in compliance with the various grant obligations and assurances. According to the current guidelines, five years is considered temporary, but for the purposes of attracting a business to rent land and construct their own facility, at least a 20-year lease term is required by most lending institutions for project finances. Therefore, non-aeronautical can only be considered in areas that have been clearly demonstrated as not required for aviation related development and properly depicted on the ALP.

Along those lines, it must also be properly communicated to the FAA that the intent of any non-aeronautical use would be for the sole purpose of protecting the airport's ability to be financially self-sufficient. Given the airport's financial dependence on the Essential Air Service program, the FAA must give fair consideration to support any revenue generating opportunity, aviation related or not. Of course this does not relieve the airport of its responsibility to ensure all applicable requirements, especially those related to obtaining fair market value, are met for any use of airport land. Any lease with more than a five year term should also have an escalation clause tied to an established economic index and be escalated at least every five years to comply with FAA requirements.

Wastewater Treatment Facility

A portion of the larger non-aeronautical area south of Caruso Drive and Ramp Road is being considered for the construction of a wastewater treatment facility. The benefits of such a facility on-airport property would be very significant in its ability to free up areas for aviation related development as well as for revenue potential. Currently all of the airport facilities utilize a number of septic systems around the airport. The drain field areas associated with these systems cannot be developed and most of them are in areas immediately adjacent to the airfield facilities. The ability to eliminate the drain field areas would open up land that would be able to support future aviation related facilities. This is especially true for the larger area just south of Taxiway A and the new ARFF facility.

Depending on the ultimate processing capacity for the wastewater treatment facility, it is likely that revenue could also be generated by making the facility available to off-airport users. In the simplest form, this might include the ability to charge a fee for septic system pump trucks to bring their wastewater to the airport facility for processing. Eventually it may even have the potential for facilities neighboring the airport to tie into the system. For example, this might include the campground located just south of airport property or other uses in the surrounding area.

Boat Mooring and Storage

Given the current seaplane ramp, paved automobile parking area, and available frontage along the Jordan River, the airport is in a unique position to generate additional revenue from different boat operators. Over the past couple of years, the airport has provided limited boat mooring and storage space for a fee. While the actual demand is not known, the potential exists for this to become a more significant source of revenue for the airport year round.

The expanded use of the seaplane ramp and any mooring along the shore may ultimately require special permits and/or the addition of facilities such as dock or other landside facilities between the automobile parking and shoreline. As with the other non-aeronautical uses, the ability to offer on-airport boat storage will require the proper planning and coordination with the FAA for acceptance. The non-aeronautical use just north of Ramp Road and Morris Yachts has been considered for boat storage or some other marine related use on the ALP. Advantages to expanding on-airport boat storage is that these uses do not take up a lot of space, can be for very short terms, and do not require any significant facilities.

Expansion of Passenger Terminal Building

Plans to expand the terminal building are necessary to properly accommodate passengers, airline, TSA, and rental car company space requirements in the future, as well as to improve the level of customer service. However, it will also create the ability for the airport to enhance different revenue streams from the facility. Outside of the facility leases or reimbursements for the current tenants, an expanded facility creates the opportunity to provide more concession, advertisement, or commercial business space. Depending on the ultimate building configuration, it may be possible to add non-aeronautical revenue streams from a number of passenger amenities such as sundries/gift shops, coffee stand, snack bar/café, or even a small restaurant. It should be noted that additional landside signage should be included for any improvements as it has been reported by airline management and others that many people, including locals, are not fully aware of the airport's presence or its services.

Create an Airport Destination

The airport has applied for a grant from the National Scenic Byways Program to leverage the scenic, historic, and recreational potential of the airport facilities. This would be done by creating two interpretive areas for visitors arriving by air, land, or water to learn about the adjacent Acadia All American Road, the scenic views from, and the historical use of airport facilities. These two areas would include outdoor kiosks and other enhancements at the passenger terminal building and seaplane ramp.

Currently the passenger terminal has excellent automobile parking and as described in the terminal expansion section, the potential to create new passenger and visitor amenities such as shops or food services. However, the seaplane ramp would be most improved under the grant. Overall the seaplane ramp area is in excellent condition;

however, improvements to the surrounding area include landscaping, better organized automobile parking, removal of debris, the addition of picnic tables, benches, interpretive and way finding signs. Themes for the improvements will center on the natural eco-system of the Mount Desert Island Narrows and history of the facilities, as well as enhancing recreational use of the facilities by boaters and the general public.

Such improvements to the seaplane ramp area would enhance the potential to develop non-aeronautical uses in the area shown on the ALP just north of Ramp Road. While boat storage in this area was mentioned previously, another possibility is to expand on the seaplane improvements to make this area a more significant destination for the general public, meeters/greeters, and passengers alike. Given the spectacular views overlooking the Mount Desert Island Narrows, Frenchman Bay, and mountains in the background, this area could be an excellent location for a restaurant. This site would allow such a facility to create an upper seating area or observation deck with views of the surrounding airfield and scenic byways. Again it should be noted that additional landside signage should be included for any improvements as it has been reported by airline management and others that many people, including locals, are not fully aware of the airport's presence or its services.

Expand Itinerant Aircraft Parking Apron

The ALP shows a future expansion of the itinerant aircraft parking apron on the north side of Taxiway A. This apron is programmed to be constructed in two phases spanning both the short and mid-term planning periods. Ultimately the new apron would provide an additional 32,950 square yards of itinerant parking space. While even the current apron space is not needed year round, the general aviation demand during the peak season does and generates some of the most significant revenue streams for only a portion of the year.

Should the scheduled commercial passenger service cease operations, this project would still be required as the current airline apron space that would become available in front of the terminal would still not meet the peak general aviation demand. In fact, if the airport finds itself under Financial Scenario 2, this project would need to be conducted as early as possible. Depending on the timing, consideration for moving the apron project up might include postponing the project to expand the terminal building or those for new snow removal equipment/facilities, as they would not be as critical without commercial passenger service.

Hangar Space for Overnight Airline Aircraft

Historically the airport has not constructed, owned, or operated any hangar facilities for lease to aircraft owners and it is not recommended for the County to start. However, Colgan Air has expressed a desire for hangar space to store the aircraft they keep overnight at the airport. While providing additional hangar space is ultimately a business decision for either the full service FBO or another private entity, doing so would create additional revenue for the airport. As such, the airport should actively support any effort to do so, potentially including assisting with non-aviation sources of funding such as local or regional economic development grants.

Increase Rates and Charges for Services

The airport should continually evaluate its fee structure and land lease terms, relative to other regional airports, as it may have the potential for increasing some of its rates and charges. Those found below market average need to be increased over time to generate the appropriate revenue due to the airport. This would be absolutely necessary if the airport were to fall into Financial Scenario 2 (loss of airline service) for any new leases.

As mentioned previously, it is critical for the airport to ensure fair market value will be obtained during the negotiation of any future non-aeronautical lease for FAA compliance. Likewise, all existing leases need to be reviewed and the rates adjusted as required before renewal. **Table 8** provides an overview of various rates and charges currently assessed by three New England airports similar to BHB. While a direct comparison is not always possible, this information can help to establish benchmarks for BHB to consider when updating existing leases or creating new ones in this highly competitive industry. It should be noted that of the airports listed, BHB is the only one with a current FAR Part 139 certificate although all have Essential Air Service.

Table 8
Comparative Rates and Charges

Airport	Fuel Price/Gallon [1]		% of Gross	Fuel (fuel flow fee)	Annual Tie-Down Fee	Airport Owned Hangar Fee		Land Lease Rate	Landing Fee	Building Lease Rate	Itinerent Parking/Ramp Fee	Other Revenue
Hancock County - Bar Harbor Airport	100LL	$5.86	3.75% on first $1mil then 3.5%	Avgas	SE- $330	T-Hangar	NA	Commercial- $0.155/SF	NA	$18.25/SF, min of $125/mo	40% of that collected by FBO	
	Jet A	$5.26		Jet	ME- $390	Large Hangar	NA	Private- $0.225/SF	NA			
Augusta State Airport	100LL	$5.30	2% with min $12/yr (not incl. acft or fuel sales, tie down or parking	Avgas $.08	$516 (airport gets 40% or $206.40)	T-Hangar	NA	$0.12/SF	$10 lt MEL	Office/term $.40/SF	$50 small jets	
	Jet A	$4.63		Jet $.08		Large Hangar	NA		$25 Jet	Hangar $.24/SF	$100 large jets	
Lebanon Municipal Airport	100LL	$6.00	See 1/	Avgas See 2/	Signal FBO ($660) Airport ($600)	T-Hangar	City t-hangar 1,072 sf to 1,450 sf ($475 - $525/mo)	Signal - 388,650 sf at $828.78/mo = $0.03 /sf /yr	See 3/	See 4/	See 5/	Soda machine. Off-airport operators (rental cars, limos, shuttles). Advertising in terminal (and soon website). Rental car percentage of gross (10% of revenue over a min amount).
	Jet A	$5.45		Jet See 2/		Large Hangar	City 2,550 SF ($850/mo).					
Knox County Regional Airport (Rockland)	100LL	$5.10	2.5% Aero businesses	Avgas NA	SEL $280 2	T-Hangar	NA	$7000 per acre/yr =$0.16 psf	NA	Terminal $17-$22 psf	$7 SEL $12 MEL<12,500	Overnight auto parking $4
	Jet A	$4.95	6-10% non-Aero	Jet NA	MEL $360	Large Hangar					$30> MEL 12,500 and Jets	

1/ 4% of total gross receipts for sales and services for all piston aircraft (excluding sale of hard parts, sales of all other parts and labor, fuel sales, and aircraft sales maintenance and service fees associated with Signal aircraft. Hard parts 1%. Distributor / aircraft sales 1%.

2/ Contract fuel ($0.04 per gallon). All other fuels (0.07 per gallon).

3/ Signal collects landing fees from transient operators and gives LEB 15% Signal is allowed to waive landing fees for aircraft that purchase 500 or more gallons of fuel
Single: $0. Twin $10. Small Turboprop $25. Large Turboprop $50. Jet $125.

4/ Terminal: Exclusive areas (counter: $24.20 - office: $25.97 / sf / yr). Common areas: (bag room $24.20 - bag claim: $25.97 /sf / yr). Car rentals $25.44 / sf/ yr)

5/ Parking fee: Piston $15.00 (max. of 5 nights per mo) Jet ($50 - $200 per night)
Handling Fee: Piston Single $0. Piston Twin ($10 / night). Jet (100 - $500 per night)

Initiate a Fuel Flowage Fee

Currently the full service FBO at the airport owns and operates all aircraft fueling operations at the airport. Under the current arrangement, the airport collects a percent of gross fee from the FBO. This essentially allows the airport to collect revenue from the FBO in exchange for the privilege of operating their business at the airport. Such an agreement requires the FBO to provide very transparent financial records to the airport.

Revenue from the sale of aircraft fuel is typically the most significant source of revenue for general aviation airports. As such, if the scheduled commercial passenger service were to stop, it would likely be beneficial to renegotiate portions of the FBO's current percent of gross fee agreement and replace it with a fuel flowage fee. Fuel flowage fees are a predetermined charge owed to the airport for each gallon of fuel purchased by the users of the airport. **Table 8** reflects the fuel flowage fees collected by the New England airports similar to BHB. Again, this option should only be considered if the airport were to fall into Financial Scenario 2 where the scheduled commercial passenger service ceases operations.

Large Aircraft Landing Fees

Landing fees for larger general aviation aircraft should be considered for additional revenue generation, particularly if scheduled service is ever discontinued. As shown in **Table 8**, both the Augusta State and Lebanon Municipal Airports currently have some form of landing fees for the larger general aviation aircraft. The ability to collect additional revenue through landing fees may be very critical to the financial self sufficiency of the airport in the absence of airline operations. However, landing fees can be very difficult to collect at airports without an airport traffic control tower (ATCT).

If considered, the airport would need to determine whether to base fees on the type of aircraft, by weight, or a combination of the two. Usually landing fees start at multi-engine aircraft or a specified minimum gross takeoff weight and are indexed to weight. Essentially, the heavier the plane is, the higher the landing fee. Based aircraft and single-engine piston aircraft are usually exempt from landing fees. Some airports without an ATCT or significant activity are installing automated aircraft collection and billing systems. These systems monitor aircraft landings, screens the aircraft for landing fee eligibility, and sends a landing fee invoice to the registered aircraft owner. Again, this option could be considered now or if and when the scheduled commercial passenger service ceases operations.

SUMMARY

Based on the analysis presented, BHB is projected under the expected scenario to not only maintain, but increase the current revenue streams. Given the required expenditures under the same conditions, the airport will continue to have a very positive cash flow over the next five years. This will enable the County to properly preserve the existing airfield facilities, add/improve capacity where necessary, and remain a financially self sufficient entity. Regardless, a number of the revenue enhancing recommendations should be considered to better diversify the revenue accounts.

Should the airport lose scheduled commercial passenger service as illustrated under Financial Scenario 2, the overall outcome is entirely different. In this situation, the airport would be able to cut a number of expenditures directly related to the passenger airline operations, but not enough overall costs for the facility to maintain a positive cash flow. At risk under this scenario would certainly be the various improvements of the proposed Capital Improvement Plan, but also other day to day operations, including perhaps maintenance and supplies. This of course is the worse case scenario under which nearly all of the revenue enhancing recommendations would apply. Similarly, the actual implementation of the various cost cutting or financial strategies under this situation would have to be determined at that time to consider the financial condition of the airport and overall economic conditions.

Summary of Business Plan Recommendations

- Reconciliation of existing leases
- Implement escalation clause for all five (5) year and greater lease terms
- Support the proposed wastewater treatment facility
- Expanded use of existing seaplane base
- Expand passenger terminal building
- Create an airport destination
- Expand itinerant aircraft parking apron
- Support private entity hangar construction for scheduled service provider
- Continually evaluate fee structure and land lease terms and increase rates and charges for services, as necessary
- Initiate a fuel flowage fee
- Implement large aircraft landing fees

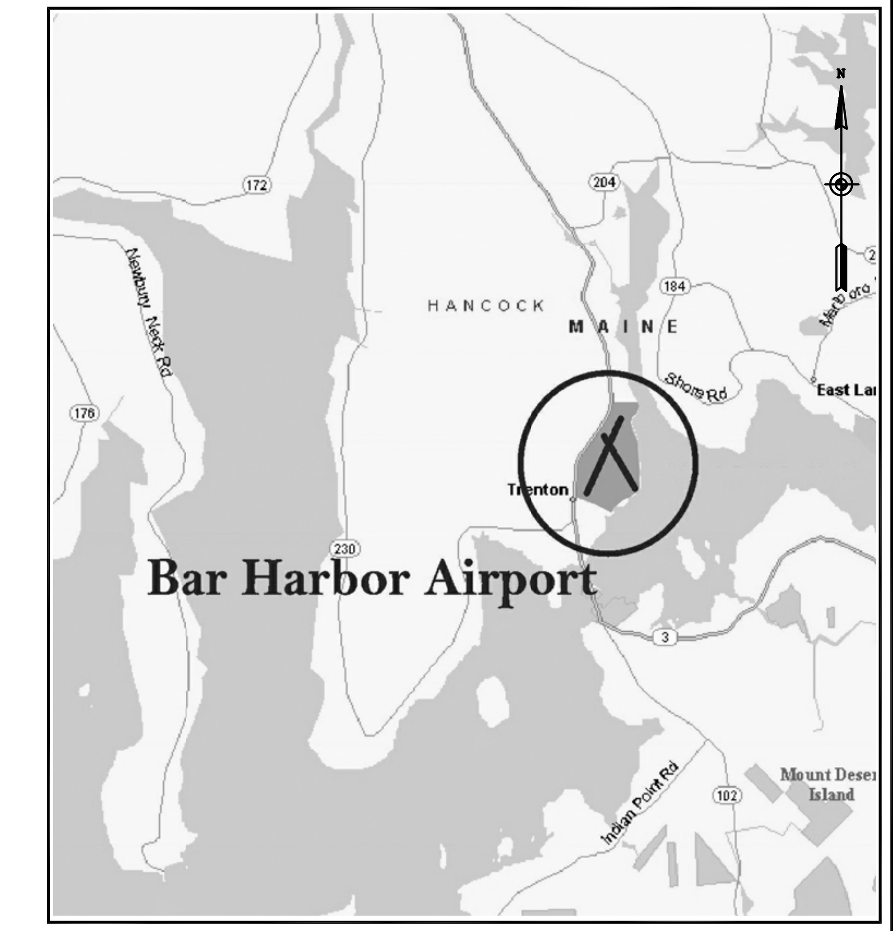
Appendix C

Plan Set (Graphics)

VICINITY MAP
NOT TO SCALE

Hancock County
Bar Harbor Airport (BHB)
Trenton, Maine

MASTER PLAN UPDATE



LOCATION MAP
NOT TO SCALE

FEDERAL/STATE PROJECT NO.
AIP 3-23-0006-30-2010
HOYLE, TANNER PROJECT NO. 030340

INDEX TO DRAWINGS

1. COVER/TITLE SHEET
2. ALP (EXISTING FACILITIES)
3. ALP (ULTIMATE FACILITIES)
4. ALP (ULTIMATE AVIGATION EASEMENTS)
5. ALP DATA SHEET
6. TERMINAL AREA PLAN
7. RUNWAY 04-22 PLAN AND PROFILE
8. RUNWAY 17-35 PLAN AND PROFILE
9. FAR PART 77 AIRSPACE SURFACES (SHEET 1 OF 2)
10. FAR PART 77 AIRSPACE SURFACES (SHEET 2 OF 2)
11. LAND USE AND NOISE CONTOUR PLAN
12. EXHIBIT A - PROPERTY MAP

May, 2011

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY

PROJECT DESIGNER
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DES. BY	DR. BY	CHKD. BY
TLM	DWH	ERM

SCALE: AS SHOWN
DATE: MAY, 2011

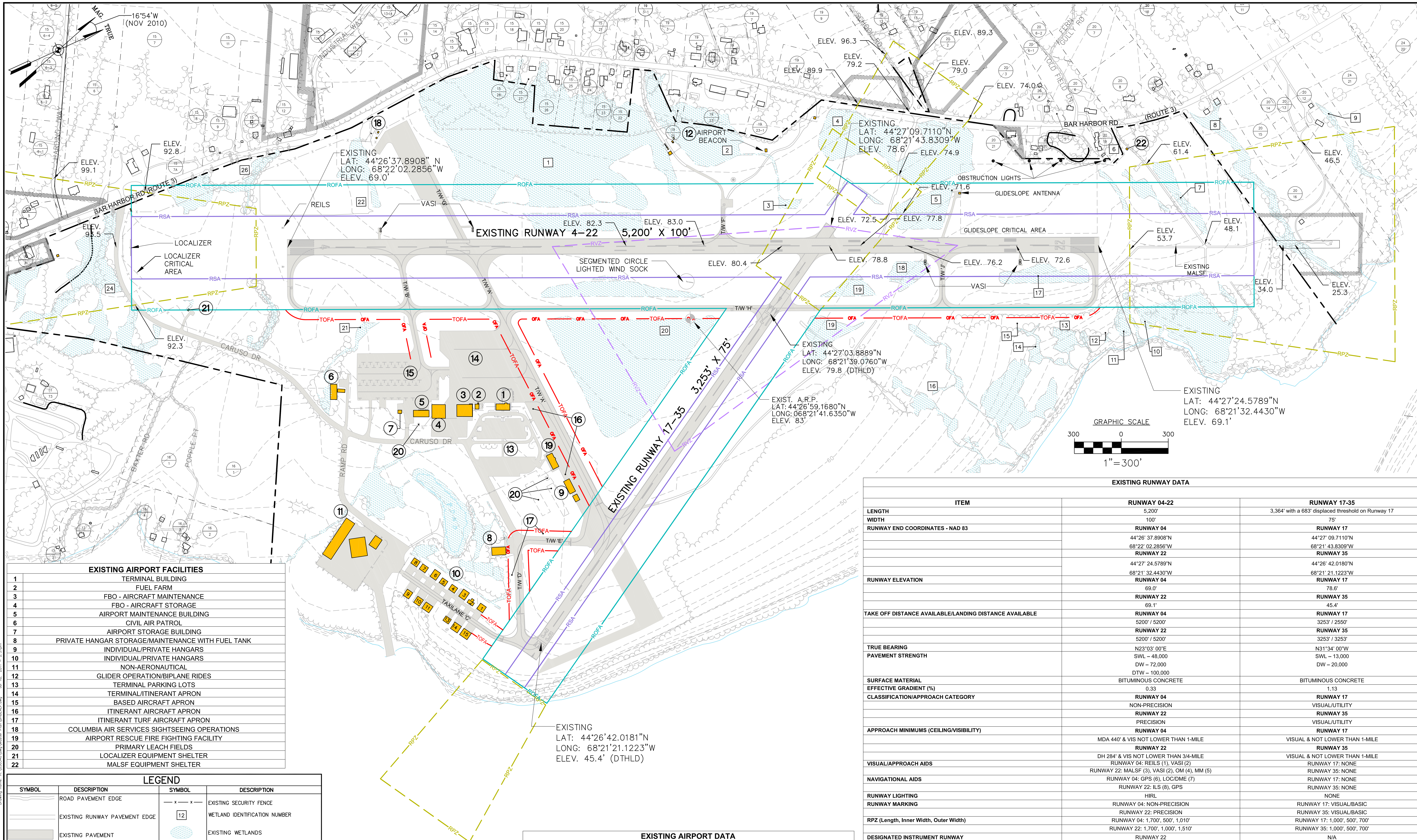
HANCOCK COUNTY, BAR HARBOR AIRPORT
AIRPORT MASTER PLAN UPDATE

COVER/TITLE SHEET

HTA PROJ. No.: 030340
FILE: BHBCOVR
AIP No.: AIP3-23-0006-30-2010
DRAWING NO.
1

SHEET 1 OF 12

Drawing name: H:\030340\dwg\Master Plan\BHBCOVR.dwg May 13, 2011 - 12:18pm



EXISTING AIRPORT FACILITIES

1	TERMINAL BUILDING
2	FUEL FARM
3	FBO - AIRCRAFT MAINTENANCE
4	FBO - AIRCRAFT STORAGE
5	AIRPORT MAINTENANCE BUILDING
6	CIVIL AIR PATROL
7	AIRPORT STORAGE BUILDING
8	PRIVATE HANGAR STORAGE/MAINTENANCE WITH FUEL TANK
9	INDIVIDUAL/PRIVATE HANGARS
10	INDIVIDUAL/PRIVATE HANGARS
11	NON-AERONAUTICAL
12	GLIDER OPERATION/BIPLANE RIDES
13	TERMINAL PARKING LOTS
14	TERMINAL/ITINERANT APRON
15	BASED AIRCRAFT APRON
16	ITINERANT AIRCRAFT APRON
17	ITINERANT TURF AIRCRAFT APRON
18	COLUMBIA AIR SERVICES SIGHTSEEING OPERATIONS
19	AIRPORT RESCUE FIRE FIGHTING FACILITY
20	PRIMARY LEACH FIELDS
21	LOCALIZER EQUIPMENT SHELTER
22	MALSF EQUIPMENT SHELTER

LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	ROAD PAVEMENT EDGE	—x—x—	EXISTING SECURITY FENCE
	EXISTING RUNWAY PAVEMENT EDGE	12	WETLAND IDENTIFICATION NUMBER
	EXISTING PAVEMENT		EXISTING WETLANDS
	EXISTING TREE LINE	MAP / LOT	MAP & LOT NUMBERS FOR ABUTTING PROPERTIES TO THE AIRPORT. NOTE: ALL ABUTTER INFO IS NOT COMPLETELY SHOWN. SEE DATA SHEET (SHEET 4 OF 12) FOR COMPLETE LIST.
	EXISTING CONTOUR (TYP)	ARP	AIRPORT REFERENCE POINT
	BUILDINGS ON AIRPORT PROPERTY		EXISTING TIE DOWN
	AIRPORT PROPERTY LINE	RPZ	RUNWAY PROTECTION ZONE
	ABUTTING PROPERTY LINES	RSA	RUNWAY SAFETY AREA
	EXISTING AVIGATION EASEMENT AREA	ROFA	RUNWAY OBJECT FREE AREA
		TOFA	TAXIWAY OBJECT FREE AREA
		RVZ	RUNWAY VISIBILITY ZONE

EXISTING AIRPORT DATA

ITEM	EXISTING
AIRPORT ELEVATION (U.S.G.S. – M.S.L.)	83 '
AIRPORT REFERENCE POINT (ARP)	44° 26' 59.1680" N 068° 21' 41.6350" W
MEAN MAX TEMPERATURE HOTTEST MONTH	77°F
NAVIGATIONAL AIDS	ILS, LOC/DME, GPS
DISTANCE FROM TOWN OF BAR HARBOR	8 mi. NW
LAND OWNED (ACRES)/AIRPORT AREA FEE	468
AIRPORT AREA EASEMENTS (ACRES)	67.68 +/-
OWNER	HANCOCK COUNTY
OPERATIONAL ROLE (NPIAS)	NON-HUB PRIMARY
MAG. DECLINATION NOV 2010	16° 54' 00" W (2010)
AIRPORT REFERENCE CODE/AIRPORT DESIGN CODE	C-II

EXISTING RUNWAY DATA

ITEM	RUNWAY 04-22	RUNWAY 17-35
LENGTH	5,200'	3,364' with a 683' displaced threshold on Runway 17
WIDTH	100'	75'
RUNWAY END COORDINATES - NAD 83	**RUNWAY 04**	**RUNWAY 17**
	44°26' 37.8908"N 68°22' 02.2856"W	44°27' 09.7110"N 68°21' 43.8309"W
	RUNWAY 22	**RUNWAY 35**
	44°27' 24.5789"N 68°21' 32.4430"W	44°26' 42.0180"N 68°21' 21.1223"W
RUNWAY ELEVATION	**RUNWAY 04**	**RUNWAY 17**
	69.0'	78.6'
	RUNWAY 22	**RUNWAY 35**
	69.1'	45.4'
TAKE OFF DISTANCE AVAILABLE/LANDING DISTANCE AVAILABLE	**RUNWAY 04**	**RUNWAY 17**
	5200' / 5200'	3253' / 2550'
	RUNWAY 22	**RUNWAY 35**
	5200' / 5200'	3253' / 3253'
TRUE BEARING	N23°03' 00"E	N31°34' 00"W
PAVEMENT STRENGTH	SWL – 48,000 DW – 72,000 DTW – 100,000	SWL – 13,000 DW – 20,000
SURFACE MATERIAL	BITUMINOUS CONCRETE	BITUMINOUS CONCRETE
EFFECTIVE GRADIENT (%)	0.33	1.13
CLASSIFICATION/APPROACH CATEGORY	**RUNWAY 04**	**RUNWAY 17**
	NON-PRECISION	VISUAL/UTILITY
	RUNWAY 22	**RUNWAY 35**
	PRECISION	VISUAL/UTILITY
APPROACH MINIMUMS (CEILING/VISIBILITY)	**RUNWAY 04**	**RUNWAY 17**
	MDA 440' & VIS NOT LOWER THAN 1-MILE	VISUAL & NOT LOWER THAN 1-MILE
	RUNWAY 22	**RUNWAY 35**
	DH 284' & VIS NOT LOWER THAN 3/4-MILE	VISUAL & NOT LOWER THAN 1-MILE
VISUAL/APPROACH AIDS	RUNWAY 04: REILS (1), VASI (2)	RUNWAY 17: NONE
	RUNWAY 22: MALSF (3), VASI (2), OM (4), MM (5)	RUNWAY 35: NONE
NAVIGATIONAL AIDS	RUNWAY 04: GPS (6), LOC/DME (7)	RUNWAY 17: NONE
	RUNWAY 22: ILS (8), GPS	RUNWAY 35: NONE
RUNWAY LIGHTING	HIRL	NONE
RUNWAY MARKING	RUNWAY 04: NON-PRECISION	RUNWAY 17: VISUAL/BASIC
	RUNWAY 22: PRECISION	RUNWAY 35: VISUAL/BASIC
RPZ (Length, Inner Width, Outer Width)	RUNWAY 04: 1,700', 500', 1,010'	RUNWAY 17: 1,000', 500', 700'
	RUNWAY 22: 1,700', 1,000', 1,510'	RUNWAY 35: 1,000', 500', 700'
DESIGNATED INSTRUMENT RUNWAY	RUNWAY 22	N/A
AIRPORT REFERENCE CODE/AIRPORT DESIGN CODE	C-II	B-II
CRITICAL AIRCRAFT	GRUMMAN GULFSTREAM III	BEECHCRAFT KING AIR 350
CRITICAL AIRCRAFT (WING SPAN)	77.8'	57.9'
CRITICAL AIRCRAFT APPROACH SPEED (KNOTS)	136	115
CRITICAL AIRCRAFT MTOW (POUNDS)	69,700	15,000
PARALLEL TAXIWAY	H	NONE
TAXIWAY LIGHTING	MITL	NONE

NOTES:
(1) REILS - RUNWAY END IDENTIFIER LIGHTS
(2) VASI - VISUAL APPROACH SLOPE INDICATOR
(3) MALSF - 1,400-FOOT MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH SEQUENCED FLASHERS, OR FLASHING LIGHTS
(4) OM - OUTER MARKER
(5) MM - MIDDLE MARKER
(6) GPS - GLOBAL POSITIONING SYSTEM APPROACH
(7) LOC/DME - LOCALIZER APPROACH WITH DISTANCE MEASURING EQUIPMENT
(8) ILS - INSTRUMENT LANDING SYSTEM

REV. NO.	DATE	DESCRIPTION	BY

REVISIONS

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DES. BY TLM | DR. BY DWH | CHKD. BY ERM

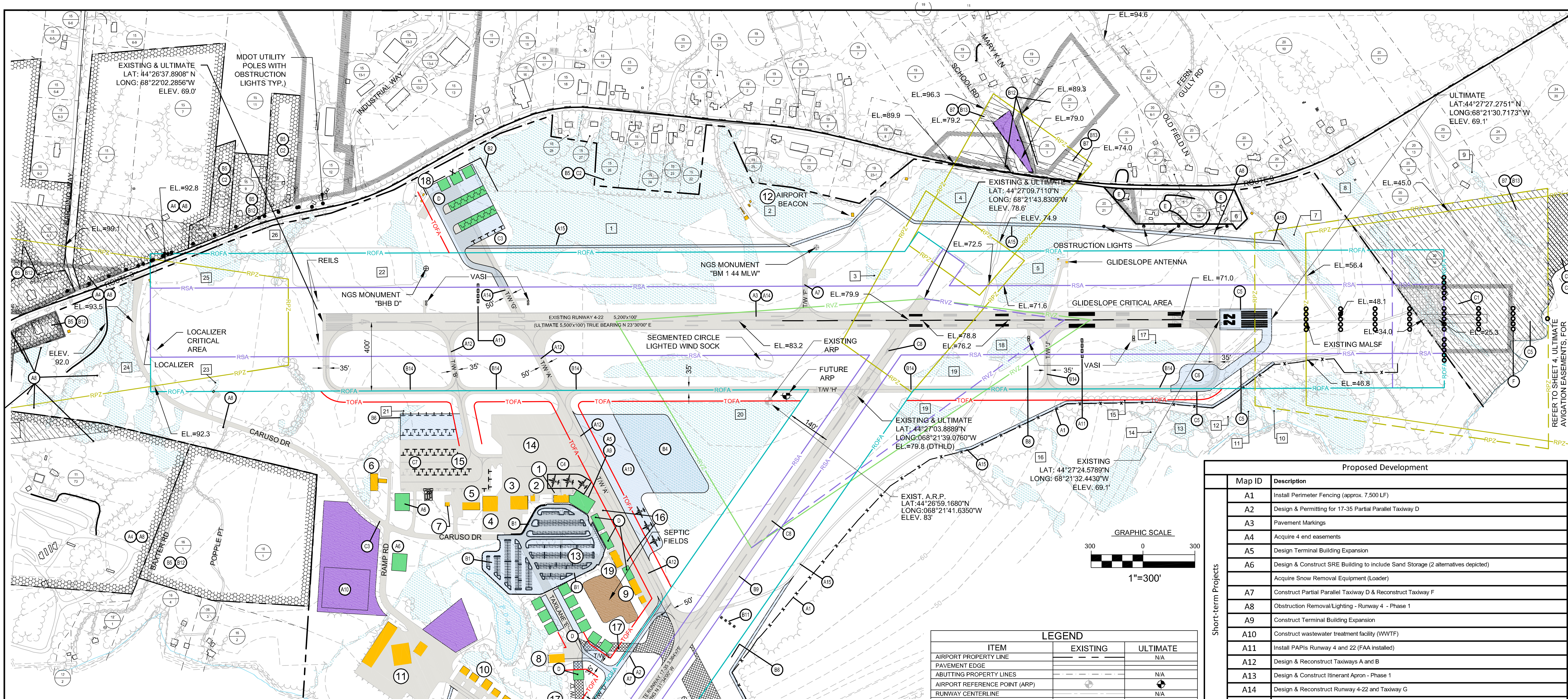
SCALE: AS SHOWN | DATE: MAY, 2011

HANCOCK COUNTY, BAR HARBOR AIRPORT
AIRPORT MASTER PLAN UPDATE

AIRPORT LAYOUT PLAN (EXISTING FACILITIES)

HTA PROJ. No.: 030340
FILE: BHBEALP
AIP No.: AIP3-23-0006-30-2010

DRAWING NO.
2



EXISTING AIRPORT FACILITIES	
1	TERMINAL/ADMINISTRATION BUILDING
2	FUEL FARM
3	FBO - AIRCRAFT MAINTENANCE
4	FBO - AIRCRAFT STORAGE
5	AIRPORT MAINTENANCE BUILDING
6	CIVIL AIR PATROL
7	COUNTY STORAGE BUILDING
8	PRIVATE HANGAR STORAGE/MAINTENANCE WITH FUEL TANK
9	INDIVIDUAL/PRIVATE HANGARS
10	INDIVIDUAL/PRIVATE HANGARS
11	NON-AERONAUTICAL
12	GLIDER OPERATION
13	TERMINAL PARKING LOTS
14	TERMINAL AREA RAMP
15	BASED AIRCRAFT APRON
16	ITINERANT AIRCRAFT APRON (PARKING FACILITY TO BE USED UNTIL NEW TERMINAL BLDG CONSTRUCTION)
17	ITINERANT AIRCRAFT APRON (TO BE REMOVED)
18	COLUMBIA AIR SERVICES SIGHTSEEING OPERATIONS
19	AIRCRAFT RESCUE AND FIRE FIGHTING
20	SEAPLANE RAMP

AIRPORT DATA

ITEM	EXISTING	ULTIMATE
AIRPORT ELEVATION (U.S.G.S. – M.S.L.)	83 '	SAME
AIRPORT REFERENCE POINT (ARP)	44° 26' 59.168" N 068° 21' 41.635" W	44° 27' 0.224" N 068° 21' 41.459" W
MEAN MAX TEMPERATURE HOTTEST MONTH	77°F	SAME
NAVIGATIONAL AIDS	ILS, LOC/DME, GPS	ILS, LOC/DME, 2 GPS
DISTANCE FROM TOWN OF BAR HARBOR	8 Mi. NW	SAME
LAND OWNED (ACRES)/AIRPORT AREA FEE	468	469
AIRPORT AREA EASEMENTS (ACRES)	67.68 +/-	163.62 +/-
OWNER	HANCOCK COUNTY	SAME
OPERATIONAL ROLE (NPIAS)	NON-HUB PRIMARY	SAME
MAG. DECLINATION NOV 5, 2010	16° 54' 00" W (2010)	SAME
AIRPORT REFERENCE CODE/AIRPORT DESIGN CODE	C-II	SAME

FAA DISCLAIMER

THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THIS PLAN BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED THEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

NCGS MONUMENT DATA

IDENTIFIER	SURVEY STATION NAME	PACS OR SACS	LATITUDE	LONGITUDE	ELEVATION
"BM 1 44 MLW"	NGS PID-AB2639	PACS	44°27'05.33964"	068°21'51.19308"	89.7
"BHB D"	NGS PID-AB2640	SACS	44°26'44.53962"	068°22'02.72949"	72.6
"BHB E"	NGS PID-AB2641	SACS	44°26'47.62969"	068°21'22.82233"	51.7
SOURCE: NATIONAL GEODETIC SURVEY, NAD 83 (2007), NAVD 88.					

FEDERAL AVIATION ADMINISTRATION NEW ENGLAND REGION AIRPORT DIVISION	BUREAU OF TRANSPORTATION SYSTEMS PLANNING MAINE DOT	HANCOCK COUNTY COMMISSIONERS
APPROVED:	APPROVED:	APPROVED: DATE:
DATE:	DATE:	APPROVED: DATE:
		APPROVED: DATE:

LEGEND

ITEM	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		N/A
PAVEMENT EDGE		
ABUTTING PROPERTY LINES		N/A
AIRPORT REFERENCE POINT (ARP)		
RUNWAY CENTERLINE		N/A
FENCELINE (8' HIGH)		
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY VISIBILITY ZONE	RVZ	RVZ
TAXIWAY OBJECT FREE AREA	TOFA	TOFA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
AIRPORT BEACON/UNLIGHTED WIND SOCK		N/A
UTILITY POLE		
TIE DOWN		
RUNWAY PROTECTION ZONE	RPZ	RPZ
TREELINE		N/A
EXISTING CONTOURS	230	N/A
AIRPORT BUILDINGS		
BUILDINGS OFF AIRPORT		SAME
PAVEMENT		
ACCESS ROADWAYS		
TO BE REMOVED	N/A	
FUTURE PROPERTY ACQUISITION	N/A	
AVIGATION EASEMENT AREA		
NCGS MONUMENT		N/A
WETLANDS		N/A
WETLAND ID NUMBER	12	N/A
MAP & LOT NUMBERS FOR ABUTTING PROPERTIES TO THE AIRPORT. NOTE: ALL ABUTTER INFO IS NOT COMPLETELY SHOWN. SEE DATA SHEET (SHEET 5 OF 12) FOR COMPLETE LIST.	MAP / LOT	N/A
BUILDING RESTRICTION LINE	BRL	SAME
RESERVED FOR NON-AERONAUTICAL REVENUE GENERATION	N/A	
NAVAID CRITICAL AREA		SAME
FUTURE PHASED AVIGATION EASEMENTS	N/A	

Proposed Development

	Map ID	Description
Short-term Projects	A1	Install Perimeter Fencing (approx. 7,500 LF)
	A2	Design & Permitting for 17-35 Partial Parallel Taxiway D
	A3	Pavement Markings
	A4	Acquire 4 end easements
	A5	Design Terminal Building Expansion
	A6	Design & Construct SRE Building to include Sand Storage (2 alternatives depicted)
		Acquire Snow Removal Equipment (Loader)
	A7	Construct Partial Parallel Taxiway D & Reconstruct Taxiway F
	A8	Obstruction Removal/Lighting - Runway 4 - Phase 1
	A9	Construct Terminal Building Expansion
	A10	Construct wastewater treatment facility (WWTF)
	A11	Install PAPIs Runway 4 and 22 (FAA installed)
	A12	Design & Reconstruct Taxiways A and B
	A13	Design & Construct Itinerant Apron - Phase 1
	A14	Design & Reconstruct Runway 4-22 and Taxiway G
	A15	Design & Construct Perimeter Road
Mid-term Projects	B1	Expand existing and reconfigure the automobile parking lot
	B2	Install Perimeter Fencing (approx. 7,500 LF)
	B3	Obstruction Analysis (R/W 17, 35, 22) and eALP update
	B4	Design & Construct Itinerant Apron - Phase 2
	B5	Acquire 4 end easements - Phase 2
	B6	Design & Construct GA Ramp Expansion
	B7	Acquire easements (R/W 17, 35, 22)
	B8	Install lighted supplemental windsock at the approach end of Runway 35
	B9	Install medium intensity runway lights (MIRLs) on Runway 17-35
	B10	Install runway end identifier lights (REILS) for an approach to Runway 35
		Implement a GPS approach to Runway 35 (FAA)
	B11	Install a PAPI for an approach to Runway 35 (FAA installed)
	B12	Obstruction Removal/Lighting - Runway 4 - Phase 2
	B13	Obstruction Removal (R/W 17, 35, 22)
	B14	Design & Reconstruct Taxiway H and J
Long-term Projects	C1	Obtain property and avigation/hazard easements for Runway 22 extension
	C2	Obstruction Removal/Lighting - Runway 4 - Phase 3
	C3	Reconstruct portion of Airport Access Road
	C4	Reconstruct Terminal Apron
	C5	Extend Runway 22, Taxiway H and MALSF / Obstruction Removal / Lighting
	C6	Design & Construct Holding Bay/Run-up Area for Runway 22
	C7	Reconstruct GA Apron
	C8	Reconstruct Runway 17-35
	C9	Convert abandoned piece of pavement used for overflow parking to turf
	D	Private Development
	E	Parcels to be acquired, if available: 20/19, 20/20, & 20/21
	F	Install a MALSR for an approach to Runway 22 (FAA installed)

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY

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DES. BY	DR. BY	CHKD. BY
TLM	DWH	ERM

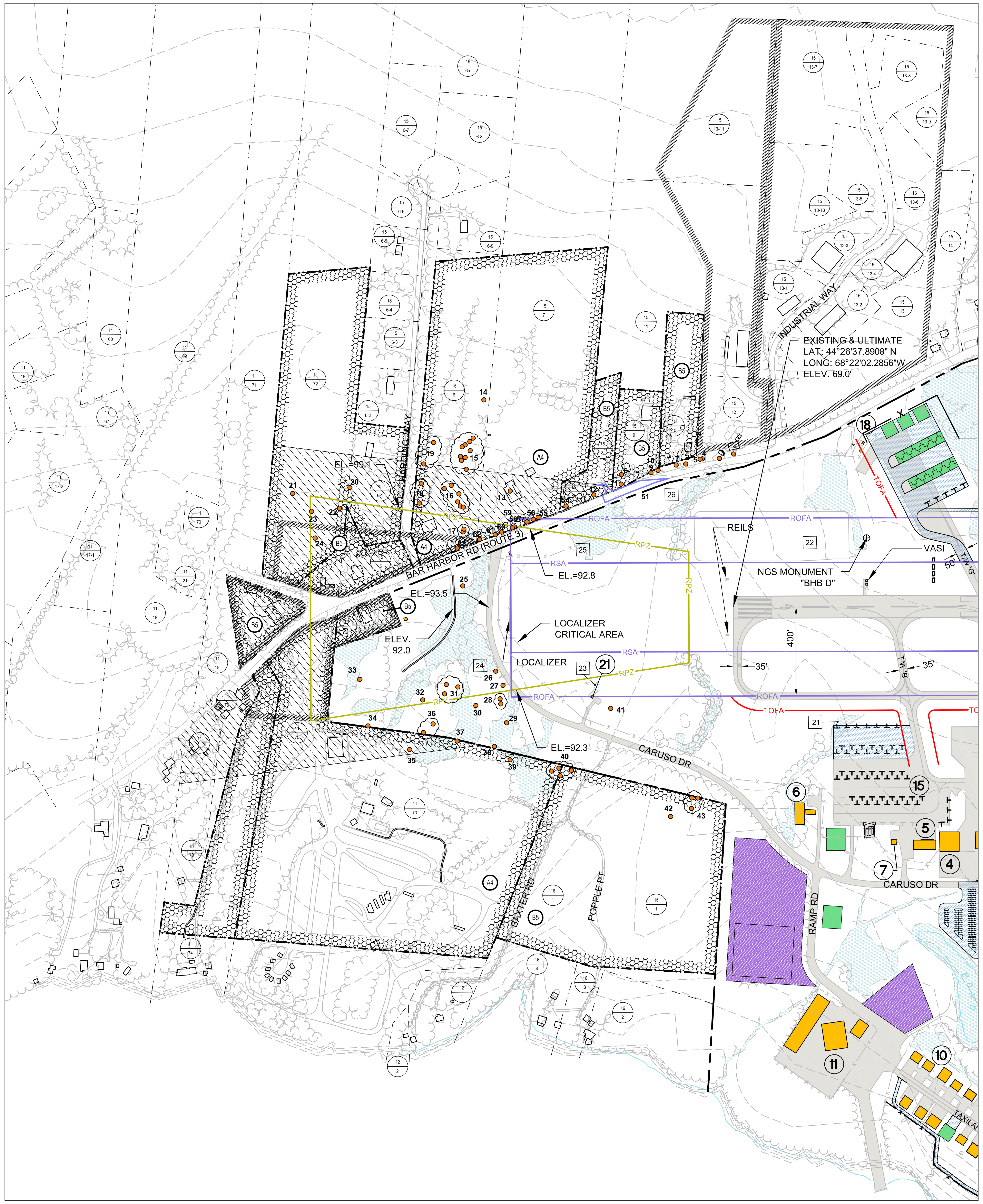
SCALE: AS SHOWN DATE: MAY, 2011

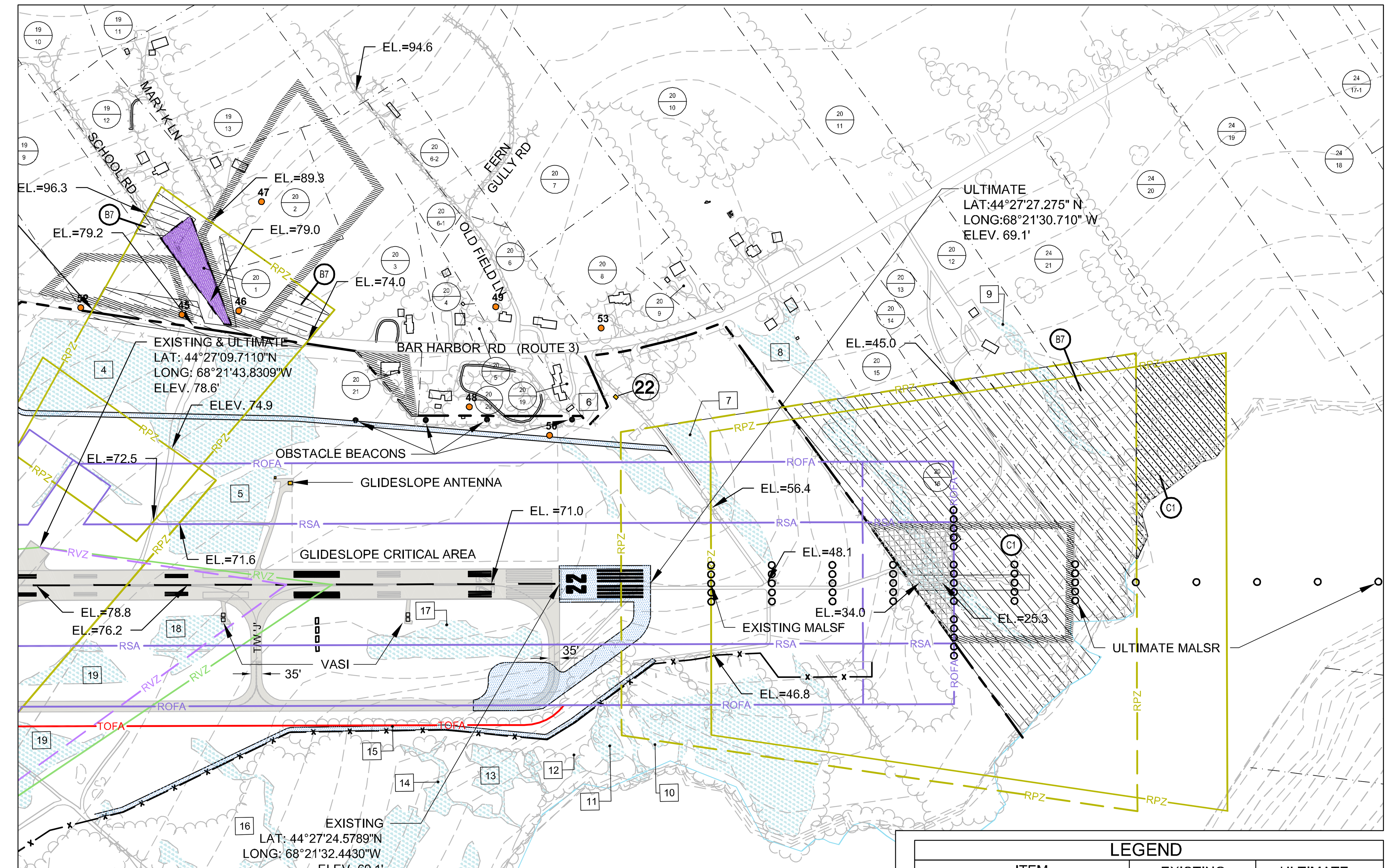
HANCOCK COUNTY, BAR HARBOR AIRPORT
AIRPORT MASTER PLAN UPDATE

AIRPORT LAYOUT PLAN (ULTIMATE FACILITIES)

HTA PROJ. No.: 030340
FILE: BHBPALP
AIP No.: AIP3-23-0006-30-2010
DRAWING NO.
3

16°54'W (NOV 2010)
MAG.
TRUE





LEGEND

ITEM	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		N/A
PAVEMENT EDGE		
ABUTTING PROPERTY LINES		N/A
AIRPORT REFERENCE POINT (ARP)		
RUNWAY CENTERLINE		N/A
FENCELINE (8' HIGH)		
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY VISIBILITY ZONE	RVZ	RVZ
TAXIWAY OBJECT FREE AREA	TOFA	TOFA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
AIRPORT BEACON/UNLIGHTED WIND SOCK		N/A
UTILITY POLE		
TIE DOWN		
RUNWAY PROTECTION ZONE	RPZ	RPZ
TREELINE		N/A
EXISTING CONTOURS	230	N/A
AIRPORT BUILDINGS		
BUILDINGS OFF AIRPORT		SAME
PAVEMENT		
ACCESS ROADWAYS		
TO BE REMOVED	N/A	
FUTURE PROPERTY ACQUISITION	N/A	
AVIGATION EASEMENT AREA		
NGCS MONUMENT		N/A
WETLANDS		N/A
WETLAND ID NUMBER	12	N/A
MAP & LOT NUMBERS FOR ABUTTING PROPERTIES TO THE AIRPORT. NOTE: ALL ABUTTER INFO IS NOT COMPLETELY SHOWN. SEE DATA SHEET (SHEET 5 OF 12) FOR COMPLETE LIST.	MAP LOT	N/A
BUILDING RESTRICTION LINE	BRL	SAME
RESERVED FOR NON-AERONAUTICAL REVENUE GENERATION	N/A	
NAVAID CRITICAL AREA		SAME
FUTURE PHASED AVIGATION EASEMENTS	N/A	

GRAPHIC SCALE
300 0 300
1"=300'

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY

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DES. BY TLM | DR. BY DWH | CHKD. BY ERM

SCALE: AS SHOWN DATE: MAY, 2011

HANCOCK COUNTY, BAR HARBOR AIRPORT
AIRPORT MASTER PLAN UPDATE

AIRPORT LAYOUT PLAN (ULTIMATE AVIGATION EASEMENTS)

HTA PROJ. No.: 030340
FILE: BHBPAVES
AIP No.: AIP3-23-0006-30-2010
DRAWING NO. 4

EXISTING AND ULTIMATE RUNWAY DATA				
ITEM	EXISTING RUNWAY 04-22	ULTIMATE RUNWAY 04-22	EXISTING RUNWAY 17-35	ULTIMATE RUNWAY 17-35
LENGTH	5,200'	5,500	3,364' with a 683' displaced threshold on Runway 17	SAME
WIDTH	100'	SAME	75'	SAME
RUNWAY END COORDINATES - NAD 83	**RUNWAY 04**	**RUNWAY 04**	**RUNWAY 17**	**RUNWAY 17**
	44°26' 37.8908"N	SAME	44°27' 09.7110"N	SAME
	68°22' 02.2856"W	SAME	68°21' 43.8309"W	SAME
	RUNWAY 22	**RUNWAY 22**	**RUNWAY 35**	**RUNWAY 35**
	44°27' 24.5789"N	44°27' 27.2751"N	44°26' 41.0675"N	SAME
	68°21' 32.4430"W	68°21' 30.7173"W	68°21' 20.3388"W	SAME
RUNWAY ELEVATION	**RUNWAY 04**	**RUNWAY 04**	**RUNWAY 17**	**RUNWAY 17**
	69.0	SAME	78.6	SAME
	RUNWAY 22	**RUNWAY 22**	**RUNWAY 35**	**RUNWAY 35**
	69.1	SAME	43.3	SAME
TRUE BEARING	N23°03' 00"E	SAME	N31°34' 00"W	SAME
PAVEMENT STRENGTH	SWL – 48,000	SAME	SWL – 13,000	SAME
	DW – 72,000		DW – 20,000	
	DTW – 120,000			
SURFACE MATERIAL	BITUMINOUS CONCRETE	SAME	BITUMINOUS CONCRETE	SAME
EFFECTIVE GRADIENT (%)	0.33	SAME	1.13	SAME
CLASSIFICATION/APPROACH CATEGORY	**RUNWAY 04**	**RUNWAY 04**	**RUNWAY 17**	**RUNWAY 17**
	NON-PRECISION	SAME	VISUAL/UTILITY	SAME
	RUNWAY 22	**RUNWAY 22**	**RUNWAY 35**	**RUNWAY 35**
	PRECISION	SAME	VISUAL	NON-PRECISION
APPROACH MINIMUMS (CEILING/VISIBILITY)	**RUNWAY 04**	**RUNWAY 04**	**RUNWAY 17**	**RUNWAY 17**
	DA 386' & VIS NOT LOWER THAN 1-MILE	SAME	VISUAL & NOT LOWER THAN 1-MILE	SAME
	RUNWAY 22	**RUNWAY 22**	**RUNWAY 35**	**RUNWAY 35**
	DH 283' & VIS NOT LOWER THAN 3/4-MILE	DH & VIS TBD	VISUAL & NOT LOWER THAN 1-MILE	DA TBD & VIS NOT LOWER THAN 1-MILE
VISUAL/APPROACH AIDS	RUNWAY 04: REILS (1), VASI (2)	RUNWAY 04: REILS (1), PAPI (7)	RUNWAY 17: NONE	RUNWAY 17: NONE
	RUNWAY 22: MALSF (3), VASI (2), OM (4), MM (5)	RUNWAY 22: MALSR (9), PAPI (7)	RUNWAY 35: NONE	RUNWAY 35: REILS (1), PAPI (7)
NAVIGATIONAL AIDS	RUNWAY 04: GPS (6)	SAME	RUNWAY 17: NONE	SAME
	RUNWAY 22: ILS (8), GPS	SAME	RUNWAY 35: NONE	RUNWAY 35: GPS (6)
RUNWAY LIGHTING	HIRL	SAME	NONE	MIRL
RUNWAY MARKING	RUNWAY 04: NON-PRECISION	SAME	RUNWAY 17: VISUAL/BASIC	SAME
	RUNWAY 22: PRECISION	SAME	RUNWAY 35: VISUAL/BASIC	RUNWAY 35: NON-PRECISION
RPZ (Length, Inner Width, Outer Width)	RUNWAY 04: 1,700', 500', 1,010'	SAME	RUNWAY 17: 1,000', 500', 700'	SAME
	RUNWAY 22: 1,700', 1,000', 1,510'	SAME	RUNWAY 35: 1,000', 500', 700'	RUNWAY 35: 1,700', 500', 1,010'
DESIGNATED INSTRUMENT RUNWAY	RUNWAY 22	SAME	N/A	RUNWAY 35
AIRPORT REFERENCE CODE/AIRPORT DESIGN CODE	C-II	SAME	B-II	SAME
CRITICAL AIRCRAFT	GULFSTREAM III	SAME	CESSNA CONQUEST	BEECHCRAFT KING AIR 350
CRITICAL AIRCRAFT (WING SPAN)	77.8	SAME	49.3'	57'11"
CRITICAL AIRCRAFT APPROACH SPEED (KNOTS)	136	SAME	100	115
CRITICAL AIRCRAFT MTOW (POUNDS)	68,700	SAME	9,925	15,000
PARALLEL TAXIWAY	H	SAME	NONE	PARTIAL
TAXIWAY LIGHTING	MITL	SAME	NONE	MITL

NOTES:

(1) REILS – RUNWAY END IDENTIFIER LIGHTS

(2) VASI – VISUAL APPROACH SLOPE INDICATOR

(3) MALSF – 1,400–FOOT MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH SEQUENCED FLASHERS, OR FLASHING LIGHTS

(4) OM – OUTER MARKER

(5) MM – MIDDLE MARKER

(6) GPS – GLOBAL POSITIONING SYSTEM APPROACH

(7) PAPI – PRECISION APPROACH SLOPE INDICATOR

(8) ILS – INSTRUMENT LANDING SYSTEM

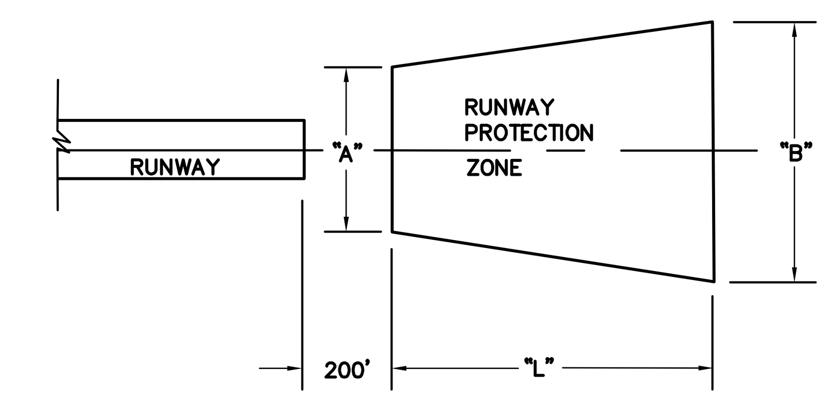
(9) MALSR – 2,400–FOOT MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS (RAILS)

AIRPORT DESIGN CRITERIA						
AIRPORT INFRASTRUCTURE	RUNWAY 04-22			RUNWAY 17-35		
RUNWAY	DESIGN CRITERIA C-II (FT)	EXISTING (FT)	ULTIMATE (FT)	DESIGN CRITERIA B-II (FT)	EXISTING (FT)	ULTIMATE (FT)
LENGTH		5,200	5,500		3,364 W/A 683–FOOT DISPLACED THRESHOLD AT THE 17 END	SAME
WIDTH	100	100	SAME	75	75	SAME
RUNWAY SAFETY AREA (RSA)						
WIDTH	400 (1)	RUNWAY 04: 400	SAME	150	RUNWAY 17: 150	SAME
		RUNWAY 22: 400	SAME		RUNWAY 35: 150	SAME
LENGTH BEYOND RUNWAY END	1,000	RUNWAY 04: 1,000	SAME	300	RUNWAY 17: 300	SAME
		RUNWAY 22: 1,000	SAME		RUNWAY 35: 300	SAME
RUNWAY OBSTACLE FREE ZONE (ROFZ)						
WIDTH	400	RUNWAY 04: 400	SAME	250	RUNWAY 17: 250	SAME
		RUNWAY 22: 400	SAME		RUNWAY 35: 250	SAME
LENGTH BEYOND RUNWAY END	200	RUNWAY 04: 200	SAME	200	RUNWAY 17: 200	SAME
		RUNWAY 22: 270	SAME		RUNWAY 35: 200	SAME
INNER APPROACH OFZ WIDTH	400	RUNWAY 22: 400	SAME	N/A	N/A	SAME
INNER APPROACH OFZ LENGTH	1,600	RUNWAY 22: 1,600	SAME	N/A	N/A	SAME
INNER APPROACH OFZ SLOPE (2)	50:1	RUNWAY 22: 34:1	SAME	N/A	N/A	SAME
RUNWAY OBJECT FREE AREA (ROFA)						
WIDTH	800	RUNWAY 04: 800	SAME	500	RUNWAY 17: 500	SAME
		RUNWAY 22: 800	SAME		RUNWAY 35: 500	SAME
LENGTH BEYOND RUNWAY END	1,000	RUNWAY 04: 1,000	SAME	300	RUNWAY 17: 300	SAME
		RUNWAY 22: 1,000	SAME		RUNWAY 35: 300	SAME
PARALLEL TAXIWAY						
WIDTH	35	35	SAME	35	N/A	35
TAXIWAY SAFETY AREA (TSA)	79	79	SAME	79	N/A	79
TAXIWAY OBJECT FREE AREA (TOFA) WIDTH	131	131	SAME	131	N/A	131
RUNWAY SEPARATION STANDARDS						
RUNWAY CENTERLINE TO TAXIWAY/TAXILANE CENTERLINE	300	400	SAME	240	N/A	240
RUNWAY CENTERLINE TO AIRCRAFT PARKING AREA	400	400	SAME	250	250	SAME
TAXIWAY/TAXILANE SEPARATION STANDARDS						
TAXIWAY CENTERLINE TO PARALLEL TAXIWAY/TAXILANE CENTERLINE	105	N/A	SAME	105	N/A	SAME
TAXIWAY CENTERLINE TO A FIXED OR MOVABLE OBJECT	65.5	65.5	SAME	65.5	N/A	65.5

NOTES:

(1) ACCORDING TO ADVISORY CIRCULAR 150/5300–13, AIRPORT DESIGN, FOR ARC C–I AND C–II, A RUNWAY SAFETY AREA WIDTH OF 400 FEET IS PERMISSIBLE.

(2) DESIGN STANDARDS REQUIRE A SLOPE OF 50 FEET (HORIZONTALLY) TO 1 FOOT (VERTICALLY) FOR A PRECISION APPROACH RUNWAY (RUNWAY 22) WITH 3/4 MILE VISIBILITY MINIMUMS. HOWEVER, THE FAA ACCEPTS A SLOPE OF 34:1 DUE TO THE SURROUNDING MOUNTAINOUS TERRAIN, A COMMON PHENOMENON WITHIN THE NEW ENGLAND REGION. THE HORIZONTAL DISTANCE OF THE PRECISION APPROACH SURFACE FOR RUNWAY 22 IS 50,000 FEET, NOT 10,000 FEET, WHICH IS THE STANDARD DISTANCE REQUIRED FOR A 34:1 SLOPE. THIS IS DUE TO THE IMAGINARY SURFACE REQUIREMENTS FOR A PRECISION APPROACH TO RUNWAY 22, WHICH SHOULD BE MAINTAINED EVEN IF THE 50:1 SLOPE CANNOT.



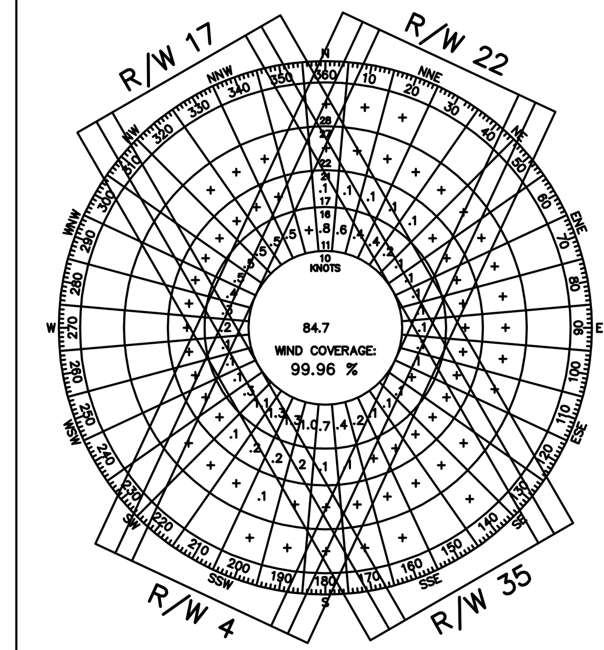
RUNWAY PROTECTION ZONE DATA					
	RUNWAY	APPROACH CATEGORY	"L" (FT)	"A" (FT)	"B" (FT)
EXISTING	4	NON–PRECISION	1,700	500	1,010
	22	PRECISION	1,700	1,000	1,510
	17	VISUAL/UTILITY	1,000	500	700
	35	VISUAL/UTILITY	1,000	500	700
ULTIMATE	4	SAME	SAME	SAME	SAME
	22	SAME	SAME	SAME	SAME
	17	SAME	SAME	SAME	SAME
	35	NON–PRECISION	1,700	500	1,010

RUNWAY APPROACH SLOPE DATA			
	RUNWAY	APPROACH CATEGORY	APPROACH SLOPE
EXISTING	4	NON–PRECISION	34:1
	22 (1)	PRECISION	34:1
	17	VISUAL/UTILITY	20:1
	35	VISUAL/UTILITY	20:1
ULTIMATE	4	SAME	SAME
	22	SAME	SAME
	17	SAME	SAME
	35	NON–PRECISION	SAME

NOTE:

(1) (4) FAR Part 77's approach surface standards require a horizontal distance of 10,000 feet at a slope of 50 (horizontally) to 1 (vertically) with an additional 40,000 feet at a slope of 40 (horizontally) to 1 (vertically) for all precision instrument runways, such as Runway 22, a precision instrument approach runway with 3/4 mile visibility minimums. However, other operational surfaces, such as TERPS only require a 34:1 approach surface.

ALL WEATHER WIND ROSE

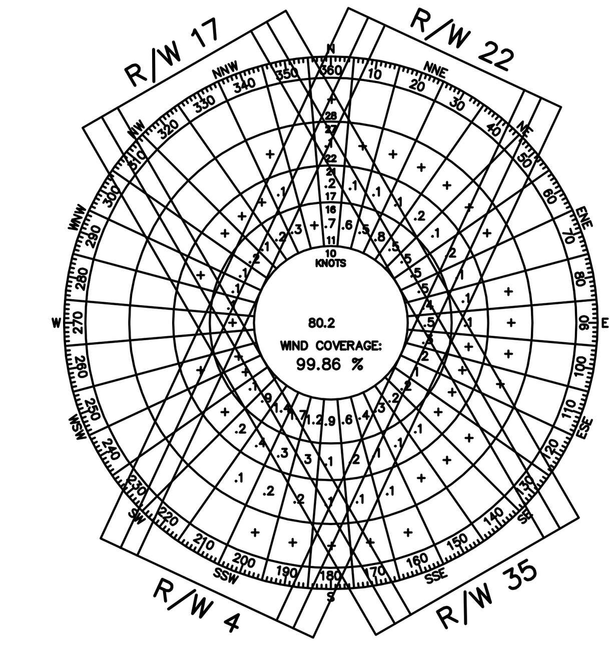


ALL WEATHER WIND COVERAGE

Crosswind Component Knots (MPH)	Runway 04-22	Runway 17-35	Combined Coverage
10.5 (12)	96.06% *	93.57%	99.17%
13 (15)	97.97%	96.94%	99.78%
16 (18)	99.59%	99.23%	99.96%

Station: Bar Harbor, Maine # 72607
Source: National Climatic Data Center
Period of Observations: January 2000 - December 2009
* Overall average. During half of each year (November - May) coverage < 95%.

IFR WEATHER WIND ROSE

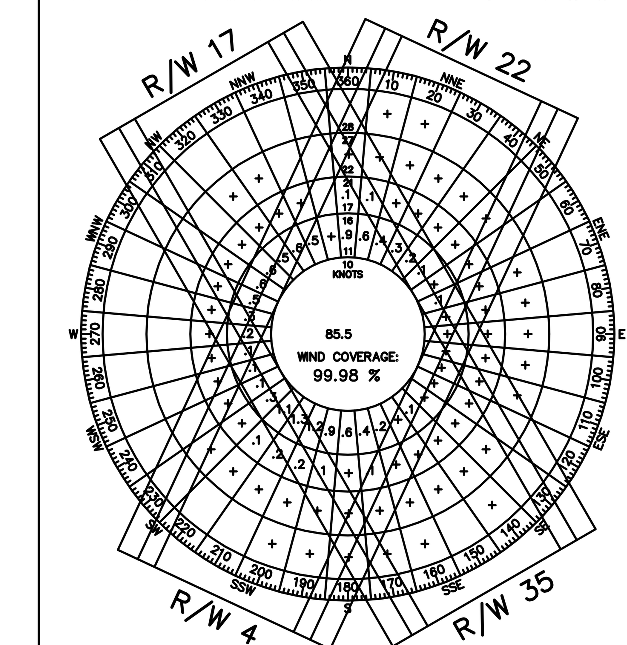


IFR WIND COVERAGE

Crosswind Component Knots (MPH)	Runway 04-22	Runway 17-35	Combined Coverage
10.5 (12)	95.51% *	90.00%	98.33%
13 (15)	97.67%	94.65%	99.45%
16 (18)	99.24%	98.17%	99.86%

Station: Bar Harbor, Maine # 72607
Source: National Climatic Data Center
Period of Observations: January 2000 - December 2009
* Overall average. During half of each year (November - May) coverage < 95%.

VFR WEATHER WIND ROSE



VFR WIND COVERAGE

Crosswind Component Knots (MPH)	Runway 04-22	Runway 17-35	Combined Coverage
10.5 (12)	96.09% *	94.28%	99.31%
13 (15)	97.98%	97.40%	99.83%
16 (18)	99.64%	99.44%	99.98%

Station: Bar Harbor, Maine # 72607
Source: National Climatic Data Center
Period of Observations: January 2000 - December 2009
* Overall average. During half of each year (November - May) coverage < 95%.

AIRPORT ABUTTERS				
MAP	LOT NO.	OWNER	BOOK/PAGE	TOTAL ACRES
11	20	CHARLES STARR	3917/207	2.21
11	72	R.F. & N.P. GAVELEK TRUSTEE	4779/176	22.9
11	73	NARROWS TOO #5038	4167/67	41
15	5	RICHARD HARDING	3741/68	1.17
15	6	BULLDOG REALTY LLC	4842/127	0.00
15	7	GERALD KANE SR.	2489/212	39.50
15	8	LEONA E. KANE	2577/341	1.40
15	9	RDR REALTY LLC	4672/25	1.88
15	10	NORMA M. WENTWORTH	1880/443	2.91
15	11	GRANITE SHOP	4252/116	12.00
15	12	STEPHEN A. THONER	4252/116	1.96
15	13	TOWN OF TRENTON	UNK	UNK
15	13–1	RONALD MURPHY	3182/293	1.86
15	14	BRUCE STAPLES	1457/440	3.10
15	15	CAROLL LELAND	1472/556	41.95
15	16	GAIL LELAND & CAROLL LELAND dba CAROLL'S SUPERMARKET	1462/320	0.46
15	17	CAROLL LELAND	1427/218	5.18
15	18	CARROLL & GAIL LELAND	1253/64	13.25
15	22	CAROLL LELAND	1422/555	1.00
15	23	EDWARD LIBITZKI	1363/77	1.00
15	24	PAUL E. LARSON	3972/335	1.10
15	25	WILLIAM & EUGENIA LABELLE	2665/392	0.94
15	26	DOUGLAS MONSON	1194/104	1.20
15	27	ELLEN JO BROWN	2058/276	0.60
15	28	CAROLL T. LELAND	2321/215	0.50
15	31	TRENTON GRANGE HALL	0/0	1.15
15	201	HANCOCK COUNTY AIRPORT	0/0	229.16
16	1	DONALD STOVER	3607/318	16.00
16	2	ROBERT W. KATES	2633/203	4.82
19	1	JEFFREY A. HOOPER	4035/228	0.70
19	2	JACKIE DAVIDSON	5114/162	0.00
19	3	JACOB SINCLAIR	4637/94	6.80
19	8	BONNIE DAMON ETAL	748/446	2.47
19	9	TOWN OF TRENTON	2754/412	12.00
19	23	KATHERINE BEVERIDGE–TITTERINGTON	5185/229 & 2859/266	0.00
19	23–1	MARK E. DUNBAR	4515/290	1.83
19	25	GARY A. MCDONALD	2855/646	0.00
20	1	HANCOCK COUNTY AIRPORT	1067/421	1.63
20	3	DANIEL E. CUTSHALL	4522/91	5.00
20	6	MARY T.F. BEAUDOIN	2720/10	2.82
20	8	WALTER R. DUNTON, JR.	5030/272	0.00
20	9	ROBERT A. CARTER	4910/217	1.00
20	10	JAMES HODGKINS	893/16	50.00
20	15	JEFFREY HODGKINS	3561/97	2.98
20	16	JEFFREY HODGKINS	3561/97	14.14
20	19	ELLEN W. MCEVLVAIN	2902/649	0.60
20	20	RICHARD & MARGARET DUNN	1435/58	2.70
20	21	VINCENZA JACQUES	1396/316	0.40

NOTES:

INFORMATION PROVIDED BY THE TOWN OF TRENTON ACCORDING TO PROPERTY OWNERSHIP DATA AS OF NOVEMBER 2010

MAP 20, LOT NO. 21, VINCENZA JACQUES, HOLDS AN EXISTING EASEMENT WITH HANCOCK COUNTY, WHICH ALLOWS HIS LEACH FIELD TO BE ON AIRPORT PROPERTY

AVIGATION AND HAZARD EASEMENTS ARE LISTED ON THE EXHIBIT A DRAWING, WHICH IS AVAILABLE IN THE TRENTON TOWN OFFICES OR THE AIRPORT MANAGER'S OFFICE.

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY

PROJECT DESIGNER

Hoyle, Tanner & Associates, Inc.
150 Dow Street
Manchester, NH 03101-1227
Tel 603-669-5555
Fax 603-669-4168
Web Page: www.hoyletanner.com

DES. BY	DR. BY	CHKD. BY
TLM	DWH	ERM

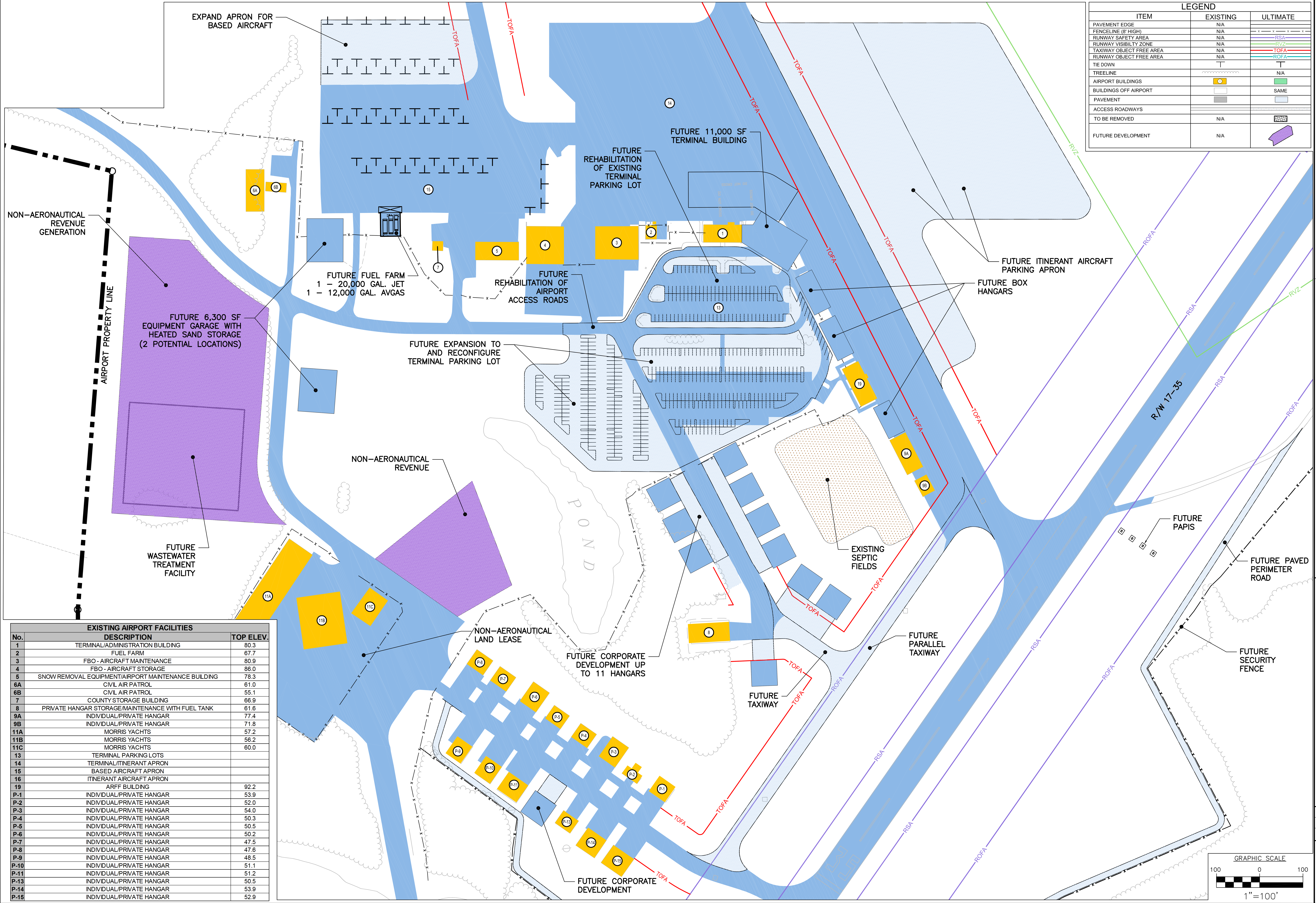
SCALE: AS SHOWN DATE: MAY, 2011

HANCOCK COUNTY, BAR HARBOR AIRPORT
AIRPORT MASTER PLAN UPDATE

ALP (ULTIMATE FACILITIES) DATA SHEET

HTA PROJ. No.: 030340
FILE: BHBDSHT.dwg
AIP No.: AIP3-23-0006-30-2010

DRAWING NO.
5



LEGEND

ITEM	EXISTING	ULTIMATE
PAVEMENT EDGE	N/A	
FENCELINE (8' HIGH)	N/A	
RUNWAY SAFETY AREA	N/A	RSA
RUNWAY VISIBILTY ZONE	N/A	RVZ
TAXIWAY OBJECT FREE AREA	N/A	TOFA
RUNWAY OBJECT FREE AREA	N/A	ROFA
TIE DOWN		
TREELINE		N/A
AIRPORT BUILDINGS		
BUILDINGS OFF AIRPORT		SAME
PAVEMENT		
ACCESS ROADWAYS		
TO BE REMOVED	N/A	
FUTURE DEVELOPMENT	N/A	

EXISTING AIRPORT FACILITIES

No.	DESCRIPTION	TOP ELEV.
1	TERMINAL/ADMINISTRATION BUILDING	80.3
2	FUEL FARM	67.7
3	FBO - AIRCRAFT MAINTENANCE	80.9
4	FBO - AIRCRAFT STORAGE	86.0
5	SNOW REMOVAL EQUIPMENT/AIRPORT MAINTENANCE BUILDING	78.3
6A	CIVIL AIR PATROL	61.0
6B	CIVIL AIR PATROL	55.1
7	COUNTY STORAGE BUILDING	66.9
8	PRIVATE HANGAR STORAGE/MAINTENANCE WITH FUEL TANK	61.6
9A	INDIVIDUAL/PRIVATE HANGAR	77.4
9B	INDIVIDUAL/PRIVATE HANGAR	71.8
11A	MORRIS YACHTS	57.2
11B	MORRIS YACHTS	56.2
11C	MORRIS YACHTS	60.0
13	TERMINAL PARKING LOTS	
14	TERMINAL/ITINERANT APRON	
15	BASED AIRCRAFT APRON	
16	ITINERANT AIRCRAFT APRON	
19	ARFF BUILDING	92.2
P-1	INDIVIDUAL/PRIVATE HANGAR	53.9
P-2	INDIVIDUAL/PRIVATE HANGAR	52.0
P-3	INDIVIDUAL/PRIVATE HANGAR	54.0
P-4	INDIVIDUAL/PRIVATE HANGAR	50.3
P-5	INDIVIDUAL/PRIVATE HANGAR	50.5
P-6	INDIVIDUAL/PRIVATE HANGAR	50.2
P-7	INDIVIDUAL/PRIVATE HANGAR	47.5
P-8	INDIVIDUAL/PRIVATE HANGAR	47.6
P-9	INDIVIDUAL/PRIVATE HANGAR	48.5
P-10	INDIVIDUAL/PRIVATE HANGAR	51.1
P-11	INDIVIDUAL/PRIVATE HANGAR	51.2
P-13	INDIVIDUAL/PRIVATE HANGAR	50.5
P-14	INDIVIDUAL/PRIVATE HANGAR	53.9
P-15	INDIVIDUAL/PRIVATE HANGAR	52.9

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY

PROJECT DESIGNER

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DES. BY	DR. BY	CHKD. BY
TLM	DWH	ERM

SCALE: AS SHOWN DATE: MAY, 2011

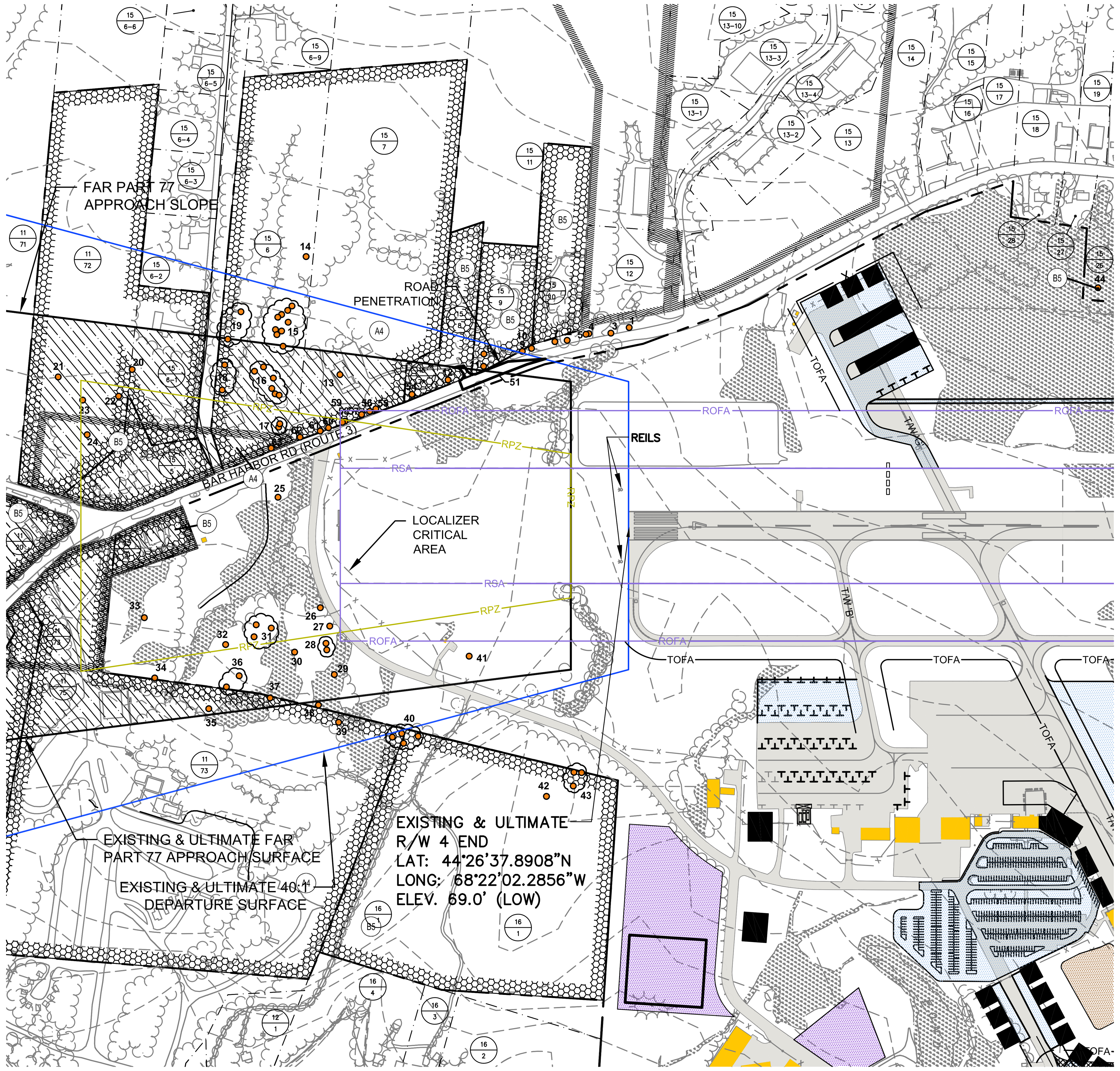
HANCOCK COUNTY, BAR HARBOR AIRPORT
AIRPORT MASTER PLAN UPDATE

TERMINAL AREA PLAN

HTA PROJ. No.: 030340
FILE: BHBCTA01
AIP No.: AIP3–23–0006–30–2010

DRAWING NO.
6

SHEET 6 OF 12



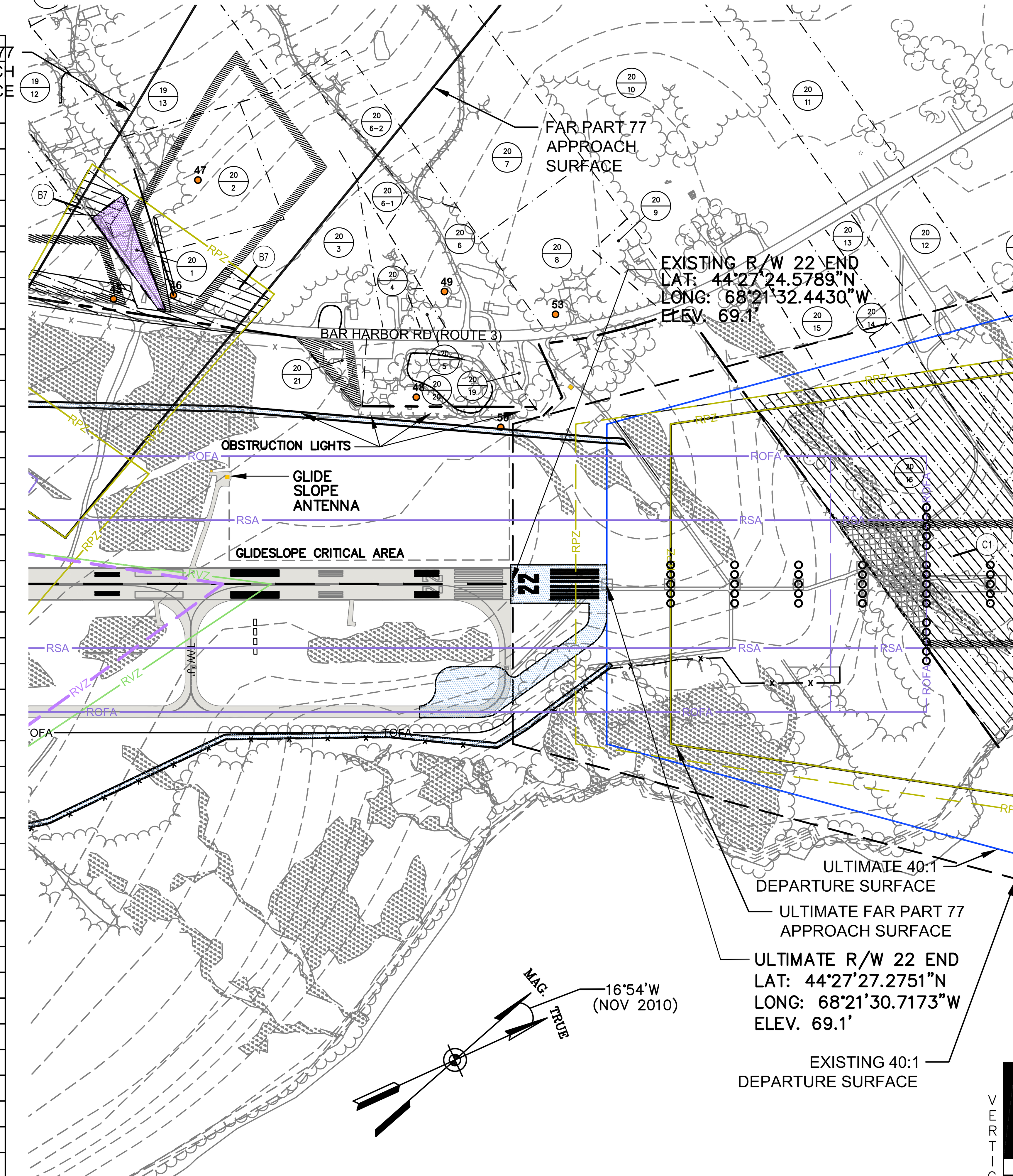
PLAN

SCALE 1"=300'

RUNWAY 4/22 OBSTRUCTION DISPOSITION CHART					
NO.	DESCRIPTION	TOP ELEVATION (MSL)	PART 77 HEIGHT	PENETRATION	DISPOSITION
* 1	UTILITY POLE	106.84	96.02	+10.82	A
2	LARGE TREE	96.36	89.69	+6.68	B
* 3	UTILITY POLE	106.21	93.23	+12.98	A
* 4	UTILITY POLE	103.86	92.97	+10.89	A
* 5	UTILITY POLE	103.86	92.69	+11.17	A
6	LARGE TREE	90.88	86.27	+4.61	A
* 7	UTILITY POLE	104.2	89.65	+14.55	A
* 8	UTILITY POLE	104	87.24	+16.76	A
* 9	UTILITY POLE	103.86	86.14	+17.72	A
* 10	UTILITY POLE	103.85	86.14	+17.71	A
* 11	UTILITY POLE	102.41	80.30	+22.11	A
* 12	UTILITY POLE	102.49	81.60	+20.89	A
13	BUILDING	94.71	92.63	+2.08	A
14	LARGE TREE	145.78	141.70	+4.07	B
15	LARGE TREES	VARIES	98 to 118	+4.6 to +27.2	B
16	LARGE TREES	VARIES	98 to 101	+9.4 to +41	B
17	LARGE TREES	VARIES	98 to 99	+1.2 to +1.9	B
18	LARGE TREES	VARIES	104 to 105	+16.9 to +19.4	B
19	LARGE TREES	VARIES	104 to 117	+0.8 to +12.1	B
20	LARGE TREE	115.59	113.83	+1.75	B
21	LARGE TREE	123.09	121.38	+1.71	B
22	LARGE TREE	120.86	115.22	+5.65	B
23	LARGE TREE	121.25	118.88	+2.36	B
24	LARGE TREE	124.32	118.42	+5.90	B
25	LARGE TREE	104.26	98.95	+5.31	B
26	LARGE TREE	98.87	94.63	+4.24	B
27	LARGE TREE	102.07	93.67	+8.40	B
28	LARGE TREES	VARIES	93 to 95	+11.5 to +12.2	B
29	LARGE TREE	94.87	93.20	+1.67	B
30	LARGE TREE	97.99	97.26	+0.73	B
31	LARGE TREES	VARIES	99 to 102	+7.8 to +12.3	B
32	LARGE TREES	111.46	104.30	+7.16	B
33	LARGE TREE	113.65	112.59	+1.06	B
34	LARGE TREE	114.3	111.53	+2.77	B
35	LARGE TREE	106.9	106.02	+0.88	B
36	LARGE TREES	VARIES	102 to 105	+3.3 to +6.6	B
37	LARGE TREE	102.72	99.75	+2.97	B
38	LARGE TREE	97.06	96.73	+0.33	B
39	LARGE TREE	106.9	104.47	+2.42	B
40	LARGE TREES	VARIES	107 to 113	+2.8 to +7.4	B
41	UTILITY POLE	79.45	79.45	+0.60	E
42	LARGE TREE	133.77	132.89	+0.88	B
43	LARGE TREES	VARIES	119 to 127	+8.5 to +20.2	B
44	TREE	158	115.60	42.4	B
45	TREE	148	113.40	34.6	C
46	TREE	146	119.30	26.7	C
47	TREE	162	136.20	25.8	C
48	TREE	129	81.10	47.9	D
49	TREE	144.2	128.30	15.9	D
50	TREE	108	69.10	38.9	C (ON AIRPORT)
51	ROADWAY	VARIES	76.28 TO 81.68	0 TO 4.52	D
53	TREE	136	125.00	11	D
* 54	UTILITY POLE	101.36	85.28	+16.08	A
* 55	UTILITY POLE	101.46	88.97	+12.49	A
* 56	UTILITY POLE	101.68	89.60	+12.08	A
* 57	UTILITY POLE	101.42	90.42	+11.00	A
* 58	UTILITY POLE	100.89	92.11	+8.78	A
* 59	UTILITY POLE	100.74	92.38	+8.36	A
* 60	UTILITY POLE	101.77	93.80	+7.97	A
* 61	UTILITY POLE	101.05	94.65	+6.40	A
* 62	UTILITY POLE	99.98	96.70	+3.28	A
* 63	UTILITY POLE	100.07	99.66	+0.41	A

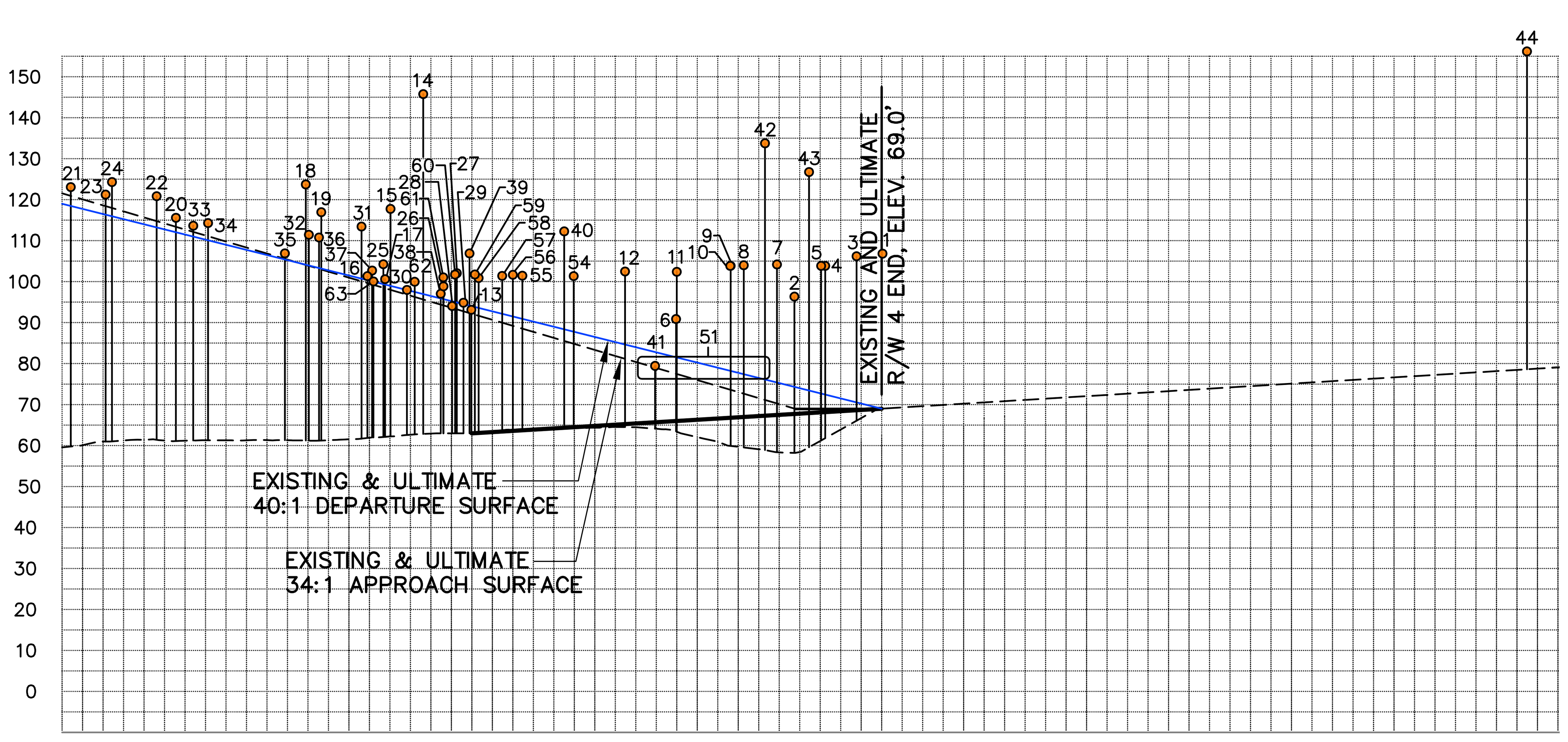
DISPOSITION LEGEND	
A	INSTALL OBSTRUCTION LIGHT
B	OBTAIN EASEMENT / CLEAR TREES
C	CLEAR TREE
D	NO ACTION REQUIRED (PROTECTED BY OBSTRUCTION LIGHTS)
E	NO ACTION REQUIRED

NOTE: NUMBERS MARKED WITH '*' ARE PROPOSED MDOT UTILITY POLES WITH OBSTRUCTION LIGHTS



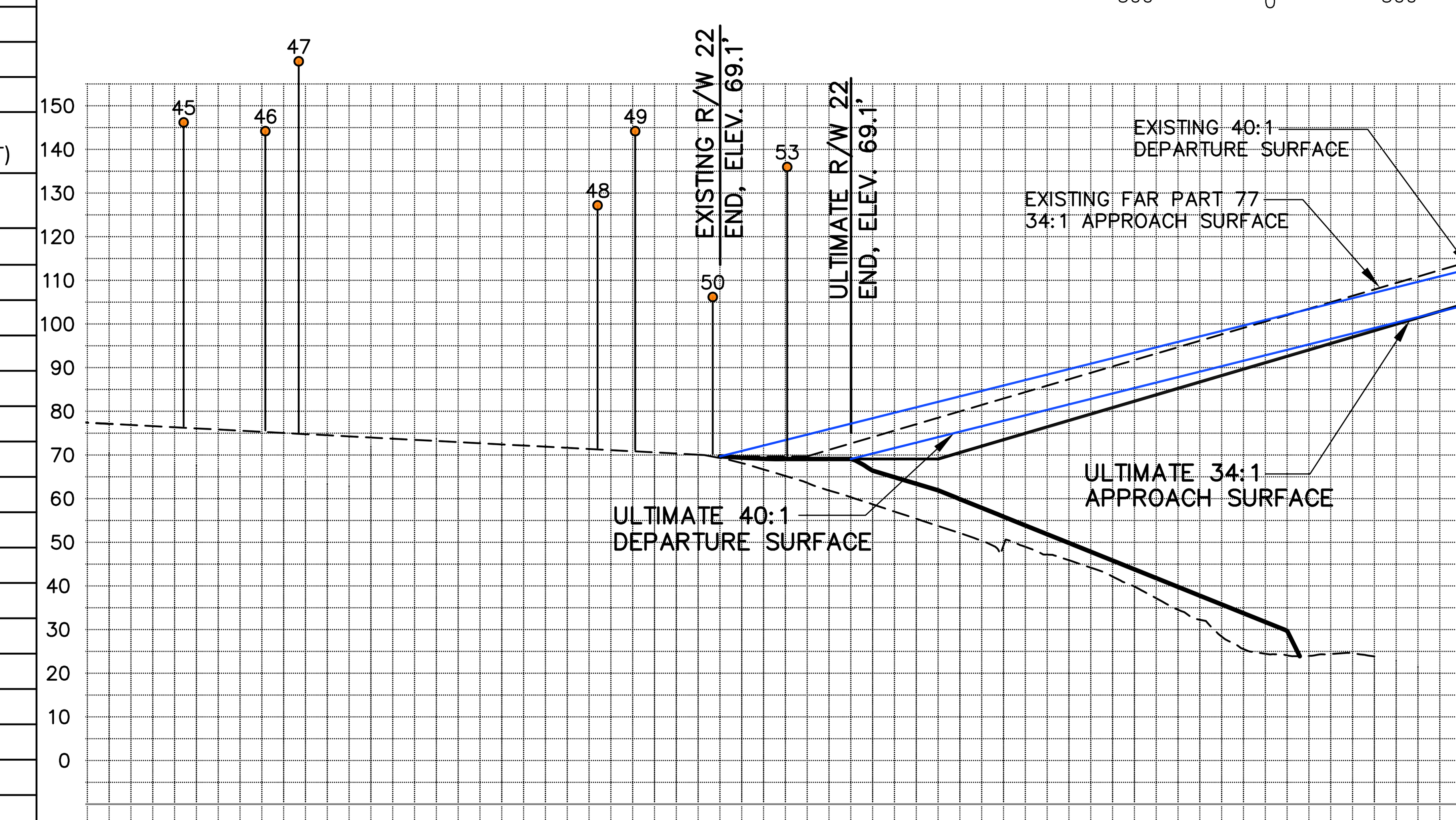
PLAN

SCALE 1"=300'



PROFILE

HORIZONTAL SCALE 1"=300'
VERTICAL SCALE 1"=30'



PROFILE

HORIZONTAL SCALE 1"=300'
VERTICAL SCALE 1"=30'

REV. NO.	DATE	DESCRIPTION	BY

REVISIONS

150 Dow Street
Manchester, NH 03101-1227
Tel 603-669-5555
Fax 603-669-4168
Web Page: www.hoyletanner.com

DES. BY	DR. BY	CHKD. BY
TLM	DWH	ERM

PROJECT DESIGNER
Hoyle, Tanner & Associates, Inc.

SCALE: AS SHOWN DATE: MAY, 2011

HANCOCK COUNTY, BAR HARBOR AIRPORT
AIRPORT MASTER PLAN UPDATE

RUNWAY 4-22 PLAN AND PROFILE

HTA PROJ. No.: 030340
FILE: BHBPLPR4-22
AIP No.: AIP3-23-0006-30-2010

DRAWING NO.
7

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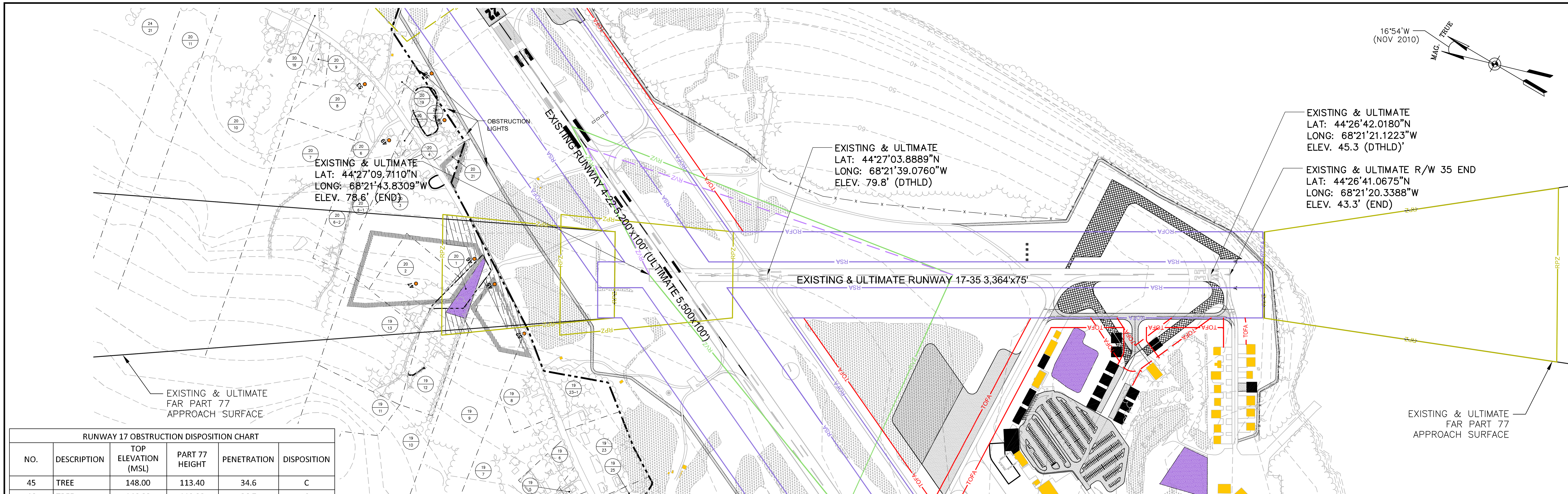
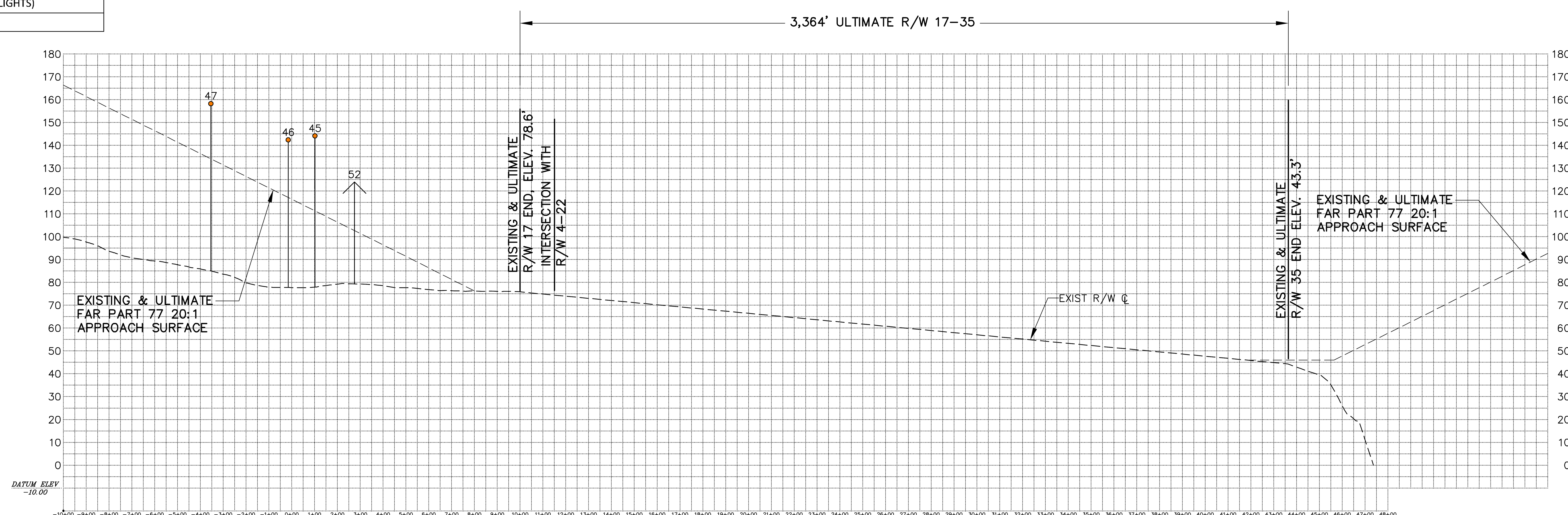


RUNWAY 17 OBSTRUCTION DISPOSITION CHART					
NO.	DESCRIPTION	TOP ELEVATION (MSL)	PART 77 HEIGHT	PENETRATION	DISPOSITION
45	TREE	148.00	113.40	34.6	C
46	TREE	146.00	119.30	26.7	C
47	TREE	162.00	136.20	25.8	C
52	ROADWAY	109.00	110.60	13.4	E

DISPOSITION LEGEND	
A	INSTALL OBSTRUCTION LIGHT
B	OBTAIN EASEMENT / CLEAR TREES
C	CLEAR TREE
D	NO ACTION REQUIRED (PROTECTED BY OBSTRUCTION LIGHTS)
E	NO ACTION REQUIRED

PLAN

SCALE 1"=300'



PROFILE

HORIZONTAL SCALE 1"=300'
VERTICAL SCALE 1"=30'

HORIZONTAL 300 0 300
VERTICAL 30 0 -30

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY

150 Dow Street
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Fax 603-669-4168
Web Page: www.hoyletanner.com

DES. BY	DR. BY	CHKD. BY
TLM	DWH	ERM

PROJECT DESIGNER
Hoyle, Tanner & Associates, Inc.

SCALE: AS SHOWN DATE: MAY, 2011

HANCOCK COUNTY, BAR HARBOR AIRPORT
AIRPORT MASTER PLAN UPDATE

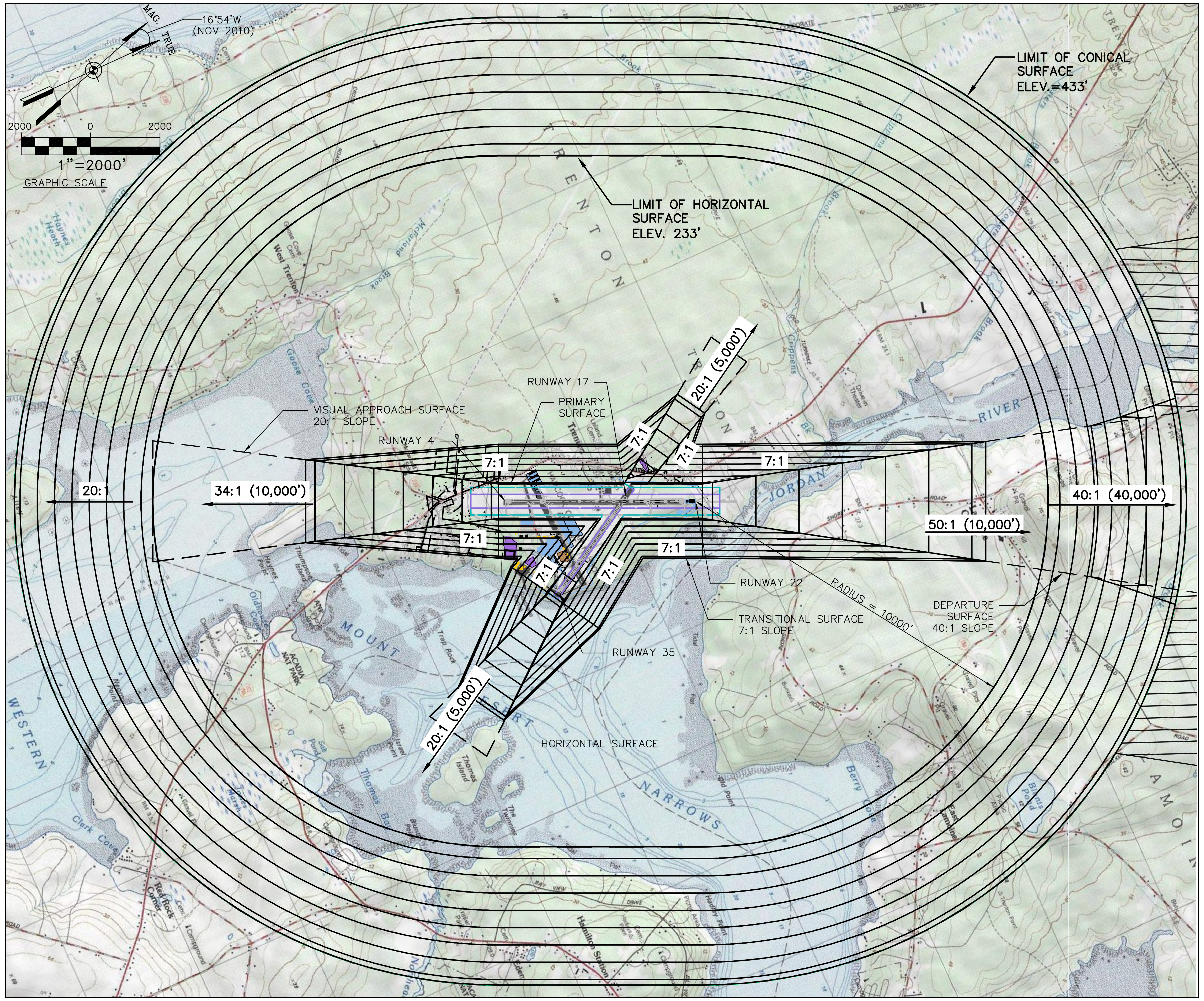
RUNWAY 17-35 PLAN AND PROFILE

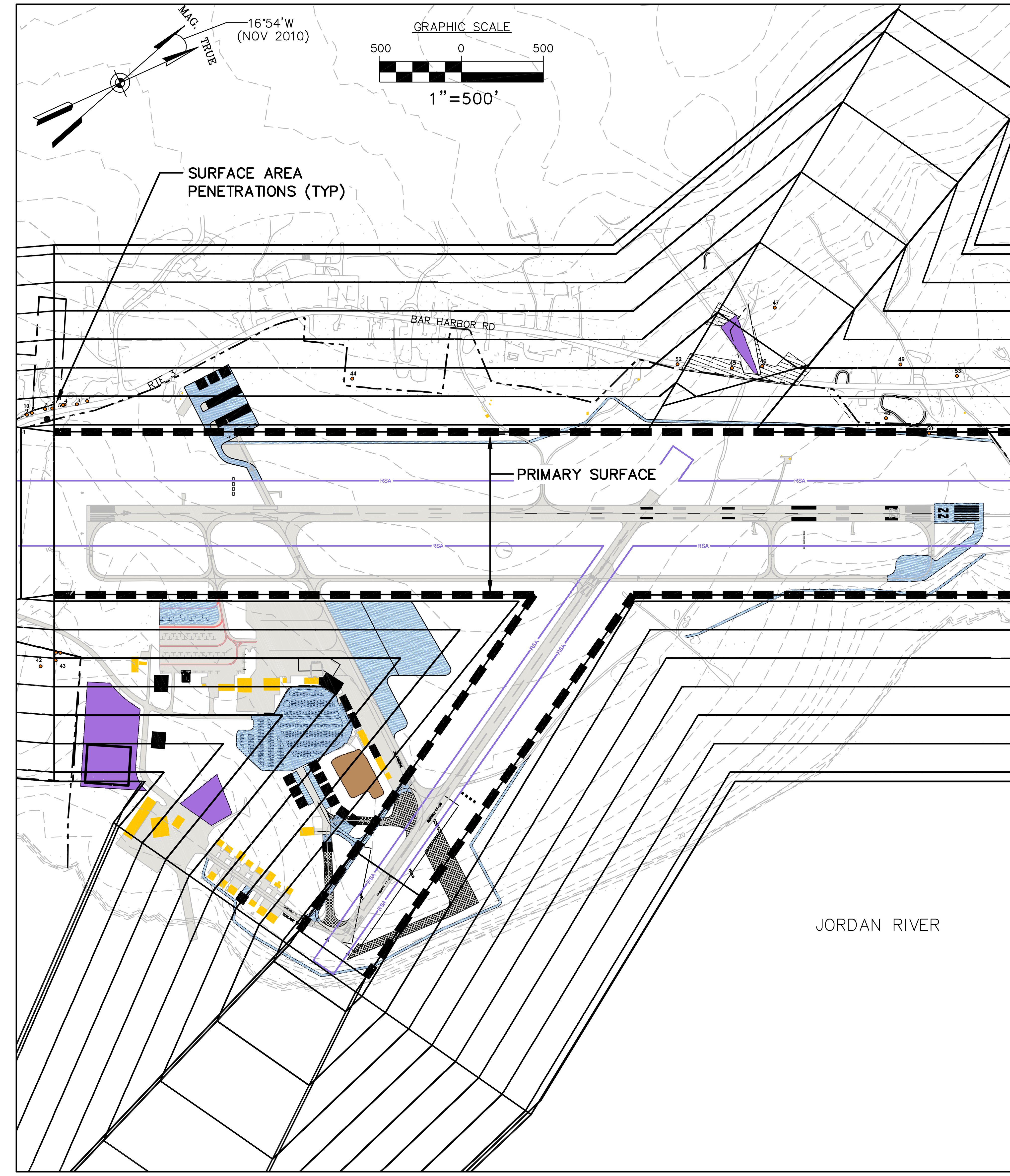
HTA PROJ. No.: 030340
FILE: BHBPLPR17-35
AIP No.: AIP3-23-0006-30-2010

DRAWING NO.
8

SHEET 8 OF 12

Drawing name: H:\030340\dwg\Master Plan\BHBPLPR17-35.dwg Jul 18, 2011 - 4:51pm





Existing and Future Part 77 Airspace Surfaces: Hancock County, Bar Harbor Airport (1)								
Airport Data	**Existing Runway 04**	**Ultimate Runway 04**	**Existing Runway 22**	**Ultimate Runway 22**	**Existing Runway 17**	**Ultimate Runway 17**	**Existing Runway 35**	**Ultimate Runway 35**
Classification	Non-precision	Same	Precision	Same	Visual - Utility	Same	Visual - Utility	Non-precision - Utility
Approach	Non-precision	Same	Precision	Same	Visual	Same	Visual	Non-precision
Visibility Minimums	1 mile	Same	3/4 mile	3/4 mile	1 mile	Same	1 mile	Same
Airport Elevation (feet, MSL)	83							
Airport Imaginary Surface	**Existing Runway 04**	**Future Runway 04**	**Existing Runway 22**	**Future Runway 22**	**Existing Runway 17**	**Future Runway 17**	**Existing Runway 35**	**Future Runway 35**
Horizontal Surface:								
Horizontal Surface Elevation (feet, MSL)	233							
Horizontal Surface Radius	10,000	Same	10,000	Same	5,000	Same	5,000	Same
Conical Surface:								
Conical Surface Elevation (feet, MSL)	433							
Horizontal Distance	4,000							
Slope	20:1							
Primary Surface:								
Length beyond runway end	200	Same	200	Same	200	Same	200	Same
Width	1,000 (2)	Same	1,000 (2)	Same	250	500 (3)	250	500 (3)
Approach Surface:								
Horizontal Distance	10,000	Same	10,000 and 40,000 (4)	Same	5,000	Same	5,000	Same
Inner Edge Width	1,000	Same	1,000	Same	250	500	250	500
Outer Edge Width	3,500	Same	16,000	Same	1,250	Same	1,250	2,000
Slope	34:1	Same	34:1 (4)	Same	20:1	Same	20:1	Same
Transitional Surfaces:	7:1	Same	7:1	Same	7:1	Same	7:1	Same

SOURCE: U.S. Department of Transportation, Federal Aviation Administration, Federal Aviation Regulation Part 77 – Objects Affecting Navigable Airspace, U.S. Government Printing Office, Washington, DC, 1975, pp. 6 – 7.

NOTES:

(1) Dimensions are in feet unless otherwise noted

(2) The width of the primary surface of a runway is the width prescribed for the most precise approach for either end of that runway; therefore, the precision approach to Runway 22 also determines the primary surface width of 1,000 feet for Runway 04.

(3) Parallel to note number 2, the most precise approach for either end of Runway 17-35 in the future is that of a non-precision approach to Runway 35; therefore, the non-precision approach to Runway 35 determines the primary surface width of 500 feet for Runway 17.

(4) FAR Part 77's approach surface standards require a horizontal distance of 10,000 feet at a slope of 50 (horizontally) to 1 (vertically) with an additional 40,000 feet at a slope of 40 (horizontally) to 1 (vertically) for all precision instrument runways, such as Runway 22, a precision instrument approach runway with 3/4 mile visibility minimums. However, other operational surfaces, such as TERPS only require a 34:1 approach surface.

Credit: USA Topo Maps, integrated from ESRI Basemap Server, credit provided below under terms of use:

This map presents land cover imagery for the world and detailed topographic maps for the United States. The map includes the National Park Service (NPS) Natural Earth physical map at 1.24km per pixel for the world at small scales, i-cubed eTOPO 1:250,000-scale maps for the contiguous United States at medium scales, and National Geographic TOPO! 1:100,000 and 1:24,000-scale maps (1:250,000 and 1:63,000 in Alaska) for the United States at large scales. The TOPO! maps are seamless, scanned images of United States Geological Survey (USGS) paper topographic maps. For more information on this map, visit us online at http://goto.arcgisonline.com/maps/USA_Topo_Maps

LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	CONICAL SURFACE		APPROACH SURFACE ABOVE HORIZONTAL SURFACE ELEVATION
	HORIZONTAL SURFACE		
150	SURFACE ELEVATION CONTOUR		APPROACH SURFACE
	EXISTING CONTOUR		SURFACE PENETRATIONS (TREES)
	PRIMARY SURFACE		SURFACE PENETRATIONS (POLES)

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY

PROJECT DESIGNER

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Tel 603-669-5555
Fax 603-669-4168
Web Page: www.hoyletanner.com

DES. BY TLM | DR. BY DWH | CHKD. BY ERM

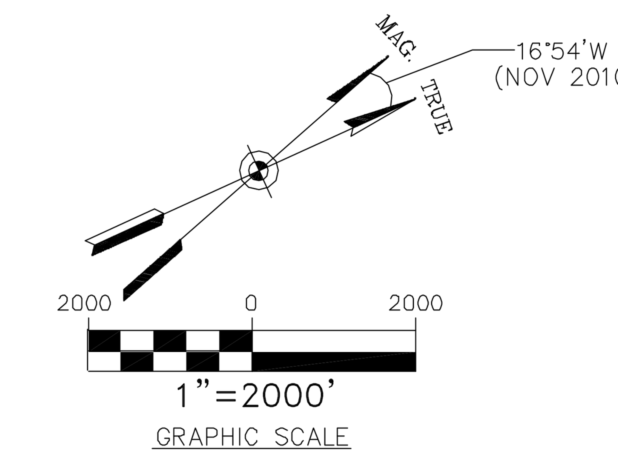
SCALE: AS SHOWN | DATE: MAY, 2011

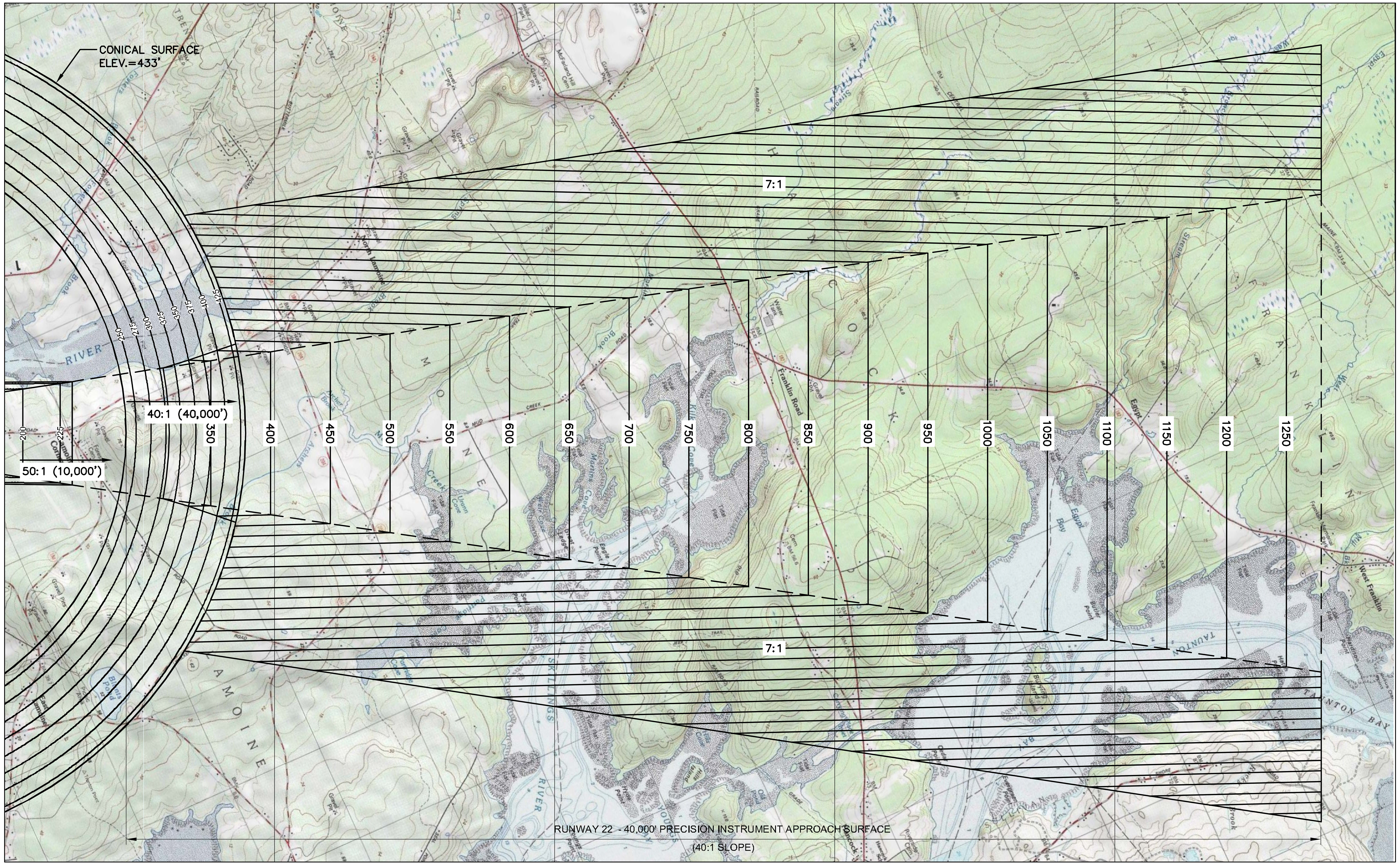
HANCOCK COUNTY, BAR HARBOR AIRPORT
AIRPORT MASTER PLAN UPDATE

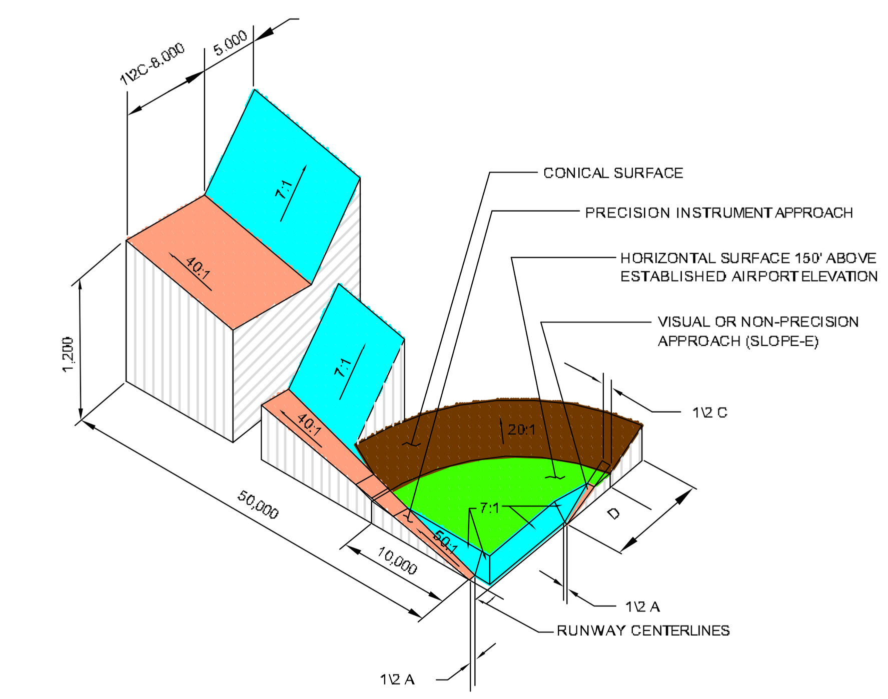
FAR PART 77 AIRSPACE SURFACES

HTA PROJ. No.: 030340
FILE: BHBP77
AIP No.: AIP3-23-0006-30-2010

DRAWING NO. 9







SECTION A-A

PART 77 ISOMETRIC

Credit: USA Topo Maps, integrated from ESRI Basemap Server, credit provided below under terms of use:

This map presents land cover imagery for the world and detailed topographic maps for the United States. The map includes the National Park Service (NPS) Natural Earth physical map at 1.24km per pixel for the world at small scales, i-cubed eTOPO 1:250,000-scale maps for the contiguous United States at medium scales, and National Geographic TOPO! 1:100,000 and 1:24,000-scale maps (1:250,000 and 1:63,000 in Alaska) for the United States at large scales. The TOPO! maps are seamless, scanned images of United States Geological Survey (USGS) paper topographic maps. For more information on this map, visit us online at
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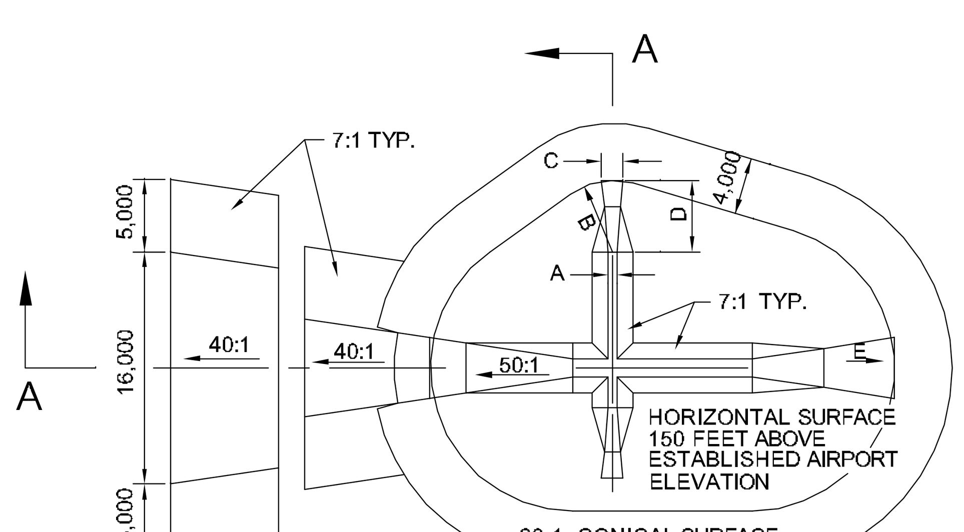

DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B		
					C	D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
		A	B	A	B		
					C	D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A- UTILITY RUNWAYS
B- RUNWAYS LARGER THAN UTILITY
C- VISIBILITY MINIMUMS GREATER THAN 3\4 MILE
D- VISIBILITY MINIMUMS AS LOW AS 3\4 MILE
* PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET

Source: FAA AC 150/5300-13

Note: See Sheet 3: Airport Layout Plan depicting modification to standard for approach surface slopes.

LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	CONICAL SURFACE		APPROACH SURFACE ABOVE HORIZONTAL SURFACE ELEVATION
	HORIZONTAL SURFACE		
150	SURFACE ELEVATION CONTOUR		APPROACH SURFACE
	EXISTING CONTOUR		SURFACE PENETRATIONS (TREES)
	PRIMARY SURFACE		SURFACE PENETRATIONS (POLES)

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY

PROJECT DESIGNER

Hoyle, Tanner & Associates, Inc.

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Tel 603-669-5555
Fax 603-669-4168
Web Page: www.hoyletanner.com

DES. BY	DR. BY	CHKD. BY
TLM	DWH	ERM

SCALE: AS SHOWN DATE: MAY, 2011

HANCOCK COUNTY, BAR HARBOR AIRPORT
AIRPORT MASTER PLAN UPDATE

FAR PART 77 AIRSPACE SURFACES SHEET 2 OF 2

HTA PROJ. No.: 030340

FILE: BHBP77

AIP No.: AIP3-23-0006-30-2010

DRAWING NO.

10

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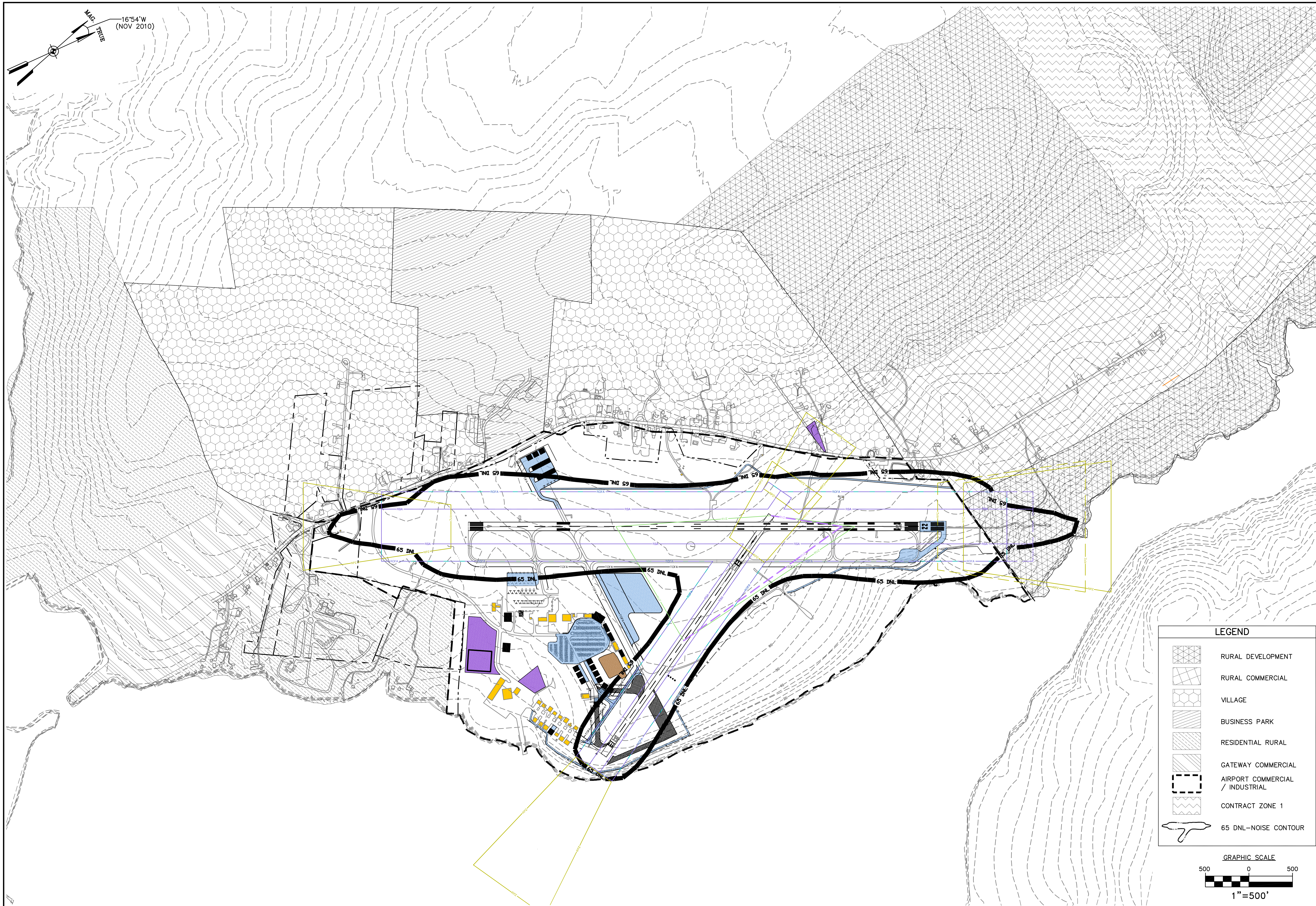

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY

PROJECT DESIGNER
Hoyle, Tanner & Associates, Inc.

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Manchester, NH 03101-1227
Tel 603-669-5555
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Web Page: www.hoyletanner.com

DES. BY	DR. BY	CHKD. BY
TLM	DWH	ERM

SCALE: AS SHOWN | DATE: MAY, 2011

HANCOCK COUNTY, BAR HARBOR AIRPORT
AIRPORT MASTER PLAN UPDATE

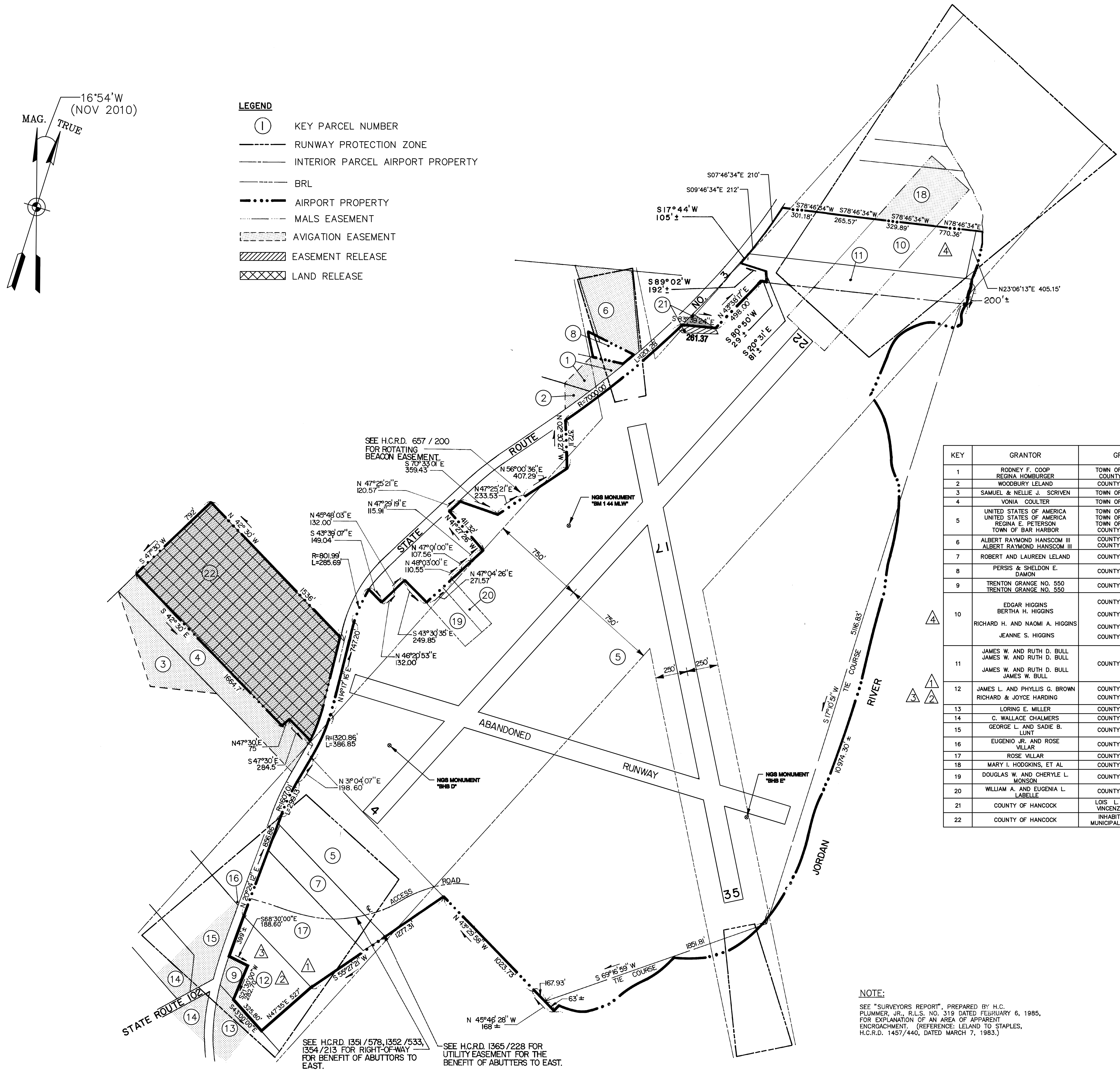
LAND USE AREA ZONING AND NOISE CONTOUR PLAN

HTA PROJ. No.: 030340
FILE: BHBLNDUSE
AIP No.: AIP3-23-0006-30-2010

DRAWING NO.
11

SHEET 11 OF 12

NCGS MONUMENT DATA					
IDENTIFIER	SURVEY STATION NAME	PACS OR SACS	LATITUDE	LONGITUDE	ELEVATION
"BM 1 44 MLW"	NGS PID-AB2639	PACS	44°27'05.33964"	068°21'51.19306"	89.7
"BHB D"	NGS PID-AB2640	SACS	44°26'44.53962"	068°22'02.72949"	72.6
"BHB E"	NGS PID-AB2641	SACS	44°26'47.62969"	068°21'22.82233"	51.7
SOURCE: NATIONAL GEODETIC SURVEY, NAD 83 (2007), NAVD 88.					



NOTE:

SEE "SURVEYORS REPORT", PREPARED BY H.C. PLUMMER, JR., R.L.S. NO. 319 DATED FEBRUARY 6, 1985, FOR EXPLANATION OF AN AREA OF APPARENT ENCROACHMENT. (REFERENCE: LELAND TO STAPLES, H.C.R.D. 1457/440, DATED MARCH 7, 1983.)

KEY	GRANTOR	GRANTEE	INST.	ACRES	H.C.R.D. BK/PG	DATE	FAA PROJECT NUMBER	REMARKS
1	RODNEY F. COOP REGINA HOMBURGER	TOWN OF BAR HARBOR COUNTY OF HANCOCK	EASEMENT EASEMENT		687/401 1100/187	8/1/42 4/14/70	89-17-018-02	CLEARING & AVIGATION AVIGATION ONLY
2	WOODBURY LELAND	COUNTY OF HANCOCK	EASEMENT	0.75	687/402	8/1/42		CLEARING AVIGATION
3	SAMUEL & NELLIE J. SCRIVEN	TOWN OF BAR HARBOR	EASEMENT	2.12	694/506	10/22/43	9-17-018-0701	CLEARING AVIGATION
4	VONIA COULTER	TOWN OF BAR HARBOR	EASEMENT		694/508	2/25/44	9-17-018-0701	CLEARING AVIGATION
5	UNITED STATES OF AMERICA UNITED STATES OF AMERICA REGINA E. PETERSON TOWN OF BAR HARBOR	TOWN OF BAR HARBOR TOWN OF BAR HARBOR TOWN OF BAR HARBOR COUNTY OF HANCOCK	AGREE AGREE FEE FEE	NOT GIVEN NOT GIVEN NOT GIVEN	714/247 723/58 800/239 975/98	11/20/47 6/22/48 5/1/57 3/20/62	FAAP 9-17-018-0701	SUPPLEMENTAL TRACTS 1-17
6	ALBERT RAYMOND HANSCOM III ALBERT RAYMOND HANSCOM III	COUNTY OF HANCOCK COUNTY OF HANCOCK	EASEMENT EASEMENT		1079/736 1100/188	2/1/62 4/14/70	ADAP 71-1-8-23-0006-01-71	CLEARING AVIGATION
7	ROBERT AND LAUREEN LELAND	COUNTY OF HANCOCK	FEE	5	1068/299	7/19/68	FAAP 9-17-018-C803	SUPERCEDES EASEMENT TO EVALINA WALKER
8	PERSIS & SHELDON E. DAMON	COUNTY OF HANCOCK	FEE	71,053 SF.	1067/421	9/13/68	ADAP 6-23-0006-01	
9	TRENTON GRANGE NO. 550 TRENTON GRANGE NO. 550	COUNTY OF HANCOCK	EASEMENT		1089/197 1110/193	11/25/69 4/14/70	FAAP 9-17-018-C803 FAAP 9-17-018-C803	CLEARING, AVIGATION & ROW AVIGATION
4 10	EDGAR HIGGINS BERTHA H. HIGGINS RICHARD H. AND NAOMI A. HIGGINS JEANNE S. HIGGINS	COUNTY OF HANCOCK COUNTY OF HANCOCK COUNTY OF HANCOCK COUNTY OF HANCOCK	EASEMENT EASEMENT EASEMENT FEE	5	1110/186 1221/202 1452/496 5240/155	4/14/70 6/26/75 12/13/82 6/25/09	FAAP 9-17-018-C803 ADAP 6-23-0006-07 A.I.P. NO. 3-25-0006-28	AVIGATION CLEARING, AIRSPACE, APPROACH LIGHTS RIGHT OF WAY, UTILITIES AVIGATION & ROW
11	JAMES W. AND RUTH D. BULL JAMES W. AND RUTH D. BULL JAMES W. AND RUTH D. BULL JAMES W. BULL	COUNTY OF HANCOCK	EASEMENT EASEMENT EASEMENT FEE	2.5 7.5 7.5	1110/185 1227/295 1452/31 2297/315	4/14/70 7/15/75 12/1/82 8/12/94	FAAP 9-17-018-C803 ADAP 6-23-0006-07 A.I.P. NO. 3-25-0006-07	AVIGATION AIRSPACE, APPROACH LIGHTS RIGHT OF WAY, UTILITIES , CLEARING
1 3 2 12	JAMES L. AND PHYLLIS G. BROWN RICHARD & JOYCE HARDING	COUNTY OF HANCOCK COUNTY OF HANCOCK	EASEMENT FEE	7.09 ac	1110/192 4797/168-169	4/14/70 6/29/07	FAAP 9-17-018-C803 A.I.P. NO. 3-25-0006-21	AVIGATION
13	LORING E. MILLER	COUNTY OF HANCOCK	EASEMENT		1110/195	4/14/70	FAAP 9-17-018-C803	AVIGATION
14	C. WALLACE CHALMERS	COUNTY OF HANCOCK	EASEMENT		1110/196	4/14/70	FAAP 9-17-018-C803	AVIGATION
15	GEORGE L. AND SADIE B. LUNT	COUNTY OF HANCOCK	EASEMENT		1110/194	4/14/70	FAAP 9-17-018-C803	AVIGATION
16	EUGENIO JR. AND ROSE VILLAR	COUNTY OF HANCOCK	EASEMENT		1110/190	4/14/70	FAAP 9-17-018-C803	AVIGATION
17	ROSE VILLAR	COUNTY OF HANCOCK	FEE	12.02	1164/276	3/26/73	FAAP 9-17-018-C803	
18	MARY I. HODGKINS, ET AL	COUNTY OF HANCOCK	EASEMENT	4.98 ac	1221/215	6/27/75	FAAP 9-17-018-C803	AIRSPACE, APPROACH LIGHTS, ROW
19	DOUGLAS W. AND CHERYLE L. MONSON	COUNTY OF HANCOCK	FEE	1.74	1364/281	11/7/79	ADAP 6-23-0006-06	
20	WILLIAM A. AND EUGENIA L. LABELLE	COUNTY OF HANCOCK	FEE	1.11	1364/283	11/8/79	ADAP 6-23-0006-06	
21	COUNTY OF HANCOCK	LOIS L. JACQUES AND VINCENZA L. JACQUES	EASEMENT	0.36	2695/454	9/9/97		EASEMENT RELEASE SWAP FOR AVIGATION EASEMENT
22	COUNTY OF HANCOCK	INHABITANTS OF THE MUNICIPALITY OF TRENTON	FEE	29+	2734/74	5/9/98		FAA APPROVAL 3/25/98 AVIGATION EASEMENT RETAINED

EXHIBIT "A"

HANCOCK COUNTY
BAR HARBOR AIRPORT
TRENTON, MAINE

SCALE: 1" = 400'

SEPT. 2, 2003

GRAPHIC SCALE

400' 200' 0 400' 800' 1200'

EXHIBIT-A.DWG

4	8/04/09	ACQUIRE HIGGINS		JLC	KJF
3	7/16/08	ACQUIRE HARDING		JLC	KJF
2	6/13/06	UPDATE KEY 12 to HARDING		JLC	KJF
1	4/25/06	UPDATE BROWN PROPERTY KEY 12		JLC	KJF
REV	DATE	DESCRIPTION	C/O	DR	CK

THOMAS F. MORAN INC. surveyors civil engineers land planners

AN HTA COMPANY

Hoyle, Tanner & Associates, Inc.

Five Commerce Park North · Bedford, NH 03102 · (603) 669-5555

HTA Companies engineers architects planners surveyors

FILE	SIZE	TYPE	ALT	REV	
45803.01	D	BD			SHEET 1 OF 1

Drawing name: exhibit-a.DWG